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IMPERIAL IRRIGATION DISTRICT

INTEGRATED WATER RESOURCES MANAGEMENT PLAN

VOL. 1

IMPERIAL IRRIGATION DISTRICT
SEPTEMBER 2009

Imperial Irrigation District Integrated Water Resources Management Plan

Draft IID Plan September 2009

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Abbreviations and Acronyms

AF	acre-feet
BMP	Best Management Practices
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CAP	Central Arizona Project
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Plan
CVWD	Coachella Valley Water District
DAC	disadvantaged community
DMM	Demand Management Measures
DoF	California Department of Finance
DWR	California Department of Water Resources
EDP	Equitable Distribution Plan
EPA	Environmental Protection Agency
IID	Imperial Irrigation District
IIM	Integrated Information Management
IRWMP	Integrated Regional Water Management Plan
IVAG	Imperial Valley Area of Governments
IWSP	Interim Water Supply Policy
KGRA	known geothermal resource areas
MAF	million acre-feet
MCI	municipal, commerical, and industrial
MW	megawatt
MWD	Metropolitan Water District of Southern California
NAF	Naval Air Facility
NEPA	National Environmental Policy Act
NPS	non-point sources
OEC	Ormat Energy Converter

ppm	parts per million
PVID	Palo Verde Irrigation District
QSA	Quantification Settlement Agreement
RAP	Region Acceptance Process
RWMG	Regional Water Management Group
SB	Senate Bill
SDCWA	San Diego County Water Authority
SDI	Supply Demand Imbalance
SRF	State Revolving Fund
SWP	State Water Plan
SWRCB	State Water Resources Control Board
TAF	thousand acre-feet
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
USBR	United States Bureau of Reclamation
UWMP	Urban Water Management Plan
WCSP	Water Shortage Contingency Plan

Executive Summary

The Imperial Irrigation District (IID) Strategic Plan adopted by the IID Board of Directors (Board) in 2008 included an objective to develop an integrated water resources plan by the end of 2009, adopt recommendations outlined in the plan in the first quarter of 2010, and implement the actions by mid-year 2010. IID has developed an Integrated Water Resources Management Plan (IID Plan) to address the changing water needs of the community and provide water for economic development while meeting its agricultural water needs and complying with existing agreements and regulations.

The Board directed staff and the consultants to ~~l~~leave no stone unturned" and to provide a wide array of potential capital projects, demand management measures and policy alternatives that it could select from in developing a ***Water Supply Portfolio.*** All these opportunities could be implemented to meet future municipal, commercial and industrial (MCI) water demands without affecting historical water uses.

IID Plan Goal

"To provide a strategic road map that defines a portfolio of water projects, demand management measures and policies intended to deliver a reliable water supply for municipal, commercial and industrial water users over a 37-year planning horizon from 2010 to 2047; and garners local consensus for a course of action that anticipates and thus avoids conflicts over water within the IID service area."

The IID Plan describes the planning process used to identify and screen a wide range of ***water management strategies***. The water management strategies provided the building blocks used to configure ***capital project solutions*** and non-structural ***policy or programmatic solutions*** (e.g., urban water conservation programs, policies for allocating water during times of shortage, etc.). It is anticipated that the IID Plan would be used by the Board to obtain input from stakeholders on the proposed actions, to build consensus and to reduce the potential for conflicts and competition amongst the various classes of users for the supplies available to the District.

These project and policy alternatives were further combined and integrated to develop immediate, near-, mid- and long-term actions that could be implemented over a 37-year planning horizon, from 2010 to 2047.

Immediate	Near-term					Mid-term	Long-term
2010	2011	2012	2013	2014	2015	2016-2020	2021-2047

The Board adopted the following objectives for the IID Plan, which were used to screen water management strategies, projects, demand management measures and policies:

- Prevent impacts to existing agricultural users of water and protect IID water rights.
- Define cost-effective projects and equitable cost-sharing agreements with those entities and water users that would receive benefits from proposed water management actions.
- Identify projects that are consistent with existing agreements on use and management of the Colorado River, including the Quantification Settlement Agreement and Transfer Agreements (QSA/Transfer Agreements).

- Recognize and resolve potential conflicts over use of available water resources.
- Promote economic development consistent with IID policies, standards, and guidelines for new consumptive uses of water.

Purpose and Need for the IID Plan

The IID Plan was initially motivated by the need to find water for proposed geothermal projects and for other economic development and growth opportunities that would provide jobs and diversify the local economy. The new project water demands, coupled with the 3.1 million acre-feet (MAF) cap placed on IID's annual Colorado River entitlement, have strained the limits of IID's existing supply and resulted in the potential for conflicts between historical and newly proposed water uses as well as among different types of water uses (agricultural, urban, industrial, environmental).

The QSA/ Transfer Agreements and federal operating rules for the Colorado River define a new reality and changed circumstances under which IID must manage the water resources of the Imperial region.

Water supply planning and the role of water agencies during the land use planning process have received increased attention from both the State Legislature and the California Courts. Recent legislation and judicial rulings have increased the requirements for IID, IID Cities, and Imperial County to adhere to more rigorous planning standards and to consult when projects are proposed that could intensify water use or have an effect on water supplies or current users.

The IID Plan provides a framework to address and resolve conflicts, reduce competition and polarization in the community, provide an alternative to litigation as a means of solving problems, identify funding strategies to build projects and develop appropriate IID policies to ensure reasonable and beneficial use of its Colorado River water entitlement.

Relation to Other IID Planning Efforts

As originally conceived, the IID Plan was intended as a document primarily for IID use to identify a ***Water Supply Portfolio*** for MCI and environmental uses, and define actions that IID could take independently to develop projects or policies to meet increasing demands and support economic development. The IID Board was under pressure to find firm and sustainable water supplies for projects that are already being considered by Imperial County and the IID Cities, so staff was directed to develop an Interim Water Supply Policy to serve as a bridge to the IID Plan and the implementation of longer-term alternatives. The actions contemplated in the interim plan have been incorporated into the IID Plan.

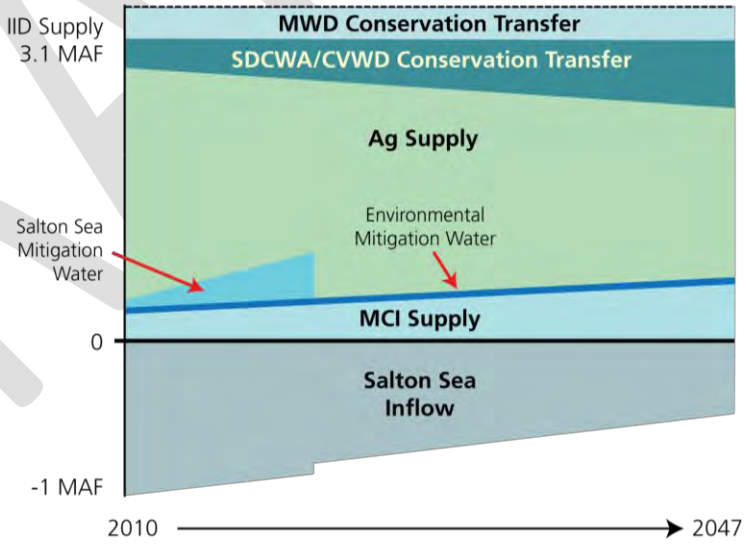
The State of California is encouraging water districts, land use agencies and local stakeholders to work together to develop Integrated Regional Water Management Plans (IRWMPs). While the IID Plan is not an IRWMP, as part of the work on the plan, the IID Board directed staff and the consultants to submit information to the California Department of Water Resources (DWR) to have an Imperial region approved for the purpose of developing an IRWMP.

$36 million of Proposition 50 and 84 monies are available to agencies located in the DWR Colorado River Hydraulic Region that have prepared an Integrated Regional Water Management Plan and that meet state requirements.

The state has approved the Imperial region, and IID intends to work with Imperial County, the IID Cities and interested community members in a facilitated process to develop an Imperial IRWMP to define regional projects, help the community resolve conflicts and qualify for funding opportunities. Development of the Imperial IRWMP will require an extensive stakeholder involvement process. The IID Plan will serve as a foundation upon which to build the Imperial IRWMP.

Existing Water Supplies

The IID Plan describes the existing district supplies, including the facilities, entitlements and contracts that define what water is available to meet current and future demands. The amount that the district can divert may vary if significant drought conditions occur, but IID has 3.1 million acre-feet (MAF) per year of senior rights to Colorado River water that are less subject to cutback in dry times than almost any of the other rights on the river system. Given the tremendous volume of IID's annual entitlement and the seniority of its water right, IID's future water supply concerns may be more appropriately characterized as a matter of demand management than as a supply problem. Historically, approximately 1 MAF of the Colorado River water diverted by IID has flowed to the Salton Sea as tailwater and drain water. In the future, planned system efficiency measures and reduction in agricultural use are expected to decrease IID's annual discharge of Colorado River water to the Salton Sea to roughly 700,000 acre-feet per year.



The QSA/Transfer Agreements require IID to conserve and transfer an additional 303,000 acre-feet per year from 2027 on, through implementation of both on-farm and system efficiency conservation measures. Combined with the existing IID/MWD Water Conservation and Transfer Program, this will result in a total annual conservation and transfer of 408,000 acre-feet when fully implemented. Fallowing for purposes of transferring water is generally prohibited under the terms of the transfer agreements, with the exception of some fallowing early in the QSA during the ramp-up to efficiency conservation and to provide Salton Sea mitigation water through 2017.

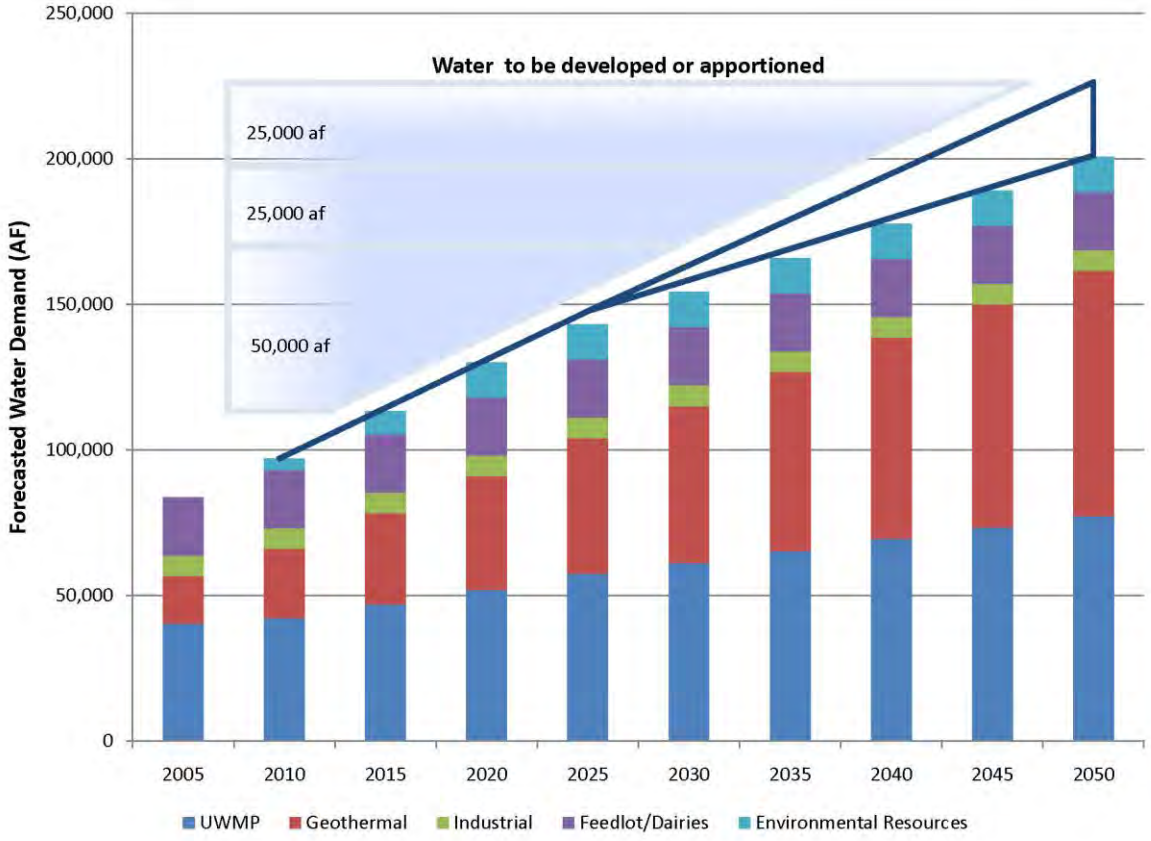
The beneficiaries of the conserved and transferred water are the Metropolitan Water District of Southern California (MWD), San Diego County Water Authority and Coachella Valley Water District (CVWD). It is important to note that by implementing efficiency conservation projects, water demands will be reduced by an amount equivalent to the conservation value. The on-farm conservation program is designed to maintain existing levels of agricultural production by reducing deliveries to the participating fields, not by any reductions in crop water use.

The result of these water conservation transfer programs is to effectively reduce IID's annual diversion from the Colorado River to between 2.6 and 2.7 MAF, with a like reduction in its use.

In the meantime, MCI demands are expected to grow over the planning horizon, and IID is also required to provide environmental water to wetlands created for mitigation purposes.

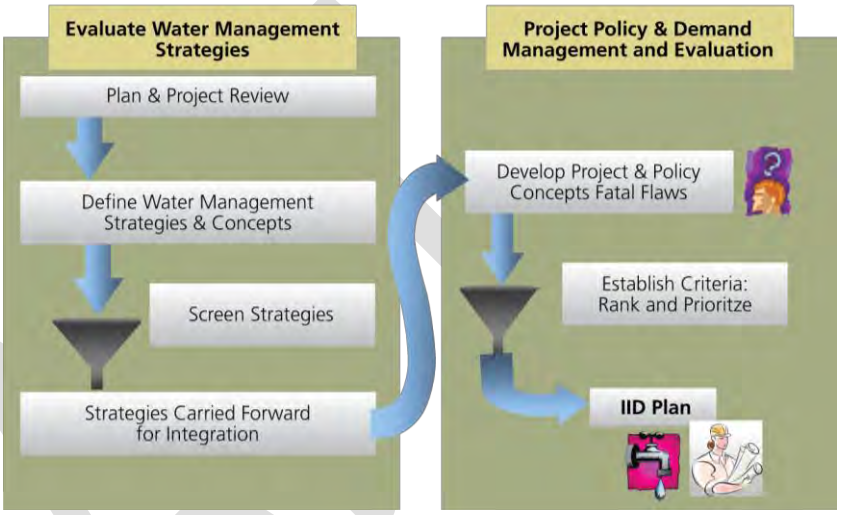
Future Demands

Future demands were forecasted to quantify the amount of water needed for non-agricultural water uses including MCI demands. Three future demand scenarios were analyzed: low-, medium- and high-water demands. The medium-water demand scenario was chosen for purposes of planning. Under this scenario, annual non-agricultural water demands are forecasted to increase by approximately 100,000 acre-feet from 2010 to 2047. A set of target planning objectives is recommended and includes development of annual supplies of 50,000 acre-feet by 2020, expanded by an additional 25,000 acre-feet by 2047, with provision for a contingency of 25,000 acre-feet. As such, the IID Plan should seek to define at least 100,000 acre-feet per year of water to be developed or managed through new capital projects and/or policies that would manage demand and define how supplemental water would be apportioned.



Process and Planning Framework

The planning process identified alternatives to meet the forecasted future demands through a number of sequential steps. The first step included review of the DWR-recommended water management strategies for inclusion in integrated plans. The state Legislature made procurement of state grants or bond funds contingent on review and integration of these strategies. Preliminary findings were made and some of the water management strategies were carried forward for further review as part of the IID Plan, a number of strategies were determined not to meet the IID Plan objectives, while others were identified as being appropriate for further review during development of the Imperial IRWMP.



The water management strategies carried forward were then integrated and used to develop ***capital projects, demand management or policy alternatives***. The alternatives were then evaluated and compared using ranking and screening criteria to identify fatal flaws, compare the range of solutions, make findings and conclusions, and prioritize recommendations for inclusion in the ***Water Supply Portfolio*** for consideration by the Board for implementation.

The IID *Water Supply Portfolio*

The IID Plan seeks to identify a ***Water Supply Portfolio*** of 100,000 acre-feet per year to meet future MCI and environmental water demands through 2047 by:

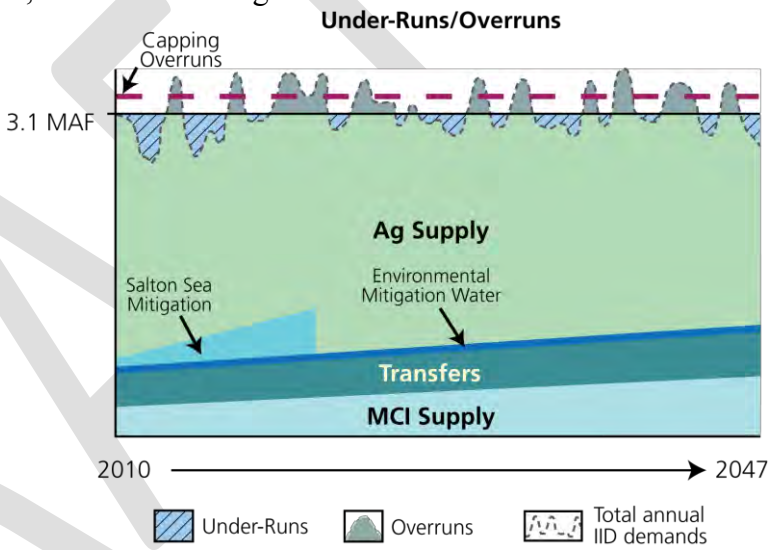
- Groundwater banking and storage to make best use of the existing IID supply
- Developing available supplies through recycling municipal wastewater, desalting drain water that would otherwise be discharged to the Salton Sea, desalting East Mesa groundwater, or by blending East Mesa groundwater with other Colorado River supplies
- Demand management – efficiency/conservation
- Annual apportionment of IID's 3.1 MAF water supply

The potential sources of water for the ***Water Supply Portfolio*** are discussed along with project alternatives to develop the sources, yields and costs, constraints and project timing. There are options to develop additional supplies for new MCI users, but these will be at a cost per acre-foot that is higher than those previously observed in the IID area. Project alternatives were developed at a reconnaissance level and further work is needed to firmly establish engineering feasibility, develop preliminary designs, evaluate environmental impacts, identify final costs, and set rates and fees.

Projects alternatives and cost information are presented in Table 1. Project alternatives were given a lower priority if their costs exceeded $600/acre-foot, if they generated potential groundwater impacts, if they entailed a large plant size and did not produce cost-effective yield; or if they required partnering or other institutional arrangements. Some of the lower-rated projects could be implemented if partnering can be worked out (e.g., recycling) or if local costs are reduced through grants (e.g., Propositions 50/84).

Groundwater Banking of Under-Runs

Groundwater banking and storage is needed to maximize IID's annual 3.1 MAF entitlement of Colorado River water. Groundwater storage/banking in the Coachella Valley or East Mesa areas should be a priority for IID in order to best manage its fluctuating agricultural demands, annual water supply limitations, and overrun obligations.



Water for groundwater banking would come from under-runs that occur when IID diverts less than its annual entitlement. There are years when IID diverts less that its full entitlement (under-runs); and years when it diverts more (overruns). The years with overruns and under-runs are about equally split, but under-runs tend to be larger than overruns on the average and this creates the opportunity for IID to generate a long-term gain in its ***Water Supply Portfolio*** from the storage of under-runs. If IID does not store the under-runs each year, this water can be diverted by MWD or another Colorado River contractor and is a lost opportunity to IID. Overruns must be paid back in subsequent years through extraordinary conservation, which at present consists primarily of the fallowing of agricultural lands. The IID Equitable Distribution Plan defines how IID responds when there is a forecasted supply/demand imbalance; but while limiting overruns, the EDP does not address the under-run scenarios. Groundwater banking will only yield new water if overruns are kept to a minimum; otherwise, the banked water would be needed to pay back the overruns rather than being available for agricultural and future MCI uses.

Groundwater banking of under-runs could yield 20,000 to 50,000 acre-feet per year over the project life-cycle. A Coachella Valley groundwater storage project has been configured and evaluated and has costs that are in the range of $260/acre-foot. Other opportunities in or adjacent to the Imperial region include partnership with CVWD to use its groundwater facilities, use of the old Coachella Canal, and development of percolation and recharge facilities in the East Mesa. East Mesa groundwater banking opportunities were integrated into groundwater development/desalination and blending project alternatives as discussed below. It is likely that these projects could be completed in the near- to mid-term and come online by 2016 should additional pilot testing and monitoring programs prove the projects long-term viability.

Table 1- Projects Ranked by Cost

Name	Description	Capital Cost	O&M	Equivalent Annual Cost	Unit Cost ($/AF)	Yield (AF)
GW 18	Groundwater Blending- East Mesa Well Field Pumping to All-American Canal	$ 39,501,517	$ 198,000	$ 2,482,000	$ 99	25000
GW 19	Groundwater Blending- East Mesa Well Field Pumping to All-American Canal with Percolation Ponds	$ 48,605,551	$ 243,000	$ 3,054,000	$ 122	25000
WB 1	Coachella Valley Groundwater Storage Project	$ 92,200,000	$ 7,544,000	$ 5,736,746	$ 266	50000
DES 8	25 KAF East Brawley Desalination with Well Field and Groundwater Recharge	$ 100,991,177	$ 6,166,000	$12,006,000	$ 480	25000
AWC 1	Systems Conservation Projects (2)	$ 56,225,000	N/A	$ 4,068,000	$ 504	8000
DES 12	East Mesa 25 KAF Desalination with Well Field and Groundwater Recharge	$ 112,318,224	$ 6,336,000	$12,831,000	$ 513	25000
DES 4	50 KAF Keystone Desalination with IID Drainwater/Alamo River	$ 147,437,743	$15,323,901	$23,849,901	$ 477	50000
DES 14	South Salton Sea 50 KAF Desalination with Alamo River Water and Industrial Distribution	$ 158,619,378	$15,491,901	$24,664,901	$ 493	50000
DES 15	South Salton Sea 50 KAF Desalination with Alamo River Water and MCI Distribution	$ 182,975,327	$15,857,901	$26,438,901	$ 529	50000
DES 2	50 KAF Keystone Desalination with Well Field and Groundwater Recharge	$ 282,399,468	$13,158,000	$29,489,000	$ 590	50000
RW 5	Regional Plant Serving Tertiary Water to IID Canal	$ 20,818,710	$ 829,853	$ 2,033,801	$ 308	6600
RW 1	Disinfected Secondary Effluent from Existing Wastewater Treatment Plants Applied to Adjacent Agriculture	$ 18,779,688	$ 486,671	$ 1,572,702	$ 118	13300
RW 3	Upgrade Existing Plants to Tertiary and Deliver Effluent to IID Canal System	$ 90,531,216	$ 2,992,257	$ 7,498,347	$ 562	13300
RW 6	Regional Plant Serving Tertiary Water to Local Service Area and IID Canal	$ 102,374,854	$ 2,280,145	$ 8,200,493	$ 488	16800
DES 7	East Brawley 25 KAF Desalination with Well Field	$ 100,409,542	$ 6,157,000	$11,964,000	$ 479	25000
DES 11	East Mesa 25 KAF Desalination with Well Field	$ 111,746,590	$ 6,327,000	$12,789,000	$ 512	25000
DES 1	Keystone 50 KAF Desalination with Well Field	$ 281,817,834	$13,149,000	$29,447,000	$ 589	50000
DES 10	East Brawley 5 KAF Desalination with Well Field	$ 24,751,185	$ 1,525,000	$ 2,956,000	$ 591	5000
DES 6	Keystone 25 KAF Desalination with Well Field	$ 160,695,766	$ 7,061,000	$16,354,000	$ 654	25000
DES 17	Heber 5 KAF Desalination with Well Field	$ 95,899,356	$ 2,476,000	$ 3,303,000	$ 661	5000
DES 13	East Mesa 5 KAF Desalination with Well Field	$ 33,027,263	$ 1,648,000	$ 3,558,000	$ 712	5000
DES 16	South Salton Sea 5 KAF East Desalination with Well Field	$ 62,177,056	$ 1,971,000	$ 5,567,000	$ 1,113	5000
DES 3	Keystone Desalination 50 KAF with Well Field and Groundwater Recharge and MCI Distribution	$ 306,357,788	$13,518,000	$31,235,000	$ 625	50000
DES 9	East Brawley 25 kAF Desalination with Well Field, Groundwater Recharge and MCI Distribution	$ 162,175,609	$ 7,084,000	$16,463,000	$ 659	25000
RW 2	Upgrade Existing Plants to Tertiary and Deliver Effluent to a Local Market	$ 140,568,145	$ 2,597,145	$10,726,215	$ 919	11700
RW 4	Regional Plant Serving Tertiary Water Locally	$ 51,323,358	$ 1,438,723	$ 4,406,758	$ 938	4700
DES 5	Keystone 25 KAF Desalination with Well Field, Groundwater Recharge & Evaporation Ponds	$ 372,088,101	$10,232,000	$31,750,000	$ 1,270	25000
	Project alternatives were considered to have a lower priority - Unit cost > $600/AF , and were not ranked (NR) in the overall Alternatives Ranking Criteria Matrix					
	Project Alternatives were considered to have a lower priority due to no groundwater banking/storage elements and not enough annual yield production < 5,000 AF, and were not ranked (NR) in the overall Alternatives Ranking Criteria Matrix					
	Project Alternatives were considered to have a lower priority due dependance on outside agency parternability, and were not ranked (NR) in the overall Alternatives Ranking Criteria Matrix.					
(1)	Assumed 50 year lifespan, 5% interest. Other project used 30 yrs and 4%. Costs will be normalized in final report					
(2)	Systems Conservation includes 24 projects, costs from $398/AF to $1169/AF, averaging $504/AF					
(3)	Source water collected from Imperial and proposed Keystone Development					
(4)	Source water collected from Imperial, Brawley, El Centro, Colexic and proposed Keystone Development					

Developing Available Supply Sources

The existing supply could be expanded by importing water, developing local groundwater by blending or desalting, desalination of drain water, use of recycled wastewater and participation in regional desalination projects.

Importing additional supplies from the Colorado River or other parts of California could be a long-term opportunity but would be constrained by competition, high cost, and legal, economic and political constraints. Costs could range from roughly $250/acre-foot to $1,000/acre-foot for temporary transfers and up to $20,000/acre-foot for long-term or permanent transfers. This is not considered feasible for IID when compared to other alternatives, but nothing would prevent private parties from seeking to import water and wheeling it through IID facilities for a fee.

IID should use an integrated approach to developing the available water supply. This could include groundwater banking, desalination of groundwater or drain water, recycling wastewater, groundwater development and blending.

Local groundwater supplies are available in the East Mesa but have elevated salt concentrations in the range of 1000 to 3000 parts per million (ppm) total dissolved solids. The salts in the water require that pumped groundwater be blended with existing Colorado River water or treated through desalination to improve water quality sufficient for IID water users. An additional uncertainty comes from the variations in source water temperature that can influence the desalination process. Temperature is dependent on the level of the aquifer pumped (i.e., shallow, middle or deep). The water currently in storage in the groundwater basin is the result of 90 years of irrigation operations and seepage from the irrigation delivery systems. It is believed that there is upwards of 1 MAF in storage in the groundwater basin that could be developed at a rate of 25,000 acre-feet a year for the next forty years without negative effects. There is very little natural recharge, and developing this resource by blending or desalting the groundwater, without providing recharge, would result in mining of the water and depletion of groundwater storage over time. Excessive groundwater depletion could create the potential for land subsidence. Close coordination with Imperial County is needed to develop groundwater resources, manage any overdraft, collect data, monitor elevations, and comply with County policies.

Two groundwater development and blending projects were configured. Both projects include well fields in the East Mesa to pump water that would then be conveyed through a pipeline to the All-American Canal (AAC) for blending with Colorado River water. The first project does not include recharge ponds, was designed to yield 25,000 acre-feet ($100/acre-foot) and potentially could be brought on line in the mid- term prior to 2015. The second project was also configured to yield 25,000 acre-feet per year, but includes percolation basins and conveyance from the AAC or Coachella Canal to the percolation ponds to recharge under-runs ($122/acre-foot). This would reduce the potential for land subsidence. The banking and groundwater storage of under-runs in the East Mesa would result in reduced water quality of the stored water, but ‗put and take' recharge operations could be designed to reduce this effect over time. Annual yields for the project with ponds was conservatively estimated at 25,000 acre feet per year but could be much higher (up to 50,000 acre-feet) depending on the

existing groundwater quality, aquifer capacity, access to land, number of wells and sizing of recharge ponds. Blending of pumped groundwater with All-American Canal or East Highline Canal water was found to be feasible but could increase the total dissolved solids concentration in those canals to levels that would require growers to increase the amount of water applied for leaching to maintain productivity. As a result, yields would vary based o the salt concentration of the groundwater. Collection of groundwater data and pilot testing are needed to confirm the feasibility and long-term viability of these projects, and to obtain data for design of groundwater pumping and blending operations.

Seventeen different desalination/groundwater development projects were configured and evaluated, including projects of different desalination plant sizes to test economies of scale (5,000, 25,000, and 50,000 acre-feet per year); projects with and without groundwater recharge and banking; and projects with different distribution infrastructure to provide water to both MCI and agriculture. Disposal of brine waste is a large cost constraint for all of the desalination alternatives. Options investigated for disposal of brine waste included evaporation ponds, new injection wells and use of injection wells at existing geothermal operations. The ability to discharge brine to the Salton Sea is uncertain because the Salton Sea Restoration Plan has not been finalized by the state. Groundwater recharge and banking in areas where the well fields are developed would mitigate for groundwater depletion and related impact. Costs ranged between $480/acre-foot and $1,100/acre-foot. Groundwater Development/Desalination projects could be completed in the near-term time frame, roughly by 2016 or 2017.

Desalination of drain water is technically feasible. Even after the QSA/Transfer Agreements and efficiency conservation measures are fully implemented by IID, there will still be up to 600,000 acre-feet per year of KAF drain water going to the Salton Sea. Drain water quality varies from approximately 2,500 to 4,500 ppm total dissolved solids. Between 50,000 and 100,000 acre-feet of drain water could be captured annually, desalinated and put to beneficial use; however, reductions in drain flows and flow to the Salton Sea may require additional mitigation. Three different drain water or Alamo River water desalination projects were configured and evaluated and prices ranged from approximately $540/acre-foot to $590/acre-foot. Local desalination programs are considered to be expensive but feasible near- to mid-term opportunities since IID can act independently or in cooperation with local interests to move relatively quickly. A major benefit of desalination of local groundwater or drain water to the region is the reliability of the supply. Future MCI users within IID need a high degree of reliability, both seasonally and during times of shortage, which these projects would provide. Desalination of drain water projects could be brought online in the mid-term time frame, roughly by 2016 or 2017.

Recycled wastewater is a viable strategy that could help meet IID objectives, provide new water and help meet future MCI demands. Six different recycled water projects were configured and there are opportunities for recycling municipal wastewater that could annually yield 6,000 to 14,000 acre-feet with a cost range of $120/acre-foot to $560/acre-foot. Costs vary depending on the level of treatment, and the size of distribution systems used to convey water to the treatment plant and from the plant to the place of use. IID would need to enter into partnerships with the water treatment agencies that own the water if they were not inclined to pursue this opportunity on their own. It is believed that a recycling

project could be brought online in the near-term, roughly by 2014 or 2015. A number of IID Cities are actively pursuing recycled water project concepts.

Regional desalting projects are being evaluated by a number of public and private organizations, including the United States Bureau of Reclamation Yuma Desalting Plant Pilot -Project; International Boundary and Water Commission proposed projects in Baja and Sonora, Mexico; the Navagua and Sea-to-Sea projects sponsored by different private/public interests. These are considered near- to long-term propositions that should be tracked to determine their cost-effectiveness.

Demand Management - Efficiency/Conservation

It is important for all users within IID to do all that is technically and economically feasible to save water to demonstrate that all Colorado River water is reasonably and beneficially used. If water can be conserved through these efforts, it could also be made available for other uses. The IID Plan investigated projects to save additional agricultural water beyond those projects already proposed for implementation as part of the IID's Efficiency Conservation Definite Plan (Definite Plan). Urban water conservation measures and water reduction opportunities by geothermal power plants were also evaluated.

Agricultural Water Conservation could result in approximately 10,400 acre-feet per year of additional system conservation and canal lining projects that are identified in the Definite Plan but not targeted for implementation, could be built in the mid- to near-term to conserve water that may then be made available to MCI uses that pay for these projects. The costs for these projects are in the $500/acre-foot range. Other agricultural conservation savings cannot be easily quantified, and it is recommended that opportunities for further savings be investigated after 2020 once the Definite Plan has been more fully implemented and there is an operational history to better define remaining conservation opportunities.

Urban Water Conservation can save water both now and in the future**.** The IID Cities and retail water purveyors are responsible for ensuring efficient urban water use as defined in their Urban Water Management Plans and by requiring conservation technologies and best management practices (BMPs) to be included as a condition of all new development. Aggressive conservation by existing urban users could save up to 8,000 acre-feet, but this would be at relatively high cost and savings should not be considered transferable to other uses. IID's role in urban conservation should be to focus on future uses and programs to ensure that urban BMPs and demand management measures are implemented at the time that projects are built. This will ensure that there are net reductions in demand, in the range of 10,000 to 20,000 acre-feet over the planning horizon, as land is converted from agricultural to MCI uses between now and 2047. These demand reductions, in conjunction with the appropriate conversion of use and apportionment policies, could result in additional water availability for future MCI uses.

Power Plant Water Conservation would be primarily related to use of cooling water**.** Power plants that rely on wet cooling could reduce their water demands by adopting hybrid cooling technologies. The investment in hybrid technology needs to be compared to the cost of developing supplemental water supplies to meet new or proposed non-agricultural

demands. State and Imperial County standards encourage power generation facilities to investigate the economic and engineering feasibility of alternative sources of cooling water and the use of water saving technologies. IID does not have MCI policy standards or guidelines at this time and should consider developing these requirements for projects utilizing IID water for cooling purposes.

Apportionment of Water within the Existing 3.1 MAF Supply

If no new water is developed or brought into the IID area, then managing or apportioning IID's 3.1 MAF Colorado River annual entitlement is essential to help meet future MCI demands. A range of alternative management concepts is reviewed in the IID Plan. IID staff has also developed an Interim Water Supply Policy that is anticipated to be approved by the Board shortly. This policy will allow action on pending projects while the Board works to refine a longer-term approach.

In the near-term, IID should consider developing policy and regulations for an annual apportionment that expands on the existing Equitable Distribution Plan. In conjunction with the program for annual apportionment and building on its existing fallowing program, it is recommended that the Board develop a type of MCI Water Exchange along with related policies that would allow fallowing for in-valley uses and apportionment of any reduction in water use associated with land being converted from agricultural to MCI uses. These waters can be used to create an industrial water supply for the exchange. It is further recommended that a system be established that the IID Board can use to review, approve and manage changes in the place of water use and type of water use needed to meet future MCI demand.

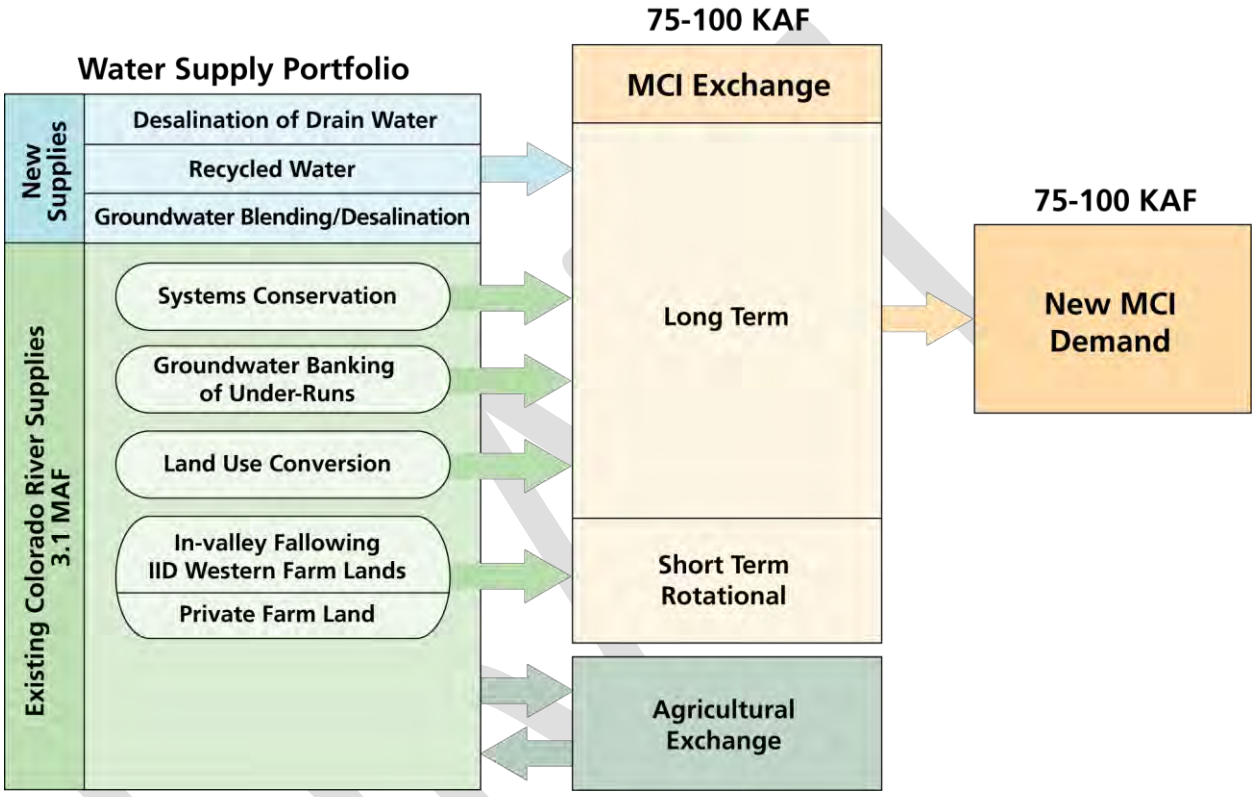
Water for an MCI Water Exchange could come from planned capital projects to be funded by new MCI uses, or from conserving water via additional agricultural fallowing for new in-valley uses or when land use conversions are approved by IID Cities or Imperial County and IID determines that water savings are being realized.

In-valley fallowing could be achieved through the rotational fallowing of private farmland or IID Western Farm Lands. An options' program was also proposed and would involve paying growers for the option of fallowing the land with additional payment should the option to fallow the property actually be exercised. This type of program has been developed in other parts of the state.

Alternatively, or in conjunction with the In-valley fallowing alternative, policies pertaining to land use conversion and changes in land use, which are the purview of the IID Cities and Imperial County, could be utilized to create non-agricultural water supplies. Planned changes in land use, from agriculture to MCI, could result in intentional demand reductions that could be credited to an MCI exchange for apportionment to MCI uses (long-term or permanent changes in place/type of use). For example, Imperial County could rezone lands for renewable energy uses that require less water (e.g., solar farm) and this water could then be put into the MCI Exchange. IID would be responsible for determining the amount of water that had been freed up by this conversion.

An annual apportionment policy and an MCI water exchange are technically feasible, though implementation of new policies and programs will face a host of challenges that will require the Board to develop guidelines, standards and/or regulations in consultation with its water users and the local land use authorities.

MCI Exchange/IID Water Supply Portfolio



IID should develop a standard contract or a permit system to review and approve proposed changes in place or type of water use; apportion water from an MCI exchange; verify a water supply for purposes of communicating with the IID Cities and County and define conditions to mitigate impacts. The goal of the IID process will be to minimize substantial injuries to any other legal user of water, no third-party effects and a net economic benefit to the IID service area. Final pricing, fee structures and rates need to be worked out, but a tiered rate structure is recommended to encourage conservation. As noted above, an ―options" program has been proposed as one means of compensating growers and landowners for fallowing, and could be utilized to generate funds for construction of capital facilities intended to develop new water supplies as mid- and long-term solutions. The program for annual apportionment should be integrally linked to a financial mechanism that would fund administration of the MCI Water Exchange, provide compensation for fallowing and establish a mitigation fund that could be used to build capital projects that result in increases to the IID ***Water Supply Portfolio***.

Guiding Principles

After reviewing and discussing the range of policy alternatives, the Board developed broad policy concepts that were then presented to the Water Planning Group composed of two members of the IID Board and two members of the Imperial County Board of Supervisors.

1. Annual apportionment to all water users: IID board should make a yearly determination of forecasted water use among all categories of users, and apportion in a manner that is consistent with existing or revised equitable distribution program guidelines. Multiple benefits are associated with an annual apportionment, including the ability to better manage annual overruns, the creation of an MCI water exchange, and the development of _pools ofwater‘ for the various classes of users to facilitate long-term planning and business development efforts.

2. Joint land-use conversion policy: Imperial County, as the land-use planning entity, and IID, as the purveyor of water to the region, should agree to the establishment of designated corridors that would facilitate the conversion of agricultural lands for the development of renewable energy production.

3. Joint groundwater study: Imperial County and IID should conduct a joint feasibility study, focusing on data collection and groundwater monitoring, to better ascertain the availability and accessibility of groundwater resources throughout the region.

4. Fallowing for in-valley water utilization: IID will consider rotational fallowing of Western Farmlands and/or private lands, and fallowing options program similar to that utilized in the Palo Verde region to generate water for MCI purposes.

5. Water storage and banking projects: IID will pursue storage projects it has already identified within its service area and banking opportunities outside its service area. While building projects to augment the existing water supply is generally more expensive than implementing the policy options listed above, the district recognizes that storage is vital to the long-term management of its water supply and that storage provides the most durable and defensible means of addressing fluctuations in agricultural usage from year to year.

6. Commitment to regional planning model: In concert with Imperial County and the larger community, IID will develop a regional water plan that actively solicits and relies on stakeholder advice and consent in balancing the needs of diverse interests. It will be guided in this process by the twin goals of multiple use and sustained yield.

It is recommended that the following additional guiding policies be considered.

7. Recognition of impacts: Projects that intensify water use and have an impact on existing IID supplies and water uses should be responsible for mitigation of the impacts. Certain MCI uses would increase demand over that historically used, and/or result in a _hardened‘ demand that requires a highly reliable supply that cannot be easily cut back in times of shortage or supply/demand imbalance. These demands would impact existing agricultural uses in times of overrun and have the potential to increase the frequency and amount of extraordinary conservation fallowing needed from agriculture. Mitigations

could include development and financing of new supplies obtained under a permit from IID, contracts with IID for a new supply, or participation in the MCI Water Exchange.

8. Those who benefit pay: Development of funding strategies should be based on the principle that those who benefit pay. MCI projects that rely on IID water should pay for the benefits they derive from use of this highly reliable supply.

9. Credit new water to investors: New water developed should be credited to the entities that invested in its development even if they do not take direct delivery of the water if those flows are used by IID in that calendar year or stored for a future use. In other words, if new water was delivered anywhere in the IID system and applied in-lieu of Colorado River water or if such water was stored, such water would be credited to the new water users and could be used to mitigate for any impacts to existing IID supplies or historical water users.

Summary of Overall Findings

Supply Augmentation

- Local water supply augmentation opportunities are available and IID could implement capital facilities alone or in partnership with IID Cities and Imperial County to increase supplies in the mid- to long-term. The capital projects will require debt service and investments in infrastructure to provide new water for future MCI uses.
- Regional supply augmentation projects for importation or desalination exist but are considered long-term propositions that would require complex permitting, partnering, extensive negotiations and planning. Importation of water supply from other areas would be in a highly competitive market involving other Southern California and Colorado River interests with large tax bases and revenues.
- Groundwater banking to maximize IID's 3.1 MAF annual Colorado River entitlement is needed to make full use of IID's existing water rights and should be a priority .
- Agricultural water users and IID Cities, most of which are economically disadvantaged, have limited willingness or ability to pay for new projects. Changes in rates to fund capital projects would likely be required to adhere to IID's Proposition 218 protest regulations.
- Contracts with new water users could expedite and fund development of capital projects.

Demand Management

- With the exception of some smaller system improvement projects, there are very few practical opportunities to implement additional agricultural water conservation projects in the near- or mid-term, beyond those already planned. It is advisable to move forward to implement the Definite Plan and to revisit additional agricultural

conservation after there is an operational history that can be used to better define remaining conservation opportunities.

- IID's role in urban conservation should be to coordinate with IID Cities and Imperial County to ensure that future water users implement BMPs to reduce future consumption and save an expected 10,000 to 20,000 acre-feet per year over what would occur in the absence of requirements for such best management practices and demand management measures.
- A regional Urban Water Management Plan and appropriate standards and guidelines would help ensure implementation of demand management measures.
- Geothermal power plants could save water through implementation of hybrid cooling.
- Results of the study of water conservation cooling technologies and costs indicate that the price per kilowatt of power produced is not sensitive to the price of water, indicating that there is an ability to pay for water at price points ($/acre-feet) of up to $400 per acre-feet as specified in the cost of capital facilities analysis in the IID Plan.
- IID raw water should be viewed as a water supply of last resort to be consistent with state laws and to confirm that all reasonably feasible measures are being taken to reduce cooling water demands.
- Regardless of whether wet or hybrid cooling is used, power plants that require cooling water in excess of historical uses should mitigate for their new water demands by supporting development of, or independently developing, capital projects to produce new water supplies or participate in some type of water exchange managed by IID and supported by the agricultural community to offset their water demands.

Water Policies and Program

- New policies and programs are needed by IID, whether to manage development of capital projects, to create new water supplies or to apportion water between existing users. If supply augmentation capital projects are not funded and implemented, the only alternative to supply water for new MCI projects is through an annual apportionment to the various classes of water uses such as agricultural and MCI.
- An annual apportionment program should be considered to apportion water on an annual basis to the use categories and to major MCI accounts.
- Annual apportionment implies reduction in agricultural water use by willing participants so that water can be made available for new demands. As opportunities for additional agricultural water conservation are extremely limited, any reduction in agricultural water supplies would come from an ~~"in~~-valley" fallowing program or land use conversions.
- Annual apportionments would allow for the development of an MCI Water Exchange for new non-agricultural uses within the IID service area and include an IID-managed process to review and approve changes in the place or type of use within the IID service area. Water for MCI Exchanges would come from:
    - Capital projects
    - In-valley fallowing of private farm land or on Western Farm Lands

    - Land use conversions from agricultural use to MCI uses that save water
- In-valley fallowing and land use conversions represent changes in place or type of use of IID's Colorado River water within the district's service area and should be accounted for by IID to ensure fairness, equity and reasonable and beneficial use of the water.
    - Land use conversions are the responsibility of the IID Cities and Imperial County and can increase or reduce water demands on a parcel. The amount of the change in demand and how to apportion that change is to be determined by IID.
    - Land use conversion also implies a change in the place or type of use of IID Colorado River water within the district's service area, and this change is the responsibility of IID.
    - The responsibilities are coequal and interrelated.
    - IID, the IID Cities and Imperial County have some shared responsibility to ensure that all of IID's Colorado River entitlement is reasonably and beneficially used and that any third-party or environmental impacts are mitigated.
- IID should develop a contracting, permitting or other refereed process to apportion, quantify and track water to new MCI demands from an MCI Water Exchange. The Equitable Distribution Plan and existing fallowing program provide a basis from which to start.
- There are opportunities to formalize and streamline the water and land use decision-making processes and ways to offset any increases in MCI water use.
- With an adopted IID Plan or Imperial IRWMP that defines capital facilities and interim measures such as the Interim Water Supply Policy, IID can assess impact fees to fund these plans provided these monies are reserved for implementation of the planned projects (e.g., capital facilities to create new water). These monies cannot be used for other nonrelated purposes.

Integrated Regional Planning and Funding

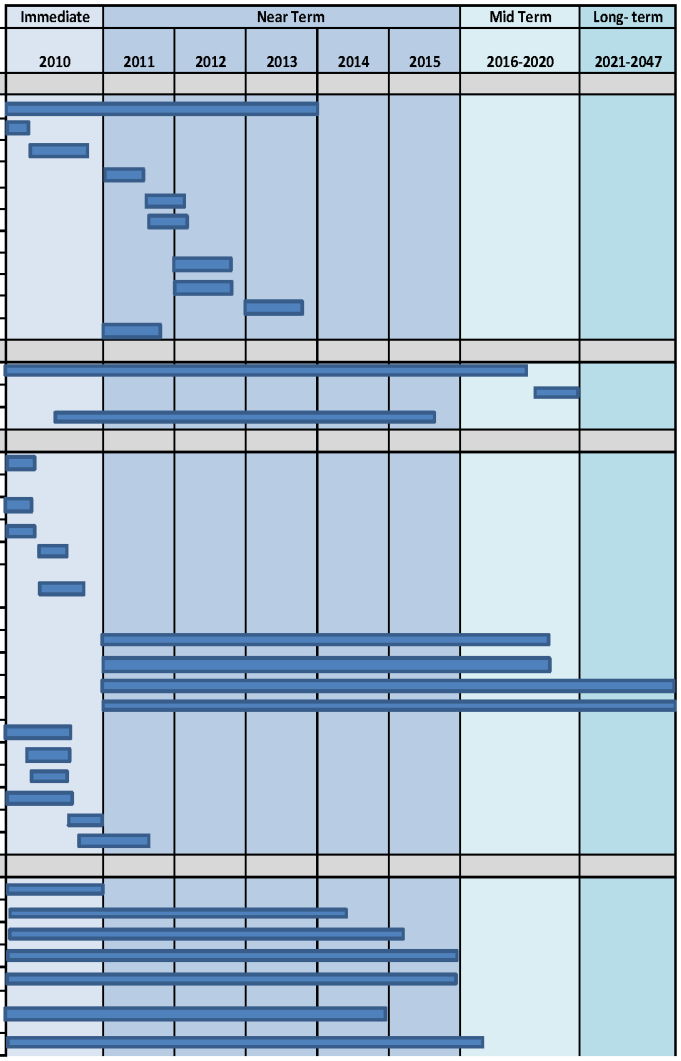
- IID should work with regional stakeholders to develop an Imperial IRWMP that defines regional projects, helps the community resolve conflicts and obtains grant funding.
- IID has proposed an effective plan for governance and oversight of the effort to develop an Imperial IRWMP.
- A facilitator should be used to assist the community to move forward with this process and to maintain a schedule, so that a plan can be adopted in a timely manner and an expedited application can be submitted for Imperial IRWMP implementation grant funding.
- The IID Plan identifies funding sources that can be accessed by the district to conduct additional feasibility and design studies, complete environmental review and implement capital projects.

