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California's Colorado River Water Use Plan

This is a working draft of California's Colorado River Water Use Plan. It is subject to further editing and revisions based on additional information, comments received and ongoing associated environmental reviews of Plan components. The draft Plan will be finalized following completion of the environmental reviews and the subsequent execution of agreements associated with the Plan which are scheduled to occur before the end of January 2001.

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CALIFORNIA'S

COLORADO RIVER WATER USE PLAN

COLORADO RIVER BOARD OF CALIFORNIA
THE RESOURCES AGENCY
STATE OF CALIFORNIA

CALIFORNIA'S COLORADO RIVER WATER USE PLAN

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GLOSSARY

Term	Description
1990 CAA	Federal Clean Air Act Amendments of 1990
af	acre-feet
Agricultural Water Suppliers Efficient Water Management Practices Act of 1990	Main goal of this Act is to further improve agricultural water use efficiency. Under this Act, agricultural water suppliers are to voluntarily prepare and submit Water Management Plans to the Agricultural Water Management Council for approval
AOP	Annual Operating Plan
Article 3(e) of 1922 Compact	Provides that the Upper Division states are not to withhold water and the Lower Division states are not to require the delivery of water which cannot reasonably be applied to domestic and agricultural uses
Authority	Salton Sea Authority
AWBA	Arizona Water Banking Authority
Arizona Water Bank	Interstate program which facilitates water transfers on a state-to-state basis
BLM	Bureau of Land Management
BMP	Best Management Practices (regarding Urban Water Conservation in California)
BO	Biological Opinion
Boulder Canyon Project Act	Effective June 25, 1929, authorized construction of Hoover Dam and the All American Canal and requires contracts with the Secretary of the Interior for use of water stored in Lake Mead
Board	Colorado River Board of California
CAA	Federal Clean Air Act of 1969
CAAQS	California Ambient Air Quality Standards
CAP	Central Arizona Project
CAWCD	Central Arizona Water Conservation District
CEF	Consideration of Environmental Factors
cfs	cubic feet per second

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Term	Description
COE	United States Army Corps of Engineers
California's Colorado River Water Use Plan	California's diverse collection of policies, programs, projects, actions, and other activities, which deal with safeguarding, protecting, and optimizing its Colorado River resources
Consuming entity	One that has authority under the laws of that state to enter into an agreement and acquire the right to use Intentionally Created Unused Apportionment
Council	Agricultural Water Management Council
CRSS	Colorado River Simulation System
CVWD	Coachella Valley Water District
Decree	1964 United States Supreme Court Decree in *Arizona v. California*
DOF	California Department of Finance
DWA	Desert Water Agency
EIR	Environmental Impact Report
EPA	United States Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
ESA	Endangered Species Act
EWMPs	Efficient Water Management Practices
FAIRA	Federal Agricultural Improvement and Reform Act
Final Rule	Establishes a framework for the Secretary to follow in considering, participating in and administering storage and interstate release agreements among entities in Arizona, California, and Nevada, along with other provisions. The Department of the Interior's stated intent for the rule is to increase the efficiency, flexibility and certainty in Colorado River management.
Forum	Colorado River Basin Salinity Control Forum
HCP	Habitat Conservation Plan
ICUA	Intentionally Created Unused Apportionment
IAWP	Interim Agricultural Water Program

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Term	Description
ICAPCD	Imperial County Air Pollution Control District
IID	Imperial Irrigation District
IRP	Integrated Resources Plan (Metropolitan Water District of Southern California, 1996)
Key Terms	Key Terms for Quantification Settlement Among the State of California, Imperial Irrigation District, Coachella Valley Water District, and The Metropolitan Water District of Southern California, dated October 15, 1999
"The Law of the River"	Body of interstate compacts, federal laws, water contracts, state laws, agreements, a treaty and other agreements with Mexico, Supreme Court decrees and federal and state administrative actions. They control River operations and the rights and priorities to use Colorado River water
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
Lower Colorado Water Supply Project	Established water supply for federal lands in California and California entities and individuals along the River with inadequate and/or no Colorado River water rights
LUDE	Land Use Distribution Element
MODE	Main Outlet Drain Extension
MDAQMD	Mojave Desert Air Quality Management District
MOU	Memorandum of Understanding regarding Efficient Water Management Practices
MWD	The Metropolitan Water District of Southern California
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO_x	nitrous oxides
NPDES	National Pollutant Discharge Elimination System, from the Clean Water Act of 1977
O_3	Ozone
Operating Criteria	Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs

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Term	Description
PM_{10}	particulate matter less than 10 microns in diameter
Present Perfected Rights	Early Colorado River diversion rights existing as of June 25, 1929, the effective date of the Boulder Canyon Project Act
PRPU	Protective and Regulatory Pumping Unit
"Put and Take " Programs	Water is placed (put) into conjunctive use and storage programs, and stored Colorado River water and indigenous groundwater is withdrawn (take) to meet needs later in time
PVID	Palo Verde Irrigation District
RMPs	Resource Management Plans
Quantification Settlement Agreement	The agreement between Imperial Irrigation District, Coachella Valley Water District and The Metropolitan Water District of Southern California dated _____, 2000 settling certain disputes related to Colorado River water rights and uses, and establishing water budgets for each agency during the duration of the settlement
RCPG	Regional Comprehensive Plan and Guide
the River	The Colorado River
ROD	Record of Decision
RPAs	Reasonable and Prudent Alternatives
RTP	Regional Transportation Plan
San Luis Rey Indian Water Rights Settlement Act of 1988	Title I of Public Law 100-675, enacted to provide for the settlement of the reserved water rights claims of the La Jolla, Rincon, San Pasqual, Pauma, & Pala Bands of Mission Indians
SB 1765	Senate Bill 1765 established the Colorado River Management Program, which appropriated $235 million from the General Fund to assist with the implementation of California's Colorado River Water Use Plan
SCAG	Southern California Association of Governments
SDCWA	San Diego County Water Authority
Sea	Salton Sea

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Term	Description
SEAs	Significant Ecological Areas
Secretary	Secretary of the Interior
Seven-Party Agreement	A 1931 agreement which sets priorities among signatory agencies relative to their use of Colorado River water
SIP	State Implementation Plan
Six Agency Committee	Composed of Coachella Valley Water District, Imperial Irrigation District, Palo Verde Irrigation District, San Diego County Water Authority, The Metropolitan Water District of Southern California and the City of Los Angeles Department of Water and Power
SNWA	Southern Nevada Water Authority
SCAQMD	South Coast Air Quality Management District
Storing entity	One that is expressly authorized by the laws of that state to enter into an agreement and develop Intentionally Created Unused Apportionment
SWP	State Water Project
TDS	total dissolved solids
Test Program	Test Land Fallowing Program in the Palo Verde Valley
The Criteria	Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs, issued by the Secretary of the Interior in 1970
The Plan	See: California's Colorado River Water Use Plan
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOCs	volatile organic compounds
WSDM Plan	The Metropolitan Water District of Southern California's Water Surplus and Drought Management Plan
YDP	Yuma Desalting Plant

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COLORADO RIVER BOARD OF CALIFORNIA

In order to protect California's rights and interests in the Colorado River, the California Legislature, in 1937, created the Colorado River Board of California. Similar or counterpart agencies exist in the other Basin states.

The Board consists of ten members that are appointed by the Governor: one from each of the six major public agencies with rights to the use of water and power from the Colorado River (City of Los Angeles Department of Water and Power, Coachella Valley Water District, Imperial Irrigation District, The Metropolitan Water District of Southern California, Palo Verde Irrigation District and San Diego County Water Authority), two from the general public, and the Directors of the California Departments of Water Resources and Fish and Game.

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EXECUTIVE SUMMARY

The Colorado River is a vital water resource for California. For some areas, it is the only source of water supply. Currently, Colorado River water and hydroelectric energy support approximately 17 million people in southern California and the region's municipal, industrial, and agricultural centers, which are considered some of the most productive in the world. California also has a vital interest in the recreation, fish, wildlife, and other environmental resources of the Colorado River. The quality of Colorado River water and watershed management are also extremely important to California.

There is a fundamental change occurring in the availability and use of Colorado River water in California. As we enter the new millennium, California for the first time will be required to reduce the amount of Colorado River water it uses. Beyond its basic apportionment of Colorado River water, California will no longer be assured of the availability of water apportioned to but unused by Arizona and Nevada or the availability of surplus water under its surplus water apportionment.

California's Colorado River water right holders and users are inseparably linked through the Colorado River Basin's state apportionment/user entitlement and priority systems. They are also economically interdependent.

To meet California's Colorado River water needs within its basic apportionment of River water, given these interdependencies, necessitates a cooperative, regional approach and consensus-based solution and the addressing of long-standing unresolved issues relative to priority to and use of Colorado River water. The solution, California's Colorado River Water Use Plan (The Plan), is a framework by which programs, projects, and other activities would be coordinated and cooperatively implemented allowing California to most effectively satisfy its annual water supply needs within its annual apportionment of Colorado River water.

The framework is to be used to plan resource and financial investments and provide overall coordination on important initiatives undertaken by the Colorado River Board member agencies and others. The components of The Plan can be viewed as a diverse collection of policies, programs, projects, actions, and other activities, which deal with safeguarding, protecting, and optimizing California's Colorado River resources. Some of these are associated components, meaning that they don't directly involve Colorado River water but are needed by implementing entities and individuals to meet their water needs within California's Colorado River water apportionment. The components of The Plan are wide in scope addressing both quantity and quality of Colorado River water.

The Plan is intended to be dynamic and flexible enough to allow for modifications in, and periodic updates to, the framework when and where appropriate, and to allow for

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the substitution of projects and programs within The Plan components when they have been found to be more cost effective and/or appropriate.

The California agencies and individuals with Colorado River rights and interests are the principal implementing entities for the framework projects and programs of The Plan. They are responsible for planning, financing, and implementing projects, programs, and other actions consistent with The Plan that best meet the needs of their service area constituents. They are also responsible for obtaining the necessary project and program approvals, conducting appropriate environmental reviews, and ensuring compliance with endangered species acts (federal and state).

The Plan's provisions to transition California to its basic Colorado River water apportionment without potential major water supply and economic disruptions include initial linchpin components:

- core voluntary cooperative conservation/transfers from agricultural use to urban water use,
- further quantification of the third and sixth priorities of the Seven-Party Agreement,
- improved River and reservoir management and operations, including interim surplus water criteria, and
- water storage and conjunctive use programs.

The goal is to put into place, during the 15-year interim surplus water criteria period, the necessary cooperative water conservation/transfers, storage and conjunctive use programs, and other programs and activities that allow California to meet its Colorado River water needs within its basic apportionment.

Other actions and options necessary for individual agencies to meet their water needs within California's basic apportionment of Colorado River water include:

- demand management (e.g., water conservation and best management practices),
- increased efficiencies in water use and conveyance,
- cooperative water reduction/transfer programs (e.g., cooperative land fallowing/water transfers),
- coordinated project operations,
- interstate offstream Colorado River water banking,
- improved integration of available supplies,
- groundwater management,
- exchanges,
- dry year supplies,
- water purchases,
- drought and surplus water management,

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- additional local projects, water reuse, and groundwater and surface water recovery, and
- administrative actions necessary for effective use and management of water supplies.

There are other resource management activities that may significantly affect the quality and quantity of Colorado River water available to California. These include:

- Colorado River Basin Salinity Control Program,
- Lower Colorado River Multi-Species Conservation Program,
- watershed management,
- management of River system losses,
- improved coordinated reservoir operation,
- River augmentation, and
- Salton Sea restoration efforts.

The Plan's framework also provides for water supplies for the San Luis Rey Indian Water Rights Settlement Parties, and for municipal, industrial, and recreational users along the River with inadequate or no Colorado River water rights.

Being an international resource, there are obligations, resources management concerns, and international cooperation efforts that affect, or may affect, River operations and water use. These include:

- Mexican Water Treaty deliveries,
- International Boundary and Water Commission Minute No. 242 compliance with respect to salinity,
- conveyance and siltation,
- emergency deliveries,
- border groundwater pumping, and
- environmental issues.

There are also necessary water right and water use administrative provisions needed to ensure consistency with "The Law of the River" and provide sufficient resource management flexibility and oversight. These include:

- mainstream and tributary water determinations,
- Section 5 Contracts,
- decree accounting,
- reasonable beneficial use requirements,
- proper credit for return flows,
- inadvertent overrun accounts and pay backs, and
- agency water budgets pursuant to Quantification Settlement Agreement.

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The Plan also includes consideration of environmental factors. Implementation of The Plan is expected to:

- result in less Colorado River water use by California (the reduction of up to 1 million acre-feet (af) per year as compared to the highest amount diverted in the past 25 years),
- further water conservation, water reuse, local water supply development, storage and conjunctive use programs, and recovery of groundwater and surface water,
- result in cooperative water conservation/transfers that shift water from agriculture to urban use, and
- maintain current agricultural production with less water.

California's Colorado River Water Use Plan will reduce reliance on the Colorado River without severe dislocations in either urban or agricultural areas. It will not stimulate new growth, foster unplanned urban development, affect demands on local or regional transportation systems, require new public services and utilities, or create long-term increases in ambient noise levels. It will make a de minimus contribution to cumulative land use impacts and have a de minimus effect on associated socioeconomic resources, such as employment, earnings, and housing. The Plan and the accompanying Quantification Settlement Agreement programs and projects are designed to preserve the ability to meet existing needs while diverting less water from the Colorado River.

Fundamentally, these programs and projects are not about increasing water supplies to accommodate increased population growth. Some of the key points that need to be considered regarding The Plan and the issue of population growth are as follows:

- Water Does Not Equal Growth – Studies by the Southern California Association of Governments (SCAG) show that water is not causally linked to population growth in southern California. Growth is a result of many factors, most of them economic in nature.
- Plan Maintains Current Level of Water Supply – No additional supplies of Colorado River water will reach southern California as a result of The Plan. Urban southern California has historically received in many years a full Colorado River Aqueduct delivery of approximately 1.25 million af and will continue to do so with these programs in place.
- CVWD's Colorado River Water Use Offsets Groundwater Usage – Under The Plan, CVWD's Colorado River water use will return to previous normal diversion levels to offset Coachella Valley groundwater basin over-draft. Consequently, the settlement and programs will provide for needs to be met, but will not facilitate new population growth in the Valley.
- Plan Consistent With Historic Diversion Patterns – Under The Plan, IID will reduce its diversion of Colorado River water due to conservation efforts

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within the Imperial Valley; Coachella will increase its diversion of Colorado River water with a corresponding decrease in use of groundwater; and Metropolitan will continue to receive a full Colorado River Aqueduct delivery. This pattern has occurred a number of times in the past, and will now be locked into place by agreement. Because this simply replicates historic patterns, this diversion pattern is not linked to new population growth.

Between 1996 and 2000, California voters approved historic levels of general obligation bond financing for improving California water supply reliability, water quality and for restoring watershed ecosystems. The funding support provided by the $995 million Safe, Clean, Reliable Water Supply Act in 1996; the $2.1 billion Safe Neighborhood Parks, Clean Water, Clean Air, and Coastal Protection Act in 2000; and the $1.97 billion Safe Drinking Water, Clean Water, Watershed Protection and Flood Protection Act in 2000 extends to the implementation of the Colorado River Water Use Plan.

The State of California has also supported Plan implementation from the General Fund. Most notably, $235 million was appropriated in 1998 for lining portions of the All American and Coachella Canals ($200 million) and for groundwater storage and conjunctive use programs ($35 million) identified in The Plan.

The new Quantification Settlement Agreement, other interagency agreements and associated implementation agreements with the Secretary of the Interior, together with the Secretary's administration of water rights and use, constitute the principal binding and enforceable provisions of The Plan. The agreements have specific implementation timetables that are reflected in the implementation schedule discussion.

The agencies responsible for implementing the components of The Plan intend to move forward as quickly as possible. In a number of cases, environmental documentation must be prepared and, in certain cases, permits and approvals must be secured from state and/or federal agencies to permit projects to move forward. An implementation schedule has been developed. The goal is to comply with the schedules, but it must be understood that considering the complexity of the implementation of components, that the actual timing may vary somewhat. Similarly, it should be understood that some components and/or associated components may be modified but would still produce the same conceptual results, or that other options may be substituted if they are found to be more effective and appropriate. There are also related activities, such as the Salton Sea restoration efforts, that may affect the use of Colorado River water that have been included with respect to their implementing actions.

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I. PREAMBLE

A. Need for a Plan

The start of the new millennium begins a new era for the Colorado River Basin, an era in which water use will be limited in the future. This is especially significant for California in that for the first time it will be required to reduce the amount of Colorado River water it uses. Beyond its basic apportionment of Colorado River water, it will no longer be assured of the availability of water apportioned to but unused by Arizona and Nevada or the availability of surplus water under its surplus water apportionment.

California's Colorado River water right holders and users are inseparably linked through the Colorado River Basin's state apportionment/user entitlement and priority systems. To bring the needed certainty as to the supply available to each California Colorado River water user and to protect the southern California regional economies will require optimizing the use of California's basic and surplus apportionments of Colorado River water. The further quantification of California's Colorado River water rights and uses, increased efficiencies in water delivery and use, development and implementation of cooperative water supply programs, and new provisions for administration of water rights and use to help afford lower priority users an assured water supply will help facilitate this goal. The necessity for close coordination and cooperation among all California Colorado River water users leads to the need to establish a resource management framework to help guide California's Colorado River water use.

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Figure xxx – Map of Colorado River Basin

1. Colorado River Basin Background

The Colorado River ("the River") is the principal water resource in the arid Pacific Southwest. From its headwaters in the Rocky Mountains, it traverses 1,440 miles to the Gulf of California. Its drainage encompasses 244,000 square miles and includes portions of seven states and the Republic of Mexico. The seven states are the Upper

Division states of Colorado, New Mexico, Utah, and Wyoming, and the Lower Division states of Arizona, California, and Nevada. The Colorado River's major tributaries include the Green, Yampa, White, Gunnison, Dolores, San Juan, Little Colorado, Virgin, and Gila Rivers.

The dividing point between the Upper and Lower Basins, as defined in the 1922 Colorado River Compact, is at Lee Ferry, Arizona, approximately 17 miles downstream of Glen Canyon Dam. By River miles, Lee Ferry is almost halfway down the River.

The unregulated flow of the River varies widely during the year, and from year to year over long periods of time. The maximum annual natural flow (24.5 million af at Lee Ferry) is approximately five times the minimum (5.0 million af). To cope with its extreme variability, reservoirs have been constructed with a combined usable capacity of approximately 60 million af, approximately four times the 1906-1998 average annual natural flow of approximately 15.1 million af at Lee Ferry. Creditable flood control space of 5.35 million af must be available at the beginning of each calendar year in the Colorado River system reservoirs. 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 capacity of approximately 51 million af.

Figure xxx – Photo of Hoover Dam

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Other major storage reservoirs in the Upper Basin include Flaming Gorge on the Green River on the Utah/Wyoming border, Navajo on the San Juan River in New Mexico, and Blue Mesa, Morrow Point, and Crystal on the Gunnison River in Colorado. These reservoirs and Lake Powell allow the Upper Basin to develop their Colorado River water apportionments while meeting the Upper Division states' water delivery obligation to the Lower Basin.

Other capital improvements in the Lower Basin of importance to California include Davis, Headgate Rock, Parker, Palo Verde, Imperial, and Laguna Dams. Lake Mohave (behind Davis Dam) is a regulatory reservoir with a powerplant at the dam. Lake Havasu (behind Parker Dam) is the forebay and desilting basin for MWD's

Colorado River Aqueduct in California and the Central Arizona Project in Arizona and has a powerplant at the dam. Palo Verde Dam serves as the River diversion structure for irrigated agriculture in the Blythe area in California. Imperial Dam serves as the River diversion structure for the All American Canal in California and the Gila Gravity Main Canal in Arizona. Laguna Dam, originally a diversion dam for the Yuma Project, now serves as a desilting basin on the Colorado River. Senator Wash Dam provides for off-stream regulatory storage.

The Colorado River is of major importance to each of the seven states of the Colorado River Basin and Mexico. Each of them has attempted to secure for its citizens maximum rights to the use of this lifeline of the Southwest. Out of these attempts has arisen a body of interstate compacts, federal laws, water contracts, state laws, a treaty and other agreements with Mexico, Supreme Court decrees, agreements and federal and state administrative actions. Together, these documents and their interpretation are generally referred to as "The Law of the River" and control River operations and the rights and priorities to the use of Colorado River water. "The Law of the River" is based on a concept that apportions the use of water between the Upper and Lower Basins and among states, and a priority system to the use of Colorado River water. The apportionment and priority concept is comprehensive in dealing with the waters of the River, designating quantities and priorities for use within each of the states, and identifying which state will be charged with the use involved. The foundation document of "The Law of the River" is the 1922 Colorado River Compact.

The Secretary of the Interior (Secretary) has been given responsibilities and authorities to implement portions of "The Law of the River." The United States Army Corps of Engineers has the principal responsibility for Colorado River flood control criteria and the International Boundary and Water Commission is responsible for international Colorado River matters.

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2. California's Colorado River Rights and Interests

The water and power resources of the Colorado River system are vital to the California economy. Seven counties in southern California, with a current population of approximately 17 million, more than half of the state's population, receive water and hydroelectric energy from the Colorado River. It also provides for the irrigation of approximately 900,000 acres of some of the most productive farmland in the nation. California's use of Colorado River water for municipal, industrial, and agricultural purposes represents approximately 65 percent of the total water used in southern California. Even when California is limited to its basic apportionment of Colorado River water, it will still represent over 50 percent of all water used in southern California. California also has a vital interest in the fish, wildlife, and recreational resources of the Colorado River.

Common to all Colorado River Basin states is the right to develop, manage, and use their Colorado River water apportionments in a manner which most effectively meets

their needs and most efficiently uses their Colorado River resources, consistent with "The Law of the River."

California's diversions and use of Colorado River water predate the 1922 Colorado River Compact. The first diversion right in California was obtained from the federal government in 1856 by the City of Winterhaven for 780 af per year. The 1865 United States Congress established the Colorado River Indian Reservation on the border between Arizona and California. Between 1873 and 1890, Colorado River diversion rights were established for the Indian nations of the Colorado River Indian Tribes, and the Fort Yuma Quechan Indian Tribe, and the Fort Mojave Indian Tribe. The Chemehuevi Indian Tribe developed its rights in 1907.

Thomas Blythe filed an annual Colorado River diversion right for 219,780 af in 1877 for the Palo Verde Valley area. The City of Needles holds a diversion right with a priority date of 1885 for 1,500 af. By the turn of the twentieth century, Californians had established annual Colorado River diversion rights to more than 343,500 af. In 1901, the now Imperial Irrigation District established a Colorado River diversion right to 2.6 million af per year, bringing California's annual Colorado River diversion right to nearly 3 million af in the first year of the new century. These early diversion rights later became identified as Present Perfected Rights.

The most significant documents to date that relate to California's Colorado River rights and interests include:

- 1922 Colorado River Compact
- 1928 Boulder Canyon Project Act
- 1929 California Limitation Act
- 1931 (California) Seven-Party Agreement
- California Water Delivery Contracts
- Hoover Dam Power Contracts
- 1944 Mexican Water Treaty
- 1948 Upper Colorado River Basin Compact
- 1956 Colorado River Storage Project Act
- 1964, 1979, and 1984 U.S. Supreme Court Decrees in *Arizona v. California*
- 1968 Colorado River Basin Project Act
- 1970 Criteria for the Coordinated Long-Range Operation of Colorado River Reservoirs
- 1973 International Boundary and Water Commission Minute No. 242
- 1974 Colorado River Basin Salinity Control Act and 1984, 1995, and 1996 Amendments
- 1982 Field Working Agreement for Flood Control Operation of Hoover Dam and Lake Mead
- 1986 Colorado River Floodway Protection Act
- 1986 Lower Colorado Water Supply Act

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- 1988 San Luis Rey Indian Water Rights Settlement Act
- 1992 Grand Canyon Protection Act
- 1998 Salton Sea Reclamation Act

In addition, California's Colorado River water development and use could be affected by provisions of the 1969 National Environmental Policy Act as amended, the 1970 California Environmental Quality Act as amended, and the provisions of the 1973 federal Endangered Species Act as amended and the California Endangered Species Act of 1984 as amended.

The very limited discussion of some of the provisions of the listed documents herein is to help provide a basic understanding of the intrastate and interstate parameters and aspects of California's rights and interests in the Colorado River and its Colorado River Water Use Plan.

Figure xxx – Photo of Parker Dam

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Under the 1922 Colorado River Compact, the Upper and Lower Basins were each apportioned the right to beneficial consumptive use of 7.5 million af per year from the Colorado River system. In addition, the Lower Basin was given the right to increase its use by 1 million af per year. The 1922 Compact states that any required delivery of water to Mexico shall be supplied first from water surplus to the foregoing apportionments (a total of 16 million af per year) and that if the surplus is insufficient, the burden of the deficiency shall be borne equally by the Upper and Lower Basins. It provides that the states of the Upper Division will not cause the flow at Lee Ferry to be depleted below 75 million af for any period of 10 consecutive years. It specifies that the states of the Upper Division shall not withhold water and the states of the Lower Division shall not require delivery of water, which cannot reasonably be applied to domestic and agricultural uses. The 1922 Compact negotiators relied on data that led to the conclusion that the average annual natural Colorado River flow at Lee Ferry was 18 million af or greater. This is a figure higher than what the long-term average flow is believed to be today, and explains the general reference to the River being over apportioned.

Increased development of the Lower Basin and the apportionment of its 7.5 million af per year share under the 1922 Compact began with passage of the Boulder Canyon Project Act. This Act, in addition to authorizing construction of Hoover Dam and the All American Canal, made a contract with the Secretary mandatory for any use of stored water. The Act referenced the need to satisfy any then existing rights. These Present Perfected Rights were subsequently defined in the 1964 U.S. Supreme Court Decree in *Arizona v. California* to be: (1) water rights acquired in accordance with state law and exercised by an actual diversion of water, and (2) rights created by the reservation of mainstream water for federal establishments under federal law whether or not the water had been applied to beneficial use. The non-federal or miscellaneous Present Perfected Rights are those perfected rights existing as of June 25, 1929, the effective date of the Boulder Canyon Project Act. Rights for the Indian reservations and holders of these miscellaneous Present Perfected Rights in California must be satisfied out of California's basic apportionment. During a shortage condition, the Secretary is directed to first satisfy Present Perfected Rights and then apportion the amount remaining to others in the states. The Decree did not specify as to when either surplus or shortage conditions would be deemed to be applicable.

The U.S. Supreme Court in its decision in *Arizona v. California* restricted California's Colorado River water use to 4.4 million af of the first 7.5 million af of consumptive use apportioned in a year to the Lower Division states from the Colorado River, plus not more than one-half of any surplus waters, as had been suggested in the Boulder Canyon Project Act and as provided in the California Limitation Act. In addition, the Secretary in any one year may assign water apportioned to but unused by a Lower Division state for beneficial use in another Lower Division state; however, no rights to the recurrent use are established through such use. If less than 7.5 million af is available in a year from the mainstream for the Lower Division States, and after providing for satisfaction of Present Perfected Rights in the order of their priority dates without regard to state lines, the Court left the remaining amount of water to be apportioned by the Secretary to the Lower Division States consistent with "The Law of the River."

The Decree established that "consumptive use from the mainstream within a state shall include all consumptive uses of water of the mainstream, including water drawn from the mainstream by underground pumping…." The Decree defined consumptive use as being diversions of mainstream water, less return flows that may be diverted by others with rights thereto or that may be delivered to Mexico. The Decree defined mainstream as the mainstream of the Colorado River downstream from Lee Ferry within the United States. The Court ruled that rights to water diverted from tributaries in the Lower Basin were unaffected by the Decree and such use would not be accounted against the mainstream apportionment. This decision acted to reduce the future availability of surplus water to California.

Following the *Arizona v. California* decision, Congress passed the Colorado River Basin Project Act in 1968. Major features of the Act included: (1) authorization of the

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Central Arizona Project (CAP) and several Upper Basin projects, (2) provision for a priority for California's basic apportionment of 4.4 million af per year and uses of similar character in Arizona and Nevada over the Central Arizona Project and other post-1968 projects, (3) the United States' assumption of the responsibility for meeting the entire Mexican Water Treaty delivery obligation when the River is augmented by 2.5 million af per year, and (4) direction to the Secretary to establish coordinated long-range operating criteria for the major Colorado River reservoirs.

The Secretary issued the Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs in June 1970. The Criteria govern the operation of Upper Basin reservoirs and Lake Mead and identify factors to be considered by the Secretary in determining a normal, surplus, or shortage condition in meeting consumptive water use requirements. The Criteria have as an objective the release of a minimum of 8.23 million af per year from Lake Powell. They provide for a determination by the Secretary of the amount of water to be retained in Upper Basin reservoirs without impairment of the Upper Basin's consumptive uses and for a reservoir operating plan to be developed by the Secretary each year after consultation with the seven Basin states. When the Upper Basin storage is greater than the amount so determined, releases above the minimum will be made in order to maintain as nearly as practicable, active storage in Lake Mead equal to active storage in Lake Powell. The Criteria also provide that the reasonable consumptive use requirements of all mainstream users in the Lower Basin will be met until such time as deliveries commence from the CAP. Deliveries from the CAP commenced in 1985.

The governing view of River operations during the development of the Criteria anticipated that the level and growth of water needs for this period and beyond would be such that little or no surplus water would occur, and did not contemplate a prolonged interim period of surplus water. Most efforts relating to reservoir operations in the development of the Criteria focused on shortage criteria. Consequently, existing Colorado River management maximizes the amount of water held in storage in the near term. This strategy tends to force more flood control releases in wet years, in excess of both downstream needs and the ability to divert and store such water for subsequent use. In dry years, this strategy leans towards not releasing water to users even though there may be a significant probability of surplus water releases in excess of both needs and the ability to store and divert such water over the period 2000-2015. Overall, this strategy does not optimize the beneficial use of this valuable resource because it does not take full advantage of the large volume of storage created by the extensive infrastructure on the River. It was also envisioned in the 1968 Colorado River Basin Project Act that there would be federal augmentation of the flow of the Colorado River. In the absence of augmentation, the ability to optimize the use of available surplus water and to store water offstream is essential.

Surplus criteria beyond that currently formulated are needed to guide reservoir operations to assist in optimizing beneficial use of surplus water while keeping the risk of shortages minimal. A strategy of more specific criteria or guidelines to cover the interim period of likely available surplus water would provide for more effective and efficient

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use of Colorado River water by providing for steadier releases over longer periods of time and the ability to divert and store such water for subsequent use, reducing the need for damaging flood control releases in excess of downstream needs.

As part of the development of interim surplus criteria, interim shortage criteria, risks and impacts need to be fully addressed. In the event that there are impacts associated with implementing the interim surplus criteria, the beneficiaries will have to mitigate for impacts attributable to their use of the additional amount of surplus water made available by the interim criteria. These interim surplus and shortage criteria and the experience gained from them will be of substantial value for the potential development and implementation of appropriate criteria for the longer term transitioning between normal and surplus and normal and shortage conditions.

The California water delivery contracts, executed from 1930 to 1934 between the United States and California public agencies, provided for storage and delivery of water from Lake Mead in excess of 5.362 million af per year, the amount shown in California's 1931 Seven-Party Agreement. This Agreement sets the priorities among the signatory agencies relative to their use of Colorado River water. The first three priorities are for a total beneficial consumptive use of up to 3.85 million af per year, with Palo Verde Irrigation District (PVID) having the first priority to irrigate 104,500 acres of Valley lands; the Yuma Project, Reservation Division, having second priority to irrigate not more than 25,000 acres; and the third priority being shared amongst Imperial Irrigation District (IID), Coachella Valley Water District (CVWD), and PVID, the latter being for 16,000 acres of adjoining lower Palo Verde Mesa lands. The fourth priority is held by The Metropolitan Water District of Southern California (MWD) for 0.55 million af per year. The first four priorities allocate a total of 4.4 million af per year which is equal to California's basic apportionment of Colorado River water. The fifth priority for 0.662 million af per year is also MWD's now due to the City of San Diego merging its entitlement, and the sixth priority of 0.3 million af is for the same entities as the third priority. The seventh priority is for agricultural use in the Colorado River Basin in California. The Seven-Party Agreement priority provisions were incorporated verbatim by the Secretary into each of the water delivery contracts. Some of the agencies have subsequently entered into surplus water contracts with the United States Bureau of Reclamation.

Figure xxx – Photo of Imperial Dam

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There is no further written division of the first three priorities' right to the use of the 3.85 million af per year under the priority provisions of the Seven-Party Agreement. This lack of further quantification other than by priority makes it difficult to develop and implement cooperative water supply programs and can cast uncertainty as to water supply reliability.

In 1975, a federal/state task force was formed to develop a water supply of up to 10,000 af per year for federal lands in California, and for California entities and individuals along the River with inadequate Colorado River water rights and/or no rights to meet existing and/or future domestic, municipal and industrial water needs. The Lower Colorado Water Supply Project was authorized in 1986 for that purpose.

The salinity of the Colorado River is one of the major problems facing the Basin's water users. Colorado River salinity increases with the distance moved downstream. The salinity of the River increases from approximately 100 to 200 mg/l TDS in the upper reaches of the Green and Colorado Rivers to approximately 800 to 900 mg/l TDS at the Northern International Boundary between the United States and Mexico near Yuma, Arizona. Being a downstream user, control of River salinity is important to California in that it avoids economic detriments or penalty costs (consumer costs) associated with the use of high salinity water. Lower salinity water also reduces the amount of water needed for beneficial use and enhances the opportunity for water reuse. Reduced water use and increased opportunities for water reuse are important aspects for optimizing the use of California's available Colorado River water supply. Such concerns for River salinity led to the enactment of the Colorado River Basin Salinity Control Act of 1974.

Besides salinity, watershed management efforts are needed to prevent other contaminants from entering the River and posing concerns to public health and in-stream uses. Other water resource objectives that should be considered in watershed management programs include increased water supply availability, enhanced water supply storage and groundwater recharge, flood and erosion control, aquatic ecosystem protection, and habitat restoration.

3. Increasing Uses by Others of Their Apportionments

Following ratification of the Colorado River Compact, development in the Upper Basin continued slowly. In 1948, the Upper Basin states reached agreement on and ratified the Upper Colorado River Basin Compact which provided for the division of the 1922 Compact apportioned water use among the Upper Basin states. In 1956, the Colorado River Storage Project Act was enacted by the Congress to provide for water resource development in the Upper Basin. It authorized the construction of Glen Canyon, Flaming Gorge, Navajo, Blue Mesa, Morrow Point, and Crystal Dams. This Act also authorized the construction of 11 irrigation projects and investigations for a number of other projects. The 1968 Colorado River Basin Project Act, besides authorizing the

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construction of the Central Arizona Project, authorized the construction of a number of projects in the Upper Basin that would allow the Upper Basin states to further develop use of their 1922 Compact apportioned water. Upper Basin current annual use, including reservoir evaporation, is approximately 4.5 million af.

Development in the Lower Basin proceeded more rapidly. Both Arizona and Nevada will soon reach full use of their respective basic annual apportionments of 2.8 million af and 0.3 million af. Arizona's use has been enhanced by its creation of the Arizona Water Banking Authority (AWBA) in 1996. The purpose of the AWBA is to store Arizona's unused apportionment and surplus water in western, central, and southern Arizona to firm up municipal and industrial water supplies from water shortages and Central Arizona Project (CAP) service interruptions, help meet the water management objectives of the Arizona Groundwater Code, and assist in the settlement of Indian water right claims. The AWBA may also enter into storage and interstate release agreements with entities in Nevada and California.

The current total water use within the Colorado River Basin is over 1 million af less than the long-term average runoff when surplus water is not made available. However, the use of Colorado River water by the Basin states has reached the point where California can no longer rely on the occurrence of a surplus condition or on unused Arizona and Nevada apportionments.

4. Need for California to Limit Its Uses to its Basic Apportionment

Under a normal condition, California has a basic apportionment of 4.4 million af per year, and under a surplus condition has an apportionment of 50 percent of the surplus water made available to the three Lower Division states. In addition, the Secretary may allow California to use water apportioned to but unused by Arizona and Nevada, including the states' basic and surplus apportionments.

With the commencement of CAP deliveries in 1985, California's dependable supply from the Colorado River was reduced to its basic apportionment of 4.4 million af per year. California's annual use of Colorado River water has varied from 4.5 to 5.2 million af over the last ten years. Historic and current use of up to 5.2 million af per year stems from the occurrence of surplus conditions and the availability of water apportioned to but unused by Arizona and Nevada.

Since 1964, California has made significant investments to offset the eventual reduction in available Colorado River water. These investments have included developing additional sources of imported water, conservation (demand reduction and use efficiency improvements), surface and groundwater storage, local supplies, conjunctive use programs, reclaimed water projects, and recovery and treatment of contaminated groundwater. While these investments have significantly increased supplies and reduced demand for imported water, they have not been adequate to offset the reduction of Colorado River water to 4.4 million af per year when considered in

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conjunction with the reduction in dependable State Water Project and Los Angeles Aqueduct supplies. This reality has fueled further efforts to maximize the beneficial use of California's River water through cooperative Colorado River conservation programs and transfers of conserved water.

The challenge is to effect these changes and still maintain the productivity of major urban and agricultural centers.

In 1996, the Secretary deferred further consideration of any additional Colorado River surplus guidelines until California put in place a realistic strategy to assure that it will be able to limit its annual use of Colorado River water to 4.4 million af when necessary, or to meet its needs from sources that do not jeopardize the entitlements of others. Development of this strategy was considered by the Secretary to be a prerequisite for Secretarial approval of any further cooperative Colorado River water transfers between California agencies.

5. Recognition of California Agencies' Economic and Water Interdependency

While geographically separated with distinctively different economic bases and water delivery and distribution infrastructure, the major public agencies with Colorado River water rights and contracts are, from a water supply and economic perspective, regionally wedded to each other. Their economies and economic sectors are interrelated and interdependent, they are consumers of goods and services produced within each others' service areas, and their principal economic fuel, water, is a shared resource.

Besides sharing a water resource, they are bound closely together by the Colorado River system apportionment/entitlement and priority system. Water not used by one user becomes the supply for another. So long as there was sufficient Colorado River water available to meet all their beneficial water needs, long-standing differences among California agencies with respect to Colorado River water rights, use, and water supply remained unresolved. As the need to optimize the use of California's basic apportionment to meet all its Colorado River water needs intensifies, so does the need to

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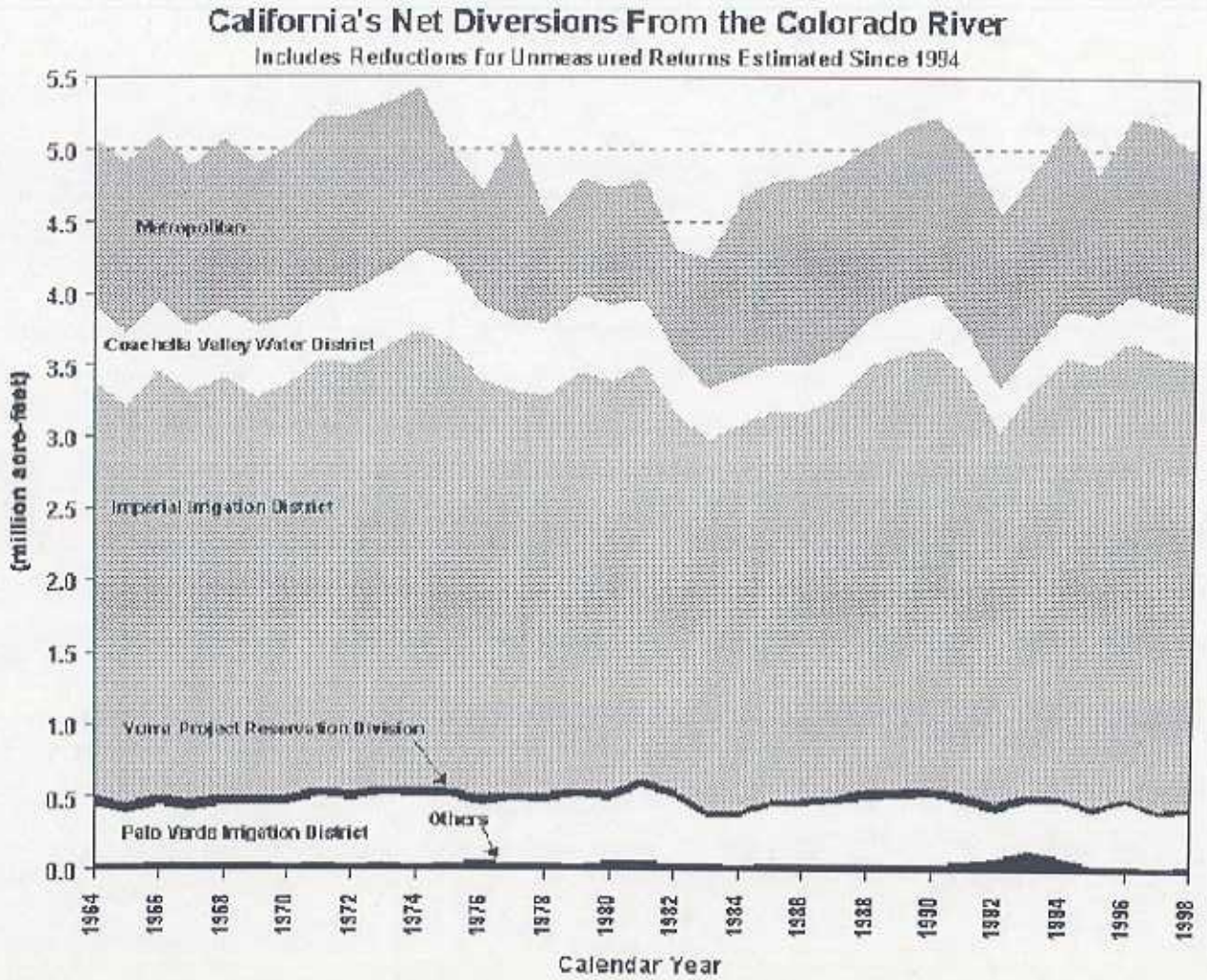
Figure xxx - California's Net Diversions from the Colorado River



resolve or accommodate long-standing unresolved differences. Helpful to resolving many of the unresolved issues is the further quantification of the agencies' rights and uses of Colorado River water. Central to optimizing the use of California's basic apportionment of Colorado River water and maintaining the vitality of the region's economies are increased water conveyance and use efficiencies, and mutually advantageous water transfers.

6. Need for Certainty as to Water Supply Reliability

Repeated investments since 1964 have failed to offset the eventual reduction in available Colorado River water due to the reduction in dependable supplies available to southern California from other parts of the State. If California were limited to its basic Colorado River apportionment, absent steps to optimize River water use and accommodation of unresolved differences among the agencies, the water supply reliability of all California Colorado River water users would be brought into question. The importance of Colorado River water to every water right holder and the water interdependency of those holders resulting from the apportionment/entitlement and priority system impair the ability of any individual agency to resolve the Colorado River water supply reliability issue. This limits the ability of all users to plan, finance, and implement means to meet future water supply and management needs.

Increasing the certainty of the water right holders' Colorado River water supply reliability allows them to define other required water supply and management projects and programs, for both the Colorado River or other sources of supply, in a timely manner in order to meet future needs. Entities within southern California have and continue to implement programs that facilitate efficient use of water resources, the voluntary transfer of water to areas where it is needed, the augmentation of the available water supply through conjunctive use of ground and surface water supplies and maximization of the available water supplies through improved management of water resource facilities.

Furthermore, many of the required actions associated with implementing measures to limit use of water in California to its basic apportionment are interrelated and need to be considered collectively and in a coordinated fashion so as to optimize the use of the apportionment and to provide California Colorado River rights holders more certainty as to their supply. This means bringing finality to:

- mainstream water use determinations,
- proper credit for measured and unmeasured return flows,
- acquisition of supplies by those with no or insufficient rights through the execution of necessary water supply contracts and operation of the Lower Colorado Water Supply Project, and
- establishment of inadvertent overrun accounts and payback procedures.

These all affect the water available to water right holders and point to the need for a consensual and regional approach to California's Colorado River Water Use Plan.

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Figure xxx – Map of Service Areas of California Entities Using Colorado River Water

B. Purpose of The Plan

The overall purpose of California's Colorado River Water Use Plan (Plan) is to provide its Colorado River water users with a framework by which programs, projects, and other activities will be coordinated and cooperatively implemented allowing California to most effectively satisfy its annual water supply needs within its annual apportionment of Colorado River water. This framework specifies how California will transition and live within its basic apportionment of Colorado River water when necessary.

The components of The Plan are wide in scope dealing with both water quantity and quality. It is intended to help bring certainty to all California Colorado River water right holders as to the reliability of their River supply so that they can plan, finance, and implement other required measures in a timely manner to fully meet their water supply and management needs. It is founded on interagency cooperation, and embraces regional approaches and consensus-based processes. It is intended to be fully consistent with California law and "The Law of the River" and to foster greater levels of interstate cooperation and coordination in addressing Colorado River matters of mutual interest.

The Plan is intended to be dynamic and flexible enough to allow for modifications in, and periodic updates to, the framework when and where appropriate, and to allow for substitution of projects and programs within The Plan components when they have been found to be more cost effective and/or appropriate.

The significance of Colorado River water to each California Colorado River water right holder varies, but in all cases it constitutes the sole source or a principal supply of water, without which the water right holder could not meet its water needs.

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The Plan framework encompasses and relies heavily on:

- further quantification of California's rights and use of Colorado River water where helpful to facilitate the optimum use of California's Colorado River resources,
- cooperative core water supply programs and voluntary transfers,
- increased efficiencies in water conveyance and use,
- water storage and conjunctive use programs to increase normal and dry year water supplies,
- water exchanges,
- administrative actions necessary for effective use and management of water supplies,
- improved reservoir management and operations,
- drought and surplus water management plans,
- coordinated project operations for increased water supply yield,
- groundwater management, and
- Colorado River salinity control and watershed protection.

Other key associated resource management concepts that the agencies are pursuing include:

- Lower Colorado River Multi-Species Conservation Program,
- water demand management (seasonal shift in deliveries, water scheduling changes, peaking modification, etc.),
- additional water conservation,
- groundwater and surface water recovery,
- interstate offstream water banking,
- additional local projects,
- water reuse, and
- other voluntary water transfers and water purchases.

Not all of these options are available to each California Colorado River water right holder. Bringing certainty as to the holders' Colorado River water supply reliability allows them to individually or cooperatively implement those measures that best meet their needs. This can mean potential further investments in Colorado River programs and projects or other sources of supply.

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II. PLAN PROCESS

The process for the formulation, implementation, and revision of California's Colorado River Water Use Plan provides for:

- respect and protection of each Colorado River water right holders' water rights and interests,
- the development of unified policies and positions, and a general framework for optimizing California's Colorado River water apportionment through the Colorado River Board of California that provides for input by its agencies and citizens and other interested parties,
- the Colorado River Board of California to ensure that necessary intrastate, interstate, federal, and international discussions, actions, coordination and cooperation on issues, programs, projects, and other Colorado River matters affecting California's Colorado River rights and interests occur and are carried out in a timely manner,
- the coordinated development and implementation of specific framework projects, programs, and other actions by the entities and individuals with Colorado River rights and interests, and water and power contracts, and others,
- the identification and timely incorporation of key Plan framework components needed to safeguard and protect California's Colorado River rights and interests, and optimize the use of its apportionment,
- the further quantification of California's Colorado River rights, interests, and use to help remove uncertainties over Colorado River water supply reliabilities and provide the optimization of its use of its apportionment,
- the consideration and implementation of necessary interstate aspects, and
- the timely updates of The Plan to reflect actual events and conditions over time.

A. Role of the Colorado River Board of California

The Colorado River Board of California was created by the California Legislature in 1937 in recognition of the vital nature of the Colorado River water resources to the general well being of its agencies and citizens. Its charge is to safeguard and protect California's rights and interests in the Colorado River. It is authorized (California Water Code Sections 12500-12565) to:

- investigate past, present, and potential uses of the Colorado River system within and without the State,
- investigate, coordinate, collate, and preserve information, facts, and data bearing upon the claims of all states and of all public or private agencies within and without the State to and in respect of the water and the use of water of the Colorado River system,

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- confer with representatives of the other States in the Colorado River Basin, representatives of the United States, and others concerning problems and measures relating to the development of the Colorado River Basin, the use of the water of the Colorado River system, and the protection of the interests therein of the State and of the United States,
- shall negotiate, respecting such problems and measures, and discuss the same and formulate and recommend to the Governor and Legislature measures, agreements, and legislation deemed for the benefit of the State and the United States,
- develop a plan for California to meet its Colorado River water needs within its basic apportionment of Colorado River water, and
- carry out all other actions deemed necessary or expedient to achieve the purposes of the Board.

The Board provides a central forum and mechanism to:

- carry out activities that protect and advance California's Colorado River rights and interests,
- formulate California's policies and positions on Colorado River matters,
- develop unified positions on Colorado River related issues, and
- help resolve problems between California agencies with Colorado River water and power contracts.

Protection of California's Colorado River water rights and interests is accomplished through investigations and through working with other State agencies, the State Legislature, water agencies, and individuals within California, and with the other Colorado River Basin states, federal agencies, the Congress, and the courts. Investigations include analyses of engineering, legal, environmental, operational, and economic matters concerning the Colorado River resources of the seven Basin states and factors involved in the obligations pursuant to the Mexican Water Treaty.

The Board consists of ten members that are appointed by the Governor: one from each of the six major public agencies with rights and interests to the use of water and power from the Colorado River (City of Los Angeles Department of Water and Power, Coachella Valley Water District, Imperial Irrigation District, The Metropolitan Water District of Southern California, Palo Verde Irrigation District, and San Diego County Water Authority), two from the general public, and the Directors of the California Departments of Water Resources and Fish and Game or their designees. The Board appoints from among members of the Board, other than the Director of Water Resources or the Director of Fish and Game or their designees, a chairman who is ex officio the "Colorado River Commissioner."

The primary function of the Board members is to formulate California's policies and positions on Colorado River matters. The California Attorney General acts as the

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Board's legal counsel. The Board makes reports and recommendations to the Governor as requested or as the Board deems proper.

Pursuant to its responsibilities to safeguard and protect the rights and interests of its agencies and citizens in the resources of the Colorado River, the Board undertook the development of California's Colorado River Water Use Plan to address the new era in which Colorado River water use will be limited. The Plan provides a framework and guidance and identifies specific means by which California can live within and optimize the use of its apportionment of Colorado River water and, through working with other Basin states and federal agencies, can enhance the management and operation of the River and its reservoir system for the mutual benefit of all states, users, and uses of the River. The goal is to accomplish this without disrupting or diminishing the regions' economies.

B. Role of the California Colorado River Water Right Holders, Water and Power Contractors

The Boulder Canyon Project Act provides that no person shall have or be entitled to have the use for any purpose of the water stored pursuant to the Act except by contract with the Secretary. By natural extension, California agencies and individuals with Colorado River water rights and interests, holding Colorado River water contracts are the principal implementing entities for the framework projects and programs of California's Colorado River Water Use Plan. They are responsible for planning, financing, and implementing projects, programs, and other actions consistent with The Plan that best meet their water supply and management needs and their fiduciary responsibilities to their service area constituents. They are also responsible for obtaining the necessary project and program approvals, conducting appropriate environmental reviews, and ensuring compliance with endangered species acts (state and federal).

Many of the specific key actions of components of California's Colorado River Water Use Plan are cooperative programs and projects involving two or more parties. The Colorado River system apportionment/entitlement and priority system require that these actions be coordinated and cooperatively carried out. This leads to necessary agreements, contracts, approvals, and other arrangements amongst the involved agencies and individuals. Such documents constitute the main enforceable and binding aspects of California's Plan.

C. Identification of Plan Linchpin Components

There are initial linchpin components of California's Colorado River Water Use Plan that in their absence would make it difficult to achieve the goals of The Plan or California's orderly transition to its basic River water apportionment without potential major water supply and economic disruptions. These linchpin Plan components are:

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- core cooperative water conservation/transfers from agricultural use to urban use,
- further quantification of the third priority of the Seven-Party Agreement,
- improved River and its reservoir management and operations, and
- water storage and conjunctive use programs.

Factors essential to implementing the linchpin components are:

- agency cooperation and coordination,
- a consensus-based regional approach, and
- long-term agreements.

Given the Colorado River system apportionment/entitlement and priority system, these components are interrelated and in some cases interdependent. For example, absent further quantification of rights, further cooperative conservation/transfers would be extremely difficult. In addition, the absence of further guidance with respect to Lake Mead surplus and shortage conditions, at least for an interim period, draws into question whether the needed put-and-take water storage and conjunctive use programs can be successfully implemented. While agency cooperation and coordination are not projects or programs, the absence of this aspect affects the viability of The Plan.

Of these linchpins, the cooperative water conservation/transfers of between 0.4 to 0.5 million af per year of water from agricultural use to urban use and the further quantification of the water rights, which helps facilitate these transfers, provide the greatest long-term contributions volume wise for California to meet its Colorado River water needs from within its basic apportionment.

Other specific projects, programs and options to them provide the means to meet the remaining needs. Thus, southern California's future reliable water supply from the Colorado River is not contingent upon the success of a single program, but rather a combination of programs and projects.

D. Need for and Development of Key Terms for Quantification Settlement

As stated earlier in the description of the Seven-Party Agreement, there has been no division of the use of up to the 3.85 million af per year available for use by the holders of the first three priorities. Use of water on PVID valley lands has first priority, the Yuma Project, Reservation Division land second priority, and the third priority is shared amongst lands in IID, CVWD, and PVID, the latter being for 16,000 acres of the adjoining lower Palo Verde Mesa lands. The greatest opportunities for cooperative water conservation/transfers exist within IID. The lack of further quantification of the third priority would make it difficult to develop and implement cooperative water supply programs and can cast uncertainty as to water supply reliability. Further quantification of

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the third priority also can provide the needed quantum baseline by which conservation and transfer programs can be measured.

Further quantification of other water rights, interests, and uses may also be found to be helpful to other cooperative water supply programs, improved resource management, and increased water supply reliability.

E. Interstate Aspects

The Colorado River is a shared resource that serves multi-intra-and-interstate, federal, national, and international interests. To avoid perpetual conflicts, there are basic common threads that form a fabric that bind all interests together. To be effective, these basic common threads and fabric must apply universally throughout the Colorado River Basin, transcending national, state, and intrastate boundaries. They are heavily relied on by all interests for the cooperative development, management, and use of the Colorado River and form the foundation for obtaining favorable decisions and considerations on Colorado River matters. The fabric has grown over time with additional threads being woven in to meet new and changing needs. That fabric is the "The Law of the River" and those threads are the documents and their interpretations that collectively constitute "The Law of the River."

California's Colorado River Water Use Plan inherently has interstate aspects since it deals with the management and use of Colorado River water. For those interstate aspects to gain the acceptance of the Secretary and the other Basin states, they must comply with "The Law of the River" and provide for its mutually beneficial evolution and growth. "The Law of the River" is both flexible and dynamic, having already evolved to meet changing needs and conditions.

The interstate aspects of California's Colorado River Water Use Plan include:

- proper use of basic and surplus water apportionments,
- surplus and shortage River operations and management,
- improved River management and operations,
- interstate offstream water banking,
- the Interim Period with respect to the operation of the Yuma Desalting Plant pursuant to Title I of the Colorado River Basin Salinity Control Act,
- Lower Division states' Decree accounting and administration of water right matters,
- mainstream and tributary water use determinations,
- resolution of non-contract water use issues,
- proper credit for measured and unmeasured return flows,
- inadvertent overruns and pay back provisions,
- water use averaging for Decree accounting purposes,
- Colorado River Basin salinity control and watershed protection, and

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- the Lower Colorado River Multi-Species Conservation Program.

These are all of importance to the other Basin states and are areas that they too are involved in, or concerned with, with respect to their own use of Colorado River water.

F. Continuous Plan Process

Similar to "The Law of the River", California's Colorado River Water Use Plan needs to remain dynamic and reflect actual events and conditions over time. Projects, programs and other actions within The Plan's components may be added, deleted, or others substituted in their place when found to be more cost-effective or appropriate. Some of the changes will come with improvements in technology. In any case, there will be a need to periodically update The Plan to ensure that its framework and guidance are responsive to changing conditions and that it adequately safeguards and protects California's interests and rights to Colorado River water.

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III. POLICY GUIDELINES

In 1997, the Colorado River Board of California adopted the following policy principles regarding California's Colorado River Water Use Plan:

Commitment

- Develop a comprehensive plan for the use of California's annually apportioned Colorado River water, which protects California's interest in and rights to Colorado River water and safeguards individual contract water right holder's entitlements.
- Affirm California's ability to satisfy the water needs of southern California within its 4.4 million af annual "basic" apportionment, when conditions on the Colorado River dictate, through cooperative intrastate and interstate programs.
- Consult with other Colorado River Basin stakeholders in the development of California's Colorado River Plan.

Colorado River Aqueduct

- Implement various programs and activities to meet urban southern California's water demands in a manner that prevents economic and political disruption in the Colorado River Basin states.
- Maintain a full Colorado River Aqueduct within California's annual apportionment through dry-year options, core transfers, and other programs that may be available to the southern California coastal plain.

Agricultural Entitlements

- Achieve quantification of the agricultural agencies' entitlements, to the extent necessary, within the first three priorities (the 3.85 million af entitlement) and within the sixth and seventh priorities of California's Seven-Party Agreement in order to facilitate voluntary water transfers and to ensure effective administration of the entitlements.
- Foster development of administrative procedures by each agency to effectively administer and apportion water within its service area in conjunction with voluntary water transfers.

Intrastate Water Transfers and Supply Augmentation

- Facilitate voluntary willing seller/willing buyer transfers of Colorado River water, along with the necessary transportation agreements, that result from extraordinary conserved water savings, protect others' water rights, and address third party impacts.

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- Implement cooperative intrastate programs, such as groundwater banking, that effectively augment the Colorado River water supplies for agencies within southern California.

Interstate Water Transfers and Supply Augmentation

- Cooperate with the Colorado River Basin states and the federal government to implement programs that maximize the use of Colorado River water within the United States and/or augment the available water supply.
- Foster implementation of interstate programs, such as the Arizona Water Bank, that facilitate water transfers on a state-to-state basis.
- Cooperate with the federal government on programs to meet its obligations to augment the Colorado River and to operate the Yuma Desalting Plant.

Reservoir Operations

- Promote interim and long-term operating criteria for the Colorado River reservoir system that are subject to periodic review, are based upon the availability of water within the Colorado River Basin, and recognize the need to avoid spills and maximize the annual apportionment of water among the Lower Division states.
- Promote programs that provide the needed administrative and operational flexibility to assist the states in managing their annual apportionment of Colorado River water.

Efficient Use

- Promote implementation of best management practices in the environmental, urban, and agricultural sectors.

Water Quality

- Support continued efforts by the Federal Government and the states to reduce and control Colorado River salinity.

The Board has also taken separate actions on other specific Colorado River matters that bear on California's Colorado River Water Use Plan. These collectively define the policy framework of The Plan. These actions are found in resolutions adopted by the Board, and in statements and testimony before legislative authorization, appropriations, and oversight bodies and the courts on specific matters. An example is the Colorado River Basin Salinity Control Program in which the Board has taken numerous actions on the overall program, the River salinity standards, specific projects, and program funding.

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IV. COMPONENTS OF THE PLAN

The Key Terms for Quantification Settlement Among the State of California, IID, CVWD, and MWD, dated October 15, 1999 (Key Terms) constitute the further quantification, a significant advancement in the development of California's Colorado River Water Use Plan. It substantively addressed major portions of what are considered as the linchpin components of California's Colorado River Water Use Plan. The framework of The Plan though is broader than the scope of the Key Terms and the related new Quantification Settlement Agreement.

While the Key Terms provided for the settlement of numerous issues amongst the agencies, not all of the Key Terms, even when fully implemented through legally binding documents, are included in the California Plan, because they are arrangements which affect only the agencies and do not implicate the interest of the state as a whole. The Key Terms provided the framework that the agencies used to develop appropriate legally binding documents and the basis to comply with all environmental laws prior to approving the new Quantification Settlement Agreement. In contrast, the California Plan is a framework, which is to be used to plan resource and financial investments and provide overall coordination on important initiatives undertaken by the agencies. As a Plan, it documents and links the commitments to be undertaken by the agencies with respect to California's overall apportionment to use Colorado River water.

Components of California's Colorado River Water Use Plan can be viewed as a diverse and lengthy collection of policies, programs, projects, actions, and other activities, which deal with safeguarding, protecting, and optimizing California's Colorado River resources. Some of these are associated components, meaning that they don't directly involve Colorado River water but are needed by the implementing entities and individuals to meet their water needs within California's Colorado River apportionment, e.g., water reuse and additional local projects.

Upon close examination, it is apparent that none of the components and associated components are mutually exclusive of each other. They either interface, or are interrelated and interdependent. Some are in place, others require further implementation. When fashioned into a coordinated framework employing a consensus-based regional approach, these components become a plan. The Plan is sufficiently flexible to provide for other component options and/or other specific programs and projects when they are deemed more cost-effective or appropriate. While not contingent upon a specific project or program, its success is tied to the magnitude of, and timing for, implementation of various linchpin components.

Appropriate groupings of The Plan components and associated components help define The Plan's framework and the interrelated nature of the components (Figure 2), and aids in their understanding. Specific projects, programs, and actions of each component further define The Plan. These specific programs, projects, and actions are

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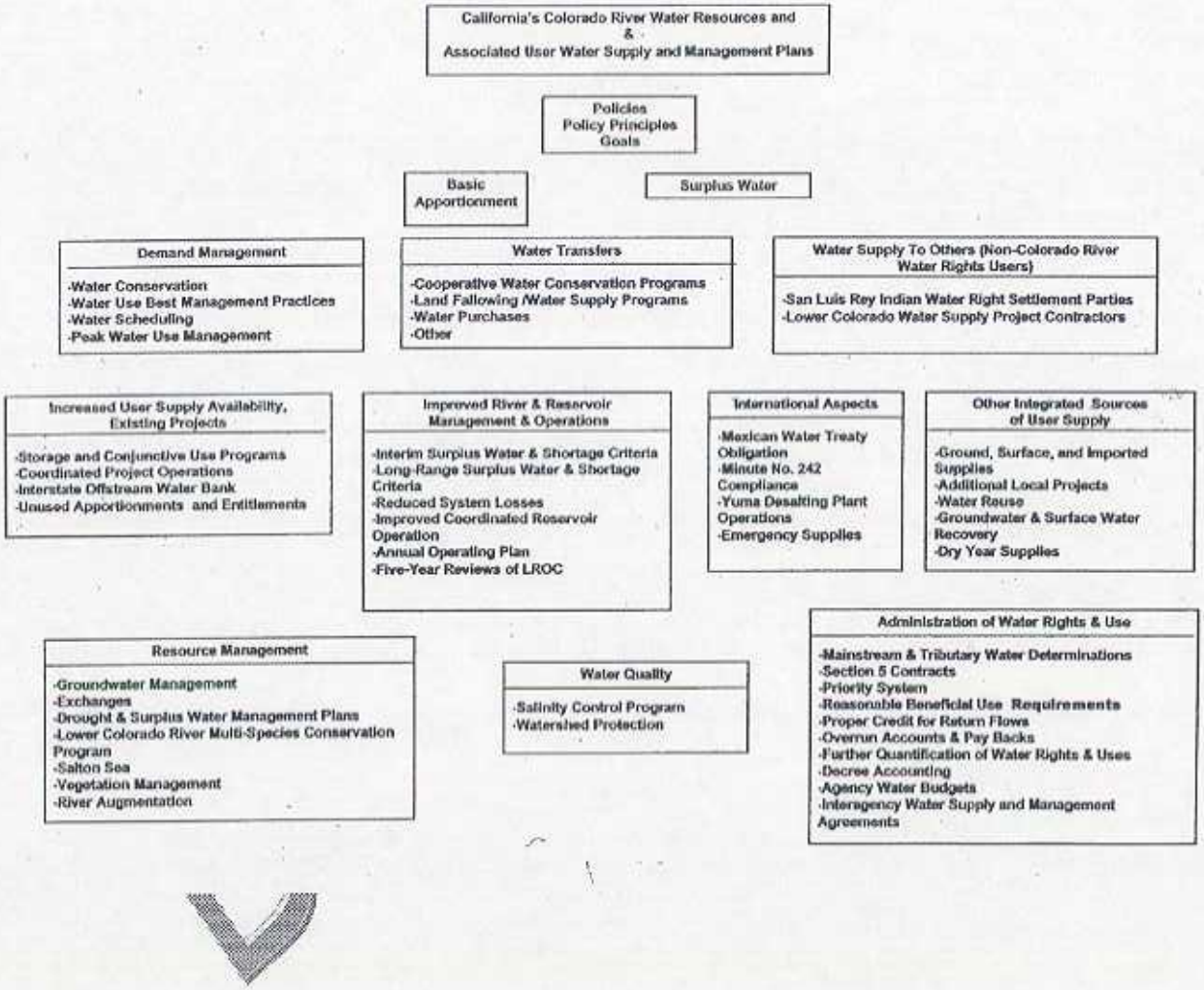
Figure xxx - Framework Components of California's Colorado River Water Use Plan



developed by the implementing entities under The Plan's coordinated framework and are tailored to meet their specific Colorado River needs.

Inasmuch as California's Colorado River water use will be limited in the future and given the interdependency of the entitlement and priority system, cooperative agreements or other arrangements will be needed for implementation of specific projects and programs to optimize California's Colorado River water use, as well as some of those that safeguard and protect California's rights and interests in the resources of the Colorado River. These interagency agreements and other associated implementation agreements, together with the Secretary's administration of water rights and use, constitute the principal binding and enforceable provisions of The Plan.

A. Water Transfers

Water transfers may be made for use in the same year as the transfer, or retained for future use. Those for future use are carried out in coordination with storage and/or conjunctive use programs. The Secretary's November 1, 1999 Final Rule on Offstream Storage of Colorado River Water and the creation of the Arizona Water Banking Authority (AWBA) allow for such programs to be carried out on an interstate basis with respect to both basic and surplus Colorado River water apportionments.

As discussed earlier, cooperative voluntary intrastate water transfers play a critical linchpin role in California's ability to meet its Colorado River water needs from within its basic apportionment. Fundamentally, there needs to be sufficient long-term core transfers from agricultural use to urban use so that the remaining water needs can be addressed by other water supply program and project options. The core transfers are, for the most part, conserved Colorado River water from one area of use being made available for use to meet an existing Colorado River water use in another area, resulting in a net reduction in the use of Colorado River water.

Short-term water transfers may also play an integral role in meeting the region's water needs. This includes transfers in the form of dry year, spot market, and emergency supplies, and water supply reserve building. Water transfer options include short- or long-term cooperative arrangements wherein a party forgoes the use of water, such as in the case of a cooperative agricultural land fallowing/water supply transfer.

Other options are water market purchases for current or subsequent year use. The new Quantification Settlement Agreement allows for the signatory districts, without objection by any district, to acquire Colorado River water from other Colorado River water right holders, so long as such acquisitions will not materially reduce the water available to another district under the Quantification Settlement Agreement.

With respect to long-term transfers, preference is given to cooperative voluntary water conservation/transfers inasmuch as they generally have lesser third party impacts to

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regional and local economies and the environment, and help optimize existing resources. Cooperative water conservation/transfers can result in significant benefits including:

- a permanent water savings and a long-term, reliable water supply,
- increased water use and conveyance efficiencies, and
- investments in infrastructure improvements that provide for improved water operations, increased operational flexibility, and best management water use practices.

With respect to California's Colorado River water service area, the principal area of cooperative water conservation program opportunities is within Imperial Valley with the need for the use of the conserved water lying within the Coachella Valley and the coastal plain of southern California.

The new Quantification Settlement Agreement and its associated Secretarial Implementation Agreement provisions on the third and sixth priority use provide the mechanisms needed to help facilitate the voluntary shift of approximately 0.5 million af per year from agricultural use to principally urban use and the needed quantum baseline by which such programs can be measured. The new Agreement also provides a long-term water supply for the San Luis Rey Indian Water Rights Settlement.

Under the new Quantification Settlement Agreement, use of Priority 1 and 2 (Seven-Party Agreement) water by PVID and the Yuma Project Reservation Division will continue basically unchanged. IID and CVWD have agreed that their Priority 3 annual use will be capped at 3.1 million af and 0.33 million af, respectively. These baselines of entitlement establish the foundation for the Quantification Settlement Agreement's water budgets for IID, CVWD and MWD.

The following summarizes the yields and estimated start dates of the core cooperative voluntary water conservation/transfer projects and associated exchanges:

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Table yyy – Cooperative Water Conservation/Transfer Projects

Cooperative Water Conservation / Transfer Projects	Annual Yield (af)	Estimated Start Date
MWD / IID 1988 Water Conservation Program	100,000 – 110,000[1]	Completed
SDCWA / IID Transfer and SDCWA / MWD Exchange	130,000 – 200,000[2]	2002
MWD / CVWD SWP Water Transfer / Colorado River Water Exchange	35,000	2003
Coachella Canal Lining-MWD / SLR[3]	26,000	2005[4]
All American Canal Lining-MWD / SLR[3]	67,700	2006[4]
IID / CVWD / MWD Conservation Program	100,000[5]	2007

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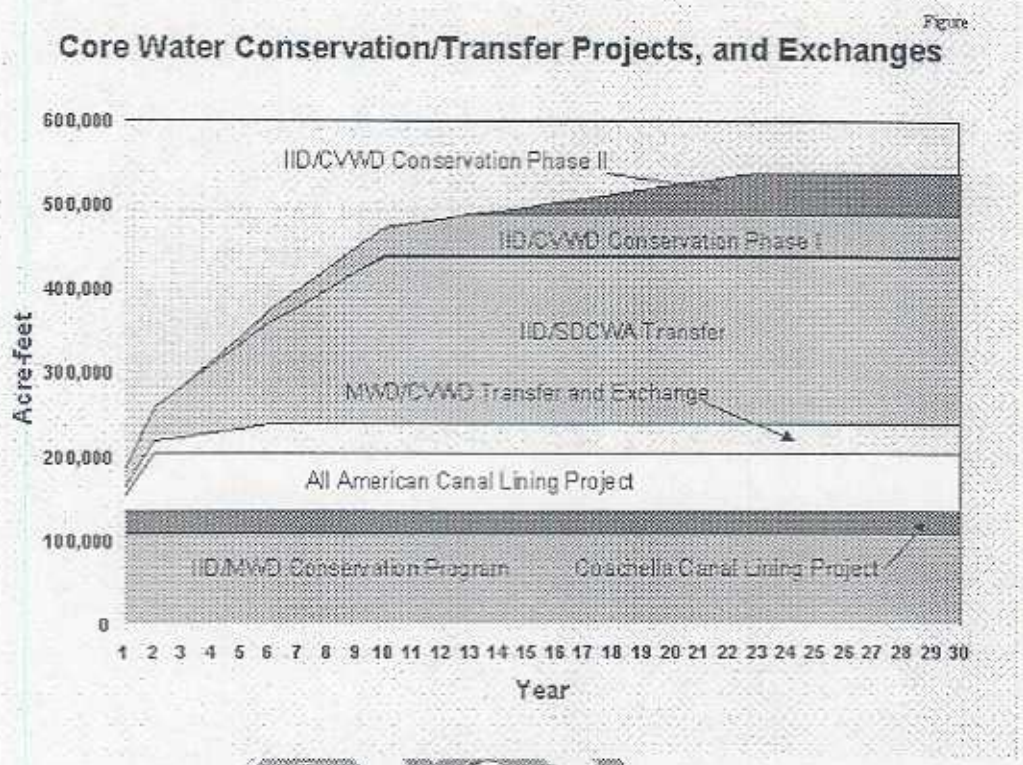
The estimated water build-up schedule of the core cooperative voluntary water conservation/transfers is shown in Figure xxx. The agencies' Colorado River entitlement water use budgets are adjusted for each increment of transfer, resulting in an overall reduced use of Colorado River water by California. As can be seen, there is approximately a 20-year transition period before the core water conservation/transfers are fully implemented. All of the core conservation/transfers to the coastal plain of southern California occur within a ten-year implementation period.

[1] Yield to MWD, except for 20,000 acre-feet per year to be made available to CVWD
[2] Yield to SDCWA
[3] Yield to MWD and San Luis Rey Indian Water Rights Settlement Parties
[4] Date by which full conservation benefits will be achieved
[5] Yield to CVWD, MWD has an option to acquire water CVWD does not need. MWD assumes responsibility for 50,000 acre-feet per year to CVWD after year 45 of Quantification Agreement

Figure xxx - Core Water Conservation/Transfer Projects and Exchanges



Collectively, these provide for the movement of up to 538,700 af per year from agricultural use to principally urban use for up to 75 years. The following is a brief description of each of the core cooperative water conservation/transfers and exchanges.

The new Quantification Agreement contemplates that water conserved and made available by IID to MWD of approximately 90,000 af per year pursuant to the IID/MWD 1988 Water Conservation Agreement will continue to be made available to MWD for up to 75 years. The remainder of the conserved water from this program, 20,000 af per year, will be available to CVWD. Measures that have been implemented that produce the program's conserved water include canal concrete lining, regulatory reservoirs, non-leak gates, lateral interceptors, system automation, 12-hour delivery, and irrigation management.

In 1998, the San Diego County Water Authority and Imperial Irrigation District completed a landmark water conservation and transfer agreement, which is an essential component of The Plan. With an expected yield of up to 200,000 af, this pact is believed to be the largest agriculture-to-urban water transfer in United States history. Colorado River water will be conserved by IID and Imperial Valley farmers, who voluntarily participate in the program, and the conserved water will be transferred to the Authority

for use in San Diego County. Farmers will conserve the water by employing extraordinary conservation measures, including on-farm reservoirs to buffer supply and demand, linear sprinkler machines and drip/trickle irrigation systems, and tailwater recovery. Crop land fallowing will not be utilized to conserve water. IID conservation measures could include canal lining and seepage prevention, the construction of lateral interceptors and reservoirs, and measures to increase water delivery/ordering flexibility.

The Authority will receive between 130,000 and 200,000 af of water per year, after an initial ramp-up period in the water deliveries. Water deliveries are projected to begin flowing into San Diego County in 2002 with an initial delivery of 20,000 af. Each subsequent year, deliveries will increase by 20,000 af until the program's maximum yield is reached. The initial term of the agreement is 45 years, with a provision that either agency may extend the agreement for an additional 30-year term.

To deliver the transfer water to San Diego County, the Authority completed a Water Exchange Agreement with the Metropolitan Water District in 1998. Under this agreement, MWD will take delivery of IID's conserved water, using its Colorado River Aqueduct, and exchange a like quantity and quality of water to the Authority. The exchange agreement has a term of 30 years.

The water transfer and exchange agreements have a number of contingencies that must be met before the agreements can be implemented. The contingencies include quantification of the agricultural agencies' entitlements, development of interim surplus criteria, and the allocation of state funding for water conservation projects on the All American and Coachella Canals and conjunctive use storage facilities along the River. Each of these contingencies is addressed separately in this Plan.

IID will also conserve and make available to CVWD 100,000 af per year and if not needed by CVWD, the water may be available to MWD. Authorized State funding of $200 million will be utilized to concrete line portions of the All American and Coachella Canals, resulting in additional supplies for MWD of 77,700 af per year and a permanent supply for the San Luis Rey Indian Water Rights Settlement of 16,000 af per year. Additionally, to better utilize Colorado River and California State Water Project supplies, MWD and CVWD have agreed to a transfer of 35,000 af per year of MWD State Water Project entitlement to CVWD through an exchange.

In addition to these core water conservation/transfers and exchanges, a cooperative water conservation/interim transfer project, involving the lining of the first 49 miles of the Coachella Canal and the conservation of 132,000 af per year, has been in place since 1980. It allows the federal government, for an interim period, to store the conserved water in Lake Mead to offset storage releases associated with the bypassing of drain water from the Wellton-Mohawk Division, Gila Project, Arizona to the Santa Clara Slough instead of accounting for the drainage water in water deliveries to Mexico. This was carried out as an interim measure to comply with the salinity requirements of delivered water to Mexico contained in Minute No. 242 of the International Boundary

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and Water Commission. It was planned as a temporary substitute for the Yuma Desalting Plant which is to treat the drainage water permitting it to be accounted for in the deliveries to Mexico.

The interim period for the federal government's use of the conserved water from the lining of the first 49 miles of the Coachella Canal to offset Lake Mead storage releases for this purpose ends "the first year that the Secretary delivers main stream Colorado River water to California in an amount less than the sum of the quantities requested." The conservation project has reduced, by an equivalent amount, the level of Colorado River water use that California would have otherwise had to reduce to remain within its basic apportionment of Colorado River water and will aid the California agencies in meeting their needs within their Colorado River water entitlements. The Yuma Desalting Plant and the lining of the first 49 miles of the Coachella Canal were authorized under Title I of the Colorado River Basin Salinity Control Act of 1974.

With regard to other types of transfers, a cooperative program for forgoing the use of water through land fallowing and allowing an equivalent amount of water to be used elsewhere has been successfully tested by California agencies with Colorado River water rights. MWD executed an agreement in 1992 for the implementation of a Test Land Fallowing Program (Test Program) in the Palo Verde Valley. In addition to a program agreement, there were 63 land fallowing agreements executed by Palo Verde Valley landowners and lessees and MWD. A total of 20,215 acres of land were fallowed, which was approximately 23 percent of the irrigated acreage in the valley. The program saved approximately 186,000 af of water over the two-year test period. The saved water was stored in Lake Mead for future use by MWD. The water was released from Lake Mead as flood control releases in 1997.

The fallowing Test Program requirements were that a history of farming was required on the land to be fallowed, that the land was to have been irrigated absent the program, that no new land could be brought into agricultural production by the participants, and that a land management plan was required to control weeds and dust.