- IID is likely to be more successful in obtaining grant funding if a unified local front is developed with the IID Cities, Imperial County, the agricultural community and other stakeholders.

Implementation Schedule

Figure ES-1 presents the schedule for the capital project alternatives and shows the timing of potential yields (acre-feet per year) from both the capital projects and the policy/program actions. A preferred alternative has not been selected by the IID Board and there are a number of approaches to combining the non-structural policy/program actions with capital projects to create new water. A final implementation plan can be configured once the Board has received public comment, reviewed that information and provided further direction.

Figure ES-1. Project Implementation Schedule



	Planned Yield (AF/Yr)	Immediate 2010	Near Term 2011	2012	2013	2014	2015	Mid Term 2016-2020	Long- term 2021-2047
Urban Water Conservation Actions									
Convene and Urban Water Management and Conservation Committee									
Define funding									
Develop a Regional UWMP									
Drought, catastrophic interruption plans									
Urban Conservation Public Information									
In- School Programs									
Development Standards									
Landscape Code, Ordinance, Standards									
Plumbing Code, Ordinance, Standards									
Standards for Dual Plumbing New Development									
Conservation Rate Structures									
Agricultural Water Conservation Actions									
Implement Definite Plan and Systems Conservation Plan									
Revisit and Review Definite Plan (Adapt/Revise)									
AWC 1 Canal Lining and 'Not Built' QSA Systems Conservation Projects	10400								
Policy/Program Actions									
Interim Water Supply Policy (1)	TBD								
Annual Apportionment with MCI Water Exchange									
Design Adopt Annual Apportionment, MCI Exchange Policy/Program									
Coordinate with County on Joint Conversion Policies									
Establish Mitigation Fund									
Environmental Review Apportionment, MCI Exchange, Land Use Conversion Policy									
In- Valley Fallowing Program (2)									
Western Farmlands (2000 acres rotational program)	7400								
Private Fallowing (1000 acre rotational program)	3700								
Land Use Conversion - Normal urban growth (3)	1600 -14000								
Land Conversion - Rezoning Ag to Industrial (4)	1850- 1370								
Preliminary Project Designs									
Economic Analysis									
Develop CEQA Strategy									
Develop Imperial IRWMP									
Develop IRWMP Grant Application									
Develop EIR Program/Project EIR									
Capital Facility Actions									
Conduct Joint Goundwater Study									
GW 18 Groundwater Blending, East Mesa Well Field	15000								
GW 19 Groundwater Blending, East Mesa, Banking/Percolation Ponds	25000- 35000								
GWB 1 Coachella Groundwater Bank	50000								
DES8 East Brawley Desalination with Well Field and Groundwater Recharge									
RW 1 - Disinfected Secondary Effluent at Existing Wastewater Treatment Plants Applied to Adjacent Agriculture	13300								
RW 5 Regional Plant Serving Tertiary Water to IID Canal	6600								

Timing of Industrial Water Portfolio Planned Yields (AF)

MCI Exchange: Policy for Land Use Conversion and In Valley Fallowing	Unit Cost ($/AF)	Timing of Yield (AF/yr)							
In-Valley Fallowing w/ Option Program (2)									
Western Farmlands	$200		7400	7400	7400	7400	7400	7400	
Private Fallowing	$200		3700	3700	3700	3700	3700	3700	
Land Use Conversion - Normal urban growth (3)	$0		1600	1600	1600	1600	1600	4300	14000
Land Use Conversion - Rezoning Ag to Industrial (4)	$0		1850	1850	1850	1850	1850	3700	3700
Capital Facilities, IID Developed									
GW 18 Groundwater Blending, East Mesa Well Field	$91					15000	15000	15000	15000
GW 19 Groundwater Blending, East Mesa Well Field, Percolation Basins (5)	$129						25000	25000	25000
WB 1 Coachella Valley Groundwater Storage Project	$265							50000	50000
DES 8 East Brawley Desalination with Well Field and Groundwater Recharge	$480							25000	25000
AWC 1 Canal Lining & 'Not Build' Systemwide Projects	$504						10,400	10,400	10,400
Capital Facilities, Recycled Water, Multiple Participants									
RW 1 Disinfected Secondary Effluent from Existing Wastewater Treatment Plar	$118						13300	13300	13300
RW 5 Regional Plant Serving Tertiary Water to IID Canal	$308							6600	6600
Total Potential Combined Yield		0	14550	14550	14550	29550	78250	164400	163000

(1) IWSP savings linked and accounted for as part of In-Valley Fallowing actions.

(2) In-Valley fallowing would be in addition to the QSA/Transfer Fallowing as assumed. 2000 acres of Western Farmlands and 1000 private acres at 3.7 AF/acre Initial Western Farmlands Fallowing for Interim Water Supply Policy. Yield will vary by participation in the program. Yield set as a goal to match new demands. Plan is to include "Option" Contracts exercised in overrun years as part of managing the cap.

(3) Based on average growth and 1.75 AF/acre savings from land conversion over the periods identified.

(4) Assume 500 acres, between 2010 and 2015; 500 additional 2016-2020 at 3.7 AF/acre

(5) Yield is conservatively estimated pending field study and modeling. With Recharge could go to 50,000 AF

1 Purpose and Need, Goals, and Objectives

1.1 Introduction

The Imperial Irrigation District (IID) Strategic Plan[1] (Strategic Plan) adopted by the IID Board of Directors (Board) in September 2008 included an objective to develop an integrated water resources plan by the end of 2009, adoption of recommendations outlined in the plan in the first quarter of 2010, and implement the actions by mid-year 2010. IID is working to develop an Integrated Water Plan (IID Plan) to address changing water needs of the community and provide water for economic development while meeting its agricultural water needs and complying with existing agreements and regulations.

The target audience for this plan is the IID Board and the affected public. The IID Plan presents the consultants findings and recommendations. The Board will review the findings and recommendations, make decisions on the course of action to ultimately be implemented, and adopt the IID Plan. The IID Plan would then serve as a blueprint for future actions and decision making.

At the beginning of the process, the Board directed staff and consultants to ~~"l~~eave no stone unturned" and to provide a list of potential projects, demand management measures and policy alternatives that the Board could then choose from. The anticipated outcome of the planning process is a ***Water Supply Portfolio*** of capital projects, management actions and policies that would identify the water to be used to meet new municipal, commercial, and industrial (MCI) water demands without affecting current agricultural and municipal water users.

The IID Plan describes the planning process used to identify and screen a wide range of ***water management strategies***. The water management strategies provided the building blocks that were used to configure ***project solutions*** (capital facility or ~~"b~~rick and mortar projects") and non-structural ***policy or program solutions*** (e.g., water conservation programs, policies for allocating water during times of shortage, etc.). These project and policy alternatives can be further combined and integrated to develop immediate, near-, mid-, and long-term actions that could be implemented over a 37-year planning horizon, from 2010 to 2047.

It was anticipated that the information produced and published in the IID Plan would be further used by the Board to obtain a consensus by stakeholders on potential projects within the IID service area. Ideally, these projects would be accepted by the rate payers for funding and implementation. It is also expected that the IID Plan would reduce potential conflicts between water users, and between IID acting in its capacity as the water management agency

[1] IID 2008 Strategic Plan Adopted September 23, 2008; Strategic Objective B

and Imperial County and the cities acting as the land use authority and decision makers for projects that need water from IID.

The State's planning framework recommends local entities work to clearly define the issues and conflicts that are to be resolved through integrated planning. This section begins with a discussion of the issues and conflicts that shaped the purpose and need for the IID Plan and provided the basis for establishing goals and objectives.

1.2 Conflicts

One of the goals of the IID Plan is to resolve and/or reduce current and potential future conflicts among water users. No real or perceived conflicts can be resolved without recognition and clear understanding of the problems that drive the conflict. Conflicts within the Imperial Valley have historical, geographic, technical, and institutional components.

The QSA/Transfer Agreements and Federal operating rules for the Colorado River define a new reality and the changed circumstances under which IID must manage the water source of the Imperial Region.

With the growth of Las Vegas, the completion of the Central Arizona Project, and creation of the Arizona Water Banking Authority, IID and the other Colorado River contractors became enmeshed in interstate and interregional conflicts surrounding Colorado River water use. The Quantification Settlement Agreement and related Transfer Agreements (QSA/Transfer Agreements)[2] settled many interstate and interregional conflicts among federal interests (U.S. Bureau of Reclamation, USBR), Lower Basin States (California, Arizona, Nevada); and tribal and other California water rights holders Palo Verde Irrigation District (PVID) and Yuma Project, IID, Coachella Valley Water District (CVWD), Metropolitan Water District of Southern California (MWD) over the use of and rights to Colorado River water. This prevented litigation that could have resulted in even greater impacts to IID's water supply. Resolution of the interregional and interstate conflicts has resulted in supply constraints for IID customers that now must be resolved at the local level.

A host of technical problems and institutional issues covering the entire Southern California and Lower Colorado River geography were resolved by the QSA/Transfer Agreements, and after extensive public hearings the State Water Resources Control Board (SWRCB) issued approvals authorizing the QSA.[3] The QSA/Transfer Agreements have been approved by all appropriate parties, creating a complex legal, political, regulatory, and operational landscape.

The seniority of the IID water rights is confirmed under the QSA and the Federal agreements, and for the term of the QSA, the rights are effectively capped at 3.1 MAF per year.

[2] For an overview of the QSA and related documents, visit http://www.iid.com/Water/QSAWaterTransfer or http://www.usbr.gov/lc/reportsarchive.html

[3] SWRCB Order WRO 2002-0013, http://www.waterboards.ca.gov/waterrights/board_decisions/adopted_orders/orders/2002/wro2002-13revised.pdf

The Secretary of the Interior, acting as Water Master for the Colorado River and through the USBR, manages the large federal facilities on the Colorado River, establishes operating policies and provides final accounting for all Colorado River water uses including components of the QSA/Transfer Agreements. Since adoption of the QSA/Transfer Agreements, two major changes that both benefit and constrain IID include the Inadvertent Overrun and Payback Policy and the Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lakes Powell and Mead.

California's share of the Colorado River is fixed and finite at 4.4 million acre-feet (MAF) per year under most conditions, of which IID receives 3.1 MAF. In addition, the QSA/Transfer Agreements in total require IID by 2027 to reduce its net annual consumptive use of Colorado River water by 408,000 acre-feet (AF), with the conserved water transferred out of the Imperial Region. The result of these water transfers is to effectively reduce IID's annual supply to between 2.6 and 2.7 MAF of consumptive use measured at Imperial Dam. This supply is stable and reliable due to IID's senior water rights. With the implementation of on-farm and system efficiency measures, this amount is anticipated to meet existing agricultural demands in most years. One of the premises of the QSA/Transfer Agreements is that agricultural productivity will remain at pre-agreement levels and that extraordinary measures like fallowing of land would not be required to meet the commitments.

IID/MWD transfer projects produces 105,000 AF per year of conserved water per the agreement between IID and MWD. The additional reduction of 303,000 AF per year is to be achieved through the implementation of system and on-farm efficiency measures, without taking agricultural land out of production. The IID/San Diego County Water Authority (SDCWA) and IID/CVWD transfer agreements bring monies into the Imperial Region to fund the capital improvements and efficiency programs needed to achieve the required additional conservation and to address the environmental impacts of these programs. As with the IID/MWD program, measures implemented as part of the IID/SDCWA and IID/CVWD transfer programs are expected to reduce consumptive use by a like amount within the Imperial Region.

The Definite Plan outlines how IID will decrease its annual water use to meet its conservation and transfer obligations as defined by the schedules in the QSA/Transfer Agreements while ensuring the long-term viability of the IID's agricultural economic base.

The IID Definite Plan (IID, 2007) has been prepared by IID to define actions to conserve water and meet the IID QSA commitments. The Definite Plan provides a road map of the projects, costs, and investments that can be implemented as either voluntary on-farm or as system conservation measures using the revenues generated from the transferred water. Even with full implementation of the IID Definite Plan, agricultural demand is expected to vary significantly from year to year due to fluctuations in markets and weather, further complicating and limiting IID's operational flexibility. In addition, new MCI developments are anticipated for the Imperial Region, which may reduce the water supplies available for agricultural use. In some years IID's total annual consumptive use may exceed its Colorado River entitlement, resulting in inadvertent overruns (annual use that exceeds the capped amount), which IID must pay back in subsequent years according to the terms of the Inadvertent Overrun and Payback Policy.

To reduce the likelihood of an overrun in any given year, IID has approved an Equitable Distribution Plan (EDP) that defines how the District will apportion water to its customers when the demand for water is anticipated to be greater than the available supply. When this is projected to occur, a Supply Demand Imbalance (SDI) may be declared by the Board. For agricultural water users, implementation of the EDP will cap their annual water apportionments and call into effect other measures that require additional planning and water management actions, with resulting higher costs. The EDP provides a high degree of reliability to MCI users during time of supply and demand imbalance when agricultural users may be required to cut back on deliveries to prevent overruns and keep the total IID demand within the 3.1 MAF cap (less transfer obligations). The higher degree of reliability granted to non-agricultural users in the IID water service area further limits the annual supply available to existing agricultural water users in any year that SDI is in effect – especially if new developments, with their associated water demands, are approved.

The Equitable Distribution Plan provides a high degree of reliability to MCI users during time of supply and demand imbalance when agricultural users may be required to cut back on deliveries to prevent overruns and keep the total IID demand within the 3.1 MAF cap.

Two areas of conflict arise out of the potential for an annual overrun, both resulting from the hardened demands on the part of the MCI and environmental uses, which are not as affected in times of an SDI declaration. One conflict is that MCI water users pay a higher price to IID for water than do agricultural users – whether or not an SDI is declared. The higher price is associated with benefits of increased reliability. The other conflict is that MCI and, to a degree, environmental uses reduce the supply for existing agricultural users in years when demand exceeds supply, and development of new non-agricultural uses will only exacerbate this situation. Increasing MCI demands, with the higher reliability requirements, have a potential impact on historical agricultural uses of water and could result in the need for extraordinary conservation measures or fallowing in years when there is an overrun. This sets up a conflict between agricultural uses and proposed MCI uses over the impact and need for mitigation.

There are also years when IID may have an _under-run,' when demand is less than the full entitlement available to divert. During under-run years, other California interests with junior water right priorities can divert and beneficially use the water that IID is not able to use. IID is seeking to develop opportunities to divert and store this water to increase water supply reliability in the Imperial Region. Potential storage may be available in the East Mesa, which is under the jurisdiction of Imperial County. The needed agreements regarding such a project could benefit from cooperation and development through the Integrated Water Resources Management Plan process.

The IID Cities and Imperial County have realized that their economic development is constrained by the recent cap on IID's Colorado River water supply and the lack of any new reliable water supplies that will not impact existing agricultural water availability. Agricultural users are concerned that new development projects may negatively impact their supply. To address this challenge, either ~~"n~~new"

Though solving problems within the Colorado River Region, the 3.1 MAP cap has created the potential for competition and conflicts at the local level among agricultural, municipal, industrial, commercial, and environmental uses within Imperial Region.

water is needed to support growth or water would have to be allocated from existing agricultural uses. Changes to State law imply changes to IID's role in the development review process and this creates the potential for conflict between IID and the lead land use agencies. Senate Bills 610 and 221 have increased the need for IID, the cities within IID, and Imperial County to adhere to more rigorous planning standards. Both the legislature and the courts have created substantive informational and procedural requirements for how IID and the land use agencies must interact to prepare water supply assessments, to verify water supply availability and during environmental reviews. Imperial County and the Cities are required to verify a supply prior to final approval of the final subdivision map for many developments, and to ensure that there are no impacts to existing users. The commitment of delivered surface water to new developments could significantly affect existing water users in the IID area or the other contractual or legal requirements to Colorado River water. IID and the land use agencies need to work together to demonstrate that water is available for proposed new development.

The new reality and changed circumstances affect the planning environment in which Imperial Region stakeholders are making land use and water management decisions, and there are existing and potential conflicts within the Imperial Region between current users and future users and/or among the types of water users (agricultural, municipal, industrial, commercial, and environmental). The conflicts are manifested in a number of lawsuits among local interests and in unresolved requests for water supply for new uses.

IID, as the water rights holder and wholesaler of the Colorado River supply, is working to develop a consensus with the other stakeholders in the Imperial Region regarding water availability, sources of new supply, and how best to set water supply policies that will affect land use decisions. Imperial County and the IID Cities need to be able to make defensible findings related to reliable water supply availability for new development water demands. In addition, a host of other issues related to water treatment, source water protection, drainage, recycling, and groundwater management may best be addressed at a regional scale.

The water supply and demand management problems, conflicts, and opportunities described herein must now be resolved within the Imperial Valley at the local level by community stakeholders. The IID Plan will establish a range of water management strategies that can be used to develop project alternatives resulting in priorities for funding and implementation. The Imperial Region seeks to use the IID Plan framework to address and resolve conflicts through a facilitated process to reduce competition and polarization in the community, to build consensus, to provide an alternative to litigation, and to find a way forward in which the water demands for agriculture, economic development, and environmental uses can be met in a more harmonious manner.

1.3 Purpose and Need for IID Plan and Proposed Imperial Region IWRMP

The purpose of the IID Plan is to define a cost-effective water supply portfolio that supports economic development and provides a reliable supply of water for new MCI demands without impacting historical agricultural uses of water or impacting existing agreements or contracts. The purpose is also to prevent or resolve conflicts between water users; to manage changes in the place of use or type of use of water within IID boundaries; and to ensure that all of the IID entitlements to Colorado River water are reasonably and beneficially used.

Changes in State law make water management and land use planning interdependent, and without a firm water supply, Imperial County and cities may have trouble documenting that there is a verifiable water supply, making defensible findings, and permitting new development that increases water use.

IID Cities and developed areas within the IID service area include Brawley, El Centro, Imperial, Westmorland, Calipatria, Niland, Seeley, Heber, Calexico, and Holtville. The respective cities and Imperial County have authority over land use. They adopt General Plans and zoning to guide land use; prepare UWMPs to guide use of their available water supplies where required to do so; and act in such matters as lead agency pursuant to the California Environmental Quality Act (CEQA). IID, as a responsible agency with jurisdiction by law, provides comments on land use and development proposals to ensure all impacts to IID current water users and facilities are adequately recognized and mitigated. As a water wholesaler and water management agency, IID seeks to consult with Imperial County and the IID Cities when they are making determinations as to the adequacy of existing water supplies and when they need to make findings to commit water to new development.

Imperial County adopted a Groundwater Management Ordinance, revised May 11, 2004, and amended August 3, 2004. Portions referring to IID are contained in Section 92202.01. IID and the County need to work together to realize any potential to develop groundwater in storage. Developing groundwater in storage would result in storage depletion since the natural recharge is limited or non-existent.

Physical solutions consisting of local and regional projects, policies and funding are needed to ensure a safe, reliable water supply is available to meet planned and anticipated MCI demands in the incorporated cities and/or unincorporated areas of Imperial County. IID is working to provide a reliable supply to meet MCI demands, including geothermal and other possible energy projects; while ensuring that these new supplies avoid, minimize, or mitigate impacts to historical agricultural water users.

1.4 Goal

The Board initiated work in January 2009 to prepare and plans to adopt the IID Plan. The Board reviewed and accepted the goals and objectives at the April 14, 2009 Board Meeting. The IID Plan will provide the basis for the Imperial IRWMP, which will be developed in cooperation with additional stakeholder input. The proposed goal for the IID Plan and the IWRMP is:

> ~~"~~To provide a strategic road map that defines a portfolio of water projects, demand management measures and policies intended to deliver a reliable water supply for municipal, commercial, and industrial water users over a 37-year planning horizon from 2010 to 2047; and garners local consensus for a course of action that anticipates and thus avoids conflicts over water within the IID service area."

1.5 Objectives

The objectives for the IID Plan should be tangible and specific, and should help the Board to define and select alternative management strategies that will support the Board in meeting the stated goal. The objectives provide a basis for screening water management strategies that include both capital projects and non-structural policies and programs. IID Plan objectives are to:

- Prevent impacts to existing agricultural users of water and protect IID water rights.
- Define cost-effective projects and equitable cost sharing agreements with those entities and water users that would receive benefits from proposed water management actions.
- Identify projects that are consistent with existing agreements on use and management of the Colorado River, including the QSA/Transfer Agreements.
- Recognize and resolve potential conflicts over use of available water resources.
- Promote economic development consistent with IID policies, standards, and guidelines for new consumptive uses of water.

2 Background and Plan Overview

IID is located in Imperial County, between the Colorado River and the Salton Sea, which is California's largest saltwater lake.[4] Figure 2-1 shows the general location of IID's major delivery facilities and other major regional water delivery infrastructure. The area is reliant on imported water supplies from the Colorado River. The major population centers are generally located on the expanse of flatlands created by the valley infilling between the surrounding mountain ranges. The Coachella Valley is to the north and the Mexicali Valley (Baja California, Mexico) to the south, both of which lie within the Salton Sea watershed.

This portion of California is a desert with high temperatures and low average rainfall of three inches per year; however, surface water for irrigation is available supplied wholly from the Colorado River via the All-American Canal. As a result, the area has become suitable for agriculture, which has supported the economic growth and establishment of population centers in and around the Imperial Valley. The need for balancing the MCI demands with the agricultural demands creates a unique situation for the area's water needs and requires consideration to effectively manage water resources.

Figure 2-2, Jurisdictional and Administrative Boundaries, presents the county boundaries, location of developed areas, water district boundaries, IID delivery system, and important land ownership features. IID is responsible for delivery of untreated, non-potable Colorado River water for all uses. IID has an entitlement to 3.1 MAF of Colorado River water.

Figure 2-3 presents the key hydrologic features showing the watershed boundaries, groundwater basin boundaries, and other important IID facilities used to manage Colorado River supplies. With more than 3,000 miles of canals and drains, IID is the largest irrigation district in the nation; delivering up to 2.8 MAF annually to nearly one-half million irrigated acres.[5] Approximately 97 percent of the delivered water is used for agricultural purposes, making possible Imperial County's ranking as one of the top ten agricultural regions nationwide. The remaining three percent of its water deliveries supply seven municipalities, one private water company, and two community water systems as well as a variety of industrial uses and rural homes or businesses.[6]

The Urban Area designation on the Imperial County's Land Use Plan includes areas surrounding the six incorporated cities; Imperial, Brawley, El Centro, Westmorland, Holtville, and Calexico (IID Cities). The respective IID Cities and Imperial County have authority over land use; adopt General Plans and zoning to guide land use; prepare Urban Water Management Plans (UWMPs) to guide use of their available water supplies where required to do so; and act as lead agency pursuant to the CEQA. The Imperial Region

[4] California DWR. 2009. *California Water Plan Update 2009 Public Review Draft.*

[5] For a complete Water Balance see *IID 2007 Water Conservation Plan,* pp 28 – 32.

[6] IID website.

includes a number of unincorporated communities, Calipatria and Niland to the north; Heber, Seeley, and the Naval Air Station in the center; and Ocotillo/Nomirage in the West Mesa area.

Figure 2-1. Regional Location

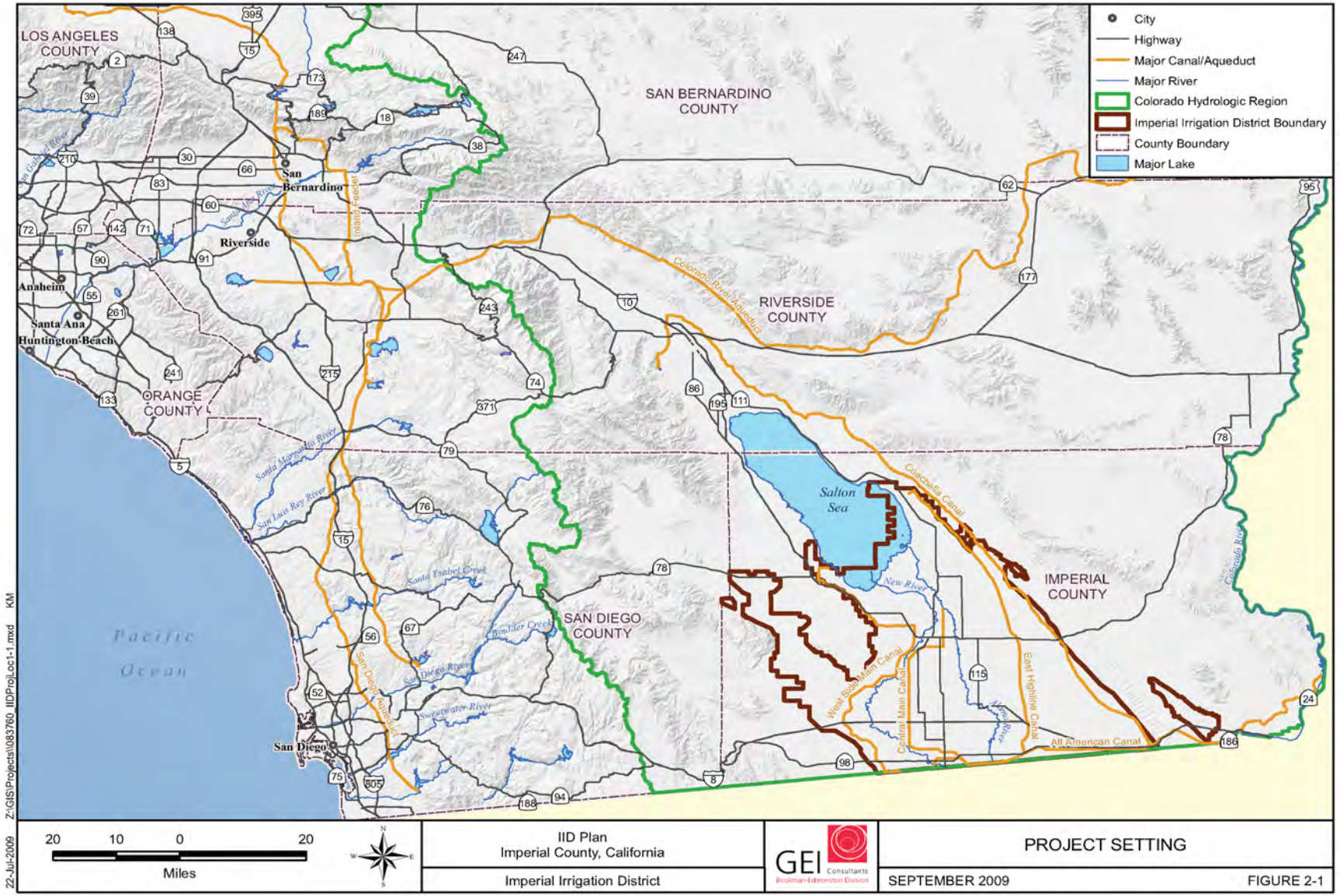


Figure 2-2. Administrative and Jurisdictional Boundaries

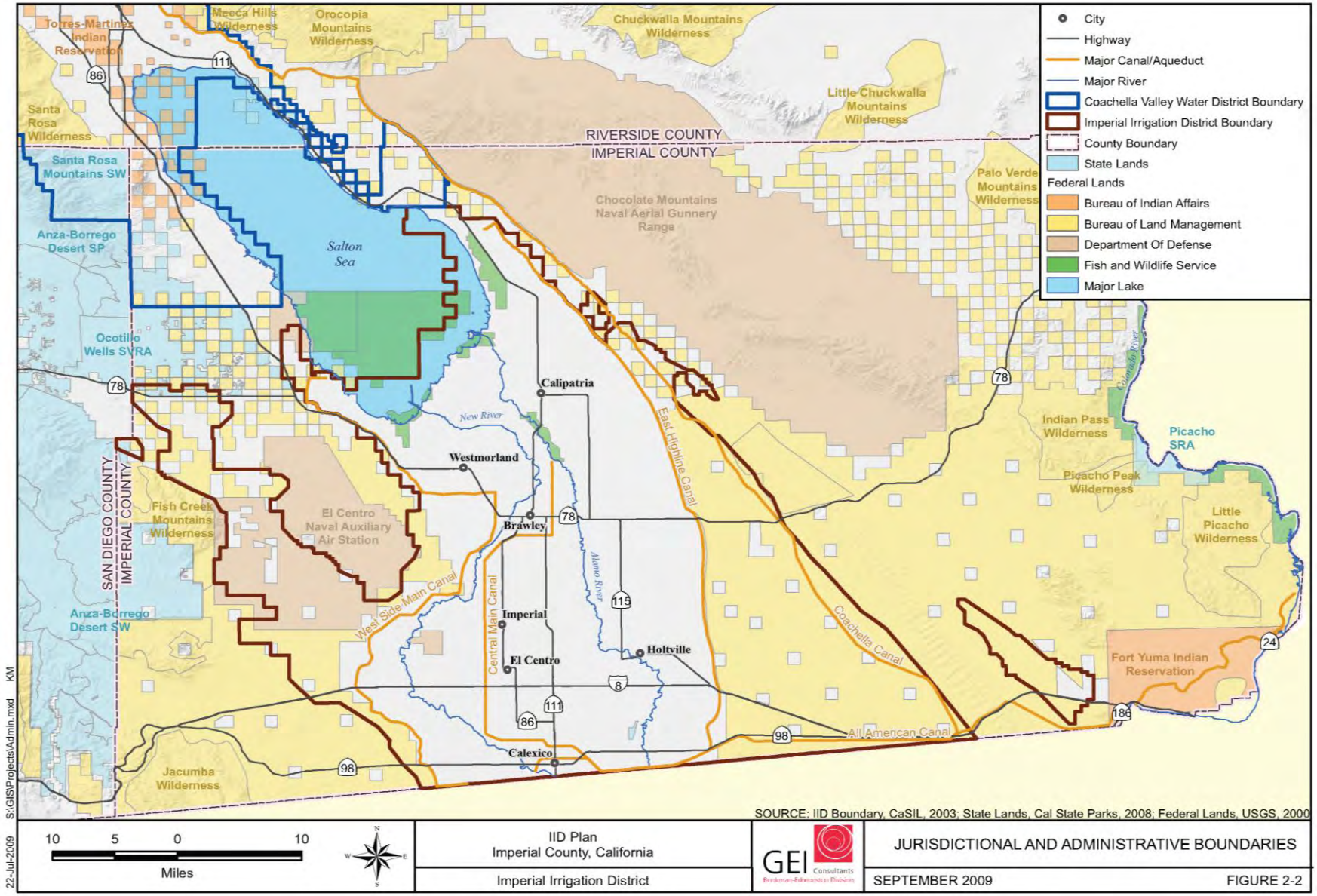
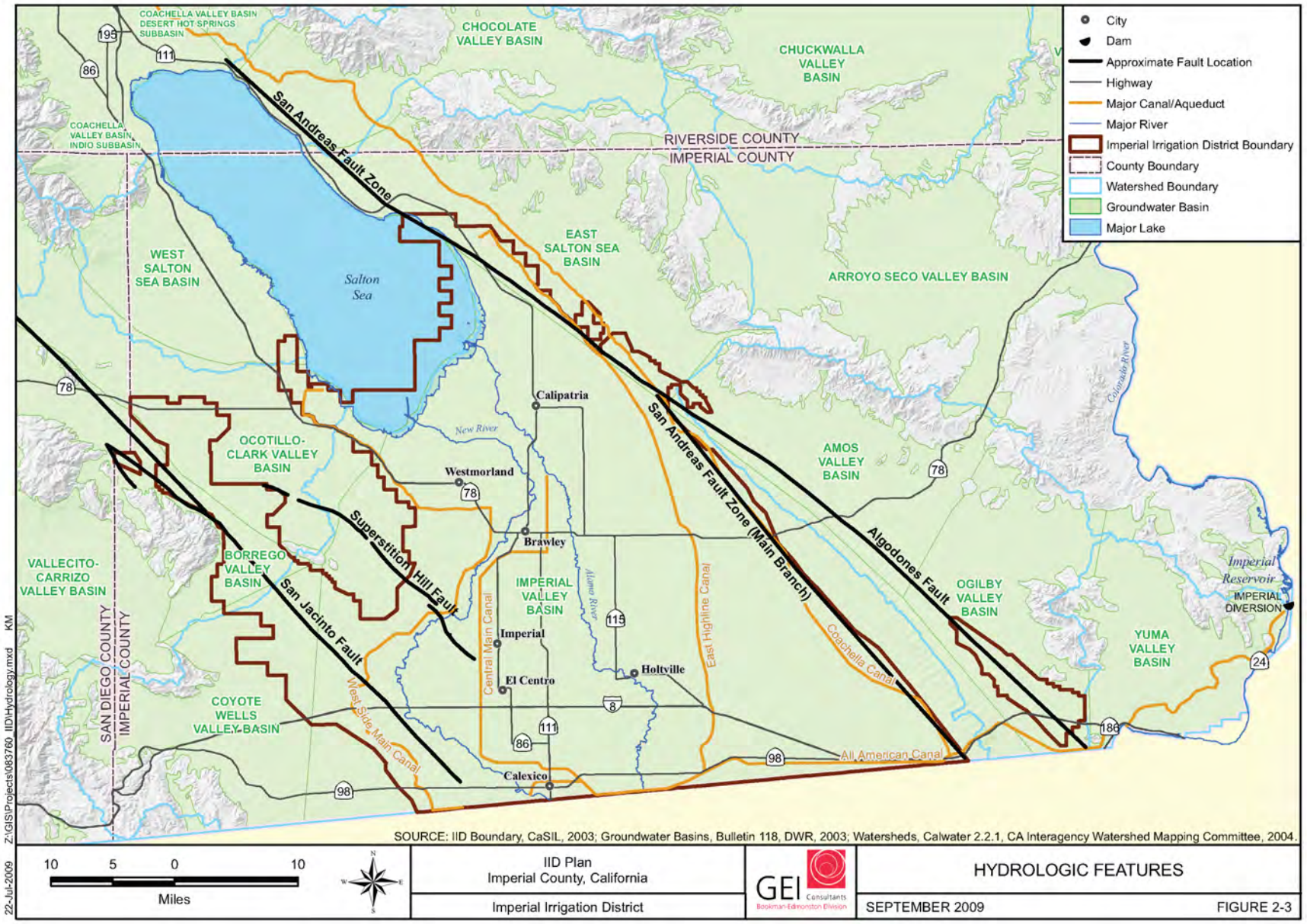


Figure 2-3. Key Hydrologic Features



2.1 IID Background and Authorities for Developing the IID Plan

IID is an irrigation district organized under the California Irrigation District Law, codified at §§ 20500 et seq. of the California Water Code and the IID Plan is developed under the authorities granted IID. IID delivers Colorado River water in its service area for potable and irrigation purposes. By a decisive favorable vote at an election held on July 14, 1911, the people of the valley organized the IID and the vote was made effective by Resolution of the Board of Supervisors of Imperial County on July 24, 1911. IID is governed by a five-member Board of Directors. While elected by vote of all qualified voters, each member represents a separate geographical division of IID. Directors serve a four-year term. Critical functions of IID are:

- Diversion and delivery of Colorado River water
- Operation and maintenance of the drainage canals and facilities
- Generation and distribution of electricity

IID provides a majority of the water distribution and drainage services that are available in the service area.[7] Surface water, purveyed under IID's senior water rights to the Colorado River water[8] and contract with the federal government,[9] is delivered through an extensive canal system. IID delivers only untreated, non-potable surface water to agricultural, domestic, MCI users in its 500,000 acre water service area. IID purveys wholesale water to MCI users but does not provide treated water at the retail level. Cities and other developed communities that receive water from IID, treat and purvey it to their retail customers. It is anticipated that the MCI sector use will increase in the future, placing increased demands on a water supply that has become stressed as a result of IID actions and plans to meet QSA/Transfer Agreement obligations. IID also provides access to an extensive drainage network. Drainage water is collected in an equally extensive surface drain system and conveyed via the New River or Alamo River or directly to the Salton Sea.

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[7] IID Energy provides electric power to more than 145,000 customers in the Imperial Valley and parts of Riverside and San Diego counties. As the sixth largest utility in California, IID Energy controls more than 1,100 megawatts of energy derived from a diverse resource portfolio that includes its own generation, and long- and short-term power purchases. As a consumer-owned utility, IID Energy works to efficiently and effectively meet its customers' demands at the best possible rates, tying the area's low-cost of living directly with low-cost utilities. This is accomplished by producing 30 percent of our power supply locally; and using efficient, low-cost hydroelectric facilities, steam generation facilities, as well as several natural gas turbines. Environmentally friendly operations are emphasized by employing as many "green" resources as available. IID Energy's diverse resource portfolio provides its customers with some of the lowest cost rates in the State.

[8] The California State Water Resources Control Board issued Water Rights Permit No. 7643 in January 1950 to divert up to 10,000 cfs year-round, limiting the IID diversions under its federal contract to 3,850,000 acre-feet per annum. IID also holds pre-1914 water rights.

[9] In 1932 IID entered into a contract with the Secretary of the Interior to receive entitlement to 3.85 MAF of water minus priorities one (PVID) and two (Yuma Project) – as in the 1931 California Seven-Party Agreement. IID's federal entitlement has two components: 1) the Prior Perfected Right to 2.6 MAF, and 2) the remaining contract portion, between the PPR and the maximum amount under the 1932 Contract and the Seven Party Agreement – both grounded in state law prior appropriations, as limited by the QSA and related Transfer Agreements.

2.2 Policy Baseline and Existing Conditions

There are a range of existing conditions that provide the baseline from which to develop capital project or policy solutions. The baseline policy environment for developing the IID Plan includes:

- The Law of the River and historical Colorado River decisions, agreements and contracts
- The QSA/Transfer Agreements
- IID Water Conservation and Transfer Project Habitat Conservation Plan/National Community Conservation Planning Act (HCP/NCCP (Draft, May 2009)
- The Definite Plan, now referred to as the Systems Conservation Plan, which defines the rigorous agricultural water conservation practices being implemented by growers and IID to meet the QSA commitments
- The EDP, which defines how IID will prevent overruns and stay within the cap on the Colorado River water rights
- Existing IID standards and guidelines for evaluation of new development and define IID's role as a responsible agency and wholesaler of water
- The Imperial County General Plan and the General Plans for each of the IID Cities

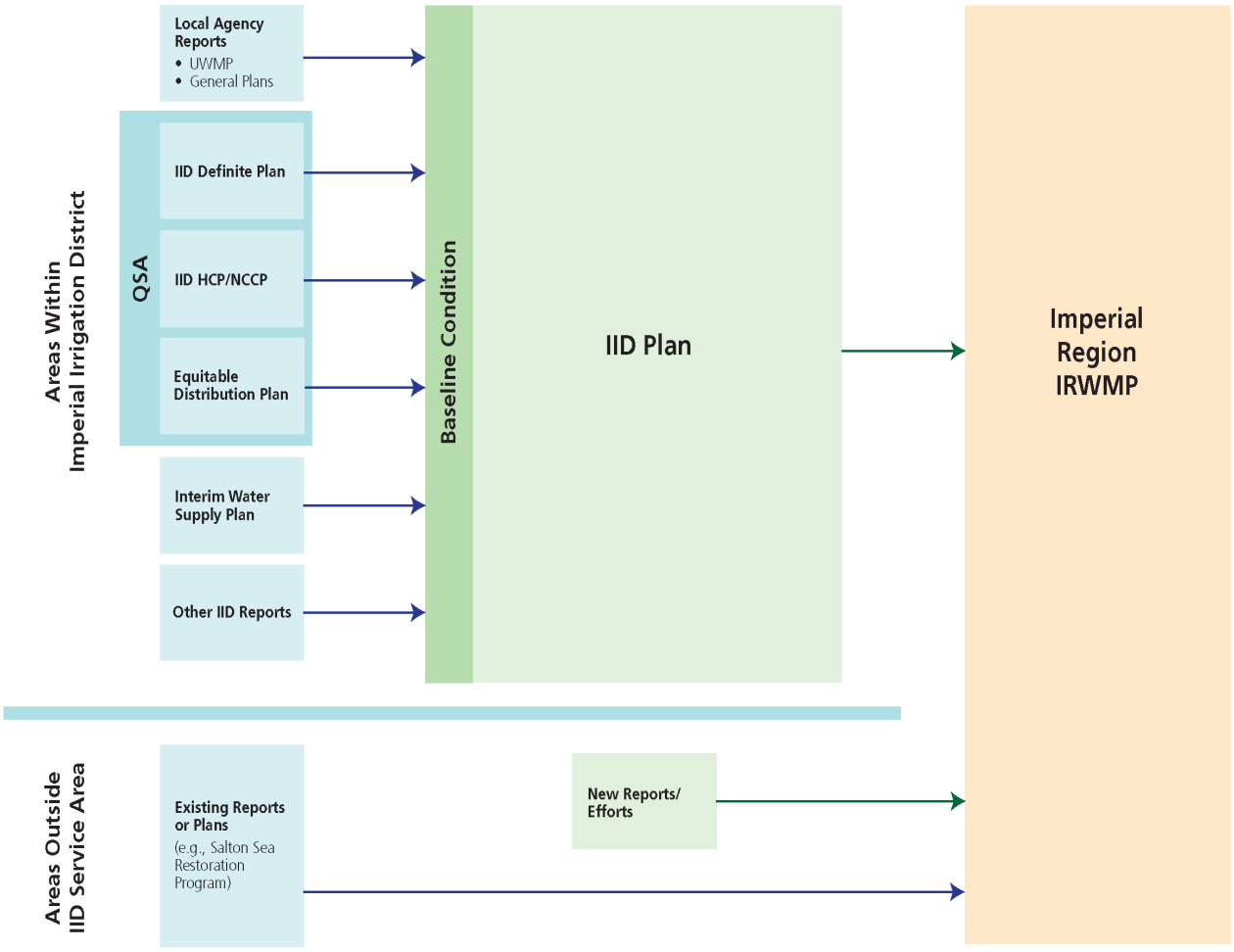
2.3 Relation to Other IID Planning Efforts

As originally conceived, the IID Plan was intended as a document primarily for IID's use in identifying a water supply portfolio for MCI and environmental uses, and to define actions that IID could take independently to develop projects or policies to meet increasing demands and support economic development.

The IID Plan was developed in context of a rapidly evolving set of circumstances and a pressing need to find water for proposed projects. The IID Board was under increasing pressure to find firm and sustainable water supplies for projects that were already being considered by Imperial County and the IID Cities and were in the queue for decisions by the lead land use agency. The relationship between the IID Plan and other planning efforts within the Imperial Valley is represented conceptually on Figure 2-4. The existing plans and agreements adopted by the IID Board provide the baseline conditions. Existing city and Imperial County general plans and UWMPs also establish the existing conditions for development of the IID Plan.

The IID Board directed staff to identify an Interim Water Supply Policy (IWSP) that would allow IID to apportion water to the currently proposed projects; support the lead land use agency to make appropriate and legally defensible findings and determinations related to water supplies and environmental impacts; and allow the proposed land use or development proposals to proceed.

Figure 2-4 Relation to Other IID Planning Efforts

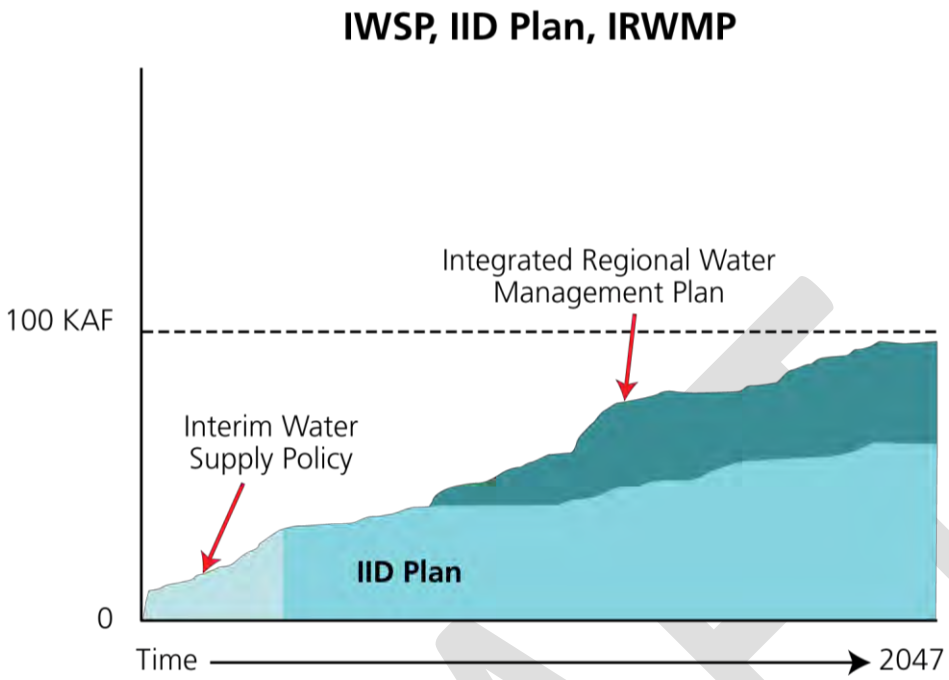


The IID Staff, consulting team for the IID Plan, and IID Definite Plan consultants have been working together to identify immediate and near-term projects that IID can implement relatively quickly as part of the IWSP and can be integrated into the IID Plan.

The State of California is encouraging water districts and land use agencies to work together to develop IRWMPs. The California Department of Water Resources (DWR) provides IRWMP guidelines and is managing the distribution of Proposition 50 and 84 grant funds. Monies are available for planning and project implementation. Obtaining bond funding is contingent on having an IRWMP that meets the state standards. Originally, the IID Plan was not intended to be an IRWMP prepared pursuant to the State of California requirements. Development of the Imperial Region IRWMP will require a far more extensive stakeholder involvement process that was anticipated for the IID Plan, and Imperial IRWMP projects could involve multiple participants and sponsors.

Figure 2-5 shows the timing of the water supplies produced under the different plans.

Figure 2-5. Timing of Water Supplies from IWSP, IID Plan, and IRWMP



In order to preserve the option of developing an IRWMP, IID decided to evaluate DWR's recommended water management strategies as a first step to be consistent with the State's requirements and legislative intent for an IRWMP. It is the intent of the Legislature to encourage local agencies to work cooperatively to manage their available local and imported water supplies to improve the quality, quantity, and reliability of those supplies. State funding has been made contingent on such cooperation.

The State's planning framework is also intended to identify regional priorities and provide the basis for allocating public resources (bond funds). The State's intent is also for local entities like IID to coordinate with others in their planning area to identify, avoid, and resolve water-related conflicts at a local level. As such, the IID Plan identifies the conflicts within IID, which need to be directly addressed if the IID Plan is to be a success.

There is $36 million available from Proposition 84 in the Lower Colorado Region for projects identified in an IRWMP. As mentioned, the preparation of an Imperial Region IRWMP (with boundaries that extend beyond those of the IID Plan) is being considered. With the exception of the City of Brawley, the communities within IID are classified as disadvantaged and could benefit from access to the state bond funds being distributed under the State's IRWMP program.

Meetings and conference calls were held in February and March with Imperial County and the IID Cities to explain the Board's intent for developing a plan and to begin the outreach process. Considerations expressed by participants to embark on an integrated planning process include:

- Involvement in achieving better planning efforts that address regional water needs unique to the Imperial Region and ensuring those needs are adequately identified and prioritized.
- Developing solutions that help the cities with preparation of water supply assessments and UWMPs.
- Coordinating water management between regional agencies and working together to find economically and environmentally responsible solutions to regional needs.
- Ensuring equitable resource protection.
- Ensuring appropriate consideration for federal and state funding.
- Ability to integrate specific funding through a sub-regional approach.

The State is encouraging water agencies like IID to work with the land use agencies, other water districts and local stakeholders to realize efficiencies, coordinate on regional projects and integrate their assets, and seek mutual solutions to regional water management issues.

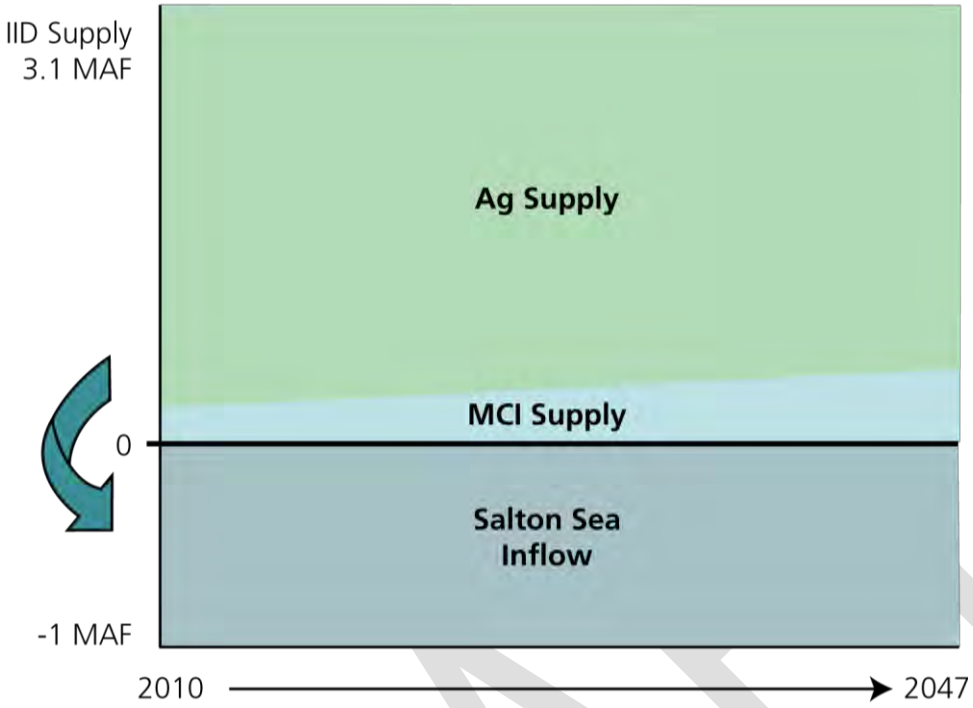
The Board made a mid-course correction in March 2009 and directed staff to continue to develop the IID Plan and initiate the process to also develop an Imperial Region IRWMP. The first step was to produce a Region Acceptance Process (RAP) document to submit to DWR for review and approval of the proposed Imperial Region. The RAP defines the proposed decision making structure for governance and oversight roles for developing the plan, and a preliminary plan for stakeholder involvement and public involvement. It explains how IID water and the land use agencies in the Imperial Region will employ coordinated approaches to the planning of multi-beneficiary projects that will achieve the parties' common objectives.