Land fallowing has been demonstrated as a viable means of providing a reliable short- or long-term water supply. In particular, it offers a proven means to help meet water needs when adequate supplies are not available, as well as a means to build supply reserves. MWD has identified this specific option for such times as there is an inadequate Aqueduct water supply during the period of interim surplus criteria.

Voluntary cooperative water transfers will continue to play an important foundation role for California to meet its Colorado River water needs within its apportionment and to optimize the use of its apportionment. California's Colorado River Water Use Plan encourages further voluntary cooperative transfers that improve the management and use of water without materially impacting water available to other users. Consideration of transfers is guided by the Board's adopted policy principles.

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B. Increased User Supply Availability, Existing Projects

Conjunctive use and storage programs, coordinated project operations, interstate offstream Colorado River water banking, and unused Colorado River water apportionments and entitlements represent other important means for California Colorado River water users to increase their water supply yield and availability of Colorado River water. These may be supplemented by dry-year supplies and water purchases.

1. Conjunctive Water Use and Storage Programs

Absent the use of surplus Colorado River water and River water apportioned but unused of the other lower Basin states, the Key Terms for Quantification Settlement core voluntary cooperative water conservation/transfers from Imperial Valley to the southern California coastal plain are not sufficient for a full MWD Colorado River Aqueduct supply. The remaining amount, approximately 300,000 af per year, is to be provided for by conjunctive water use and storage programs. Beyond that in any particular year that the conjunctive use and storage program supplies may be insufficient, dry year supplies, water purchases, or other supplies would be used to meet that need.

Figure xxx – Proposed Storage and Conjunctive Use Programs

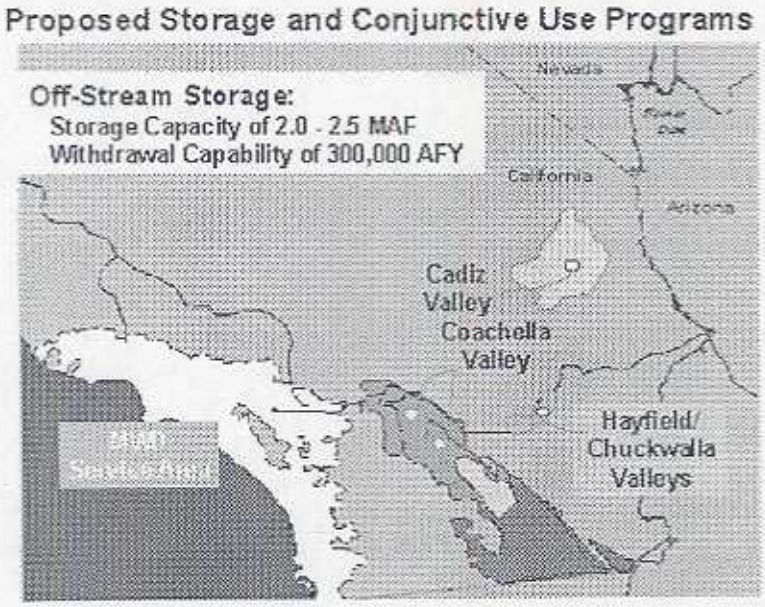

Table YYY – Conjunctive Use and Storage Program Details

The conjunctive water use and storage programs are "put and take" programs. For MWD, water would be placed (put) into these programs through the coordinated operation of its supplies, wherein a greater portion of its needs would be met by the increased availability and use of other supplies thereby allowing the offset Colorado River water to be stored for these programs. Conversely, during the "take" periods stored Colorado River water and indigenous groundwater would be withdrawn to meet needs. The cycle of "put" and "take" would be repeated, thereby increasing supply yield through more effective and coordinated use of existing facilities and the conservation of supplies.

During the period of the interim surplus criteria, surplus Colorado River water would be the "put" water (to storage) to prime the conjunctive water use and storage programs for subsequent withdrawal when surplus water is not available to California. After the 15- year interim surplus criteria period, the coordinated operation of supplies that takes advantage of the increased availability of other supplies to MWD to meet needs provides for the "put" Colorado River water for these programs. Water purchases and cooperative land fallowing/transfers or other cooperative water use reduction/transfers are other options to provide for "put" water.

Water quality management is also a deciding factor in the "put" and "take" operations and choice of supplies. Water supply quality affects water treatment requirements, water conservation efficiencies (better quality, less use), water reuse opportunities (more effective use of existing supplies, lesser need for other supplies), and the utilization of groundwater.

Those conjunctive use and storage programs outside of the MWD service area that require the use of the Colorado River Aqueduct for "put and take" operations that are being studied or implemented include Hayfield/Chuckwalla, Cadiz, and upper Coachella Valley. CVWD and MWD currently have an active cooperative Colorado River water conjunctive use and storage program in the upper Coachella Valley. Those being studied or implemented that do not require the use of the Aqueduct for "put" operations and that provide for "put" in excess of that which can be provided by the Aqueduct include the lower Coachella Valley and the Arizona interstate groundwater bank.

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MWD has entered into cooperative conjunctive use programs within its service area with its member agencies and is studying or has implemented others that may use Colorado River water and/or California State Water Project water for "put and take" operations or from which withdrawals can be made, if needed, to allow for Colorado River Aqueduct "put" water operations for programs outside its service area. Those associated with the State Water Project for conveyance include Semitropic and Arvin Edison groundwater storage programs. MWD does not have direct access to groundwater basins underlying its service area. In order to implement a groundwater storage or conjunctive use program, MWD must implement an agreement with an entity, which has rights for groundwater storage and extraction in an underlying basin.

Conjunctive water use and storage programs within the Coachella Valley provide a means to meet the Valley's groundwater management needs. Cooperative programs with other Colorado River water users in the Coachella Valley offer the opportunities to meet water supply needs of others as well as the Valley's management needs. MWD's Colorado River Aqueduct provides for the conveyance of Colorado River water to the upper Coachella Valley. For the lower Coachella Valley, Colorado River water can be conveyed through the All American Canal and Coachella Canal and can be stored through direct recharge or indirectly by water users utilizing canal water instead of groundwater. Potential water available for these purposes include surplus Colorado River water, users' Colorado River entitlement water, and Colorado River water purchased from other Colorado River water right holders.

2. Coordinated Project Operations

In cases where users have more than one source of supply, the coordinated use of those supplies can, through the more effective use of existing facilities, increase water yield and storage, improve supply and stored water quality, and reduce water costs. Other than for MWD and CVWD, the Colorado River is, and is likely to remain, the sole source of water supply for other California Colorado River water right holders. For them to receive additional supply benefits from coordinated project operations, they must cooperatively participate in programs of others.

MWD has the greatest capability of California Colorado River users to benefit from coordinated project operations. Others can potentially benefit through the participation in cooperative programs with MWD, such as CVWD has done. MWD can take advantage of its diversity of water supplies and can receive additional water supply and management benefits through the coordination of its supplies with the local supplies of its member agencies, and the coordination of its State Water Project and Colorado River supplies.

Drawing more on supplies under surplus water conditions under a coordinated plan of operation provides for increased yield. Further, better water quality generally exists during surplus periods versus normal water supply years, and planned operations

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for improved water quality can be undertaken. Offstream storage of surplus water allows for additional recovery of water and the coordinated use of various storage sources can help strategically relocate supplies to more effectively meet economic and environmental needs. Indirect storage operations also allow for the strategic shifting and placement of supplies. Coordinated project operations can be instrumental for effective drought management and supply recovery operations and for addressing other supply disruptions. Coordinated project operations are the key means in establishing a sustainable yield for storage and conjunctive use programs.

3. Interstate Offstream Colorado River Water Banking

Interstate offstream water banking of unused basic and/or surplus Colorado River water apportionments provides an added water management dimension to meeting water supply needs of the Lower Division states. On November 1, 1999, the Department of the Interior issued a Final Rule to facilitate voluntary interstate offstream storage of Colorado River water among Arizona, California and Nevada. The Final Rule establishes a framework for the Secretary to follow in considering, participating in and administering storage and interstate release agreements among entities in Arizona, California, and Nevada. It will enable entities in Nevada and California to store Colorado River water in Arizona's groundwater basins. It will permit state-authorized entities to store Colorado River water offstream, develop intentionally created unused apportionment (ICUA), and make ICUA available to the Secretary for release and use in another Lower Division state using an agreement. The Department's stated intent of the rule is to increase the efficiency, flexibility and certainty in Colorado River management.

A storing entity in the rule is defined as one that is expressly authorized by the laws of that state to enter into an agreement and develop ICUA. Colorado River stored within a storing state for this purpose is water that would otherwise be unused in that state, but that is within its basic or surplus apportionment.

A consuming entity is defined as one that has authority under the laws of that state to enter into an agreement and acquire the right to use ICUA. Under an agreement, the Secretary may make the consuming state's unused basic or surplus apportionment available for the purpose of storing this water in the storing state. When the consuming entity requests water under an agreement, the storing entity will reduce the storing state's consumptive use of Colorado River water, thereby developing ICUA. The Secretary will release the ICUA to the consuming entity for use in the consuming state. ICUA will be released to the consuming entity only in the year and to the extent that ICUA is developed by the storing entity after all necessary actions have been taken under the Final Rule.

The Final Rule allows anticipatory releases of ICUA and use of this ICUA by the consuming entity before the actual development of ICUA by the storing entity in the same year. As the rule allows for the release and delivery of ICUA in the same year in which it is developed, the Secretary will not require actual storage of water subsequent to

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the release of ICUA if, consistent with the laws of the storing state, the development and recovery were to occur in the same year.

The Secretary will be a party to any such agreement (but not necessarily to the financial aspects of the arrangements between the storing and consuming entities) and will release ICUA to the consuming entity and not to other entitlement holders. For the consuming entity, the agreement can satisfy the Boulder Canyon Project Act requirement that all diversions of water require a contract with the Secretary.

Any agreement is to identify a procedure for the Secretary to follow to verify and account for the quantity of water stored, and describe the notice given to entitlement holders, including Indian Tribes, of opportunities to participate in the development of ICUA, all consistent with the laws of the storing state.

The Secretary is to notify the public of the intent to participate in negotiations to develop an agreement and provide a means for public input. In executing an agreement, the Secretary must consider applicable law and executive orders, applicable contracts, potential effects on trust resources and potential effects on entitlement holders among other matters.

In 1996, the Arizona legislature created the AWBA. The AWBA was created specifically to protect Arizona's supply of Colorado River water, and to provide opportunities for interstate banking. Its major objective is to store Arizona's unused Colorado River water entitlement in western, central, and southern Arizona to develop long-term storage credits to: (1) firm existing water supplies for municipal and industrial Arizona users during Colorado River shortages or Central Arizona Project (CAP) service interruptions; (2) help meet the water management objectives of the Arizona Groundwater Code; and (3) assist in the settlement of American Indian water rights claims in Arizona. The statute provides a role for interstate storage programs, limiting the annual recovery amount to no more than 100,000 af in total for entities in California and Nevada.

Each year, AWBA pays the delivery and storage costs to convey what would otherwise be unused Arizona Colorado River water into central and southern Arizona through the CAP. The water is stored underground in existing aquifers (direct recharge) or is used by water agencies in lieu of pumping groundwater (indirect storage). For each acre-foot stored, AWBA accrues a credit that can be redeemed in the future.

Both the Southern Nevada Water Authority (SNWA) and MWD are currently in discussions with the AWBA regarding participation in the Arizona water bank to make more effective use of Colorado River apportionments and surplus water in meeting future water needs. SNWA is seeking to accumulate 1.2 million af of unused apportionment or surplus Colorado River water during the interim surplus criteria period and the storage of future periodically available surplus Colorado River water as part of its program to meet future needs.

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Figure xxx – Photo of Flooding of Colorado River

MWD is seeking to use the Arizona water bank to store surplus Colorado River water to assist in its transition to its basic apportionment and to help mitigate incremental impacts caused by the use of interim surplus criteria, guard against critical year hydrology, and make more effective use of surplus Colorado River water to meet long-term needs. This involves the potential to accumulate up to 2 million af of stored surplus water collectively in the Arizona water bank and the lower Coachella Valley with an annual storage and extraction of up to 200,000 af per year for the stated purposes.

Previously in October 1992, MWD and the Central Arizona Water Conservation Water District (CAWCD) executed an Agreement for a Demonstration Project on Underground Storage of Colorado River water. Under the agreement, SNWA had an option to participate in the project which they did exercise. MWD and SNWA paid the costs of CAWCD storing water indirectly in central Arizona. CAWCD is responsible for the costs of recovery of the water. MWD executed an Amendatory Agreement in December 1994 with CAWCD to increase Program capacity from 100,000 af to 300,000 af and extend the time for storage from December 31, 1996 to December 31, 2000. Under the Agreement, as amended, 139,000 af of Colorado River water has been stored underground. MWD and SNWA have the option to recover approximately 90 percent of their shares of this water, 81,000 af and 45,000 af, respectively, in the future.

4. Unused Apportionments and Entitlements

Optimizing California's use of its basic and surplus apportionments is essential to meeting its water needs. Given the inherent interstate and intrastate apportionment and priority system of "The Law of the River", effective cooperative forecasting of water use will be instrumental to making the most effective use of state apportionments and user entitlements.

Section II (B) 6 of United States Supreme Court Decree in *Arizona v. California* provides for the Secretary to release water apportioned but unused by a Lower Division

state for consumptive use in another Lower Division state. It also provides that no rights to the recurrent use of such water shall accrue by reason of such use. With respect to California's priorities to the use of Colorado River water, water not used by one user becomes the supply for another.

C. Other Integrated Sources of User Supply

Those California Colorado River water right holders with the higher priorities to the use of Colorado River water have limited opportunities for alternative sources of water supply. However, their higher priority standing generally means they have lesser or no need for other supplies. The exception is Miscellaneous Present Perfected Right holders, such as the City of Needles, which have inadequate rights to meet existing and/or future water needs. The Lower Colorado Water Supply Project, authorized by P.L. 96-375 in 1986, is intended as the supplemental water supply for municipal, industrial, and recreational users along the River with inadequate Present Perfected Rights.

For lower priority Colorado River water users MWD and CVWD, the integrated development of ground, surface, and imported supply sources, either directly or, in the case of MWD, in conjunction with member agencies, has provided the means to meet their service area's water needs. The integrated use of water supplies will also help provide the means for the region to meet its water needs when California is limited to its basic apportionment of Colorado River water.

The Coachella Valley Water Management Plan being developed by CVWD will address its water supply quality and quantity and groundwater management needs. The goal of the plan is to assure adequate quantities of safe, high quality water at the lowest cost. The plan will involve the integrated use of conservation, groundwater, surface water, recycled water, and Colorado River water. Colorado River water plays a prominent role in meeting the water management needs of Coachella Valley. This includes CVWD's entitlement of Colorado River water, transfers of conserved water from Imperial Valley in the future, exchanges of State Water Project water for Colorado River water, and cooperative storage and conjunctive use programs in the future.

The water supply used in the coastal plain of southern California originates from many sources. Its needs are met through the integrated use of conservation, groundwater, surface water, recycled water, recovered groundwater, and imported supplies delivered through MWD's Colorado River Aqueduct, the Los Angeles Aqueduct, and the State Water Project. MWD provides imported Colorado River water and State Water Project water and supports local resource development, conservation, and storage. MWD, in conjunction with its member agencies, groundwater basin management agencies, and other water providers developed an Integrated Resources Plan (IRP) in 1996 to guide the means by which the region would meet its future water needs.

The focus of the IRP process was to collectively examine all of the available resource options in order to develop a least-cost plan that meets the reliability and quality

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needs of the region. The major objective for the IRP was to develop a comprehensive water resources plan that ensures reliability, affordability, water quality, diversity of supply, and adaptability for the region, while recognizing the environmental, institutional and political constraints to resource development. This resulted in a preferred resource mix strategy and future targets for all components of the preferred resource mix. The IRP will be periodically updated and revised to reflect changed conditions, including assumptions, forecasts, and demand trends.

The Colorado River has and will continue to play an essential role in meeting the regional needs of coastal southern California. This includes MWD's entitlement to Colorado River water; transfers of conserved water from Imperial Valley; options to the use of Colorado River supplies of other Colorado River water right holders; dry year and reserve building supplies derived from cooperative land fallowing programs; storage and conjunctive use programs; recovered groundwater, surface and drainage waters; and other Colorado River water purchases. The storage and conjunctive use programs include Cadiz, Hayfield/Chuckwalla, upper and lower Coachella Valley, and the Arizona water bank.

D. Demand Management

Demand management provides a cost-effective means to meet future water needs. This includes water conservation, water use best management practices, modified water use behaviors, improved conveyance efficiencies, and peak water use management. With respect to water use efficiencies, the Colorado River Board adopted the policy principle to "promote implementation of best management practices in the environmental, urban, and agricultural sectors."

Demand management measures have been instrumental in reducing MWD's current water needs below historic levels even with continued growth in population. In addition, cooperative Imperial Valley voluntary water conservation/transfers provide the principal means for California to meet its Colorado River water needs within its basic apportionment of Colorado River water. Further water conservation and other demand management measures are essential components of supply management plans of IID, CVWD, and MWD.

1. Water Conservation

Water conservation has and will continue to play a pivotal role in meeting southern California water needs, and is essential to meeting the region's needs within California's basic apportionment of Colorado River water. Imperial Valley farmers and the IID have made significant dollar and resource investments in a broad range of on-farm conservation and conveyance/distribution system improvement programs and measures to improve water management. Implemented on-farm water conservation measures and practices have included lining head ditches, land leveling, and improved on-farm management, such as tailwater reuse, sprinkler irrigation, drip irrigation, and

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deep tillage. Over 2,600 miles, or over 90 percent, of farm head ditches have been concrete-lined to date to reduce seepage and to obtain better control of water delivered to fields. Precision laser land leveling has improved on-farm irrigation efficiencies by maintaining uniform field slopes and removing the cross slope to improve distribution uniformity. Approximately 80 percent of Imperial Valley farmland is releveled in a touchup operation every three to five years.

Through the cooperative IID/MWD water conservation program, 25 systems have been installed to collect tailwater at the end of the field and pump it back to the head ditch for reuse. Many growers independently use portable pumpback systems with aluminum pipelines while others who have several adjacent fields use the tailwater from upper fields to irrigate lower fields.

While not suitable for many conditions and crops, sprinkler irrigation has been adopted where appropriate in Imperial Valley. The most extensive use is in the germination and establishment of crops with small seeds such as carrots and lettuce. With sprinkler irrigation, growers can conserve water during germination by applying smaller, more precise applications of water than is possible with surface irrigation.

Properly designed, installed, and managed drip irrigation systems can improve distribution uniformity, decrease soil surface evaporation, and reduce or eliminate tailwater. On selected high value crops in the Imperial Valley (melons, tomatoes, asparagus), drip irrigation provides an economic advantage due to improved yields and water management.

Deep tillage improves the infiltration and drainage characteristics of many Imperial Valley soils which, in turn, reduces tailwater runoff. Many growers deep till to a depth of 20 to 30 inches.

Conveyance/distribution system improvements include canal lining, regulating reservoirs, system automation, and lateral interceptors. IID and Imperial Valley growers have concrete-lined or pipelined 1,102 miles of canals. An additional 200 miles were lined as part of the IID/MWD water conservation program. Thus, over 1,300 of the 1,675 miles of canals within the IID system have been lined, conserving an estimated 58,000 af of water per year.

Regulating reservoirs reduce canal spill by capturing excess canal flows that occur when an irrigator uses less water than originally ordered, and provide make up water to meet unanticipated demands. Six of IID's ten regulating reservoirs were constructed as part of the IID/MWD water conservation program. Automated water control structures, part of IID's Supervisory Control and Data Acquisition (SCADA) system, provide more stable water levels in canals, which result in more uniform deliveries and fewer canal spills.

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Lateral interceptors are constructed at or near the end of laterals to capture excess lateral flow before it spills into the drainage system. Interceptor channels carry water to a regulating reservoir where it is used to meet delivery orders. As part of the IID/MWD water conservation program, three lateral interceptor systems were constructed. Lateral interceptors now serve one-sixth of the irrigated farmland within IID and conserve an estimated 34,000 af of water per year.

Cooperative voluntary water conservation in Imperial Valley and Coachella Valley under the new Quantification Settlement Agreement will provide for the transfer of over 500,000 af of water from agriculture to principally urban use within approximately the next 15 years. This will be achieved through further on-farm water conservation and conveyance/distribution system improvement programs and practices. It includes concrete lining of portions of the All American Canal and Coachella Canal.

Since the late 1980s, water agencies in the MWD service area have retrofitted some 1.5 million ultra-low-flush toilets, distributed some 3 million low-flow showerheads and conducted numerous landscape audits, home water surveys, commercial and industrial water efficiency measures and public education programs. These conservation programs, together with state-mandated plumbing codes, are saving approximately 480,000 af per year in MWD's service area. The cumulative investments by the coastal southern region in conservation to date have been over $180 million.

Within MWD's service area over an additional 500,000 af is projected to be saved from conservation by 2020. This will bring the total savings attributable to conservation within MWD's service area to approximately 1 million af per year at a cumulative investment of $1.3 billion.

Conservation is also an important component of CVWD's water management plan for Coachella Valley. By 2035, conservation within the Coachella Valley will save over 65,000 af each year. CVWD's water conservation elements fall into three categories: agricultural, domestic, and golf course.

Agricultural conservation will be achieved by expanding CVWD's ongoing programs which encourage Valley growers to use the most up-to-date irrigation practices, design irrigation systems that incorporate conservation features, refine existing drip irrigation management and improve distribution uniformity. CVWD is currently conducting voluntary on-farm water audits within Improvement District No. 1 in order to identify the range of water application practices in the valley. CVWD is also reviewing its internal operating policies to identify opportunities for additional water savings.

Domestic water conservation in the Coachella Valley will focus on water-efficient landscaping and irrigation technology, installation of water-efficient plumbing and public information and education programs.

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Golf course water conservation will be achieved through cooperative efforts with existing golf course owners and developers of new golf courses focusing on irrigation techniques, scheduling and uniform distribution of water. Application of state-of-the-art technology, including use of on-site evapotranspiration (ET) measurements, coupled with computer-controlled irrigation systems, will be promoted. CVWD also encourages participation in the water conservation audit program sponsored by the Natural Resources Conservation Service.

Water conservation for other California Colorado River water users, such as PVID, reduces the cost of water through efficiency improvements.

The Bureau of Reclamation in considering annual Colorado River water supply contract delivery requests reviews the districts' water conservation plans as part of their determination of reasonable beneficial use. To assist users in their preparation of water conservation plans, the Bureau of Reclamation developed "Achieving Efficient Water Management" guidebooks for preparing both Urban and Agricultural Water Conservation Plans. The Bureau of Reclamation has also developed an "Incentive Pricing Handbook for Agricultural Water Districts", April 1977. The Bureau of Reclamation defines water conservation measures as those methods, techniques, policies, practices, procedures, activities, institutional arrangements, structural projects, physical facilities, equipment, or devices which reduce water consumption, reduce water withdrawal or diversion, reduce water loss or waste, improve water use efficiency, or increase water recycling or reuse.

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2. Water Use Best Management Practices

Urban water conservation best management practices developed by California water agencies, and environmental and other public interest groups include:

- increased plumbing efficiency in new structures and retrofits for existing structures,
- interior/exterior water audits and incentive programs for residential, industrial, and commercial/institutional customers,
- distribution system leak detection and repair,
- metering with commodity rates,
- conservation pricing,
- large landscape water conservation requirements for new development,
- high efficiency washing machine rebates, and
- public education and information.

These best management practices (BMP) are described in the Memorandum of Understanding Regarding Urban Water Conservation in California as amended on April 8, 1998. The BMPs are based on the best available data and are subject to being revised as the state of knowledge improves.

The California Legislature passed the Agricultural Water Suppliers Efficient Water Management Practices Act in 1990. The main goal of the Act is to further improve agricultural water use efficiency. In 1997, agricultural water suppliers, environmental interest groups, and other interested parties entered into a Memorandum of Understanding (MOU) Regarding Efficient Water Management Practices (EWMPs) by Agricultural Water Suppliers in California and established an Agricultural Water Management Council. In accordance with the Act, agricultural water suppliers are to voluntarily prepare and submit Water Management Plans to the Council for approval. PVID, CVWD, and IID are all signatories to the MOU and members of the Council.

The Bureau of Reclamation in its water conservation plan guidebooks identifies agricultural and urban water conservation best management practices. It recommends four "fundamental" measures as applicable to all districts' programs. It further recommends that a water conservation plan address how the district has implemented, or could implement, each of the four fundamental measures:

- a *water measurement and accounting system* designed to measure and account for the water conveyed through the district distribution system to water users,
- a *water pricing structure* that encourages efficiency improvements by water users,
- an *information and education program* for users designed to promote increased efficiency of water uses, and
- a *water conservation coordinator* responsible for development and implementation of the water conservation plan. In addition, the completed plan, is to include a resolution by the district's governing body approving the plan.

The Bureau of Reclamation also lists additional measures for agricultural and municipal and industrial districts to consider. These lists are not intended to be all-inclusive. A district is encouraged to consider these measures, and any other water conservation measures not listed below, that may be applicable to its circumstances.

Agricultural Water Conservation Measures

- On-farm program incentives – Facilitate and/or provide financial incentives and assistance for on-farm water use efficiency improvements (e.g., lease, low interest loans, or water charge rebates for on-farm conservation measures).
- Drought/water shortage contingency plan – Develop a drought/water shortage contingency plan for the district that outlines policies and procedures for operation and allocation during water supply shortages.
- Water transfers – Facilitate voluntary water transfers that do reasonably affect the district, the environment, or third parties.

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- Conjunctive use – Where appropriate, increase conjunctive use of surface and groundwater within the district, and work with appropriate entities to develop a groundwater management plan.
- Land management – Facilitate potential alternative uses for lands with exceptionally high water duties, or whose irrigation contributes to significant problems (e.g., drainage that precludes attainment of water quality standards).
- Operational practices and procedures – Evaluate potential district operational policy and institutional changes that could allow more flexibility in water delivery and carry-over storage.
- Distribution system scheduling – Implement a program of distribution system scheduling based on area-wide crop demand modeling or advanced ordering requirements.
- On-farm irrigation scheduling – Facilitate the delivery of crop water use and on-farm water delivery information to district customers for on-farm irrigation scheduling.
- Pump efficiency evaluations – Coordinate the evaluation of district and private pumps with local utilities, evaluating both energy and water efficiency.
- Distribution control – Modify distribution facilities and controls to increase the flexibility of water deliveries (e.g., automate canal structures, institute variable turn-off times, etc.).
- Reuse systems – Construct district operational spill reuse systems.
- Reduction of conveyance losses – Line distribution ditches and canals or convert to pipe.
- Construction, lining, or covering of regulatory reservoirs – Construct, line or cover small regulatory reservoirs within the distribution system.

Municipal & Industrial Water Conservation Measures

- Residential and governmental audit and incentive programs – Provide interior and exterior water audits and incentive programs for single-family residential, multi-family residential, and governmental/institutional customers.
- Commercial and industrial audit and incentive programs – Conduct commercial and industrial water conservation audits, water use reviews, and incentive programs.
- Landscape programs – Provide landscape water conservation audit and incentive programs for new and existing customers.
- Distribution system audit program – Conduct distribution system water audits, leak detection, and repair at regular intervals.
- A drought/water shortage contingency plan – Develop a drought/water shortage contingency plan for the district that outlines policies and procedures for operation and allocation during water supply shortages.

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- Wastewater reclamation and recycling programs – Design and implement wastewater reclamation and recycling programs.
- Plumbing regulations – Enforce applicable Federal, State, and local requirements for the sale and installation of water-efficient plumbing products.
- Fixture replacement programs – Implement programs to retrofit low consumption toilets and/or high efficiency showerheads in existing buildings.
- Conjunctive use – Where appropriate, increase conjunctive use of surface and groundwater within the district, and work with appropriate entities to develop a groundwater management plan.

E. Water Supply To Others (Non-Colorado River Water Rights Users)

There are two groups of water users that don't have Colorado River water rights for which water supply solutions have been developed that involve Colorado River water. They are the San Luis Rey Indian Water Rights Settlement parties and entities along the River without Colorado River water rights that are eligible to receive Lower Colorado Water Supply Project water.

1. San Luis Rey Indian Water Rights Settlement Parties

The San Luis Rey Indian Water Rights Settlement Act of 1988 (Title I of Public Law 100-675) was enacted to provide for the settlement of the reserved water rights claims of the La Jolla, Rincon, San Pasqual, Pauma, and Pala Bands of Mission Indians, which are located in northern San Diego County. The Act authorizes and directs the Secretary to arrange for a 16,000 af supplemental supply of water to benefit the Bands and the local communities. This supply can be obtained either from water development from public lands in California outside the service area of the Central Valley Project, from water salvaged as the result of concrete lining portions of the All American Canal or Coachella Canal, or through a contract with MWD.

Title II of P.L.100-675 authorized the Secretary to line parts of the canals, and permitted the Secretary to enter into an agreement or agreements with PVID, IID, CVWD, and/or MWD for construction or funding. The Act did not authorize appropriation of federal funds for canal lining.

On September 25, 1998, Governor Pete Wilson signed Senate Bill No. 1765, Colorado River Management Program, which appropriated $235 million from the General Fund to assist with the implementation of California's Colorado River Water Use Plan. The sum of $200 million is to be used to fund the lining of portions of the All American Canal and the Coachella Canal. The $200 million is only to be expended for the lining of these canals. The allocation of the water conserved from the canal lining projects is to be consistent with federal law and is to be determined by an agreement

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among MWD, IID, PVID, CVWD, and the San Luis Rey Indian Water Rights Settlement parties.

The availability of state canal lining funding is based on the following requirements being met:

- the Salton Sea Authority having completed a study of seepage and subsurface inflows to the Salton Sea from the All American Canal and Coachella Canal,
- all environmental documentation and permits having been approved and certified for the lining projects, and
- statements of findings by the Director of the California Department of Fish and Game and the Secretary that each canal lining project will have avoided or mitigated all significant effects on fisheries and other wildlife.

The remaining $35 million is to be used to finance the installation of recharge, extraction, and distribution facilities for groundwater conjunctive use programs necessary to implement the California Plan. Water stored in connection with the groundwater conjunctive use programs is to be for the benefit of MWD's member agencies.

2. Lower Colorado Water Supply Project Contractors

In 1975, a federal/state Task Force was established by the Department of the Interior to identify sources of water for Bureau of Land Management (BLM) lands along the Colorado River in California that had no rights to water and cities and private citizens that had inadequate or no rights to Colorado River water. The Task Force in its 1975 report recommended that ground water underlying lands alongside the All American Canal in Imperial County be exchanged for an equivalent amount of mainstream Colorado River water that would be diverted upstream along the River as the recommended supply source.

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Figure xxx – Photo of Lower Colorado Water Supply Project

Upon completion of further reconnaissance-level studies, the Congress enacted P.L. 96-375 in 1980, which authorized the Secretary to engage in feasibility studies to identify an annual water supply of up to 10,000 af per year for non-contract and certain contract users of Colorado River water within California. This included BLM recreational lands and existing and potential recreational, domestic, and municipal water users along the Colorado River in California.

Bureau of Reclamation in its report entitled "Lower Colorado River Water Supply Study, California—Planning Report/Environmental Assessment" dated December 1985 identified as a preferred plan, essentially the same project as that of the 1975 Task Force report. The project is being developed in two stages with two wells already completed, eventually expanding to five wells that would provide up to 10,000 af per year. The well water would be pumped into the All American Canal and used by IID and CVWD in lieu of Colorado River water and in exchange for an equivalent amount of upstream Colorado River water diversions.

In May 1992, the Secretary entered into a contract with IID and CVWD providing for the exchange of water from the Lower Colorado Water Supply Project well field for Colorado River water. The contract provides that if the quality of groundwater produced by the project wells is poorer than the quality of Colorado River water above Imperial Dam, the exchange may be halted at IID's and CVWD's discretion.

In September 1992, the City of Needles entered into a contract with the United States providing for the repayment of costs of the Lower Colorado Water Supply Project and delivery of water. Under that contract, the Bureau of Reclamation commenced construction of the first stage of the project which consisted of groundwater wells along the All American Canal in the Sand Hills having a total annual capacity to withdraw 5,000 af of groundwater for discharge into the All American Canal. The City of Needles agreed to pay all costs for the construction, administration, operation, maintenance, and replacement of the first stage facilities. Should other entities contract for a share of project water from the first stage, those entities would be required to assume their respective proportionate share of the costs. The City of Needles also agreed to assume the administrative responsibility for other entities within San Bernardino County that may receive water from the project.

In an October 1995 contract with the United States, IID agreed to perform the administration and operation, maintenance, and replacement functions for the project well field. Construction of the first stage facilities was completed as of October 1996. Following completion of the construction of the first stage, the Bureau of Reclamation offered the City of Needles a proposed amendment to the September 1992 contract. Among other things, the amendment would convey authority to the City of Needles to subcontract for project water among entities in Riverside and Imperial Counties as well as San Bernardino County. This proposed amendment to the September 1992 contract has yet to be executed. In September 1998, the Bureau of Reclamation entered into an

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intra-agency agreement with the BLM that conveyed 1,150 af of Project water for use on federal lands along the Colorado River that are administered by BLM.

Currently, the first stage of the Project has been constructed. The total capacity of 5,000 af per year has been contracted to the City of Needles (3,850 af) and BLM (1,150 af).

F. Improved River And Reservoir Management And Operations

Resources management requires the optimization of the operation of the Colorado River system reservoirs to satisfy the growing needs of the purposes for which the reservoir system is operated. This is particularly important since federal augmentation of the River as envisioned in the 1968 Colorado River Basin Project Act has not occurred. The Colorado River has been widely developed through great investments by many water and power agencies and the federal government to provide system storage of approximately 60 million af. The reservoir system and its extensive storage allows the Colorado River to be efficiently managed so as to optimize the beneficial use of this resource which supports more than 20 million people as well as multi-billion dollar business, manufacturing and farming economies. Opportunities will arise for the Colorado River Basin States through a collaborative process to further optimize the operation and management of the Colorado River system reservoirs to satisfy the growing needs and multiple purposes for which the reservoir system is operated.

1. Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs

In 1970, the Secretary, pursuant to Section 602 of the Colorado River Basin Project Act of 1968, P.L. 90-537, adopted Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs (Operating Criteria). The Operating Criteria are to be administered consistent with applicable federal laws, the Mexican Water Treaty, interstate compacts, and decrees relating to the use of the waters of the Colorado River. The Operating Criteria call for a minimum release of 8.23 million af per year from Lake Powell. It defines factors that the Secretary is to consider in determining whether normal, surplus, or shortage conditions exist.

2. Annual Operating Plan

Pursuant to the Operating Criteria, the Secretary is to submit to the Congress and the governors of the Basin states a report describing the actual operation under the adopted criteria for the preceding compact water year and the projected plan of operation for the current year.

The plan of operation is to include such detailed rules and quantities as may be necessary, consistent with the Operating Criteria, and is to reflect appropriate consideration of the uses of the reservoirs for all purposes, including flood control, River

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regulation, beneficial consumptive uses, power production, water quality control, recreation, enhancement of fish and wildlife, and other environmental factors. The projected plan of operation may be revised to reflect the current hydrologic conditions, and the Congress and the Governors of the Basin states are to be advised of any changes by June of each year.

The plan of operation for Upper Basin reservoirs is to include a determination by the Secretary of the quantity of water to be in storage as required by Section 602(a) of P.L. 90-537. Section 602(a) storage is to address compliance with Article III(c) and Article III(d) of the 1922 Colorado River Compact without impairment of annual consumptive uses in the Upper Basin pursuant to the 1922 Compact. Article III(c) of the 1922 Compact provides for the Upper Division states to deliver at Lee Ferry, water to supply one-half of the deficiency associated with the delivery of water to Mexico. Article III(d) of the 1922 Compact provides that the Upper Division states are not to cause the flow of the River at Lee Ferry to be depleted below an aggregate of 75 million af for a period of 10 consecutive years. The quantity of 602(a) storage is to be determined by the Secretary after consideration of all applicable laws and relevant factors, including, but not limited to, the following:

- historic streamflows,
- the most critical period of record,
- probabilities of water supply,
- estimated future depletions in the Upper Basin, and
- the necessity to assure that Upper Basin consumptive uses not be impaired because of failure to store sufficient water to assure deliveries under Section 602 of P.L. 90-537.

Water not required to be stored is to be released from Lake Powell to:

- the extent it can be reasonably applied in the Lower Division states to the uses specified in Article III(c) of the 1922 Compact, but no such releases are to be made when the active storage in Lake Powell is less than the active storage in Lake Mead,
- maintain as nearly as practicable, active storage in Lake Mead equal to the active storage in Lake Powell, and
- avoid anticipated spills from Lake Powell.

Article III(c) of the 1922 Compact provides that the Upper Division states are not to withhold water and the Lower Division states are not to require the delivery of water which cannot reasonably be applied to domestic and agricultural uses.

Water released from Lake Powell, plus the tributary inflows between Lake Powell and Lake Mead, is to be regulated in Lake Mead and either pumped from Lake Mead or released to the Colorado River to meet requirements as follows:

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- Mexican Water Treaty obligations,
- reasonable consumptive use requirements of mainstream users in the Lower Basin,
- net River losses,
- net reservoir losses, and
- regulatory wastes.

Under River shortage and surplus conditions, the Secretary is to consider all relevant factors, including, but not limited to, the following:

- Lake Mead operating requirements (described above),
- requests for water by holders of water delivery contracts with the United States and of other rights recognized in the decree in *Arizona v. California,*
- actual and forecast quantities of active storage in Lake Mead and in the Upper Basin storage reservoirs,
- estimated net inflow to Lake Mead,
- historic streamflows, including the most critical period of record,
- priorities set forth in Article II(A) of the decree in *Arizona v. California* (River regulation, improvement of navigation, flood control, irrigation and domestic use, and power), and
- the uses of the reservoirs for all purposes as stated in the Operating Criteria.

3. Five-Year Reviews of Long-Range Operating Criteria

The Secretary may modify the Operating Criteria from time to time in accordance with Section 602(b) of P.L. 90-537. The Secretary is to sponsor a formal review of the Operating Criteria at least every five years, with participation by State representatives as each Governor may designate and such other parties and agencies as the Secretary may deem appropriate. The last review commenced in 1996 and was completed in 1998. No changes have been made to the Operating Criteria since 1970.

4. Interim Surplus Water and Shortage Criteria

The Bureau of Reclamation published in the May 18, 1999 Federal Register a notice of intent to solicit comments on the development of surplus criteria for management of the Colorado River and to initiate the National Environmental Policy Act process. The surplus criteria help identify those circumstances under which the Secretary may make Colorado River water available for delivery to the States of Arizona, Nevada, and California in excess of the collective 7.5 million af annual normal apportionment. The schedule for the Bureau of Reclamation's evaluation of the effects of specific criteria calls for a Record of Decision on interim surplus criteria by December 2000.

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A strategy of more specific criteria to cover an interim period of available surplus water would provide for more effective and efficient use of Colorado River water by providing more predictable releases and reducing the need for adverse flood control releases.