2.4 The IID Water Supply Portfolio

The IID Water Supply Portfolio includes the water assets that can be managed to meet current and future demands. As explained in greater detail in Chapter 5, IID's current Water Supply Portfolio includes 3.1 MAF of water rights to the Colorado River. The most senior rights are the _prior perfected rights' to approximately 2.6 MAF.

Figure 2-6 conceptually shows how the 3.1 MAF is apportioned between agricultural and MCI uses and further illustrates how MCI use increases over time. Historically, one third of the water, or about 1 MAF, was outflow to the Salton Sea via farm runoff and drainage that was salty and not able to be put to additional use.

Figure 2-6. Conceptual Water Supply Portfolio

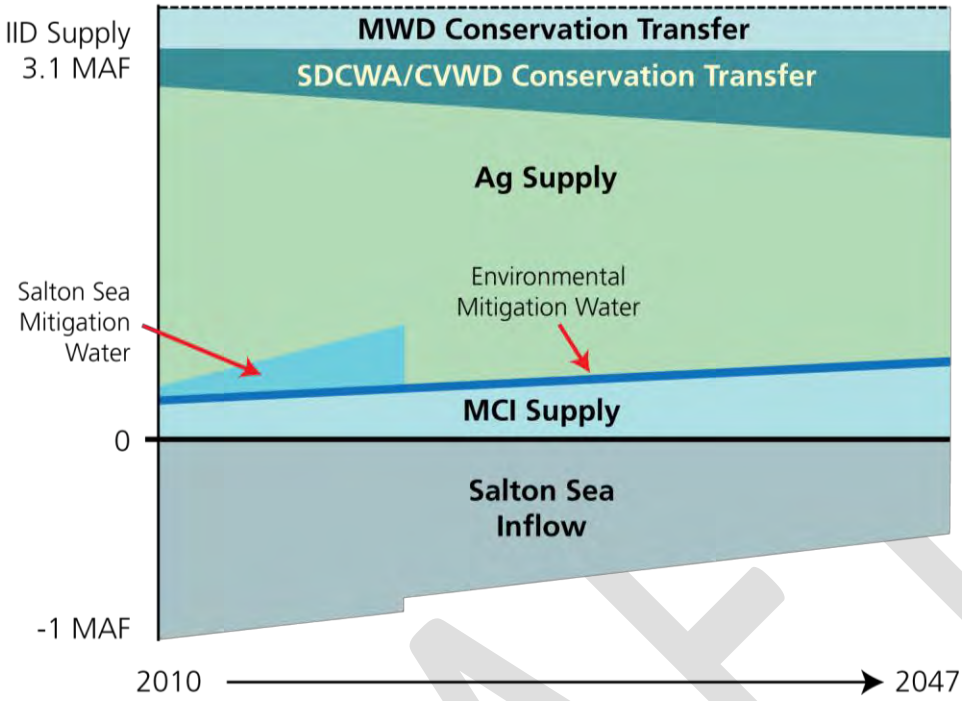


The IID Colorado River water rights are a collective right and are IID's principal assets to be managed for the benefit of the lands and people within the service area. The amount that IID can divert can vary with drought conditions, but IID's water rights are very senior and less subject to cut back in dry times than almost all of the other rights to the Colorado River. This is one reason the problem has been identified as more of a demand problem than a supply problem. The supply is relatively fixed, and it is the demand that can vary based on rainfall, agricultural market conditions, crop mix, and other variables.

The QSA/Transfer Agreements with MWD and SDCWA/CVWD provided funding to support agricultural conservation efforts. This conserved water was then made available for the transfer, but IID still retains the water rights. This benefits IID and the transferring party.

The QSA/Transfer Agreements affects the Water Supply Portfolio in a number of ways as shown in Figure 2-7. Agriculture conservation reduces the proportional share of the water used by agriculture while maintaining the existing levels of production. The reduction in agricultural use resulting from conservation reduces the flow to the Salton Sea as shown in Figure 2-7 by the diminishing amount of water that flows to the Salton Sea over time. As part of the QSA/Transfer Agreements, IID was required to provide water to the Salton Sea through fallowing of agricultural land to prevent impacts. IID also provided environmental water and has created wetlands mitigation for impacts associated with the reduction in drainage water. These are also shown on Figure 2-7.

Figure 2-7. Future Water Supply Portfolio with the QSA/Transfer Agreements



The linchpin of the IID Plan is to identify 100 TAF of water that can be more actively managed to meet MCI and environmental water demands within the IID service area, with 50 TAF to be identified by no later than 2010, and the balance to be defined by 2040.

Managing the current 3.1 MAF Water Supply Portfolio to meet this goal can be accomplished by different methods, including:

- Expanding the size of the Portfolio
- Preventing or recapturing water leaving the Portfolio
- Apportionment of water within the Portfolio

As shown in Figure 2-8, expanding the Water Supply Portfolio could include actions such as importing additional water from the Colorado River or by developing local groundwater. Preventing or recapturing water leaving the Water Supply Portfolio would also result in more water for local use and could include desalination of drain water or recycling municipal wastewater. Both drain water and municipal wastewater currently flow to the Salton Sea and are lost for purposes of beneficial use within the IID service area. This is shown conceptually in Figure 2-9.

Managing or apportioning water within the current Water Supply Portfolio is shown conceptually in Figure 2-10. The volume of water needed for future MCI uses would come from a reapportioning of water from existing uses to new uses, either through conservation, or by stopping using water in one place and moving it to another place for a different use. This later situation would likely result in fallowing of land, less intensive cropping, or some other means to ensure a firm yield of water.

Figure 2-8. Expanding the Size of the Water Supply Portfolio

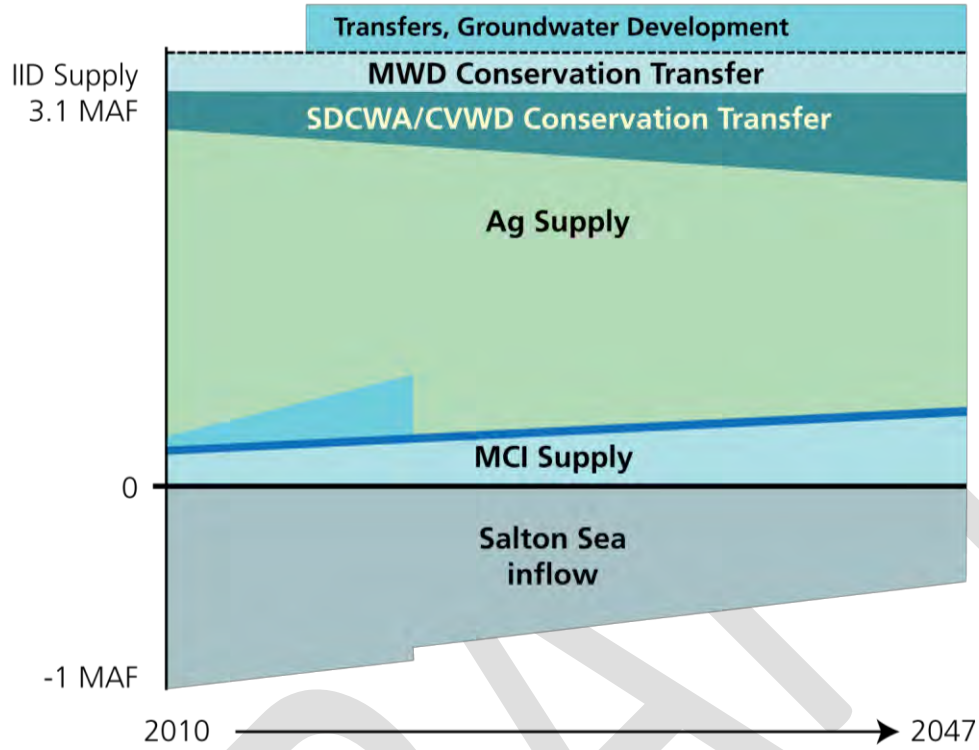


Figure 2-9. Recapturing Water Lost to the Salton Sea for Reuse as Part of the Water Supply Portfolio

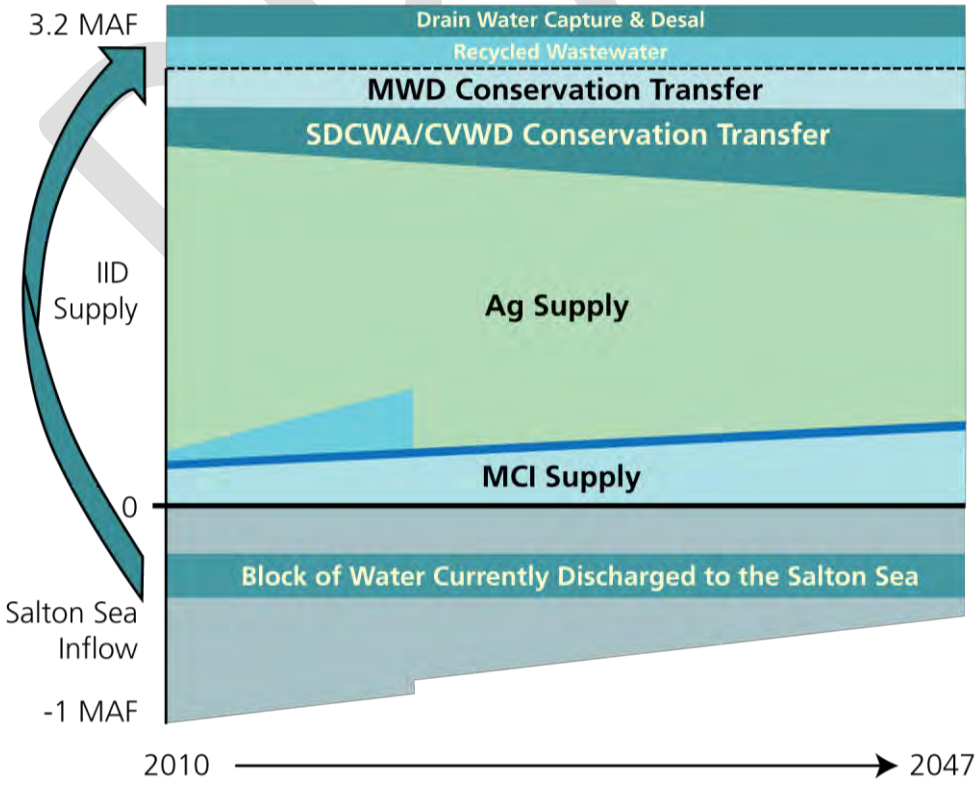
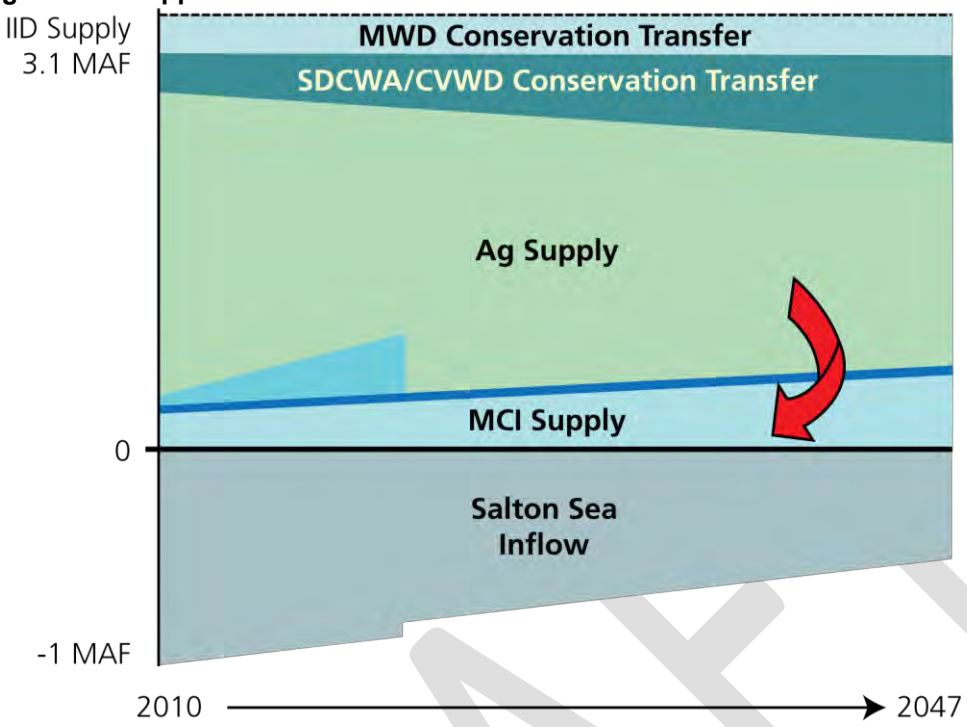


Figure 2-10. Apportionment of Water within the Water Portfolio



Allocation, apportionment, or exchange of water between users within IID are all construed to have the same meaning. These actions would occur under a mechanism to be used within IID to account for changes in the place or type of water use. A process to manage allocation or apportionment is needed to ensure that they do not result in substantial injury to any other legal user of water; and that there is net economic benefit to the IID service area. IID will need to work with the community to develop a system to distribute, apportion, allocate, or exchange water available to the IID service area.

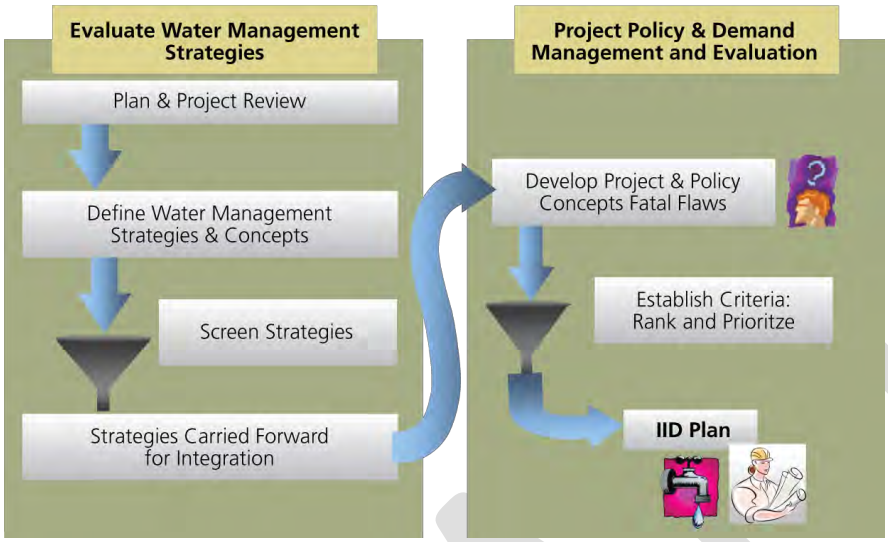
2.5 Process and Planning Framework

The IID Plan was developed through a number of sequential steps shown on Figure 2-11. The first step included review of the water management strategies recommended by DWR for inclusion in integrated plans. The State legislature has also made use of state grants of bond funds contingent on review and integration of these strategies. This first step was documented in "Project Scoping Report – Review and Evaluation of Water Management Strategies" presented in Appendix A and summarized in Chapter 6. Some of the water management strategies were carried forward for further review as part of the IID Plan, a number were determined not to be applicable to IID or would not meet the IID Plan objectives, while others were identified as being appropriate for further review as part of the proposed Imperial IRWMP.

The water management strategies carried forward were then integrated and used to develop project alternatives. The project alternatives were then evaluated and compared using a ranking and screening criteria to identify fatal flaws, compare the range of supply augmentation and demand management solutions, and prioritize recommendations for

inclusion in the IID Plan. The recommendations were then to be considered by the Board for implementation over the defined planning horizon.

Figure 2-11. Planning and Process Framework



2.5.1 Planning Horizon

The IID Plan is to configure project and policy alternatives that will be implemented over a 37 year planning horizon from 2010 to 2047. This end point of the QSA agreements was chosen as the out boundary of the planning horizon.

IID is the water wholesaler. Retail water purveyors within the IID area that have greater than 3000 service connections are required by State law to update their UWMPs in 2010, and every five years thereafter. The UWMPs need information contained in the IID Plan and should be developed to be consistent with the IID Plan.

2.5.2 Project Integration

At the beginning of the process, the question was asked, ~~"~~What is being integrated?" Based on discussions with the staff and Board, it was concluded that the IID Plan and subsequent Imperial IRWMP would investigate how to integrate the following:

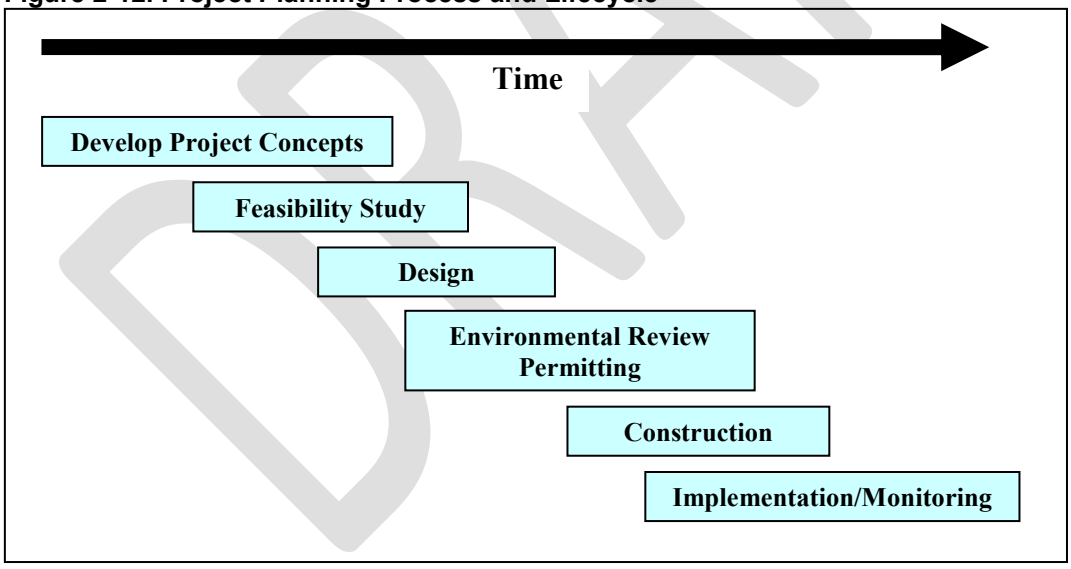
- Regional and local water supplies
- Supply and demand management measures
- Capital projects and policies to better manage the available Colorado River Supply
- Sources of local, state, and federal funding
- Capital facilities over the planning horizon
- Existing plans
- Political powers and authorities of the local agencies

This later point, integration of political powers and authorities, would help to establish a unified front when dealing with others within the Colorado River region, and with the state and federal government agencies that influence how IID manages its supplies.

Chapters 6 and 7 describe how water supply sources, water management strategies, and capital facilities/projects were considered and integrated into the IID Plan. Throughout the document there is discussion on how existing plans are factored into the IID Plan or should be factored into the Imperial IRWMP. Later chapters deal with integrating funding sources and political authorities.

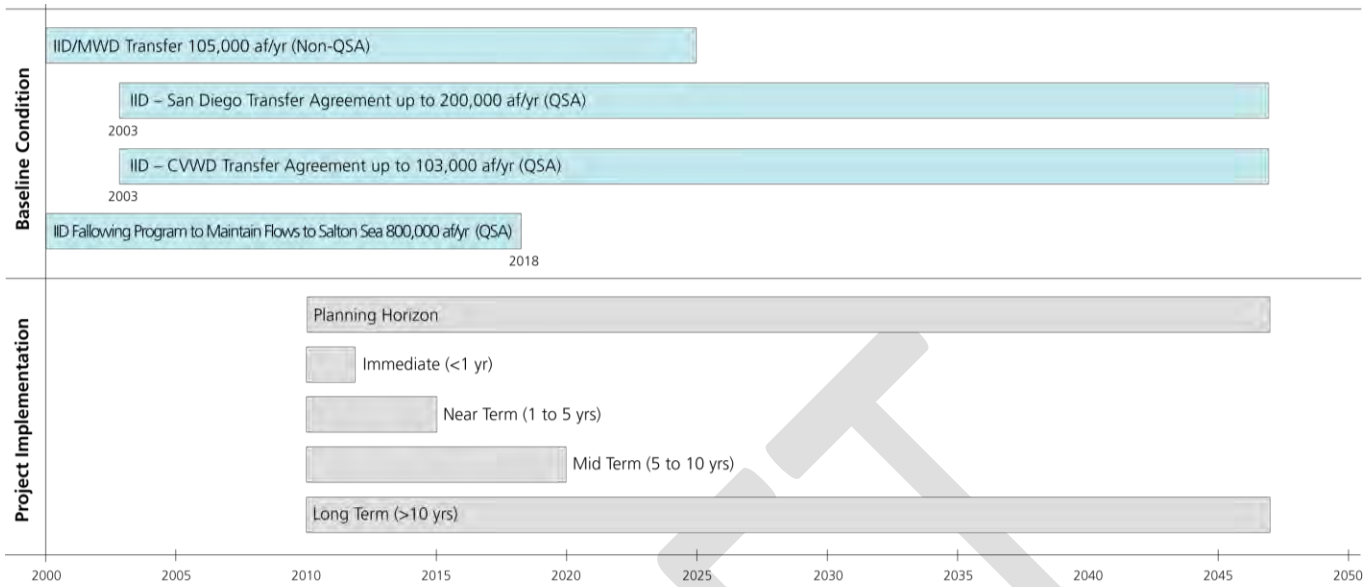
The IID Plan seeks to integrate projects over the planning horizon based on where a project is in the planning process and a project's readiness to proceed. Knowing where a project is in the project development lifecycle will help IID and local stakeholders set priorities and match projects to potential funding sources. For example, if a project requires a further feasibility study prior to moving into the design phase, this activity may be able to be funded through grant funds intended for this purpose. Alternatively, if a project is "shovel ready," it may be qualified to receive state or federal grant funds for construction and implementation. Shovel ready projects are those with final designs, environmental clearances and permits, and identified sources of financing.

Figure 2-12. Project Planning Process and Lifecycle



The timeline for implementing proposed projects was broken down into immediate, near-, mid-, and long-term priorities. Each of the policies and projects were characterized in terms of their readiness to proceed' and where the project was in the project development lifecycle. This is shown in Figure 2-12. Individual project development lifecycles may fit into the project implementation categories (immediate, near-term, mid-term, long-term) shown on Figure 2-13.

Figure 2-13. IID Program Time Line



2.5.3 Planning Challenges

In developing the IID Plan, it is recognized that IID is facing complex challenges related to:

- Aging infrastructure both inside the district and for major conveyance.
- Impacts of urban growth on existing infrastructure (e.g; piping canals, liability).
- Inability to increase rates and fees both from a policy standpoint (Proposition 218), and as a result of economics of rural agricultural communities and crop commodity markets.
- Competition for available supplies within the Colorado River Region and Southern California, and internally within IID between current agricultural users, environmental water demands, and expanding urban communities.
- Changing societal values regarding water district roles in the planning process and changes to State law governing land use and water supplies (SB610 and SB221 requirements).
- Constantly changing and evolving regulatory environments (e.g., CEQA, National Environmental Policy Act (NEPA), 404 permitting; State and Federal Endangered Species Acts).
- Increased, and sometimes unrealistic, expectations on how much water can be saved through conservation.
- Introduce and integrate SB610 and SB221 culture.

3 Physical Setting, Regional Water-Related Components

This section provides a description of water-related components of the region. It generally describes the physical components including the natural and man-made infrastructure, watersheds and surface features, groundwater basins, water collection systems, distribution systems, wastewater systems, flood water systems, and recharge facilities. This section also explains how water arrives in the region, how it is used, and how it is handled after it is used.

Irrigation water is available solely from the Colorado River and is transported to the Imperial Valley via the All-American Canal. As a result, the area is suitable for agriculture, which has supported the economic growth and establishment of population centers in and around the Imperial Valley. The need for balancing a fixed supply with the growing MCI demands and existing agricultural demands creates a unique situation for the area's water suppliers, which requires integrated consideration in order to effectively manage water resources and the region's further development.

With more than 3,000 miles of canals and drains, IID is the largest irrigation district in the nation. IID has the right to the net consumptive use of up to 3.1 MAF per year of its Colorado River entitlement. Up to 2.8 MAF of Colorado River water are delivered to nearly one-half million irrigated acres and a variety of other users in the Imperial Valley. Approximately 97 percent of the transported water is used for agricultural purposes, making possible Imperial County's ranking as one of the top ten agricultural areas nationwide. The remaining three percent of IID's water deliveries supply seven municipalities, one private water company and two community water systems as well as a variety of industrial uses and rural homes or businesses.[10]

3.1 Climate

IID is located in the Northern Sonoran Desert, which has a subtropical desert climate with hot summers and mostly mild winters. Average rainfall is less than three inches per year, most of which occurs in the winter. However, summer storms can be significant in some years. Clear and sunny conditions typically prevail. The region receives 85 to 90 percent of possible sunshine each year, the highest value in the United States. Winter temperatures are mild, but summer temperatures are very hot, with more than 100 days over 100 degrees Fahrenheit (deg. F, °F) each year in the Imperial Valley (CDWR, 2005, Volume 3, Ch 11, p 11-1). IID's service area is characterized by hot, dry summers. The average annual air temperature is 72 degrees Fahrenheit, and frost is rare. Rainfall averages less than three (3) inches/year, with most rainfall occurring in brief but intense events. The majority of rainfall occurs from November through March. Summer thunderstorms occur periodically, but, cloud cover is rare.

[10] Imperial Irrigation District website.

Table 3-1. Imperial Valley Climate Characteristics

Climate Characteristic	Annual Value
Average Precipitation (93-year record)	2.86 inches (In)
Minimum Temperature, Jan 1937	16.0 deg. F
Average Min Temp, 1914 –2006	29.0 deg. F
Maximum Temperature, July 1995	121.0 deg. F
Average Max Temp, 1914 –2006	115.2 deg. F

Source: IID Imperial Station Record; Imperial Irrigation District, 2007 Water Conservation Plan.
Imperial Irrigation District. Resources Planning and Management Section. October 2008

Table 3-2. Monthly Climate Summary – 30-Year Average (1977 – 2006)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Max Temp (°F)	80	84	91	99	105	112	114	113	110	101	89	78	98.0
Min Temp (°F)	5	37	42	47	54	60	68	699	62	51	39	33	99.8
Avg Temp (°F)	57	60	65	72	78	86	92	92	87	76	64	56	73.8
Avg Rainfall (In)	.51	.49	.40	.06	.04	.00	.11	.37	.26	.29	.19	.43	3.15

Source: IID Imperial Station Record; Imperial Irrigation District, 2007 Water Conservation Plan.
Imperial Irrigation District. Resources Planning and Management Section. October 2008

3.2 Physical Components and Infrastructure

Imperial County extends over 4,597 square miles, bordering Mexico to the south, Riverside County to the north, San Diego County on the west, and the State of Arizona on the east. The terrain varies from 235 feet below sea level at the Salton Sea to 4,548 feet at Blue Angel Peak.

3.2.1 Watersheds

DWR divides the state into 10 hydrologic regions corresponding to the state‘s major water drainage basins. Imperial Valley is located in the Colorado River Hydrologic Region. Figure 2-1, presented in the Introduction, shows the boundary of the Colorado River Hydrologic Region, and the relation to other Southern California features.

Despite its dry climate, the Colorado River Hydrologic Region contains some substantial surface water bodies, including the Colorado River and the Salton Sea. Figure 2-3 presents more localized hydrologic features including the groundwater basin boundaries and the surface water divide for the south Salton Sea watershed, which includes the New and Alamo rivers and extends into the Mexico border.[11]

[11] Imperial County, 2007. *Flood Management Plan.* February, 2007.

3.2.2 IID Water Delivery System

IID's delivery system begins at Imperial Dam where Colorado River water is diverted into IID's desilting basins at Senator's Wash. After being desilted, the water is conveyed by gravity through the 80-mile-long All-American Canal. The All-American Canal discharges water to several turnouts, including the Coachella Canal, the East Highline, Central Main, and Westside Main. East Highline Canal, an unlined 49-mile canal, serves the eastern part and a portion of the central part of the IID water service area. The canal roughly follows the northeastern boundary of the IID water service area and conveys irrigation water to agricultural fields via a series of east-to-west laterals. The Central Main Canal connects to the All-American Canal just north of Calexico and serves most of the central part of the IID water service area. The Westside Main Canal joins the All-American Canal near the western edge of the IID water service area and serves the western portion of the IID water service area. These three main canals serve as the main arteries of IID's water delivery system, which consists of approximately 1,667 miles of canals and laterals that distribute untreated surface water for irrigation to over 6,000 farm delivery gates and for non-potable use to rural service pipes and small parcels, and to all other users within the IID water service area.

While constrained by the QSA/Transfer Agreements, delivery of Colorado River water to users in the IID water service area is driven by user demand. Agricultural demand varies throughout the year and from year to year in response to a combination of influences, including changes in climate and local rainfall, crop cycles, crop prices, and government crop programs. IID delivers water 24/7, 365 days a year, with demand typically being highest in April, and remaining fairly high until August, after which it starts to decline. This period of highest use is the driest and hottest time of the year in the Imperial Valley. MCI demand is fairly constant throughout the year, but it is expected to grow as economic opportunities arise and come to fruition.

3.2.3 IID Drainage System

IID's drainage system includes a network of 1,456 miles of open and closed (pipeline) drains, 750 surface and subsurface drainage pumps, thousands of miles of subsurface drains (tile) and an associated collection of pipelines and water recovery systems. Water entering the drainage system can originate from the following sources:

- System seepage (i.e., water that has seeped from canals and laterals; this is intercepted by IID drains)[12]
- Operational spill (unused water that has traveled through the delivery system to ensure full demand is met; this is discharged to IID drains)[13]
- On-farm tailwater runoff (i.e., surface water runoff from the end of an irrigated field when total water applied exceeds the soil infiltration rate)

[12] IID has seepage recovery systems along the All-American Canal and the East Highline Canal.

[13] IID has three lateral interceptor systems and a portion of the Westside Main Canal (serving around 100,000 acres) where such water is collected and delivered to other users; this is called Operational Discharge.

- On-farm tilewater (i.e., water passing the crop root zone that normally enters a tile drain, also referred to as leach water)
- Storm water runoff
- Groundwater (i.e., intercepted groundwater that has moved into the drains from the deeper aquifer near the east boundary of the irrigated area)[14]

3.2.4 Drinking Water Systems

Ten communities in the Imperial Region receive water for domestic purposes from IID: Calexico, Holtville, El Centro, Imperial, Brawley, Westmorland, Calipatria, Niland, Seeley, and Heber. IID also delivers water to the Naval Air Facility. Each city and unincorporated community has its own facilities for treating and distributing water to its users. Five other districts supply water to areas in Imperial County that are outside of IID. Of these, Palos Verdes Community Water District, Winterhaven Water District, and CVWD distribute treated water for domestic use.

As noted earlier, to comply with U.S. Environmental Protection Agency (EPA) requirements and avoid termination of canal water service, residents in the IID service area who do not receive treated water service must obtain alternative water service for drinking and cooking from a state-approved provider. To avoid penalties that could exceed $25,000 a day, IID strictly enforces this rule. IID tracks nearly 4,000 raw water service accounts required by the California Department of Public Health (CDPH) to have alternate drinking water service.

In 1983, the California Legislature enacted the Urban Water Management Planning Act (Water Code Sections 10610 - 10656). The Act states that a city is required to create an UWMP when the city services more than 3,000 connections or if the city delivers more than 3,000 acre-feet of water per year. In the Imperial Region, cities that meet the criteria for an UWMP and have submitted them for review to DWR are: El Centro, Calexico, Brawley, and Imperial. Communities that do not yet need to prepare an UWMP are Holtville, Calipatria, Westmorland, Heber, Seeley, and Niland.

3.2.5 Wastewater Systems

Table 3-3 lists the Imperial County wastewater treatment plants, providing information on owner, location, capacity, and related data. Based on the information currently available, no community in the Imperial County is recycling municipal water. Each community that has adopted an UWMP (Imperial, Brawley, Calexico, and El Centro), states that it currently does not have plans to begin recycling municipal water, most specifically citing the lack of cost-effectiveness for this strategy.

Imperial County communities have stated that consideration for implementing any kind of reclaimed water program has been limited due to the concerns arising from the terms of the QSA/Transfer Agreements about reducing inflows to the Salton Sea. Treated wastewater

[14] CH2MHill. 2008. *Draft – Supplement to the IID Water Conservation and Transfer Project EIR/IES for the Managed Marsh Complex.* January 2008.

from facilities within IID ultimately discharges to the Salton Sea (via drains that discharge to the Alamo and New River), along with water from CVWD and other sources. Within the Imperial Valley, these inflows support habitats on the rivers and the Salton Sea depends on such inflows for several reasons, discussed below.

Imperial Valley inflow, though salty, provides a constant source of water, which in volume has typically equaled the Sea's evaporation. Therefore, these flows have maintained the Sea's level and helped to reduce the effect of evaporation, which causes the salinity levels in the Sea to concentrate (at present, the Sea is about 50 percent more saline than the Pacific Ocean). As noted in the section on Recreation, the Sea serves as a critical link on the Pacific Flyway for bird migration.

Under the terms of the QSA/Transfer Agreements, IID and its water users are required to maintain ~~"n~~ormal" flow to the Sea through 2018. This is being achieved through IID's Fallowing Program and through taking care that no QSA/Transfer Agreements or other activity impacts this flow. Nevertheless, flows through the New River from Mexico have reduced due to water being treated and reused in Mexico. Inflow from the IID water service area is expected to decrease greatly starting in 2019, when, in accord with the terms of the QSA/Transfer Agreements, all transferred water will be from conservation savings. Inflow from Mexico is also expected to decrease further as Mexicali continues to implement its reclaimed water program.[15]

Table 3-3. Wastewater Effluent in Imperial County

Discharge sources	Current Conditions				
	Plant Capacity [AFY]	Average Flow [AFY]	Treatment Level	TDS + (NPDES permit limits) [mg/L]	Discharge to (Discharge point / End of Drainage Path)
City of Brawley WWTP	6,608 +/^	3,920 +/^	Secondary +	4,500 max. daily, 4,000 avg. annual	New River + / Salton Sea
City of Calexico Municipal WWTP	4,816 +/^	3,024 ^		4,500 mean 7-day, 4,000 mean 30-day	New River / Salton Sea +
Calipatria WWTP	1,938 +/^	1,120 +/^		4,500 max. daily, 4,000 avg. annual	G Drain / Salton Sea via Alamo River +
El Centro Municipal WWTP	8,960 +/^	4,480 +/^	Secondary ^	4,500 mean 7-day, 4,000 mean 30-day	Central Main Drain / Salton Sea via Alamo River +
El Centro Generating Station	1,165 +			4,500 mean 7-day, 4,000 mean 30-day	Central Drain No. 5 / Salton Sea via Alamo River +
Gateway of the Americas WWTP	224 ^	205 ^			
Heber Geothermal Company, Heber	4,816 +			4,500 max. daily, 4,000 avg. annual	Strout Drain +
Heber PUD WWTP	907 ^	392 ^			
City of Holtville Municipal WWTP	952 ^	728 ^			Pear Drain/Salton Sea via Alamo River^
City of Imperial Water Pollution Control Plant	1,568 +/^	1,073 +/^	Tertiary ^	4,500 max. daily, 4,000 avg. annual	Dolson Drain / Salton Sea via Alamo River +
Second Imperial Geothermal Co., Heber	1,680 +			4,500 max. daily, 4,000 avg. annual	Beech Drain / Salton Sea via New River +
Niland WWTP	560 ^	258 ^			

[15] Salton Sea Authority Plan for Multi-Purpose Project July 2006 Draft for Board Review

Discharge sources	Current Conditions				
	Plant Capacity [AFY]	Average Flow [AFY]	Treatment Level	TDS + (NPDES permit limits) [mg/L]	Discharge to (Discharge point / End of Drainage Path)
Seeley County WWTP	224 +/^	95 +/^		4,500 max. daily, 4,000 avg. annual	New River + / Salton Sea
Westmorland WWTP	560 ^	291 ^		4,500 mean 7-day, 4,000 mean 30-day	Trifolium Drain No. 6 / Salton Sea via New River +
Totals	34,978	15,586	--	--	--

Note: Capacities and flows based on information in NPDES permits and Service Area Plans; therefore, the date of information varies.
+ From NPDES Permit
^ From Service Area Plan
*For total calculation, it was assumed that future plant capacity would remain the same for facilities where no information on future expansion has been found.

? Future average flows from Service Area Plan projections for 2020 except for El Centro Municipal WWTP and Heber PUD WWTP, which are for 2014.

Remarks:

City of Brawley WWTP
NPDES permit CA0104523 (Effective June 29, 2005 to June 29, 2010).
City of Brawley Final Service Area Plan, February 2007.
City of Calexico WWTP
NPDES permit CA7000009 (Effective 2004-2009).
City of Calexico Service Area Plan, May 31, 2006.
Calipatria WWTP
NPDES permit CA0105015 (Effective June 29, 2005 to June 29, 2010).
Final Calipatria Service Area Plan (CL1-04), November 2004.
El Centro Municipal WWTP
NPDES permit CA0104426 (Effective 2003-2008).
City of El Centro Service Area Plan, November 2005.
El Centro Generating Station
NPDES permit CA0104248 (Effective 2004-2009).
Gateway of the Americas WWTP
NPEDES permit CA7000015 referenced in SAP, unable to locate copy of permit at this time.
Gateway of the Americas Service Area Plan, December 2005.
Heber Geothermal Company, Heber
NPDES permit CA0104965 (Effective June 29, 2005 to June 29, 2010).

Heber PUD WWTP
Heber Public Utility District DRAFT Service Area Plan, June 2004.
Holtville WWTP
City of Holtville Final Service Area Plan/Municipal Service Review, October 2006.
NPDES permit CA 0104361 (Effective to June 21, 2011 identified, unable to locate copy of permit at this time
City of Imperial Water Pollution Control Plant
NPDES permit CA0104400 (Effective June 29, 2005 to June 29, 2010).
City of Imperial Service Area Plan, June 26, 2008.
Second Imperial Geothermal Company, Heber
NPDES permit CA7000003 (Effective June 29, 2005 to June 29, 2010).
Niland WWTP
Sanitation District Service Area Plan for Wastewater Facilities, February 2006.
Seeley County WWTP
NPDES permit CA0105023 (Effective 2002-2007).
Seeley County Water District Service Area Plan, Final July 10, 2003.
Westmorland WWTP
NPDES permit CA0105007 (Effective 2001-2006).
City of Westmorland Service Area Plan, March 3, 2005.

3.3 Geologic and Groundwater Setting

Because groundwater development is one of the water management strategies considered for the IID Plan, the geologic and groundwater setting is described. For a detailed description of the groundwater resources and discussion of the feasibility of developing these supplies please see Appendix B. The Imperial Valley and Coachella Valley are located in the Colorado Desert geomorphic province. The Colorado Desert is a low-lying barren desert basin, with portions of the area below mean sea level and runoff flowing to the Salton Sea. The province is a depressed block between active branches of alluvium-covered San Andreas Fault with the southern extension of the Mojave Desert to the east. It is characterized by the ancient beach lines and silt deposits of extinct Lake Cahuilla.[16] The Imperial Valley is characterized by a northwest to southeast trending valley bounded on the west by the Jacumba Mountains and on the east by the Chocolate Mountains.[17] Beyond the mountains to the west lies San Diego, California, and to the east beyond the Colorado River is southwestern Arizona. Much of the central portion of the Imperial Valley is below sea level, reaching nearly 230 feet below mean sea level (msl) at the Salton Sea.

Groundwater basins within the Imperial Region include portions of the Coyote Wells Valley Basin, Borrego Valley Basin, Ocotillo-Clark Valley Basin, West Salton Sea Basin, and Ogilby Valley Basin, and all of the Imperial Valley Basin, East Salton Basin, and East Amos Valley Basin, which in all total about 2,800 square miles[18] (Figure 2-3). The major surface water body within the Imperial Valley is the Salton Sea, and the Imperial Valley basins drain internally to the Salton Sea via the New River and Alamo River. Groundwater bearing materials are generally younger and older alluvial sediments derived from the erosion of the surrounding mountain ranges.

The area is situated on and near extensive fault systems, generally trending northwest to southeast. Large nearby faults include the San Andreas, Superstition Hills, and San Jacinto Faults[19] (Figure 2-3). The faulting influenced groundwater movement. More small to moderate earthquakes have occurred in the Imperial Valley than along any other section of the San Andreas Fault system. Typically, some part of Imperial County is affected by a minor earthquake (less than magnitude 3.5) every few months. Every five years, the county might experience a moderately damaging event (magnitude of 5.5 or greater). At least once every 50 years, there is likely to be a major earthquake (magnitude of 6.8 or greater). Microseismicity (magnitude of less than 2.0) occurs almost continuously in the county, often with dozens and sometimes hundreds of events per day (County of Imperial, 2006).

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[16] California Geological Survey, 2002. Note 36. http://www.consrv.ca.gov

[17] Oakeshott, Gordon B., 1978. *California's Changing Landscapes: A Guide to the Geology of the State, Second Edition.* McGraw-Hill Book Co., Inc., New York.

[18] California DWR, 1975. *California's Groundwater, Bulletin118* September 1975

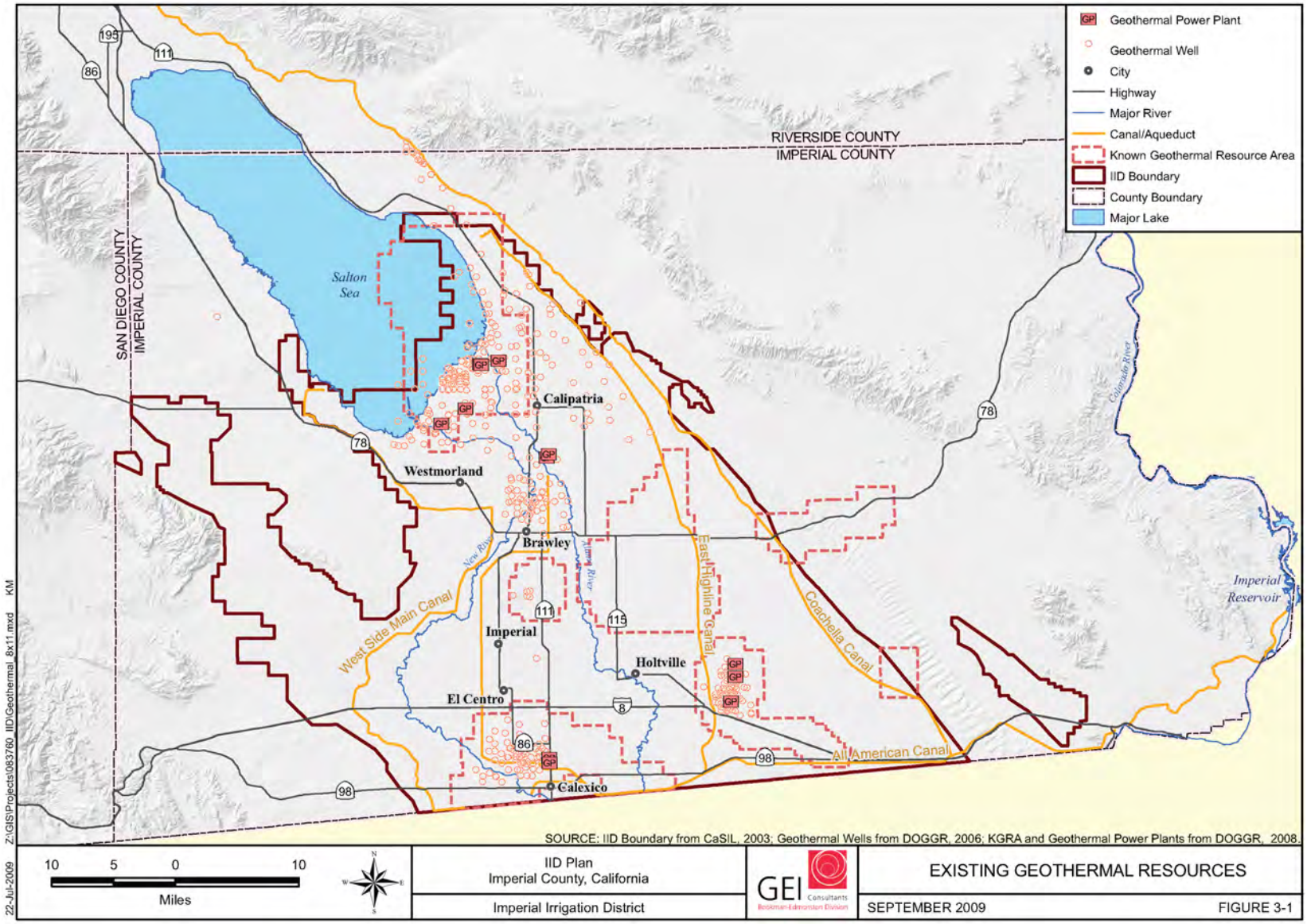
[19] Hart, Earl W., and Bryant, William A., 1999. *Fault-Rupture Hazard Zones in California – Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zones Maps*. California Department of Conservation, Division of Mines and Geology, Special Publication 42, Sacramento.

3.4 Other Geologic Resources

Geothermal resources will represent a large component of the future water demand. The geological resources that lend to the development of this resource are described. Geothermal resource areas and sources of sand and gravel are generally located along the southern border of the Salton Sea; other resources are found in the surrounding hills. As shown in Figure 2-3, there are seven known geothermal resource areas (KGRAs) in the Imperial Valley: the Dunes KGRA, East Mesa KGRA, Glamis KGRA, Heber KGRA, East Brawley KGRA, South Brawley KGRA, and Salton Sea KGRA. Ensuring that there is adequate water supply for existing and geothermal power plants and other power production operations is a key issue for the IID Plan. The Imperial County General Plan has a geothermal resources element, which anticipated future water demands for economic development of the region‘s geothermal resources and for developing other sustainable power generation operations, primarily solar and wind.

Other geologic resources in the IID water service area include mineral resources (rock and stone, sand, gravel, clay, and gypsum), metals (gold, silver, nickel, and lead), radioactive elements, and geothermal areas. In the Imperial Valley sand and gravel are significant economic resources. Most of these materials are derived from shoreline deposits from ancient Lake Cahuilla. Additional sources of lower quality sand and gravel are found in alluvial fan deposits.

Figure 3-1. Geothermal Resource Areas and Existing Plants



3.5 Land Use and Water

This section briefly discusses land use in the IID area since current and proposed future land use drives the water demands. Future land use maps were digitized from information contained in the General Plans for Imperial County of the incorporated cities and as discussed in Chapter 5, these maps were used as the basis for forecasting future water demand. The intent is to be as consistent as possible with the prevailing land use plans and to integrate the forecast from the separate land use agencies.

3.5.1 Agricultural

Agricultural land use dominates the IID service area. Over 120 types of crops are grown in the Imperial Valley, with a total area of approximately 520,000 acres receiving water.[20] Currently, around 430,000 acres are in cultivation, with some 40,000 acres being fallowed, and the remainder in MCI or other use. Around 65,000 acres of the cultivated area are double-cropped.[21] The total gross agricultural production value in 2008 was $1,684,522,000. Values in all the commodity groups either increased or remained relatively stable over the prior year. Crops grown on this acreage consume around 1.75 MAF per year of water (5-year average estimated crop ET, 2000 to 2004).[22] Additional water is needed for leaching and other agricultural practices. Agriculture has the highest water consumptive use in Imperial County. Crop water requirements vary greatly with the type of crop, soil type, and weather. The EDP includes an apportionment of 5.25 acre-feet per acre during a year of supply and demand imbalance. Historically, IID has delivered up to 2.8 MAF per year of water primarily for agricultural purposes to its customers in Imperial County.

3.5.2 Municipal

Domestic water uses account for approximately 3 percent of Imperial Region total water use, but only around 2 percent of Imperial County total water use. Ten Imperial Valley communities receive water for domestic purposes from IID: Calexico, Holtville, El Centro, Imperial, Brawley, Westmorland, Calipatria, Niland, Seeley, and Heber (Figure 2-2). Water is also delivered to the Naval Air Facility (NAF) from IID's Elder Lateral Canal. From June 1, 1986, to October 23, 1991, the NAF used approximately 3,714 AF of water, with a daily average water use of 2.0 acre-feet.[23] As listed below, each city and unincorporated community served by IID have their own facilities for water treatment and distribution to the users in their jurisdiction. In addition, as noted previously, IID tracks nearly 4,000 raw water service accounts that are required by the CDPH to have alternate drinking water service,

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[20] See Imperial Agricultural Commissioners Reports http://imperialcounty.net/ag/Crop%20&%20Livestock%20Reports/archives_1907-2007.htm. Also see Ag Census Data for Imperial County at: http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/County_Profiles/California/cp06025.pdf

[21] IID website. Annual Inventory of Areas Receiving Water & Crop Report

[22] IID. *Final IID 2007 Water Conservation Plan*, p. 30

[23] Imperial County. *General Plan, Water Element.* Planning/Building Department.

maintains a small-acreage pipe and drinking water database, and provides an annual compliance update to CDPH.

Not all water utilized in the Imperial County is delivered by IID. Groundwater of mixed quality can be found on the eastern and western sides of Imperial County, particularly in the Ocotillo-Coyote Wells Groundwater Basin. The safe yield of these formations is limited due to the desert climate and minimal natural recharge. Imperial region communities of Ocotillo, Nomirage, and Yuha Estates rely on groundwater from the Ocotillo-Coyote Wells groundwater basin. The County of Imperial commissioned a study of the groundwater basin by the USGS, known as the Skrivan Report, which was released in November 1977. The study reported an overdraft of 500 AF per year and warned of possible saline intrusion. The County also employed Dr. David Huntley, a geohydrology consultant, to review the report and the basin. He projects an even greater overdraft of 1,608 AF per year to 2,410 AF per year and saline intrusion.[24] Future growth in Ocotillo/Nomirage is, therefore, expected to consist primarily of infill on existing lots, rather than expansion of community boundaries, except at very low densities.