Underlying premises relative to the development, use, and administration of interim surplus criteria include:

- criteria are interim, for a 15-Year Period;
- used as guidance in conjunction with the Operating Criteria to develop the Annual Operating Plan (AOP);
- the AOP process remains in place and provides the flexibility and means to make adjustments, if conditions warrant;
- five-year review process contained in the Operating Criteria remains in place or more frequent formal reviews can be conducted, if required;
- the five-year review time frame allows for the interim criteria to be adjusted based on experience gained and any changed conditions without a lengthy administrative process;
- there is a high probability of surplus water being available for the next 15 years;
- one of the interim surplus criteria River management goals for water supply (beneficial consumptive use) is to use anticipated surplus water to help California transition to its basic apportionment; and
- beneficiaries will mitigate for the incremental impacts attributable to their use of surplus water under interim criteria as compared to the current operating practice for making surplus water available.

The development of interim surplus criteria must give full and appropriate consideration consistent with "The Law of the River", to the needs, benefits, risks and impacts to all uses of the River. Such considerations help frame parameters that may be used in establishing interim surplus criteria and guidelines.

Interim surplus criteria general River management goals for the various uses and River operation purposes include:

Water Supply (beneficial consumptive use)

- protect states' and water users' existing water rights, apportionments, and entitlements;
- meet all basic and surplus apportionment needs to the extent possible, consistent with "The Law of the River", through the use of anticipated surplus water while minimizing risks and impacts;
- protect against future water shortages; and
- provide water at the lowest possible cost

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Power Production

- avoid loss of power generation;
- avoid powerplant bypass flows; and
- to extent possible maintain favorable power generation efficiencies

Reservoir Elevation

- provide required vacant flood control space;
- avoid adverse impacts of flood control releases (includes downstream recreation, environmental resources, water quality, River stabilization, and property);
- protect against potential water shortages;
- protect water supply intake levels;
- protect against water quality degradation; and
- preserve recreation potential to the extent possible, consistent with "The Law of the River"

Flood Control

- comply with Army Corps of Engineers flood control regulations; and
- avoid adverse impacts of flood control releases (downstream recreation, environmental resources, water quality, River stabilization, property, and high groundwater)

Fish and Wildlife (including fish and wildlife resources and habitat)

- avoid adverse impacts of flood control releases;
- take into account environmental needs regarding timing and magnitudes of releases above downstream needs; and
- consistent with the Lower Colorado River Multi-Species Conservation Program

Mexico

- provide for Mexican Water Treaty delivery obligation (including scheduling an additional 200,000 af of surplus water, if appropriate); and
- take into account Mexico's additional needs as a matter of international comity, in regards to timing and magnitudes, in releases above downstream needs and the Mexican Water Treaty obligation

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River Regulation

- make diversions possible;
- maintain and satisfy contractual requirements and demand;
- provide for River stabilization; and
- maintain uses consistent with "The Law of the River"

Improvement of Navigation

- maintain a navigable stream and reservoirs consistent with "The Law of the River"

Recreation

- preserve reservoir and downstream recreation potential to the extent possible, consistent with "The Law of the River"

Water Quality Control

- maintain the River salinity at or below the numeric criteria below Hoover and Parker Dams and at Imperial Dam;
- minimize any water quality degradation stemming from interim surplus criteria; and
- avoid adverse water quality conditions associated with flood control releases.

Consideration must also be given to required River facilities maintenance and outages.

Interim surplus criteria must consider all of the relevant factors outlined in the Operating Criteria and interim surplus River management goals for the various uses and River operating purposes, consistent with "The Law of the River". With respect to California's consumptive use requirements during the 15-year interim surplus criteria period, there needs to be sufficient water to meet demands during the stepped implementation of agriculture to urban transfers and to make the storage and conjunctive use programs (Cadiz, Hayfield, and Coachella programs) viable after the 15-year period. In addition, the potential for storing anticipatory flood control releases in the Arizona water bank and/or lower Coachella Valley would provide water for mitigation of incremental impacts caused by the interim surplus criteria as compared to the current practice, guard against critical year hydrology, and make more effective use of surplus water to meet long-term needs. The capabilities for this latter use of anticipatory flood control releases, for planning purposes, could include up to 200,000 af per year "put" and "take" capability and storage of up to 2 million af.

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In concept, the availability of surplus water under the interim surplus criteria needs to be tied to avoiding damaging flood control releases and reservoir elevations. Interim surplus criteria should reflect specific tiers or levels of surplus water depending on the probability of flood control releases and projected reservoir levels with proper consideration or assurances for protected levels. Each successive level or tier would provide a decreasing availability or allowed use of surplus water.

By defining avoidance of damaging flood control releases and reservoir elevation triggers for the stepped down use of surplus water and the use of reservoir shortage avoidance strategies, risks and impacts can be minimized relative to future shortages, higher water delivery costs, degraded water quality, and lost recreation benefits. Should impacts occur, beneficiaries will have to mitigate for the incremental impacts attributable to their use of surplus water under the interim criteria as compared to the current operating practice. Shortage strategies would include consideration for protecting the Southern Nevada Water Project intake level at Lake Mead (elevation 1050 feet above mean sea level) and the Hoover Dam Powerplant minimum power pool (elevation 1083 feet above mean sea level).

The seven Basin states are working together on the development of interim surplus criteria acceptable to all seven states for consideration by the Secretary which appropriately considers all uses of the reservoirs and the incremental impacts attributable to the criteria.

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5. Reduced System Losses

System losses to the lower Colorado River, excluding unused flood control releases and storm water inflows, include evaporation, phreatophyte consumptive use, bypass Wellton-Mohawk irrigation drainage to the Santa Clara Slough (approximately 120,000 af per year), and regulatory losses (water ordered but not taken). Senator Wash Dam and Reservoir is intended to recapture regulatory losses and to make use of excess flows from storm contributions that cannot be conserved through coordinated operation of other reservoirs. Reduction of system losses provides additional water for beneficial use.

a. Senator Wash Dam and Reservoir

Senator Wash Dam and Lake is an off-stream pump generation facility. It is located approximately eighteen miles northeast of Yuma, Arizona, and is on the California side of the Colorado River two miles upstream from Imperial Dam in the downstream end of an arroyo known as Senator Wash. The purpose of this strategically placed retention reservoir is to improve water scheduling by recapturing water ordered that cannot be used or excess River flows. Usable reservoir capacity is approximately 12,600 af. Water salvage is accomplished by storing River flow upstream of Imperial

Dam when it is not needed and releasing it later to meet scheduled demands. It takes 3-1/4 days for water released from Hoover Dam to reach Imperial Dam.

As a result of excessive seepage through the earthfill dam, the operating water surface of the reservoir is limited to elevation 240 feet, which is eleven feet lower than the initial design. This measure has reduced the usable capacity of the reservoir from 12,600 af to approximately 7,500 af.

The Bureau of Reclamation is maintaining a safety of dams data collection program to determine and monitor the foundation and seismic stability of the dam and associated structures. This consists of installing pressure sensitive equipment below Senator Wash Dam and Squaw Lake Dike. The most recent program involved raising and lowering the Lake incrementally from the presently restricted elevation of 240 feet to 251 feet and back to 240 feet over a three-month period and analyzing the data collected.

A fully functional Senator Wash Lake is essential to making the most effective use of the available supply.

Figure xxx – Photo of Senator Wash Reservoir

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b. Losses from Vegetation and Evaporation

Estimates of evaporation and phreatophyte consumptive use River system losses within the lower Colorado River are:

Table yyy - Components of System Loss Within the Lower Basin, in Acre-Feet

Component	1995	1996	1997	1998	Average
Lake Mead Evaporation[1]	877,800	995,600	996,100	921,400	947,725
Evaporation Hoover-Mexico[2]	312,323	353,329	304,087	276,753	311,623
Phreatophyte Consumptive Use[2]	631,492	681,783	604,448	582,466	625,047
Totals	1,821,615	2,030,712	1,904,635	1,780,619	1,884,395

Evaporation is a function of water surface area, the larger the surface area the greater the evaporation loss. There are measures to suppress evaporation; however, those currently available are either not practical or appropriate for the Colorado River.

Removing nonnative vegetation along the lower Colorado River and replacing it with native vegetation could reduce consumptive use of water along the River and result in substantial improvement in wildlife habitat. The Bureau of Reclamation has conducted a vegetation management study for the lower Colorado River. The purpose of the study was to examine the feasibility of removing salt cedar and replacing it with native vegetation. It was estimated that between 11,000 and 68,000 af of water could be salvaged annually depending on the percentage of salt cedar removed and the number of acres of vegetation replaced.

6. Improved Coordinated Reservoir Operation

The Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs (Operating Criteria) are to guide and coordinate operation of the Colorado River reservoirs, consistent with "The Law of the River" with appropriate consideration of the uses of the reservoirs for all purposes, including flood control, River regulation, beneficial consumptive uses, power production, water quality control, recreation, enhancement of fish and wildlife, and other environmental factors. Both the United States Army Corps of Engineers (COE) and the Bureau of Reclamation are directed in their general authorizations and regulations to coordinate operation of reservoirs in the

[1] Data from USGS reports
[2] Data from Lower Colorado River Accounting System reports

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same River basin so as to accomplish most efficiently the uses for which the reservoirs were authorized. It is most likely that opportunities exist or will exist where improved coordinated reservoir operation can more effectively and efficiently meet Colorado River needs. The Basin states need to explore such opportunities with the federal river operating agencies, including the International Boundary and Water Commission.

Painted Rock Reservoir is an example where potential improved coordination and management and additional purposes may:

- improve flood control;
- improve control of downstream erosion and sedimentation in United States and Mexico from flood flows;
- increase conservation of Gila River and mainstream Colorado River waters;
- reduce high groundwater and drainage problems in the Wellton-Mohawk area; and
- provide for more effective compliance with the Mexican Water Treaty and Minute No. 242 of the International Boundary and Water Commission.

Painted Rock Dam is the last dam on the Gila River before its confluence with the Colorado River which is approximately 126 miles downstream from the dam. The Gila River's confluence with the Colorado River is below the last Colorado River diversion works in the United States but above Morelos Dam, Mexico's main diversion structure on the Colorado River.

It is an earth-filled dam constructed by the COE for the single purpose of flood control. The reservoir created behind Painted Rock Dam has a gross capacity of approximately 2.5 million af at the Dam's crest elevation. The reservoir is normally in a near dry condition under the current COE approved operation schedule. Painted Rock Dam provides flood protection to lands along the lower Gila River, along the lower Colorado River in Arizona and California, and in the Imperial Valley in California. During times of major storm events, operation of the Dam is closely coordinated with operation of the Bureau of Reclamation dams located along the Colorado River.

The addition of water conservation and supply and other possible uses as project purposes of Painted Rock Reservoir would, first require the concurrence of Arizona as well as the purchase of flood control easement lands, and changes to the present flood control criteria. Title I of the Colorado River Basin Salinity Control Act of 1974 provides the Secretary with the authority with respect to desalting complexes and plants to "acquire on behalf of the United States such lands or interest in lands in Painted Rock Reservoir as may be necessary to operate the project in accordance with the obligations of Minute No. 242" of the International Boundary and Water Commission.

This Painted Rock Reservoir discussion is solely to illustrate that opportunities do exist and that the Basin states, in conjunction with the federal agencies, should be exploring these opportunities where appropriate.

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G. Resource Management

There are a number of implemented Colorado River and related resource management efforts, or efforts currently being considered, that are aimed at improving the quality and quantity of Colorado River water, making more effective use of existing facilities and water supplies, and protecting and restoring environmental resources. These include groundwater management, exchanges, drought and surplus water management, River augmentation, Lower Colorado River Multi-Species Conservation Program, and Salton Sea restoration efforts.

1. Groundwater Management

Groundwater management is an integral associated component of California's Colorado River Water Use Plan and it is the responsibility of Colorado River water right holders and/or their member agencies with groundwater management responsibilities. It is essential to preserving the utility of groundwater basins, storage and conjunctive use programs, protection of groundwater quality, and groundwater recovery. Groundwater immediately adjacent to the Colorado River is considered mainstem Colorado River water and the principal concerns are for water quality and water rights. There is limited groundwater use in IID's service area; however, there is the potential for underground storage on the East Mesa.

The principal associated groundwater components of California's Colorado River Water Use Plan currently are the Coachella Valley, the coastal plain of southern California, and the other groundwater basins outside of these areas used in connection with storage and conjunctive use programs involving Colorado River water.

a. Coachella Valley

Since the early part of this century, the Coachella Valley has been dependent on groundwater as a source of supply. Water management in Coachella Valley began in 1915, when declining groundwater levels pointed to the need for a supplemental water source. The Coachella Valley Stormwater District was formed in 1915 followed by formation of CVWD in January 1918. In 1918, a contract was awarded for construction of spreading facilities in the Whitewater River northwest of Palm Springs.

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Figure xxx – Map of Coachella Valley

During the next 16 years, CVWD's activities focused on obtaining imported Colorado River water. In 1934, negotiations with the federal government were completed, and plans were in place for the construction of the Coachella Branch (Coachella Canal) of the All American Canal. Construction of the canal began in 1938, was interrupted by World War II, and was finally completed with the first deliveries of imported Colorado River water to area growers in 1949. The impact of imported water on the Coachella Valley was almost immediate. By the early 1960s, water levels in the lower Valley had returned to their historical highs.

Although the groundwater levels in the lower Valley had stabilized, water levels in the upper Valley continued to decline. In 1963, CVWD and Desert Water Agency (DWA) entered into contracts with the State of California for entitlements to State Water Project water. To avoid the costly construction of an aqueduct to bring State Water Project water directly to the Coachella Valley, CVWD and DWA entered into agreements with MWD to exchange Colorado River water for State Water Project water.

Starting in 1973, CVWD and DWA began exchanging their annual State Water Project water entitlement of up to 61,200 af with MWD to recharge upper Valley groundwater supplies at the Whitewater Spreading Facility. By 1999, the spreading facility had percolated in excess of 1.3 million af of Colorado River water exchanged for State Water Project water.

Water levels in the lower Valley remained relatively stable until the 1980s when they once again began to decline. Groundwater demand had once again exceeded supply, resulting in decreases in groundwater levels of 60 feet or more in some parts of the lower Valley. Because groundwater recharge in the Lower Valley is complicated by the existence of relatively impervious clay layers in the valley floor, CVWD began looking for sites sufficiently far away from the main clay layer to allow groundwater recharge. In 1995, CVWD began operating the Dike No. 4 pilot recharge facility, which has successfully demonstrated that Lower Valley groundwater recharge is possible. The facility was expanded in 1998 in order to determine the ultimate recharge capacity of a facility at this location.

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CVWD is developing a comprehensive Coachella Valley Water Management Plan to assure adequate quantities of safe, high quality water at the lowest cost to Coachella Valley water users. The waters available to CVWD through the new Quantification Settlement Agreement are an integral part of the Management Plan. The Management Plan goals and objectives are:

- eliminate groundwater overdraft and associated adverse impacts including
  - groundwater storage reductions,
  - declining groundwater levels,
  - land subsidence, and
  - water quality degradation;
- provide operational flexibility for Coachella Valley water users;
- minimize adverse economic impacts to Coachella Valley water users; and
- minimize environmental impacts.

The alternative water management strategies include consideration of conservation, groundwater recharge, source substitution, and mandatory pumping restrictions. The alternatives include:

- no project,
- pumping restriction by adjudication,
- management of demand and maximization of local resources, and
- combination alternative.

Along with the plan, a program environmental impact report is being prepared that discusses the social, economic, and environmental impacts of the preferred alternative.

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b. Coastal Plain

As previously stated, MWD does not have direct access to groundwater basins underlying its service area. In order to implement a groundwater storage or conjunctive use program within its service area, MWD must implement an agreement with an entity which has rights for groundwater storage and extraction in an underlying basin.

Groundwater production, currently approximately 1.4 million af per year, represents approximately one-third of the water needs of the coastal plain of southern California. Many of the major groundwater basins have been adjudicated. Groundwater management activities include storage and conjunctive use programs, replenishment programs, sea water intrusion barriers, groundwater recovery, and water quality improvement and protection programs. Groundwater will remain an important component of coastal southern California's water supply. Preservation of groundwater

quality is essential to maintaining the utility of the region's groundwater, especially with respect to salinity.

c. Cadiz Project Groundwater Management Plan

The Cadiz groundwater storage and supply program proposes to construct facilities that would enable MWD to: store Colorado River water in the groundwater basin underlying Cadiz Valley for later use; pump the quantity of stored Colorado River water and convey it to the Colorado River Aqueduct when needed; and transfer a portion of the indigenous, naturally evaporating groundwater from the Cadiz Valley groundwater basin to the Colorado River Aqueduct. The program is a partnership between MWD and Cadiz Inc. and is intended to help MWD meet its current and future water supply needs by better managing available supplies.

Figure xxx – Photo of Cadiz Spreading Basin

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The Cadiz Valley is located approximately 30 miles northwest of MWD's Iron Mountain Pumping Plant on the Colorado River Aqueduct, and 45 miles west of Needles, California. The facilities proposed for the Cadiz Project are a 35-mile-long pipeline between MWD's Colorado River Aqueduct at Iron Mountain and the Cadiz groundwater basin in the Fenner Gap. Spreading basins covering 390 acres would be constructed in the Fenner Gap along with 30 extraction wells.

Colorado River water would be diverted from the Aqueduct at Iron Mountain and would be conveyed to the spreading basins for underground storage. The extraction wells would be used to recover stored water which would then be conveyed by the project conveyance pipeline to the Aqueduct. Indigenous groundwater would also be extracted and conveyed to the Aqueduct for use within MWD's service area to the extent allowable under the requirements of the Cadiz Project Groundwater Management Plan. The groundwater management plan would ensure that adjacent land uses do not experience significant adverse effects caused by exercising the groundwater basin and that the safe yield of the groundwater basin would be maintained over the 50-year life of the project.

The project is designed for an annual storage/extraction capacity of approximately 150,000 af of water in the Cadiz groundwater basin. Over the 50-year life of the project, a minimum of 1 million af of Colorado River water would be stored in the Cadiz groundwater basin, and up to 2 million af of indigenous groundwater could be transferred to the Aqueduct for delivery to MWD's service area depending upon natural recharge of the groundwater basin.

To determine the viability of the project, an eight-month pilot demonstration was conducted. The demonstration program confirmed the capability of the groundwater basin to store water in an effective manner. A facility optimization study was also completed in tandem with the demonstration program. The program is currently under environmental review and a final environmental impact report/environmental impact statement is anticipated to be issued later this year. Implementation of the program would begin following completion of the environmental documentation and necessary approvals.

d. Hayfield Groundwater Management

The Hayfield groundwater storage and potential conjunctive use program is one of the future supply options for MWD. The Hayfield Valley is located in the Mojave Desert in Riverside County along Interstate Highway I-10 between the communities of Chiriaco Summit and Desert Center and is crossed by the Colorado River Aqueduct. The aquifer beneath this valley is capable of storing up to 800,000 af of Colorado River water.

Water stored in this aquifer would be returned as needed to the Colorado River Aqueduct. The annual "put" and "take" capacity of this program would be approximately 150,000 af per year through the construction of spreading basins and extraction wells. Indigenous groundwater is limited but could yield additional supply for short periods through a conjunctive use program. MWD is currently completing a demonstration program for the Hayfield groundwater storage and potential conjunctive use program. As of March 2000, over 60,000 af of Colorado River water has been delivered for storage in the Hayfield Valley groundwater basin.

e. Chuckwalla Groundwater Storage Program

The Chuckwalla Groundwater Storage Program was studied as part of MWD's plan to increase its reliable water supply by storing Colorado River water in years when water is available and delivering it to coastal southern California when needed. The Chuckwalla Valley lies approximately 13 miles north of Desert Center in the eastern Mojave Desert in Riverside County. The Chuckwalla Valley is adjacent to the Hayfield Valley and has the capacity to store up to 1.2 million af of water in the northern portion of the valley.

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Figure xxx – Photo of Hayfield

Previously stored water would be returned to the Colorado River Aqueduct at an annual rate of up to 150,000 af per year. While the potential exists in this basin, further study and environmental assessment would be necessary to determine the scope, feasibility and cost for developing a storage program.

2. Exchanges

Water exchanges can play an important role in making more effective use of existing facilities in meeting water needs, improving water quality, deferring or eliminating the need for capital improvements, and lowering operation and maintenance costs.

a. Advance Delivery Agreement

MWD has executed contracts with CVWD and the Desert Water Agency (DWA) which require that MWD exchange its Colorado River water for those agencies' State Water Project entitlement water on an annual basis. In accordance with an advance delivery agreement executed by MWD, CVWD, and DWA, MWD delivers Colorado River water in advance to these agencies for storage in the upper Coachella Valley groundwater basin. In years when supplies are insufficient, CVWD and DWA may use the stored water. In return, MWD may continue to receive CVWD's and DWA's State Water Project water and suspend deliveries of Colorado River water for recharge while maximizing deliveries of Colorado River water to its service area. As of February 2000, water remaining in the advance delivery storage account was approximately 290,000 af. This exchange makes more effective use of existing facilities and supplies to meet these agencies' water needs. It avoids the costly construction of facilities to serve State Water Project water to CVWD and DWA. It provides for dry year supplies for MWD and it assists in groundwater management in Coachella Valley.

b. Key Terms Exchange

Under the October 1999 Key Terms for Quantification Settlement, MWD will provide CVWD with a firm supply of 35,000 af. The transaction involves a transfer

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agreement and an exchange agreement. MWD will transfer 35,000 af per year of its State Water Project water entitlement to CVWD on a permanent basis under the Monterey Agreement. Permanent basis refers to a term until 2035, the renewal date of the State Water Project contractors' agreements, with a right of renewal to coincide with the term of the Quantification Period. Upon termination of the Quantification Period, CVWD will re-convey this State Water Project entitlement to MWD.

The State Water Project entitlement transfer water will be delivered to CVWD through an exchange agreement. MWD and CVWD will exchange 35,000 af per year of State Water Project entitlement transfer water and Colorado River water. CVWD will deliver its 35,000 af per year of State Water Project entitlement transfer water to MWD at the Devil Canyon Afterbay. In exchange, the Secretary will deliver 35,000 af per year of Colorado River water to CVWD at Imperial Dam for delivery of exchange water through the All American and Coachella Canals, and/or MWD will deliver water at the service connection adjacent to the Whitewater River on the Colorado River Aqueduct, at MWD's option. The parties will cooperate to deliver water at the point of delivery, which provides the maximum flexibility to CVWD if needed, except that the delivery will be made at Imperial Dam when MWD needs to optimize the use of the Colorado River Aqueduct.

Figure xxx – Photo of Upper Coachella Valley Spreading Basins

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If State Water Project deliveries are subject to shortage allocations during dry years, MWD will provide CVWD with the firm delivery of 35,000 af per year by making up any shortfalls in deliveries through deductions from the existing Advance Delivery Account.

c. Additional Proposed Exchanges

DWA, CVWD, and MWD are also participating in the development of an additional water management program. This program has been divided into two separate phases. Phase 1 consists of an agreement between MWD, CVWD, and DWA and an amendment to MWD's State Water Project water contract to transfer 50,000 af per year of State Water Project water during wet years. This will allow MWD to expand its

groundwater storage capabilities in the Upper Coachella Valley to store Colorado River Aqueduct water that would be later withdrawn. Phase 2 involves a groundwater conjunctive use and storage program in lower Coachella Valley which CVWD and MWD are currently jointly studying. The program would assist CVWD in meeting its groundwater management and water supply needs and provide MWD with dry or normal year water supply.

MWD is also currently considering other possible exchanges to improve water quality and water supply reliability, reduce costs, and make more effective use of existing supplies and facilities.

3. Drought and Surplus Water Management

With the exception of CVWD and MWD, other California Colorado River water users are totally reliant on Colorado River water as their sole source of supply. Because of their priority to use standing they are unlikely to be significantly affected by drought. CVWD has a higher priority to Colorado River water than MWD. A combination of higher priority and availability of groundwater and State Water Project water help insulate CVWD from the severe effects of short-term drought. Implementation of its water management plan that involves demand and groundwater management will provide further drought protection.

MWD with its low priority to Colorado River water use faces the most unreliable supply profile for Colorado River water in California. MWD and its member agencies have developed extensive storage and transfer projects and agreements to provide reliability even under the most adverse of historical conditions. This insured reliability has come at a significant financial cost, but would still not meet MWD's reliability goals without coordinated operations of these resources. To manage its storage and transfer resources, the MWD developed and adopted the Water Surplus and Drought Management Plan (WSDM Plan) through a representative planning process with its member agencies. The WSDM Plan, adopted by the MWD Board of Directors in April 1999, established criteria for the coordinated operation of owned or contracted groundwater and surface water storage both in and out of the southern California region. The WSDM Plan establishes the triggers for the call of option transfers and the incremental reduction of supplies to its non-firm water customers.

When imported supplies exceed projected demands for imported water within MWD's service area, MWD can operate available storage facilities to maximize the benefits of stored water to its member agencies. A number of factors affect MWD's ability to divert available water into storage. Some of these factors include facility outages, system capacity, water quality (including requirements for managing total dissolved solids), and varying supply and demand patterns.

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The following represents MWD's general framework and guide for resource management drought actions:

- draw on storage in Diamond Valley Lake;
- draw on out-of-region storage;
- reduce/suspend long-term seasonal and groundwater replenishment deliveries;
- draw on contractual groundwater storage programs in the region;
- draw on SWP terminal reservoir storage (per Monterey Agreement);
- call for extraordinary drought conservation and public education;
- reduce Interim Agricultural Water Program deliveries;
- call on water transfer options contracts;
- purchase transfers on the spot market; and
- implement the allocation of MWD's imported supplies to its member agencies.

Many factors will dictate the exact order in which these actions will be taken during shortages.

4. River Augmentation

The Colorado River Basin states have been aware for many years of the impeding future constraints on their use of the River's water, and the Congress, in the 1968 Act authorizing the Central Arizona Project, also recognized that there would be insufficient water in the Colorado River Basin to meet the long-term needs of the Basin states. In that Act, the Congress authorized studies of measures to augment the water supplies of the Colorado River and also provided in Section 202: "…that the satisfaction of the requirements of the Mexican Water Treaty from the Colorado River constitutes a national obligation which shall be the first obligation of any future augmentation project…".

Over the years, four possible measures for augmenting the Colorado River have been identified: (1) desalting of sea water; (2) importation from the Columbia River Basin; (3) weather modification (snowpack augmentation) to increase runoff; and (4) vegetation management to increase runoff.

Presently, the most promising means for augmenting the Colorado River are desalting, vegetation management, and snowpack augmentation.

a. Snowpack Augmentation

The Bureau of Reclamation has previously forecasted that a demonstration precipitation management program in the Upper Colorado River Basin could increase runoff by 340,000 af in a year. Following the demonstration, it was estimated that a fully operational program could increase runoff in the Basin by 1.7 million af. A snowpack augmentation program could serve as the means by which the federal government could

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meet its obligation to develop water to meet the requirements of the Mexican Water Treaty.

In 1993, the Bureau of Reclamation completed updating its program plan for a demonstration precipitation management program under an agreement among the Bureau of Reclamation, Colorado River Commission of Nevada, Utah Division of Water Resources, Central Arizona Water Conservation District, Upper Colorado River Commission, and the Six Agency Committee. The Six Agency Committee is composed of CVWD, IID, PVID, SDCWA, MWD, and the City of Los Angeles Department of Water and Power. Specific activities conducted included reviewing the results of research and operational programs conducted since 1983, surveying the Basin for additional sub-basins that could be considered as potential demonstration areas, and identifying the actions required to comply with the National Environmental Policy Act. The updated program plan was published as a Bureau of Reclamation report, "Validation of Precipitation Management by Seeding Winter Orographic Clouds in the Colorado River Basin".

b. Vegetation Management

The United States Forest Service (Forest Service) has conducted studies on managing vegetation in national forest watersheds to increase runoff. The Forest Service has a policy to increase water yields where cost-effective in water-short areas. The most effective management measures for increasing water yield have been found to be the selective cutting of small openings, referred to as patchcutting, in timberlands, and the conversion to low water consuming vegetation. Studies have indicated that, theoretically, water yield in the Colorado River Basin could be increased by as much as 16 percent through vegetation management, but that a goal of increasing water yield by 1 million af per year, which is less than one-half of the theoretical amount, is more realistic and attainable. In addition, studies have shown that the combined effects of vegetation management and weather modification (snowpack augmentation) within the same watershed increase runoff more than if the two practices were applied separately.

The Forest Service has made vegetation management an ongoing element of its management plans for the national forests in the Colorado River Basin. In the individual plans, the need and importance of water yield has been recognized, opportunities for increased runoff have been identified, and consideration for these needs has been given in arriving at multiple use management prescriptions. The Colorado River Board and other Colorado River Basin states have been working with the Forest Service to encourage the agency to develop a specific coordinated vegetation management program for all national forests in the Colorado River Basin that could be integrated with snowpack augmentation activities in the Basin to effectuate greater augmentation benefits.

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c. Desalting

The ocean represents a potentially abundant source of water supply. Although there is often public support for this resource, ocean desalination is currently limited by its high costs, environmental impacts of brine disposal, and siting considerations. Based on current technology, the costs for desalination of ocean water for potable uses ranges from $900 to $2,500 per af depending on the type of treatment and the distribution system that would be required to deliver the water. Although high costs may currently limit this resource, ocean desalination may prove to be an important strategy in the future.

5. Lower Colorado River Multi-Species Conservation Program

The purpose of the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) is to develop and implement a proactive long-term endangered species conservation and compliance program for the lower Colorado River. Its specific goals are to: (1) conserve habitat and work toward the recovery of threatened and endangered species and reduce the likelihood of additional species listings under the Endangered Species Act (ESA); (2) accommodate current water diversions and power production and optimize opportunities for future water and power development; and (3) provide the basis for federal and California Endangered Species Acts compliance through incidental take authorizations.

The LCR MSCP planning area is the mainstream lower Colorado River from below Glen Canyon Dam to the southerly international boundary with Mexico, and extends to the 100-year floodplain and reservoir full pool elevations. Covered activities include ongoing operations and maintenance activities by the Bureau of Reclamation, and federal, state, and private water and hydroelectric power users, as well as identified future actions. The LCR MSCP will provide conservation measures to benefit more than 50 endangered and other at-risk species and their associated aquatic, riparian, and upland habitats.

The program is a broad-based federal, state, tribal, and private partnership, which includes water, hydroelectric power and wildlife management agencies in Arizona, California, and Nevada. In California, representatives include the Colorado River Board and its member agencies, the Southern California Public Power Authority, the Southern California Edison Company, the City of Needles and the Counties of San Bernardino and Imperial.

The LCR MSCP is to provide long-term ESA compliance for federal and non-federal interests in the Lower Colorado Region for the next 50 years. Long-term reasonable and prudent alternatives (RPAs) and resources management plans (RMPs) will be identified and implemented in the LCR MSCP. For each subsequent federal action requiring ESA compliance, the Fish and Wildlife Service will evaluate the efficacy of the LCR MSCP and determine if the proposed agency action is sufficiently mitigated.

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For non-federal interests, the LCR MSCP will contain a habitat conservation plan (HCP) component. The LCR MSCP's HCP will provide long-term mitigation in order to offset any incidental take of endangered species through the actions and programs of the non-federal and tribal resource users along the lower Colorado River.

6. Lake Havasu Fisheries Improvement Program

The Lake Havasu Fisheries Improvement Program was established in 1992 as a partnership effort of the U.S. Bureau of Land Management (BLM as Lead Agency), Bureau of Reclamation, the Fish and Wildlife Service, Anglers United, Arizona Game and Fish Department, California Fish and Game, and MWD. The program's primary goals are to improve Lake Havasu fisheries habitat and recreational access to those habitats. As mitigation for facilitating the growth of non-native (game) fish species, the program is also required to grow and reintroduce sufficient numbers of razorback suckers and bonytail chubs (federal and California endangered native fish species) to offset these impacts. The native fish goals are to repatriate 30,000 individuals each of razorback suckers and bonytail chubs. The program is expected to be completed in the year 2003.

The fisheries improvement program is funded by the federal agencies with matching funds from some of the other members and by in-kind contributions. The program has received very strong local support in the form of volunteer labor from the general public and various community service groups in nearby areas.

To date, approximately 550 acres of fish habitat have been placed around the Lake. Four of the six proposed angler access sites have been constructed. Pilot projects are underway with Imperial Irrigation District to grow bonytail chub at the California Department of Fish and Game's Niland fish hatchery, and with commercial hatcheries on the Gila River Indian Reservation.

7. Salton Sea

The Salton Sea, located between the Imperial and Coachella valleys, supports a rich and biodiverse ecosystem. As late as a million years ago, the Gulf of California extended into the area now occupied by the Imperial and Coachella valleys of southeastern California. For millennia, the Colorado River deposited its heavy load of silt into the Gulf at its mouth then located near the vicinity of Yuma, Arizona. Gradually a broad delta fan built up such that the below sea level Salton Sink became isolated from the Gulf.

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Figure xxx – Photo of Salton Sea

Subsequently, the Colorado River meandered over its broad delta such that it alternatively discharged its flow into the Salton Sink or into the Gulf of California. The result was a repeating cycle of a vast inland lake and complete desiccation from evaporation when the Colorado River meandered toward the Gulf. Upon the arrival of European peoples in the late 19th century, the Salton Sink was dry.

In 1901, the predecessor to IID constructed and placed into operation facilities to bring Colorado River water to the Imperial Valley for irrigation. Flooding in mid-1905 compromised the diversion structure and Colorado River water flowed uncontrolled into the Salton Sink for nearly two years. By the time control was regained, the 278-foot below sea level Salton Sink was covered with a 500 square mile body of water having a depth of more than 80 feet. Evaporation quickly reduced the size of the newly created Salton Sea until it reached a level that was sustained by inflows from irrigation drainage.

Currently, the Salton Sea is approximately 50 feet deep at a surface elevation of 228 feet below sea level and occupies approximately 375 square miles. Current inflow to the Salton Sea is approximately 1.3 million af per year consisting mostly of agricultural drainage from IID (77 percent). Other inflow components include municipal wastewater and agricultural drainage from the Mexicali Valley area in Mexico (11 percent), agricultural drainage from the CVWD (8 percent), and regional runoff and direct precipitation (4 percent). Inflows from Mexico include untreated or minimally treated municipal wastewater discharged to the New River that are diluted by the much greater quantities of agricultural drainage water.

The Salton Sea supports an abundant fishery consisting entirely of introduced species and provides important wintering habitat and forage on the Pacific Flyway. At the southern end of the Sea lies the Sonny Bono Salton Sea National Wildlife Refuge. Annually, over one million birds are estimated to migrate through the area. Of the nearly 400 bird species using the Salton Sea area, four are listed as endangered. This abundance continues despite regular fish mortality events, normally described as "die-offs." As many as one million fish or more have been known to perish in a single event. Avian die-offs have also been recorded throughout the 20th century. However, the magnitude

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and frequency of avian die-off events that have occurred since 1987 have concerned wildlife resource agencies and captured the attention of the Secretary and Congress.

Overshadowing the wildlife die-off events is the increasing salinity of the Salton Sea. With evaporation as its sole outflow, dissolved salts contained in the inflows have collected in the Salton Sea and have been concentrating at a rate of approximately one percent per year. Current salinity is approximately 44,000 parts per million (ppm), 25 percent higher than ocean water. Without a mechanism to control salinity, it is estimated that salinity could reach 50,000 ppm within twenty years, the level at which science suggests that the Sea's ecosystem will begin to collapse. The collapse would be principally manifested in the loss of the Sea's fishery, which would represent a loss of food resources for fish-eating birds migrating along the Pacific Flyway.

Reductions in inflow would cause the rate at which salinity increases in the Salton Sea to accelerate. Water conservation in the Imperial Valley, as proposed by IID and SDCWA, as well as some of the other programs identified in the October 15, 1999 Key Terms for Quantification Settlement, would likely result in reduced irrigation drainage discharged to the Salton Sea.

In order to deal with the problems of the Salton Sea, the Congress, in 1992, authorized the Salton Sea Research Project (P.L. 102-575), which directed the Secretary to conduct a research project "to reduce and control salinity, provide endangered species habitat, enhance fisheries, and protect human recreational values". Subsequently, the Salton Sea Authority was formed under a joint powers agreement among the County of Imperial, County of Riverside, IID, and CVWD. The continuing interest of the Secretary and the Congress culminated in the Salton Sea Reclamation Act of 1998 (P.L. 105-372). The opening clause of P.L. 105-372 reads, "To direct the Secretary of the Interior, acting through the Bureau of Reclamation, to conduct a feasibility study and construct a project to reclaim the Salton Sea, and for other purposes."

Title I, Section 101 of P.L. 105-372 directs the Secretary to complete all studies, including, but not limited to environmental and other reviews, of the feasibility and cost-benefit of various options that permit the continued use of the Salton Sea as a reservoir for irrigation drainage and:

- 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.

It also directs the Secretary to consider the following options:

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- use of impoundments to segregate a portion of the waters of the Salton Sea in one or more evaporation ponds located in the Salton Sea basin;
- pumping water out of the Salton Sea;
- augmented flows of water into the Salton Sea;
- a combination of the options; and
- any other economically feasible remediation option the Secretary considers appropriate.

P.L. 105-372 specifies that the options considered shall be limited to proven technologies and shall not include any option that relies on the importation of any new or additional water from the Colorado River. It also includes specific language providing for the preservation of rights and obligations with respect to the Colorado River.

In evaluating options, the Secretary is 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 that are based on a maximum likely reduction in inflows into the Salton Sea Basin which could be 800,000 af or less per year. Citing the need for California to reduce its demands on the Colorado River and specifically identifying the proposed transfer from IID to SDCWA, the House Committee on Resources stated the following[1]:

> "These provisions are included to clearly indicate the Committee's support and approbation for anticipated future water transfers out of the Salton Sea Basin, and to avoid the adoption of an alternative that frustrates such water management choices."

In his evaluation of options, the Secretary is to "consider the ability of Federal, tribal, State and local government sources and private sources to fund capital construction costs and annual operation, maintenance, energy, and replacement costs and shall set forth the basis for any cost sharing allocations as well as anticipated repayment, if any, of Federal contributions."

The Secretary was to complete and submit to the Congress no later than January 1, 2000, all feasibility studies and cost analyses of the options for the Congress to fully evaluate such options. Federal funds appropriated for the feasibility studies were provided through other Congressional acts.

Pursuant to Title I, Section 102, the Secretary was to conduct, concurrently with the feasibility study, studies of hydrology, wildlife pathology, and toxicology relating to wildlife resources of the Salton Sea by Federal and non-Federal entities (wildlife studies). It also established the "Salton Sea Research Management Committee" for the purpose of overall management of the studies, consisting of the following persons:

[1] House Report 105 621, ordered to be printed on July 14, 1998.

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- Secretary
- Governor of California
- Executive Director of the Salton Sea Authority
- Chairman of the Torres Martinez Desert Cahuilla Tribal Government
- Director of the California Water Resources Center

The studies were to be coordinated through a "Science Subcommittee" that reported to the Salton Sea Research Management Committee. Membership in the Science Subcommittee includes representatives from state and federal resource agencies as well as representatives from select California universities and the Los Alamos National Laboratory. It authorized the appropriation of $5 million for conducting the wildlife studies.

Title I, Section 103 of P.L. 105-372 renamed the "Salton Sea National Wildlife Refuge" located along the southern portion and shore of the Salton Sea as the "Sonny Bono Salton Sea National Wildlife Refuge."

Title II of P.L. 105-372 directed and authorized the Secretary to "promptly conduct research and construct River reclamation and wetlands projects to improve water quality in the Alamo River and New River, Imperial County, California, by treating water in those rivers and irrigation drainage water that flows into those rivers." This effort is to be done in cooperation with Desert Wildlife Unlimited (a private environmental organization), IID, and other interested persons. Title II authorized the appropriation of $3 million for this research and construction.

Under the authority of P.L. 105-372 and with State and federal funding, the Authority in partnership with the Bureau of Reclamation has conducted scientific studies of the Sea's environment, prepared feasibility studies of options to control the salinity of the Salton Sea, and has prepared draft environmental documentation for a project to reclaim the Salton Sea. The goals of this Salton Sea Restoration Project are to:

- maintain the Sea as a repository for agricultural drainage;
- provide a safe, productive environment at the Sea for resident and migratory birds and endangered species;
- restore recreational uses at the Sea;
- maintain a viable sport fishery at the Sea; and
- identify opportunities for economic development around the Sea.

The results of the scientific studies completed as of January 2000 indicate that the Salton Sea is a rich and biodiverse resource. In the United States, only the Gulf Coast of Texas hosts more species of birds. Pesticide levels in the sediments and waters of the Sea were found to be below detectable levels. Contaminant levels in general were found to be minimal relative to hazard assessments except for a limited number of "hot spots." Investigations failed to reveal any evidence of toxins causing either fish or bird kills.

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Thus the cause of the periodic fish die-offs is believed to be due to eutrophication or periods of water temperatures during winter that are below the tolerance of certain species. The root cause of the majority of the recent avian die-offs has yet to be determined.

These findings have led the Secretary and the Authority to state that increasing salinity presents the most immediate threat to wildlife and recreational uses at the Sea. The Secretary and the Authority have proposed that a Salton Sea Restoration Project be conducted in two phases. The first phase would consist of construction and operation of facilities to remove as much as 9 million tons of dissolved solids annually from the Salton Sea. The two primary mechanisms considered for achieving this removal are:

- an enhanced evaporation system that sprays a fine mist of water into the air to accelerate evaporation and create a saline precipitate, and/or
- one or more evaporation ponds constructed within the current Salton Sea that would concentrate salts within their boundaries to reduce salinity in the Sea.

Five alternative configurations including one or both of these types of facilities and other project components have been developed and are the subject of an Environmental Impact Statement/Environmental Impact Report released in January 2000. The estimated capital cost of the alternatives range from approximately $290 million (plus $12 million annually for operation, maintenance, and power) to $520 million (plus $9 million annually for operation, maintenance, and power). These costs are based on the existing inflows to the Salton Sea. The objective of Phase I would be to attend to the immediate problem of increasing salinity levels in the Salton Sea.

Implementation of a second project phase is estimated to be necessary by the year 2030. Proposed Phase II actions include consideration of importing municipal waste water to the Salton Sea from the southern California coastal plain or from the Phoenix-Tucson area in central Arizona, and exporting Salton Sea water to the Pacific Ocean, across Mexico to the Gulf of California, or to an interior dry lake bed. Preliminary estimates suggest that the capital cost of Phase II facilities could be as much as $1 billion or more. In addition to facilities to control salinity, reduced inflows would require actions to maintain the elevation of the Salton Sea for the principal purpose of restoring recreational uses and fostering lake shore development. The action proposed is construction of a displacement dike at a cost of approximately $460 million.

Total capital costs of a Salton Sea Restoration Project could be as much as $2 billion or more (Phase I actions: $290 to $520 million, displacement dike: $460 million, Phase II actions: $1 billion or more).

In his report to Congress submitted on January 13, 2000, the Secretary recommended, "at a basic level, that the Salton Sea should be saved; a no action alternative is not acceptable." Project funding remains an open question.

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With respect to California's Colorado River Water Use Plan, the Congress specified in P.L. 105-372 that alternatives should not include importation of any new or additional water from the Colorado River and should account for the transfer of water out of the Salton Sea Basin, citing the need for California to reduce its demands on the Colorado River.

H. Water Quality

Water quality considerations and management are key to how California and the other Basin states and Mexico can most effectively use their apportionments of Colorado River water. Supply water quality affects public health and safety, the quality of ecosystems, water treatment requirements, water quality damages incurred by the water users, water conservation efficiencies, water reuse opportunities, and the utilization of other water supplies. Two major water quality considerations for the Colorado River are salinity and watershed management. Both deal with point and non-point sources of contaminates.

The water quality discussions herein deal only with watershed considerations to ensure the delivery of safe, good quality water. Each Colorado River water right holder, in turn, may have a water quality management program specifically tailored to most effectively meet its water needs. Costs associated with water quality have the potential to significantly increase the future cost of water. Management of watershed water quality can play a major cost-effective role in helping to reduce and/or avoid those costs.

1. Colorado River Salinity Control Program

Salinity has long been recognized as one of the major problems of the River. The Colorado, like most western rivers, increases in salinity from its headwaters to its mouth, carrying an average salt load of approximately nine million tons annually past Hoover Dam, the uppermost location at which numeric criteria have been established. In addition to total salt load which measures the total mass of salt carried in the River (tons/year), this report also examines salinity in terms of concentration as expressed in milligrams per liter (mg/L).

The salts in the Colorado River system are indigenous and pervasive. Many of the saline sediments of the Basin were deposited in prehistoric marine environments. Salts deposited with the sedimentary rocks are easily eroded, dissolved, and transported into the River system. The Colorado River Basin Salinity Control Program is designed to prevent a portion of this abundant salt supply from moving into the River system.

In a 1971 study, the United States Environmental Protection Agency (EPA) analyzed salt loading in the Colorado River Basin and divided it into two categories, naturally occurring and human caused. The EPA concluded that approximately half (47 percent) of the salinity concentration measured in water arriving at Hoover Dam is from natural causes including salt contributions from saline springs, ground water discharge

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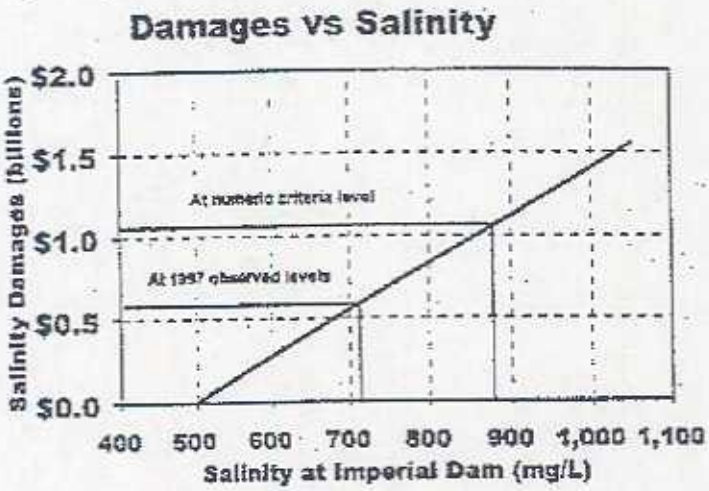
into the River system (excluding irrigation return flows), erosion and dissolution of sediments, and the concentrating effects of evaporation and transpiration. The natural causes category also included salt contributions from nonpoint (excluding irrigated agriculture) or unidentified sources or from the vast, sparsely-populated regions of the drainage, much of which is administered by the BLM or other governmental agencies. Of the land within the Colorado River Basin, approximately 75 percent is owned and administered by the Federal Government or held in trust for Indian tribes. The greatest portion of the naturally occurring salt load originates on these federally-owned and administered lands. Human activities can influence the rate of natural salt movement from rock formations and soils to the River system and include livestock grazing, wildlife management, logging, mining, oil exploration, road building, recreation and urbanization.

Approximately 53 percent of the salinity concentration in the water arriving at Hoover Dam, as identified by EPA, results from various human activities. EPA estimated that out-of-Basin exports account for approximately 3 percent of the salt concentration at Hoover Dam, with irrigation accounting for 37 percent, reservoir evaporation and phreatophyte use accounting for approximately 12 percent, and approximately 1 percent attributed to municipal and industrial uses. Much of the salt load contribution from irrigated agriculture is from federally-developed irrigation projects.

Figure xxx Damages v. Salinity



Colorado River water users in the Lower Basin have suffered significant economic impacts due to long-term continued use of water with elevated salinity levels. At current salinity levels, as shown in Figure ____, these salinity damages are estimated to be in excess of $600 million per year. MWD recently refined the estimate of salinity damages for its service area as an element of a MWD-Bureau of Reclamation Salinity Management Study. Considering this work, Bureau of Reclamation is currently refining the estimate of salinity damages in other portions of the lower Colorado River Basin.

Agricultural water users suffer economic damage as a result of using highly saline waters through reduced crop yields, added labor costs for irrigation management, and added drainage requirements. Urban users incur additional costs due to more frequent replacement of plumbing and water-using appliances, use of water softeners and the

purchase of bottled water. Industrial users and water treatment and wastewater utilities incur reductions in the useful life of system facilities and equipment from higher levels of salinity.

A significant economic impact in the Lower Basin results from the regulatory restrictions imposed by local and regional water quality standards and management programs that protect groundwater supplies. Regulatory agencies have placed restrictions on reuse or recharge of waters that exceed specified salinity levels. If the salinity levels of the Colorado River increase, these regulatory actions result in additional expensive treatment of water prior to reuse or disposal instead of reuse of the waters. If disposal options are selected, additional costly water must be developed or imported to meet the demands previously met or that could be met by water reuse.

a. History and Background

In the 1960s and early 1970s, the seven Colorado River Basin states and representatives of the federal government discussed the problem of salinity levels increasing in the lower reaches of the Colorado River. In 1972, the federal government enacted the Clean Water Act which mandated efforts to maintain water quality standards in the United States. At the same time, Mexico and the United States were discussing the increasing salinity of Colorado River water being delivered to Mexico.

The Basin states established the Colorado River Basin Salinity Control Forum (Forum) in 1973. The Forum is composed of representatives from each of the seven Basin states appointed by the governors of the respective states. The Forum was created for interstate cooperation and to provide the states with the information necessary to comply with Section 303(a) and (b) of the Clean Water Act.

Congress enacted the Colorado River Basin Salinity Control Act (P.L. 93-320) (the Act) in June of 1974 with the Forum's support. Title I of the Act addresses the United States' commitment to Mexico and provided the means for the United States to comply with the provisions of Minute No. 242. Title II of the Act created a water quality program for salinity control in the United States. Primary responsibility for the federal program was given to the Secretary, with the Bureau of Reclamation being instructed to investigate and build several salinity control units. The Secretary of Agriculture was instructed to support the effort within existing authorities.

The EPA promulgated a regulation in December 1974, which set forth a basinwide salinity control policy for the Colorado River Basin. The regulation specifically stated that salinity control was to be implemented while the Basin states continue to develop their 1922 Colorado River Compact-apportioned water. This regulation also established a standards procedure, and required the Colorado River Basin states to adopt and submit for approval to the EPA water quality standards for salinity, including numeric criteria and a plan of implementation, consistent with the policy stated in the regulation.

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The Basin states acting through the Forum initially responded to this regulation by developing and submitting to EPA a report entitled Water Quality Standards for Salinity Including Numeric Criteria and Plan of Implementation for Salinity Control – Colorado River system dated June 1975. Since the states' initial adoption, the water quality standards have been reviewed every three years (1978, 1981, 1984, 1987, 1990, 1993, 1996, and 1999) as required by Section 303(c)(l) of the Clean Water Act.

The Colorado River Basin Salinity Control Act was amended in 1984 by P.L. 98-569 to authorize two additional units for construction by the Bureau of Reclamation. The amendments directed the Secretary and the Secretary of Agriculture to give preference to the salinity control units with the least cost per unit of salinity reduction. The Act was also amended to establish a voluntary on-farm salinity control program to be implemented by the United States Department of Agriculture (USDA) and provided for voluntary replacement of incidental fish and wildlife values foregone on account of the on-farm measures. Many cost-effective salt-load reducing activities were accomplished in the decade following that authorization. P.L. 98-569 also directed BLM to implement salinity controls.

The Bureau of Reclamation and the Forum, in 1994, concluded that the existing Act, as amended, with its unit-specific approach and authorization ceiling, was limiting salinity control opportunities. In 1995, the Act was amended by P.L. 104-20 to authorize an entirely new way of implementing salinity control. The Bureau of Reclamation's new Basinwide Salinity Control Program opens the program to competition through a public process and has greatly reduced the cost of salinity control. An additional $75 million of expenditures by Bureau of Reclamation were authorized by P.L. 104-20.

The Federal Agriculture Improvement and Reform Act (FAIRA) of 1996 (P.L. 104-127) further amended the USDA's role in salinity control by creating a new conservation program known as the Environmental Quality Incentives Program (EQIP) which combined four conservation programs, including USDA's Colorado River Basin salinity control program. FAIRA provided authority for funding the nationwide EQIP through the year 2002. USDA has created rules and regulations concerning how EQIP funds are to be allocated. The past authority for the states to cost-share from the Basin funds was retained in the new EQIP program with linkage to Bureau of Reclamation's authority to distribute Basin funds for cost sharing.

Presently pending in the Congress is legislation that would raise the authorized funding ceiling of The Bureau of Reclamation's new Basinwide Salinity Control Program by $100 million.

b. Overview of Standards

The Forum proposed, the states adopted, and the EPA approved water quality standards in 1975, including numeric criteria and a plan of implementation, to control salinity increases. The standards require that a plan be developed which will maintain the flow weighted average annual salinity at or below the 1972 levels while the Basin states

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continue to develop their 1922 Colorado River Compact apportioned water supply. The Forum selected three stations on the mainstream of the lower Colorado River as being appropriate points to measure the salinity of the Colorado River. These stations are located at the following points on the Colorado River: (1) below Hoover Dam; (2) below Parker Dam; and (3) at Imperial Dam. Numeric criteria were established for these points as required by the 1974 regulation. The numeric criteria are flow-weighted average annual salinity values.

Table yyy – Salinity Concentration

Station	Salinity Concentration In mg/L
Below Hoover Dam	723
Below Parker Dam	747
At Imperial Dam	879

A plan of implementation was also developed in 1975 by the Forum and participating federal agencies as part of the standards. It was designed to ensure compliance with the numeric criteria for salinity. During each triennial review, the numeric criteria are reviewed and the plan of implementation is updated to ensure continuing compliance with the standards.

The Colorado River water quality standards for salinity, and the approach taken by the Basin states in complying, are unique. The Forum relied on the Basin states' projections of use of 1922 Colorado River Compact apportioned waters. The salinity projections are based on the long-term mean water supply of 15 million af per year. The plan of implementation is revised as necessary to ensure compliance with the standards.

Salinity control activities necessarily include a water quality monitoring and analysis component that provides basinwide information for program evaluation. The monitoring and analysis component provides an essential database for future studies, supports state and regional planning activities, and provides an objective basis for evaluating the effectiveness of salinity control measures.

Continuing evaluations of the salinity of the Colorado River are made by the Bureau of Reclamation, U.S. Geological Survey (USGS) and BLM. The results of several studies were published by the agencies during the period 1996-1999. To evaluate changes in salinity, water quality and streamflow data are obtained on a daily, weekly, monthly, and/or quarterly basis at various points on streams throughout the Basin by

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USGS in cooperation (through financial and/or direct services) with private entities, the states and other federal agencies.

Salinity data are based on total dissolved solids (TDS) as the sum of constituents, whenever possible. The sum of constituents values are defined to include calcium, magnesium, sodium, chloride, sulfate, a measure of the carbonate equivalent of alkalinity and, if measured, silica and potassium. If a sum of constituents value could not be computed, TDS as residue of evaporation (at 180 degrees Celsius) is substituted. Further, some reported salinity values are based on correlation with specific conductance measurements. The terms "salinity," "TDS," and "concentration" in mg/L are used interchangeably herein.

Average annual salinity concentrations and salt loads are determined on the basis of a flow-weighted average annual salinity concentration. The flow-weighted average annual salinity is simply the concentration determined from dividing the annual total salt load passing a measuring station by the total annual volume of water passing the same point during a calendar year. The flow-weighted average annual salinity is calculated by first multiplying the daily concentration values by the daily flow rates. These values are then summed over a calendar year and then divided by the sum of the daily flow rates.

d. Existing Salinity Conditions

The goal of the Colorado River Basin Salinity Control Program is to maintain the flow weighted average annual salinity at or below the numeric criteria. The effort is not intended to counteract the salinity fluctuations that are a result of the highly variable flows caused by short-term climatic variations in temperature, precipitation, and snowmelt. Therefore, to evaluate the effectiveness of the Colorado River Basin Salinity Control Program, salinity data were analyzed and adjusted by removing the effects of these variations to better understand program effectiveness under long-team mean water supply conditions.

This adjusted data was used to evaluate whether current salinity control efforts are sufficient to meet the numeric criteria of the salinity standards under the current and projected levels of water development in the Basin.

e. Future Salinity Projections

For past reviews of the water quality standards, salt-routing studies were conducted using the Colorado River Simulation System (CRSS) developed by Bureau of Reclamation. The CRSS is a package of computer models and databases developed by the Bureau of Reclamation as a tool for use by water resource managers dealing with water-related issues and problems. Previous studies were conducted to provide estimates of future flow-weighted average annual salinity concentrations for each year of the study period below Hoover and Parker Dams and at Imperial Dam in the Lower Basin.

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Currently, the Bureau of Reclamation is developing a new model to analyze the Colorado River system, including salinity. This is an ongoing process that is intended to provide a better tool for projecting future salinity concentrations. Because the model was not completed in time for the 1999 Review, projections developed for the 1996 Review were used in the 1999 Review. This analysis determined that the salinity control program would need an estimated total of 1,477,000 tons of salinity control in order to meet the numeric criteria in 2015 at the Hoover station. This represents 756,000 tons beyond the existing 721,000 tons of salinity control. This includes a shortfall of 384,000 tons of salinity control that were to be in place by 1998 to offset estimated development. Based on comments received during the 1996 Review, the Forum determined that the shortfall should be eliminated as soon as possible and at least within the next six years. The plan of implementation has been developed to remove at least 87,000 tons/year through 2005. This includes 64,000 tons/year to eliminate the shortfall and the 23,000 tons/year needed to maintain the numeric Criteria through 2015.

f. Program Funding

Adequate funding is required to meet the standards. Funds are provided from federal and non-federal sources. Federal appropriations, Basin states cost-share funds, and local participant funds are used to implement the Colorado River Basin Salinity Control Program. The Basin states and the local producers have funds available and stand ready to implement the program.

Over the past 12 years, annual appropriations to the Bureau of Reclamation were as large as $34,566,000 as recently as 1992, but in 1998 they were only $7,600,000. Because of improved cost effectiveness, the Basin states believe the appropriation to the Bureau of Reclamation can be smaller than in the past, but find that approximately $17,500,000 is needed each year through 2015. An increased funding ceiling is now needed for the Bureau of Reclamation program. Legislation to increase the funding ceiling by $100 million is now before the Congress.

Table yyy - Salinity Control Requirements

1998 Salinity Control Requirements	
Requirements	1,105,000 tons/year
Measures in Place	721,000 tons/year
Shortfall	384,000 tons/year
2015 Salinity Control Requirements	
Requirements	1,477,000 tons/year
Measures in Place through 1998	721,000 tons/year
Plan of Implementation Target	756,000 tons/year

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Following the passage of FAIRA in 1996, federal funding is provided to USDA each year for distribution for environmental enhancement efforts through the nationwide EQIP. In 1991 and 1992, when salinity control was a separate line item, $14,783,000 was made available to USDA's Colorado River Basin salinity control program by Congress, but in 1998 and 1999 USDA allocated only $3.9 million and $5.1 million. A solution to this under-funding problem is for USDA to designate the Colorado River Basin as a national conservation priority area and increase funding to the Colorado River salinity control activities of EQIP to $12 million per year.

BLM has an important role to play in controlling salt contributions from nonpoint sources from the very sizeable amount of federal land it manages. Accounting procedures used by BLM in the past did not allow for an analysis to occur as to expenditures for salinity controls measures being implemented by the agency. Recent efforts by BLM staff to determine the effects of management practices being implemented is providing new information and BLM accomplishments for Fiscal Year 1999 have been estimated. This will lead to a determination of the adequacy of the effort and the level of funding needed for the activities.

EPA has programs that give financial assistance to the states to implement nonpoint source pollution control efforts. Recently, the federal assistance has been increased and now the salinity control effects of these efforts need to be evaluated.

g. Plan of Implementation

For the 1999 Review, the plan of implementation to maintain the numeric criteria has been designed to maintain salinities of the Colorado River at or below the numeric criteria below Hoover Dam through the year 2015. The Hoover Dam station was chosen because this point requires the most salinity control to accommodate the numeric criteria through this time period.

The Forum determined that 1,477,700 tons of salt must be removed or prevented from entering the system annually to maintain the numeric criteria through 2015. The plan of implementation includes projects which remove the required salt tonnage. This will principally be accomplished by reducing the salt contributions to the River from existing sources and minimizing future increases in salt load caused by human activities.

The plan of implementation is composed of many actions contemplated by the federal government (and cost shared by the Basin states) and many of its agencies, and by each of the seven Basin states and many of their agencies. The plan of implementation can be briefly summarized as follows:

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- Completion of Bureau of Reclamation, BLM, and USDA salinity control measures to the extent that the measures remain viable and approximately cost effective with the acceleration of the Bureau of Reclamation and the USDA efforts by the Basin states' cost sharing,
- Implementation of Forum recommended and adopted policies:
  - Imposition of effluent limitations, principally under the National Pollutant Discharge Elimination System (NPDES) permit program provided in Section 402 of the Clean Water Act of 1972, on industrial and municipal discharges, based on the Forum's 1977 "Policy for Implementation of Colorado River Salinity Standards Through the NPDES Permit Program,"
  - "Policy for the Use of Brackish and/or Saline Waters for Industrial Purposes,"
  - "Policy for Implementation of the Colorado River Salinity Standards Through the NPDES Permit Program for Intercepted Ground Water," and
  - "Policy for Implementation of the Colorado River Salinity Standards Through the NPDES Permit Program for Fish Hatcheries."
  - Implementation of nonpoint source management plans developed by the states and approved by EPA.

In order to meet the goal of 1.48 million tons of salinity control through 2015, it will be necessary to fund and implement potential new measures, which ensure the removal of an additional 756,000 tons annually. Table ___ illustrates that the Bureau of Reclamation can potentially remove an additional 501,000 tons, USDA an additional 242,000 tons and BLM an additional 13,000 tons. The costs per ton for salt control are estimated to be $30/ton for Bureau of Reclamation, $45/ton for USDA, and $30/ton for BLM. Based on these costs per ton, in order to achieve this level of salt reduction, the Forum has estimated that the federal departments and agencies will require the following funding commitments:

- Bureau of Reclamation - $17.5 million/year;
- USDA - $12.0 million/year; and
- BLM - $5.2 million/year.

These estimated cost values are substantiated through salinity control expenditure experience to date and the technical ability to actually implement these efforts through the Colorado River Basin Salinity Control Program.

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Table yyy - Colorado River Basin Salinity Control Program
Plan of Implementation Summary
(Values in Tons/Year)

AGENCY	MEASURES IN PLACE	POTENTIAL NEW MEASURES	TOTAL
Bureau of Reclamation	421,000	501,000	922,000
U.S. Department of Agriculture	262,000	242,000	504,000
Bureau of Land Management	38,000	13,000	51,000
TOTAL	721,000	756,000	1,477,700

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2. Watershed Management

For water resources, watersheds and sub-watersheds provide an appropriate geographic unit of management. There has been substantial national and state attention given recently to watershed management plans and programs to protect and improve water quality and aquatic ecosystems pursuant to federal and state clean water and safe drinking water acts. In particular, this includes source water protection programs and nonpoint source pollution control programs. There is also a growing recognition of the need to better coordinate programs.

Watershed management plans and programs need to give consideration to all water resources management objectives for watersheds, including water quality protection and/or improvement, water supply availability, water supply storage, flood and erosion control, and aquatic ecosystem protection objectives. Such coordinated approaches improve the effectiveness and efficiency in maximizing the potential overall improvement and protection of watersheds in meeting watershed management needs. Coordination in watershed management goals and programs, approaches, assessments of watershed functions and conditions, habitat restoration, remediation, environmental clean up, and watershed monitoring will help provide necessary consistency between federal, state, tribal, and local government watershed management efforts to most effectively meet all needs.

As previously indicated, approximately 75 percent of the land within the Colorado River Basin is owned and administered by the federal government or held in trust for Indian tribes.

I. International Aspects

The international boundary between the United States and Mexico extends over 1,952 miles and is characterized by deserts, mountains, and by two major rivers -- the Colorado River and the Rio Grande, which provide waters to the largely arid but fertile lands along the rivers in both countries. Along the boundary are fifteen pairs of sister

cities sustained by agriculture, import-export trade, service and tourism, and in recent years by a growing manufacturing sector. The two countries share a twenty-four mile segment of the Colorado River system as their international boundary.

The International Boundary and Water Commission (IBWC), formed by United States and Mexico, originated as the International Boundary Commission in 1889 – with responsibilities primarily focused on resolving boundary disputes. Water issues became key IBWC responsibilities at the turn of the century, first through investigations and a treaty governing a portion of the Rio Grande at El Paso – Juarez (1906) and then by way of the 1944 Treaty between the United States and Mexico. The IBWC functions under the policy direction of the U.S. State Department and the Mexican Secretariat of Foreign Relations.

The IBWC consists of two sections – the United States Section and the Mexican Section. Each section is headed by an engineer Commissioner appointed by his respective president. The two sections operate international joint projects along the entire boundary, overseeing binational storage dams, wastewater treatment plants, flood control projects, diversion dams, hydrographic and water quality monitoring programs.

The United States and Mexico are addressing questions over the quality and the conveyance of Colorado River water delivered by the United States to Mexico under the 1944 Water Treaty in a binational setting. The United States has the obligation to deliver 1.5 million af annually of these waters in accordance with a schedule provided by Mexico and within salinity standards agreed to by the two Governments in 1973. In times of surplus Colorado River conditions in excess of the United States' needs, Mexico may schedule an additional 200,000 af. In times of Colorado River shortage conditions, the United States may reduce these deliveries proportionate to reductions that are made in the United States. The United States and Mexico have the right to use the channel of the Colorado River for discharge of flood and other excess waters. The two countries are also addressing other water quality issues and modification of the current conveyance system.

The IBWC is addressing these questions through a cooperative spirit that involves partnering with water resource, water quality and water planning agencies of the federal and border state governments, including local entities. The IBWC has established a binational task force involving the federal water resource agencies of both countries that each country has charged with managing the Colorado River system. In this way, a number of issues are addressed in a cooperative manner using the Bureau of Reclamation's Lower Colorado Region office's existing resources and management practices and those of Mexico's Comisión National del Agua. Two issues are currently being addressed in this manner: salinity and conveyance.

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1. Title I –Colorado River Basin Salinity Control Act

In 1944, the United States and Mexico signed a treaty requiring the United States to deliver 1.5 million af of Colorado River water to Mexico annually. The treaty did not address the quality of the water. However, the Mexican Government filed a formal protest with the United States when the salinity of the delivered water increased sharply in the early 1960s. Increased salinities were caused by: (1) the discharge to the Colorado River of highly saline irrigation drainage from newly constructed drainage wells in the Wellton-Mohawk Irrigation and Drainage District in Arizona; (2) a reduction in Colorado River excess flows to Mexico, caused by the filling of Lake Powell behind Glen Canyon Dam; and (3) the construction of Painted Rock Dam in Arizona, which significantly reduced Gila River flood flows to the Colorado River.

The United States and Mexico pursued a series of temporary solutions to the salinity problem throughout the 1960s and early 1970s. The United States began to modify Wellton-Mohawk irrigation drainage pumping and River operations in 1963 and 1964. In 1965, the United States reached its first salinity agreement with Mexico (Minute No. 218 of the IBWC). Minute No. 218 authorized the construction and operation of the Main Outlet Drain Extension (MODE), which allowed Wellton-Mohawk irrigation drainage to be discharged either above or below Morelos Dam. In 1972, President Nixon appointed former United States Attorney General Herbert Brownell to recommend a permanent, definitive, and just solution to the salinity problem. Among other things, Brownell recommended: (1) constructing a desalting plant to treat Wellton-Mohawk irrigation drainage; and (2) allowing for a difference between the salinity of the waters arriving at Imperial Dam near Yuma, Arizona, and the salinity of the waters delivered to Mexico.

The Presidents of the United States and Mexico approved a recommended agreement in the form of Minute No. 242. Minute No. 242 requires that the average annual salinity of Colorado River water delivered by the United States to Mexico upstream of Morelos Dam (Mexico's principal diversion structure) not exceed the average annual salinity of the water arriving at Imperial Dam by more than 115 parts per million (ppm) plus or minus 30 ppm. This value is referred to as the salinity differential.

Among its other provisions, Minute No. 242 requires the United States to continue to deliver approximately 140,000 af of water annually to Mexico across the Southerly International Land Boundary near San Luis, Mexico, and in the Limitrophe Division of the Colorado River, in partial satisfaction of Mexico's 1.5 million af entitlement. The United States also agreed to limit groundwater pumping in its territory within 5 miles of the Southerly International Boundary to no more than 160,000 af annually. Mexico made a similar agreement. The United States made several commitments to secure the seven Colorado River Basin states' support for Minute No. 242. The United States assured the States that any agreement with Mexico would not cost, impair, or injure landowners, water users, or preference power users in the United

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States and recognized, as a "national obligation," the replacement of the reject stream from the desalting plant and any Wellton-Mohawk irrigation drainage bypassed to meet the salinity differential established in Minute No. 242.

To enable the United States to comply with its obligations under Minute No. 242, Congress passed P.L. 93-320 on June 24, 1974. The Title I program of P.L. 93-320 authorizes salinity control projects downstream of Imperial Dam.

The central feature of the Title I program is the Yuma Desalting Plant (YDP). Other Title I features include a program to reduce the volume of Wellton-Mohawk irrigation drainage; concrete-lining of the first 49 miles of the Coachella Canal to reduce seepage and to provide a temporary source of replacement water for bypassed irrigation drainage; and construction of the Protective and Regulatory Pumping Unit (PRPU) to conserve United States groundwater for use in the United States and for delivery to Mexico.

Figure xxx – Photo of Yuma Desalting Plant

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The YDP is the world's largest reverse osmosis desalting plant. The YDP was intended to maximize the use of irrigation drainage for delivery to Mexico by removing sufficient salts to meet the salinity differential in most years. When needed, the Bureau of Reclamation could salvage agricultural drainage water, desalt it, and put the product water into the Colorado River to become part of the U.S. treaty-required water deliveries to Mexico. The plant is designed to produce an average of 68,500 af of product water per year at approximately 300 mg/l total dissolved solids. Following completion and partial operation of the YDP, the Bureau of Reclamation placed the facility into standby status while it considers long-term alternatives to operating the Plant. Since the Colorado River Basin Salinity Control Act was signed into law, the United States has met the salinity differential by bypassing Wellton-Mohawk irrigation drainage to the Santa Clara Slough (without charge to the treaty) and substituting an equal amount of good quality water from upstream storage for delivery to Mexico.

The objective of the irrigation efficiency improvement program was to reduce Wellton-Mohawk irrigation drainage by improving irrigation efficiencies and reducing

the irrigated acreage within the district. Before the program was initiated, irrigation efficiency was approximately 56 percent. While the program was active, irrigation efficiency met and exceeded the target efficiency of 72 percent, and irrigation drainage dropped from 220,000 af to a low of 118,500 af annually. Developed and undeveloped irrigable lands were reduced by 10,000 acres.

As authorized by P.L. 93-320, the first 49 miles of the Coachella Canal have been concrete-lined. Since lining was completed in 1980, up to 132,000 af of water a year (the amount saved by lining) has been credited toward the replacement of irrigation drainage bypassed to meet the salinity differential. The United States will lose this temporary source of replacement water when less water than is contractually ordered is delivered to California water users.

The Protective and Regulatory Pumping Unit was constructed to manage and conserve United States groundwater for the benefit of the United States and for delivery to Mexico. Ultimately, the PRPU will produce approximately 160,000 af of water; of this, approximately 125,000 af a year will be delivered to Mexico. This amount, combined with approximately 15,000 af of water from wasteways in the Yuma Valley, will furnish 140,000 af of Mexico's 1.5 million af entitlement, as provided in Minute No. 242.

2. Conveyance and Siltation

The Gila River floods in 1993 and 1995 deposited sediment in several places in the Colorado River and in Mexico's irrigation water conveyance system. Mexico was concerned in late 1994 that deposition of sediment at Morelos Dam may have prevented Mexico from maximizing its diversions in early January 1995, a period of high demand.

In 1995, IBWC arranged for an emergency silt removal program involving Mexico's Comisión Nacional del Agua and the Bureau of Reclamation in the Morelos Dam area. The arrangement also set the basis for future channel conveyance improvements.

3. Emergency Deliveries to Mexico

Since 1972, the Government of Mexico has requested assistance with emergency deliveries of water for the City of Tijuana a number of times, first to deal with a severe shortage of water, and later when major repairs were being made to the Colorado River-to-Tijuana aqueduct in Mexico. Typically, these requests are formally presented to the Commissioner of the United States Section of the International Boundary and Water Commission (IBWC) who then requests assistance from MWD. The physical connection is an extension of the Otay Water District's potable water distribution system in the San Diego area. In the past, only a few hundred af of Mexico's Colorado River water has been diverted from Lake Havasu through MWD's Colorado River Aqueduct, transported through SDCWA's system and ultimately through the Otay connection and into Mexico

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while repairs are being made. Recently this connection was being evaluated for modifications in both countries to allow future deliveries to Tijuana in an emergency situation. Historically, Mexico has paid for the cost to have this water transported, as well as the cost to improve the connection.

4. Colorado River Issues with Respect to Mexico and the Delta

The Colorado River delta is a rich ecosystem, home to hundreds of species inhabiting approximately 150,000 acres of riparian forest, emergent marsh and inter-tidal wetlands. Environmental organizations are proposing that additional water be provided for riparian habitat and fresh water flows to the Gulf of California.

Figure xxx – Photo of An Endangered Species

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The northern Gulf of California contains two endangered species, the vaquita (porpoise) and totoaba (sea bass), that are not currently addressed by the LCR MSCP or the Bureau of Reclamation's interim Biological Opinion on lower Colorado River operations and maintenance.

The U.S. Fish and Wildlife Service and Bureau of Reclamation have formed a Technical Work Group with Mexican counterparts to identify research needs and projects for sensitive biological resources found along the lower Colorado River as well as in Mexico. To date, they have drafted three proposals for further discussion: (1) a literature search of historic and present environmental conditions, and establishment of dual depositories for this literature; (2) development of a hydraulic model for the lower Colorado River from the Northerly International Boundary to the Gulf of California; and (3) pilot riparian habitat restoration projects in the delta.

5. Border Environmental Issues

Mexicali is contributing raw sewage and other pollution to the New River, the major freshwater input to the Salton Sea. With time, it is believed that Mexico will make use of this water for agriculture, groundwater replenishment, potable and other purposes.

The New River originates in Mexico in the Mexicali Valley, approximately 22 miles south of the International Boundary. From this valley, the River receives industrial wastewater, storm water and agricultural drainage. It also receives raw and partially treated sewage from the City of Mexicali, Baja California, Mexico. The average flow at the boundary is approximately 200 cubic feet per second (cfs). Once it crosses the International Boundary, the New River flows through the Imperial Valley for approximately 60 miles until it reaches its outlet, the Salton Sea, the largest body of surface water in California.

The California Regional Water Quality Control Board, Colorado River Basin Region, is addressing the New River's water quality problems attributable to activities in the United States through the State's Watershed Management Initiative. The strategy for the short and long-term solutions for the sanitation of the New River at the International Boundary was agreed upon by the federal governments of both Mexico and the United States under the IBWC's Minute No. 288, adopted in October 1992.

6. Border Groundwater Issues

Title II of P.L. 100-675 authorized the Secretary of the Interior to line the All American Canal from Pilot Knob to Drop 4. The All American Canal was constructed along the border of the United States and Mexico in California. Mexico has objected to this proposed project because water that presently seeps from the canal migrates into Mexico where it is recovered from groundwater aquifers and used for agriculture. The United States maintains that seepage from the All American Canal is surface water which was allocated to the United States under the 1944 Water Treaty and the United States has the right to conserve those waters. As a matter of goodwill only, the United States has encouraged Mexico to consider conveying a part of its 1944 Treaty waters in a lined All American Canal, which would result in a water quality benefit to Mexico.

J. Administration Of Water Rights And Use

The administration of lower Colorado River water rights requires a number of determinations including whether water use is pursuant to, and in accordance with, a contract with the Secretary; whether water pumped from the underground is Colorado River water; and whether proper credits against diversions have been given to a user for measured and unmeasured return flows to the Colorado River, as well as detailed and accurate annual records of diversions of water. The timeliness of these determinations and reports are made difficult by the priority system and the lag in processing final data. The water use administration and accounting efforts are carried out pursuant to the United States Supreme Court's 1964 Decree in *Arizona v. California.*

1. Mainstream and Tributary Water Determinations

In its 1964 Decree in *Arizona v. California*, the U.S. Supreme Court specified that consumptive use from the mainstream within a state shall include all consumptive uses of

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water of the mainstream, including water drawn from the mainstream by underground pumping. Consumptive use means diversion from the stream less such return flow as is available for consumptive use in the United States or in satisfaction of the Mexican treaty obligation. Rights and use of Colorado River water in the lower Colorado River Basin are expressed in terms of diversions and consumptive use as defined by the decree.

There are hundreds of wells along the Colorado River below Lee Ferry within the flood plain and on the adjoining terraces and mesas. Currently, water withdrawn from a well located within the flood plain of the Colorado River is considered by the Bureau of Reclamation to be Colorado River mainstream water and, consequently, the user must be a Colorado River water right holder. Those wells found to be using tributary water do not require a Colorado River water right.

In an effort to determine if wells located outside the flood plain are yielding water that is Colorado River mainstream water, the U.S. Geological Survey released its 1994 report entitled "Method to Identify Wells That Yield Water That Will Be Replaced by Colorado River Water in Arizona, California, Nevada, and Utah" (U.S. Geological Survey Water-Resources Investigations Report 94-4005). The area covered by the report extends from the upstream reach of Lake Mead down the Colorado River to Laguna Dam near Yuma, Arizona. The Bureau of Reclamation has indicated that this report provides the primary tools that would be used to presume if a well is, or is not, pumping Colorado River water.

In its report, the U.S. Geological Survey has delineated the flood plain of the Colorado River and identified the extent and the elevation of the "Accounting Surface." The Accounting Surface is defined as the elevation and slope of the unconfined static water table in the Colorado River aquifer outside the flood plain and reservoirs of the Colorado River that would exist if the River (including the reservoirs) were the only source of water to the aquifer. The Accounting Surface extends from the edge of the flood plain away from the River to the physical limit of the aquifer. Generally, the elevation of the accounting surface is based on a perpendicular extension of the surface elevation of the Colorado River. The extent of the Accounting Surface, depending on the region, ranges from no accounting surface (e.g., along the Topock Gorge) to as much as 50 miles away from the Colorado River (e.g., MWD's Eagle Mountain Pumping Plant).