The East Mesa Unit and the West Mesa Unit, which are within the Imperial Valley boundaries, also have wells that are used to extract water from the groundwater basin. East Mesa Unit has four wells that are approximately six hundred feet deep. Scattered residential development is found in the East Mesa Unit along with some mines.[25] As mentioned earlier, some geothermal developments in the East Mesa Unit may have potential to cause water pollution.

The West Mesa Unit is primarily land that is owned or regulated by the Bureau of Land Management. A portion of the land in the West Mesa Unit is used by the NAF for bombing practices and exercises. In the West Mesa, groundwater is also pumped for industrial use at the U.S. Gypsum plant at Plaster City. U.S. Gypsum reportedly has constructed six production wells in this area, three of which are inactive. Water from the remaining three wells is transported to Plaster City via pipeline. The quality of the groundwater pumped in this area of the Basin is reportedly good.

Outside of the Imperial Valley, CVWD boundaries encompass nearly 640,000 acres, most of which are located in Riverside County; however, boundaries extend into Imperial and San Diego counties. In total, CVWD provides drinking water to more than 100,000 homes and businesses in Riverside and Imperial Counties, including the communities of Salton City and the Hot Mineral Spa/Bombay Beach. This water is from wells drilled into an aquifer with capacity estimated at 39.2 MAF. Nearly as many residents receive their sanitation services from the district; 6.5 billion gallons of sewage are treated yearly. Whenever and wherever possible, this wastewater is treated and recycled for golf courses and other outdoor irrigation.

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[24] David Huntley, Ph.D. 1979. "The Magnitude and Potential Effect of Declining Ground Water Elevations in the Ocotillo-Coyote Wells Basin"

[25] Imperial County. *General Plan, Water Element.* Planning/Building Department.

Recycled water supplements imported water for use in recharging groundwater tables, a vital program to ensure adequate supplies of water for future generations.[13]

3.5.3 Industrial

Extensive geothermal resources have been identified in several areas of the Imperial Valley. These are identified as KGRAs, and are shown on Figure 2-3. Power plants are currently generating electricity from the hot water resources in the Salton Sea, the Heber KGRA, and the East Mesa KGRA. The 15 existing power plants can generate about 300 megawatts, and it is estimated that the Imperial Valley resource could support approximately 2,750 megawatts of power production on a sustained basis.

Geothermal power plants extract hot water through large wells drilled from 2,000 to 12,000 feet below the surface. The hot water is either allowed to boil to produce steam or passed through heat exchangers. Return flows of hot water from both processes are injected back into the geothermal reservoirs through separate wells. Problems of contaminating the surface waters or nearby non-geothermal groundwater can arise if return flows are not injected to a significant depth; if they are injected under too much pressure; if they are injected into faults or fractures that connect to the surface; or if the injection wells leak. The potential for surface spills exists from pipeline failures or well blowouts.

3.5.4 Recreational

Some of the waters in the Imperial Valley provide recreational activity. The Salton Sea was once a popular recreation and marine sport fishery area. Several commercial marinas, residential recreational communities, and public parks are now located around the sea.

Within the IID water service area are a number of recreational water bodies and refuge areas, including Ramer Lake, Sunbeam Lake, Wister Wildlife Refuge, and a number of duck club areas. These water bodies receive IID lateral spill and/or drain water. Water-based recreational activities are not allowed in IID reservoirs, irrigation canals or drains; however, in most reservoirs and all main and lateral canals, individuals do fish for species such as channel catfish, bass and sunfish.[26]

Weist Lake County Park, located along the Alamo River near Brawley, includes facilities for boating, fishing and waterfowl hunting. Also located within the region are the Sonny Bono Salton Sea National Wildlife Refuge and the Imperial Wildlife Area.[27, 28]

The Sonny Bono Salton Sea National Wildlife Refuge, managed by the US Fish and Wildlife Service, was designed to reduce waterfowl depredation in adjacent croplands. Management practices include an intensive farming program that involves cooperative farmers. Crops are

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[26] IID website; and Salton Sea Ecosystem Restoration Draft PEIR Chapter 13: Recreation http://www.saltonsea.water.ca.gov/PEIR/draft/Chapter_13_Recreation.pdf

[27] Text copied/adapted from USFWS: http://www.fws.gov/Refuges/profiles/index.cfm?id=81631

[28] Text copied/adapted from CDFG: http://www.dfg.ca.gov/lands/articles/imperial01.html

grown for waterfowl consumption during the winter. The refuge winters up to 30,000 snow, Ross's, and Canada geese, and 60,000 ducks from November through February. Marsh birds and shorebirds account for more than 6,000,000 use-days each year. Endangered species observed on the refuge include the southern bald eagle, peregrine falcon, California brown pelican, Yuma clapper rail, and desert pupfish.

A significant Yuma clapper rail population nests on the refuge. Sensitive species using the refuge include the fulvous whistling-duck, wood stork, long-billed curlew, mountain plover, western snowy plover, burrowing owl, and white-faced ibis. The refuge manipulates water levels in ponds to provide habitat for shorebirds and waterfowl.

The Imperial Wildlife Area is made up of three units owned by California Department of Fish and Game. The Wister (5,423 acres) and Hazard (535 acres) units‘ areas are located along the southern shoreline of the Salton Sea. They consist of upland habitat and managed wetlands, primarily to provide waterfowl forage. The wildlife areas provide hunting, fishing, and recreational uses. Public use information of the unit has been recorded since 1961, with an average of around 15,000 visits per year.[24]

The Wister Unit is a long, narrow sliver sandwiched between the desert and the Salton Sea on a gentle slope, where 189 miles of levees and 27 miles of canals form terraces between seasonally flooded ponds and fields. Fresh Colorado River water for the ponds is pumped to Wister from out of the Coachella Canal. The Hazard Unit, which abuts the Northern portion of the Sonny Bono Salton Sea National Wildlife Refuge, is south and east of the Wister Unit.

The Salton Sea forms the entire western boundary of the Wister and Hazard Units in a line that shifts as agricultural runoff changes. Salts in the runoff account for ever-increasing salinity of the sea. Under the QSA/Transfer Agreements, IID is to retain what would have been normal flow to the sea through 2018. After that IID expects to reduce flows, causing the Salton Sea to recede and saline concentrations to increase more rapidly. This makes the wildlife area's fresh water ponds bordering the Sea even more crucial for wildlife. Most species must have sources of fresh water to survive.

The Finney-Ramer Unit (2,047 acres) is located south of the Salton Sea near Calipatria and the Alamo River. It was originally established by the USBR as a waterfowl refuge and includes four lakes. All of the Imperial Wildlife Area units receive water that would otherwise be IID lateral or canal spill or drain water. More than 90 percent of the Wister and Hazard units are flooded in the fall; fresh greenery fringes and carpets the ponds.

Imperial Wildlife Area is a crossroads for birds from the north and the Pacific Ocean and some unusual varieties from the south. Imperial Region probably has one of the highest species counts of all wildlife areas - nearly 400 different species can be found here. This human-made marsh provides essential habitat for migratory birds navigating the Pacific Flyway.

There are numerous opportunities for nature viewing, photographing, hiking, and bird watching. Activities for visitors on the Wister, Hazard and Finney-Ramer units include

hunting for waterfowl, dove, coots, moorhens, snipe, pheasant, quail, raccoon, and rabbit in season; and fishing for catfish, largemouth bass, and bluegill on the wildlife area, and corvina, sago, and croaker on the Salton Sea.[25]

Mudpots underscore geothermal activity in the Imperial Region Earthquake fault lines and are marked by a series of bubbling pools of mud. This unusual effervescence is produced by carbon dioxide, which rises from below the water table. As the escaping gas is vented, it mixes with surface water and soil to produce a cool, bubbling mixture of mud. Imperial Wildlife Area has the largest concentration of mudpots in the entire Imperial Region.[24]

The Salton Sea International Bird Festival, which is held each February, brings in several hundred bird watchers from throughout the country. The festival consists of tours, lectures, and exhibits, and generates considerable economic activity.

3.6 Flood Protection Measures

Imperial Valley structural flood protection measures include a dike system that provides flood protection from 100- to 500-year events for areas adjacent to the Salton Sea from 100- and 500-year floods. Breakwaters at various locations near the shore of the Salton Sea prevent damage from wave action.

Several of the washes along the western shore of the Salton Sea were channelized when that area was developed. Many of these washes contain the 100-year flood within their channel banks. Non-structural measures are being utilized to aid in the prevention of future flood damage. These are in the form of land use regulations adopted from the Code of Federal Regulations that control building within areas that have a high risk of flooding. Imperial County has an ordinance that requires a permit for any construction near Salton Sea below the minus 220-foot contour.

Per the U.S. Army Corps of Engineers Reconnaissance Report: Flood Control and Related Purposes, September 1989, the IID drainage system largely consists of earthen open channels paralleling irrigation canals on the downstream side of the fields. The drains collect excess surface flows from the agricultural fields (tailwater), subsurface flows from a system of tile drains underlying the fields (tilewater), and operational spill from the canals and laterals. The entire system was designed strictly to drain excess irrigation water; consequently, the system has no more than incidental capacity to intercept and convey storm runoff from the surrounding desert, mountains, or the urban areas in the Imperial Valley.[29]

[29] Imperial County, 2007. *Flood Management Plan.* February 2007.

4 Proposed Regional Boundary

This section is included to provide some context between the IID Plan area (boundary of Imperial Irrigation District) and a proposed Imperial Region boundary that may be used to develop the Imperial Region IRWMP.

4.1 Basis for Imperial Region Boundary

The geographic coverage for the IID Plan is the IID service area. The proposed Imperial Region would extend beyond the IID boundary as shown in Figure 4-1. This section describes the geographic extent and basis for the recommended Imperial Region, which would be the subject of the proposed Imperial Region IRWMP. The basis for formation of the Imperial Region was

- Administrative and jurisdictional boundaries and stakeholders
- Hydrologic features
- IID Plan goals and objectives
- Selection of the best suited area to resolve the conflicts identified

Figure 2-1 presented in Chapter 2 showed the project location and Imperial Region boundary in relation to the proposed region's Southern California neighbors. The area selected for Imperial Region lies completely with DWR's Colorado River Hydrologic Region.[30] It is also entirely within the SWRCB Region 7, Colorado River Basin Region.[31]

Figure 2-2, Jurisdictional and Administrative Features, showed city and county boundaries, public land ownership, water district boundaries, tribal areas, and other appropriate administrative boundaries. Figure 2-3, Hydrologic Features, presented DWR Bulletin 118 groundwater basins boundaries; geologic fault lines, which influence groundwater flow and storage areas; watershed divides; water delivery canal infrastructure; and other physical and topographic features.

DWR has defined the criteria for establishing a region for purposes of preparing an IRWMP. IID prepared the Regional Assessment Process document to obtain DWR's approval for the proposed Imperial Region. IID has not heard whether the proposed Imperial Region has been accepted by DWR. The proposed Imperial Region will help IID and the local land use agencies to better communicate, coordinate, and cooperate when making water and land use decisions. The basis for selection of the boundaries was also made for the reasons below:

[30] DWR website: DWR Bulletin 160-05, http://www.waterplan.water.ca.gov/previous/cwpu2005/index.cfm

[31] CAEPA website: http://www.waterboards.ca.gov/coloradoriver/

- Imperial Regional Water Management Group (RWMG) members already have experience working together to address complex issues, so they will be well equipped to develop an IRWMP.

- Urban and rural development of the Imperial Valley south of the Salton Sea tie together the powers and authorities of the agencies that are anticipated to support development of the Imperial IRWMP, including Imperial County and the cities.

- Primary conflicts within the region related to future land use and new water demands are intensified by issues surrounding the apportionment of IID's water supply and competing uses within the Imperial Valley.

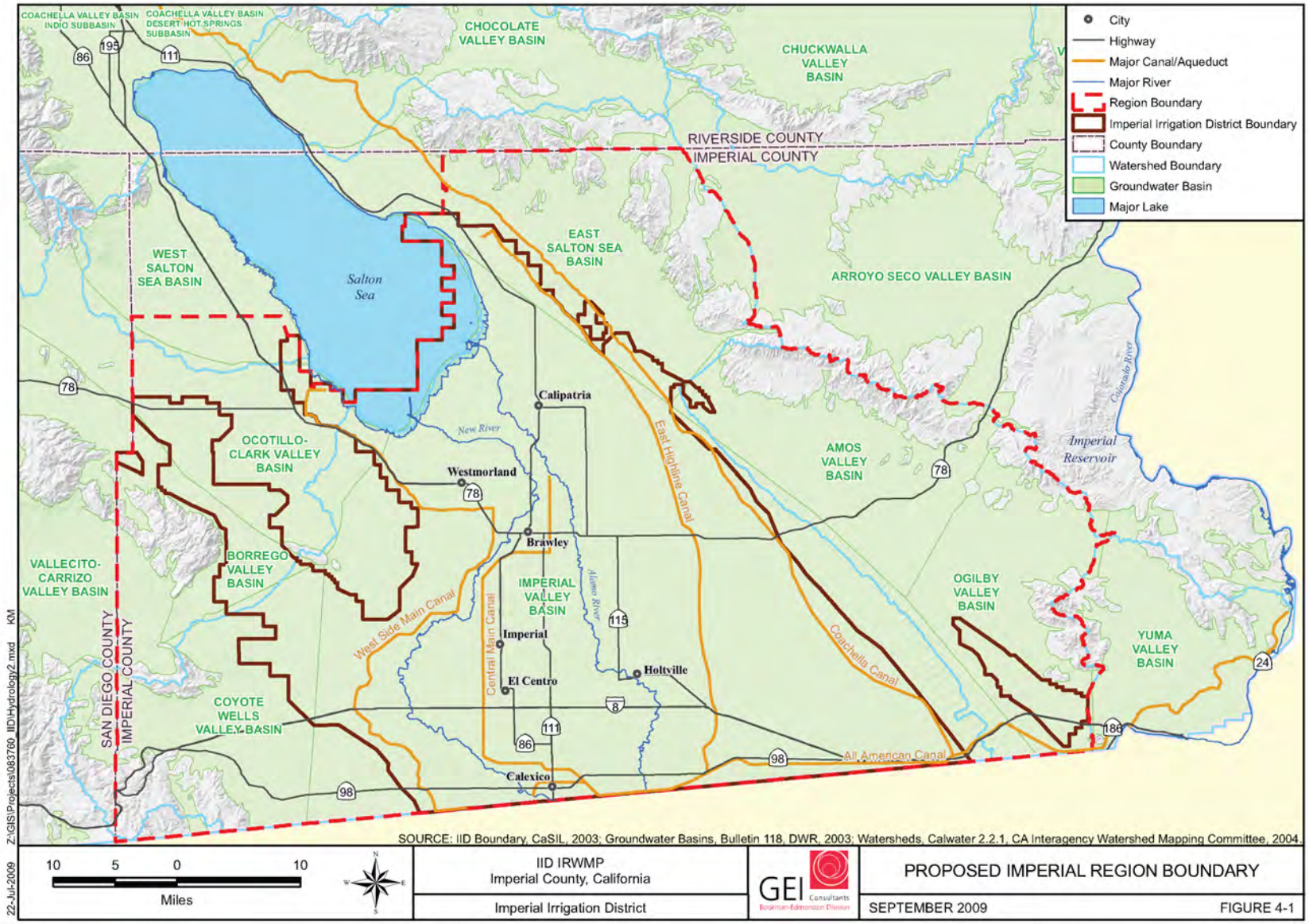
- Imperial Region presents opportunities for recycled and reclaimed water use because of the geographic proximity of its MCI users.

- Imperial Region has prospects for integrated groundwater and surface water management and has unique and distinct groundwater conditions, issues, and aquifers.

In developing the proposed Imperial IRWMP boundary (boundary), a number of meetings and conference calls were held to evaluate both physical and institutional features. The proposed Imperial Region boundary encompasses the service areas of multiple local agencies, as shown in Figure 4-1, and will maximize opportunities to integrate water management activities related to natural and man-made water systems, including water supply reliability, water quality, environmental stewardship, and flood management. The boundaries were established to be inclusive of a larger area where practical.

In the Imperial Region there are no overlapping areas or areas not covered (voids), nor are there any known voids immediately outside the Imperial Region boundary. To the south, the boundary is based on the international border with the Republic of Mexico. To the west, the boundary follows the Imperial County line up from Mexico to the point where it meets with the CVWD boundary; it then follows the southern CVWD boundary going east to the point where it abuts the northern IID boundary. The Imperial Region boundary then continues to follow the IID boundary east under the Salton Sea to where the IID boundary again abuts the CVWD boundary. It then follows the CVWD boundary north to a point where a line was extended north to the Imperial County line, where it extends east along the county line until it reaches the eastern boundary of the East Salton Sea Basin. The eastern boundaries of the East Salton Sea Basin, Amos Valley Basin, and Ogilby Valley Basin watersheds form the remainder of the Imperial Region boundary to the east, following the Ogilby Valley Basin watershed divide south to where it meets the Yuma Valley Basin. The Yuma Valley Basin boundary is then followed down to the Mexican Border. As shown on Figure 4-1, much of the land within the Imperial Region is under Federal control, and these lands are managed under existing plans prepared pursuant to Federal laws.

Figure 4-1. Imperial Region Boundary



4.2 Relationship and Coordination with other IRWMPs

By virtue of the QSA/Transfer Agreements and reliance on the Colorado River, the Imperial Region is interrelated and interdependent with the DWR South Coast Hydrologic Region (SDCWA, MWD) and other IRWM regions in the Colorado River Hydrologic Region in Southern California. Coordinating with adjacent regional planning efforts is particularly important in the Imperial Region because of the linkages through the QSA/Transfer Agreements and because other plans in the area have a bearing on the Salton Sea and/or the Colorado River. There is a total of $36 million of bond funding available for the Colorado River Region. The other Colorado River Regions must also have an IRWMP to compete for the available funding.

Coordination on Colorado River issues occurs through other existing management structures such as the Colorado River Board of California, the Colorado River Water Users Association, and various USBR initiatives. Local cooperation on Salton Sea issues is primarily through the Salton Sea Authority. These have an influence on the Imperial Region IRWMP and are part of the baseline conditions.

Despite this connection and the desire for interregional cooperation, unique and distinct water management issues separate the Imperial Region from the South Coast hydrologic region and from other integrated planning efforts within the DWR Colorado Hydrologic Region.

The South Coast hydrologic region is not geographically proximate to the Imperial Region; is primarily urban, with a complex array of water agencies, multiple counties, and cities; and is reliant on MWD for most of its main Colorado River water supply and for delivery of its IID/SDCWA Transfer of Colorado River water, with multiple additional sources of water (groundwater, local surface water, and imported State Water Project (SWP)). The South Coast is also socioeconomically very different from the Imperial Region.

The draft 2009 California Water Plan update references the Colorado River Water Delivery Agreement: Federal QSA[7] as an integrated regional planning effort along with other efforts in the Colorado River Hydrologic Region, including:

- Coachella Valley RWMG
- Mojave Water Agency IRWM
- Salton Sea Water Authority
- Borrego Water District

The boundary with CVWD was used since CVWD is part of the Coachella Valley Regional Water Management Group, which along with other local water districts, Riverside County, the local cities, and stakeholders is preparing its own IRWMP. The Coachella Valley Region is unique and distinctly different from the Imperial Region: the Coachella Valley RWMG has its own water distribution facilities, Colorado River apportionment, and State Water Project allocation. In addition, the region is more reliant on groundwater, has problems of overdraft, and is mostly urban. Within CVWD, the crop mix and delivery system are tangibly different

from those of IID. IID and CVWD have been in contact regarding the congruent boundaries of the two regions and are communicating on how they will work together in the future as the two plans are developed (Attachment B).

With signing of the QSA/Transfer Agreements, historical conflicts between CVWD and IID over Colorado River water have been largely resolved, and it is appropriate that IID work within the Imperial Region to address the localized water management issues, conflicts, and opportunities facing the Imperial Region.

The Mojave IRWM effort is well north of the Imperial Region, being more geographically proximate to the Coachella Valley Region.

The Borrego Water District is located in San Diego County, is not geographically proximate to the Imperial Region, and has its own unique water resource, economic, political, social, and technical issues.

It is the intent of the Imperial RWMG to coordinate with other regional planning efforts on an annual or as-needed basis to discuss water policy, implementation projects, monitoring and data management, and/or other water management issues. The Imperial RWMG plans to effectively integrate with other IRWMPs in Coachella Valley by having representatives attend meetings, and by providing agendas, reports, and minutes to other organizations and actively collaborating with other organizations on Imperial Region projects and issues.

4.3 Relation to other Plans in the Lower Colorado River Basin

The Imperial IRWMP will seek to be consistent with and integrate key elements of the other land use, water supply, and environmental management plans that currently exist. The planning process will include review and consideration of the goals and objectives of the existing plans to evaluate how the Imperial IRWMP is influenced by, and could have an influence on, these other plans. This includes, at a minimum, the following:

- QSA/Transfer Agreements
- IID Definite Plan
- IID EDP
- City UWMPs
- City General Plans
- Imperial County General Plan
- Salton Sea Restoration Plan
- Water Quality Control Plan for the RWQCB, Colorado River Basin Region
- IID Water Transfer Agreement Habitat Conservation Plan
- Lower Colorado River Multispecies Habitat Conservation Plan

Other key plans will be identified as the process moves forward.

5 Demand-Supply and Water Budget

This chapter provides a summary of the existing supplies available to IID to support both current and future agricultural and non-agricultural water demands. It documents the historical IID water rights to the Colorado River and how the "Law of the River," QSA/Transfer Agreements, and the federal contract operating policies established by the U.S. Department of Interior for the Colorado River all influence the availability and reliability of IID's water supply. There are times when IID could see its supply diminished because of drought or climate change, but IID has senior water rights that are highly reliable and relatively stable compared to the other water rights on the Colorado River, even in dry or multiple dry years.

It is the variability in annual demand that creates the potential for conflict and competition for the available supply between current and proposed future uses, or between historical uses for agriculture and new MCI uses.

Agriculture represents 97 percent of the water historically used in IID, though the amount of non-agricultural water demands are anticipated to grow, placing additional strain on IID's existing supply. Non-agricultural water demands include MCI and environmental water commitments. MCI uses vary less on an annual basis than agricultural uses, which require a higher degree of reliability, and are harder to cut back in times of shortage when there is a supply and demand imbalance. Agricultural water demand can vary annually as a function of weather and market conditions. There are times when the total amount of demand for all uses can exceed the available Colorado River Entitlement, resulting in a supply and demand imbalance and an "overrun" condition. In an overrun condition, IID is essentially over-drafting its checking account to the Colorado River and will have to pay back the overrun water. In times of supply and demand imbalance agriculture is the first to have to cut back and reduce demands. This implies that any increase in MCI demands could increase the number of times when there is a supply and demand imbalance and when agriculture would be required to cut back.

Chapter 7 will describe projects that will help protect all IID users from overrun on the Colorado River water entitlement. Chapter 8 will discuss opportunities for water conservation and demand management.

The purpose of this chapter is to:

1. Define the amount of water that needs to be managed, either through development of new water projects or by apportionment of the existing water to meet future non-agricultural water demands.

2. Describe the overall IID water budget.

3. Describe the amount of water available from each potential new source.

A series of more detailed technical memorandums was prepared to support this chapter and is referenced in the appropriate appendices.

5.1 Existing Water Supply and History

This section describes the Colorado River water supply available for use by IID within its service area (place of use). Included in the description are narratives regarding IID water rights, transfer agreements, environmental water requirements, and the reliability of the existing supply. More detailed information is included in Appendix C, Technical Memorandum 2.1 - Existing Supplies.

Historically, California diverted 5.2 MAF from the Colorado River. This was in excess of the 4.4 MAF of entitlements available to the State from the Colorado River. In the mid-1990s, Arizona and Nevada began using their full allotment of Colorado River water. This required California, including IID, to find a way to reduce its annual use from around 5.2 MAF to 4.4 MAF to stay within the California apportionment.

In 1988, MWD and IID signed agreements to implement 15 new projects called the Water Conservation Program, and in 1989 IID, MWD, PVID, and CVWD signed additional agreements to conserve and transfer water. In October 2003, a set of interrelated contracts called the QSA/Transfer Agreements were signed by the U.S. Secretary of the Interior, various Indian tribes, IID, CVWD, MWD, and SDCWA. Under the QSA/Transfer Agreements, IID's Quantified Priority 3a annual allocation of Colorado River water use was capped at 3.1 MAF measured at Imperial Dam. IID agreed to water transfers and made environmental commitments in exchange for money from other users to fund on-farm and systems wide conservation measures that would reduce total agricultural demands, while at the same time maintaining agricultural productivity.

The amount of water available at Imperial Dam for IID net consumptive use is just under 2.8 MAF in 2010, leveling off at just over 2.6 MAF in 2027 and for the term of the QSA/Transfer Agreements.[32,33]

Under the QSA/Transfer Agreements, IID expects agricultural demands to decrease in an amount equivalent to the water conservation attributable to on-farm and systems efficiency measures. So while IID's total volume of water diverted from the Colorado River will decline, so too will its agricultural demands because of agricultural water conservation actions. One of the principles of the QSA/Transfer Agreements was that although the amount of water going to agricultural uses would decrease, the total agricultural output and

[32] For details, see Colorado River Water Delivery Agreement: Federal QSA, Exhibit B, October 2003 http://www.usbr.gov/lc/region/g4000/crwda/crwda.pdf.

[32] Throughout this technical memo, net consumptive use is defined as per USBR Colorado River Accounting and Water Use (Decree Accounting) at Imperial Dam – not with any other accounting.

production would remain the same with the exception of the extraordinary conservation (fallowing) that would occur between 2003 and 2017 to mitigate impacts to the Salton Sea.

5.1.1 IID's Colorado River Rights

IID's water rights are formed under both California and Federal law. The IID Colorado River water rights are formed through a collection of agreements, generally known as the "Law of the River" that governs the interstate water rights regarding the Colorado River.[34]

5.1.1.1 IID's California Water Right

IID's rights to appropriate Colorado River water are longstanding.[35] Beginning in 1885, a number of individuals, as well as the California Development Company, made a series of appropriations of Colorado River water under California law for use in the Imperial Valley. Pursuant to then-existing California laws, these appropriations were initiated by the posting of public notice for approximately 7 million AFY at the point of diversion and recording such notices in the office of the county recorder. IID's predecessor rights holders made reasonable progress in putting their pre-1914 appropriative water rights to beneficial use.

The IID was organized under the California Irrigation District Act in 1911 for the purpose of acquiring the rights and properties of the California Development Company and its two Mexican companies. Water rights were conveyed to IID on June 22, 1916.[36] By 1929, 424,145 acres of the Imperial Valley's approximately one million irrigable acres were under irrigation, thus demonstrating reasonable progress towards putting pre-1914 appropriative water rights to beneficial use. The California SWRCB issues Water Rights Permit No. 7643 in January 1950 to divert up to 10,000 cfs year round, limiting the IID diversions under its federal contract to 3,850,000 acre-feet per annum.

5.1.1.2 Colorado River Entitlement

The 1922 Colorado River Compact guaranteed 7.5 MAF to the Lower Basin states in the Colorado River Basin. The allocation between Lower Basin states was provided in the 1928 Boulder Canyon Project Act,[37] providing California with 4.4 MAF plus 50 percent of any

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[34] See USBR *Law of the River* - Consisting of Colorado River Compact, Boulder Canyon Project Act, California Seven Party Agreement, Mexican Water Treaty, Upper Colorado River Basin Compact, Colorado River Storage Project, *Arizona v. California* Supreme Court Decision (Supplemental Decree and Consolidated Decree), Colorado River Basin Project Act, Long Range Operating Criteria, Minute 242, and Colorado River Basin Salinity Control Act. http://www.usbr.gov/lc/region/pao/lawofrvr.html .

[35] IID holds legal title to all its water and water rights in trust for district purposes including delivery to landowners within the district. California Water Code §§20529 and 22437; Bryant v. Yellen, 447 U.S. 352, 371 (1980), fn.23.

[36] Text taken from Petition for Approval of Long-term Conserved Water Transfer Agreement and Changes in Point of Diversion, Place of Use and Purpose of Use, Chapter III: IID Water Rights http://www.iid.com/Water_Index.php?pid=228 .

[37] HR 5773, an Act to provide for the construction of works for the protection and development of the Colorado River Basin, for the approval of the Colorado River compact, and for other purposes.

declared surplus out of the Lower Basin supply. Within California, the Seven Party Agreement[38] of 1931 provided the water right priorities shown in Table 5-1.

In 1932, IID entered into a contract with the Secretary of the Interior to receive entitlement to 3.85 MAF of water minus priorities one (PVID) and two (Yuma Project) – as in the 1931 California Seven-Party Agreement. IID's federal entitlement has two components: 1) the Prior Perfected Right (PPR) to 2.6 MAF, and 2) the remaining contract portion, between the PPR and the maximum amount under the 1932 Contract and the Seven Party Agreement – both grounded in state law prior appropriations.

The federal contract required IID to pay construction and maintenance costs associated with its delivery facilities at Imperial Dam and with the All-American Canal. A conflict over deliveries to CVWD ensued. The conflict was resolved by a 1934 compromise agreement that provided CVWD with its own USBR water delivery contract and that stipulated that CVWD would subordinate its Seven-Party Agreement water right priority to IID's. Thus, IID retains its full apportionment of the 3.85 MAF remainder after priorities 1 and 2, prior to CVWD diverting water.

The U.S. Supreme Court in Arizona v. California (1964 to 2006)[39] ruled that present perfected rights and Federal reserved water rights for Tribes must be included in the Colorado River allocations, and that these rights held higher priority than subsequent decreed rights. Pursuant to the terms of the Boulder Canyon Project Act, California's 4.4 MAF per year of mainstream water was to be used to satisfy ―any rights which existed on December 21, 1928." These rights included present perfected rights within IID's pre-1914 state law appropriative rights.

Although the United States Supreme Court in Arizona v. California defined both ―Perfected Right"[40] and ―Present Perfected Rights"[41] in the 1964 Decree, IID's present perfected rights were not quantified until the Supreme Court issued a Supplemental Decree in 1979. That Supplemental Decree defined IID's PPRs as ―a right to Colorado River water in annual quantities not to exceed: (i) 2.6 MAF of net consumptive use diversions from the mainstream, or (ii) the consumptive use required for irrigation of 424,145 acres and for the satisfaction of related uses, whichever of (i) or (ii) is less," with a priority date of 1901.

[38] Agreement under the Boulder Canyon Project, requesting apportionment of California's share of the waters for the Colorado River among the applicants in the state, August 18, 1931.

[39] Supreme Court Decision – 1964; Supplemental Decree – 1979; Consolidated Decree - 2006.

[40] A water right acquired in accordance with state law, which right has been exercised by the actual diversion of a specific quantity of water that has been applied to a defined area of land…

[41] Perfected rights, as defined above, existing as of June 25, 1929, the effective date of the Boulder Canyon Project Act.

Table 5-1. California Seven-Party Agreement Priorities (1931)

Priority	Water User	Annual Apportionment	Present Perfected Rights
1	**Palo Verde Irrigation District -** for use exclusively on 104,500 acres of Valley land in and adjoining district	3,850,000 AF	219,790 AF or consumptive use for 33,604 acres
2	**Yuma Project -** for use on California Division, not exceeding 25,000 acres of land		38,270 AF or consumptive use for 6,294 acres
3a	**Imperial Irrigation District -** for use on lands served by All-American Canal in Imperial and Coachella Valleys		2,600,000 AF or consumptive use for 424,145 acres
3b	**Palo Verde Irrigation District -** for use exclusively on additional 16,000 acres of mesa lands		
4	**MWD -** for use on the Southern California Coastal Plain	550,000 AF	
	Subtotal: California limit (not including surplus waters) of Colorado River water per Boulder Canyon Project Act and 1929 Limitation Act	**4,400,000 AF**	
5a	**MWD -** for use on the Southern California Coastal Plain	550,000 AF	
5b	**City and County of San Diego** - through MWD	112,000 AF	
6a	**Imperial Irrigation District -** lands served by AAC in Imperial and Coachella Valleys	300,000 AF	
6b	**PVID** - for use exclusively on 16,000 acres of mesa lands		
7	**California Agricultural Use -** Colorado River Basin lands in California	All remaining available water	
	Total:	5,362,000+ AF	

Note: (1) The Seven-Party Agreement 5.362 MAF annual allocation includes surplus water, as available. The likelihood of surplus being available has diminished with increased use and drought conditions on the river.
Source: *IID 2005 Annual Water Report*, p 22

IID's present perfected rights are significant, because Article II(B)(3) of the 1964 Supreme Court Decree provides that in any year in which there are less than 7.5 MAF of mainstream water available for release for consumptive use in Arizona, California and Nevada, the Secretary of the Interior shall first provide for the satisfaction of present perfected rights in the order of their priority dates without regard to state lines before imposing shortage cutbacks on other junior water rights holders.

5.1.2 Quantification Settlement Agreement and Related Transfer Agreements

The QSA/Transfer Agreements are a set of interrelated contracts that resolve certain disputes among the United States, the State of California, IID, MWD, CVWD and the SDCWA, for a period of 35 to 75 years, regarding the reasonable and beneficial use of Colorado River water; the ability to conserve, transfer and acquire conserved Colorado River water; the quantification and priority of Priorities 3 and 6 within California for the use of Colorado River water; and the obligation to implement and fund environmental impact mitigation related to the above.[42]

Conserved water transfer agreements between IID and SDCWA, IID and CVWD, and IID and MWD are all part of the QSA/Transfer Agreements. These contracts identify the conserved water volumes and transfer schedules for IID along with the price and payment terms. As specified in the agreements, IID will transfer to MWD up to 110,000 AF,[43] to SDCWA up to 200,000 AF and to CVWD and MWD combined up to 103,000 AF per year of water. The conserved water will come from delivery system improvements, on-farm efficiency improvements, and some fallowing, all in return for payments totaling billions of dollars. In addition, IID will transfer up to 67,700 AF per year of conserved water from the lining of the All-American Canal to SDCWA and certain San Luis Rey Indian Tribes in exchange for the payment of all lining project costs and a grant to IID of certain rights to use the conserved water. This last transfer is for a period of 55 to 110 years. It is the 3.1 MAF per year cap, not the conservation activities, that affects the supply. While conservation activities affect IID diversion; it is important to realize that there is an equivalent reduction in demand as a result of these conservation efforts.

5.1.2.1 Environmental Water Commitments

As part of the QSA/Transfer Agreements, several environmental programs require use of IID's entitlements and have been implemented by IID to preserve habitat and protect listed species.

5.1.2.2 Salton Sea Impact Mitigation

With implementation of the QSA/Transfer Agreements Water Transfer, flows to the Salton Sea were expected to decrease relative to historic levels. To address this, the SWRCB permit for the IID/SDCWA Water Transfer stipulates that the inflow into the Salton Sea is not to be reduced during the first 15 years (2003 to 2017) of the program.

To meet this obligation, IID adopted a strategy that is designed to mitigate impacts to the biological resources of the Salton Sea. IID agreed to undertake fallowing in an effort to mitigate Salton Sea impacts during this period by conserving more water than needed to meet its transfer obligations. IID will deliver additional conserved water in a volume equal to the amount that would have flowed to the Salton Sea absent the transfer program.[44] This

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[42] For QSA/Related Transfer Agreements documents related to IID, see IID, IID Water/ QSA link; for other QSA/Related Transfer Agreements see USBR Lower Colorado Region, Reports & Brochures link.

[43] Starting in 2007, by agreement between IID and MWD, this transfer was fixed at 105,000 AFY.

[44] IID. *Final IID 2007 Water Conservation Plan*, p 57., see at http://www.iid.com/Water/WaterPlanning

requirement will effectively reduce the water supply available for consumptive use by growers that participate in the IID Fallowing Program, through the year 2017. However, since the water for conservation is from consensual fallowing agreements with individual growers, the mitigation does not impact the water supply of users that do not participate in the fallowing program.

5.1.2.3 Construction of Managed Marsh Habitat

IID is in the first stage of constructing a managed marsh to mitigate potential habitat losses and/or habitat degradation that may result from projects and programs implemented to meet its QSA/Transfer Agreements obligations. To mitigate potential negative impacts due to QSA/Transfer Agreements efforts, IID will construct a 959-acre managed marsh that will receive water from IID's canal system. The marsh plan is based on a vegetation survey of IID drainage canals, and the consumptive use of the managed marsh complex is estimated to be approximately 5,760 acre-feet per year (6.0 AF/acre), with an additional 4,416 AF per year (4.6 AF/acre) draining from the complex, for a total delivery requirement of over 10,000 AF per year. The discharge and consumptive water use by the managed marsh complex have the effect of reducing the water supply available for other beneficial uses in the IID water service area.

5.1.3 Future Colorado River Water Supply

Climate change or prolonged drought could influence Colorado River flows and IID supplies. Studies by scientists at the Scripps Institution of Oceanography at the University of California at San Diego indicate that average Colorado River flows may decrease by 10 to 30 percent by 2050, causing a decrease in Colorado River flow of about 400,000 AF per year 40 percent of the time by 2025, and twice that by 2050. Under this scenario, the Colorado River would be able to provide all of its allocated water only 10 to 40 percent of the time. The USBR, using a different set of calculations reached a similar prediction: that the Colorado River could run short of water 58 to 73 percent of the time by 2050.[45] These findings are significant because decreased supplies on the Colorado River would affect millions of people and large areas of irrigated agriculture.

Several studies since 1979 have looked at potential impacts that changes in average temperature and precipitation might have on the flow of the Colorado River. Over time, results of global climate models have improved, but they are not necessarily more accurate than scenario results from temperature and precipitation inputs into statistical hydrologic regression analyses. Similarly, hydrologic models can capture many of the processes that affect basin runoff, but their complexity harbors uncertainty and error. The general conclusion from model results shows that the average annual runoff (flow) of the Colorado River could decrease by 1 to 3 MAF in the next few decades as a result of changes in regional temperature and precipitation. There is uncertainty related to climate change and natural variability, and how each of these conditions would affect Colorado River supplies.

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[45] Text extracted from ~~–S~~study: Shortages likely on Colorado River by 2050," By Mike Stark, Associated Press Writer, *The San Francisco Chronicle*, April 20, 2009.

5.1.4 Reliability of IID's Colorado River Supply

Under the *Law of the River*, IID has significant historical legal protections in place to maintain its 3.1 MAF Priority 3a water right to consumptive use of Colorado River water even during lower Colorado River flow periods. The prior perfected right for 2.6 MAF makes the supply very reliable in terms of the priority right and IID's ability to provide this water to the service areas even in the dry years as compared to others on the Colorado River. The prior perfected rights would be the last to be reduced in time of drought. Even with this level of reliability, there are anticipated to be times when IID will face a supply and demand imbalance related to the variations in agricultural demand. This is discussed further in the Water Demand section.

The reliability and certainty of IID's Colorado River water right is governed by a number of factors. In years with normal or average Colorado River flows and adequate reservoir storage in Lakes Powell and Mead the IID allocation will remain at 3.1 MAF. In years with surplus flows (greater than 7.5 MAF in the Lower Basin and adequate reservoir storage), the Seven-Party Agreement and QSA/Transfer Agreements provide for allocations beyond 4.4 MAF within California. The likelihood of surplus flows in the Colorado River has been diminished by increased Colorado River water use by Nevada and Arizona, and by persistent drought conditions relative to historical flows.

Even in drought years with Lower Colorado River flows less than 7.5 MAF the existing laws and agreements provide security that the IID should receive its Present Perfected Rights of 2.6 MAF and its overall water allocation remains at 3.1 MAF. This protection is based on the following:

- 1885 California water right, based on reasonable and beneficial use of approximately 7 MAF, conveyed to IID on June 22, 1916.
- 1922 Colorado River Compact requires the Upper Basin states to ensure the supply of 7.5 MAF at Lees Ferry for use by the Lower Basin states (actually stated as 75 MAF over 10 years). Thus, it is the responsibility of the Upper Basin states to provide the full Lower Basin allocation, even in drought years and even if the 10-year running average annual water supply of the river is less than 15.0 MAF.
- 1931 Seven-Party Agreement provides a schedule of apportionments and priorities, which the parties requested ~~–~~The Division of Water Resource to, in all respects, recognize… and recommend to the Secretary of the Interior… for insertion in any and all contracts for water made by him pursuant to the terms of the Boulder Canyon Project Act…Pursuant to the provisions ... California was apportioned 4.4 million AF per year out of the lower basin allocation of 7.5 million AF per year, plus 50 percent of any available surplus water." [46]

[46] ~~–~~On November 5, 1930, the Secretary of the Interior requested the California Division of Water Resources to recommend a proper method of apportioning the water that California was entitled to receive under the 1922 Colorado River compact and the Bounder Canyon Project act. Thereafter, a number of users and prospective

- 1931 IID agreed to limit its California pre-1914 appropriate water rights in quantity and priority to the apportionments and priorities contained in the Seven-Party Agreement.[47]
- 1968 Colorado River Basin Project Act states that all deliveries to the Central Arizona Project (CAP) and all other post-1968 water deliveries are subordinate to pre-existing Colorado River water rights in the Lower Basin, regardless of each state's allocations under the 1928 Boulder Canyon Project Act. Therefore, all post-1968 rights in the Lower Basin, including the CAP's, are effectively junior in priority to California's Colorado River diversions under its 4.4 MAF rights. Post-1968 rights in the Lower Basin are estimated to be 1.8 MAF.
- 1979 Supplemental Decree in *Arizona v. California* retains IID's present perfected rights to use of the Colorado River water. If water supply shortages occur along the Colorado River, IID's present perfected rights must be satisfied prior to the satisfaction of any non-perfected rights, regardless of state lines and Federal agreements. IID has a present perfected right to 2.6 MAF.
- 2003 QSA/Transfer Agreements slightly modify the guaranteed senior water right of IID within California under the terms of the Seven Party Agreement (senior to CVWD, MWD and San Diego City and County), as follows: IID retains its priority 3(a) right to 3.1 MAF of net consumptive use at Imperial Dam; however, if IID does not use its full annual apportionment, MWD can divert the balance up to California's 4.4 MAF per year allocation.
- 2007 USBR interim guidelines provide that shortages in Lake Mead storage, and decreasing water levels in the reservoir, will prompt reductions in the deliveries to Arizona and Nevada, but that California deliveries will remain at 4.4 MAF. If California deliveries remain to be 4.4 MAF, then IID deliveries should likewise remain at the agreed right of 3.1 MAF net consumptive use under the terms of the QSA/Transfer Agreements.

According to the "Law of the River," IID should retain a legal right to annual net consumptive use of 3.1 MAF from the Colorado River, even if severe water supply shortages occur. Under the terms of various agreements and laws, the annual Colorado River flows would have to be reduced to less than 5.0 MAF (one-third of historic average) before the water supply to IID would be impacted. Nevertheless, in the face of a large-scale water supply disruption in the western states, IID is potentially subject to some water supply reduction. The following sections explain how IID's 3.1 MAF per year is apportioned consistent with the QSA/Transfer Agreements and the other operating conditions on the Colorado River.

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users of Colorado River water, including IID and MWD, entered into the Seven-Party Agreement." For source, see Footnote 6.

[47] Text from IID Water Rights, see Footnote 6 for source.

5.2 Current and Future Water Demands

Water supplies within IID are conveyed from the Colorado River and are used by IID to meet all water demand in its service area. There are no other sources of supply. The IID Plan provides documentation of current and potential future non-agricultural water demands that will be reliant on the existing supply described above. Non-agricultural water demands include MCI, environmental, feedlot, dairy, industrial, and geothermal energy operations. Raw, untreated water is conveyed through open canals to the individual cities or other large non-agricultural water users. IID Cities treat and deliver potable water to end users. Demands are expected to increase by up to 100,000 AF by 2040. Historical and forecasted future water demands are documented in more detail in Appendix D.

5.2.1 Current Conditions

The 2008 population in Imperial County, as reported by the Imperial Valley Area of Governments (IVAG) and California Department of Finance (DoF), is 176,158 and 187,006, respectively. With population estimates of 152,610 and 154,570 in 2003, this represents an annual growth rate of approximately 3 percent. Calexico had the biggest population growth for a municipality with an increase of 6,533 and 7,190 for DoF and IVAG, respectively, between 2003 and 2008. Unincorporated areas of Imperial County showed the greatest growth with an increase of 13,286 over the five-year period.

MCI water demand accounts for approximately three percent of IID's delivered Colorado River water. However, it is expected that MCI water demand will increase with population growth. The average annual 1997 to 2008 MCI water use is 65,600 AF.

5.2.2 Future Conditions

Future water demand conditions are governed by the expected population growth or land use changes. There are a number of methods for forecasting future growth as discussed below and in Appendix D.

5.2.2.1 Policy of Future Water Allocation

The future apportionment to non-agricultural water users for municipal, industrial, geothermal, feedlots/dairies, and environmental resources was prescribed in the EDP. The EDP prescribes the amount of water that IID water users receive during periods of SDI. Under SDI conditions, industrial, geothermal, dairies and feed lots are based on historical practices and contracts and water availability as delineated in the IID Plan for future users. Environmental resources use is based on the amount of mitigation area that has been developed.

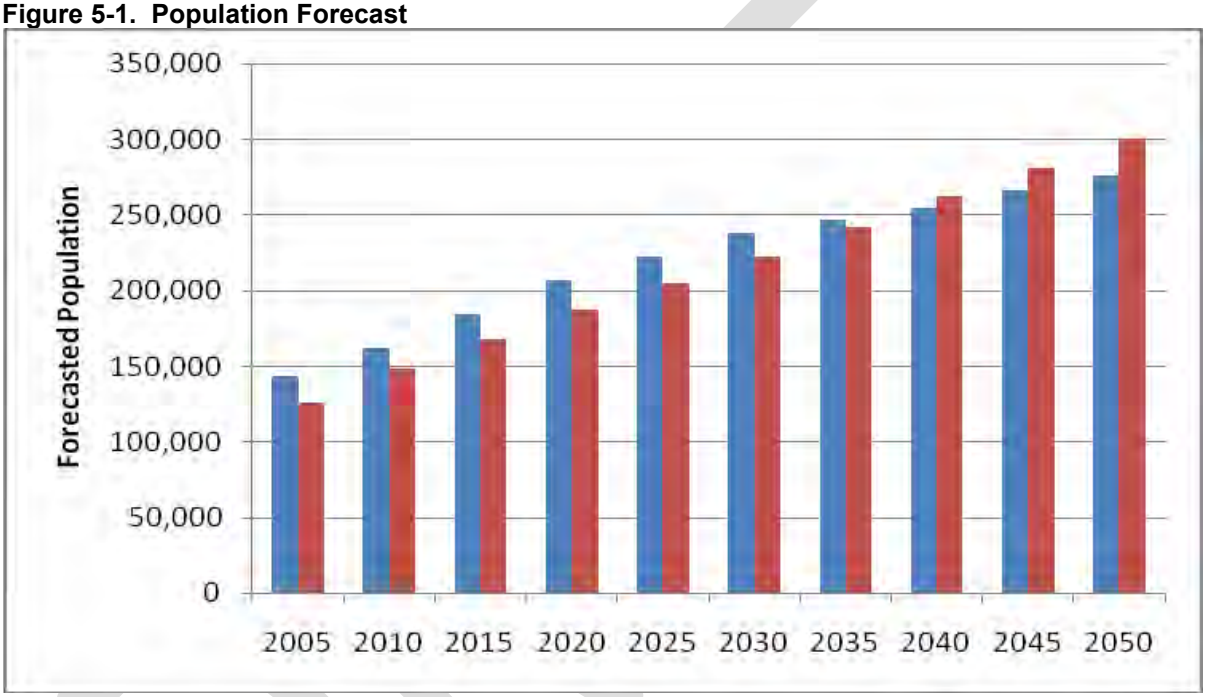
Municipal water is based on the amount of municipal water used in 2006 (37,958 AF, *2009 SDI Apportionment Report*, IID) plus the current District-wide average use per capita multiplied by the increase in population since 2006. Average use was calculated as 0.26 AF per capita per year. The allotted per capita water use factor is applied to the current service population to determine the total apportionment to the water agency. Water use, on a per capita basis, varies significantly among the urban agencies reflecting (1) differences in the

balance of residential, commercial, industrial, and public uses in each town, and (2) differences in the residential density, lot size, building vintage, and landscaping.

5.2.2.2 Population Growth

IVAG and DoF prepare estimates of future population. The IVAG and DoF estimates of future population are shown in Figure 5-1. These estimates represent population growth in organized areas. Appendix D includes a breakdown of the population for each individual city.

Figure 5-1. Population Forecast

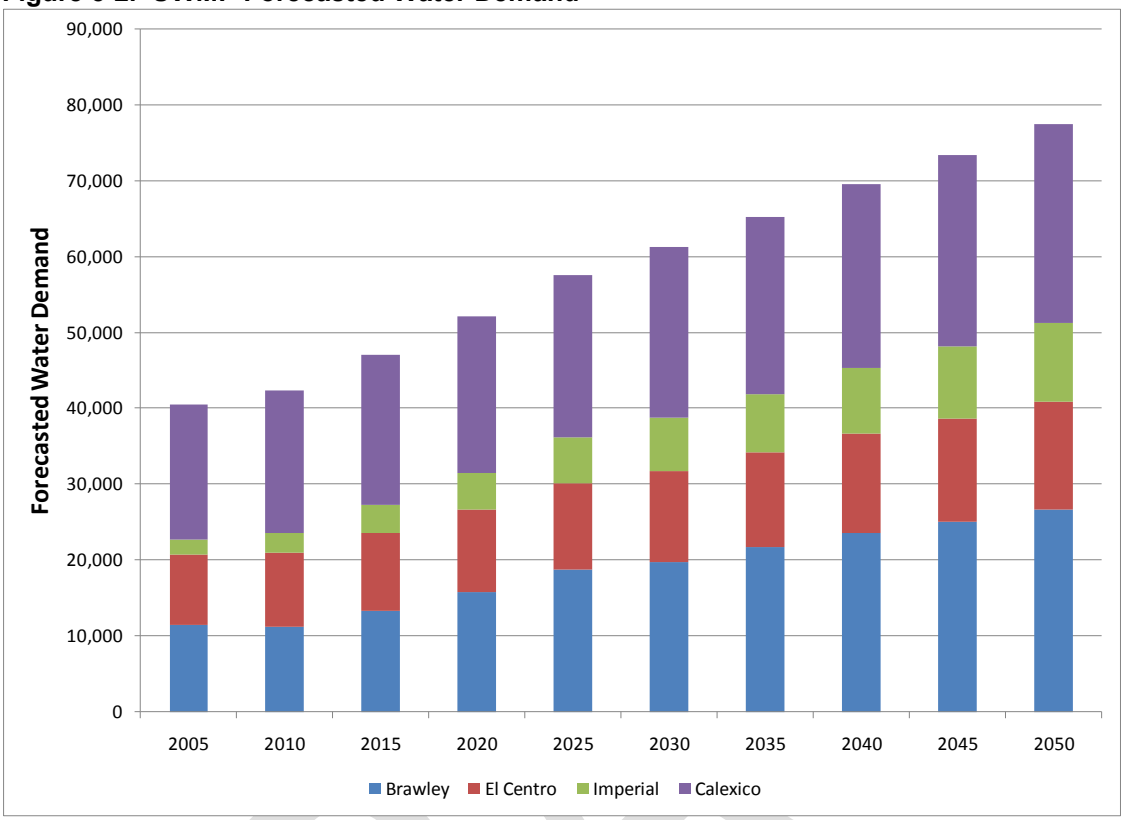


These estimates represent a potential range of population forecasts. Population within these ranges will be used in estimating future water demand. The IVAG data show a slower growth rate towards the end of the planning horizon. Documentation associated with the data does not provide an explanation for the reduction in growth rate.

5.2.2.3 Urban Water Management Plans

UWMPs are required by every urban water supplier that provides water to 3,000 or more customers, or that provides over 3,000 acre-feet of water annually. These plans document the reliability of water service to meet the needs of its various categories of customers during normal, dry, and multiple dry years. The plans document how much demand an urban supplier meets and shows forecasted demand over a 20 year period in five-year increments. Four cities have prepared UWMPs within IID and the demand documented in those UWMPs is shown in Figure 5-2.

Figure 5-2. UWMP Forecasted Water Demand



The UWMPs report a total urban water demand (e.g., actual demand) of approximately 40,500 AF in 2005 and a forecasted demand of 77,500 AF in 2050.

5.2.2.4 Municipal Consumptive Use

Three methods were used to estimate future municipal water use. These methods are focused on the municipalities in IID. Other non-agricultural water uses were forecasted separately.

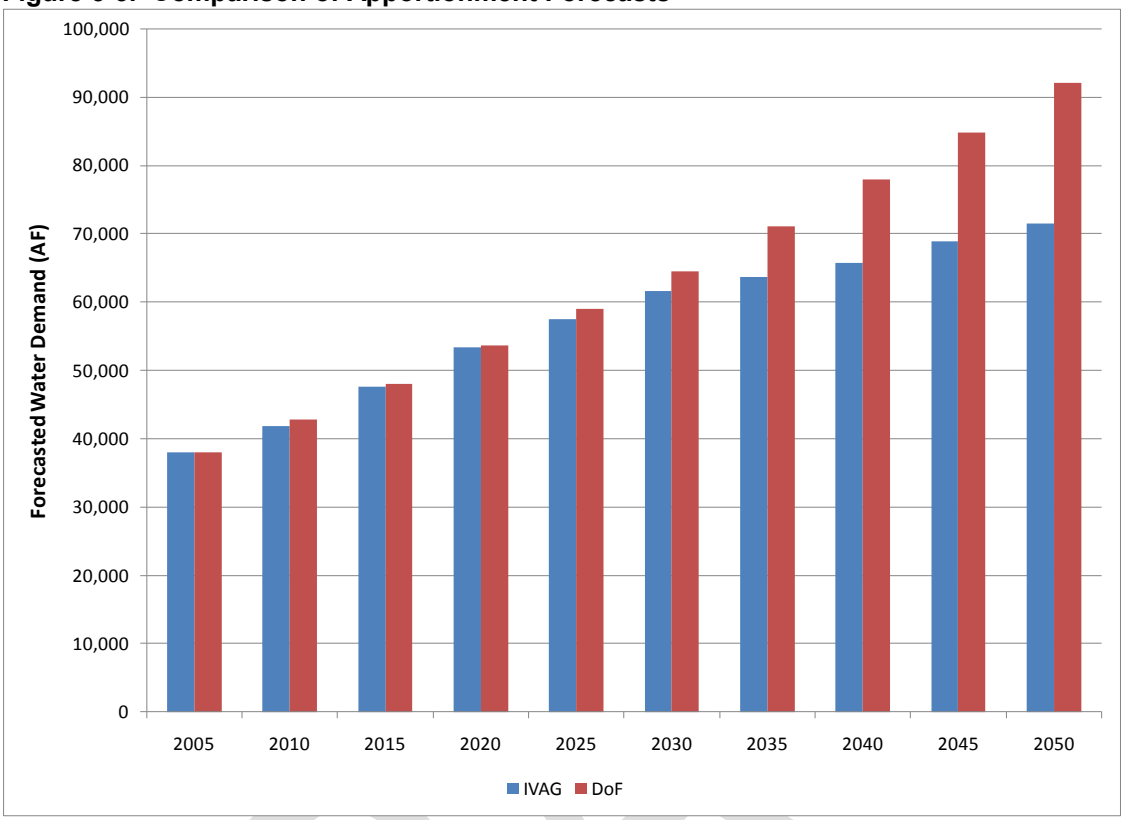
- Method 1: SDI apportionment
- Method 2: Water Use per Capita Model
- Method 3: Land Use Model

Each method is discussed below along with the estimated forecasted demand.

5.2.2.4.1 Method 1: SDI Apportionment

The EDP prescribes that forecasted water use will be 0.26 acre-feet per capita per year (af/cp/y) for the population difference between 2006 and some future year plus the water use in 2006. Using future population estimates, the 2006 baseline water demand amount of 37,959 AF, and 0.26 AF/cp/y for all population growth beyond 2006, Figure 5-3 shows forecasted water demand using IVAG and DoF population forecasts.

Figure 5-3. Comparison of Apportionment Forecasts

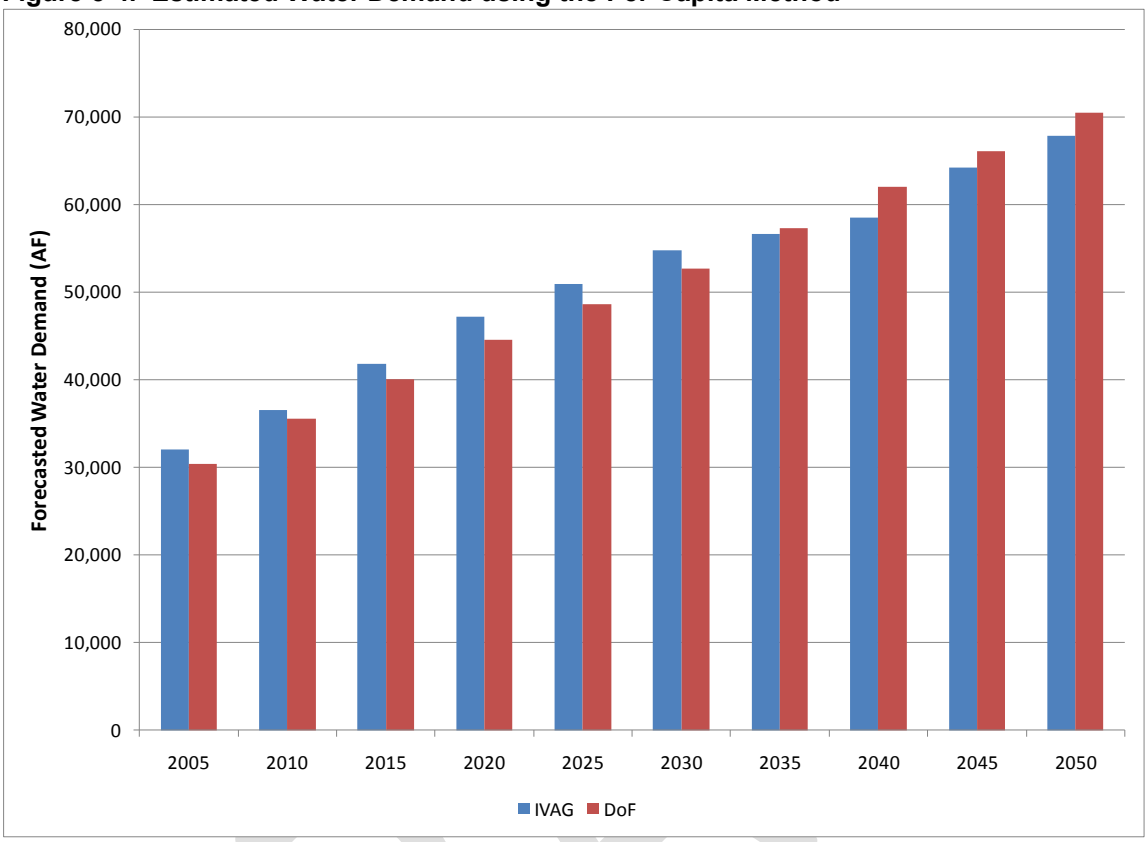


5.2.2.4.2 Method 2: Water Use Per Capita Model

Future water demand can be estimated by using per capita use of water. A model was developed using a demand per day, a distribution of the daily demand to the different types of water use, and population. The average daily per capita demand (gallons per day, gpd) for the urban areas in IID is approximately 208 gpd.

Demand was forecasted using the average per capita data and the IVAG and DoF population forecasts. Figure 5-4 shows the forecasted water demand.

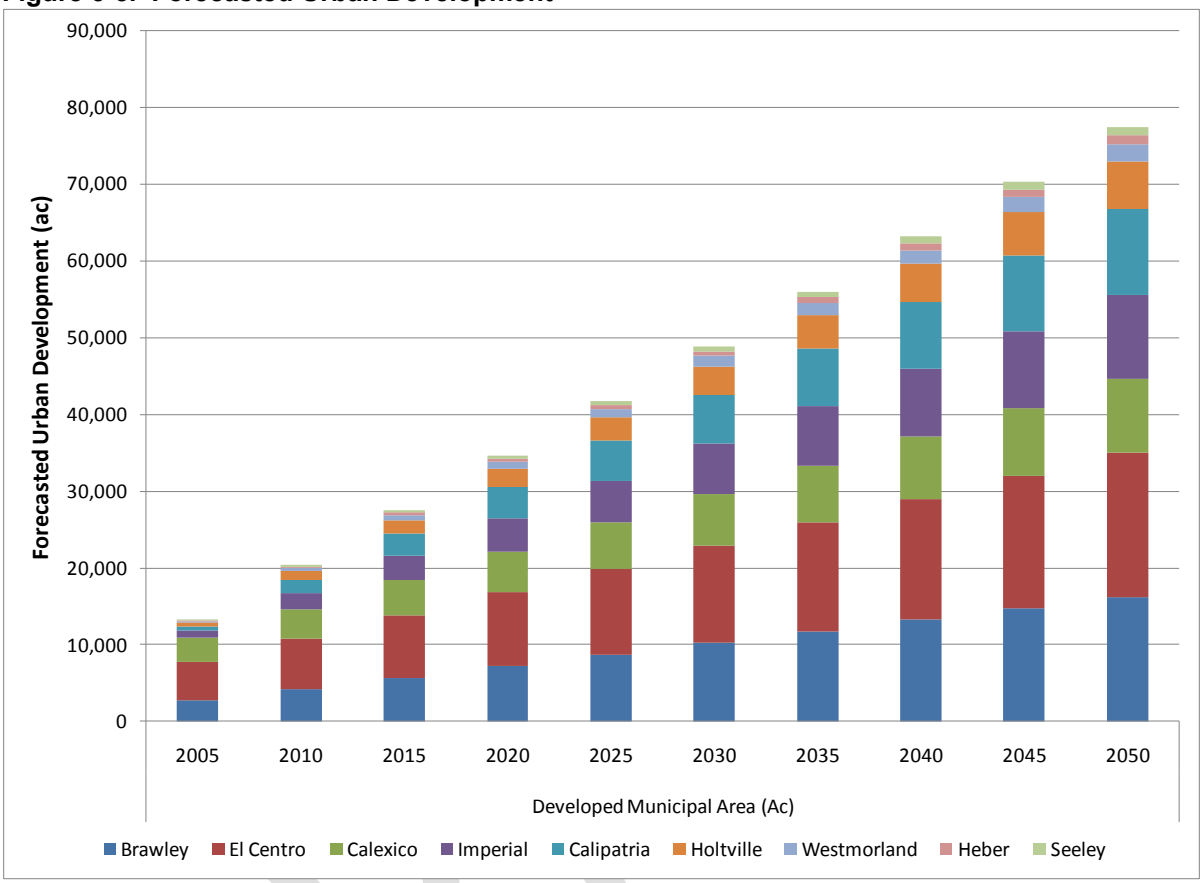
Figure 5-4. Estimated Water Demand using the Per Capita Method



5.2.2.4.3 Method 3: Land Use Model

Future water demand can also be estimated by forecasted land use. Each land use type has a certain amount of the water use associated on a unit-by-unit basis. Knowing the total area for a certain land use type and multiplying it by unit water use associated with that land use type will provide an estimate of the water demand for the land use. Figure 5-5 summarizes the forecasted developed land use in municipal areas.

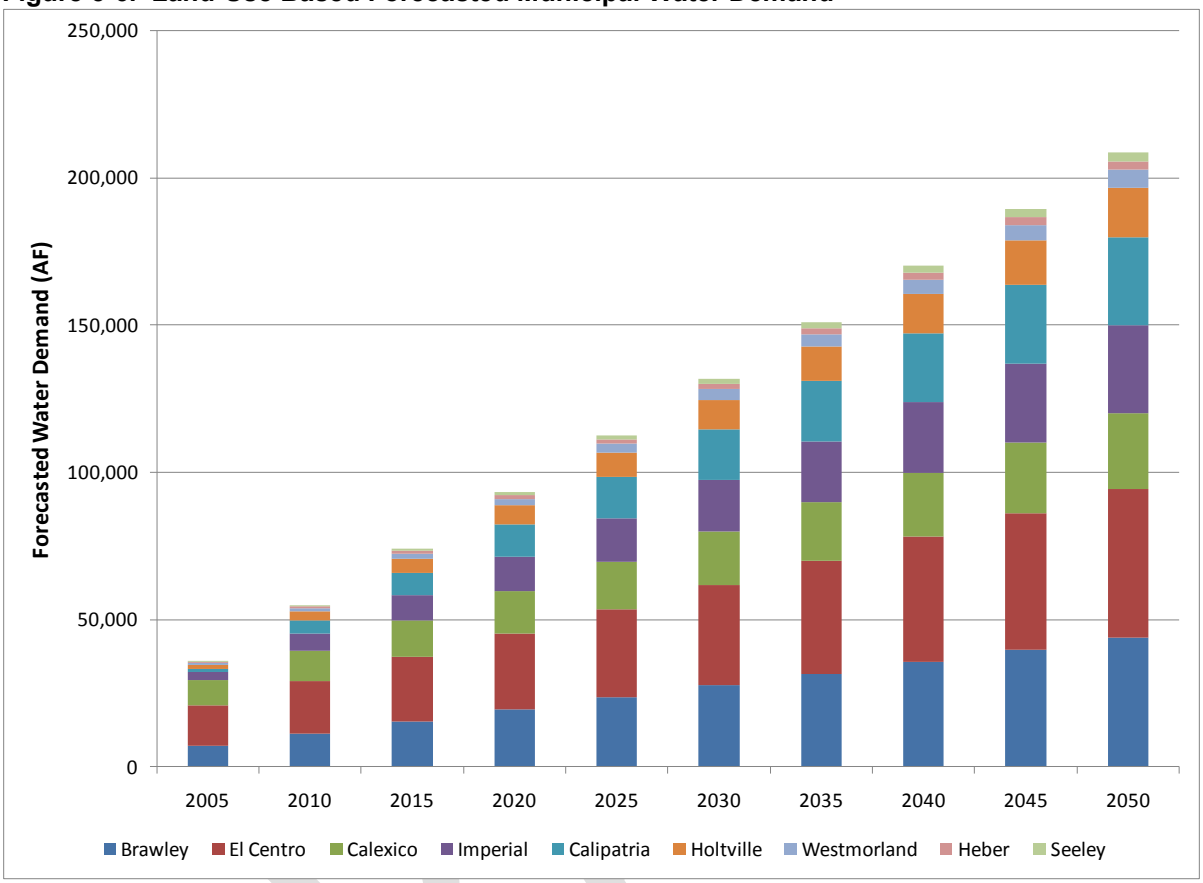
Figure 5-5. Forecasted Urban Development



Source: Data extracted from AutoCAD files provided by Imperial County Planning Department, LAFCO and City of Calexico. Heber and Seeley area estimated.

Using the developed municipal area and 2006 water delivery data, unit water demand values were calculated for each municipal area. The area-weighted unit water demand was calculated for each municipality and the average unit water demand was 2.7 AF/acre. Forecasted water demand was determined using projected land use area and area-weighted unit water demand data and Figure 5-6 shows the forecasted water demand.

Figure 5-6. Land-Use Based Forecasted Municipal Water Demand



5.2.2.5 Summary of Forecasted Municipal Water Demand

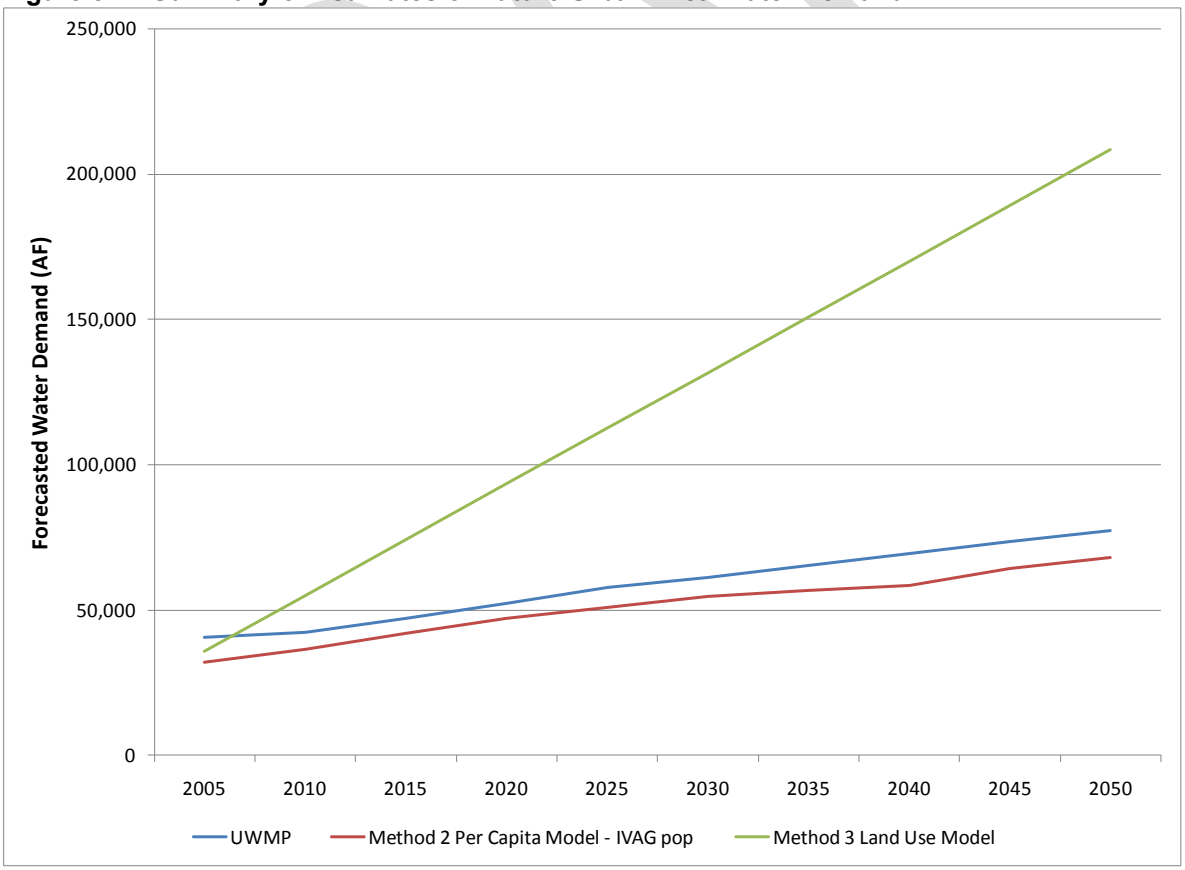
Table 5-2 provides a summary of each method used to estimate municipal water demand and an average of the four methods used to forecast municipal water demand.

From Table 5-2, the Per Capita Model using the IVAG population estimates represents the low range of forecasted water demand. The forecasted demands included in the municipalities' UWMPs are representative of a medium range water demand estimate, and the land use model is representative of a high range water demand estimate. These three estimates are shown in Figure 5-7 to provide the full range of water demand forecasts. These may be considered the high, medium, and low forecasts.

Table 5-2. Summary of Municipal Water Demand

	Forecasted Water Demand (AF)						
		Method 1		*Method 2*		*Method 3*	
	UWMP	*S/D - IVAG pop*	*S/D - DoF pop*	*Per Capita Model - IVAG*	*Per Capita Model - DoF*	*Land Use Model*	*Average*
2005	40,495	37,958	37,958	32,088	30,357	35,697	37,984
2010	42,303	41,839	43,801	36,529	35,506	54,886	44,394
2015	46,991	47,626	48,826	41,843	40,011	74,106	51,887
2020	52,081	53,412	54,373	47,156	44,515	93,293	59,637
2025	57,605	57,537	59,516	50,944	48,581	112,488	66,818
2030	61,195	61,659	65,130	54,730	52,646	131,678	73,417
2035	65,261	63,711	71,467	56,613	57,320	150,881	79,778
2040	69,563	65,762	78,185	58,497	61,994	170,068	86,162
2045	73,391	68,849	84,933	64,189	66,112	189,270	91,124
2050	77,385	71,521	92,102	67,868	70,476	208,466	97,970

Figure 5-7. Summary of Estimates of Future Urban Area Water Demand



5.2.2.6 Future Industrial/Geothermal Water Demand

As of 2006, there was 530 megawatt (MW) of installed geothermal capacity in the IID service area, with an additional 552 MW of geothermal capacity under development in early 2009. It has been estimated that 4,500 MW could be generated from geothermal energy if fully developed (*Renewable Energy Feasibility Study Final Report*, 2008). The 1997-2008 average water demand, measured as gate deliveries, is 16,274 AF. On average, 31.7 AF of water was needed to produce one MW over the past ten years when comparing the average annual water demand of 16,274 AF with the power generated (approximately 471 MW annually). It is estimated that an additional 19,158 AF of water would be needed to meet the water demands if the next 605 MW of geothermal energy are developed. Similarly, it is estimated that 142,500 AF would be needed to meet the fully developed geothermal energy potential.

Industrial water users outside municipal areas are governed by the same terms as geothermal energy in the EDP. Their 1997-2008 average water demand was 7,092 AF. For planning purposes, it was assumed that industrial water demand will not change going into the future.

5.2.2.7 Future Feedlots/Dairies Water Demand

The 1997 to 2008 annual average water use by feedlots and dairies was 20,000 AFY. Under the EDP, future use will be based upon past use and other considerations. It is assumed that future feedlot and dairy water will remain unchanged from the 1998 to 2008 average.

5.2.2.8 Future Environmental Resources Water Demand

Environmental resources water is needed for QSA/Related Transfer Agreement mitigations. A total of 960 acres of freshwater marsh is to be created by October 2019. This project, which is part of the Habitat Conservation Plan, is being developed as mitigation for the QSA transfer program and operations and maintenance impacts on drains. The water demand for the habitat is 12 AF per acre.

Additional mitigation efforts include a 50-acre salt marsh (does not use freshwater), 50 acre tamarisk mitigation (will use 500 AF of fresh water), and desert mitigation, which has no water demand.

For 2009, EDP includes 1,500 AF for environmental resources water. With a fully developed tamarisk mitigation area, the environmental resource water requirement should be 12,020 AFY by 2020.

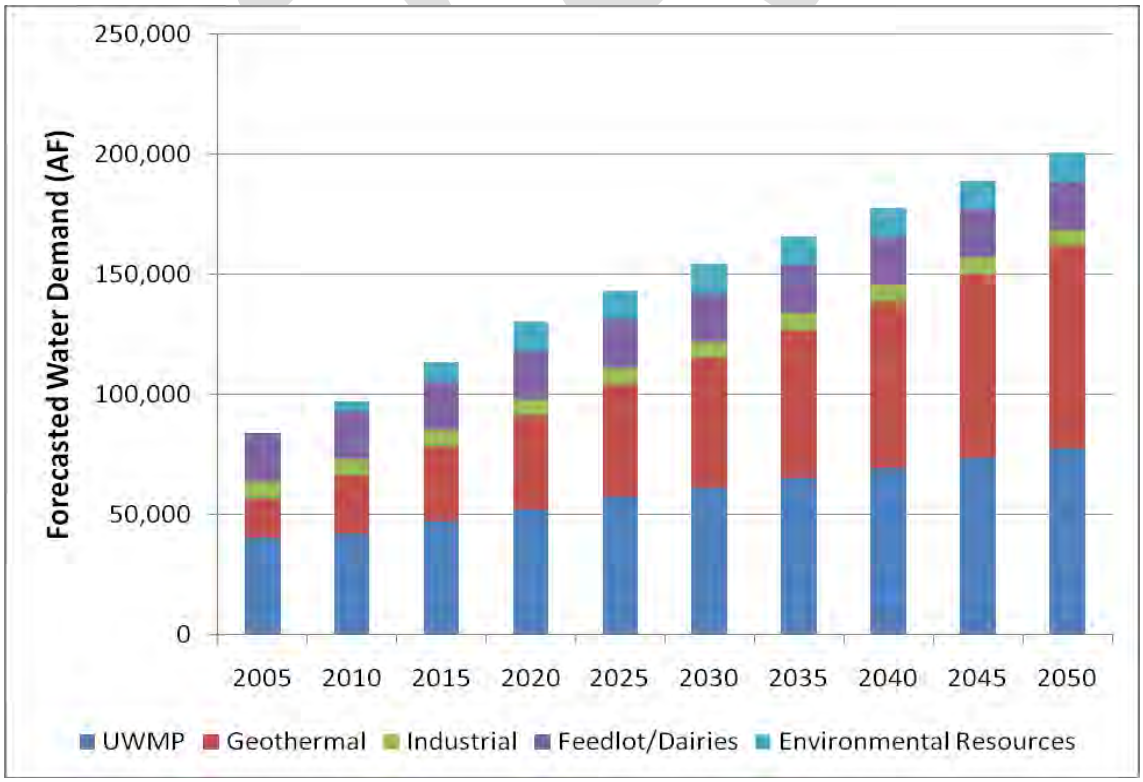
5.2.3 Amount of Water to be Managed for MCI

The future demands were used to quantify the block of water that the Board would need to develop (capital projects) or to manage via policy to apportion existing supplies. To develop the planning assumption for evaluation of projects and programs, three scenarios were developed to show the cumulative future non-agricultural water demands. The scenarios, low future water demand, medium water demand, and high water demand are composites of different estimates of future water demand. The low forecasted water demand estimate is comprised of the Per Capita model and no future development in geothermal resources. The second scenario is comprised of relatively medium future water demand based on

development of half of the known geothermal resources and municipal growth based on the forecasts included in the 2005 UWMPs. The third scenario is a high future water demand scenario based on full development of geothermal energy resources and municipal growth based on the land use model. Figure 5-8 shows the medium water demand scenario.

No MCI or geothermal water conservation assumptions are included in this forecast or scenario. Instead, it is presumed that an urban water conservation strategy will be defined, which will require that all future demands incorporate best management practices appropriate for the proposed use and will do everything needed to reduce water demands on the IID system and Colorado River. To be effective, these should be made a requirement or condition on the development at the time of approval by the appropriate land use agency. The medium future water demand scenario was used to provide the basis for planning how future non-agricultural water demands will be met. Non-agricultural water demands are forecasted to increase by approximately 100,000 acre-feet by 2050. A target planning objective will be established to develop new water supplies, or to plan for reapportionment of 50,000 acre-feet by the year 2025, with an additional 50,000 acre-feet needed by 2050. Since it is hard to predict future land use and industrial development with great certainty, it is also recommended that the IID Plan, or any subsequently prepared Imperial Regional IRWMP, include a contingency of 25,000 acre-feet. The IID Plan will seek to define 100,000 acre feet of water to be developed or managed for purposes of meeting future non-agricultural water demands.

Figure 5-8. Medium Future Water Demand Scenario



5.3 Current Water Budget

The following text and figure describing IID's water balance are incorporated from the *Efficiency Conservation Definite Plan, IID Delivery System analyses (Vol 1), Technical Appendix 1.b* (Davids Engineering, et al., May 2007, pp 8 – 35 of 184). The following graphs are based on the 2008 water balance information.

Figure 5-9 provides a conceptual overview of all flow paths within the IID water balance study area boundary. These include all water sources: AAC, rainfall, surface, and subsurface inflows. The arrows are sized relative to flow volume. Blue arrows signify water flow paths and red arrows signify discharge of water to the atmosphere via crop evapotranspiration (ET), evaporation from IID conveyance/distribution systems, rivers, drains, MCI consumptive use, and transpiration by vegetation growing along canals, drains, and rivers. This figure also shows the 1998 through 2008 average annual value for several components of the water balance.

The water balances were developed as part of the *Efficiency Conservation Definite Plan* (Definite Plan) and include monthly and annual accounting. The water balances are based on modified versions of spreadsheets developed by the IID Water Study Team in 2000.

5.3.1 Methods and Assumptions

The IID water balance has boundaries that coincide with AAC inflow at Mesa Lateral 5 on the East, the Mexican border on the South, the Westside Main Canal service area on the West, and the Salton Sea on the North. The first step in the IID water balance is to sum inflows and subtract outflows and this equals the total consumptive use plus the change in soil water storage.

Inflows include the AAC, the New and Alamo rivers from Mexico, rainfall, Mesa storm flows, and subsurface inflows. Outflows, which discharge to the Salton Sea, include the New and Alamo rivers, Direct-to-Sea flows, and subsurface outflow.

The results from the water balance are shown in Figures 5-10 through 5-14. Detailed water budget tables are included in Appendix E. The effects of increased conservation can be observed from 2003 to present as in Figure 5-10, which presents the annual inflow from the All-American Canal at Mesa Lateral 5. Figure 5-11 shows the annual delivery and use of water from the All-American Canal water budget. Figures 5-12 and 5-13 show the agricultural and non-agricultural water use and outflow water budget. Figure 5-14 shows the distribution to the drainage water budget.

From Figure 5-12, Crop ET is the largest category of water use and represents the biggest opportunity for water savings through water conservation. A 5 percent reduction from 2006 levels would provide approximately 75,000 AF of water available for other uses. Similarly, reuse of tailwater and tilewater has the potential of providing over 800,000 AF of additional water supply if it could be captured.

Figure 5-9. IID Annual Water Budget (as adopted from Davids Engineering et al. IID Delivery Systems Analyses (Vol. 2) Technical Appendices 1.B, P.2)

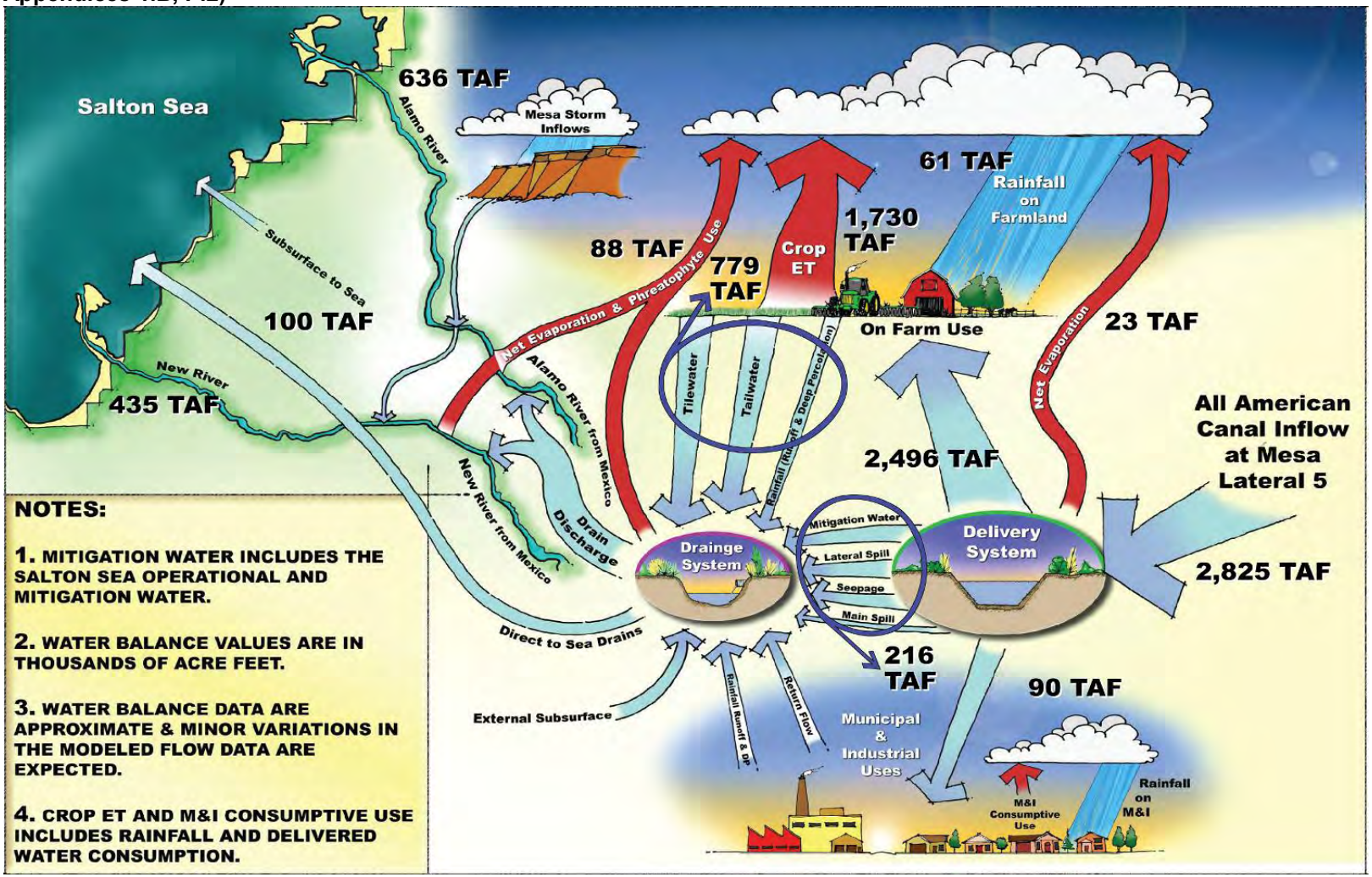


Figure 5-10. Annual All-American Canal Inflow at Mesa Lateral 5

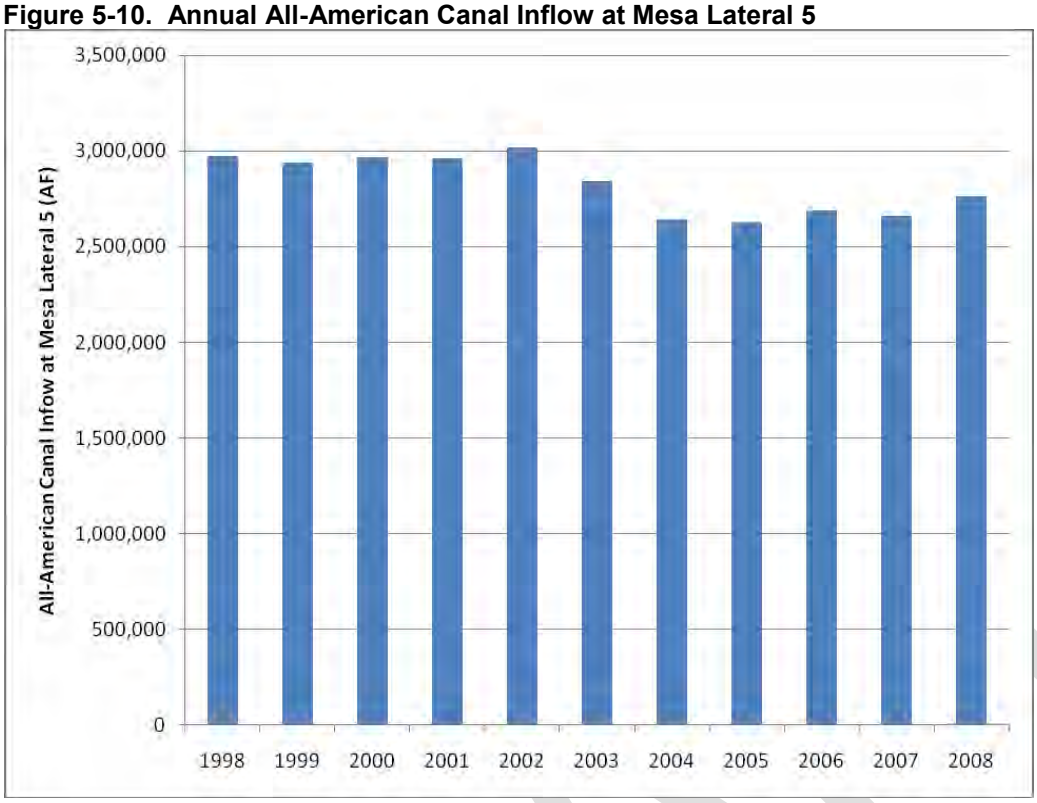


Figure 5-11. Annual IID Water Delivery and Losses Water Budget

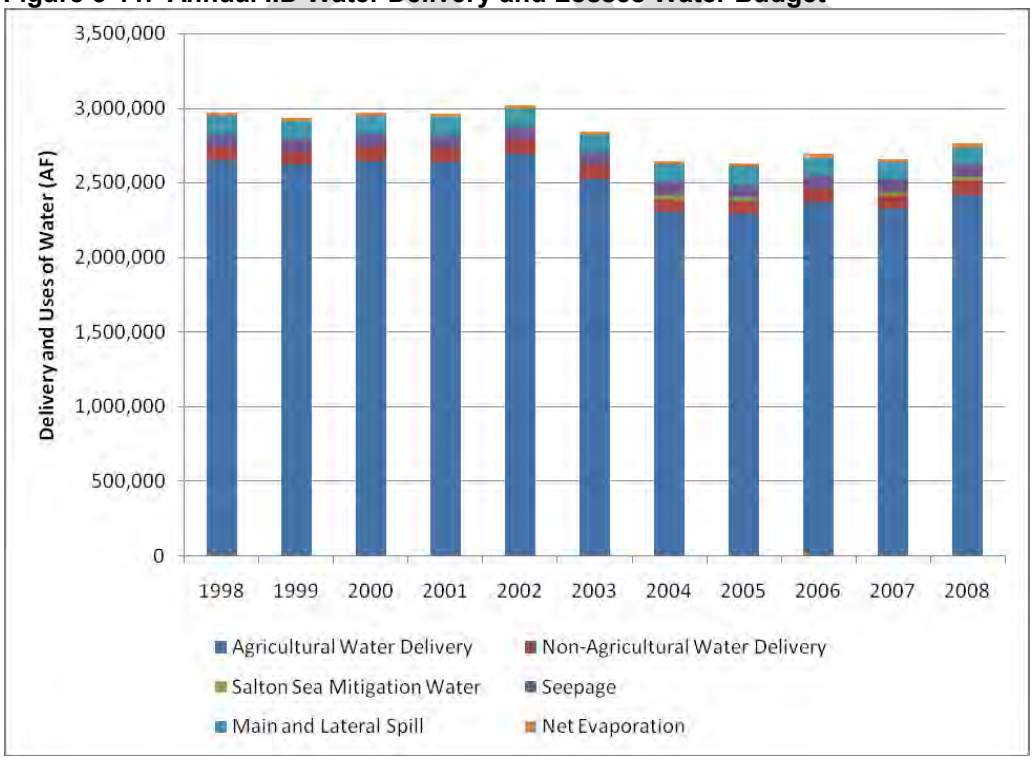


Figure 5-12. Agricultural Water Use and Outflow Budget

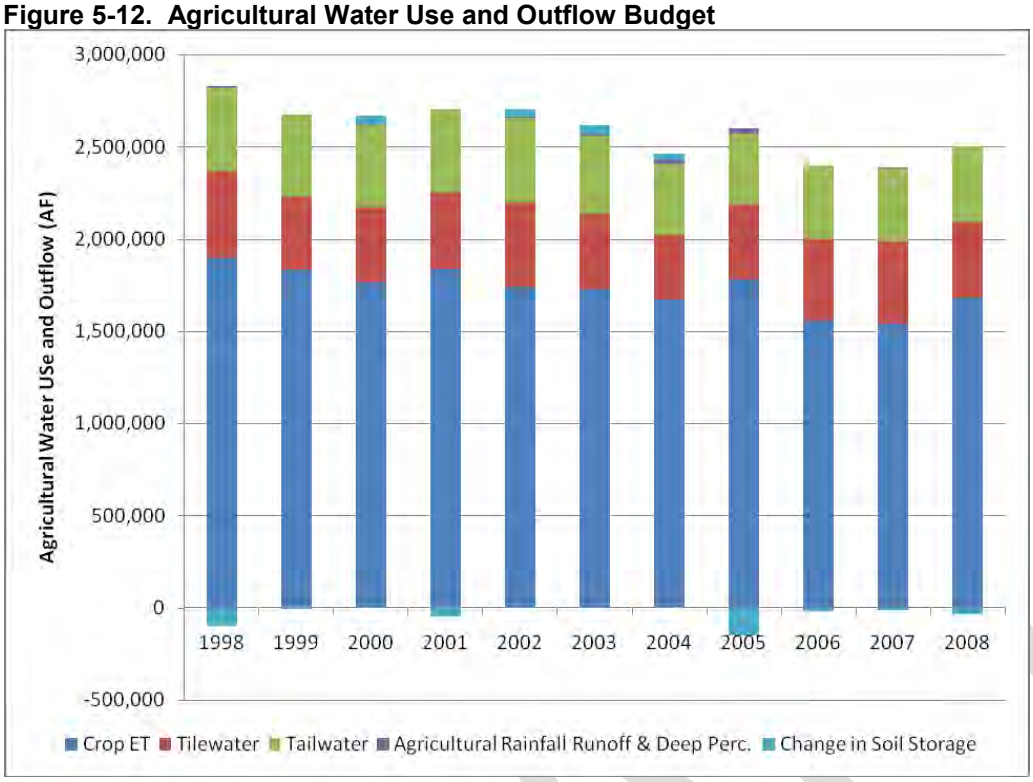


Figure 5-13. Non-Agricultural Water Use and Outflow Budget

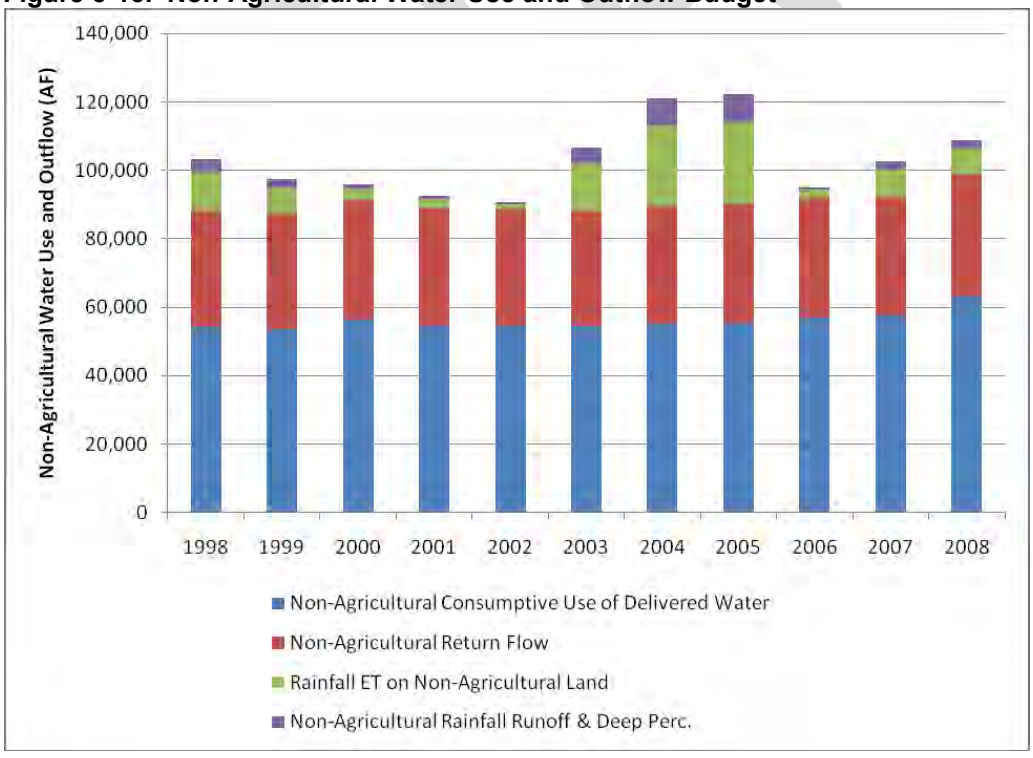
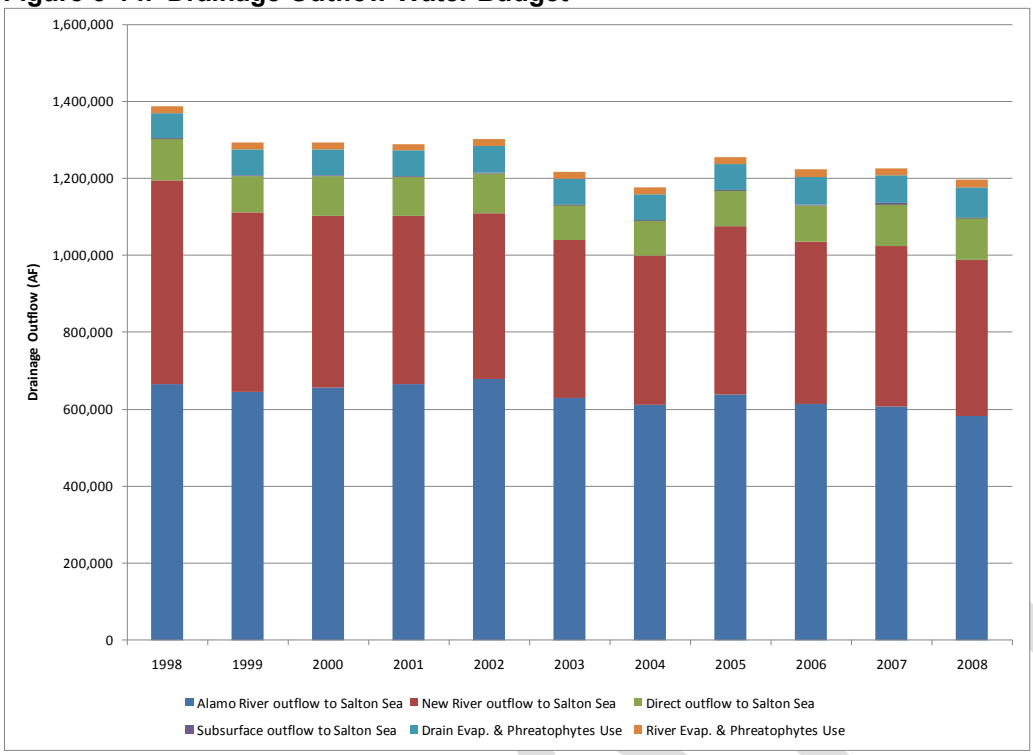


Figure 5-14. Drainage Outflow Water Budget



5.4 Water Available for Development

5.4.1 Groundwater Available for Development

Review of the water management strategies and currently available groundwater and water quality data indicate that there is groundwater available for development but that this water is salty and would need treatment through desalination to be able to be used for agricultural or non-agricultural uses. The feasibility for groundwater development was evaluated as documented in Appendix B. Based on this review, and as described in further detail in Chapter 7, a range of groundwater development projects alternatives were configured and costed.

There is groundwater that can be developed in the East Mesa. The area has limited natural recharge and the groundwater in storage is from the historical seepage of the Coachella, All-American and East Highline Canals. The aquifer is nearly full and has appropriate hydrogeologic characteristics to allow wells to yield useable quantities of water that could then be conveyed to desalination plants for treatment distribution and use.

The developable volume of water is on the order of 1 to 2 MAF. It is believed that up to 1 MAF could be developed over 40 years at a rate of 25 TAF per year, but further field reconnaissance and modeling would be necessary to evaluate potential impacts.

Developing this groundwater without providing recharge would result in a mining operation that would deplete this storage over time. Without further groundwater banking and recharge operations, this means the annual yield would need to be established by policy of the IID Board and Imperial County Board of Supervisors.

5.4.2 Colorado River Available for Groundwater Banking

As discussed in the Water Management Strategy, groundwater banking would help IID better manage its available supplies by providing a place to store IID water when it is available but is not being diverted (under-runs). Under-runs occur when IID does not divert its full entitlement. In such conditions, other California users can divert this unused water. Unless IID has a place to store the water, it will be used by others and lost to IID for MCI or agricultural uses. Groundwater banking is recognized as a beneficial use of Colorado River water. Developing groundwater banking facilities is an extremely important tool for IID to make its Colorado River water rights.

To make maximum use of water banked in under-run years, the size of overrun years needs to be limited through agricultural demand management. Limiting overruns decreases payback requirements, thus increasing the amount of water available in storage for either agricultural or MCI uses.

5.4.2.1 Approach and Groundwater Banking Scenarios

To develop a groundwater bank, one of the first steps is to quantify how much water is available for banking, then find appropriate storage capacity in a groundwater basin and size the needed facilities accordingly.

Since the QSA in 2003, IID has had under-runs in 3 of 6 years and it is expected that an under-run will occur in 2009[48] (see Figure 5-15). The total of these under-runs is almost 370,000 AF. This is water that could have been ordered and stored if adequate groundwater banking facilities had been available to IID. This period of accounting is the only data available under the QSA operating regulations and may not reflect future diversions.