Wells located within the Accounting Surface having a static water surface elevation that is equal to or less than the elevation of the Accounting surface at that point would be presumed to yield water that would be replaced by water from the Colorado River mainstream.

The U.S. Geological Survey is currently preparing its delineation of the Accounting Surface below Laguna Dam.

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Municipal, industrial, and recreational water users found to be using Colorado River water, through such determinations, without a Colorado River water right may be eligible to contract for water from the Lower Colorado Water Supply Project.

2. Section 5 Contracts

Section 5 of the Boulder Canyon Project Act provides the basic authority for the Secretary to contract for the storage and delivery of water for irrigation and domestic purposes. The Act provides that no person shall have or be entitled to have the use for any purpose of water stored except by contract with the Secretary and that contracts for irrigation and domestic uses shall be for permanent service.

The1964 Decree in *Arizona v. California* defines domestic use to include the use of water for household, stock, municipal, mining, milling, industrial, and other like purposes, but excludes the generation of electrical power.

3. Decree Accounting

Article V of the U.S. Supreme Court's 1964 Decree in *Arizona v. California* required that the United States prepare and maintain detailed and accurate records annually of diversions of water from the Colorado River mainstream, return flow of such water to the mainstream as is available for consumptive use in the United States or in satisfaction of the Mexican Treaty obligation, and consumptive use of such water. The Decree required that these quantities be stated separately as to each diverter from the mainstream, each point of diversion, and each of the States of Arizona, California, and Nevada.

To moderate MWD's risk for use in excess of 420,000 af per year by PVID on Palo Verde Valley and Mesa lands and the Yuma Project-Reservation Division (Priorities 1, 2 and 3b), the Key Terms for Quantification Settlement call for the Bureau of Reclamation to develop certain accounting mechanisms. These include standards and procedures for consumptive use decree accounting for Priorities 1, 2, and 3b which utilize, at MWD's discretion, either a 25-year running average or an actual annual consumptive use. The development of the standards and procedures for running average accounting will be done in consultation with the other Basin states.

The Key Terms also provide that the Bureau of Reclamation will determine that the interim period under the Colorado River Basin Salinity Control Act has not ended so long as IID and MWD submit annual estimates of water diversions to the Bureau with the modifier " to the extent Colorado River water is available to IID and MWD under each of its entitlements and the Quantification Settlement Agreement water budget components." The interim period refers to the period when conserved water resulting from the lining of the first 49 miles of the Coachella Canal is being used to offset the bypass of Wellton-Mohawk drainage to the Santa Clara Slough for the purpose of meeting the salinity

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appropriate proceedings or actions before executive, legislative, or judicial agencies to enforce the State's prohibition against waste and unreasonable use of water. The SWRCB's regulations regarding waste/unreasonable use determinations define "misuse of water" as "any" waste or unreasonable use of water. A waste/unreasonable use determination can only be made by the SWRCB after a quasi-judicial hearing in which the water user's due process rights are protected.

6. Proper Credit for Returns Flows

Consumptive use means diversion from the stream less such return flow as is available for consumptive use in the United States or in satisfaction of the Mexican treaty obligation. Receiving proper credit for return flow, measured and unmeasured, helps ensure the optimum use of California's Colorado River water apportionment. This is currently carried in the Article V decree accounting.

In 1969, the Lower Basin states asked the Bureau of Reclamation to develop a method that would consider all return flows, measured and unmeasured, for each diverter in a consistent and equitable manner. The initial response to this request was to establish the Task Force on Unmeasured Return Flow in 1970. After extensive discussion with the Lower Basin states and trials of other methods, in 1984 the task force chose to develop and apply a water balance approach to the lower Colorado River. The proposal to develop and study the method was accepted by all the members of the task force, and the method was named the Lower Colorado River Accounting System (LCRAS).

The accounting system calculates consumptive use by vegetation, including phreatophytes as stream flow depletion for four specified reaches (Hoover-Davis-Parker-Imperial-Morelos Dams) of the lower Colorado River from Hoover Dam to Morelos Dam. Consumptive use by vegetation is apportioned by diverter using digital-image analysis of satellite data to calculate areas of each vegetation type belonging to each diverter and water use rates to estimate the amount of water used by each vegetation type. LCRAS uses a water balance and performs a summation of all identified inflows, outflows, and water uses for each of the four reaches. The result of this summation is called a residual, and represents the impreciseness of measurement or estimation in some or all of the inflow, outflow, and water use values. To determine a final value of crop, phreatophyte, and domestic consumptive use, the residual of the water balance is distributed to the original estimates for all inflows, outflows, and water uses in proportion to the product of their magnitude and variance.

There are differences between the values of consumptive use compiled for the Decree Accounting Report and those calculated by LCRAS for all diverters. Those differences need to be resolved before LCRAS can be considered for decree accounting purposes.

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control objectives of Minute No. 242 of the IBWC. The Bureau of Reclamation will consult with the other Basin states on this matter.

4. Priority System

A basic premise of the River's priority to use system is that water which cannot be beneficially used by a Colorado River right holder becomes available to meet the needs of lower priority right users, which needs may not otherwise be met. California's 1931 Seven-Party Agreement set the priorities among the signatory agencies relative to their use of Colorado River water. California's prioritized contracts for over 5,362,000 af per year of consumptive use were made pursuant to and incorporate the 1931 Agreement. During the period of the new Quantification Settlement Agreement, the priorities and uses of water would be as provided in the new Quantification Settlement Agreement and as modified by the Interagency Water Acquisition and Secretarial Implementation Agreements, the district's water budgets and caps and their deductions for senior Miscellaneous and Indian Present Perfected Rights.

5. Reasonable Beneficial Use Requirements

In the case of California Colorado River water users, the State of California and the federal government oversee reasonable beneficial use.

The right to use and reasonable beneficial water use doctrines are part of the basic foundation of western water management. Under the Reclamation Act of 1902, "beneficial use shall be the basis, the measure, and limit of the right" to use federal Bureau of Reclamation project water. Generally, states or their delegated subdivisions are responsible for determinations of reasonable beneficial water use, unless otherwise provided by federal law. The California Constitution and Water Code require that water resources within the state be put to beneficial use to the fullest extent of which they are capable, and that waste or unreasonable use or unreasonable methods of use be prevented, and that the conservation of such waters is to be exercised with the view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare. Inherent within the concept of beneficial use is the recognition that beneficial water use at one time may, because of changed conditions, become a waste of water at a later time.

Because of the unique Lower Division states' federal water supply contracts and the interstate Colorado River water master role of the Secretary, the Regional Director of the Lower Colorado Region of the Bureau of Reclamation, through a delegation of secretarial authority, has responsibility for annual determinations and enforcement of reasonable beneficial use of Colorado River water in the lower Colorado River Basin states (Title 43, Code of Federal Regulations, Part 417).

While not the exclusive method of enforcement, the California Water Code authorizes the California State Water Resources Control Board (SWRCB) to take all

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7. Inadvertent Overrun Accounts and Pay Backs

Inadvertent overruns would occur when a consumptive water use entitlement for that year, as modified by the Key Terms, would be exceeded. The delays in obtaining decree accounting data and good water management requires flexibility in annual year deliveries. The Key Terms call for the establishment of cumulative inadvertent overrun accounts. Overruns within the limits of an account must be repaid by reductions in diversions below a district's entitlement over a specified period in annual amounts, starting in the first full year after an overrun is reported by the Bureau of Reclamation. Any overruns in excess of a district's allowed account must be repaid within the first full calendar year after the excess is reported by the Bureau of Reclamation. Overrun paybacks would be forgiven in the event of flood control spills or anticipated flood control releases and overrun paybacks would be tolled, but not prohibited, during periods of unlimited surplus water availability. Development of inadvertent overrun procedures and accounts for all three lower Basin states will be considered in a formal public process conducted by the Bureau of Reclamation.

8. Further Quantification of Water Rights and Uses

The new Quantification Settlement Agreement with respect to priorities 3 and 6 of the 1931 California Seven-Party Agreement helps facilitate the implementation of cooperative water supply programs and provides the needed quantum baseline by which conservation and transfer programs can be measured. Further quantification of other rights, interests, and uses may also be found to be helpful to other cooperative water supply programs, improved resource management, and increased supply reliability.

9. Agency Water Budgets Pursuant to Quantification Agreement

The further quantification of rights and uses of Colorado River water are defined in water budgets for CVWD, IID, and MWD contained in October 15, 1999 Key Terms. The PVID and the Yuma Project-Reservation Division rights (Priorities 1 and 2 of the 1931 Seven-Party Agreement) would continue essentially unchanged, except for consumptive use decree accounting purposes. This further quantification of rights and uses centers on the core voluntary water conservation/transfers and exchanges, which collectively shift over 500,000 af per year from agriculture to principally urban use. The water budgets also provide for the agencies to forego use of 16,000 af from the All American and Coachella Canal lining projects, to permit this supply to facilitate implementation of the San Luis Rey Indian Water Rights Settlement.

The water budgets also define the districts' deductions for the senior Miscellaneous and Indian Present Perfected Rights:

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IID	11,500 af per year
CVWD	3,000 af per year
MWD	Remainder

With respect to Priorities 1, 2, and 3b of the 1931 Seven-Party Agreement, the uses of PVID and Yuma Project-Reservation Division would be assumed to be 420,000 af per year. MWD would bear (absorb) the risk for uses in excess of 420,000 af per year, and conversely, would be entitled to the use of any unused water below 420,000 af.

Incorporating these provisions, the water budgets for the districts, when California is limited to its basic Colorado River water apportionment of 4.4 million af per year, are shown below:

IMPERIAL IRRIGATION DISTRICT

Water Budget	Budget Cap and Adjustments
3.1 MAF	Priority 3 Water Use Cap
< 100 –110 KAF >[1]	To MWD Per 1988 Agreement
< 130 –200 KAF >	To SDCWA
< 67.7 KAF >	To MWD, All American Canal Lining Project[2]
< 50 KAF >	To CVWD
< 50 KAF >	To CVWD through year 45
< 11.5 KAF >	For Miscellaneous Indian PPRs if no Priorities 6 or 7 water is available
2.61 – 2.69 MAF	Adjusted Budget

[1] < > indicates a transfer to others
[2] Less 11.4 KAF for SLR, IID has call rights on the conveyance during surplus years

Priorities 6 and 7 (when available)

<38 KAF>	To MWD
63 KAF	IID Use
<119KAF>	To CVWD

Balance in accord with existing priority system

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COACHELLA VALLEY WATER DISTRICT

Water Budget	Budget Cap and Adjustments
330 KAF	Priority 3 Water Use Cap
< 26 KAF >	To MWD: Coachella Canal Lining Project[1]
20 KAF	From MWD- Approval Agreement
50 KAF	From IID
50 KAF	From IID, then MWD after year 45
35 KAF	From MWD
< 3 KAF >	For Miscellaneous/Indian PPRs if no Priorities 6 or 7 water is available
456 KAF	Adjusted Budget

[1] Less 4.5 KAF for SLR.

Priorities 6 and 7 (when available)

<38 KAF>	To MWD
<63 KAF>	For IID
119 KAF	CVWD Use

Balance in accord with existing priority system

METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Water Budget	**Budget and Adjustments**
550 KAF	Priority 4 Water Use Cap
130-200 KAF	IID / SDCWA Transfer & MWD / SDCWA Exchange
100-110 KAF	From IID- 1988 Agreement
< 20 KAF >	To CVWD-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
< 31.5+KAF >	For Miscellaneous / Indian PPRs if no Priority 6 water or under use of Priority 1, 2 and 3b
771-851 KAF	Priority 4, Transfers and Other Adjustments
662 KAF	When available, Priority 5 and surplus water
38 KAF	From IID / CVWD- when Priority 6 water available
+ KAF	Under use of Priorities 1and 2

In years when there are insufficient direct Colorado River supplies and transfers available for a full Colorado River Aqueduct, other supplies will be substituted to provide a full Aqueduct or other non-Aqueduct supplies available to MWD will be used.

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10. Interagency Water Supply and Management Agreements

The core voluntary conservation/transfers and exchanges of the Key Terms for Quantification Settlement will be carried out through the execution of a new Quantification Settlement Agreement, separate Interagency Water Acquisition Agreements, and where necessary Secretarial Implementation Agreements. In addition, separate agreements will be entered into with respect to cooperative storage and conjunctive use programs and water use reduction programs (e.g., cooperative land fallowing/water transfer programs). The Secretary will make deliveries of Colorado River water in accordance with agencies' and individuals' water rights and water budgets, as modified by these Interagency Water Acquisition Agreements, the new Quantification Settlement Agreement, and Secretarial Implementation Agreements.

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V. IMPLEMENTATION SCHEDULE

California's Colorado River Water Use Plan is made up of components that deal directly with Colorado River water use, and associated components that deal indirectly with River water use, but that are necessary for California to meet its water needs within its apportionment of Colorado River water. While most external interest has been on how California is going to reduce its River water use when required, other aspects of The Plan are of equal importance. No less important are demand management, resource management, efforts to control River salinity and watershed management, international matters, and the administration of water rights and use. The Plan's implementing entities for the most part are the agencies and individuals with California's Colorado River water rights. In some cases, such as River salinity control, the implementing entities include interstate and federal interests. The State is also assisting in the implementation of The Plan through state funding support for Plan components and associated components. Figure yyy, Implementation Schedule Summary, provides an overview of the implementation schedule of Plan components and associated components.

A. State Funding Support for Actions to Improve Water Supply Reliability and Implement California's Colorado River Water Use Plan

Within the last four years, California voters have approved historic levels of general obligation bond financing for water-related programs for improving California water supply reliability and water quality and for restoring watershed ecosystems. This support extends to implementation of measures contained in, and relating to, the Colorado River Water Use Plan.

In 1996, voters approved the $995 million Proposition 204 -- the Safe, Clean, Reliable Water Supply Act. In 2000, the voters approved Propositions 12 and 13 – the $2.1 billion Safe Neighborhood Parks, Clean Water, Clean Air, and Coastal Protection Act and the $1.97 billion Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Act.

By improving water supply reliability, water quality, and ecosystems throughout California, the recent bond measures facilitate the ability of southern California's Colorado River water users to implement The Plan, as well as directly providing funding for some Plan elements. The State of California has also supported Plan implementation from the General Fund. Most notably, $235 million was appropriated in 1998 for lining the All American and Coachella Canals ($200 million) and for Plan groundwater storage and conjunctive use programs ($35 million). An additional $300,000 was provided in 1998 to the Salton Sea Authority for studying the canal linings' impacts on the Sea.

Proposition 204 funds actions such as ecosystem restoration, clean water and water recycling programs, drainage water management programs, and water conservation and groundwater recharge programs. In particular, it includes:

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- a $60 million low-interest loan program for local agency water recycling projects,
- a $27.5 million low-interest loan program for local agency construction of agricultural drainage water management units (drainage management units at the Salton Sea are specially identified as eligible projects),
- a $25 million low-interest loan program for local agency water conservation and groundwater recharge programs, and
- a $25 million loan and grant program for feasibility studies and implementation of projects that develop new water supplies, such as conveyance, groundwater extraction, or diversion facilities.

Proposition 12 funds watershed and riparian corridor improvements, wetlands habitat development, land acquisition for restoration and habitat, and agricultural land stewardship programs. An $82.5 million program was explicitly authorized to provide a state match for projects developed pursuant to the federal Salton Sea Reclamation Act of 1998. In addition, $5 million was specified for environmental restoration projects approved pursuant to the Salton Sea Reclamation Act and the final EIS for the Salton Sea restoration project.

With respect to wildlife habitat programs, Proposition 12 provides $5 million for acquisition/development of wetlands outside of the San Joaquin Valley, $10 million for acquisition of riparian habitat and watershed conservation, $40 million for acquisition/restoration of habitat supporting threatened/endangered species, and $100 million for acquisition of lands covered by Natural Community Conservation Plans (subject to legislative approval). These habitat acquisition programs could contribute to the Lower Colorado River Multi-Species Conservation Program.

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Figure xxx – Summary Implementation Schedule

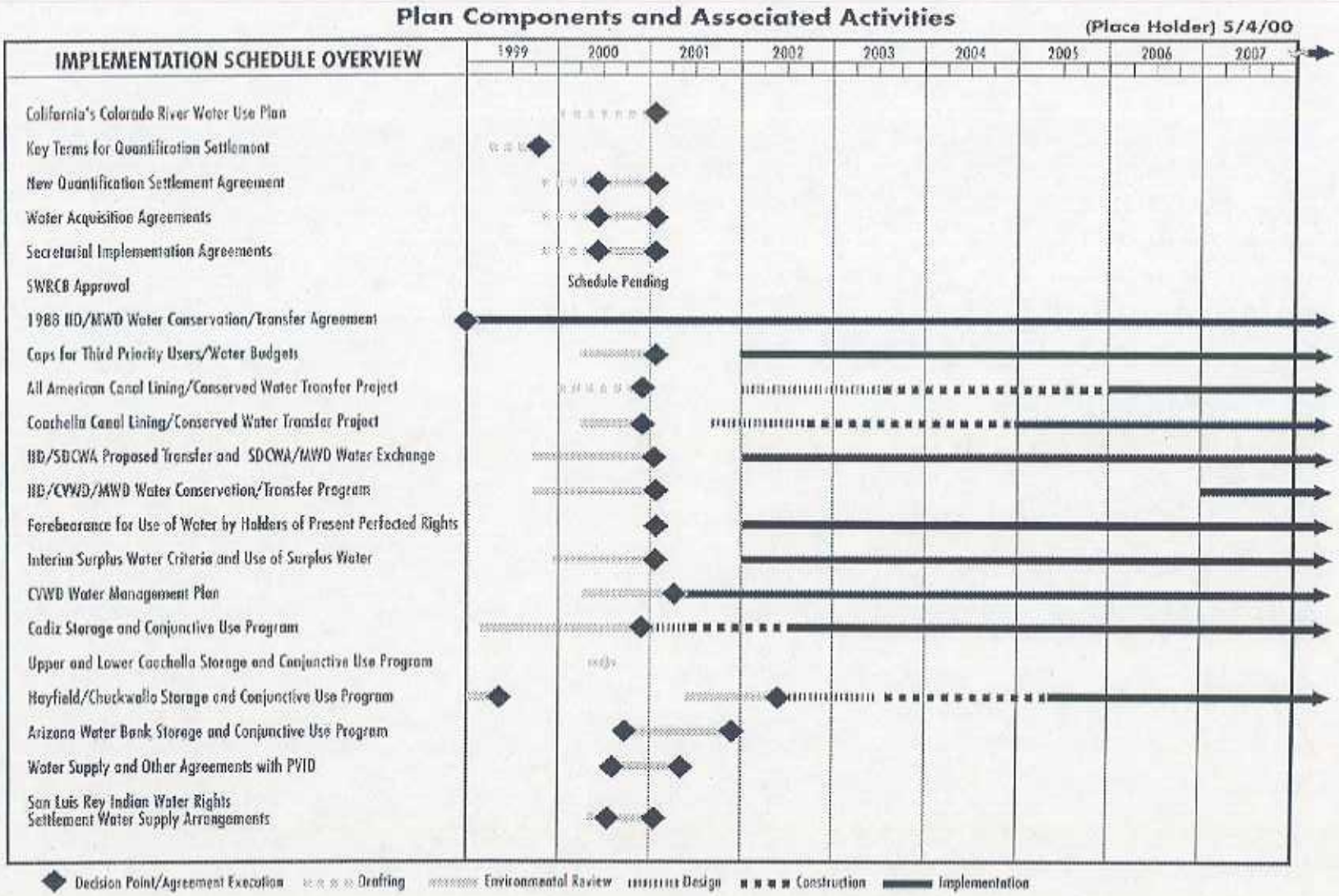
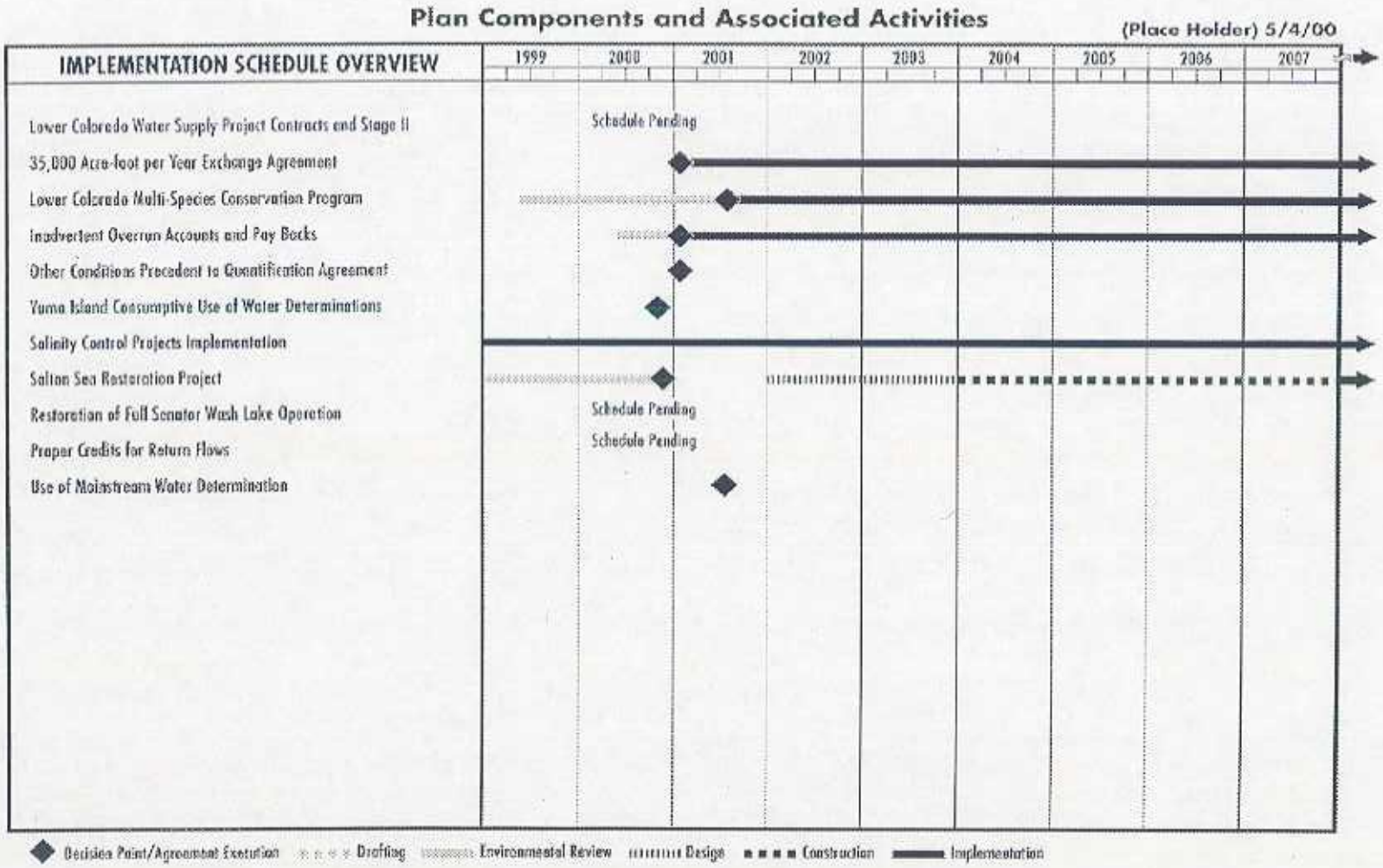


Figure xxx – Summary Implementation Schedule



Proposition 13 funds a variety of loan and grant programs and other activities. This includes:

- a $35 million low-interest loan (construction) and grant (feasibility studies) agricultural water conservation program for local agencies,
- a $30 million low-interest loan (implementation) and grant (feasibility studies) urban water conservation program for local agencies,
- a $ 30 million low-interest loan and grant groundwater recharge facilities program for local agencies,
- a $200 million grant program for feasibility studies and design and construction for local agency conjunctive use programs,
- a $180 million loan and grant program for interim water supply/water quality infrastructure projects located in the Delta export service area that could be completed by March 2009 (eligible project types include groundwater storage, water transfers, agricultural water conservation and drainage management-projects must be approved by the Governor),
- a $40 million loan and grant program for local agency water recycling projects with 60 percent of the funding reserved for specified southern California counties (half of the funding is reserved for grants for construction of projects meeting specified conditions including reducing Colorado River water demands), and
- a $235 million grant program for specified project types in the Santa Ana River watershed (eligible projects include groundwater banking, water conservation, and treatment of brackish or contaminated groundwater).

B. Transition Period for Implementation

The agencies responsible for implementing the linchpin components of California's Colorado River Water Use Plan that affect California's ability to meet its Colorado River water needs within its basic apportionment intend to move forward as quickly as possible and to have all necessary associated projects and programs in place within a 15-year period. In a number of cases, environmental documentation must be prepared, and in certain cases permits must be secured from state and/or federal agencies to permit projects to move forward. Each of the projects which involve discretionary approvals must receive consideration by the respective agency's board of directors. Written agreements can then be executed and design and construction of the physical features of the projects can take place. Figure __ shows the relationship of the Key Terms, the new Quantification Settlement Agreement, Interagency Water Acquisition Agreements, Secretarial Implementation Agreements, and necessary environmental reviews and Endangered Species Act compliance.

As previously stated, these interagency agreements and other associated implementation agreements, water budgets and caps, together with the Secretary's administration of water rights and use, constitute the principal binding and enforceable

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provisions of The Plan. The interagency agreements have specific implementation timetables that are reflected in this implementation schedule discussion.

Figure xxx – Photo of IID Canal Lining Operations

The intent is to comply with the timetables presented herein. This is the goal, but it must be understood that with the complexity of the implementation of components the actual timing may vary somewhat. Similarly, it should be understood that some components and/or associated components may be modified but would still produce the same conceptual results, or that other options may be substituted if they are found to be more effective and appropriate. There are also related activities that are not part of California's Colorado River Water Use Plan but that may affect the use of Colorado River water, such as the Salton Sea restoration efforts, that have been included with respect to their implementing actions.

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C. Schedule of Key Terms, Other Plan and Associated Components

Figure xxx and Table yyy depict the planned schedule of implementation up to the core voluntary water conservation/transfers and exchanges. These are to remain in place up to the 75-year period of the Quantification Settlement Agreement and are subject to renewal after that period.

1. 1988 IID/MWD Conservation Agreement

The first of The Plan's components has been completed. The 1988 IID/MWD Conservation Agreement's projects have been implemented and IID is making available 109,460 af of water in the year 2000 to MWD. It is anticipated that these conservation projects will produce 110,000 af per year in future years.

2. Caps for Third Priority Users/Water Budgets

(Place holder)

The Key Terms and draft documents serve as the detailed description of proposed steps to be undertaken within the Quantification Settlement Agreement for environmental documentation. Draft documentation, prepared by these three agencies signatory to the

Figure xxx - Quantification Settlement, Implementation Agreements, Associated Environmental Reviews and Endangered Species Act Compliance

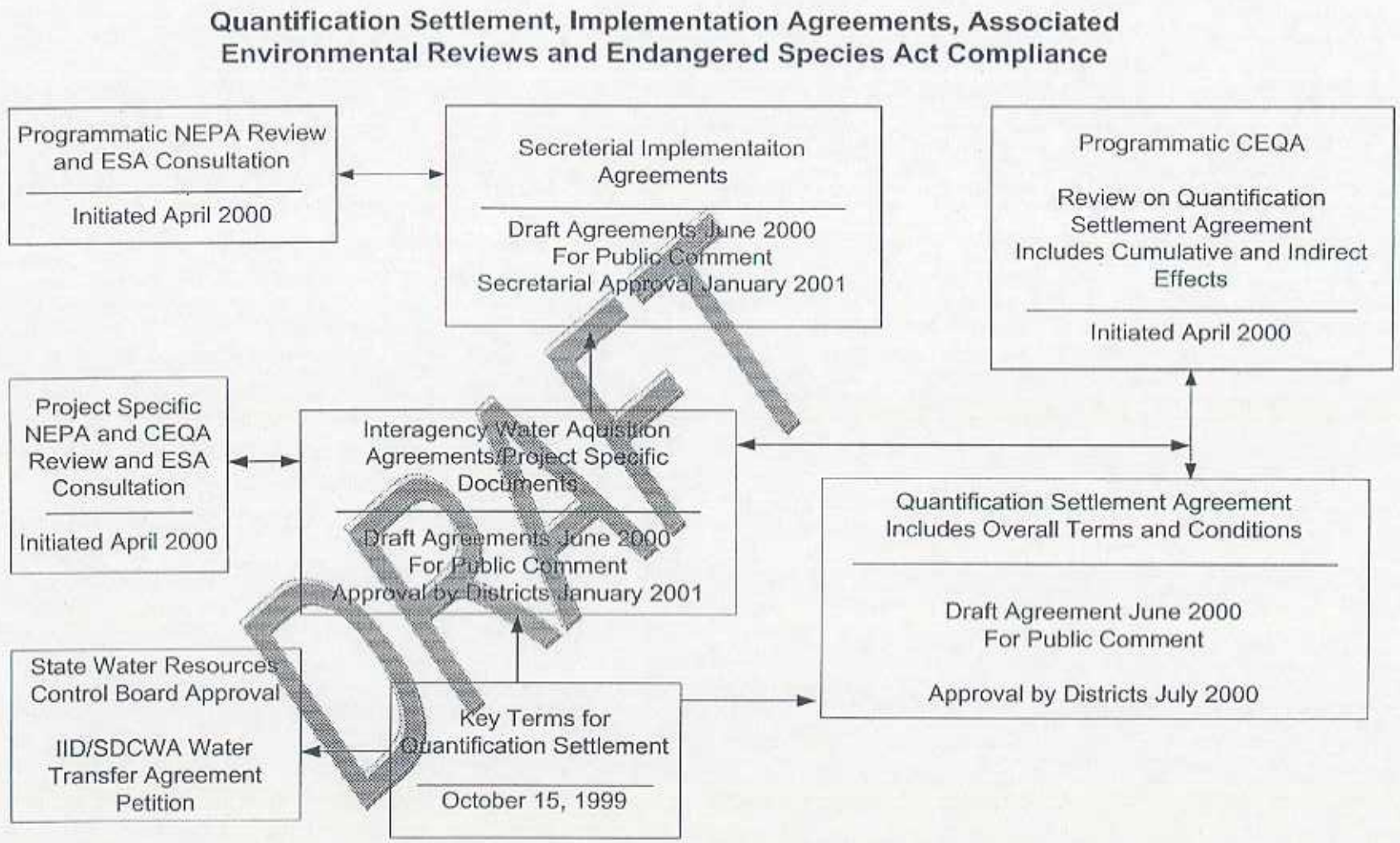

Figure xxx – California Use of Water

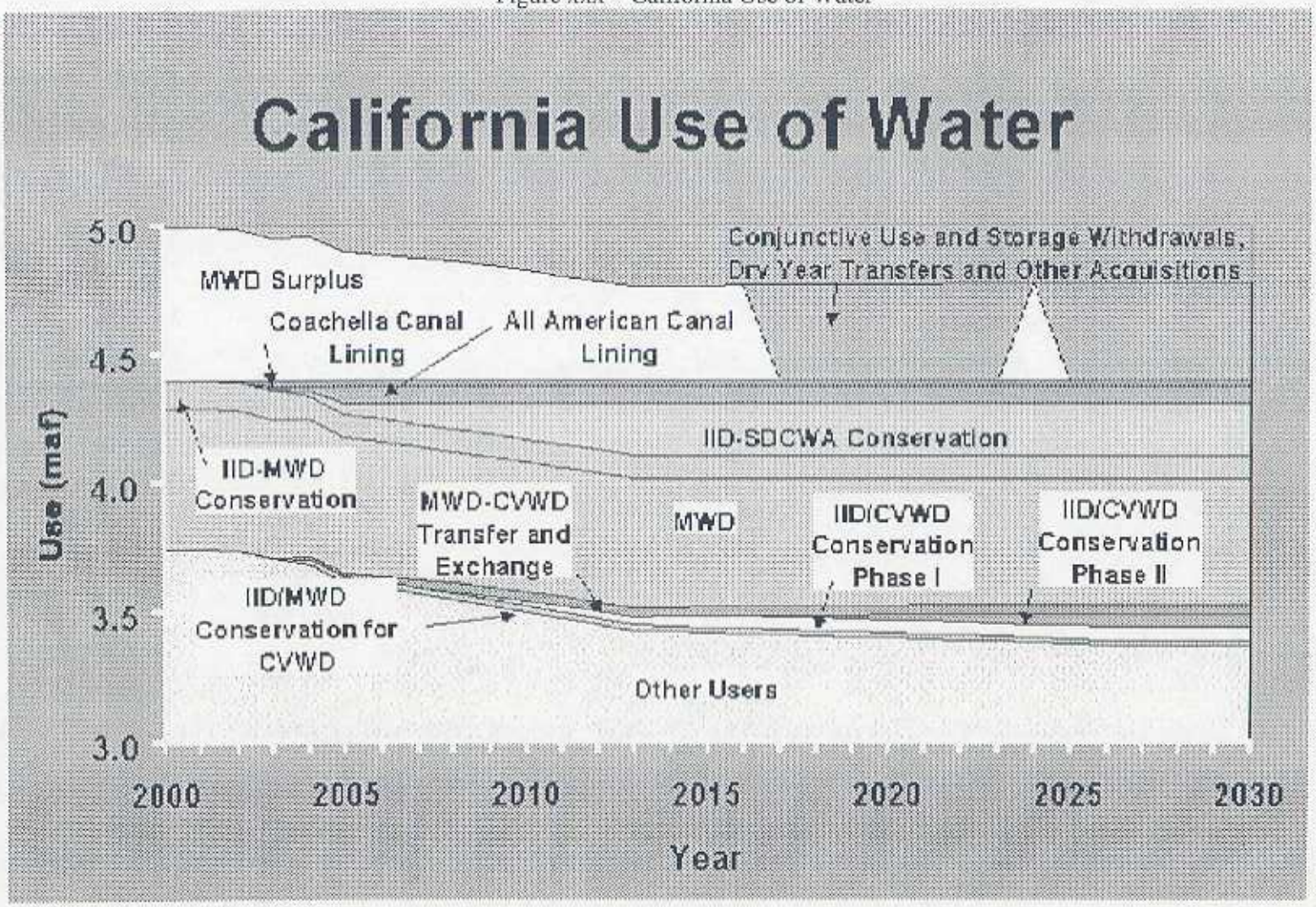

Table yyy - California 4.4 Plan Scheduled Water Transfer Buildup

YEAR	IID/MWD CONSERVATION PROGRAM	MWD/CVWD EXCHANGE	COACHELLA CANAL LINING PROJECT	ALL AMERICAN CANAL LINING PROJECT	IID/SDCWA WATER TRANSFER	PVID LAND FALLOWING (1)	IID/CVWD CONSERVATION PROGRAM		TOTAL
2001	110,000	7,000	0	0	0	0	0	0	117,000
2002	110,000	14,000	671	0	20,000	0	0	0	144,671
2003	110,000	21,000	13,864	0	40,000	0	0	0	184,864
2004	110,000	28,000	25,164	16,850	60,000	0	0	0	240,014
2005	110,000	35,000	26,000	16,850	80,000	0	0	0	267,850
2006	110,000	35,000	26,000	67,700	100,000	0	0	0	338,700
2007	110,000	35,000	26,000	67,700	120,000	0	5,000	0	363,700
2008	110,000	35,000	26,000	67,700	140,000	0	10,000	0	388,700
2009	110,000	35,000	26,000	67,700	160,000	0	15,000	0	413,700
2010	110,000	35,000	26,000	67,700	180,000	0	20,000	0	438,700
2011	110,000	35,000	26,000	67,700	200,000	0	25,000	0	463,700
2012	110,000	35,000	26,000	67,700	200,000	0	30,000	0	466,700
2013	110,000	35,000	26,000	67,700	200,000	0	35,000	0	473,700
2014	110,000	35,000	26,000	67,700	200,000	0	40,000	0	478,700
2015	110,000	35,000	26,000	67,700	200,000	0	45,000	0	483,700
2016	110,000	35,000	26,000	67,700	200,000	0	50,000	0	488,700
2017	110,000	35,000	26,000	67,700	200,000	0	50,000	5,000	493,700
2018	110,000	35,000	26,000	67,700	200,000	0	50,000	10,000	498,700
2019	110,000	35,000	26,000	67,700	200,000	0	50,000	15,000	503,700
2020	110,000	35,000	26,000	67,700	200,000	0	50,000	20,000	508,700
2021	110,000	35,000	26,000	67,700	200,000	0	50,000	25,000	513,700
2022	110,000	35,000	26,000	67,700	200,000	0	50,000	30,000	518,700
2023	110,000	35,000	26,000	67,700	200,000	0	50,000	35,000	523,700
2024	110,000	35,000	26,000	67,700	200,000	0	50,000	40,000	528,700
2025	110,000	35,000	26,000	67,700	200,000	0	50,000	45,000	533,700
2026	110,000	35,000	26,000	67,700	200,000	0	50,000	50,000	538,700
2027	110,000	35,000	26,000	67,700	200,000	0	50,000	50,000	538,700
2028	110,000	35,000	26,000	67,700	200,000	0	50,000	50,000	538,700
2029	110,000	35,000	26,000	67,700	200,000	0	50,000	50,000	538,700
2030	110,000	35,000	26,000	67,700	200,000	0	50,000	50,000	538,700

(1) Timing and total volume have not been negotiated.

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Key Terms for Quantification Settlement and the SDCWA, are scheduled to be released in June 2000 for public review. The final environmental documentation would be available in December 2000 for final agency action. Assuming the decision is to move forward, the Quantification Settlement Agreement would take effect in January 2001. It is anticipated that Secretarial Implementation Agreements would be executed in January 2001, following submittal of a Biological Assessment by the Bureau of Reclamation to the Fish and Wildlife Service in August 2000, public review of the draft Programmatic Environmental Assessment (PEA) in September 2000, and publication of a final PEA and a decision in December 2000. With these steps completed, caps on use of water by users in the third priority would be in place for the year 2002 as would water budgets for California's users of Colorado River water.

3. All American Canal Lining Project

(Place holder)

It is anticipated that execution of project implementation agreements for the All American Canal Lining Project will take place in December 2001. These agreements would cover acquisition of conserved water, construction and funding, and mitigation. Design would commence in January 2002 after selection of a Project engineer, with construction beginning in July 2003. With completion of the first year of the Project, conserved water would be available annually beginning in 2004. With completion of the remainder of the Project, 67,700 af of conserved water would be available annually beginning in 2006.