A set of demand data was developed for the QSA environmental impact analysis based on weather data from 1925 to 1999 and crop patterns from 1987 to 1998.[49] A groundwater banking model was created to evaluate multiple groundwater banking scenarios and quantify water available for banking and pumping based on these data. The model has a managed overrun variable that can be adjusted based on anticipated overrun limitations. Site-specific assumptions include maximum available storage, maximum recharge rate, maximum pumping rate, initial groundwater storage, and losses due to inefficiencies and/or treatment of extracted water supplies. The groundwater banking model allows the user to calculate available water supplies based on estimated aquifer physical characteristics and an assumed overrun management value. This available water supply can be allocated according to the scenario chosen by the user such that beneficiaries and their associated water supplies are defined. The model provides new water yield first from under-runs and then from banked water. Only under-runs in excess of new water yields are banked.

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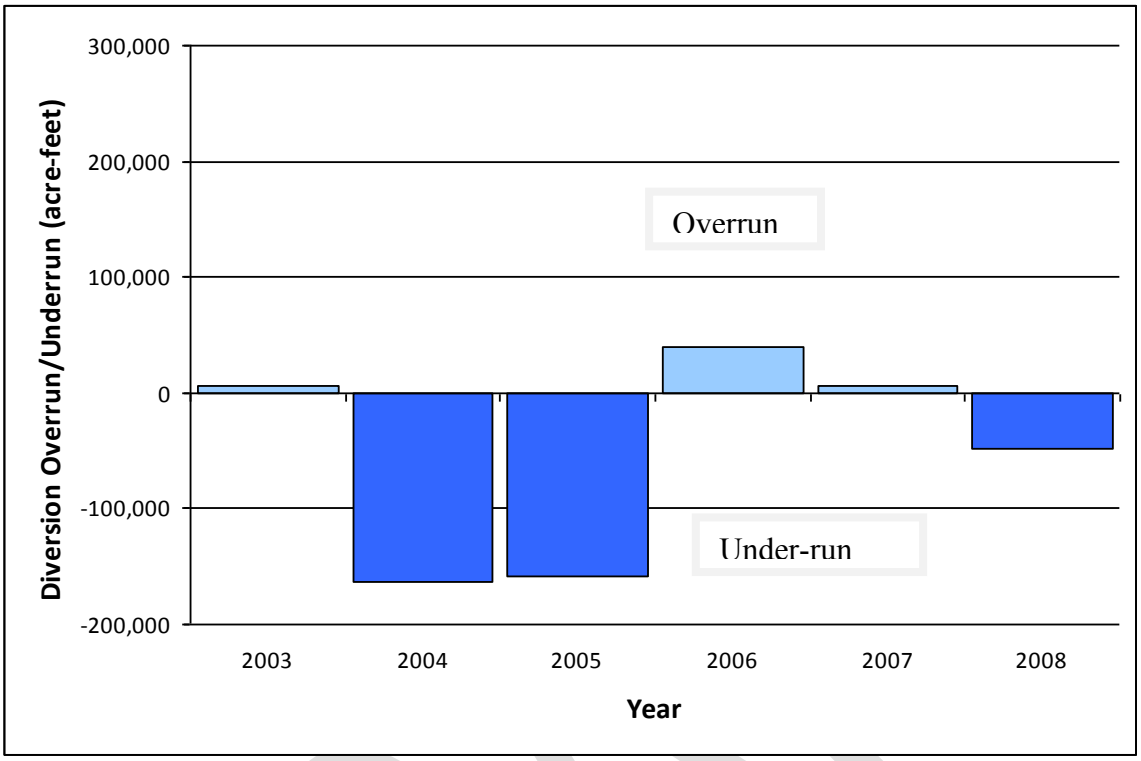
[48] U.S. Bureau of Reclamation Lower Colorado Region Provisional CY2009, July 14, 2009 http://www.usbr.gov/lc/region/g4000/hourly/forecast09.pdf.

[49] From TABLE 6-4, Draft Imperial Irrigation Decision Support System, November 2001, prepared by CH2MHill et al.

Figure 5-15. Recent IID Diversion Overrun and Under-Run based on USBR Colorado River Decree Accounting



5.4.2.2 Analysis Results

The presented modeling results are limited to a few examples that cover a range of probable scenarios. Additional scenarios can be analyzed by adjusting recharge capacity, withdrawal capacity, initial and maximum groundwater storage, and system operation efficiency.

The annual yield from groundwater banking ranges from 19,000 AF to 55,000 AF per year based on the scenarios described in Table 5-3. These scenarios assume that groundwater pumping is not used for repayment of inadvertent overruns.

If the banked groundwater is used to pay back uncapped inadvertent overruns, there are no additional water resources available because the quantity of overruns is approximately equal to the under-runs in the 75 year record; however, by limiting inadvertent overruns additional water supplies are available.

Table 5-3. Estimated Yields from Various Groundwater Banking Scenarios.

Analysis Scenario		Managed Overrun, AF/YR			
		No Overrun	50,000	100,000	200,000
100,000 AF/YR Aquifer Contribution Limit	Original data order, limited initial storage	23,000	19,000	19,000	19,000
	Original data order, adequate initial storage	45,000	39,000	34,000	31,000
	Initial under-run period, limited initial storage	39,000	33,000	29,000	26,000
	Initial under-run period, adequate initial storage	45,000	39,000	34,000	31,000
200,000 AF/YR Aquifer Contribution Limit	Original data order, limited initial storage	23,000	19,000	19,000	19,000
	Original data order, adequate initial storage	55,000	50,000	44,000	40,000
	Initial under-run period, limited initial storage	50,000	43,000	38,000	35,000
	Initial under-run period, adequate initial storage	55,000	49,000	43,000	40,000

Table Notes:

- Losses are estimated to be 5 percent.
- Groundwater withdrawal capacity is estimated to be 50,000 AFY.
- Total aquifer storage capacity is estimated to be 1,000,000 AF.
- All scenarios result in either no change in groundwater storage or greater groundwater storage at end of the 75 year record (no negative net change).
- Limited initial storage assumes that initial storage is zero.
- Adequate initial storage allows utilization prior to under-runs. The initial storage ranges from 230,000 AF for the 31,000 AFY yield to 650,000 AF for the 55,000 AFY yield. In these scenarios the initial and ending storage are the same.
- The original data order has an early period with limited under-runs.
- The scenario with initial under-runs re-configures the raw data into the following order: 1982-1999, 1925-1981.

Groundwater storage and banking can be used to meet increasing MCI water demands and/or reduce the extraordinary conservation measures that would be required to pay back inadvertent overruns. When groundwater storage is used solely to meet increasing MCI demands, IID will order water specifically for groundwater banking during years in which an under-run could occur. The USBR currently forecasts under-runs and overruns during the year based on deliveries, but the methodology could be refined by IID based on cropping patterns and weather data. If inadvertent overruns occur, extraordinary conservation measures including fallowing would be required to pay back overruns as per USBR policy. This scenario allows maximum MCI supply.

Alternately, the yield from banking groundwater could be apportioned to both the agricultural and MCI sectors. This option allows payment of inadvertent overruns from groundwater storage and creates additional supplies for MCI demands. Payment of inadvertent overruns would be accomplished by leaving additional water supplies in the Colorado River and taking diversions from banked groundwater. Any remaining banked groundwater would be available to meet additional MCI demands. In this scenario extraordinary conservation obligations are reduced as paybacks are supplemented by groundwater resources. This scenario leaves less water for MCI use because a portion of the banked groundwater is used for payback of inadvertent overruns.

The IID Board needs to establish policy and provide guidance on how the water from a groundwater bank would be apportioned.

5.4.3 Drainage Water

Use of agricultural drain water represents a significant source of water within the valley. The minimum flow needed for a viable desalination plant is 50,000 acre-feet per year. The average annual flow summed from drains considered for recovery (Holtville Main, Mesquite, Central and Rose) is approximately 170,000 acre-feet. It is assumed that combined drain flow recovery would be sufficient for operation of a viable desalination plant. Post QSA water quality (as salinity) within drain systems varies between 2,700 and 3,700 ppm, which does not pose an issue for a desalination plant. Reclaiming the drain water and the use of drain water would be subject to environmental review and documentation. Additional information regarding drain water reuse is contained in Appendix G.

5.5 Findings

This chapter identifies the nature and extent of the water supply issues and establishes the size of the supply needed for development or apportionment to future non-agricultural water users. The summary of findings includes:

- Existing water supplies are derived from senior water rights that are relatively stable and are highly reliable even in single or multiple years of below normal hydrology, even with a 3.1 MAF cap.
- The 3.1 MAF cap presents a demand management issue, rather than exclusively a supply issue, because even though the supply is stable and highly reliable, agricultural demands can vary greatly, resulting in a potential to overrun to the IID entitlement.
    - These overruns must be paid back in future years and if not managed, could affect the Water Supply Portfolio.
    - Management of overruns through programs like the EDP is needed to minimize the overruns and the need for payback of water in subsequent years.
    - The Definite Plan is a good investment in that it will help IID stay within the 3.1 MAF cap while maintaining historical levels of agricultural productivity, and helping to document and demonstrate to the State of California (SWRCB), U.S. Department of the Interior, and other Colorado River water users that agriculture is putting the water to reasonable and beneficial use, further protecting IID‘s water rights and providing defensible evidence to prevent or protect from legal challenge.
- By 2040 it is likely that 100 TAF will need to be further managed either by development of new water supplies or reapportionment of the existing supply available to IID in order to meet non-agricultural water demands.
    - By 2010, 50 TAF will be needed
    - By 2040, an additional 25 TAF should be planned
    - An additional 25 TAF should be included as a contingency in the planning
- Water Available for Development
    - Groundwater Development
        - The East Mesa has groundwater in storage that can be developed but would require desalination.

    - Up to 1 MAF (at a rate of 25 TAF) could be developed over 40 years.
    - Developing this groundwater without providing recharge would be a groundwater mining operation that would deplete this storage over time.
- Groundwater Banking
    - Based on previous modeling, the annual yield from groundwater banking ranges from 19,000 AF to 55,000 AF per year, varying based on the ability to cap overruns and assumptions related to sizing of facilities.
    - There would be little additional water available if the inadvertent overruns are not limited or the banked groundwater is used for payback.
    - If the under-runs are not banked, it will be used by other Colorado River users and will be lost to IID, essentially diminishing the IID Water Supply Portfolio (use it or lose it).
    - The IID Board needs to adopt policy related to how it would apportion water stored in a groundwater bank and decide whether the water would be allocated to paying back overruns, committed to MCI uses, or some combination of the two.

6 Review of Water Management Strategies

Every five years DWR prepares the California Water Plan (CWP) consistent with the California Water Code. A key effort of CWP Update 2005 was to define a finite, but comprehensive, set of water resource management strategies that local agencies and regional planning efforts throughout the state can integrate into their local water management plans. DWR defines a water resource management strategy as a project, program, or policy that helps local agencies like IID manage their water and related resources. The strategies provide individual building blocks or "tools" that include both structural ("brick and mortar") and/or non-structural (policies and programs) solutions. The draft CWP Update 2009 identifies 26 water management strategies intended to help local agencies, like IID, develop integrated water plans. For the IID Plan, the DWR water management strategies were adapted, evaluated, and screened for their applicability within IID.

The California Legislature encourages local agencies to work cooperatively to manage their available local and imported water supplies to improve the quality, quantity, and reliability of those supplies. State bond funding has been made contingent on such cooperation and on the integration of the state's water management strategies. The Legislature directed that the water management strategies be considered in any IRWMP and further directed that DWR incorporate the water management strategies into the IRWMP guidelines and the criteria used when evaluating regional plans and making funding decisions.

As part of the IID Plan process, IID produced a "Project Scoping Report – Review and Evaluation of Water Management Strategies" (Appendix A; Draft July 24, 2009). The purpose of the interim report was to provide information to help the Board and stakeholders understand the range of water management strategies that, when applied alone or in various combinations, could be used to meet the IID Plan goals and objectives, and to lay the foundation for how the community's long-term water needs could be met.

The intent of the Project Scoping Report was threefold: 1) to define those water management strategies that would be carried forward for more detailed evaluation, 2) to indicate those that would be better addressed through the broader Imperial Region IRWMP, and 3) to eliminate those deemed infeasible or not applicable to meeting IID objectives. The result of the screening process was a list of preferred water management strategies that were further researched, analyzed, and integrated to formulate project alternatives. These strategies were broken into three major categories for purposes of the IID Plan:

1. Supply Augmentation
2. Demand Management
3. Other

The Board discussed the preliminary findings and information in its mid-April 2009 workshop. At that same time the Board also considered whether to move forward to engage the community and initiate preparation of an Imperial Region IRWMP. As a first step in moving down the pathway to prepare an IRWMP, the Board directed staff to prepare a Regional Assessment

Process (RAP) document to submit to DWR for consideration and approval of the proposed Imperial Region.[50] The RAP document was necessary to begin the IRWMP process and to qualify for bond funds. With this changed emphasis, some strategies that IID may have considered not to be within the area of IID responsibility were recommended for further development as part of the broader Imperial Region IWRMP, which is to include additional stakeholder involvement.

6.1 Evaluation Method

The Project Scoping - Water Management Strategies Report contains a discussion of each of the 26 water management strategies recommended by DWR, including:

1. Description of the strategy
2. Current application of the strategy within the IID area (baseline conditions)
3. Opportunities for application of the strategy
4. Constraints to applying the strategy
5. Relation to other water management strategies (integration approach)
6. Preliminary findings and recommendations

The consultants, in cooperation with IID staff, developed and then applied a ranking and screening criteria to evaluate the water management strategies and their applicability to the IID circumstances. These are listed below in Table 6-1.

Table 6-1. Water Management Strategies Screening Criteria

Objectives - How well does the strategy help to meet the IID Plan Objectives?		
5- Fully meets objectives. Meets multiple objectives	----------	1- Does not meet, or is inconsistent with objectives. Meets one or less objectives
Complexity- Does the strategy have complex legal, political, or technical issues that would impede the ability to design, permit or implement?		
5- Least complex, not complicated	----------	1 – Most complex, very complicated
Resolve conflicts, Colorado River- would the strategy help to resolve or avoid conflicts on the River?		
5- Would avoid conflicts or strongly support conflict resolution	----------	1 - Would create conflicts or reduce ability to resolve conflicts
Resolve conflicts, Imperial- Would the strategy help to resolve or avoid conflicts within the imperial region?		

[50] Following review and assessment, DWR approved the Imperial Region in September 2009.

5- Would avoid conflicts or strongly support conflict resolution	----------	1 - Would create conflicts or reduce ability to resolve conflicts
Regional Benefits – Would the strategy provide region wide benefits to multiple participants?		
5- Provides regional benefits, involves multiple participants	----------	1- Provides limited regional benefits for singular participant
Timeliness – Is the strategy well defined for the Imperial regions; are potential projects ready to proceed? Are they relevant to the regional issues? Do they have a feasibility study, preliminary design and environmental clearance and approvals?		
5- Strategy well defined, projects identified and relevant to region	----------	1- Strategy not well defined, project not identified or relevant to region
Political Acceptability, Local- Would the strategy be widely supported within the Imperial Region? Could it receive local funding and support?		
5- Strongly supported	----------	1- Weak or limited support
Political Acceptability, Regional- Would the strategy be widely supported within the Colorado River Region? Would it generate political controversy? Could it receive state or federal funding and support?		
5- Strongly supported	----------	2- Weak or limited support

Based on these criteria, preliminary findings and recommendations were made as to whether the strategy should be further considered separately, integrated with other strategies, eliminated from further consideration or pushed to the Imperial Region IRWMP. Once evaluated, the water management strategies that had not been eliminated were used to define and configure the regional projects and programs (See Chapters 8 and 9).

6.2 Preliminary Findings and Screening Results

Preliminary findings were made to further prioritize and guide the subsequent work and configure projects, programs, and policies. Table 6-2 presents a summary of the results, showing which strategies were: 1) carried forward for further consideration (green), 2) to be further developed as part of the Imperial Region IRWMP (blue), and 3) eliminated (red). Imperial Region IRWMP projects, which will considered once the IID Plan is complete, will be developed with stakeholder involvement.

The major findings of the preliminary screening and scoping of water management strategies are listed below. The findings in this chapter vary somewhat from the Project Scoping Report. The revisions were based on additional information and analysis including the technical memorandums listed below and the results of other evaluations.

- IID Groundwater Banking Opportunities. NRCE Technical Memorandum, September 1, 2009. (Appendix F)
- Summary and analysis of available water quality and flow data for the Alamo and New River and for drains within the IID Project area. NRCE Technical Memorandum, September 4, 2009. (Appendix G)
- All-American Canal/ East Highline Canal Groundwater Augmentation & Blending. GEI, August 21, 2009. (Appendix M.1)
- Preliminary Evaluation of Substitution of Groundwater for Surface Water on Crop Water Needs. Davids Engineering Technical Memorandum, September 3, 2009. (Appendix M.2)

6.3 Strategies Carried Forward for Further Review

Following analysis, the following DWR water management strategies, which are discussed in greater detail below, were selected to be carried forward for further review:

Supply Augmentation

- Integrated Approach to Desalination, Groundwater Development and Groundwater Banking
- Desalination
- Groundwater Development
- Groundwater Banking
- Recycling Wastewater
- Apportionment of Water within IID
- California and Colorado River Water Transfers, Exchanges, and Importation

Demand Management

- Agricultural Water Use Efficiency/Conservation
- Urban Water Use Efficiency/Conservation
- Economic Incentives: Loans, Grants, Water Pricing

6.3.1 Supply Augmentation Strategies

6.3.1.1 Integrated Approach to Desalination, Groundwater Development and Groundwater Banking

Desalination of brackish groundwater, drain water, or the flows in the New and Alamo Rivers; groundwater banking; and recycling of wastewater all have the potential to increase the available supplies that can be apportioned to future MCI demands. These three basic strategies can be integrated to produce quantifiable increases to the IID Water Supply Portfolio. Since they have not been historically used, developing groundwater supplies would expand the size of the IID Water Supply Portfolio. Recycling and use of drainage water increases the IID Water Supply Portfolio by reducing the amount of water that is discharged by IID as drainage to the Salton Sea. Drain water or urban wastewater that flows to the Salton Sea can be captured and treated to

remove salts so that this water can be put to beneficial use. An additional reconnaissance and feasibility study was recommended to define and further test the feasibility of integrated capital project alternatives, and to generate costs and yields for purposes of comparison. Increased competition for available Colorado River supplies have changed the market for water, and sources not previously believed to be cost-effective may now be viewed as viable.

Table 6-2. Summary of Water Management Strategies

Water Management Strategy	Opportunities	Constraints	Notes	Carry Forward?	Preliminary Estimate of Yield (Acre Feet) (1)	Range of Cost ($/af)(1)	Meeting objectives	Complexity	Resolve conflicts, Colorado River	Resolve conflicts, Imperial	Regional Benefits	Timeliness	Political Acceptability, Local	Political Acceptability, Regional	Total
Groundwater Banking, Conjunctive Use	Local groundwater storage and banking of IID unused apportionment, assuming managed overruns; surplus Colorado River water; Colorado River water obtained through transfer. Local banking potential in East Mesa, West Mesa. Regional opportunities include Coachella Valley Water District, Arizona other possible locations.	Unused apportionment is episodic and without managing overruns, banking potential is limited; transfers of Colorado River water will be complicated; very infrequent surplus water on Colorado River that is not already accounted for. Need support and cooperation of Imperial County for "in" County banking. Need agreements with CVWD and Arizona for regional banking. Complex insitiutional environment.	Could be implemented relatively quickly within CVWD since facilities are being built and additional facilities are proposed. Water potentially available under current Colorado River operating agreements and requirements.	Yes	10,000 to 50,000	$400-$700	5	3	4	4	5	5	5	3	34
Apportionment or Allocation within IID+A8	Transfer of consumptive uses between use categories within IID through conservation and implementation of agricultural, municipal or other demand management measures. (e.g.; fallowing, power plant systems retrofit, etc.); includes accounting for reductions in land use changes from Ag to Urban, with conservation restrictions to produce savings	Fallowing against current regulations; strongly resisted by ag community and other interests due to socioeconomic impacts. Cost of retrofit of existing facilities to implement technologies and save water. Political issues, historical competition, lack of guidance and policies for accounting for water during changes in land use.	Fallowing would require change in policy. Needs to be integrated with other agricultural, urban or industrial water use efficiency measures. Would require a system for accounting and verification of water conserved. Issues could be resolved locally with minimal state or federal interventions. Economic analysis of jobs and socio economic effects needs more review.	Yes	Varies with Assumptions (8)	TBD Could be net positive revenue	4	5	5	3	5	5	2	5	34
Groundwater Development	Develop brackish groundwater (coupled with desalination); harvest lost water from historical operations. Large volume of water in storage (700K-2.5 MAF).	Desert aquifers have minimal safe yield. Need cooperation between County and IID to overcome institutional and political barriers. Water quality in current formations. Potential subsidence. Complex legal environment, permitting, and environmental compliance. Will take time to develop opportunity.	Not a long term sustainable strategy (10-20 yrs) unless coupled with groundwater banking to replenish groundwater. Groundwater development needs to be integrated with desalination to be successful. Need to coordinate closely with Imperial County as the authority for management of groundwater under the Groundwater Management Plan and related policies and regulations.	Yes	15,000 to 25,000	$150-$400	4	4	3	5	5	5	3	3	32
Desalination	New and Alamo Rivers: Large volumes of brackish groundwater (700KAF to 2.5 MAF); Drain water. Costs per unit for treatment have dropped. Purchase capacity in existing Yuma Desalter. Publicly owned regional plant; localized plant. Require desal for power plants as condition of approval. Public/Private partnership	Brine disposal, permitting, cost, political acceptability. Volume of drain water that could be recovered possibly constrained by HCP; cost of mitigation, impacts to Salton Sea.	Additional review and reconnaissance level evaluation needed. Potential is related to integration with groundwater development; accessing drain water. Yield a function of volume and duration of mining; ability to recharge and replenish groundwater or to desalt drainage.	Yes	15,000 to 50,000	$300-900 brackish $1,100-$1,800 Seawater	5	3	3	5	5	3	4	3	31
Water Transfers - Colorado River	Present perfected rights holders, including Tribal "reserved" water rights, other small rights. Intentionally created surplus (ICS). Out of IID area fallowing and forbearence. "Short" term lease versus transfer.	Limits under Decree; constrained by QSA. Tribal water regarded as for Tribal uses. Competition between California parties, and between basin states. External public perception that IID has all the water it needs. Competition with those with higher ability and willingness to pay. Likely lease only, no long- term.	Not near term solution; will take time to identify and negotiate agreements; obtain approvals and clearances. Opportunities probably limited due to institutional barriers, high costs, intensive competition.	Yes	5,000 to 15,000	$250- $500 Spot, $10,000 to > $20,000 Long Term	5	2	2	5	5	3	5	2	29
Water Transfers- California	SWP and CVP contractors; independent water rights holders (individuals, districts) north and south of the Delta. Use of SWP and CVP facilities to wheel water. Exchanges of California water with Colorado River water.	SWP and CVP issues and regulations in the Delta; regulatory and environmental hurdles; intensive competition for water with other M&I users, high costs. External public perception that IID has all the water it needs. Competition with those with higher ability and willingness to pay.	Not near term solution; will take time to identify and negotiate agreements; obtain approvals and clearances. Opportunities probably limited due to institutional barriers, high costs, intensive competition. Lower probability than other supply augmentation opportunities.	Yes	5,000 to 10,000	$500- $1000 Lease, $10,000 to >$20,000 Long Term	5	1	5	5	5	1	5	1	28
Recycled Municipal Water	Individual municipal plant upgrades and local distribution. Shared regional plant(s). Ag reuse of water in exchange for Colorado River Water.	City cooperation required. Potential effects to habitat in New and Alamos River and Salton Sea. Mitigation costs, cost for additional treatment and distribution infrastructure (purple pipes). Permitting. Market acceptability.	Tie to agricultural reuse and offset program to minimize distribution costs, and account for investments in plant improvements. May not be available until after Salton Sea issues are resolved; or at least until 2017.	Yes	8000 to 17,500 (4)	$250-500	5	3	3	2	5	3	3	4	28
Conveyance—Regional/Local	Extensive existing regional and local infrastructure allows for moving water. Key to other water management strategies and integrated into other programs. Not to be regarded as stand along project.	Needs not yet defined; conveyance costs can be high; easements and rights of way; potential habitat and farmland impacts.	Not carried forward as an independent strategy, but integrated into the other water management strategies.	No	N/A	N/A	4	4	3	3	3	3	2	4	26
System Reoperation/Operations- Local, Regional	Reoperation of Colorado River federal facilities to better manage available storage. Reoperation of IID system, additional operational storage. Additional raw water storage for municipal systems.	Existing Decrees and USBR operating rules well established; limited flexibility to change operations. Definite plan has identified systems storage and reoperation opportunities; limited additional potential. Cost of land to build local raw or treated water storage.	Limited potential. Integrate strategy with Agricultural Water Use Efficiency and Conservation (Definite Plan); Water Quality Treatment and Distribution; and Water Transfer to find residual opportunities. Groundwater banking could help overcome existing Colorado River operating constraints.	No	N/A	N/A	3	1	1	4	3	3	4	1	20
New California Surface Water Supply	New water rights appropriation. New Central Valley Project or State Water Project contracts. Participate in new storage projects.	Legal, technical, political, high costs, long planning time frames and economic	Eliminate from further consideration	No	N/A	N/A	4	1	2	3	3	1	4	1	19
Surface Storage—Local, Regional	Colorado River reservoir; IID regional reservoir; IID operational storage; City operational storage	No need for additional storage on Colorado River. Regional reservoir would be impractical, expensive, face environmental hurdles. High evaporation losses.	IID operational storage already in Definite Plan. Need for city storage not defined and should be evaluated as part of the Drinking Water Treatment and Distribution Strategy.	No	N/A	N/A	3	1	1	3	1	1	3	1	14
Demand Management															
Agricultural Water Use Efficiency/Conservation	Additional on- farm, systems efficiency conservation actions above Definite Plan project currently being designed and implemented. Fallowing for local needs.	Political acceptability; social justice concerns; limited technical ability to further reduce water use in the near term until Definite Plan is fully implemented.	Additional conservation for internal transfer beyond that anticipated in the Definite Plan will be costly. Extensive ag conservation being implemented as part of the QSA/Transfer Agreement; IID Definite Plan and Agricultural Water Management Plan. Needs further economic evaluation. Fallowing policy would need to change, could be part of IID Internal Transfer strategy.	Yes	TBD	>$500 (3)	4	3	4	3	5	2	2	5	28
Urban Water Use Efficiency/Conservation	Improve regional coordination; develop programs to save and reallocate urban water; reduce costs for drinking water and waste water treatment due to reduced volumes; develop drought contingency plans; support compliance with existing regulations. Develop and integrated cost share program. Reduce future unit water demands with standards and guidelines.	Cost and political support. Resistance to changing roles and to working together. Communities are financially straped.	Addressed primarily in IID Cities UWMPs; also closely integrated to Equitable Distribution Plan and Land use and water supply planning strategies.	Yes	8500 (5)	$225 to $525 present (2)	4	4	3	5	5	4	4	5	34

Water Management Strategy	Opportunities	Constraints	Notes	Carry Forward?	Preliminary Estimate of Yield (Acre Feet) (1)	Range of Cost ($/af)(1)	Meeting objectives	Complexity	Resolve conflicts, Colorado River	Resolve conflicts, Imperial	Regional Benefits	Timeliness	Political Acceptability, Local	Political Acceptability, Regional	Total
Other Water Management Strategies Recommended by DWR															
Economic Incentives (Loans, Grants, Water Pricing)	Current State bond funding for integrated planning and regional projects. Water users with ability to pay; potentially willingness to pay due to market forces and limited alternatives. State and federal focus on green power and sustainable projects that integrate water, power and ecosystem could be designed.	Political acceptability. Disadvantaged communities with limited ability to pay for higher water and wastewater rates. Resistance to changing rate structures.	Economic incentives and business models need further research. Funding alternatives and sources to be identified and evaluated. Range of rate structures need to be evaluated. Pricing of water, rate adjustents and use of other funding mechanisms could be important components for capital formation to build projets or create incentives for conservation or project development.	Yes	N/A	N/A	3	2	4	4	4	3	3	4	27
Land Use Planning and Management	Define projects which when funded could provide "new" water and a sustainable, reliable water supply and provide mitigations for new development. Streamline development review process; update IID Developers Guide and CEQA Guidelines; provide a regional water supply assessment;	Political acceptance; costs for new projects; limited staff resources to review all projects.	Adoption of Board policies would support implemention of projects and clarify IID role in ensuring impacts to water supplies are fully mitigated. Need to get Board to provide policy direction. Recommend a specific team work with consultant, staff, and legal draft proposal; then work with cities and county to further review and refine.	Yes	N/A	N/A	5	3	3	5	5	4	4	5	34
Drinking Water Treatment and Distribution, Wastewater Treatment	Regional treatment facilities, local facility improvements for storage of raw and treated water and to help meet drinking water standards; improve distribution infrastructure. Support disadvantaged communities.	Cost and resistance to rate increases for planned improvements. Management, financial and technical resource availability. Obtaining support for regional projects. Need to identify and prioritize investments	No new yield but programs are important to helping local communities and disadvantaged communities. Should be futher considered if in IRWMP is to be developed.	No	N/A	N/A	1	3	2	3	4	3	4	3	23
Storm water -Urban Runoff Management	Capture and retention of stormwater for direct use or groundwater recharge. Creation of water features. Improve coordination during development review. Ensure implementation of retention, detention and best management practices to control urban nonpoint source runoff.	Limitations to staffing and funding for adding to current programs. Need new policies and standards. No major regional conflicts identified.	Could be integrated with land use and water supply plan and plan integration. Does not yeild water. Issues with use of IID storm drains need to be resovled but this is not currently established as a priority objective for the IID Plan.	No	TBD	TBD	2	2	2	4	4	3	3	3	23
Other Water Management Strategies Considered but not Included															
Ecosystem Restoration	Potential to integrate habitat restoration and ecosystems management and mitigation costs into projects at the time of development. Coordinate requirements with other projects that will effect drain water and require mitigation.	Does not produce water. Political acceptability; costs need refinement; no current standards for non- IID projects.	This strategy does not yield new water or meet current IID objectives. Ecosystems restoration or enhancement might be further considered in the IRWMP regional analysis should there be impacts, solutions or mitigation that are needed. IID HCP, once adopted, will provide the basis for IID ecosystems restoration and management strategy. IID and others will continue to track and participate in the State and Federal Salton Sea restoration efforts.	No	N/A	N/A	1	3	3	3	3	3	2	3	21
Forest Management	Limited opportunity	No constraints	Not applicable to desert environment	No	N/A	N/A	1	3	3	3	3	3	3	3	22
Pollution Prevention	Pollution prevention efforts are cheaper than remediation and clean up once a problem occurs. ' Additional Non- Point Source measures for ag and urban areas.	Limited role for IID; existing City and County efforts in place and limited perception of need for additional programs and costs.	Existing land use planning program; Regional Board, Department of Health and other state and federal efforts in place generally support IWRMP goals and objectives to protect existing levels of quality.	No	N/A	N/A	2	3	3	2	3	3	2	2	20
Agricultural Lands Stewardship	Strong policies and support for agricultural lands preservation.	No constraints	Imperial County already protection ag lands via General Plan policies	No	N/A	N/A	3	3	2	2	2	2	2	3	19
Watershed Management	Limited opportunity	No constraints	IWRMP will recognize surrounding federal and state area management efforts	No	N/A	N/A	2	3	1	1	3	3	3	3	19
Recharge Area Protection	Protect natural recharge areas or areas with potential for groundwater banking.	Lands already protected or in private hands; cost of new programs. Limited need for new programs.	strategies integrated with conjunctive use and groundwater banking efforts.	No	N/A	N/A	1	1	2	2	4	3	2	3	18
Water-dependent Recreation	Limited independent opportunities but could be factored into the IID HCP/NCCP created wetlands plan to allow passive uses.	Limited opportunities to create water dependent recreation.	Marginally applicable. Would be integrated to environmental management programs and any activities associated with Salton Sea Restoration. Included in public access features of IID HCP and wetlands mitigation program	No	N/A	N/A	2	2	2	2	3	2	3	2	18
Groundwater Remediation/Aquifer Remediation	Improve interagency coordination on existing programs.	Politically unsupported, perceived as unneeded and redundant to existing programs.	Covered in other programs.	No	N/A	N/A	1	2	2	2	3	2	2	3	17
Conveyance Delta	Limited opportunity	No constraints	Unrelated; could influence water transfer opportunities in California.	No	N/A	N/A	1	1	3	1	4	1	1	3	15
Surface Storage—CALFED	Limited opportunity	No constraints	Unrelated to regional issues. Could influence water transfer opportunities in California and affect the price of water to State contractors like the MWD.	No	N/A	N/A	1	1	3	1	4	1	1	3	15
Precipitation Enhancement	Limited opportunity	No constraints	Inappropriate climate	No	N/A	N/A	1	1	1	1	1	1	1	1	8

CWC §10537 emphasis for "regional plans or programs "that increase water supplies through 1) groundwater storage and conjunctive water management; 2) desalination; 3) precipitation enhancement; 4) water recycling; 5) regional and local surface storage; 6) water-use efficiency or 7) storm water management.

(1) All Costs and yields are preliminary and subject to further evaluation for specific project concepts

(2) 2005 dollars, 2005 California State Water Plan (DWR); California Bay Delta Authority; ROD for CALFED sites $150 to $450 per acre foot.

(3) Mitigation cost not included; estimated at $420 per acre foot

(4) Range based on 50% recycling of current 16KAF and future 36 KAF

(5) Based on 10% savings of total M&I adjusted demands, 1997-2008 Table 3 adjusted demands

Key to color coding

Carried forward for integration with other strategies in the IID Plan
Not carried forward as part of the IID Plan but should be factored into and IRWMP
Not carried forward as part of the IID Plan

6.3.1.2 Desalination

Desalination of groundwater or drain water could help meet the IID Plan objectives; provide a potential new and reliable source of water; help to resolve conflicts within the region; and provide benefits to the Imperial Region. The development of desalination, though potentially costly, may prove cost-effective given other options, and could be a relatively timely solution (given QSA/Transfer Agreement commitments, drain water desalination could likely not be brought online until 2018) that is relatively simple to explain to the public, making it potentially more politically acceptable. Local desalination would not result in conflicts on the Colorado River, nor encounter political opposition from other Colorado River water users. Desalination projects could be eligible for state or federal grant funding, and a large desalination plant could provide partnering opportunities that might reduce costs to local rate payers. Considerations of desalinization opportunities include:

- Overall potential desalination opportunities within the Imperial Region:
    - Developing a large regional desalination facility
    - Developing smaller, distributed desalination facilities near points of demand in the KGRAs
    - Providing economic incentives or pricing to encourage private interests to develop desalination plants to treat brackish groundwater in lieu of using IID's Colorado River supply
    - Requiring new geothermal plants or large industrial water users to develop desalination facilities to mitigate for water supply impacts
    - Investing in, or buying capacity in desalination capacity at other plants in the Lower Colorado River Region (e.g., Yuma Desalter or other plants being considered by the International Boundary and Water Commission)
- Local desalination programs are considered to be the best near-term opportunities since IID can act independently or in cooperation with local interests to move relatively more quickly than for interregional projects (see next bullet).
- Interregional projects may represent viable longer term opportunities that may provide economies of scale due to partnership possibilities with other Colorado River interests. Preliminary list of projects that could be tracked include:
    - Yuma Desalter
    - Navagua Desalination
    - International Boundary and Water Commission proposed projects in Baja and Sonora, Mexico
    - Sea to Sea proposal
- A primary constraint to desalting is disposal of the brine waste product. Evaporation ponds, re-injection to already salty groundwater formations, and Salton Sea disposal all need further review.
- A major benefit of desalination of local groundwater or drain water to the local area is the reliability of the supply. Future MCI users within IID need a high degree of reliability, both seasonally and during times of shortage.

- Brackish drain water and flow in the New River and Alamo River will be available even after implementation of the Definite Plan, which, if not captured, will flow to the Salton Sea. The water is likely not available for other use until 2018.
- Cooperative public/private partnerships could be formed to invest in desalination systems for purposes of creating a new water supply for non-agricultural water users. Economic incentives and pricing would need to be worked to finalize a business model, and additional economic evaluations are needed.
- Opportunities may exist for desalination to be funded by water suppliers outside of the Imperial Region that may be interested in buying capacity in Imperial Region desalination plants to increase reliability and security of their own supply. Such a strategy would require integrating desalination with transfer or exchange of Colorado River water to create a net benefit for the Imperial Region.

6.3.1.3 Groundwater Development

This strategy, if coupled with desalination, would help to meet the IID objectives and was carried forward for further consideration and to develop project concepts. Considerations for the implementation of this strategy include:

- Developable groundwater in the East Mesa and in deep aquifers in the central part of the Imperial Valley.
    - This water would most likely require desalination if it is to be treated to an appropriate quality for the intended beneficial use, but detailed data are lacking and would be needed for purposes of preliminary designs.
    - Blending of pumped groundwater with All-American Canal or East Highline Canal water is likely to increase the total dissolved solids concentration in those canals to levels that would require growers to increase the amount of water applied for purposes of leaching salts and maintaining productivity. Additional field data are needed for testing the feasibility of groundwater pumping and blending.
- East Mesa groundwater development, unless coupled with intentional groundwater recharge and banking operations, would deplete water in storage in the groundwater basin if, as anticipated, it is found that there is a lack of natural recharge.
- Close coordination with Imperial County is needed to develop groundwater resources, manage overdraft and comply with County policies.
- Evaluate East Mesa groundwater banking to avoid, minimize or mitigate any potential negative effects of groundwater development.
- The following local and regional groundwater development strategies have been eliminated from further consideration in the IID Plan based on technical constraints and relative infeasibility:
    - Central Imperial Valley Upper Aquifer
    - Central Imperial Valley ~~–D~~eeper" Aquifer
    - West Mesa Aquifer

6.3.1.4 Groundwater Banking

Groundwater banking of any of IID's unused Colorado River apportionment (under-run water) would meet IID objectives, especially since it would capture water that would go to other more junior Colorado River water rights holders if not diverted and used by IID. Groundwater Banking is consistent with existing QSA/Transfer Agreements, is considered a reasonable beneficial use by both the USBR and the State of California, and would not encounter opposition from other Colorado River water users; is not likely to encounter local political opposition; and is technically feasible.

- Opportunities in or adjacent to the Imperial Region include:
  - Participation in the CVWD groundwater bank
  - Development of recharge facilities along the Coachella Canal
  - Use of the old Coachella Canal in East Mesa
  - Development of dedicated percolation and recharge facilities in the East Mesa
- CVWD groundwater bank is likely to be the best immediate- or near-term proposition since it is consistent with existing QSA/Transfer Agreements, elements of the project are in place or are ready to proceed, and a preliminary feasibility study has been conducted. Yields are limited to existing capacity and negotiation of agreements with CVWD is needed.
- East Mesa groundwater basin is nearly full, so only limited storage capacity is available. Groundwater banking would be optimized by first depleting groundwater storage to make room for the Colorado River water that is available in years where IID has an under-run. Very little is known about the quality and quantity of this resource; however, based on the limited information available, it is expected that the quality of the recharged water would be degraded initially, but may improve over time. Additional feasibility study and field work are needed as part of pre-design, and for evaluation of economic and environmental effects.
- The Arizona Water Bank could be a longer term prospect, but would involve policy and political challenges and is a mid- to long-term proposition.
- Analysis of under-runs from the Colorado River indicate that :
  - Potential yield from banking ranges between 19,000 and 50,000 acre-feet per year, depending on the ability to cap overruns, size of recharge facilities, potential to utilize existing groundwater storage, and initial conditions of the storage basin.
  - If the banked groundwater is used to pay back uncapped inadvertent overruns, no additional water resources are available because the quantity of overruns is approximately equal to the under-runs in the 75 year record. However, by limiting inadvertent overruns additional water supplies are available.

6.3.1.5 Recycling Wastewater

Recycled water is a viable strategy that would help meet IID objectives, would provide new water and could support additional development by mitigating for impacts of new water demands on current users.

- Opportunities for recycling municipal wastewater are related to:
    - Matching the water available at existing treatment plants and at current levels of treatment to appropriate uses
    - Building the needed pipelines infrastructure to distribute the treated wastewater
    - Upgrading existing plants to increase the level of treatment process so that the reclaimed water can be applied to wider types of use, and constructing distribution facilities to convey the water to points of demand
    - Constructing larger, centralized plants to treat the water to a high level (tertiary) for relatively unrestricted use
- The biggest constraint is the need for institutional arrangements with the water treatment agencies that own the water; relative cost of recycled water as compared to IID raw water; lack of perceived need to develop additional supplies; and market perceptions for reuse of recycled water.
- This strategy would require that IID:
    - Define the district‘s role in recycling wastewater
    - Develop partnerships with the Imperial Valley communities to increase the district‘s available supply through recycling
    - Support marketing the recycled water for agricultural uses as a supply that can be used in lieu of Colorado River water
    - Manage the apportionment of the Colorado River water saved through in-lieu use of recycled water
- At present, individual IID communities have found that recycled water is not cost-effective as compared to raw water from IID and none of the UWMPs include recycling of municipal wastewater as an option.
- The geography of Imperial County includes relatively small communities and extensive agriculture. This may provide opportunities for agricultural irrigation with recycled water at relatively low distribution costs as compared to purple pipe systems to deliver water to MCI users.
- The economics and economies of scale for large regional facilities to reclaim wastewater need to be evaluated in the next step and compared to the upgrades at existing plants.
- To make use of recycled water for future MCI uses it is necessary to plan now for future developments, since installing dual plumbing prior to development is far cheaper than retrofitting existing community systems.
- Discharges from the wastewater treatment plants in the district are generally to IID drains, the Alamo River, or the New River. Any diversion of flows may have environmental impacts on the drains, rivers, or the Salton Sea, and related mitigation activities and costs must be factored into reuse strategies.

6.3.1.6 Apportionment of Water within IID[51]

Apportionment implies assigning a fixed volume of water to the major use categories, including agriculture, municipal, industrial, and environmental. Currently within IID, apportionment is occurs only in years when there is a supply and demand imbalance under the EDP. Apportionment could be annual and the program could be revised. Depending on the systems and policies to be developed, apportionment would assign a firm and fixed amount of water to the primary use categories on an annual basis and a program could be designed to allow for changes in place of water use or the type of water use. Such a program could involve fallowing, reduction in water application resulting in lower crop yield, shifting to crops that use less water, or other actions that would allow for exchange of water between current uses and new uses. If apportionment were to include fallowing, apportionment may not be consistent with the IID Plan objective to "prevent impacts to existing agricultural users of water" unless the impacts are mitigated. Fallowing could conflict with a IID Plan objectives and is potentially a fatal flaw and a basis for rejection of this strategy. Apportionment or allocation of water was carried forward for further review to help the Board evaluate if non-structural policy alternatives can be used to meet a forecasted future MCI water use of between 50,000 to 100,000 acre-feet. If apportionment or allocation involves fallowing for in valley uses, it will need to be an explicit policy decision of the Board and will require mitigation strategies for agricultural and other impacts.

- Apportionment is technically feasible, but implementation will face a host of economic, political, and legal issues that will require the Board to develop policies, guidelines, or regulations to be practical. This includes decisions related to the role of IID in a local water market; water pricing and rate structures; and determinations whether there are policy solutions that would not involve fallowing and whether any potential impacts to agriculture or local communities from apportionment or allocation could be mitigated.
- Internal apportionment by IID should not result in additional conflicts with other Colorado River water users and is likely to be politically acceptable even if not positively construed by other Colorado River diverters.
- Development of policies, programs, and pricing strategies that would encourage or facilitate apportionment and water exchanges could be quite complex, but if well conceived, they could reduce political conflicts in the IID service area related to competition for the fixed IID supply of water, and could result in net regional economic benefits that merit further study.

[51] In the draft Project Scoping Report, the term Internal Transfer of water was used to describe changes in place or type of water use within IID boundaries. Within the context of state water law, a change in the place of water use or the type of water use is typically referred to as a water transfer. Such transfer implies that a person or entity that is to transfer the water has a water right (license or permit) to the water that is the subject of the transfer. Since all of the water delivered within IID is under a single water right, and since IID managed the water right to ensure reasonable beneficial use within the IID service area as the permitted place of use, it was believed that use of internal transfer would not be an appropriate term and allocation or apportionment of the water would be more appropriate.

- The economics of transferring or apportioning water between uses within IID is being further reviewed to document if there are regional economic benefits, and to ensure that any third-party and socioeconomic effects are documented and can be mitigated.
- Opportunities for apportionment or allocation include extraordinary conservation using measures currently beyond those included in the Definite Plan, including fallowing on IID lands or private lands, reducing water use through crop rotation; or other demonstrable methods.
- Apportionment or allocation of water would include a systematic decision process to allow for IID consideration of changes to the place or type of use of Colorado River water within the IID service area. Apportionment implies that a historical water use would be reduced or eliminated to apportion or allocate water to a future water use at a different location, or to a new use on a portion of the same property.
- For purposes of the IID planning process, it is assumed that such an allocation or apportionment would need to provide a firm supply of ~~"~~wet" water that could be verified by IID and the land use agency for purposes of making findings to permit a new development.[52]
- Apportioning water to new MCI uses has a potential impact to current users primarily in years when there is an overrun because MCI uses are not subject to the same level of cut back as agricultural uses. In years with a supply/demand imbalance (shortage or anticipated overrun), the certainty that IID gives to MCI supplies reduces the supply available to agriculture and/or increases the overrun that must be paid back in subsequent years, either way, this will reduce the amount of water available to agriculture.
- In years when there is an under-run, any new MCI uses of the water would be part of the normal IID diversions and would serve to reduce the volume of water that could be captured by junior water rights holder to the Colorado River.[53] However, if the under-run is being banked and agricultural use is not capped, there may only be water available to meet inadvertent overruns with none left over for new MCI uses. The IID board will need to develop a policy to resolve this.
- The ability to achieve political consensus is uncertain and will influence the timeliness of this water management strategy. If consensus within IID and among IID stakeholders can be achieved on the mechanisms for apportioning or allocating water, this could be a timely and relatively cost effective solution.

6.3.1.7 California and Lower Colorado River Region Water Transfers, Exchanges, and Importation

This strategy would involve IID seeking alternative water sources from outside of the IID jurisdictional area, developing agreements for transfer or exchange of water which would

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[52] SB610 and SB 221 revised the California Water Code to require that land use entities making land use decisions ensure that there is a verifiable water supply and that there are no impacts to existing water users.

[53] All diversion in under- run years, whether for groundwater banking, ag or MCI uses, are part of the IID consumptive use of Colorado River water and such diversions in under- run years would than reduce the amount of water that could be diverted by other California entities with rights to the Colorado River.

then be imported by IID to increase the available supply and to meet new non-agricultural demands. Though technically feasible, external water transfers are heavily constrained by institutional, legal, and political issues. Although external water transfers, exchanges, and importation of water are considered long-term propositions, out-of-basin transfers are considered a high cost, low opportunity prospects. There is uncertainty in the timing under which such transfers would occur, but they are not considered immediate or near-term solutions.

Even though there are significant constraints, there are not any fatal flaws that would eliminate Colorado River and California water transfers, and these strategies were carried forward for purposes of the IID Plan since it could help meet objectives; could help resolve conflicts within IID by providing new water to support economic development and reduce conflicts between competing uses; would provide regional benefits (but at great cost); and would likely be politically acceptable at the local level. Considerations include:

- Water transfers along the Lower Colorado River would be quite complex; face exceptional competition, be costly; could produce conflicts with other Colorado River users; and have heavy constraints weighed against limited opportunities.
- Water transfers in California may be even more complex than those from the Colorado River; could produce conflicts related to competition with others in the Southern California water market who would also be in the market for these supplies; and would have heavy legal and institutional constraints weighed against limited opportunities.
- Neither California or Lower Colorado River transfers are timely solutions and are not near-term strategies, but they should be retained for mid- to long-term application. It is recommended that IID continue to allocate staff, legal, and consulting resources to tracking and exploring some of the opportunities for Colorado River and California water transfers, but understand that other entities may provide significant hurdles and yields of new water would come at significant costs.
- At the same time, IID could encourage other interests with a need for water to pursue water transfers that would allow importing new water into the IID service area. This will develop price awareness and sensitivity by development interests, IID Cities, Imperial County, and others in the Imperial IID Region. Such imported water would still require conveyance, or wheeling this water through IID facilities. IID needs to develop a policy and pricing strategy for wheeling third-party water through IID facilities should this opportunity arise.

6.3.2 Demand Management Strategies

6.3.2.1 Agricultural Water Use Efficiency (Conservation)

Agricultural water use efficiency strategies, beyond those already identified and included in the IID Definite Plan,[54] could free up additional water that could be apportioned to future MCI development, but at a relatively high cost. IID has already implemented, and has plans to implement, a large number of agricultural water efficiency projects. As a result, the potential water that could be developed from additional agricultural water conservation is limited, and actions beyond those anticipated in the IID Definite Plan will be more expensive and may be less effective (See Chapter 8 for a more complete discussion of opportunities). With the exception of fallowing lands, agricultural conservation strategies are not believed to have technical fatal flaws; are not likely to cause additional local or Lower Colorado River Region conflicts or create extensive political opposition; could provide benefits in the Imperial Region; could be implemented in a timely fashion, are not exceedingly complex and were, therefore, carried forward for further review and consideration in the IID Plan.

- Uncertainties exist related to the degree of on-farm conservation to be achieved as part of the IID Definite Plan, hence, the need for structural or operational agricultural conservation strategies beyond those currently planned for implementation, to meet QSA/Transfer Agreement commitments.
- Based on the preliminary analysis, the total additional agricultural water conservation potential was estimated to be about 65,000 acre-feet. The preliminary estimated cost for the additional ranges from between $500 and $700 per acre-foot. Environmental mitigation costs could add approximately $420 per acre-foot to these costs as a one-time payment. Additional agriculture water conservation that does not include fallowing will increase the salinity in the drains and are likely to have environmental mitigation requirements.
- It is assumed that any IID Plan agricultural water conservation activities would be in addition to those already included in the IID Definite Plan. Opportunities include:
    - Fallowing
    - On-farm conservation
    - Canal lining/Seepage recovery
    - Spill recovery
    - Integrated Information Management

[54] Efficiency Conservation Definite Plan -FINAL REPORT, Prepared as part of the Imperial Irrigation District Efficiency Conservation Definite Plan May 2007, by Definite Plan Team: Davids Engineering, Inc. and Keller Bliesner Engineering, LLC, in association with CONCUR, Inc., DAVEY-CAIRO ENGINEERING, INC., GEO/Graphics, ITRC, Western Resource Economics, Colorado State University and Utah State University

6.3.2.2 Urban Water Use Efficiency (Conservation)

Urban water use efficiency improvements are consistent with IID Plan objectives; could serve to reduce current or potential conflicts in the Imperial Region by demonstrating that the MCI users, such as geothermal plants, are willing and able to make the commitment and investment in demand management measures (DMMs) to conserve water; and will be carried forward for further review and development.