Figure xxx – Photo of All American Canal

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4. Coachella Canal Lining Project

(Place holder)

The Coachella Canal Lining Project Draft Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) is scheduled to be re-released in July 2000 for public review. The final EIS/EIR would be released in November 2000 for public review. A Record of Decision would follow in December 2000. Assuming the decision is to move forward with

Project implementation, execution of project implementation agreements would take place in January 2001. As with the All-American Canal Lining Project, these agreements would cover allocation of conserved water, construction and funding, and mitigation. Design would begin in August 2001 after selection of a Project engineer, with construction beginning in August 2002. With completion of successive reaches of the Project, 671 af of conserved water would be available in 2002, 13,864 af of conserved water would be available in 2003, 25,164 af would be available in 2004, and 26,000 af would be available annually beginning in 2005.

Figure xxx – Photo of Coachella Canal

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5. IID/SDCWA Water Conservation and Transfer and SDCWA/MWD Water Exchange

(Place holder)

The Draft EIR/EIS for the IID/SDCWA Water Conservation and Transfer Project is scheduled for release in August 2000 for public review. After considering comments received, the final EIS/EIR is for final agency action in the December 2000 to March 2001 timeframe. A Record of Decision would follow. The Project involves water conservation by IID of up to 300,000 af per year and the transfer of up to 200,000 af per year to SDCWA. Following a decision to move forward with Project implementation, IID would contract with landowners or farmers in its service area to conserve between 130,000 and 200,000 af per year by June 2001. Should the quantity of water conserved by on-farm methods be more than 130,000 but less than 200,000 af per year, IID could elect to generate all or a portion of the remainder of the conserved water to be transferred to SDCWA.

The first 20,000 af of conserved water would be made available by IID in 2002. An additional 20,000 af of conserved water would be made available each year thereafter until up to 200,000 af is made available annually beginning in the year 2011. The water would be diverted by MWD. SDCWA would receive an amount of water equal to the amount diverted by MWD by exchange under the 1998 Exchange Agreement between the two agencies.

6. IID/CVWD/MWD Water Conservation/Transfer Program

(Place holder)

The IID/CVWD/MWD Water Conservation Program anticipates the transfer by IID to CVWD of up to 100,000 af per year of conserved water out of the 300,000 af of conserved water generated by IID as described above in the IID/SDCWA Water Conservation and Transfer Project. MWD would have the option of utilizing any of this conserved water that CVWD does not elect to acquire.

The environmental impacts of the conservation activities by IID are to be assessed in the EIR/EIS being prepared for the IID/SDCWA Water Conservation and Transfer Project. The Coachella Valley Water Management Plan Program EIR will assess the environmental impacts of the use of the conserved water within the Coachella Valley. The Draft Water Management Plan and its Program EIR is scheduled to be issued in August 2000. Following a public review period, and issuance of the Final Program EIR, CVWD's Board of Directors would consider approving the Program in February 2001.

With a decision to move forward with the IID/CVWD/MWD Water Conservation Program, 5,000 af would be available in 2007. An additional 5,000 af would be made available each year thereafter until 100,000 af is made available annually beginning in the year 2026. MWD would provide funding for a portion of the payments to be made to IID by CVWD.

7. Use of Water by Holders of Present Perfected Rights

The responsibility for reducing Colorado River diversions to permit the Secretary to meet the needs of users holding present perfected rights to use of Colorado River water would be allocated to IID, CVWD, and MWD beginning in 2002 following the execution of the Quantification Settlement Agreement, Interagency Water Acquisition Agreements, and the Secretarial Implementation Agreements the previous year.

8. Use of Surplus Water

(Place holder)

The Draft EIS for the promulgation of surplus criteria by the Secretary is scheduled for release for public review in May 2000. The Final EIS is to be released in October 2000 for public review. A Record of Decision would follow in December 2000. With the execution of the Quantification Settlement Agreement, Interagency Water Acquisition Agreements, and Secretarial Implementation Agreements in January 2001, interim criteria for the declarations of the availability of surplus water would be in effect through year 15 of the Quantification Settlement Agreement, that is 2016.

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9. CVWD Groundwater Management Plan

(Place holder)

In 1995, CVWD released a Notice of Preparation for a Program EIR for the Coachella Valley Water Management Plan to manage water resources and eliminate the groundwater overdraft in the upper and lower Coachella Valley groundwater basins. Elements of the proposed plan include:

- implementing water conservation measures for agriculture, municipal and industrial uses, and golf courses,
- delivering reclaimed water for agricultural and golf course irrigation,
- increasing groundwater recharge in the Upper Valley at the existing Whitewater River recharge basins using additional State Water Project exchange water,
- delivering Coachella Canal water to golf courses and agricultural users in the Lower Valley currently on wells, and
- recharging the Lower Valley basin with Coachella Canal water at new recharge sites to be located near Dike 4 and Martinez Canyon.

In March 1999, CVWD reissued the Notice of Preparation and informed the public that it wished to incorporate the results of ongoing Colorado River allocation negotiations into the proposed plan. The Draft Program EIR is scheduled to be released in *August 2000*. Following consideration of public comments scheduled to be completed at the end of *September 2000*, it is anticipated that the Program EIR would be certified in *December 2000* and that the Notice of Determination would be filed in *January 2001*. Potential site-specific impacts from construction of recharge basins, pipelines, and pumping stations would be addressed in separate subsequent environmental documents which would "tier off" the Program EIR.

10. Cadiz, Hayfield/Chuckwalla, Upper and Lower Coachella, and Arizona Water Bank Storage and Conjunctive Use Programs

(Place holder)

MWD and the BLM issued a joint Draft Environmental Impact Report/Environmental Impact Statement on the Cadiz Groundwater Storage and Dry-Year Supply Program for public review in November 1999. The public comment period closed on March 8, 2000. Following the closure of the comment period, it has been determined to issue a revised Draft EIR/Supplemental EIS to allow public comment on the project Groundwater Management and Monitoring Plan. A final environmental document is anticipated to be complete by *October 2000*. MWD's Board would consider the document in November, and make a decision as to whether to proceed with the project at the same time. The BLM would issue a Record of Decision if the project were approved. Final design of the project would immediately follow project approval and take six months to complete. Construction of storage and conveyance facilities would begin by Spring 2001 and be complete by Summer 2002. The storage facilities

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would then begin storing Colorado River water. The project extraction well field construction activities would follow.

The Upper Coachella Valley storage program is an ongoing program by which MWD has delivered Colorado River water in advance to DWA and CVWD for storage in the Upper Coachella Valley groundwater basin in accordance with a 1984 agreement. A final report identifying the facilities required for a lower Coachella Valley storage and conjunctive use program, their costs, and an environmental checklist was released in April 2000. Negotiations on the terms and conditions of an agreement to implement a lower Coachella Valley storage and conjunctive use program are expected to follow. Once the terms and conditions have been defined, environmental documentation would be prepared.

The Hayfield/Chuckwalla Groundwater Storage Program was considered by MWD's Board in April, 1999. A Demonstration Project in the Hayfield Valley is currently in progress with the goal of storing 100,000 af of Colorado River water by July 2010. As of the beginning of April 2000 approximately 60,000 af has been stored in the Hayfield Valley groundwater basin. MWD plans to continue to store water in the Hayfield Valley groundwater basin. Additional land in the valley is proposed to be acquired for project implementation and the acquisition should be completed by 2002. Environmental documentation for the land acquisition, preliminary design and permitting would be complete by May, 2002. Final design and construction of project facilities would be completed by May, 2005. The Hayfield Groundwater Storage Program would be fully operational with up to 800,000 af of water in storage in 2005.

The AWBA and MWD have discussed the potential for storage of Colorado River water underground in Arizona for MWD. With MWD and SNWA having expressed an interest in negotiating storage and interstate release agreements, it is anticipated that AWBA would draft agreements for MWD's and SNWA's review. A public process initiated by Bureau of Reclamation would follow which could be completed in *November 2000*. Environmental documentation would be prepared with completion possible by *September 2001*. A decision regarding execution of the agreement could then be expected in *October 2001*.

11. Agreements With PVID

(Place holder)

PVID and MWD have discussed the concept of a land fallowing agreement and expect to complete negotiations on the terms and conditions of such an agreement in *August 2000*. Preparation of environmental documentation would follow with completion anticipated for *May 2001*.

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12. Lower Colorado Water Supply Project

(Place holder)

The Lower Colorado Water Supply Project is to provide a 10,000 af per year water supply for BLM lands and cities and individuals along the Colorado River in California that do not have Colorado River water rights or that have inadequate rights to meet their existing and future needs. This supply is limited to BLM recreational lands and existing and potential domestic, municipal, and recreational users along the Colorado River in California.

The project is being developed in two stages with two wells, with the first stage of the Project already completed. The Project will eventually be expanded to five wells that would provide up to 10,000 af per year. The total capacity of the 5,000 af per year first stage has been contracted to the City of Needles and BLM. The City of Needles will subcontract with eligible users in San Bernardino, Riverside, and Imperial Counties.

Those domestic, municipal, and recreational users along the River in California found to be using mainstream Colorado River water by the Bureau of Reclamation through direct diversions or by wells which have no or inadequate Colorado River water rights, and are determined to be eligible, can contract for a supply from the Lower Colorado Water Supply Project.

13. San Luis Rey Indian Water Settlement Water Supply Arrangements

(Place holder)

The San Luis Rey Indian Water Rights Settlement Parties, the Department of the Interior, MWD, and SDCWA have resumed discussions regarding the manner in which an amount of water, equivalent to 16,000 af of Colorado River water which will be foregone by PVID, IID, CVWD, and MWD, will be made available in northern San Diego County for use by the Settlement Parties. It is expected that the terms and conditions of an agreement to make water available will be negotiated by *July 2000*. Preparation of environmental documentation would follow with completion expected in *December 2000*. A decision with respect to execution of the agreement is anticipated in *January 2001*

14. 35,000 Acre-foot per Year Exchange Agreement

(Place holder)

The proposed 35,000 af per year State Water Project transfer and State Water Project-Colorado River water exchange would be a subject of the CVWD-MWD Water Acquisition Agreement.

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15. Lower Colorado River Multi-Species Conservation Program

(Place holder)

The Lower Colorado River Multi-Species Conservation Program proposed alternatives are scheduled for release for public scoping in June 2000, and the Program's draft EIS/EIR release for public review would follow in October 2000. Completion of environmental review, a Record of Decision by the Secretary of the Interior, California and Federal Endangered Species Act permitting, and execution of an Implementation Agreement among MSCP participants are scheduled for July 2001.

16. Administration of Water Rights

a. Inadvertent Overrun Accounts and Pay Backs

(Place holder)

In June 2000, the Bureau of Reclamation is expected to initiate a public process to consult with interested parties on establishing inadvertent overrun accounts for Colorado River water users in Arizona, California, and Nevada. Following the consultation, a decision on inadvertent overrun accounts is expected by *January 2001*.

b. Trend Test for Priorities 1, 2, and 3b

(Place holder)

Reclamation is to develop a process for establishing a statistically significant trend test of increases in use by Priorities 1, 2, and 3b by *January 2001*.

c. Running Average Consumptive Use Decree Accounting

(Place holder)

The public consultation process on establishing inadvertent overrun accounts will also encompass the concept of accounting for consumptive use of Colorado River water on a running average basis.

d. Yuma Island

(Place holder)

The Department of the Interior plans to appoint an independent panel by *December 2000* to review and provide recommendations in connection with the determination of consumptive use on the area known as the Yuma Island, and whether such use is charged to Priority 2 contained in the California Colorado River water delivery contracts.

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e. Proper Return Flow Credits

(Place holder)

Receiving proper credit for measured and unmeasured return flow helps ensure the optimum use of California's Colorado River water apportionment. The Bureau of Reclamation needs to complete the development of a method that accurately defines all return flows, measured and unmeasured, for each diverter in a consistent and equitable manner, pursuant to Article V decree accounting requirements.

D. Senator Wash Dam and Lake

(Place holder)

Senator Wash Dam was constructed at the end of the Colorado River system in the United States for the purpose of recapturing water ordered that cannot be used or excess river flows. The operating capacity has been reduced due to excessive seepage through the earthfill dam. The Bureau of Reclamation is investigating the problem. A fully functional Senator Wash Lake is essential to making the most effective use of the available supply.

E. Salinity Control

The Colorado River Basin Salinity Control Forum determined that 1,477,700 tons of salt must be removed or prevented from entering the system annually to maintain the numeric criteria through 2015. The plan of implementation includes projects which remove the required salt tonnage. In order to meet the goal of 1.48 million tons of salinity control through 2015, it will be necessary to fund and implement potential new measures, which 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:

- Bureau of Reclamation - $17.5 million/year;
- USDA - $12.0 million/year; and
- BLM - $5.2 million/year

With respect to legislation to increase the authorized funding ceiling of the Bureau of Reclamation's new Basinwide Salinity Control Program by $100 million, the goal is to obtain enactment in year 2000.

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F. Salton Sea

(Place holder)

The Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Salton Sea Restoration Project was released to the public on January 26, 2000. The public comment period ends on May 16, 2000. The Final EIS/EIR is tentatively scheduled for release in September 2000 with a Record of Decision to be issued by the end of the year. Assuming the decision is to move forward with the Project, design and construction of the Phase I action is scheduled to commence in January 2002 and would take approximately three to four years, depending on the alternative selected. Operation of the Phase I action is anticipated to be by 2008.

Phase I actions consist chiefly of removing dissolved salts from the Salton Sea. Operation of Phase II actions are described as being necessary by 2015 at the earliest or 2030 at the latest. The implementation schedule of Phase II is dependent on the timing of future reductions in inflows to the Salton Sea. Potential Phase II actions consist of exporting water from the Salton Sea to the ocean or another long-term disposal site and/or importing an augmenting supply to the Salton Sea.

Other actions proposed to be implemented during Phase I include fish harvesting, improvements to recreational facilities, shoreline cleanup, wildlife disease control, and wetland habitat. In addition, when inflow is reduced a displacement dike is proposed to be constructed in the Salton Sea to displace volume and raise the surface elevation. The implementation schedule for these actions has not been identified. With respect to wildlife disease control, the Salton Sea Authority has already entered into arrangements with the U.S. Fish and Wildlife Service and the California Department of Fish and Game to monitor and respond to wildlife die-offs that may occur. This activity is being undertaken with finite funding provided from the U.S. Environmental Protection Agency.

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VI. CONSIDERATION OF ENVIRONMENTAL FACTORS

A. Summary

This chapter, which is a Consideration of Environmental Factors (CEF) related to California's Colorado River Water Use Plan (The Plan), satisfies the requirement under the California Environmental Quality Act (CEQA) for public agencies to consider environmental factors related to actions with regard to a feasibility/planning study for possible future actions. The overall purpose of The Plan is to provide California's Colorado River water users with a framework by which programs, projects, and other activities would be coordinated and cooperatively implemented allowing California to most effectively satisfy its annual water supply needs within its annual normal-year apportionment of Colorado River water. The Plan framework specifies how California would transition from its current use to its basic apportionment of 4.4 MAF/year when surplus water or water apportioned to but unused by other Lower Basin States is not available. California's annual use of Colorado River water has varied from 4.5 to 5.2 million af over the past ten years.

The Plan is intended to be dynamic and flexible enough to allow updates to the framework, which may include substitution or modification of projects and programs within The Plan components when they are found to be more cost effective and/or appropriate. The CEF describes environmental resources potentially affected by The Plan and potential impacts of The Plan implementation on those resources. The level of detail of the discussions is general in nature. Implementation of any specific projects proposed by individual water agencies that would be considered under The Plan would be subject to a separate CEQA process that would provide specific detail and impact assessment.

The geographic area assessed in this analysis is the southern California region served by the Metropolitan Water District (MWD) of Southern California, Imperial Irrigation District (IID), San Diego County Water Authority (SDCWA), Coachella Valley Water District (CVWD), Los Angeles Department of Water and Power (LADWP), and Palo Verde Irrigation District (PVID). This consists of all or part of Ventura, Los Angeles, Orange, San Diego, San Bernardino, Riverside, and Imperial Counties. It also includes the Lower Colorado River and the areas of conveyance and distribution of Colorado River water by these agencies.

Resources addressed in the CEF include agriculture resources, land use/planning, population/housing and other socioeconomic factors, air quality, transportation/traffic, mineral resources/geology and soils, utilities/service systems, noise, hazards and hazardous materials, aesthetics, cultural resources, hydrology/water quality, and biological resources. In addition, the CEF discusses potential cumulative impacts and potential growth-related issues associated with the combined activities identified in the Plan.

The CEF is based on the following factors. Water from the Colorado River is utilized for both agricultural and urban uses. A central component of The Plan is the transfer of conserved water from primarily agricultural areas to primarily urban areas. For example, IID may implement programs that would conserve water through measures such as lining of canals

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and other conveyances and on-farm conservation. Portions of this conserved water could be moved to the coastal urban agencies (MWD and SDCWA), and portions could be used to offset groundwater overdraft in CVWD's groundwater basins. Any such transfers to MWD and SDCWA would simply replace surplus Colorado River water or Colorado River water apportioned to but unused by other Lower Basin states (Nevada and Arizona).

The following discussion summarizes the findings of the environmental factors analysis. Implementing The Plan would have a minimal effect on the conversion of undeveloped and agricultural land in coastal urban agencies' service areas to urban uses and would not provide additional water to the MWD and SDCWA beyond that anticipated to be available under current operations. Historic trends indicate that conversion would continue, but the types of activities addressed under The Plan would not be expected to change the rate or extent of conversions.

In attempting to address groundwater overdraft, CVWD has committed to adopting mechanisms that would tend to shift demand away from groundwater use toward Colorado River water use, or it would use the existing groundwater basin to supply Colorado River water. The likely result would be that CVWD's Colorado River water diversions would not exceed maximum historic annual diversion levels. Since any water transferred into CVWD's service area would be used to offset groundwater depletions, The Plan would not be expected to change agricultural cropping patterns and intensities or other land uses. IID's conservation programs and the related transfers are expected to make a less than considerable contribution to farmland or open space conversion in its service area.

For the reasons mentioned above, the combined activities described in The Plan are expected to make a de minimus contribution to land use or agricultural impacts within southern California and therefore have a de minimus effect on associated socioeconomic resources such as employment, earnings, and housing. Likewise, potential water transfers are not expected to stimulate new growth that would affect local or regional transportation systems, require public services and utilities (i.e., other than those exemplified by the water conservation, groundwater recharge, and canal lining projects mentioned above), or create long-term increases in ambient noise levels. Potential air quality effects could include changes in air pollutant emissions associated with pumping of water to different locations and fugitive dust emissions associated with any construction related to Plan implementation. Air quality is expected to be minimally affected, however.

Ground disturbance could be associated with certain types of projects such as the expansion or construction of spreading grounds in the CVWD, canal lining, IID system conservation and on-farm management practices. Operational changes in shortage reservoirs could also occur, resulting in changed water levels. Implementation of The Plan could result in a potential change in the current rate of increasing salinity of the Salton Sea and a change in surface elevation. These activities could potentially affect biological, cultural, and aesthetic resources. However, regulatory requirements would necessitate evaluation of these impacts on a site-specific basis, requiring mitigation where appropriate. In addition, The Plan addresses

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continued processing of, and participation by the agencies in, the Lower Colorado River Multi-Species Conservation Program (LCR MSCP).

B. Introduction (Purpose, Intent, and Scope of the CEF)

California's Colorado River Water Use Plan is intended to guide the preparation of detailed arrangements regarding the use of Colorado River water in the future. This CEF complies with the applicable portions of the CEQA Statutes and Guidelines (*Sections 21102 and 21150 Public Resources Code* and *Section 15262, CEQA Guidelines)* and provides appropriate consideration of environmental factors related to The Plan. The CEF is designed to be an objective source of useful information to the Colorado River Board of California, individual water agency decision-makers, and the public regarding the potential environmental effects of The Plan. This information will be reassessed and updated as needed as the project components of The Plan are implemented.

This CEF provides only an identification of issues and description of resource categories associated with The Plan. A number of detailed agreements and arrangements are proposed in The Plan which describe specific projects. Prior to implementation, project components of The Plan would be the subject of environmental assessment under CEQA as appropriate.

C. Analysis of Cumulative Impacts Relating to the Environmental Factors

This section of the CEF briefly describes existing conditions for the environmental resources that could be affected by The Plan and the potential impacts of The Plan implementation on those resources. The environmental resources discussed are those listed in Appendix G of the CEQA Guidelines. The analysis is based on the existing version of The Plan and the general information known to date. Details regarding proposed water transfers is included in Section IV.J.9 of The Plan. The level of detail of the impact discussions parallels the level of detail of The Plan. Therefore, impact discussions are general in nature. Any specific projects that may be considered for implementation by individual water agencies would be subject to a separate environmental review.

This CEF does not contain a formal analysis of cumulative impacts. Instead, the emphasis of the analysis is to address the potential environmental effects of the combined activities envisioned in The Plan.

The geographic area assessed in this analysis is the southern California region served by MWD (includes LADWP and SDCWA), IID, CVWD, and PVID, as well as the Lower Colorado River and the areas of conveyance and distribution of Colorado River water by these agencies. This consists of all or part of Ventura, Los Angeles, Orange, Riverside, San Diego, San Bernardino, and Imperial Counties, including the lower Colorado River Water Supply Project, Yuma Project-Reservation Division, and other users.

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1. Agriculture Resources

a. Resource Description

The most recent Farmland Conversion Report prepared by the California Department of Conservation indicates that the seven-county southern California region trails only the San Joaquin Valley in the amount of agricultural land converted to urban uses during the 1994 to 1996 study period. This continues a long-term trend driven by California's population growth and market preferences for relatively low-density development. In that vein, Riverside, San Diego, and San Bernardino were the top three counties in the amount of agricultural land converted during the 1994 to 1996 study period. The total amount of prime farmland in southern California converted to non-agricultural uses was approximately 3,256 acres, which accounts for less than one tenth of one percent of agricultural lands in Riverside, Imperial, San Bernardino, Los Angeles, San Diego and Riverside Counties. At opposite ends of the spectrum, Riverside and Imperial Counties accounted for approximately 42 percent and 6 percent, respectively, of this loss of agricultural land in southern California (California Department of Conservation 1998).

Prime and unique farmland and farmland of statewide importance are classified on the basis of physical and chemical features of the soil types, as well as climate and water supply. A total of 1,278,210 acres in The Plan area are classified as prime farmland based on the county soil surveys (USDA-NRCS 2000). Additional acreage of unique farmland and farmland of statewide importance also occur in The Plan area (USDI 1988).

Agricultural land uses are primarily guided by the adopted land use policies of individual counties. State programs such as the Williamson Act, which encourages the retention of prime agricultural lands through lowering the property tax rate, help maintain agricultural land uses.

The Coachella Valley is a major agricultural area. Although its production numbers are aggregated with the rest of Riverside County, it is a center for date production (approximately 78 percent of the total statewide value) and its agricultural income places the county among the top five producers of artichokes, bell peppers, cantaloupes, honeydew melons, sweet corn, and watermelons (California Department of Food and Agriculture 1998).

Imperial County is ranked as one of California's top ten counties in agricultural production value. Imperial County has approximately 522,000 acres of high quality, irrigated farmland including approximately 460,000 acres served by IID. During the period of 1994 to 1996, approximately 420 acres of irrigated farmland were converted to other uses (California Department of Conservation 1998). This is one of the lowest rates of conversion in the state. In 1998, Imperial County was the state's top producer of carrots (producing approximately 57 percent of the total statewide value), sugar beets (producing approximately 38 percent of the statewide value), onions (producing approximately 22 percent of the statewide value), wheat (producing approximately 19 percent of the total statewide value), alfalfa hay (producing approximately 17 percent of the statewide value), and sweet corn (producing approximately 17

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percent of the statewide value). Imperial County also produces approximately 27 percent of the statewide value of cantaloupes, 22 percent of the dates, and 18 percent of the watermelons (California Department of Food and Agriculture 1998).

San Diego County is also one of California's top ten counties in agricultural production value. Nursery and flower products, avocados, and eggs are the leading commodities (California Department of Food and Agriculture 1998). Approximately 172,000 acres were in production in 1998 (San Diego County 1998).

b. Impacts of Plan Implementation

Water from the Colorado River is utilized for both agricultural and urban uses. A central component of The Plan is the voluntary IID transfer of conserved water from agricultural areas to urban areas. Collectively, the transfers of conserved water, summarized in Section IV.J.9, amount to over 500,000 af per year.

Key to The Plan is voluntary conservation and transfer of IID agricultural irrigation water to SDCWA and MWD. It is anticipated that a portion or all of the conserved water transferred from the IID would be moved through the existing Colorado River Aqueduct and the Coachella Canal. Most of the conserved agricultural water would be transferred to MWD and SDCWA to replace surplus and apportioned but unused Colorado River water that would no longer be available. The conserved water delivered to the San Luis Rey Indian water right settlement parties would be conveyed by the Colorado River Aqueduct and would also replace water previously conveyed through this Aqueduct. The amount of water conveyed by the Aqueduct is physically limited by its capacity, and no additional water beyond that previously used in coastal Southern California would be provided.

CVWD provides water to both urban and agricultural water users within the Coachella Valley. The groundwater basin beneath the Valley is currently being overdrafted. Colorado River water is directed to the CVWD from the Colorado River by way of the Coachella Canal and MWD's Colorado River Aqueduct.

CVWD delivers Colorado River water to 70,000 acres of farmland and groundwater to approximately 72,000 homes and businesses. Groundwater was, and is, a major water supply in the Coachella Valley. The groundwater basin also serves as a major water distribution system. Currently, groundwater supplies approximately 50 percent of the total demand in the Coachella Valley. The use of groundwater versus Colorado River water, is a dynamic balance requiring the weighing of multiple factors, including economy, quantity, timing, quality, and availability. The advent of new drip irrigation technology in the 1980s prompted some shift away from Colorado River supplies because this water requires treatment for use in drip systems.

Since 1997, the population increase in the Coachella Valley's cities has averaged approximately 2.4 percent — close to the countywide rate, and greater than the state as a whole (the City of La Quinta grew at a rate of 6 percent during that period; without its contribution,

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the Coachella Valley's growth rate would be substantially lower than the county's). Since the water transferred to CVWD would be used for groundwater replenishment, The Plan would have a minimal effect on agricultural land in the Coachella Valley.

It is anticipated that the IID would receive sufficient Colorado River water each year, even with the proposed transfers to the MWD, SDCWA, and CVWD to sustain the existing level of agricultural productivity. The impacts of IID's conservation programs, including the potential for land fallowing, would be analyzed at a project level prior to implementation, as appropriate. However, it is anticipated that these programs would make a less than considerable contribution to farmland conversion in the Imperial Valley.

The Plan does not affect the Yuma Project-Reservation Division, and it would have no effects on PVID with the possible exception of temporary effects due to land fallowing projects. It is anticipated that the water supply for agriculture in San Diego County would not change due to implementation of The Plan; therefore, no impact to agriculture in San Diego would occur.

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2. Land Use/Planning

a. Resource Description

Land uses within The Plan area include urban development with major centers in metropolitan Los Angeles, Orange, Riverside, Ventura, San Bernardino, and San Diego Counties. Other key land uses include agriculture along the Colorado River and in the Coachella, Imperial, and Palo Verde Valleys. Large amounts of land also are much less developed and are in private ownership or are owned by federal and state governments.

Land use is under the jurisdiction of local municipalities and counties. The U.S. Department of Interior, U.S. Department of Agriculture, and the U.S. Department of Defense are the agencies primarily responsible for land use on federal property and the California State Lands Commission generally governs land uses on state-owned lands.

b. Impacts of Plan Implementation

Implementation of the Plan may result in cumulative impacts to specific areas where facilities or projects are implemented. There may be minor changes in land use due to the construction of facilities associated with the conjunctive use and storage projects. There may be temporary reductions in agricultural land use due to land fallowing associated with dry year and reserve building water transfers. It is anticipated that the area affected by fallowing would be small and would primarily occur in the Palo Verde Valley.

Projects adversely affect land use when they physically divide an established community, conflict with established land use policies and plans, or conflict with applicable habitat conservation plans. Growth throughout the region has a cumulative impact on land use as individual cities and counties pursue their own plans for the development of land. Physical

divisions occur infrequently, generally with transportation-related projects, and there is no cumulative impact associated with this factor to which The Plan might contribute.

The Plan would ensure that the available water supply for the southern California coastal plain and inland valleys remains at close to current levels. There would be no change in the capacity of the Colorado River Aqueduct, which supplies MWD and, through it, SDCWA. The Plan would attempt to maintain current maximum levels of flow through the Aqueduct, although the total annual volume that is diverted may be less than historic diversions. The IID retains its historic water rights, apportionments and priorities; however, IID would voluntarily limit its total annual diversions of Colorado River water and would transfer certain quantities of conserved water for use by others. Accordingly, in combination, the activities proposed in The Plan would not substantially contribute to land use impacts within those portions of southern California.

Anticipated canal lining and other conservation/transfer projects would eventually make available nearly 500,000 AF per year to MWD, SDCWA, and CVWD. Any such transfers would simply replace surplus Colorado River water or Colorado River water apportioned to, but unused by, other Lower Basin states (Nevada and Arizona).

3. Population/Housing and Other Socioeconomic Factors

a. Resource Description

Since the recession of the early 1990s, the economy has diversified as manufacturing jobs have been lost and new jobs in information technology, entertainment, services, and apparel and fashion design, to name a few, have been created (SCAG 1998). Development patterns favor investment in new development over reinvestment in older areas. The distribution of jobs and dependence on automobiles for access to the workplace adversely affects the ability of low-wage earners to obtain and hold employment (SCAG 1998).

Increasing housing prices exclude many from home ownership and separate workers who opt for lower cost housing on the urban fringe in Riverside and San Bernardino Counties from employment centers in Los Angeles, Orange, and San Diego Counties. The rate of new housing construction in San Diego County is not keeping pace with growth, thereby increasing the cost of housing (SANDAG 1999a).

CEQA focuses on the potentially adverse physical changes to the environment that may occur as the result of a project. It does not require social or economic changes to be analyzed. However, the analysis must include physical changes caused in turn by the economic or social changes. Also, economic or social effects of a project may be used to determine the significance of physical changes caused by the project *(Guidelines Section 15131)*. Therefore, a public agency may choose to discuss socioeconomic effects in its environmental analysis.

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b. Impacts of Plan Implementation

The Plan is expected to make a de minimus contribution to socioeconomic effects. In coastal southern California, the proposal would maintain current levels of Colorado River water in the face of impending reductions in the overall volume of water available to the region. The Plan would enable the region to maintain socioeconomic trends but would not influence the choices made by individual communities or the socioeconomic effects resulting from future planned development.

In the Coachella Valley, CVWD will address overdraft by adopting mechanisms that shift demand from groundwater to previous levels of use of Colorado River water. This would not have an adverse effect on socioeconomic factors, including population, employment, or housing.

Imperial County has the lowest per capita income in southern California, and the highest percentage of minority residents (it is approximately 70 percent Hispanic). Reflecting the county's economic dependence upon agricultural production, approximately one-third of its work force is employed in farming or related services. In January 2000, Imperial County had an unemployment rate of approximately 19.6 percent; much greater than the statewide average of 5.4 percent, but similar to that in other agricultural areas of the state (California Employment Development Department 2000). The proposed transfer of conserved water from PVID and IID to other California users would not adversely impact employment in the Riverside or Imperial Counties. As indicated above, the project-specific impacts of IID's conservation program will be studied, but these programs are not anticipated to have an adverse impact on agricultural productivity.

4. Air Quality

a. Resource Description

Air quality in a given location is defined by the concentration of various pollutants in the atmosphere, generally expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). The significance of a pollutant concentration is determined by comparing it to a national and/or state ambient air quality standard. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare with a reasonable margin of safety. The national standards are established by the Environmental Protection Agency (EPA) and termed the National Ambient Air Quality Standards (NAAQS). The NAAQS are defined as the maximum acceptable ground-level concentrations that may not be exceeded. State standards, established by the California Air Resources Board (CARB), are termed the California Ambient Air Quality Standards (CAAQS). The CAAQS are at least as restrictive as the NAAQS and include pollutants for which there are no national standards.

The main pollutants of concern within the region include ozone (O_3), volatile organic compounds (VOCs), nitrogen oxides (NO_x), and particulate matter less than 10 microns in

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diameter (PM_{10}). At present, the region primarily affected by implementation of The Plan does not attain the national and/or state ambient air quality standards for O_3 and PM_{10}. Although there are no ambient standards for VOCs or NO_x, they are important as precursors to O_3 formation.

Ozone concentrations are generally highest during the warmer months and coincide with the season of maximum sunlight. Inert pollutant concentrations (generally pollutants other than O_3 and its precursors) tend to be the greatest during periods of light winds and surface-based temperature inversions. These conditions limit atmospheric dispersion. However, in the case of PM_{10} impacts from fugitive dust episodes, maximum dust impacts often occur during high wind events. Maximum inert pollutant concentrations are usually found near an emission source.

Implementation of various Plan components could affect five distinct air basins in southern California. Air quality within this broad region is under the jurisdiction of the following six air pollution control districts:

- Ventura County Air Pollution Control District (VCAPCD), which includes the County of Ventura.
- South Coast Air Quality Management District (SCAQMD), including the non-desert portions of Los Angeles and San Bernardino Counties, all but the eastern portion of Riverside County, and all of Orange County.
- Antelope Valley Air Pollution Control District (AVAPCD), including the northeast portion of Los Angeles County roughly north of the San Gabriel Mountain crestline.
- Mojave Desert Air Quality Management District (MDAQMD), which includes the northern portion of San Bernardino County and the eastern portion of Riverside County.
- Imperial County Air Pollution Control District (ICAPCD), which includes all of Imperial County.
- San Diego County Air Pollution Control District (SDCAPCD), which includes all of San Diego County.

Identifying the region of influence for air quality requires knowledge of the types of pollutants being emitted, emission rates of pollutant sources, and meteorological conditions. The region of influence for inert pollutants (generally pollutants other than ozone [O_3] and its precursors) is generally limited to a few miles downwind from a source. The region of influence for O_3 can extend much farther downwind than for inert pollutants. Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants, or precursors. Ozone precursors are mainly the reactive portion of volatile organic compounds (VOCs) and oxides of nitrogen (NO_x). In the presence of solar radiation,

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the maximum effect of VOCs and NO_x emissions on O_3 levels usually occurs several hours after they are emitted and many miles from the source.

The EPA has designated all areas of the United States as having air quality better than (attainment) or worse than (nonattainment) the NAAQS. The CARB also designates areas of the state as either in attainment or nonattainment of the CAAQS. In regard to the CAAQS, all of the regions that encompass the project presently do not attain the O_3 and PM_{10} standards. Additionally, (1) the SCAQMD region and the Calexico metropolitan portion of the ICAPCD region do not attain the carbon monoxide (CO) standard and (2) the northwest portion of the MDAQMD region does not attain the sulfate and hydrogen sulfide standards. In regard to the NAAQS, (1) all regions do not attain the O_3 standard, except for the eastern portion of the MDAQMD region and the eastern portion of Riverside County within the SCAQMD region, (2) all regions attain the CO standard, except for the SCAQMD region, and (3) the SCAQMD, the northern portion of the MDAQMD, and the western portion of the ICAPCD do not attain the PM_{10} standard.

The following information summarizes the regulatory setting for air quality. Air quality regulations were first promulgated with the Federal Clean Air Act of 1969 (CAA). This Act established the NAAQS and delegated the enforcement of air pollution control regulations to the states. In California, the CARB is responsible for enforcing air pollution regulations. The CARB has in turn delegated the responsibility of regulating stationary emission sources to local air agencies. In areas that exceed the NAAQS, the CAA requires preparation of a State Implementation Plan (SIP), detailing how the state will attain the standards within mandated timeframes. The Federal Clean Air Act Amendments of 1990 (1990 CAA) revised the attainment planning process. The 1990 CAA identifies new emission reduction goals and compliance dates based upon the severity of the ambient air quality standard violation within a region.

The California Clean Air Act of 1988, as amended in 1992 (CCAA), outlines a program to attain the CAAQS for O_3, nitrogen dioxide (NO2), sulfur dioxide (SO2), and CO by the earliest practical date. Since the CAAQS are more stringent than the NAAQS, emissions reductions beyond what would be required to show attainment for the NAAQS will be needed. Consequently, the main focus of attainment planning in California has shifted from the federal to state requirements. Similar to the federal system, the state requirements and compliance dates are based upon the severity of the ambient air quality standard violation within a region.

Within the project region, local air quality agencies have developed attainment plans designed to reduce emissions to a level that will bring a region into compliance with the ambient air quality standards. Plans intended to attain the NAAQS are incorporated into the California SIP. Each air agency has also developed rules to regulate stationary sources of air pollution within their jurisdictions.

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b. Impacts of Plan Implementation

Implementation of The Plan could potentially produce the following impacts to air quality within the southern California region:

- Pumping of water to different locations would require additional power, some of which would be provided by fossil fuel-fired electrical generating facilities within the region. However, air pollutant emissions from these facilities would be regulated by regional air pollution control agencies through the air permit process.

- CVWD has committed to adopting mechanisms that would shift demand away from groundwater use toward Colorado River water use, or use the existing groundwater basin to supply Colorado River water. The likely result would be to return CVWD's Colorado River water diversions to previous diversion levels. These actions would not result in increased air quality impacts.

- Fugitive dust emissions could be generated during construction of facilities associated with the implementation of The Plan. Fugitive dust emissions may or may not increase as a result of land fallowing actions. Decreased surface elevation of the Salton Sea also could result in increased fugitive dust emissions.

Local agencies would review site-specific projects at the time that they are proposed. Based on discretionary authority under local air quality ordinances and policies, these agencies and decision-makers would consider these factors and determine appropriate mitigation at that time, in the event that there is a potential for significant effects.

5. Transportation/Traffic

a. Resource Description

General development throughout southern California has a cumulative impact on the regional transportation system. Increasing numbers of people, a general pattern of land use development that is not conducive to mass transit, and other factors guarantee that transportation systems will struggle to provide convenient access to employment, services, recreation, and other activities and maintain the level of mobility enjoyed in the past. The regional transportation plans (RTPs) prepared by SCAG and SANDAG address the seven-county southern California region and are based on growth projections that assume that the current levels of water availability, particularly to the coastal areas and adjoining inland valleys, will continue into the future.

SCAG predicts that by 2020, the population within its six-county area will have increased by 6.7 million people and that there will be 4 million additional jobs. As a result, traffic will worsen. The RTP has been designed to meet air quality conformity requirements.

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SCAG's Community Link 21 regional transportation plan cannot and does not attempt to solve the region's transportation problems. It programs improvements on the basis of projected available funds to minimize the worsening of traffic, congestion, and inaccessibility over the next 20 years. For example, while the total cost of needed improvements to arterial roads is estimated to be $7 billion, Community Link 21 will provide $1 billion in new targeted expenditures. Transportation revenues through 2020 are projected to be $82.5 billion; the current list of committed projects (including operations and maintenance) would cost $62 billion by 2020. The difference, plus savings expected to result from transit restructuring, would provide the region approximately $23 billion to fund new projects over the next 20 years.