Additional programmatic evaluation and design, including economic analysis of costs and benefits, is needed to allow for comparison of costs for implementing DMMS needed for water conservation to other alternatives. Urban water use efficiency achieved through implementation of DMMs is an important water management strategy that has been used throughout California to lower demand, help meet future needs, and cost-effectively stretch existing water supplies. The State is setting aggressive urban water use conservation goals and increasing the emphasis for water conservation for areas like IID that are reliant on imported supplies, even tying funding[55] for projects to implementation of DMMs.

- Potential savings from additional urban water use efficiency practices imposed on existing MCI users was estimated at 10,000 acre feet per year based on 10 percent savings of total MCI use.
- IID Cities have not been as aggressive as other desert communities in implementing DMMs or making investments in urban water conservation. The IID Cities' UWMPs do not fully addressed the Best Management Practices (BMPs) or DMMs as approved and promoted by the California Urban Water Conservation Council (CUWCC)[56] and supported by DWR. IID, as a wholesaler, has not been pushing retail water agencies to implement programs either through regulatory requirements, pricing, or by providing economic incentives or support for such programs. Developing additional urban water use efficiency efforts is to be carried forward for further review.
- Urban water use efficiency measures (DMMs) could be undertaken to ensure MCI users are reasonably and beneficially using the water; that MCI users are being held to the same standards as agriculture; and that all practical conservation measures are being implemented.
- Constraints to implementing DMMs include the administrative costs to develop and implement programs since many communities in IID are disadvantaged; lack of regulatory requirements to change; lack of financial incentives to support program implementation; relatively low cost of wholesale water; program costs or rates; political acceptability for changing lifestyles and resistance to making investments in water savings so that future growth can be supported; and concern that conservation would reduce the community's ability to respond to a drought or shortage year,

[55] AB 1420 (Chapter 628, Statutes of 2007 (Laird) requires the terms of, and eligibility for, any water management grant or loan made to an urban water supplier and awarded or administered by DWR, the SWRCB, or the California Bay-Delta Authority, with certain exceptions, to be conditioned on the implementation of the water DMMs described in the urban water management plan.

[56] The City of Calexico is the only city in the Imperial Region that is a member of the CUWCC.

resulting in unnecessary hardships imposed on the community if straight line water conservation quotas are imposed.

- UWMPs are to be updated every five years (in years ending in zero or five) and could be used to achieve consistency between water supply and land use planning, and as such, UWMPs need to be consistent with the IID Plan.

6.3.2.3 Economic Incentives (Loans, Grants, Water Pricing)

Economic incentives include financial assistance, water pricing, and water market policies intended to influence water management. Economic incentives can influence the amount of use, time of use, wastewater volume, and source of supply. Examples of economic incentives include low interest loans, grants, and water rates, rate structures, and potential local partnership opportunities. Free services, rebates, and the use of tax revenues to partially fund water services also have a direct effect on the prices paid by water users. Government financial assistance can provide incentives by regional and local agencies to develop integrated resource plans. Also, government financial assistance can help water agencies make incentives available to their water users for a specific purpose. Assistance programs can also help align the economic and financial drivers (e.g., marginal costs) affecting local, regional, and statewide water management decisions to minimize working at cross-purposes and maximize the benefits of working cooperatively with consistent goals and objectives.

A host of opportunities and constraints related to economic incentives have been carried forward for further evaluation (See Chapters 8 and 9). These include rate and fee structures; sources of funding and financing strategies; and costs and benefits of alternative strategies.

6.4 Strategies Recommended for Further Consideration as part of the Imperial Region IRWMP

Following analysis, the following DWR water management strategies, which are discussed in greater detail below, were selected to be carried forward for further consideration as part of the Imperial Region IRWMP process:

- Integration of Land Use Planning and Water Management
- Drinking Water Treatment and Distribution, Wastewater Treatment
- Storm Water and Urban Runoff Management

6.4.1 Integration of Land Use Planning and Water Management

Under California law, the management of land use is the responsibility of Imperial County and the IID Cities. They have the powers and authorities to regulate land use, develop general plans, and review and approve new development proposals. They are the lead agencies for making land use decisions, approving projects, and complying with CEQA. IID Cities are also responsible for retail water sales and for preparing UWMPs (if population is

greater than 3.000) when their population exceeds 3,000, municipal service reviews, and capital facilities plans for water services.

IID holds rights to surface water from the Colorado River, which it historically has managed and distributed to landowners for primarily agricultural purposes, and to MCI users. IID is a water wholesaler and not a public water system. In this role it acts as a responsible agency to ensure that there are no effects to IID facilities, water rights, or current water users.

In general, past informational requirements (until CEQA) for water management planning were minimal and largely avoidable within the IID jurisdiction. This was largely because municipal, industrial, residential, and commercial uses represented two to three percent of the demand. As a result of years of drought the Colorado River and IID's QSA/Transfer Agreement commitments circumstances have changed as well as water availability and sufficiency for new development. The new realities are not adequately reflected in current land use planning documents, UWMPs, or ad hoc planning process used to coordinate between IID and the land use agencies when making water resource commitments and approving new development.

In addition, recent changes to the California Government Code and the Water Code, Court precedence, and legislative decisions now require local land use agencies and water agencies such as IID to improve their communication and coordination on project-level development decisions that have been made independently in the past. Imperial County and the IID Cities must provide detailed evidence of a firm water supply; determine whether there will be enough water to supply a proposed development project without impacts to existing users; and make specific findings before new projects can be approved.

6.4.2 Drinking Water Treatment and Distribution, Wastewater Treatment

The IID Plan is focusing on regional solutions and projects. Each of the IID Cities and developed areas have water and wastewater treatment and distribution systems needs that vary from the IID City to city and from one system to the next.

IID is a wholesaler of water and does not currently have a role in water treatment; however, there are limited opportunities for IID to implement this strategy without significant involvement of the IID Cities. This strategy does not yield new water, is not currently within IID's objectives, and is not carried forward as part of the IID plan.

Current conditions related to water treatment for domestic purposes do not result in regional or local conflicts that need to be resolved via the IID Plan, and do not result in any issues that need to be addressed within the lower Colorado River basin. Regional treatment or upgrades to existing facilities could benefit the Imperial Region. Developing solutions for water treatment will take time, could be complex, and would be better addressed in an IRWMP that involves more stakeholders.

- With the exception of Brawley, all of the cities and areas of proposed development are disadvantaged communities that could benefit through adoption of an Imperial

Region IRWMP. Each community is faced with how to plan for future growth to make sure that the water supply is sufficient and the water treatment capacity and distribution network is adequate to service new developments.

- Regional projects could reduce overall costs, increase the Imperial Region's competitiveness for state and federal funding, and define a regional strategy for building political support in Sacramento and Washington.
- Specifically, an IWRMP could:
    - Define and quantify the drinking water supply system infrastructure and financing needs so that regional funding priorities can be defined.
    - Establish broad priorities for project-level investments to:
        - Repair, rehabilitate, or replace treatment, collection, or distribution systems
        - Attain compliance with applicable federal or state regulatory requirements
        - Meet applicable local service levels and future requirements consistent with the general plans
        - Address public health or environmental issues and emergencies
        - Address non-point source problems where such investments by local water or wastewater systems are cost-effective relative to other infrastructure solutions
    - Define how local rates and assessments could be used to meet any local matching funds requirements for state or federal grants.
    - Develop Imperial Region's political capital by minimizing local competition, establishing regional priorities, and defining integration opportunities and approaches to generating local funds to leverage state and federal monies and invest in needed infrastructure.
    - Consider consolidating drinking water treatment and wastewater treatment facilities and evaluate regional cost and potential cost-effectiveness.

6.4.3 Storm Water and Urban Runoff Management

Urban runoff management predominantly deals with how the water is managed after a significant rainfall event. The goal of any urban runoff program is to control the volume, velocity, and timing of the runoff, and to minimize the pollution loading to natural streams from urban sources. Typical issues that need to be evaluated for this strategy are interception, infiltration, and detaining or retaining runoff. Urban storm water management will not be further addressed in the IID Plan. Urban storm water management, because it will not yield new water, does not contribute to meeting IID Plan objectives and is not causing significant local or regional conflicts.

- IID has an interest in urban and regional storm water since, if such waters are not controlled, they could impact existing IID drainage or irrigation facilities; urban runoff could be contributing contaminants to IID drains and affect water quality and the Total Maximum Daily Load (TMDL) requirements.

- As part of the Imperial Region IRWMP, urban storm water runoff management could be evaluated in cooperation with IID Cities and Imperial County to identify opportunities for capture and reuse and to ensure any impacts to IID facilities are mitigated.
    - IID needs to work with IID Cities and Imperial County during development review to ensure that IID drainage facilities are not impacted due to new development and to work to avoid, minimize, or mitigate for any impacts through conditions placed on new developments at the time of approval.
    - IID Cities are responsible for managing storm water within their sphere of influence and ensuring that there is appropriate conveyance, retention, and detention.
    - Imperial County has county-wide storm water responsibilities as part of its land use planning authorities.

6.5 Strategies Eliminated from Further Consideration or Integrated into Other Strategies

Following analysis, the following DWR water management strategies, which are discussed in greater detail below, were eliminated from further consideration or integrated into other strategies:

- Ecosystem Restoration and Management
- Conveyance - Local/Regional
- Regional or Local Systems Reoperation
- Regional/Local Surface Storage
- New California Supplies or Water Rights
- Pollution Prevention
- Pollution Prevention - Control of Nonpoint Sources of Pollution
- Recharge Area Protection
- Groundwater Remediation/Aquifer Remediation
- Water-Dependent Recreation
- Agricultural Lands Stewardship
- Forest Management
- Watershed Management
- Precipitation Enhancement
- Surface Storage—CALFED
- Conveyance Delta

6.5.1 Ecosystem Restoration and Management

This strategy involves environmental restoration to create or recreate habitat; and environmental and habitat management to protect and improve existing habitat, preserve existing conditions, or make marginal enhancements to the current conditions.

This strategy does not yield new water or meet current IID objectives; would not reduce local or LCR Basin conflicts; it was eliminated from further consideration in the IID Plan. Ecosystem restoration or enhancement might be further considered in the Imperial Region IRWMP analysis if solutions or mitigation are needed for project impacts. Additional ecosystems restoration and enhancement opportunities may be identified and integrated into proposed Imperial Region IRWMP projects, but none have been identified at this time and IID is not planning new, stand-alone ecosystem restoration or enhancement projects as part of the IID Plan.

- Future projects that may be proposed as part of the IID Plan or Imperial Region IRWMP will seek to avoid, minimize, and mitigate environmental impacts at the time of design to the degree that this is feasible. It is generally recognized that avoidance of environmental impacts is likely to be the most cost-effective strategy, and as such, proposed projects will use environmental criteria to screen alternatives.
- IID HCP/NCCP, once adopted, will provide the basis for IID ecosystems restoration and management strategy. The existing IID HCP/NCCP will be incorporated by reference into the IID Plan, and this will be the basis for the ecosystems restoration and management strategy since the IID HCP/NCCP is needed to meet IID's objectives, protect existing supplies, and minimize conflicts over water and mitigations costs.
- Once the HCP/NCCP is finalized, the mitigation costs of future projects will be better known and will be factored into any IID Plan project that is proposed that could have similar effects.
- Activities surrounding the unfounded Salton Sea Restoration Program include important ecosystem management strategies and may have a bearing on the IID Plan and Imperial Region IRWMP. The IID Plan recognizes the important State and federal actions related to ecosystem restoration and enhancement of the Salton Sea.
- Baseline and existing conditions within IID related to this strategy include:
    - IID Water Conservation and Transfer Project HCP/NCCP.
    - Development of the 959-acre managed marsh complex along with other mitigation measures.
    - A Salton Sea Habitat Conservation Strategy to offset reductions in inflow 57 through the year 2017.

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[57] Pursuant to SB317, which amended Section 2081.7 for the Fish and Game Code; and as defined in the Agreement Between IID and DWR for the Transfer of Colorado River Water Agreement-between-IID-and-DWR.pdf. Section 2081.7(c)(1) and (c)(2) define types of water committed to mitigation.

- Unfounded Salton Sea Restoration Program to stabilize the water level and reduce the salinity of the Salton Sea.[58] The federal Salton Sea Restoration Project is evaluating actions to stabilize the elevation and reduce the salinity of the Salton Sea.[59]
- The State's Salton Sea Restoration Act of 2003[60] gave the State of California Resources Agency the responsibility for developing an ecosystem restoration study and programmatic environmental document for restoration of the Salton Sea ecosystem. Draft and final environmental documents have been produced.[61] Other important bills were passed clarifying the legislative intent[62] for the Sea and the QSA/Transfer Agreements.
- The California Legislature passed Senate Bill No. 482 (SB 482) in 2002 to facilitate implementation of the QSA; support restoration of the Salton Sea; and findings that the Salton Sea will eventually become too saline to support its fishery and fish-eating birds unless a restoration plan is adopted and implemented.
- The SWRCB issued the orders and approved the transfer of conserved water from IID to SDCWA based in part on the State's assumption of responsibility for the Salton Sea Restoration and on mitigation and ecosystem management programs to be implemented by IID. The SWRCB concluded that, with the mitigation measures specified in the SWRCB Order and implemented by IID, the proposed transfers were in the public interest; would not injure any legal user of water; and would not unreasonably affect fish, wildlife, or other in-stream beneficial uses.
- The Water Supply, Reliability, and Environmental Improvement Act of 2004, Public Law 108-361, directed the Secretary of the Interior to —complete a feasibility study on a preferred alternative for Salton Sea restoration," and Reclamation is preparing the feasibility study on behalf of the Secretary of the Interior. In January 2007, Reclamation released the Draft Restoration of the Salton Sea, Summary Report.[63] The 2007 Summary Report evaluated five alternatives for restoration of the Salton Sea. No preferred alternative has been selected at the time of issuance of this Supplement. One year later, in February 2008, Reclamation published a Final Report and Summary Report

[58] Prepared pursuant to the Salton Sea Reclamation Act of 1998 (Public Law 105-372)
[59] Prepared pursuant to the Salton Sea Reclamation Act of 1998 (Public Law 105-372)
[60] Senate Bill No. 277 (SB 277) enacted the Salton Sea Restoration Act.
[61] Resources Agency. 2007. *Final Programmatic Environmental Impact Report for the Salton Sea Ecosystem Restoration Program*.
[62] No. 317 (SB 317) revised conditions to issuance of take permits for the QSA provides that IID, acting under a contract with the United States for diversion and use of Colorado River water or pursuant to the Constitution or SB 317, or complying with an order of the Secretary of the Interior, a court, or the SWRCB, to reduce through conservation measures, the volume of the flow of water directly or indirectly into the Salton Sea shall not be held liable for any effects to the Salton Sea or its bordering area resulting from the conservation measures.
[63] Reclamation, 2008. Restoration of the Salton Sea, Summary Report. U.S. Department of the Interior, Bureau of Reclamation, Lower Colorado Region. Boulder City, Nevada, September 2007.

about the agency's study efforts to determine a preferred alternative action for restoring the Salton Sea.

- Projects proposed by private development interests, the IID Cities, or those that could be approved by Imperial County must plan on incorporating mitigations into the project, including anticipating mitigation costs so that these costs are not passed on to IID. IID will work to ensure there are no impacts to IID drains, drain flows, or related habitat, or to the IID HCP/NCCP program and currently planned ecosystem restoration and enhancements.

6.5.2 Conveyance - Local/Regional

Conveyance could be a part of the IID Plan but is not a stand-alone project and will be integrated into other agricultural water conservation or reoperations strategies, as needed.

6.5.3 Regional or Local Systems Reoperation

According to DWR, system reoperation means changing existing operation and management procedures (changing the rules) for existing reservoirs and conveyance facilities to increase water-related benefits from these facilities.

- Opportunities for increasing IID supplies or improving supply reliability may be available through developing strategies to capture, store, and use IID's Colorado River unused apportionment; intentionally created surplus; and capture and use surplus water may be available but had limited potential to fully meet IID Plan objectives were not carried forward for further development in the IID Plan. Any opportunities would be realized through integration with the Colorado River transfer, exchange, and importation strategy.
- Locally, the IID Definite Plan reviewed, identified, and is implementing both physical and operational systems improvements to increase the efficiency of the water delivery system and conserve water. The IID Definite Plan program includes developing projects and making operational changes that do not exceed a cost threshold. Any opportunities would be realized through integration with the additional agricultural water use efficiency strategy.

6.5.4 Regional/Local Surface Storage

- Opportunities for large-scale reservoir facilities on the Colorado River or within the IID service area do not exist and further evaluation in the IID Plan is not merited. Evaporative loses and cost are unreasonably high, sites are limited, environmental constraints are great, political opposition would be strong, and such projects are not timely.
- Additional operational and regulatory storage within the IID system above what are already anticipated in the Definite Plan could increase the local water supply. The feasibility and cost-effectiveness of such facilities will be integrated and further evaluated in the agricultural water conservation strategy.

- IID will encourage the cities to bring forward plans for additional storage within each city's system as part of the Water Treatment and Distribution strategies as part of the proposed Imperial IRWMP.

6.5.5 New California Supplies or Water Rights

Obtaining new water rights appropriation, a new Central Valley Project (CVP) or SWP contract, or participating in new storage projects have low probability and were not carried forward in the IID Plan.

6.5.6 Pollution Prevention

For the vast majority of contaminants, pollution prevention is generally accepted to be more cost-effective than end-of-the-pipe treatment of wastes or advanced domestic water treatment for drinking water. This is because pollution prevention measures have lower initial capital costs and less ongoing operations and maintenance costs than engineered treatment systems. State-moderated programs are generally able to control the nature and sources of some contaminants, beneficial uses are protected under the existing program, and an additional pollution prevention approach may not be cost-effective at this time. No additional pollution prevention actions were identified during initial IID Plan scoping or project definition and no further measures are anticipated for inclusion as part of the plan.

6.5.7 Pollution Prevention - Control of Nonpoint Sources of Pollution

Non-point sources (NPS) pollution that originates from otherwise legal uses of land are discharged to a waterway from dispersed sources as a result of generally accepted societal practices and situations where individual liability and responsibility are hard to determine in the Imperial Region. Local NPS pollution control programs are being implemented to control TMDLs from agricultural lands and no program expansion or changes are anticipated as part of the IID Plan. Best Management Practices (BMPs) are to be implemented where problems are detected by current water quality monitoring programs.

Existing programs include the incorporated cities' efforts to improve urban runoff consistent with the NPS pollution storm water program. No additional programs for NPS pollution control for cities have been identified for inclusion in the IID Plan at this time. Additional actions to better integrate existing programs or to expand local or regional programs to control NPS pollution may be identified as the IID Plan program is implemented; these actions would be addressed through the adaptive management strategy.

6.5.8 Groundwater Recharge Area Protection

In the Imperial Region, most of the areas that provide natural groundwater recharge or that could be developed for purposes of conjunctive use and groundwater banking are public lands that are currently protected under existing plans and regulations. No new strategies for recharge protection are anticipated and none were identified in the initial IID Plan scoping and project definition. Lands that could be used for recharge will be further evaluated as part of the conjunctive use and groundwater banking strategy; any impacts to these lands would

be included in the screening criteria for development of these sites and mitigation would be evaluated and planned for as part of project design. Project designs will seek to avoid, minimize, and mitigate any potential impacts.

6.5.9 Groundwater Remediation/Aquifer Remediation

Groundwater remediation involves extracting contaminated groundwater from an aquifer, treating it, and discharging it to a water course, using it for some other purpose, or injecting it back into the aquifer. Contaminated groundwater can result from a multitude of both naturally occurring and anthropogenic sources. Remediation results in a water source that would not otherwise be available. A wide array of local and state regulatory programs in the IID region is designed to prevent pollution of surface water and groundwater. It is not anticipated that additional regulatory programs would be recommended for inclusion in the IID Plan; instead, the IID Plan will identify opportunities to integrate and better coordinate the existing non-regulatory programs where feasible (See Chapter 7). Desalination of saline groundwater is a strategy that is being carried forward as part of the water supply augmentation program. No other groundwater remediation projects, programs, or policies are anticipated or included in the IID Plan.

6.5.10 Water-Dependent Recreation

Water-dependent recreation would be integrated with the Ecosystems Management strategy to the degree possible. Some water-dependent recreational opportunities are anticipated from the wetlands creation and water transfer mitigation projects described under the Ecosystems Management Strategy. Any effects to the Salton Sea and related water-dependent resources that could occur as a result of the other proposed strategies, projects, and programs will be evaluated during the alternatives evaluation and/or any subsequent environmental review.

Water-dependent recreation will not affect or be affected by the proposed strategies considered in the IID Plan. None of the primary IID Plan objectives would be supported by further consideration of water-dependent recreation strategies, and none of the regional conflicts would be resolved through this strategy. No actions were identified in this level of scoping and project conceptualization that are carried forward for further review.

6.5.11 Agricultural Lands Stewardship

One of the primary objectives of the IID Plan is to protect agricultural resources in IID and the Imperial Region, and to ensure any new industrial development or water intensive land use changes do not affect current water supplies or IID facilities that are used to convey water to agricultural and other municipal, industrial, domestic, and commercial water users. Agricultural lands stewardship is an ongoing practice in all water and land use planning strategies in the Imperial Region and within IID. Imperial County has agricultural preservation goals and objectives in its General Plan, backed up by zoning and other ordinances, and there were no new aspects of this strategy approach that would make a significant contribution to the realization of IID Plan objectives. No actions or programs were identified in this level of scoping and project conceptualization that are carried forward for further review.

6.5.12 Forest Management

The Imperial Valley is surrounded by extensive public lands but they are not forested. No new Forest Management programs were identified in the initial scoping and project/program conceptualization that would significantly contribute to the realization of the IID Plan goals and objectives.

6.5.13 Watershed Management

Watershed management is the process of evaluating, planning, managing, restoring, and organizing land and other resource uses within an area of land that has a single common drainage point. Watershed management tries to provide sustainable human benefits while maintaining a sustainable ecosystem. Watershed management seeks to balance changes in community needs with these evolving ecological conditions. Most of the Imperial Valley is highly developed for agriculture. Outside of the IID irrigated area there is limited development and limited potential for development. There is a large amount of public land surrounding and within the IID Plan project area. This land is actively managed and protected under current local, state, and federal programs and agencies, and these activities and existing plans are acknowledged in context of the IID Plan. There are significant environmental resources on these lands. Any effects to these resources that could occur as a result of the other proposed strategies, projects, and programs will be evaluated during the alternatives evaluation and/or any subsequent environmental review. None of the primary IID Plan objectives would be supported by further consideration of additional watershed management strategies, and none of the Imperial Region conflicts would be resolved through this strategy. No actions are identified in this level of scoping and project conceptualization that are carried forward for further review.

6.5.14 Precipitation Enhancement

With average annual precipitation of less than 3 inches per year, opportunities for precipitation enhancement are negligible and the potential yields do not merit investment in program development and implementation, and the strategy is not carried forward for further evaluation.

6.5.15 Surface Storage—CALFED

This is unrelated to the project area, though increased surface storage as anticipated by CALFED could increase probability that the California Water Transfer, supply augmentation water management strategy could be applied in the long-term to the IID Plan.

6.5.16 Delta Conveyance

This is unrelated to the Imperial Region project area, though Delta conveyance issues are recognized as being a constraint to any opportunities that might be available to IID and the region through the California Water Transfer supply augmentation water management strategy.

7 Demand Management Elements and Alternatives

This chapter discusses alternative demand management measures for agricultural water conservation, urban water conservation, and geothermal/energy production conservation. Current conditions are briefly reviewed, alternatives are discussed, and findings, conclusions, and recommendations are presented for consideration by the IID Board and stakeholders. Demand management measures include action to increase the efficiency of a current use. In theory, demand management would allow water savings to be realized that could then be apportioned to some new future use. In practice, demand management is complicated because it implies changed behaviors, increased management, and/or higher costs to existing users, face technical, political, economic, legal, and environmental challenges that make definition of tangible savings complicated.

7.1 Agricultural Water Use Efficiency and Conservation

Agricultural water use efficiency and conservation, in addition to that proposed for the 303,000 acre-feet per year conservation described in the Imperial Irrigation District Definite Efficiency/Conservation Plan (Definite Plan) and System Conservation Plan, could increase the available water supply for MCI uses in the Imperial Valley.[64, 65] IID has already implemented, and has plans to implement, a large number of water conservation projects so there are limited opportunities for additional conservation. These are discussed below and there may be additional water that could be conserved through further agricultural water conservation but the costs will be higher than those actions already planned as part of the Definite Plan. The basis for the quantification of additional water conservation options is the IID Definite Plan completed in 2007 and the System Conservation Plan prepared in 2009.

7.1.1 Current Conditions

IID is a leader in agricultural water conservation. Water conservation has a long history in IID, dating back to the 1940s when IID started to concrete line some of its ditches. Conservation efforts have continued ever since through independent efforts by IID and obligations under QSA/Transfer Agreements. As described in the Imperial Irrigation District 2007 Water Conservation Plan (IID, 2008), water conservation efforts by Imperial Valley landowners have included farm delivery ditch lining, tile drain installation, land leveling, and improving on-farm irrigation management. IID has prepared their Agricultural Water

[64] Efficiency Conservation Definite Plan -FINAL REPORT, prepared as part of the Imperial Irrigation District Efficiency Conservation Definite Plan May 2007, by Definite Plan Team: Davids Engineering, Inc. and Keller Bliesner Engineering, LLC, in association with CONCUR, Inc., DAVEY-CAIRO ENGINEERING, INC., GEO/Graphics, ITRC, Western Resource Economics, Colorado State University and Utah State University

[65] Technical Memorandum - Imperial Irrigation District System Conservation Plan and Delivery Measurement Description, prepared by Davids Engineering, Inc., Keller-Bliesner Engineering, LLC, Irrigation Training and Research Center, Cal Poly, SLO. May 21, 2009.

Conservation Plan to meet federal and state requirements.[66] These efforts have conserved significant water at the farm-level and within the conveyance and distribution system. In 1988, IID entered into an agreement with MWD to conserve additional water in the District. A variety of infrastructure and monitoring projects were funded by MWD in exchange for the water conserved by these efforts. Projects under the IID/MWD Transfer Agreement were designed to conserve up to 110,000 acre-feet annually, 105,000 AF is delivered to MWD. As a result of all of the conservation efforts that have taken place in IID, several studies concluded that the water use efficiency within IID is relatively high compared to other irrigation districts of similar size within the Lower Colorado River Basin and California.

Further agricultural water conservation is required of IID as part of the QSA/Transfer Agreements. IID's 2007 Definite Plan and 2009 System Conservation Plan provide possible means by which the District could save the additional 303,000 acre-feet per year needed for transfer to SDCWA and CVWD. The Definite Plan and System Conservation Plan recommend infrastructure and operational projects that would conserve approximately 103,000 acre-feet per year from the distribution system, and provide on-farm water conservation projects that could be voluntarily implemented by farmers to reduce tailwater runoff and otherwise conserve the remaining approximately 200,000 acre-feet per year required by QSA.

7.1.2 Agricultural Water Use Efficiency/Conservation Alternatives

Agricultural water conservation measures that are to be implemented as part of the QSA are the most cost effective measures. The remaining agricultural water conservation measures are more costly and may have a higher degree of uncertainty in effectiveness. This remaining potential for agriculture water conservation is estimated using a water balance of the IID system. Based on this water balance, various opportunities are discussed, including:

- On-Farm Conservation
- Systems Conservation
- Other Relate Measures

An overall Water Balance for IID for the 1998 to 2008 period provided by IID is presented in Appendix E. The water balance helps to identify and quantify the water conservation opportunities in the supply, distribution, and on-farm system components. The water balance provides the overall potential to conserve water without assessing whether reasonable conservation efforts could attain this potential. Table 7-1 shows the 1998-2008 average annual water balance quantities for the number of conservation components after the

[66] Section 210(b) of the Reclamation Reform Act and most water service contracts and repayment contracts executed after July 17, 1979, contain provisions requiring contractors to prepare and submit water conservation plans. IID must also comply with 43 CFR Part 417 Procedural Methods for Implementing Colorado River Water Conservation Measures with Lower Basin Contractors and Others. In California, the Agricultural Efficient Water Management Act of 1990 (AB 3616) defines state requirements for Agricultural Water Management Plans.

IID/MWD projects were completed. Remaining sources of potential water conservation are noted, along with the activities that are being addressed under the current QSA/Transfer Agreements plans.

Table 7-1. Potential Water Conservation Based on IID Water Balance (acre-feet per year)

Conservation Component	Water Balance Average (1998-2008)	QSA Conservation Activities	Potential Remaining Conservation Sources	On-Farm Obtainable Conservation
Seepage (Delivery System)	85,400	37,750	47,650	
Main & Lateral Spill (Delivery System)	122,400	67,250	52,050	40,000
Evaporation (Delivery System)	22,900	0	N/A	N/A
Tilewater (On-Farm)	418,700	0	N/A	N/A
Tailwater (On-Farm)	424,200	198,000	226,200	60,000
TOTAL	**1,073,600**	**303,000**	**325,900**	**100,000**

Note: QSA/Transfer Agreements conservation activities are based on a presentation to IID Water Conservation Advisory Board on May 21, 2009, based on the IID System Conservation Plan

Remaining conservation sources indicated in Table 7-1 are estimated to be approximately 325,900 acre-feet per year. Not all of this water can realistically be conserved. Obtainable water conservation opportunities in the delivery system were identified as projects not for construction as part of the QSA/Transfer Agreements, and are estimated to total 40,400 acre-feet per year (8,000 from identified projects _NotBuilt' as part of the planned Definite Plan, 30,000 from full IID system automation, and 2,400 from additional canal seepage reduction).[67] On-farm obtainable water conservation opportunities were estimated based on an increase in the number of farms implementing conservation measures. Supply system seepage and evaporation along the All-American Canal and delivery system evaporation within IID were not were not considered for conservation, because they are part of other conservation efforts or are considered impractical or infeasible to implement. Replacing concrete-lined canals with pipelines to reduce evaporation is a non-feasible option due to costs. Reduction in tilewater is not considered a conservation opportunity because of the leaching requirements in IID that are needed deal with salt content of the irrigation supply.

The Definite Plan and the System Conservation Plan analyze the QSA/Transfer Agreement water conservation projects listed in Table 7-2. Agricultural water conservation opportunities discussed below were considered but not selected or fully utilized in the Definite Plan. Estimated costs (not considering mitigation costs, which are currently estimated to be $90 per acre-foot) are described in the Definite Plan. Note that the overall cost of conservation increases with the amount of water to be conserved. All costs presented are based on year 2006 costs.

[67] Draft Technical Memorandum, Interim Plan Tiered Block Rate Schedule, by John Eckhardt, July 9, 2009.

Table 7-2: Water Conservation Projects in Definite Plan and System Conservation Plan

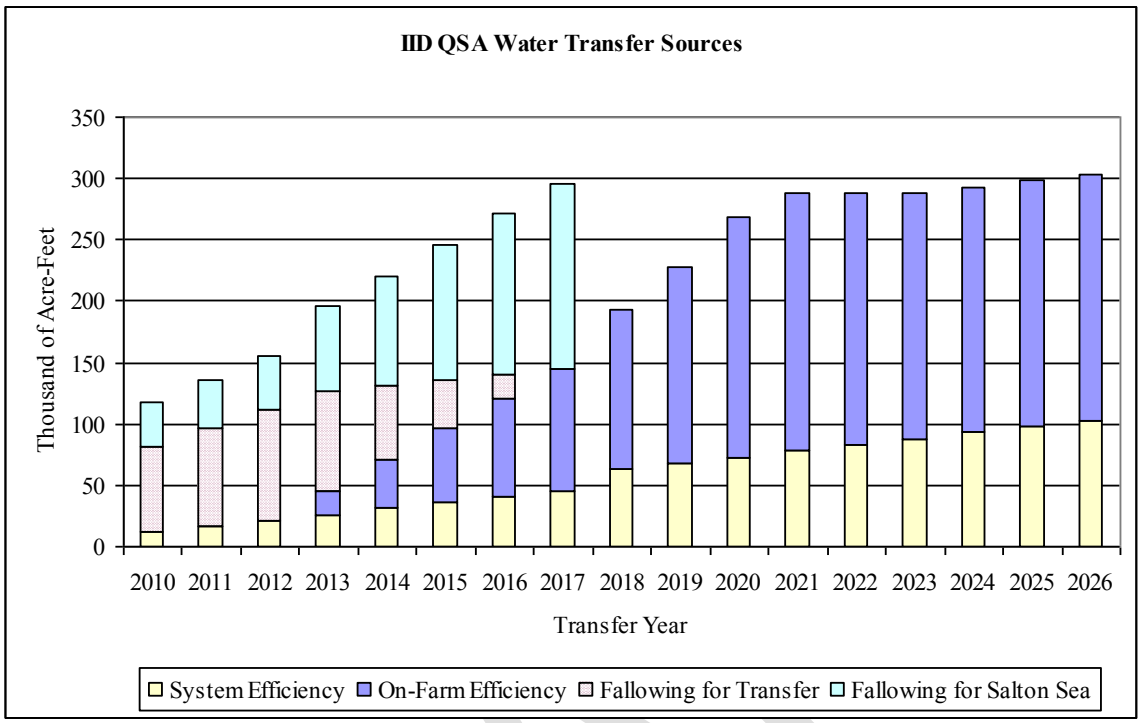
Project	Projected Water Savings (Acre-feet per Year)	Estimated Cost (2006$) ($ per Acre-foot)	Source
On-Farm Conservation Projects			
Scientific Scheduling	0.3 - 0.5 per acre	$60	1
Permanent Tailwater Reuse	0.4 - 0.8 per acre	$260	1
On-Farm Reservoirs			
Enhanced Service			
Pressure Systems (Drip/Sprinkler)	0.6 - 0.9 per acre	$550	1
Level Basin / Gated Pipe	0.9 per acre	$240	1
Total Expected for QSA	**200,000**	**$256**	
Delivery System Conservation Projects			
Canal Lining	2,400	$360	1
Seepage Recovery	**37,750**	**$16**	**2**
Integrated Information Management	**15,400**	**$268**	**2**
Mid-Lateral Reservoirs	**28,650**	**$133**	**2**
Lateral Interties	**16,750**	**$137**	**2**
Mid-Valley Collector	**6,250**	**$1,114**	**2**
Minor System Improvements	**200**	**$290**	**2**
„Not Built' Systems Conservation Projects	8,000	$504	3
System-Wide Automation	30,000	$1,376	3
Total for QSA (Bold Type Items)	**105,000**	**$170**	

Source: (1) Definite Plan, (2) System Conservation Plan, (3) Identified by Definite Plan team for inclusion in an Interim Water Supply Policy.
Items listed with **bold type** are those for the QSA/Transfer Agreements System Conservation Plan.
Water savings from the on-farm conservation projects cannot be added.
Price does not include mitigation costs

7.1.2.1 Schedule for System and On-Farm Water Conservation

The timing of the QSA/Transfer Agreement conservation projects and any potential additional conservation projects is important and could influence the timing and feasibility of any new agricultural demand management actions to be implemented for future MCI users. As presented in Figure 7-1 it will take through 2026 to fully implement the on-farm and system-wide water conservation measures for the QSA/Transfer Agreements. Fallowing, part of the QSA/Transfer Agreement, is planned through 2017 and was necessary as part of the Salton Sea mitigations and for early transfer to SDCWA prior to implementation of the on-farm and systems conservation project.

Figure 7-1. Schedule and Sources of Water for the QSA



7.1.2.2 On-Farm Conservation Projects

The on-farm conservation projects listed in Table 7-2 are to be implemented on a voluntary basis by IID farmers with incentives from IID to implement the projects. In terms of QSA/Transfer Agreements' responsibility, the Definite Plan recommends that on-farm conservation projects contribute 200,000 acre-feet per year in savings. The savings that can be expected for on-farm water conservation efforts is directly related to the number of farmed acres with conservation projects. The Definite Plan considers that growers farming 300,000 acres (nearly two-thirds of irrigated acreage) would need to adopt conservation efforts to meet the targeted 200,000 acre-feet per year of QSA/Transfer Agreements water conservation. The total irrigated land base in IID is approximately 473,000 acres in 2008.

There is potentially an opportunity to conserve an additional 60,000 acre-feet per year if growers farming another 100,000 acres would participate with an average water savings of 0.6 acre-feet per acre per year. This is based on tailwater reuse systems, with an estimated water savings of 0.4 to 0.8 acre-feet per year per acre (average of 0.6 acre-feet per acre). Specific on-farm conservation projects will depend upon whatever is most efficient and cost-effective for IID and the farmer. Either performance/result-based payment incentives and/or conservation practice payment incentives could be used to make it profitable for farmers to participate. The degree of participation that might occur is unknown.

Although the on-farm conservation measures are the same as those described in the Definite Plan, the cost per acre-feet of conserved water beyond 200,000 acre-feet per year is higher than those used in the Definite Plan, because the most feasible projects would be implemented first. Based on the Definite Plan, the 2006 cost of the on-farm water

conservation is estimated to be $256 per acre-foot at the 200,000 acre-feet per year level; incremental costs for an additional 60,000 acre-feet per year estimated to range between approximately $523 per acre-foot and $911 per acre-foot depending on the on-farm incentive mechanism used.

The major constraints to implementing conservation measures are cost and level of grower participation. Costs for agricultural water conservation above that planned for the QSA/Transfer Agreements are over $500 per acre-foot. That is, the remaining on-farm and distribution system conservation opportunities are more expensive (in terms of water savings) than most of the previously implemented measures. At the present time, on-farm water conservation policy requires voluntary participation by farmers within IID. The EDP should help to encourage farmers to manage their mandatory head gate allocation for the highest beneficial use, but on-farm conservation efforts remain voluntary.[68] Until such time as grower participation can be determined and the Definite Plan in fully implemented, it is hard to determine how much additional on-farm water conservation could be undertaken to allow for apportionment to future MCI uses.

7.1.2.3 Systems Conservation Projects

'Not-Build' QSA/Transfer Agreements Systems Conservation Projects

During the development of the IID Plan and as part of the Interim Water Supply Policy effort to identify actions that could be taken immediately, the Board tasked the Definite Plan Team with identifying _Not-Build' QSA/Transfer Agreements Systems Conservation Projects that could provide a quick source of water for pending geothermal projects. The system's conservation projects were determined not to be cost effective in context of the QSA/Transfer Agreements implementation, but could be included in an Interim Water Supply Policy and IID Plan to provide near-term sources of water for industrial use. There were 24 projects identified that could conserve 8,000 acre-feet at an estimated average cost of $504 per acre foot. The projects included mid-lateral reservoirs, canal interties, and some additional seepage interception. These are near-term projects that could be developed in the next three to five years and provide water for an Industrial Water Pool.

Canal Lining/Seepage Recovery

Many IID lateral canals are already lined as part of the District's own efforts and the IID/MWD Program. Therefore, canal seepage mostly occurs on the large main canals such as East Highline Canal and West Main Canal. The Definite Plan reports that seepage recovery systems (and not canal lining) are the most economical way to recover water that has seeped from these larger canals.

Seepage from lateral canals could be reduced through further lining efforts, but many are already lined and the estimated remaining savings are relatively small. The Definite Plan estimates that there is a potential to conserve an additional 2,400 acre-feet per year through concrete lining efforts, at a cost of $360 per acre-foot and this water could be a source for

[68] See IID website: Equitable Distribution http://www.iid.com/Water/EquitableDistribution

pending geothermal or future industrial projects. Lateral canals with the highest seepage rate were lined as part of the IID/MWD Program, making the cost of water saving for lining additional canals higher, but there are canal lining opportunities that could conserve about 2,000 acre-feet per year for less than $400 per acre-foot (Definite Plan Appendix 1, Volume 1F, Table 7).

Seepage recovery systems collect water that infiltrates into the canal alluvium. They use interceptor drains to convey the water to a pump station that pumps the seepage water back into the canal. These systems are recommended for the East High Line and Westside Main canals in IID. The System Conservation Plan estimates that 37,750 acre-feet per year would be conserved through seepage recovery projects, at an average of about $16 per acre-foot. There is uncertainty as to the potential seepage recovery projects outside of QSA/Transfer Agreements responsibilities and no additional projects were identified that could serve MCI demands.

Integrated Information Management

Integrated Information Management (IIM) represents improvements in monitoring and control of IID operations to reduce spills from the lateral canals. The System Conservation Plan outlines specific projects that are estimated to conserve an average of 15,400 acre-feet per year. Outside of QSA/Transfer Agreements responsibilities, no additional IIM projects are identified. Until the IIM program is operational, it is difficult to determine if there is any additional water conservation potential.

Spill Recovery

Spill recovery projects involve infrastructure modifications such as interceptor canals and reservoirs. Projects in the System Conservation Plan include mid-lateral reservoirs, lateral interties, mid-valley collector systems, and other minor improvements. The System Conservation Plan estimates that there is a potential to conserve an average of 51,850 acre-feet per year through spill recovery projects with reservoirs, when constructed in combination with the IIM projects. Several spill recovery projects are identified that will not be part of the System Conservation Plan to meet QSA/Transfer Agreements responsibilities. These projects are projected to conserve 7,900 acre-feet per year, at an average cost of approximately $505 per acre-foot. These could be a potential source of water for future MCI demands but since they are interconnected with planned activities and because there is uncertainty in the actual availability of the water, spill recovery is not considered a near-term opportunity for meeting future MCI demands. This should be reviewed once the Definite Plan projects have been constructed.

System-Wide Automation

As put forth in the System Conservation Plan, system-wide automation involves automation of all farm delivery turnouts and lateral canal checks within the District, and a corresponding upgrade of the SCADA system. This comprehensive automation project is estimated to conserve 25 percent of system spills, or roughly 30,000 acre-feet per year, with a cost of $1,376 per acre-foot of conserved water. Potential water conservation associated with this

system-wide automation project is partly dependent upon constructing the spill recovery and IIM projects.

Summary of Agricultural Water Conservation Potential

Table 7-2 outlines the possible delivery system and on-farm system water conservation opportunities based on a review of the Definite Plan and System Conservation Plan. Total additional potential is 100,000 acre-feet per year; realistic potential is likely on the order of 50 percent or about 50,000 acre-feet. The estimated cost for these additional (beyond that planned for QSA/Transfer Agreements) 50,000 acre-feet per year of agricultural water conservation at the on-farm level is estimated to range between $523 and $911 per acre-foot (average of $717 per acre-foot). The cost of saving another 40,400 acre-feet in the IID system is estimated to be $1,143 per acre-foot. These additional agricultural water conservation measures would be at the farm level and would be dependent on voluntary grower participation. Additional agriculture water conservation that does not include fallowing will increase the salinity in the drains and will have environmental mitigation requirements. In addition to the cost previously presented, environmental mitigation costs have been estimated to add $90 per acre-foot annually to these costs as an annual payment.

7.1.2.4 Other Related Conservation Measures or Actions

Fallowing

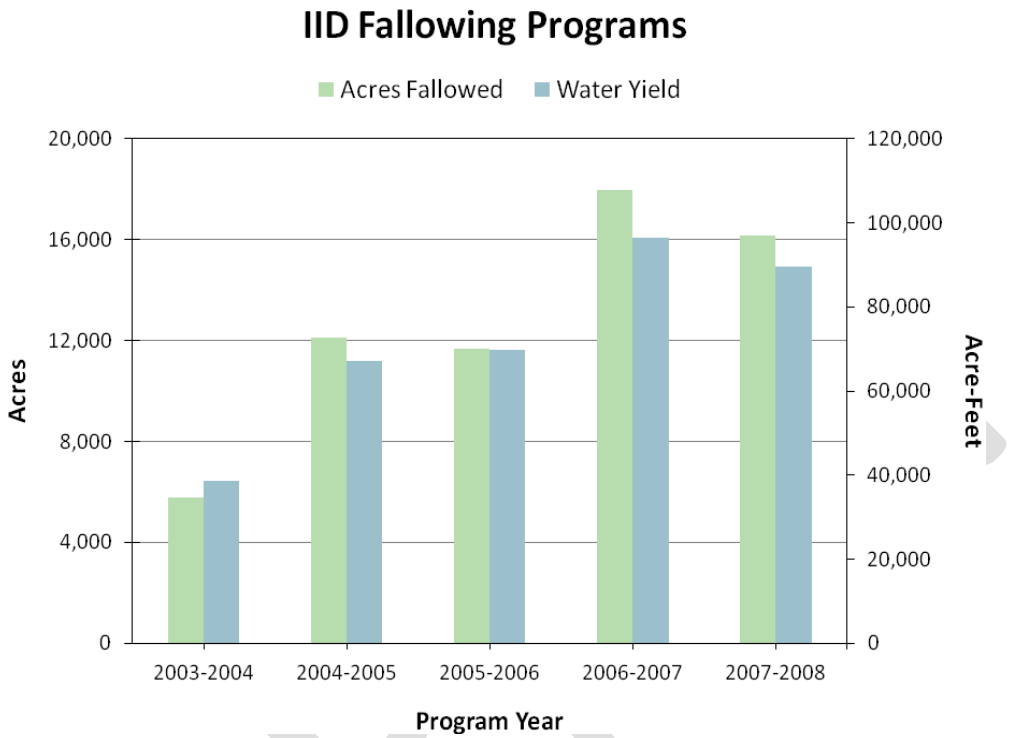
Fallowing is quickly implemented and the resulting water use reduction is easy to quantify. Fallowing is currently part of the QSA/Transfer Agreements and includes: (1) interim measure for water conservation to meet SDCWA transfer requirements through 2016, (2) to mitigate for Salton Sea impacts through 2016, and (3) as an extraordinary conservation measure to pay back overruns. A program similar to the one in place could be used in the future to provide water for MCI uses, but as a general policy, fallowing has been discouraged in the valley due to its economic impacts.

Fallowing to provide additional supplies for Imperial Valley MCI may be viewed differently than the current fallowing, because the water would remain in the valley. The cost of water from fallowing would be comparable to that from other water conservation measures and the existing fallowing program. The potential to agricultural water use to accommodate new MCI demands is very high and could easily be over 100,000 acre-feet per year while fallowing 5 percent of the cropped area. Political and economic constraints to further fallowing are also quite high. In addition to costs for fallowing arrangements, environmental mitigation and social impact costs must be considered.

As part of fallowing for the QSA/Transfer Agreements in 2003 and 2004, $3.5 million was provided by SDCWA to mitigate for social economic impacts, which is equivalent to approximately $120 per acre-foot of conserved water – in addition to the $50 per acre-foot paid to the landowners in the 2004-2005 Fallowing Program (in 2009 $85 per acre-foot is being paid to the landowner) and one third of the water was required for delivery to the Salto Sea. For planning purposes a cost of $200 per acre-foot is used. For comparison, the forbearance and fallowing program between Palo Verde Irrigation District water users and MWD pays the users approximately $200 per acre-foot for long-term agreements and a 2009

short-term emergency agreement would pay approximately $340 per acre-foot (assumes 5 acre-feet per acre fallowed).[69] Figure 7-2 shows the fallowing acres and water savings from the 2003-2008 program.

Figure 7-2. 2003 – 2008 Fallowing Acres and Water Savings



IID Western Farmlands total approximately 15,500 acres that IID leases to growers. This land is a possible opportunity for a fallowing program to provide water for new MCI use. This would have the same environmental, economic, and political issues as fallowing private lands. A fallowing program could yield water for apportionment to future MCI uses and IID theoretically could move relatively quickly to implement a program to change the type and place of use of the water. The program could be temporary and include a rotational program or could be more long-term and include changes to zoning for less water intensive uses (e.g., solar ‗farm'). The water savings would be based on the acres in such a program. For example, if 1,000 acres was rotationally fallowed (2 to 4 year terms), and 5.25 acre-feet per acre is presumed an agricultural apportionment for the property to be consistent with the EDP, and that 3.7 acre-feet were available for transfer since water needed for dust control, then 3,700 acre feet per year could be used to meet MCI demands. There is bonded indebtedness on the property that would need to be repaid. Costs for this water could range between $200 to $400 per acre-foot to retire the debt and cover environmental and socio economic mitigation costs and the amount of land committed to a fallowing program.

[69] PVID-MWD Forbearance and Fallowing Program, August 2004 and Notice of Short-term Fallowing Program dated March 24, 2009. http://pvid.org/MWDPVIDProgram/ and

Fallowing of productive private farmlands could be viewed as an alternative to be relied on for the long-term as a source of industrial water or could be used as a near-term bridge until such time as funds are collected to construct projects that produce tangible yields of new water. Fallowing of IID Western Farmlands or of marginal land based on land use decisions by the County that include rezoning to new uses would be possible if IID were to adopt policies, adapt the current fallowing program, or design a new program. Any program that could involve temporary, long-term, or permanent fallowing (land use conversion) need to be based on policy decisions by the IID Board with input from the community as discussed further in Chapter 9.

Crop Selection and Yield Reduction

Agricultural water use in the valley could be reduced by selecting crops with shorter growing seasons and/or lower water use, by reducing irrigation (and yield) on crops such as alfalfa and Bermuda grass, and by limiting the multi-cropped acreage. This could be accomplished by not irrigating alfalfa for a 4 to 6 week period in the summer. The reduced water use could be accounted for by the difference in turnout deliveries and the turnout allocation. The program would be administered in a similar fashion to the fallowing program. For eliminating one irrigation and one cutting on alfalfa, we might achieve 0.5 acre-feet per acre at a cost similar to water savings from fallowing ($200 per acre-foot). There is potential to conserve about 50,000 acre-feet per year from alfalfa because there are over 100,000 acres of alfalfa in the valley. The amount of potential water savings would be influenced by the payment for irrigation reduction offered.