SANDAG projects that by 2020 the population of San Diego County will have increased by 38 percent, the number of jobs by 45 percent, and the vehicle miles traveled by 47 percent over current levels. The draft 2020 Regional Transportation Plan (RTP) coordinates with the countywide Regional Growth Management Strategy and is designed to conform to the air quality plan for the air basin. The RTP would rely on infrastructure expansion and maintenance, effective management of transportation systems (roads, bus and rail transit, bikeways, ports and airports, etc.) through intelligent transit systems and other approaches, and the policies of the Land Use Distribution Element to reduce commute travel times, per capita vehicle miles traveled, and per capita air quality impacts. At the same time, the RTP estimates that available funding will fall $11.5 billion short of the $29.4 billion projected cost of implementation over the next 20 years (assuming current levels of state and federal funding). Extension of the countywide, transportation-dedicated sales tax to 2020 would cover less than half of this shortfall (SANDAG 1999b).

Substantial regional investments are planned throughout the seven-county southern California region to address the cumulative impacts of growth and related development on transportation systems. Nonetheless, traffic and transportation shortfalls will generally be worse than today.

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b. Impacts of Plan Implementation

It is not anticipated that implementing the various Plan components would result in traffic impacts. None of the projects would produce substantial traffic due to construction or operating parameters. Additionally, any traffic generated by the various projects anticipated in The Plan would be expected to be in remote areas where there are no congestion-related issues.

The Plan would neither change regional development assumptions nor worsen conditions beyond those projected in the SCAG and SANDAG RTPs. In other words, the transportation system will be stressed to the same extent whether or not The Plan is adopted.

The SCAG Community Link 21 RTP currently identifies a number of major roadways in the Coachella Valley that would exceed its goals for reducing congestion and delays in 2020, despite the improvements programmed as part of the RTP. SCAG has essentially

accepted in its plan that there is insufficient regional funding to solve these problems. It is expected that The Plan would not increase the overall cumulative traffic impact.

The Plan would support the transfer of conserved water from the Imperial Valley to other users. This activity is not expected to stimulate new growth that would affect either local or regional transportation systems or require the construction of additional transportation infrastructure. The proposal would have a de minimus impact on the existing and projected effects of growth on the transportation system.

6. Mineral Resources/Geology and Soils

a. Resource Description

Significant geothermal resources and oil and gas fields exist in the area potentially affected by The Plan (California Department of Conservation 1998a, 2000). According to the California Department of Conservation, Division of Mines and Geology (1998b), a variety of mineral resources are scattered throughout the project area. The following table summarizes the major minerals by county in the project area.

Table YYY - Major Minerals in the Seven-County Region

County	*Mineral Resources*
Ventura	Clay, gypsum, shale, specialty sand, sand and gravel
Los Angeles	Clay, decorative rock, sand and gravel, crushed stone, titanium, tungsten
Orange	Silica, sand and gravel
Riverside	Clay, crushed stone, dimension stone, sand and gravel
San Bernardino	Alumina, clay, crushed stone, decorative rock, feldspar, sand and gravel, limestone, gold, talc, rare earths, salt, saline compounds, pumice, volcanic cinders, zeolites
San Diego	Crushed stone, dimension stone, gemstones, specialty sand, sand and gravel,
Imperial	Clay, gypsum, sand and gravel, gold
Source:	California Department of Conservation 1998b.

Soil surface textures range from clay to sand in the project area, with a majority of the slopes ranging from nearly level to gently sloping. Susceptibility of the soils to wind and water erosion ranges from low to very high. The county with the lowest average erodibility potential due to water is Riverside (Coachella Valley) and that with the lowest in average wind erosion potential is Imperial. Soil salinity ranges from low to high, but the averages for most of the counties are in the very slightly to slightly saline range. The counties with the most saline soils are Imperial, San Bernardino, and San Diego. The variety of soil textures and other characteristics is a result of the broad range of surficial geologic formations from which the soils are derived (USDI 1988).

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There are approximately 385,000 acres of hydric soils in the seven counties, based on the county soil surveys. Hydric soils are one of the major components of wetlands (USDI 1988).

b. Impacts of Plan Implementation

Implementation of The Plan should not lead to considerable impacts to geologic and soil resources. However, there is a potential for an increase in wind erosion of hydric soils if water sources are shifted to other users.

Local agencies would review site-specific projects at the time that they are proposed.

7. Utilities/Service Systems

a. Resource Description

Utilities and service systems within the seven-county area are provided by municipalities, special agencies and large private utilities such as Southern California Edison Company, Southern California Gas Company, and San Diego Gas & Electric Company. Public agencies are controlled by local governing bodies and private utilities are under the regulation of the California Public Utilities Commission.

b. Impacts of Plan Implementation

It is anticipated that the facilities necessary for implementation of The Plan would involve only minimal requirements for public services and utilities. Additional use of electricity for operation of pumps and other facilities may be required, but would be small compared to the overall electrical consumption in the area.

The proposed Plan would ensure that available water supply remains close to current levels in the southern California region. The region served by MWD and SDCWA would continue to receive water through existing conveyance facilities. No expansion or change in these facilities would be necessary because these supplies are replacing existing supplies that would no longer be available due to reductions in the amount of surplus Colorado River water and Colorado River water apportioned to but unused by other Lower Basin states (i.e., water previously available to California). Although public services and utilities would be expanded and extended as a result of ongoing regional population growth, continuing currently planned levels of water service would not contribute to that trend. The project would have a de minimus impact on public services and utilities in the coastal plain and its adjoining inland valleys because there would not be a net increase in the supply of water to the metropolitan areas.

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The Plan would have a de minimus impact on public services and utilities in the Coachella Valley. CVWD is adopting measures that are expected to shift existing demand away from use of groundwater supplies back to Colorado River water supplies.

The impact of The Plan on public services and utilities in the Imperial Valley is dependent upon the specific water conservation measures to be undertaken; however, the combined impacts of the activities proposed in The Plan are expected to be minimal.

8. Noise

a. Resource Description

Noise can be defined as any sound whose intensity, in terms of volume, pitch, or duration, at the point of human perception, has the potential to stress or damage the organs of human hearing, cause unwanted or unhealthy physiological effects, or is otherwise considered unwanted or annoying to the listener. High noise levels can also adversely affect the behavior, physiological and reproductive processes, and migratory patterns of wildlife.

Most noise is associated with human activity and is primarily a function of traffic, machinery, and aircraft. In urban areas, motor vehicles, as a group, are the most pervasive contributors to noise levels. Aircraft, railroads, and certain high-intensity industrial noise generators may also produce high levels of community noise and annoyance reactions. Other examples of significant noise sources are powered gardening equipment, amplified music, power tools, and air conditioners.

Land uses considered noise-sensitive include residential, educational, and health facilities, research institutions, and certain recreational and entertainment facilities such as parks used for passive recreation or wilderness areas where solitude is key to the quality of the recreational experience. Most commercial and industrial uses and certain noise-generating recreational facilities such as playgrounds and gymnasiums are considered less sensitive to noise.

Southern California has a variety of land use patterns that range from natural to urban/suburban. Growth in the region has resulted in conversion of open spaces and agricultural areas to higher density urban and suburban uses, producing increases in noise associated with greater densities of development and human activity. Although this growth has caused a cumulative increase in sources of noise and in the potential number of noise recipients and noise-sensitive land uses in the region, noise impacts are nevertheless localized in nature and would not be cumulative on a regional or area-wide basis.

b. Impacts of Plan Implementation

Many of the components associated with The Plan would be non-structural (e.g., water transfers or exchanges) and would not directly contribute to noise effects.

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Some of the types of projects (e.g., structural activities) that may occur within the framework of The Plan, could result in short-term noise impacts during construction and could, depending upon the specific timing and location, in combination contribute to an increase in noise levels. Examples of structural projects that may occur include the lining of the All American and Coachella Canals to increase efficiencies in water conveyance, and development of new facilities and spreading grounds to offset groundwater overdraft in the Coachella Valley.

Local agencies would review site-specific projects at the time that they are proposed. Based on discretionary authority under local noise ordinances and policies, these agencies and decision-makers would consider factors such as specific levels of ambient noise, increased noise levels, noise duration and timing, and would determine appropriate mitigation at that time in the event that there is a potential for significant effects.

9. Hazards and Hazardous Materials

a. Resource Description

The main geologic hazard in the seven counties is from earthquakes. Other natural hazards include floods, landslides and other earth movements. The Plan area, particularly along the San Andreas, Imperial, and San Jacinto faults, is seismically active (USDI 1988). The surface geologic materials near these major faults are predominately hard rock, but there is a significant amount of softer materials that can amplify shaking and lead to increased damage from an earthquake (California Department of Conservation 2000b).

Industries and other entities in the seven-county area use a wide variety of hazardous materials ranging from fuels and solvents to radioactive materials. A wide variety of fuels, chemicals, and other hazardous materials are also transported via roadways and railways.

b. Impacts of Plan Implementation

Geologic hazards would not be materially increased by implementation of The Plan. Infrastructure improvements (including existing or future irrigation canal lining and water distribution pipelines) could be damaged during an earthquake, but the effects of these hazards would be less than considerable when compared with likely conditions without implementation of The Plan.

The various projects associated with The Plan could require the use of hazardous materials, such as lubricating oils, fuels, and chemicals associated with well drilling and water treatment. Any of the projects anticipated in The Plan that required such use would be subject to a separate CEQA process that would provide project-specific detail and impact assessment.

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10. Aesthetics

a. Resource Description

The Plan addresses Colorado River water use within the service areas of Colorado River water right holders along the Colorado River in California, and agricultural water agencies and coastal urban water agencies serving portions of Ventura, Los Angeles, Orange, San Diego, Riverside, San Bernardino, and Imperial Counties. Visual resources within these counties include intensive urbanized areas within metropolitan Los Angeles, Orange, Riverside, Ventura, San Bernardino, and San Diego Counties. There are also major agricultural areas along the Colorado River and within the Coachella and Palo Verde Valleys of Riverside County, and the Imperial Valley of Imperial County. Less developed and open space areas occur on the hillside and mountains of all counties and in the deserts of Riverside, San Bernardino, Los Angeles, and Imperial Counties. Therefore, the visual resources are locally oriented and vary according to the type of land use and the degree of open space and the existence of prominent topographic features such as mountains, ridgelines, and other unique features.

Changes to visual features and visual characteristics of the seven counties are generally controlled by the various cites and counties. Federally-owned lands administered by the U.S. Department of the Interior (Bureau of Land Management and National Park Service) and by the U.S. Department of Agriculture (Forest Service) are covered by visual quality regulations and criteria for those agencies.

Areas of greatest concern for visual resources revolve around changes to prominent topographic features that alter the character of the overall landscape. The focus is on potential impacts to these features along scenic highways and other sensitive visual resources in wilderness or other natural areas.

b. Impacts of Plan Implementation

It is not anticipated that implementation of the Plan would lead to cumulative changes to visual resources. Some of the projects associated with The Plan (especially the anticipated conjunctive use/groundwater banking project) involve development of well fields, pipelines, and other support structures, which generally do not require extensive grading or other landform modification. Impacts generally are expected to be low levels since it is not expected that major topographic features would be substantially changed.

11. Cultural Resources

a. Resource Description

CEQA includes environmental consideration of "historical resources," which are defined in CEQA Guidelines Section 15064.5. These resources include prehistoric and historic archaeological sites, districts, and objects; standing historic structures, buildings, districts, and

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objects; and locations of important historic events, or sites of traditional/cultural importance. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources (Pub. Res. Code §§5024.1, Title 14 CCR, Section 4852) including the following:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- Is associated with the lives of persons important in our past;
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- Has yielded, or may be likely to yield, information important in prehistory or history.

Humans have been living within the seven counties covered under The Plan for over 10,000 years. The analysis of cultural resources, including both prehistoric and historic sites, can provide valuable information on the cultural heritage of both local and regional populations. Prehistoric sites range from small lithic scatters left behind by early stone-tool makers to the remains of large village sites found along the coast. Historic resources include small adobe homes as well as large historic districts encompassing numerous structures and acres of land, as well as architectural structures.

In general, highly urbanized areas are less likely to contain intact prehistoric resources because of the extensive impacts caused by historic and modern development. Urban areas are often, however, located adjacent to important resources such as springs, estuaries, etc. that attracted Native American settlement. Therefore, urban development is often located in areas of high prehistoric archaeological site sensitivity. Buried archaeological sites with portions that are relatively unaffected by previous development have been commonly encountered during urban construction. Urbanized areas, however, would have a higher likelihood of containing historic resources than rural or non-developed areas.

Agricultural land has been less impacted by historic and modern development and, therefore, has a higher likelihood of containing relatively intact cultural resources despite the ground disturbances associated with plowing and other agricultural activities. In addition, coastal areas, including those within San Diego, Orange, Los Angeles, and Ventura Counties, have a high probability of containing Native American archaeological sites because many Native American communities congregated along the coast to take advantage of the rich marine resources.

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b. Impacts of Plan Implementation

CEQA Guidelines Section 15064.5 has recently been revised to indicate 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." Such changes include "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired" (CEQA Guidelines Section 15064.5 [b]).

There is the possibility that both structural and non-structural options associated with The Plan would affect significant prehistoric and historic resources. Structural projects, especially those involving extensive construction-related activities and ground disturbance, could impact a buried prehistoric archaeological site. Some non-structural types of projects also have the potential to impact significant cultural resources.

If local agencies decide to go forward with any component of The Plan, site-specific projects would be evaluated during individual CEQA review to determine if a component of The Plan would result in significant impacts to cultural resources and, if necessary, to determine appropriate mitigation measures on a project-by-project basis. Depending on the nature of the historic resource, the impact, and the ability to modify project design to avoid or minimize the impact, impacts on cultural resources could be potentially significant.

12. Hydrology/Water Quality

a. Resource Description

The Colorado River is the principal water resource in the arid Southwest. The watershed is divided into the Upper and Lower Basins, defined in the 1922 Colorado River Compact. The dividing point is at Lee Ferry, Arizona, approximately 17 miles downstream of Glen Canyon Dam. The unregulated flow of the River varies widely from year to year depending on the location and timing of precipitation throughout the watershed. To cope with its extreme variability, reservoirs have been constructed with a combined usable capacity of approximately 60 million af.

The overall purpose of The Plan is to provide California's Colorado River water users with a framework by which programs, projects, and other activities would be coordinated and cooperatively implemented and allowing California to most effectively satisfy its water supply needs within its annual apportionment of Colorado River water. California's annual use of Colorado River water has varied from 4.5 to 5.2 million af over the last ten years. This framework specifies how California would transition from its current use to its annual basic apportionment of 4.4 million af of Colorado River water when conditions on the River dictate.

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Several independent, site-specific projects have been proposed that could modify the regional water supply and water quality. These could be completed whether or not The Plan is implemented.

The quantified water rights and supply for California Colorado River water right holders are described in the water budgets pursuant to the Quantification Settlement Agreement and in other sections of this Plan, as are the descriptions of characteristics and operations of the water resources associated with California's use of Colorado River water. The discussions in this section, therefore, focus on potential changes in water supply, use, operations, and quality.

Components of The Plan and other associated components to be implemented by Colorado River water right holders are listed in Section IV

California's Colorado River diversions, when limited to the basic Colorado River water normal-year apportionment, would be significantly reduced in comparison to the highest amount diverted. For the near term, California's use of available surplus water would likely not be any more than in the past and would decline with implementation of the cooperative Colorado River water conservation/transfer programs. The conservation/transfer programs, while long-term and subject to renewal, are not permanent transfers.

During the 15-year period of interim surplus water criteria, the probability of the occurrence of damaging flood control releases and power plant bypass flows may be reduced. The use of interim surplus criteria may also increase the generation of power during non-flood control releases months.

The potential upper range of the cumulative change in Colorado River flow between Parker and Imperial dams due to California's cooperative conservation/transfers and other cooperative water supply programs for any particular year are listed in Section IV.J.9. The upper range of the potential reduced flow below Parker Dam is due to conservation and transfer of water from conveyance, distribution, and on-farm use of Colorado River water. This reduced level of use is within the range of historic use. There would also be an associated reduction in seepage and drainage similar to that which has occurred historically with reduced water use. In the case of water to be received by MWD and SDCWA, the conservation and transfer programs provide replacement water for water now diverted through the Colorado River Aqueduct.

Colorado River water quality would remain within the historic levels under The Plan; its implementation would not cause an exceedance in Colorado River salinity standards.

Under The Plan, it is anticipated that water storage and conjunctive use programs may be introduced with associated spreading grounds, extraction wells, and/or indirect use operations. A cooperative storage and conjunctive use program already exists in the upper Coachella Valley and a demonstration program exists in the Hayfield Valley.

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Groundwater Resources of the Salton Sea Basin

The Colorado River Delta begins at Laguna Dam on the Colorado River and extends west and north into the Imperial and Coachella valleys as far north as Indio, California, and extends south into the Yuma Valley in Arizona, and includes the Mexicali Valley in Mexico southward to the Gulf of California. Within this area there is a highly transmissive aquifer that extends westward into the East Mesa in Imperial County, southward into the Yuma Valley and into the eastern portion of the Mexicali Valley. The regional aquifer does not extend into the Imperial Valley or the western Mexicali Valley because the sequence of clay layers becomes thicker towards the west. For the same reason the regional aquifer does not extend to the Salton Sea or into northern Imperial County.

This regional aquifer is continuous across international and state boundaries. Recharge to this aquifer consists of flow in the Colorado River below Laguna Dam, intermittent flow in the Colorado River below Morelos Dam, irrigation with Colorado River water on lands in the Bard Valley in California, rainfall frontal runoff from the Cargo Muchacho Mountain Range, Yuma Valley in Arizona, and the Mexicali Valley, and irrigation conveyance facilities including the All American Canal. Annual withdrawals from the regional aquifer consist of approximately 50,000 af from the Yuma Valley (Bureau of Reclamation, 1964-1998) and approximately 649,000 af to 973,000 af from the Mexicali Valley (Bureau of Reclamation, 1964). Groundwater withdrawals from the regional aquifer in Imperial County have been negligible in the past. However, the Bureau of Reclamation has completed construction of the first phase of the Lower Colorado Water Supply Project. This Project includes wells along the All American Canal in the Sand Hills that have a current withdrawal capacity of 5,000 af per year, in its initial phase and an ultimate capacity of 10,000 af per year.

The only major drainage course to the east of the Salton Sea is Salt Creek. Salt Creek discharge to the Salton Sea is approximately 1,000 af per year (USGS Gauging Station 10254050). This flow consists of seepage from the Coachella Canal and runoff from springs and wells that tap from the aquifer of the Salt Creek watershed. Surface runoff from the watershed is sporadic and infrequent. The region bounded by the Coachella Canal and the Salton Sea includes aquaculture operations, recreational resorts, and a few small residential communities. The aquaculture operations and recreational resorts utilize groundwater including geothermal water and seepage from the Coachella Canal. Residents in the area use seepage from the Coachella Canal for irrigation of landscaping and vegetable gardens. Domestic water comes from withdrawals from the Coachella Valley aquifer that is piped into the area by the CVWD.

The agricultural area of the Imperial Valley consists of low permeability lakebed sediments. To prevent water logging and salinization, much of the irrigated area is underlain with subsurface tile drains that collect shallow groundwater and discharge it to the surface drainage system that flows to the Salton Sea. Alternatively, it is discharged directly to the Salton Sea. As a result, groundwater levels beneath the irrigated area of the Imperial Valley have been stabilized at depths between 5 and 20 feet below ground surface (Loeltz et al. 1975). Water collected by the subsurface drains consists entirely of water imported to the Imperial

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Valley from the Colorado River (Schroeder et al. 1991). Subsurface inflow to the Salton Sea from the Imperial Valley is estimated to be 2,000 af per year (Hely et al. 1966).

A number of studies addressing seepage and subsurface inflows from the All American and Coachella Canals to adjacent wetlands and the Salton Sea have been prepared. Geohydrology studies prepared by the Bureau of Reclamation for the All American and Coachella canal lining projects (Bureau of Reclamation 1994, Bureau of Reclamation 1993b) made certain conclusions as to the effect that lining portions of the All American and Coachella Canals would have on flows to the Salton Sea and adjacent wetlands. The Salton Sea Authority produced a study that described a numerical groundwater flow model that was developed to ascertain seepage and subsurface inflows from the All American and Coachella Canals (Tetra Tech 1999).

The agricultural area of the Lower Coachella Valley sits atop a vast aquifer from which as much as 170,000 af are withdrawn annually (Coachella Valley Water District 1999).

The CVWD estimates that overdraft from this aquifer is as much as 125,000 af per year. As a result of the overdraft, Salton Sea water is intruding into the aquifer beneath the Lower Coachella Valley (TetraTech 1999). In addition to groundwater, agriculture in the Lower Coachella Valley is irrigated with approximately 280,000 af of Colorado River water conveyed through the Coachella Canal. Much of the irrigated area is underlain with a clay lens that prevents percolating water from reaching the main aquifer. As a result, this water is discharged to the surface drainage network that is tributary to the Salton Sea.

The San Felipe Creek watershed is the source of most of the groundwater resources along the west shore of the Salton Sea. Subsurface inflow to the Salton Sea from its western shore is estimated to be 10,000 af per year (Hely et al. 1966).

The Salton Sea lies at the bottom of an interior depression. Currently the Salton Sea is approximately 50 feet deep at a surface elevation of 228 feet below sea level and occupies approximately 375 square miles. Although current inflow to the Salton Sea is approximately 1.3 million af per year consisting mostly of agricultural drainage from Imperial Irrigation District, CVWD and Mexico, there has historically been a substantial variation in this figure based on numerous factors.

b. Impacts of Plan Implementation

The combined effects of the activities identified in The Plan on water resources, based on currently proposed and anticipated projects are associated with changes in:

- Quantified water supply for a specific term
- Reliability of water supply
- Colorado River and aqueduct flow

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- Hydropower
- Groundwater recharge to the Salton Sea and Mexico
- Water quality

Quantified Water Supply

The overall effect of The Plan would be a net decrease in use of Colorado River water by California. MWD and SDCWA would receive the same amount of Colorado River water as they currently receive, but it would be conserved and stored water rather than either surplus water or water apportioned to but unused by other Lower Basin states. The storage and conjunctive use programs can provide water for coastal urban areas when needed and when the Colorado River Aqueduct has available capacity. The net result would be no increase in Colorado River water supplies to the coastal region.

Changes in flow quantities would take place within IID's service area, where conservation efforts and other projects would reduce the demand for Colorado River water and improve groundwater management in Coachella Valley.

Reliability of Water Supplies

A number of the proposed projects would increase delivery reliability to agencies by increasing storage options and taking advantage of different watersheds. One proposed project is to exchange the more reliable Colorado River water for the less reliable, but higher quality State Water Project (SWP) water. This would allow flexibility in operations when the annual conditions experienced by the SWP system differ from those occurring in the Colorado River watershed (i.e., a wet year for one system could help compensate for a dry year in the other).

The proposed groundwater banking and conjunctive use projects also would improve reliability of flows in the Colorado River Aqueduct because they would store apportioned and surplus water in years of sufficient supplies, and yield water when needed.

River and Aqueduct Flows

Implementation of projects envisioned by The Plan would have an effect on the amount of flow in the Colorado River between Parker Dam (diversion point for the Colorado River Aqueduct) and Imperial Dam (diversion point for the All American Canal to IID and CVWD).

Under The Plan, projected flow in the River could slightly decrease the annual volume of the Colorado River at Imperial Dam. Some or all of this decrease may be made up with surplus water, especially in wet years. The maximum and minimum levels of flow rate would remain the same. However, the annual decrease in flow would result in a minimal drop in 'bankline' water level.

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Flow in the Colorado River Aqueduct is planned to remain at maximum capacity. However, a portion of the water would be conserved, previously stored, or apportioned water rather than surplus or apportioned but unused water.

Hydropower

Reduced flows of Colorado River water reduce the potential for its use as a reliable source of hydropower generation by the utilities that generate power from Hoover Dam to the Headgate Rock Dam and IID. This issue has been studied in the All American Canal Lining EIS/EIR (USDI 1994). When there is no surplus water, the annual flow reduction could produce a loss of approximately 30 million kilowatt hours of electrical power, or less than 1 percent of the power produced from Hoover Dam to Imperial Dam.

The Salton Sea

Conservation of as much as 300,000 af in the Imperial Valley and transfer of this water to the SDCWA and CVWD would result in reduced flows to the Salton Sea. Reduced flows could potentially change the rate of increasing salinity of the Salton Sea and could decrease its surface elevation.

Water Quality

The salinity of the Colorado River increases as the River flows downstream. If River flows are reduced, the salinity of water at Imperial Dam and downstream may increase by approximately 4 mg/l. The possible reduction in River flow and potential subsequent increase in salinity between Parker and Imperial dams would be negligible.

The Colorado River Basin Salinity Control Program was established in 1974. The purpose of the program is to implement a broad range of specific and general salinity control measures in an ongoing effort to prevent further degradation of water quality in the United States and provide a means to comply with the obligations of the United States to Mexico defined in Minute No. 242 of the International Boundary and Water Commission.

13. Biological Resources

a. Resource Description

The cumulative effect of changes in land use, urbanization, and increasing population in southern California has resulted in the decline of native plant and wildlife populations. When such impacts occur to biological resources, native plant and wildlife species become regionally scarce, or their habitats become significantly reduced, degraded, or fragmented. Biological resources in southern California that may be affected by such impacts consist of native species of plants and animals, especially sensitive species such as federal and state-listed endangered and threatened species, proposed species, and other regional or local species of

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concern. Habitat for these species may also be adversely affected, including federally-designated Critical Habitat and other essential habitat. In addition, Los Angeles County has designated certain locations as Significant Ecological Areas (SEAs).

The seven-county area includes many important biological resource locations. These include such general locations as the Mojave Desert, Coachella Valley, Salton Sea, and various national, state, and local parks, forests, and preserves. Within these broad areas are habitats for thousands of species of plants and animals, hundreds of which are considered sensitive due to declining populations.

The regulatory setting for biological resources includes the following federal, state and local statutes and regulations.

Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.)

This Act protects threatened and endangered species (and their designated critical habitat), as listed by the U.S. Fish and Wildlife Service (USFWS), from unauthorized take, and directs federal agencies to ensure that their actions do not jeopardize the continued existence of such species. Section 7 of the Act defines federal agency responsibilities for consultation with the USFWS. Section 10 provides for the preparation of habitat conservation plans.

Executive Orders 11988 and 11990, Floodplain Management and Protection of Wetlands, Respectively

These Executive Orders require federal agencies to provide leadership to protect the natural and beneficial values served by floodplains and wetlands. Federal agencies are directed to avoid development in floodplains where possible, and to minimize the destruction or degradation of wetlands.

Clean Water Act of 1977 (33 U.S.C. 1251 et seq.)

Provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters. Section 404 of the Act prohibits the discharge of dredged or fill materials into waters of the United States, including wetlands, except as permitted under separate regulations by the U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency. An important aspect of the regulations is that discharges into waters of the United States, and the placement of fill in wetlands in particular, should be avoided if there are practicable alternatives.

California Environmental Quality Act (CEQA) of 1970 (Public Resources Code Section 21000-21177; Guidelines at Section 15000 et seq.)

Establishes requirements and procedures for state and local agency review of the environmental effects of projects proposed within their jurisdictions. CEQA requires the preparation of an environmental impact report (EIR) for projects that may significantly affect

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the environment. CEQA Guidelines stipulate that a plant or animal that is not listed but can be shown to meet criteria for listing under the Endangered Species Act (see below) shall be given the same consideration as a listed species.

California Endangered Species Act of 1984 (Fish and Game Code Section 2050 et seq.)

Provides for the protection of rare, threatened, and endangered plants and animals, as recognized by the California Department of Fish and Game, and prohibits the taking of such species without authorization by the Department. State agencies are required to consult with the California Department of Fish and Game on actions that may affect listed or candidate species. With regard to plants, the Endangered Species Act greatly expanded upon protection afforded to rare, threatened, and endangered plants under the earlier California Native Plant Protection Act of 1977.

For species occurring along or near the Lower Colorado River, a multi-species conservation program is being developed by a partnership between five federal agencies; state agencies from California, Arizona, and Nevada; several Indian tribes; various hydroelectric power and water agencies; and other interested parties. The purpose of the program is to develop a multi-species conservation program aimed at working toward the recovery of endangered, threatened, and sensitive species of wildlife, and their habitats, and attempting to reduce the likelihood of additional species listings, while accommodating current and future water and power uses. Over 100 species will be addressed by the program. Further information may be obtained from the LCR MSCP. The LCR MSCP is expected to have long-term beneficial effects on biological resources of the Lower Colorado River.

Counties and local municipalities also may maintain lists of species of special concern.

b. Impacts of Plan Implementation

Impacts to biological resources may occur from specific project implementation or from indirect land use changes supported by Plan implementation. The impacts of such changes are not always unidirectional; changes that adversely impact one set of species may be beneficial to another set of species. Raising or lowering the water level of a lake, for example, may favor some species of waterfowl at the expense of other species. For a Plan as geographically wide-ranging and multi-faceted as this one, potential impacts are difficult to specifically predict and summarize. However, any proposed new construction would be subject to a project specific environmental review process before being approved.

Since The Plan includes relatively minimal new construction, and since The Plan is not expected to change regional development patterns and land use treads, it would have a de minimus effect on biological resources of the region as a whole. However, local changes in water use, water storage, and water transportation may cause local impacts to plant and wildlife populations. Potential impacts to biological resources due to potential reduced water elevation on the lower Colorado River are being addressed in the LCR MSCP.

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D. Growth-Related Issues

1. Population Growth Trends in the Seven-County Area

The State Water Plan estimates that California currently runs a shortage of 1.6 million af in an average year (approximately 1.5 million af of this represents on-going groundwater overdraft) and 5.1 million af in drought years (DWR Bulletin 160-98). DWR projects that by the year 2020, if new water management actions are not undertaken, the state will face shortages of 2.4 million af in an average year and 6.2 million af during times of drought. If a variety of proposed management measures are applied, including measures similar to The Plan, then the year 2020 statewide shortages are estimated to be approximately 0.2 million af in average years and 2.7 million af in drought years (California DWR 1998). The population projections used by DWR in the State Water Plan are based on earlier California Department of Finance (DOF) estimates and are approximately 4.6 percent higher than current growth projections. As a result, shortages may be slightly smaller than predicted.

Southern California has traditionally been one of the fastest growing areas of California. SCAG has estimated that its six county region will include 6.7 million more residents by 2020 (SCAG 1998). SANDAG estimates that San Diego County will have over 1.3 million additional residents by that year (SANDAG 1998a). Five of California's six largest counties by population— Los Angeles, San Diego, Orange, San Bernardino, and Riverside — are located in southern California. In July 1999, the area accounted for approximately 55 percent of the state's total population.

As a measure of this growth, California's three most populous counties— Los Angeles, San Diego, and Orange — are located in coastal southern California. For the last several years, these have had the highest numerical population gains of any of the state's 58 counties. Riverside County, the sixth largest county in population, has also been among the fastest growing based on percentage change for the past several years (California Department of Finance 2000).

Population projections for the seven southern California counties prepared by DOF, SCAG, and SANDAG anticipate steady growth over the next 20 to 40 years (see Table YYY). In fact, southern California alone would house as many people as live in the entire state today. Although the estimates prepared by DOF sometimes differ from the SCAG and SANDAG forecasts, all the values reflect an expectation of substantial growth in the seven-county area.

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Table YYY - Population Projections, in Millions of Residents (December 1998)

County	*1990*	*2000*	*2010*	*2020*	*2040*
Imperial	0.111 0.109 (a)	0.155	0.222 0.206 (a)	0.299 0.208 (a)	0.504
Los Angeles	8.90 8.86 (a)	9.84	10.6 10.87 (a)	11.57 12.25 (a)	13.89
Orange	2.42 2.41 (a)	2.83	3.16 3.09 (a)	3.43 3.25 (a)	4.07
Riverside	1.19 1.17 (a)	1.57	2.13 2.22 (a)	2.77 2.92 (a)	4.45
San Bernardino	1.44 1.42 (a)	1.73	2.19 2.22 (a)	2.75 2.83 (a)	4.20
San Diego	2.51	2.94	3.44 3.44 (b)	3.92 3.85 (b)	5.12
Ventura	0.670 0.67 (a)	0.754	0.855 0.811 (a)	0.981 0.932 (a)	1.28
Southern California Total	17.2	19.3	22.6	25.7	33.5

Source: California Department of Finance, "County Population Projections with Age, Sex and Race/Ethnic Detail" December 1998

Notes: (a) SCAG projections from "State of the Region" April 1999"

(b) SANDAG projections from "2020 Cities/County Forecast" 1998

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Growth within southern California, as well as most of the state, historically has been driven by natural increase, in-migration from other states, and immigration from foreign countries. Natural increase (births minus deaths) generally accounts for 50 percent or more of California's growth in any given year. In 1998-99, for example, the natural increase made up 55 percent of the total. Foreign immigration makes up most of the remainder and generally remains more consistent in absolute numbers than in-migration from other states. During the recession of the mid 1990s, for example, foreign immigration remained positive while a strong domestic migration out of California created a net migration loss (California Department of Finance 2000). Despite this loss, California's population increased during that time due to natural increase.

Studies by the Southern California Association of Governments (SCAG) show that water is not causally linked to population growth in southern California. Growth is a result of many factors, most of them economic in nature. Water is essentially a non-factor in determining growth rates.

SCAG adopted the Regional Comprehensive Plan and Guide (RCPG) in 1996 for the purpose of setting regional planning objectives and identifying strategies for agencies to use in implementing the proposals in the plan. The RCPG represents a comprehensive, "bottom up" planning effort by SCAG, reflecting strong involvement by the region's cities and counties in

setting regional objectives and implementation strategies. The plan looks at the region through 2015, proposing strategic goals relating to maintaining acceptable levels of standard of living, quality of life, and social equity. These goals are reflected in the RCPG's elements on the economy, growth management, transportation, air quality, housing, open space, water resources, and other related topics. The RCPG is intended to serve the region as a framework for decisionmaking on growth-related issues.

By coordinating with SCAG and utilizing SCAG's regional growth forecasts as a basis for water planning, local and regional water agencies are expected to be able to continue to provide adequate water supplies without becoming a growth inducing force (SCAG 1996). Supplies from the Colorado River are one component of the overall water supply available to serve southern California, joining supplies available from the State Water Project, the Los Angeles Aqueduct, water conservation and management practices, reclamation and reuse, water transfers, and groundwater production.

SANDAG culminated a unique collaboration between San Diego County and its cities with the adoption in 1993 of the Regional Growth Management Strategy and, in 1995, the Land Use Distribution Element (LUDE). The Regional Growth Management Strategy establishes goals for improving the quality of life in San Diego County through specific growth management, conservation, and social measures. Quality of life factors include air quality, transportation, water, sensitive lands and open space preservation, waste management, and housing. The county and cities have since incorporated the basic provisions of the strategy into their individual general plans.

When the LUDE was enacted in 1995, SANDAG projected that the city and county general plans then in effect would accommodate the region's forecasted growth beyond the year 2005. One purpose of the element is to establish a regional growth management strategy that will help the region accommodate that growth. The LUDE addresses the location, intensity, and design of communities, and the relationship of those communities to the regional transportation system. Its policies encourage patterns of development that would improve mobility, reduce the need for vehicle trips, and provide sufficient urban land to accommodate anticipated population growth while concurrently minimizing the effects of growth on air quality and preserving adequate open space land to serve the region (SANDAG 1995). The LUDE recommends that each jurisdiction encourage mixed-use development, incorporate residential uses within large employment areas, and place its highest development densities within walking distance of transit nodes and within the center of towns. SANDAG anticipates that overcrowding will become acute by 2020 if the policies of the LUDE are not enthusiastically implemented by its member agencies (SANDAG 1998). The SDCWA participated in the preparation of the Regional Strategy and the LUDE and is obligated by agreement with SANDAG to use SANDAG data for planning purposes (San Diego County Water Authority 1997).

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2. Issues Related to Water Supply and Growth

The Colorado River provides over 50 percent of the water used in southern California. California's basic Colorado River apportionment of 4.4 million af per year is substantially less than historic diversion levels of up to 5.2 million af per year in the past ten years. As described earlier, increased use of Colorado River water by Arizona and Nevada will reduce the supply of apportioned but unused water and the increased use of water by the Upper Basin as well will reduce the supply of surplus water that was previously available to California. The Plan is intended to optimize the use of Colorado River water and limit diversions to the basic 4.4 million af apportionment when surplus water is not available. Water conserved in agricultural areas, primarily within the IID, would be transferred to urban areas served by the MWD and SDCWA to replace the surplus and unused Colorado River water that would no longer be available to California. Conserved water also would be provided to CVWD to help address Coachella Valley groundwater overdraft.

This section discusses The Plan's potential for growth-inducing effects. Under CEQA *Guidelines Section 15126.2(d)*, a project may have a growth-inducing effect if it would:

- foster economic or population growth or the construction of additional housing, either directly or indirectly;
- remove obstacles to population growth;
- require the construction of additional community service facilities that could cause significant environmental effects; or
- encourage and facilitate other activities that would significantly affect the environment.

The first two measures of growth-inducement are the most salient to this analysis. The following discussion will concentrate on The Plan's impacts in that context.

The Plan would be able to meet demands associated with currently projected economic growth within the southern California region by ensuring a continuous supply of Colorado River water to urban areas. However, The Plan would not increase the overall water supply to the MWD and SDCWA service area since it essentially replaces surplus and unused Colorado River water that would no longer be available. As a whole, The Plan establishes the framework for strategies, operations, and projects that are intended to provide future service using less water than is currently being distributed by establishing agreements for the use of the reduced Colorado River supply among the major southern California users. The Plan anticipates a variety of options available to maintain current end-user supplies. By itself, The Plan would make no changes in current growth rates, nor necessitate revisions to existing regional plans.

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The Plan would not remove obstacles to population growth in the region. The Colorado River Aqueduct has been operated at capacity (about 1.25 million af per year allowing for maintenance) for many of the past 15 years. No new aqueduct or expansion of the existing Colorado River Aqueduct is planned as part of The Plan or Quantification Settlement Agreement. Through conservation The Plan would allow site-specific projects that would provide sufficient water to accommodate currently projected levels of growth in the area served by MWD and SDCWA, CVWD and IID. As a result of the transfer with IID, SDCWA would receive the same amount of water that it has historically received solely from MWD, through the same delivery facilities. Any existing obstacles to growth would remain in place.

In Imperial County, the proposal would result in a decrease of water diverted from the Colorado River at Imperial Dam. Due to the implementation of water conservation activities and projects, it is anticipated that this decrease would not significantly affect agricultural productivity or growth in the Imperial Valley.

As a result of the Quantification Settlement Agreement, CVWD will receive portions of the Colorado River water conserved by IID. This conserved water offsets existing groundwater use of the overdrafted groundwater basin. Water usage in the Coachella Valley would not change as the result of The Plan. Consequently, The Plan would maintain the status quo and will not facilitate new population growth in the Coachella Valley.

Under the Quantification Settlement Agreement, IID will reduce its diversion of Colorado River water due to conservation efforts within the Imperial Valley; Coachella will increase its diversion of Colorado River water with a corresponding decrease in use of groundwater; and MWD will continue to receive a full Colorado River Aqueduct delivery. This Colorado River diversion pattern has occurred a number of times in the past, and would now be memorialized by voluntary agreement. Because this simply replicates historic patterns, this diversion pattern is not linked to new population growth.

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