Reclaimed Agricultural Drainage

Currently, agricultural and other drainage water that flows into the Salton Sea has value by creating habitat in the IID drains, in the New and Alamo Rivers, and serving environmental purposes. Such water also helps to extend the life of the Salton Sea. Based on information in the updated IID water balance, the 1998 to 2008 average drainage from Colorado River water into the Salton Sea was about one million acre-feet per year (Table 7-3). Average inflow of Colorado River to the Imperial Valley during the same period was just over 2.8 million acre-feet per year. Definite Plan implementation will result in conservation of 303,000 acre-feet per year, which will reduce the agricultural drainage. This assumes no fallowing and that the agricultural consumptive remains constant.

Selenium concentrations have been found to be elevated in the IID drainage water and treatment options to reduce selenium levels might be necessary for drainage water to be reclaimed for other uses.[70] Assuming that in the future the entire drainage flow will not be required for environmental purposes (Salton Sea), some of the water could be treated with reverse osmosis and used for future MCI purposes. Water management strategies described in Chapter 6 included this potential source of supply. Available quantities are entirely

[70] Final Environmental Impact Report/Environmental Impact Statement, Imperial Irrigation District Water Conservation and Transfer Project (section 3.1, pages 94-98), prepared for the Bureau of Reclamation and Imperial Irrigation District, October 2002 by CH2MHill, Oakland, California.

dependent on the environmental water needs of the drains, rivers, and Salton Sea. Most of the drainage collects in the New and Alamo rivers with a historical combined flow about 1.1 million acre-feet per year (includes inflow from Mexico) and is estimated to be about 800,000 acre-feet per year after the water conservation programs for the QSA/Transfer Agreements are implemented. Salton Sea inflows may also be reduced in the future as flows from Mexico are redirected to other uses south of the border. A portion of this water in the New and Alamo rivers or its tributary drains may be available for reclamation and use.

Table 7-3. Components of the Drainage from Colorado River Water Diverted to IID

Water Component	Average (1998-2008) Acre-feet per year
Tailwater	424,200
Tilewater	418,700
IID system spills	122,400
IID system seepage	85,400
System Evaporation	-22,900
MCI return flow	34,400
TOTAL	**1,062,200**

Data from IID Water Balance prepared by the Water Conservation Definite Plan Team.

Data sources for flow and salinity conditions for the New and Alamo rivers and for the Holtville, Rose, and Central Drains are summarized in Table 7-4. Drain flows and salinity levels were estimated to evaluate water supply augmentation options for using reclaimed drain water. It is noted that Alamo River flows, at the U.S. Mexico border are essentially zero. Data for the Holtville, Rose and Central drains are summarized in Tables 7-5 and 7-6 for historical conditions and those related to Post QSA/Transfer Agreements conditions. Available historical data were used to estimate discharge to rivers for unmetered drains assuming uniform salt accretion per unit drain length. Total drainage to the Salton Sea included drainage flow associated with Alamo and New Rivers and that portion associated with drains discharging directly to the Salton Sea. Post-QSA/Transfer Agreements conditions were estimated based on the following considerations.

- A 303,000 acre-foot reduction in water availability to IID as a result of QSA/Transfer Agreements transfer reflects about 10 percent of the water supply to the Valley (Table 2) and about a 30 percent reduction in drain flow (approximately 303,000 acre-feet out of 1,000,000 acre-feet Salton Sea inflows from IID‘s Colorado River diversions).
- The reduction in salt from drainage associated with the QSA/Transfer Agreements transfer reflects about 10 percent salt contributing to the Valley.
- Impacts to drain water salinity are accounted for by assuming a salt balance is maintained in IID (i.e., salt input from Colorado River is equal to salt output to Salton Sea). It is also assumed that drainage contribution is uniform throughout IID.

Table 7-4. Alamo and New River Data Summary

Location	Period of Record	Average Flow (cfs)	Average Electrical Conductivity (µS/cm)
Source IID			
Alamo River "In"	1997-2009	1.3	2,500
Alamo River "Out"	1997-2009	877	No Data
Source USGS			
Alamo River (Intl. border)	No Data	No Data	3,500
Alamo River (near Niland)	1963-2007 (intermittent)	832	3,816
Source IID			
New River "In"	1997-2009	181	4,400
New River "Out"	1997-2009	618	No Data
Source USGS:			
New River (Intl. border)	1961-2007 (intermittent)	165	7,186
New River (Westmoreland)	1963-1992 (intermittent)	588	5,189

Note: portions of the data in the IID reporting include some USGS data

Table 7-5. Historical Flow and Salt Concentration from Select Drains and the Alamo and New Rivers

Drain Station	Cumulative Distance from Mexico Border	Flow from Drain	Cumulative Flow	Cumulative Flow	Total Annual TDS
	(mi)	(acre-ft)	(acre-ft)	(cfs)	(mg/L)
Alamo at Border	0.0	1,000	1,000	0	2,500
New River at Border	2.20	130,700	131,000	180	4,400
Central Drain	21.0	88,400	170,200	240	2,500
Holtville Main Drain	29.6	79,400	288,500	400	2,500
Rose Drain Outlet	32.3	78,500	386,400	530	2,500
Alamo at Salton Sea	58.7	6,800	634,400	880	-
New River at Salton Sea	-	-	446,000	620	3,400

Highlighted cells are measured data. Other data are calculated.

Table 7-6. Post QSA Flow and Salt Concentration from Select Drains and the Alamo and New Rivers

Drain Station	Cumulative Distance from Mexico Border	Post QSA Drainage Flow	Post QSA Cumulative Flow	Post QSA Cumulative Flow	Post QSA Cumulative TDS
	(mi)	(acre-ft)	(acre-ft)	(cfs)	(mg/L)
Alamo at Border	0.0	1,000	1,000	0	2,500
New River at Border	2.20	130,700	131,000	180	4,400
Central Drain	21.0	61,900	119,000	160	3,190
Holtville Main Drain	29.6	55,600	202,000	280	3,190
Rose Drain Outlet	32.3	55,000	271,000	370	3,190
Alamo at Salton Sea	58.7	-	445,000	610	3,170
New River at Salton Sea	-	-	384,000	530	4,200

Highlighted cells are measured data. Other data are calculated.

One possible scenario for the collection and reuse of drain water consists of combining and routing drainage to the Keystone Development Area for desalination and use for geothermal plants or other industry. Three major drains consisting of the Holtville Main, Rose and Central Drains enter the New River near this location. A connection to the Central Drain would be constructed to tie into the Upper Mesquite Drain system. Existing drain systems would be modified by cross-connections that will link and expand the usable and recoverable portions of drain water. In so doing, it will be necessary to re-grade existing channels to improve capacity and efficiency of drain flow concentration. To include water from the Holtville Main Drain a conveyance system across the Alamo River would be required to connect to the combined system at the lower end of the Rose Drain, from where collected water will need to be transported over to Keystone area. Table 7-7 below shows the quantities and salinity concentrations associated with such a scenario. Such a scenario would provide ample cooling water for presently envisioned geothermal development but would require treatment to improve water quality.

Table 7-7. Estimated QSA\RTA Drain Flows and Salinity for Drain Collection and Reuse

Drain	Average Annual (ac-ft)	Maximum Month (ac-ft)	Minimum Month (ac-ft)	Maximum TDS (mg/L)	Average TDS (mg/L)
Holtville Drain	55,600	5,800	3,300	3,670	3,190
Rose Drain	55,000	5,300	3,900	3,670	3,190
Central Drain upstream of Mesquite Drain Cut Off	59,900	6,300	3,600	3,670	3,190
TOTAL	**170,500**		**10,800**		

Other options for reclaimed water supply would be from diverting water directly out of the New or Alamo River at the other desired locations.

Reclamation of agricultural drain water represents a significant and potentially useful source of water for uses within the valley. The flow of recoverable drain water is more than ample to meet the raw water feed requirements for a 50,000 acre-feet per year (finished water) desalinization plant. The water quality and specifically salinity within the drain system is estimated to vary between 2,702 and 3,682 mg\L, after implementation of the Definite Plan improvements. The combined average drain flow of the Holtville, Mesquite, Central, and Rose Drain is 170,200 acre-feet per year of water per year, which is adequate to supply a 50,000 acre-feet per year (finished water) desalinization plant.

Reclamation and re-use of agriculture drainage water is constrained by detrimental water quality, specifically salinity and selenium. Improving the water quality of the drainage water would raise the cost of using reclaimed drainage water.

Constructed Managed Marsh

This section describes the managed marsh being constructed by IID as part of its environmental compliance requirements for the QSA/Transfer Agreements. The marsh is being built to replace drain habitat impacts resulting from reduced drain flows in IID as a result of the QSA/Transfer Agreements transfers and on-going IID Operations and Maintenance activities. The managed marsh plans are described by IID in the June 2008 Supplement to the Final EIS.[71] The managed marsh habitat will consist of 959 acres in total, with 618 acres of open water/fresh-emergent marsh and 341 acres of riparian woodland/scrub. IID analyzed four alternative sites for locating the managed marsh and decided on the English Road site for construction.

The managed marsh complex may consist of 20 or more cells, approximately 30 acres or larger, each with open water and emergent vegetation components. Several potential internal cell designs were considered and may be incorporated into the site design. Colorado River water will be delivered to the site using existing canals. Water would be delivered to and drained from the cells via constructed delivery and drainage corridors and existing tile drains. Unmetered water control structures would be used to control water flow into and out of each cell and to allow the isolation of each cell for management actions. Drainage from the cells would be collected and conveyed to existing drains. Some drainage may require the use of electric pumps.

Planned water deliveries to the marsh are not specified in the Supplement to the EIS. It is anticipated that water deliveries will be whatever quantity is necessary to maintain the open water/emergent marsh habitat and the riparian woodland habitat. Consumptive water demands of these habitats are estimated to be roughly 6.0 to 8.0 acre-feet per acre. The Supplement to the EIS estimates a drain flow from the managed marsh of 4.7 acre-feet per acre. Therefore, total deliveries to the marsh habitat can be estimated as 10.0 to 13.0 acre-feet per acre.

[71] Final Supplement to the IID Water Conservation and Transfer Project EIR/EIS for the Managed Marsh Complex, by CH2MHill, January 2008.

Water quality of the inflow to the marsh is approximated by the water quality of the Colorado River at Imperial Dam. Inflow water salinity (TDS) is estimated to be 771 mg/L with a selenium concentration of 2.5 µg/L. Outflow water quality from the managed marsh is likely to be equal to or better than the irrigation drain water quality in the District. Water quality in IID drains has been estimated to have a salinity (TDS) of 2,375 mg/L with a selenium concentration of 7.9 µg/L. The EPA criteria limit for selenium is 5.0 µg/L.

Potential exists for water users to utilize managed marsh outflows. These outflows are estimated to be approximately 4,500 acre-feet per year. Considering that water quality of the managed marsh outflows should be better than typical IID drain water, the water could be treated by reverse osmosis and used for most MCI purposes.

7.1.3 Findings and Conclusions

The most cost-effective conservation measures have already been implemented, or will be implemented as part of the Definite Plan. Therefore, the conservation potential that is left is the most difficult and most costly. The water yield of some water conservation measures will not be known until the water conservation measures proposed for the QSA/Transfer Agreements have been implemented.

Achievable Systems Conservation and On-Farm Conservation. Of the potential water conservation projects only a limited amount of yield is achievable.

- System Conservation projects not currently planned for implementation as part of the QSA/Transfer Agreements and Definite Plan could provide a total of 40,400 acre-feet per year: 30,000 from full IID system automation; 8,000 from identified _Not Built' projects; and 2,400 from additional seepage reduction. The cost for system conservation is estimated to be $471 per acre-foot for 10,400 acre-feet and $1,143 per acre-foot for 40,400 acre-feet.
    - The 30,000 acre feet from full IID systems automation may be available in the mid-term after 2020 but yields would be uncertain until such time as an operational history for the Definite Plan has been observed.
    - Of these, the _Not Built' and Canal lining projects could be implemented in the near-term and provide 10,400 acre feet of water for MCI uses.
- Cost for on-farm conservation is estimated to range from $523 to $911 per acre foot and averaged $717 per acre-foot for about 60,000 acre-feet or potential yield. Either performance/result-based payment incentives and/or conservation practice payment incentives could be used to make it profitable for farmers to participate. The degree of participation that might occur is unknown. This level of uncertainty makes it hard to quantify firm yield of additional water that could be apportioned to MCI uses.

Infeasible Actions. Agricultural conservation actions determine not applicable or feasible include:

- Replacing concrete-lined canals with pipelines to reduce evaporation is a non-feasible option due to costs.
- Reduction in tilewater is not considered a conservation opportunity because of the leaching requirements in IID.

Fallowing. A well managed _in valley' fallow program could provide water for new MCI uses but there are substantive political, economic, and environmental constraints that need to be addressed to ensure third-party effects and impacts are addressed.

- Starting in 2013 and continuing through 2017, fallowing will be needed on approximately 5 to 10 percent of the IID lands to conserve the 150,000 acre feet needed to meet interim QSA/Transfer and Salton Sea mitigation requirements. After 2018, the fallowing for the QSA/Transfer Agreement and Salton Sea mitigation will be discontinued. As a result, this could constrain additional fallowing for purposes of MCI supply prior to 2018. After that time, fallowing can could be implemented and the resulting water use savings would be easy to quantify and apportion to new MCI uses.
- IID develop programs and policies to accommodate _in-valley' temporary or long-term fallowing
- The cost of water from fallowing could vary ($85 to $400) and yield is directly related to the amount of land available for fallowing either by willing growers or through IID's Western Farmlands. Costs for fallowing Western Farm Lands would be related to the cost of the bonds on the land.
- No IID or Imperial County policies were identified which would strictly prohibit fallowing for purposes of providing water for non-agricultural in valley uses, but there are significant political challenges and potential third-party and environmental effects which must be addressed if expansion of current fallowing program were to be considered.

Crop Selection and Yield Reduction. For eliminating one irrigation and one cutting on alfalfa, we might achieve 0.5 acre-feet per acre at a cost similar to water savings from fallowing ($200 per acre-foot). There is potential to conserve about 50,000 acre-feet per year from alfalfa because there are over 100,000 acres of alfalfa in the Valley. The amount potential water savings would be influenced by the payment for irrigation reduction offered. Such a program is would have high administrative overhead and would need to be closely monitored for compliance. This could be part of a longer term adaptive management strategy to be reconsidered one the Definite Plan has been implemented and there is an operational history with which to gage the success of the agricultural water conservation efforts.

Reclamation of Agricultural Drain Water. There is recoverable water from IID drains, or from the New or Alamo River that represents a significant and potentially useful source of water. There is a potential to readily recover 50,000 acre feet to meet IID plan objectives. Such water could have the potential to impact drain and riparian habitat and would require significant environmental review to evaluate impacts and mitigation requirements.

Managed Marsh Drain Water. There is an estimated 4,500 acre-feet per year of managed marsh outflows which should be better than typical IID drain water, but the recoverability, need for treatment and potential to use this water is not known and cannot be easily determined until there is an operational history. This water could be most easily recovered for agricultural use.

7.1.4 Recommendation

AWC 1) Proceed with implementation of the Definite Plan and Systems Conservation Plan program actions planned as part of the QSA/Transfer Agreements, evaluate the program once there is an operational history, and use and adaptive management strategy to plan additional measures for implementation once the success and effectiveness of the program can be measured after 2020.

AWC 2) Move forward to finance and construct the Canal Lining and _Not-Build' QSA/Transfer Agreements Systems Conservation Projects as a near-term solution to provide measurable water for industrial use. These projects could be used to provide an up to 10,400 acre feet for future MCI uses. Aggressively develop a funding mechanism and policies that can be put in place to allow for use of this water for purposes of mitigating for the potentially significant impacts associated with increased industrial water demands for geothermal projects already in the Imperial County Planning queue.

AWC 3) Additional on-farm conservation beyond that already anticipated in the Definite Plan to meet QSA requirements should be set aside from further consideration as part of a IID Plan program or as a source for future MCI supplies and the proposed industrial water portfolio. Additional on-farm conservation should be part of a longer term adaptive management strategy to be reconsidered one the Definite Plan has been implemented and there is an operational history with which to gage the success of the agricultural water conservation efforts.

AWC 4) Review development of an In-Valley fallowing Program by expanding or modifying the current fallowing program. In developing the program there should be the full participation and input of all the stakeholders in the IID area. Fallowing for in-valley uses could provide a sure and cost effective method to reduce agricultural demands and apportion water to new industrial uses but only if a program can be designed that is fair; equitable; mitigates for any third-party and environmental effects; is voluntary and has the support of the farm community. This needs to be closely tied to the policy alternatives discussed in Chapter 9.

7.2 Urban Water Use Efficiency/Conservation

Historically, urban water conservation programs in California have demonstrated potential water savings in the order of 10 to 20 percent. In the Imperial Region, urban conservation aimed at the MCI sectors could result in approximately 10,000 acre-feet per year demand reduction, thereby reducing reliance on existing supplies by a like amount. It is also anticipated that future water savings in 2040 could be on the order of 18,000 to 20,000 acre-

feet per year if aggressive DMM programs are implement. Urban water conservation programs strive to use water as efficiently as possible while still preserving the quality of life and services in an urban setting.

Once viewed and invoked primarily as a temporary source of water supply in response to drought or emergency water shortage situations, water use efficiency and DMM approaches are now viewed as a way of life in arid environments, saving considerable capital and operating costs for utilities and consumers, avoiding environmental degradation, reducing the need for imported water, and creating multiple benefits. Translating water use efficiency savings into specific water supply reliability benefits will depend on the water system involved, the level of conservation, and the variations in water savings from one year to the next, as well as throughout the year.

The IID Cities with 3000 service connections are required to develop an UWMP that evaluate and include DMMs as approved and promoted by the CUWCC and supported by DWR. There are 14 different DMMs with guidelines published by the CUWCC. It is recommended that IID Cities implement the DMMs so long as they are feasible. As a result, not every city or community will implement the same exact measure as their neighbors. Urban water conservation and implementation of DMMs are an important water management strategy used to lower manage, help meet or mitigate future needs, and cost-effectively stretch existing water supplies. The State is setting aggressive conservation goals and increasing the emphasis for water conservation for areas like IID that are reliant on imported supplies, even tying funding[72] for projects to implementation of DMMs.

IID is the wholesaler of MCI supplies. For IID, its role in urban water conservation has not been well defined. Since agriculture represents 97 percent of the water demand, IID has emphasized agricultural water conservation. IID growers and the agency have been leaders in developing agricultural water conservation efforts using state-of-the-art techniques both on farm and system wide. IID‘s role in developing and supporting MCI conservation is less mature. Neither IID nor the IID Cities, acting as retailers of water, have been as aggressive as other desert communities in implementing DMMs. There has not been as significant a level of investment in MCI conservation and this is in part attributed to the historically high reliability of Colorado River supplies and the low cost of water, but this is changing.

Increased competition for water both locally and on the Colorado River, increased scrutiny of historical and future water uses by the State and Federal agencies, and increasingly more ambitious and stringent state requirements for conservation are driving the need for greater effort in the area of MCI conservation in the Imperial Region. Additional urban water conservation should be undertaken to ensure MCI users are reasonably and beneficially using Colorado River water and that these use are being held to the same high standards of

[72] AB 1420 (Chapter 628, Statutes of 2007 (Laird) requires the terms of, and eligibility for, any water management grant or loan made to an urban water supplier and awarded or administered by DWR, the SWRCB, or the California Bay-Delta Authority, with certain exceptions, to be conditioned on the implementation of the water DMMs described in the urban water management plan.

efficiency being imposed on agriculture. Urban water use efficiency can have regulatory or voluntary elements to the program.

In general the types of MCI conservation programs focus on:

- Residential indoor water use
- Residential outdoor water use
- Public information
- Industrial, and geothermal water use
- Large landscape water use
- Targeting public agencies
- Plumbing code
- Water rates/efficiency pricing
- Leak detection

7.2.1 Current Conditions

In 1983, the California Legislature enacted the Urban Water Management Planning Act (Water Code Sections 10610 - 10656). The Act states that a city is required to create an UWMP when the city services more than 3,000 connections or if the city delivers more than 3,000 acre-feet of water in a year. In Imperial County, the cities that meet the criteria for an UWMP are: El Centro, Calexico, Brawley, and Imperial. The communities that do not yet need to prepare an UWMP are Holtville, Calipatria, Westmorland, Heber, Seeley, and Niland.

Table 7-8 below shows which of the cities submitting an UWMP have implemented or plan to implement a specific DMM. Amongst the other communities in the area, only Seeley enacts any DMMs.[73] Seeley meters their water and bills based on the amount of use. Calipatria and Westmorland also have meters on their connections but still bill on a flat rate. Niland and Heber do not have the resources to support any DMMs at this time. As can be observed in the table, there has been limited implementation of the DMMs in Imperial Cities.

The cities of Brawley, Calexico, and El Centro have a four-step water rationing and reduction plan that can be implemented during a shortage year.[74] Usually, the first stage or step is voluntary, recommended actions such as reducing landscape irrigation. Stages two through four are usually mandatory and involve activities such as flushing less, taking shorter showers, and other similar measures. Table 7-9 shows the water rationing stages and reduction plan that the cities of Brawley, Calexico, and El Centro have enacted. The City of

[73] Information on the status of DMM implementation was not available for Holtville.
[74] UWMPs for Brawley December 2005, Calexico March 2007, El Centro March 2006

Imperial has a three-stage water rationing and use reduction plan.[75] This plan takes effect when the City Engineer declares a drought or IID reduces the supply to the city. Table 7-10 shows at what conditions the City of Imperial institutes the drought policy. During each phase of a city-wide water shortage, the City of Imperial institutes certain mandatory prohibitions against particular water use practices. These prohibitions are sector-specific and at times detail water schedules and percentage restrictions on a sector-by-sector basis. Some of the activities include limiting overall residential water use, a reduction or prevention of allowing landscaping irrigation, and restricting commercial and industrial users to certain times and days allowable for water consumption.

Table 7-8. Summary of DMMs by City[76]

Demand Management Measure	Brawley	Calexico	El Centro	Imperial
Water Survey Programs for Single Family Residential and Multi Family Residential Connections				
Residential Plumbing Retrofit				
System Water Audits, Leak Detection and Repair				x
Metering With Commodity Rates for all New Connections and Retrofit of Existing Connections	x	x	x	x
Large Landscape Conservation Programs and Incentives				
High Efficiency Washing Machine Rebate Programs				
Public Information Programs	x			x
School Education Programs	x			
Conservation Programs for Commercial, Industrial, and Institutional Accounts			x	
Wholesale Agency Assistance Programs				
Conservation Pricing				
Conservation Coordinator				
Water Waste Prohibition	x	x	x	X
Residential Ultra Low Flush Toilet Replacement Programs				

[75] UWMP for the City of Imperial December 2005
[76] Information came from the UWMPs and from personal communication with city officials

Table 7-9. Summary of Water Rationing Stages and Reduction Plan for Brawley, Calexico, and El Centro[77]

Shortage Condition	Stage	Reduction Goal	Type of Rationing Program
Up to 15%	I	15%	Voluntary
15-25%	II	25%	Mandatory
25-35%	III	35%	Mandatory
35-50%	IV	50% or >	Mandatory

Table 7-10. Conditions for Water Shortage Plan-City of Imperial[78]

Shortage Condition	Stage
Up to 15%	I
15-25%	II
25-<50%	III

7.2.2 Alternative IID Roles

It is important the IID defines its role prior to developing the Imperial IRWMP programs. Possible IID efforts for urban conservation can be generally broken down into three levels of involvement:

High involvement: IID would actively promote urban DMMs, take a lead role in MCI conservation program, adopt regulatory requirements, hire staff to promote non-agricultural conservation measures, spend additional resources on urban conservation, and develop and enforce higher standards.

Moderate involvement: IID would actively support MCI conservation, but would not develop regulatory requirements, would take a supporting role with the cities and industrial groups taking the lead role in funding and staffing, and creating a level of higher expectations through adoption of standards for current and new MCI users.

Low involvement: This would essentially be the status quo where IID is uninvolved in MCI conservation programs, the cities and industry or trade groups are the lead, and current staffing and resource allocations remain at historic levels.

[77] UWMPs for Brawley, Calexico, and El Centro
[78] UWMP City of Imperial December 2005

Based on input received from IID staff and the Board members, it is recommended that IID consider a moderate degree of involvement, focusing on a stewardship role in urban water conservation and supporting the current municipal purveyors in developing their urban water conservation programs through participation in the Imperial IRWMP process.

7.2.2.1 IID Program Emphasis

IID could place emphasis on programs targeted towards existing users or future MCI users.

Existing users. IID could target existing users and work with retail water purveyors. Retailers are required by DWR to prepare UWMPs if the retailer has 3,000 connections or more, and is in a position to effect change through pricing, customer service, infrastructure changes, and for compliance with state laws.

Future Users: Whether residential, commercial, or industrial, new MCI users can be effectively influenced during the development review process through requirements and agreements to adopt DMMs.

IID will get the greatest return on investment by working with IID Cities to target future MCI water uses. It is recommended that IID focus on development of programs targeted towards new users. This is where there is likely to be the biggest return for the least investment. Emphasis on future, new MCI uses of water implies working with the IID Cities and Imperial County to engage in the process when new developments are being considered and ensuring that appropriate DMMs management practices and water conservation technologies are implemented as conditions of development during the development review and approval process for new projects.

7.2.2.2 Integration of MCI Demand Management with Land Use Planning and Management

Recent changes in Government Code and the Water Code require local governments, as the land use planning agency, to determine whether there will be enough water to supply a proposed development project before it can be approved. This will require IID Cities, Imperial County, and IID to improve their communication and coordination on projects during the application and review stage, prior to final approval. Coordination efforts for new developments are also addressed in the state's Water Code requirement for the preparation and approval of UWMPs and environmental documents prepared pursuant to CEQA.[79]

The IID Cities and Imperial County manage the development review process. The process provides the opportunity for application of new development standards, guidelines, and requirements intended to ensure that proposed projects implement appropriate DMMs.

A close look at standards for new developments, construction standards, and water resources information, such as water supply and water quality information in planning documents like UWMPs, can help IID determine urban conservation potential, ensure consistency with current or new IID policies and support good local and regional land use decisions that save

[79] See the Land Use and Water Supply Plan Briefing in the Appendices to this report.

water. This would include IID support to IID Cities and Counties during general plan formulations, development of specific plan, during municipal service reviews, or at the times when lands annex to the IID Cities or community services districts.

With an objective to obtain a reliable water supply IID will need to make investments in development of projects and programs along with gaining support from the local community for implementation. These projects would ensure a reliable water supply and provide new development projects and the approving land use agencies with appropriate guarantees of a verifiable water supply.

Although the region plans to provide a high level of water reliability (through projects developed in the IID Plan/Imperial IRWMP process), there will always be some level of uncertainty associated with maintaining and developing local and imported supplies. Therefore, as a prudent measure, IID in collaboration with other branches of local government should embark in the examination of urban water conservation and develop further planning documents such as drought management plans and UWMPs, both on the local and regional level to help offset potential regional supply shortages.

IID can also support IID Cities and Counties during general plan formulations, development of specific plans, municipal service reviews, or at the times when lands annexed to the IID Cities or community services districts to ensure that water conservation elements are to be required for all new MCI development.

7.2.2.3 Urban Water Management Plans

One purpose of preparing an UWMP is to comply with state and federal legislative mandates that have been enacted. This legislation has promoted efforts by water agencies to evaluate the efficiency of their water use practices and to plan ahead for future supply needs based on anticipated growth or changing demands within their service areas. It is the information found within these UWMPs that can help IID further define its role in urban water conservation. The UWMP are to serve as a planning tool for the next 20 years and can help set the stage for communication between land use agencies and water districts within IID. All of the current plans need to be updated in 2010.

IID supplies have their limitations. The IID Cities must identify specific projects and include a description of the increase in a water supply that is expected to be available from each water supply project or source. The updated UWMPs will need to describe water supply and demand (existing and projected) and water conservation measures, as well as water supply reliability and shortage contingency plans. The significance of the planning functions for UWMPs was elevated by the enactment of laws creating water supply assessment and verifications. UWMPs must describe the plans to supplement or replace a water supply source with alternate sources or water demand management measures if it is shown that current sources cannot meet all anticipated demands.

The IID Cities‘ 2005 UWMPs were written prior to the QSA/Transfer Agreements, and therefore do not accurately portray the current information and changed circumstances nor recognize the current limitations of the available IID supply. The existing UWMPs do not identify new water supply projects or provide substantial evidence to document the

availability of, or plan for, a long-term, sustainable water supply, nor do they define specific mitigations for increased consumptive use of water. As a result, the currently adopted UWMP may not help IID Cities meet the State requirements related to use of the UWMP during evaluation of new development or proposed projects and when making environmental determinations.

A key element of an UWMP includes a future water supply plan that describes a diversified portfolio of water resources (including treated surface water, groundwater, and recycled water) and the DMMs to reduce demands. State law allows retail water purveyors to work together with a wholesaler provider to develop and adopt a regional UWMP.

It is recommended that IID work with the IID Cities to develop a region UWMP. Because IID is the only source of wholesale water, the Imperial Region would benefit from the implementation of a regional UWMP that would highlight regional water supplies and regional conservation efforts over and above individual uncoordinated activities. IID and IID Cities can work together to determine urban conservation potential, ensure consistency with State requirements, redefine the process for resolution of water and land use decisions that are reliant on the UWMP, and conserve water.

By engaging in a regional UWMP, the opportunity for regional self-reliance increases, acceptance of large infrastructure projects providing regional benefits (i.e., Keystone Regional Water Reclamation Facility/centralized desalination plant) increases and the issue of potential regional imported shortages can be addressed to create a foundation for a regional water shortage contingency plan. Regional UWMPs would provide consistent management based on strong regional assumptions, and would address questions such as: How might alternative population growth or regional demographic patterns impact demand? What if imports into the region are restricted? Could alternative management strategies perform better under this uncertainty?

Overall, Regional UWMPs fall in line with state wide objective outlined in the California Water Plan Update 2005, which emphasizes regional solutions.

7.2.2.4 Water Shortage Contingency Plans

All Water Shortage Contingency Plans (WSCP) for California water suppliers must comply with the requirements of the Declaration of Water Shortage Emergencies—California Water Code Sections 350-359 and Government Code Sections 8550-8551. As recommended by DWR, IID should follow a seven step planning and implementation process for WSCPs. IID could develop a WSCP in cooperation with retail water providers as part of the Imperial IRWMP.

To help IID in the development of future policies related to the implementation of a WSCP each of the steps is further defined below.

1) Establish a Water Shortage Response Team
2) Forecast Supply in Relation to Demand
3) Balance Supply and Demand: Assess Mitigation Options

4) Establish Triggering Levels
5) Develop a Staged Demand Reduction Program
6) Adopt the Water Shortage Contingency Plan
7) Implement the Water Shortage Contingency Plan

Step 1: Establish a Water Shortage Response Team

Effective water shortage planning and implementation would require IID to establish a water shortage response team of senior staff representing all departments and the designation of a team leader as well as provide the team with funding and staff. IID should develop a set of principles to guide the development of drought restrictions. This team could be put together as a work group of the Imperial IRWMP.

Step 2: Forecast Supply in Relation to Demand

The IID Plan provides a description of the existing IID supply (Appendix C) and a forecast of the future demands (Appendix D) and a basic inventory of the data concerning the water supply, treatment, distribution system, and customer characteristics.

Step 3: Balance Supply and Demand: Assess Mitigation Options

The IID EDP lays out how IID will respond to supply and demand imbalance. Under the plan, MCI users are ensured a high degree of reliability and do not face the same cut backs as agriculture, but this reliability has an effect on agriculture that should be mitigated. This is a significant economic benefit to MCI users. There are two general types of water shortage mitigation options: supply augmentation and demand reduction. The IID Plan lays out the supply augmentation approaches available to IID and the retail water purveyors. These actions constitute a –project" pursuant to CEQA. Demand management approaches are reviewed in this section. These projects and the potential mitigations required need to be further consideration in context of the Imperial IRWMP and with additional stakeholder involvement. This chapter of the IID Plan further lays out MCI demand management options with emphasis on future users. To ensure the high degree of reliability granted to MCI users is supported in the future, MCI demand management actions need to be implemented by IID, Imperial County and the incorporated cities to minimize demands to the degree practical and reduce the potential for historical uses of water.

Step 4: Establish Triggering Levels

The EDP defines when a supply and demand imbalance exists. The IID Board declaration is the trigger point. Stages have not been established for MCI users, but could be set in the 2010 updated UWMPs.

Step 5: Develop a Staged Demand Reduction Program

MCI responses are currently defined in the EDP once the SDI is declared. Demand management actions are correlated with customer water-use characteristics and the projected savings are quantified.

Step 6: Adopt the WSCP

The IID Plan has not identified a need for multiple stages and further responses to a supply/demand imbalance at this time. Once completed, IID Plan will provide a basis for further discussion with Imperial Region stakeholders. Additional trigger levels and demand management measures may be defined at that time. As reduction in water use means a revenue shortfall, there are two common ways of balancing the costs and revenues: (1) raising water rates and (2) imposing a water shortage surcharge. Regardless of the method selected, the revenue program should include:

1) Estimate the amount of water use reduction that will be achieved and the associated lost revenue.

2) Estimate revenue needs: include funds for expensive new water supplies, increased water quality monitoring and an extended multiyear rationing program.

3) Design a rate adjustment or water shortage surcharge that will cover the expected revenue deficit.

4) Monitor actual revenue and compare with forecast revenue; adjust water shortage surcharges as needed.

Step 7: Implement the Water Shortage Contingency Plan

The IID Plan, if implemented, may help ensure that other water shortage contingency measures are not necessary. Part of implementing the IID Plan as a surrogate to a separate WSCP includes making sure there are sufficient resources to do so, including: adequate staff levels, staff trainings and support, budget, coordination with other agencies, customer assistance, and monitoring of actual use. All of the IID Plan MCI demand management measures will need stable funding once the Board has identified which programs need to be implemented.

7.2.2.5 Standards for New Development

Construction and post-construction technical standards, such as plumbing codes and landscape ordinances for new developments can be used to specify the minimum requirements needed to plan, design, install and maintain a wide array of MCI related water conservation practices aimed at preserving the land and water resources.

They are based on current research, field experience, the best available technology, and are a primary component to many federal, State and local conservation programs.

As part of the Imperial Region IRWMP, IID and the local stakeholders should evaluate the possibility of adopting standards for new development that would help promote efficiency and conservation over the long-term. Specifically, IID should work with IID Cities and

Imperial County as part of the Imperial IRWMP to specifically consider using the Draft DWR California 2010 Plumbing Code as a standard for new development and that new development be required to implement the actions identified. This will help to ensure future users are using best management practices to conserve water.

Typical construction standards can include installation of required meter boxes, high-efficiency fixtures, residential weather-based irrigation controllers, dual plumbing for recycled water, and mandating implementation of programmatic best management practices for landscape, residential, and commercial/industrial sectors as supported by the CUWCC. Through the adoption of these types of construction standards for new developments, IID can help to set a roadmap for local efficiencies. In addition, IID would help to meet the goals set forth in the *20x2020 Plan*, which sets forth a statewide objective of maximizing the state's urban water efficiency and conservation opportunities between 2009 and 2020, and beyond. The *20X2020 Plan* was developed through the collaborative effort of an Agency Team that consisted of state and federal agencies including DWR, SWRCB, California Energy Commission (CEC), DPH, California Public Utilities Commission (CPUC), Air Resources Board (ARB), and USBR. It aims to set in motion a range of conservation activities designed to achieve the 20 percent per capita reduction in urban water demand by 2020.[80]

It is also recommended that IID work with the cities to identify opportunities for dual plumbing systems for new development such that raw IID water or recycled water could be provided to large landscapes in lieu of treated potable water. This would reduce the treatment costs to cities in the long-term, support development of recycled water, and potentially reduce the costs for large landscape irrigation by allowing payment of a wholesale water rate to IID. The concept is to include purpose pile systems in all large development or specific plans. Purpose pile systems are reserved for distribution of recycled water for non-potable landscape uses. These systems could be connected to an IID raw until such time as recycled water was available if such systems are proven cost effective in the future. IID could provide a preferred rate less than the standard urban rate to encourage use of raw water for large landscapes.

In 2004, AB 2717 was passed, it requested the CUWCC to convene a stakeholder task force, composed of public and private agencies, to evaluate and recommend proposals by December 31, 2005, for improving the efficiency of water use in new and existing urban irrigated landscapes in California. Based on this charge, the Task Force adopted a comprehensive set of 43 recommendations, essentially making changes to the AB 325 of 1990 and updating the Model Local Water Efficient Landscape Ordinance. The recommendation of the bill charges DWR to update the Model Efficient Landscape Ordinance.

The Water Conservation in Landscaping Act of 2006 (AB 1881) enacts many, but not all of the recommendations reported to the Governor and Legislature in December 2005 by the CUWCC Landscape Task Force (Task Force). AB 1881 requires DWR, not later than January 1, 2009, by regulation, to update the model ordinance in accordance with specified

[80] 20X2020 Conservation Plan, SWRCB Draft April 2009

requirements, reflecting the provisions of AB 2717. AB 1881 requires local agencies, not later January 1, 2010, to adopt the updated model ordinance or equivalent or it will be automatically adopted by statute. Also, the bill requires the CEC, in consultation with DWR, to adopt, by regulation, performance standards, and labeling requirements for landscape irrigation equipment, including irrigation controllers, moisture sensors, emission devices, and valves to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy or water.

7.2.2.6 Metering and Better Accounting

Water delivery metering is an essential element of efficiency and conservation management, and is necessary in order to evaluate a system. Metering is a requirement for leak control, accounting and rate making, verification of water and cost savings, and the evaluation of the effectiveness of efficiency and conservation measures. Metering must be provided at all important water production processes and delivery locations including at the supply source, at critical in-plant control points, at wholesale delivery points, and at service connections.

An effective metering program allows comparison of measured flows in the system and metered deliveries to customers, which can be used to identify leaks. Water meters can help the cities as retail water providers and IID to collect the revenue they are due, they also help pinpoint leaks, locate pressure problems along their waterways, and identify and study periods of peak and non-peak use among both residential and business consumers.

Accurate assessment of water usage is vital in keeping utility bills low and conserving water in drought conditions. In order to assure water is being accounted for accurately, meters need to be selected, installed, operated and maintained using generally accepted industry standards. Meters should be regularly calibrated and tested in accordance with the manufacturer‘s recommendations or the guidelines recommended by the American Water Works Association, Manual for Water Meters-Selection, Installation, Testing, and Maintenance (AWWA M6).

It is recommended that IID Cities also develop standardized use categories across the IID region to support aggregation of data by use category for purposes of tracking changes in water use; and to develop unit water requirements or duty factors for forecasting future MCI demands by sector and prepare water budgets, UWMPs and future land use, or water supply plans.

7.2.2.7 Financial Incentives and Savings

IID does not have the adequate funding mechanism in place to ensure the needed investments in water management improvements over the long-term, and faces the challenge of raising capital to invest in efficiency improvements and programs that ultimately result in reduced water use, sales, and revenue. However, enacting a sort of public goods charge to support urban water conservation and water management would help to ensure stable and adequate funding to support future projects that would have a co-benefit of improving water quality and water supply reliability for customers. A regional approach to urban water conservation would be more cost effective than for each of IID Cities to develop independent programs and would be more administratively and fiscally efficient.

Financial incentives can be in the form of financial assistance to implement water conservation measures or through pricing signals through appropriate water pricing structures. It is recommended that IID adopt, encourage, and/or mandate conservation pricing structures. These conservation rate structures can be a useful tool to reducing per capita use. Some effective conservation rate structures include: increasing block rates and allocation-based rates.

7.2.2.7.1 Increasing Block Rates

Increasing block rates charge a higher amount per gallon as usage increases, which can provide an incentive to keep use low. The installation of water meters, again, becomes a key element in monitoring and reducing water use and has been documented to be at least 10 percent. Additionally, increasing block rates should usually be designed and implemented by customer classes (i.e. a group with a similar usage pattern).[81] Increasing block rates are generally the most effective tool, as there is the additional cost incentive to the customer. Good communication can compliment this conservation rate structure and help ensure that customers respond to this effective price signal. It is anticipated that the success of this program will be highly dependent on communication with new users versus existing users. The tracking process will also be facilitated with new users as a result of the implementation of new development standards requiring the installation of meters.

Increasing block rate structures, when differentiated by class, would allow IID to send a consistent price signal to rate payers without over-earning or under-earning. For this reason, increasing block rate structures when coupled with a heightened awareness toward conservation have been favored and successful.

Increasing rate structures tend to result in more revenue volatility than other types of structures. In other words, levels of consumption tend to be seasonal, and when coupled with higher pricing customers tend to reduce use. Over time, IID would be able to predict certain trends and achieve a level of predictable cost recovery.

In sum, increasing block rate structures is considered to be conservation-oriented and have been in greater use in areas experiencing growth in water demands, threats to existing water supplies, or a regional impetus for improved water efficiency. Analysis of such a program should be incorporated into the overall IRWMP process to fully determine and analyze the specifics of the rate design and identify customer communication tools that would be most effective in the Region. If adopted IID policies should be in place to support such a program.

7.2.2.7.2 Allocation-Based Rates

Allocation-based rates include a higher per gallon costs for usage exceeding a base usage established for each customer according to customer characteristics (i.e., land use/number of occupants. This rate structure should be examined by IID Cities to determine its applicability to rate payers.

[81] Principles of Water Rates, Fees and Charges, AWWA M1 2000

7.2.3 Findings and Conclusions

Since IID is the wholesaler of MCI supplies its role in urban water conservation has not previously been well defined.

Additional urban water conservation should be undertaken to ensure MCI users are reasonably and beneficially using Colorado River water and that these use are being held to the higher standards of efficiency being imposed on agriculture.

Review of existing UWMPs demonstrates that there has been limited implementation of the DMMs in Imperial Cities who are ultimately responsible these programs. Cost is a major constraint since most of these communities are disadvantaged and would require assistance to move forward.

The cities of Brawley, Calexico, and El Centro have a four-step water rationing and reduction plan that will be implemented during a shortage year and are prepared to respond.

IID will get the greatest return on investment by working with the Cities to target urban water use efficiency and conservation from future water uses, while playing a supporting role for water conservation efforts targeted towards existing users.

The IID Cities' UWMPs that were prepared for the 2005 update cycle were written prior to the QSA/Transfer Agreements, and therefore do not recognize the current limitations of the available IID supply. As a result, the currently adopted UWMP may not help IID Cities meet the State requirements related to use of the UWMP during evaluation of new development or proposed projects and when making environmental determinations. New pumps are due in 2010.

7.2.4 Recommendations

UWC 1) IID should plan to have a moderate degree of involvement in the urban water conservation program targeted to existing and future MCI users, assuming a stewardship role, providing support to the municipal purveyors responsible for developing their urban water conservation program, and by coordinating regional efforts if resources are provided for this purpose.

UWC 2) Convene an Urban Water Conservation Committee and work with IID Cities to develop and fund a cooperative Urban Water Conservation Program.

- Define urban water conservation regional funding mechanisms and approach
- Develop a Regional UWMP (near-term action)
- Develop drought management/contingency and catastrophic supply interruption plans
- Implement a water conservation public information and outreach campaign
- Review and track progress in implementing DMMs and implementing local or a regional 2010 UWMP

- Prepare and annual report to document regional progress
- Develop an in-school education program in English and Spanish

UWC 3) IID target future MCI water uses, emphasizing development of standards that would minimize future water demands and ensure measurable savings when agricultural land is converted to MCI uses consistent with existing land use plans.

- Streamline the development review and permitting process and ensure that water conservation best management practices and demand management measures are implemented at the time of project development and approval (See Chapter 10)
- Work with IID Cities and Imperial County as part of the Imperial IRWMP to specifically consider using the Draft DWR California 2010 Plumbing Code as a standard for new development and development of local ordinances
- Work with the Cities and Imperial County as part of the Imperial IRWMP to specifically consider using the Draft DWR Model Water Efficient Landscape Ordinance (July 15, 2009) as a standard for new development and development of local ordinances
- Identify opportunities and define requirements for dual plumbing new development such that raw or recycled water could be provided to large landscapes in lieu of treated water

UWC 4) IID should encourage the cities to implement a conservation rate structure (increasing block rates)

UWC 5) IID should encourage the Cities to develop standardized MCI use categories across the IID region to support aggregation of data by use category for purposes of tracking changes in water use; and to develop unit water requirements or duty factors for forecasting future demands and preparing water budgets, UWMPs, and future land use or water supply plans.

7.3 Renewable Energy Production Water Conservation

7.3.1 Background

This section provides a general summary of best practices, water usage, and conservation practices related to power plants in the IID service area and the economics associated with water usage. Additional information regarding best practices and geothermal technology is included in Appendix L, IID Power Plant Water Use Evaluation (IEC, 2009). The predominant renewable energy source in IID is geothermal. Geothermal plants in IID have used water from IID as part of the cooling process. Improvements and efficiencies in the cooling process can reduce the need for water. The changes in efficiencies regarding cooling practices affect the economics of geothermal power. The cooling practices are regulated

through a series of state and county regulatory requirements and policies as discussed further in Chapter 9.

7.3.2 Current Conditions

As of 2006, as discussed in Chapter 5, there were 530 MW installed geothermal capacity in the IID service area. The 1997 to 2008 average annual water demand, as measured from gate deliveries, is 16,274 acre-feet resulting in approximately 31.7 acre-feet needed to produce one MW. There is approximately 552 MW under different stages of development. It was expected that an additional 16,274 acre-feet of water would be needed to meet the demands of the geothermal plants under development. The full development of geothermal resources would yield approximately 4,500 MW and have an associated water demand 142,500 acre-feet, annually.

Many of the geothermal plants in IID rely on the Rankin thermal cycle that requires the ability to effectively remove a large quantity of waste heat from the system. Water is still the simplest and most effective medium for the transport of that heat. However, power plants in IID rely on a variety of technologies for power production and cooling. Salton Sea power plants have access to the highest available geothermal fluid temperatures of any of the Imperial Valley geothermal areas, allowing use of flash steam generation technology. The Salton Sea resource provides these plants with highly saline geothermal fluid at more than 500°F through the plant production wells. This brine is flashed to produce steam in single or dual stages, depending on the turbine construction. The steam is cleaned to remove damaging minerals and contaminants, and fed to the power turbines to generate electricity. The remaining un-vaporized brine is processed to remove zinc and other valuable materials; the remainder is then re-injected into the earth to maintain the geothermal aquifer.

The flash plant cooling needs are handled by closed-loop evaporative (wet) cooling towers. As mentioned above, the cooling tower makeup supply uses condenser water first, and then filtered IID canal water as needed. Because the condenser water is a very clean source (basically distilled water), these cooling towers can normally achieve as many as twenty cycles of concentration before blowdown is required, as compared with ten cycles at most traditional steam power plants.

The East Mesa geothermal resource area is generally a lower-temperature resource than the Salton Sea KGRA, and primarily supports binary cycle geothermal plants. The power generation facilities include the Ormesa and GEM plants, which are owned and operated by Ormat Technologies, Inc.

Ormat employs their proprietary Ormat Energy Converter (OEC) modular power plants at each of the Ormesa facilities. These units utilize a binary cycle based on a working fluid mixture of isopentane and isobutane. The geothermal brine is used to vaporize the working fluid in the OEC unit, and then is returned to the ground through a set of injection wells to be reheated. The vaporized working fluids are contained in a closed system, drives the turbine, and then is cooled and condensed in a heat exchanger, completing the cycle.

Water usage is virtually all for condenser cooling. The Ormesa plant cooling is handled by wet cooling towers, which are supplied with makeup water from the IID canal system. Water usage at the Ormesa plants is higher than for other types of thermal power plants, which is typical of plants using lower-temperature heat resources, such as the East Mesa KGRA. In a plant utilizing a lower-temperature heat resource, more heat must be removed from the condenser for each unit of electricity generated, in comparison with plants using higher-temperature heat resources, such as flash steam geothermal and fossil fueled steam plants. Compounding the higher water use required for cooling, the binary plants have no steam condensate available to offset the water needed in the cooling towers.

Geothermal plants operated in the Herber KGRA are also owned and operated by Ormat, and both have been upgraded from their original configurations with the installation of additional binary OEC units. Heber 1 is primarily a flash steam plant. The geothermal brine is flashed in two stages to produce steam for the primary generators, while the added binary-powered generator uses the heat energy still remaining in the turbine exhaust to generate additional power. As with other flash plants, the steam condensate is reused, reducing the water required from external sources. The only significant water use is for cooling tower water makeup. The cooling system is a closed-loop evaporative (wet) system, and all makeup water not supplied by condensate is provided by water from the IID canal. Heber 2 is a binary system based on the Organic Ranking Cycle and utilizing seven proprietary OEC generating units. The brine pumped from the production wells is passed through the OEC heat exchangers, where it vaporizes the isopentane working fluid. The vapor drives the turbines, generating electricity, and then passes to the condenser, where it returns to a liquid state. The condensers are cooled by a closed-loop wet cooling tower system. Since all of the geothermal brine is returned to the resource aquifer, and none is used for steam production, there is no condensate to be recovered for other uses. All of the cooling tower makeup water is therefore supplied from the IID canal, which significantly increases the water usage figures.

IID provides the supplemental water used for cooling by the geothermal plants. Each plant has contracts with IID for the amount needed for cooling. Future geothermal plants are required to prepare a Water Supply Assessment to document that there is sufficient water, post-QSA, within the IID system.

7.3.3 Comparative Costs of Alternatives

The cost analysis for this study focused on the closed-loop evaporative (wet) cooling, dry cooling, and hybrid cooling technologies as these are the three primary cooling systems being explored for power plants in Imperial Valley. As previously mentioned, closed-loop evaporative systems are currently the most popular systems due to lower capital costs. However, due to limitations in raw water supplies, both dry cooling and hybrid cooling systems are being explored for future installations.

The cost estimates for this study include everything to construct and operate the entire plant including equipment, engineering, site preparation, erection, installation, commissioning, maintenance, labor, water usage, and fuel consumption for the combined cycle plants. Broad estimates of this kind cannot include the level of detail that is used in actual design calculations but is suitable for this qualitative study.

The following sections provide a description of the equipment and costs for each cooling technology for a 50 MW Binary Geothermal plant with a 300°F source, a 50 MW Dual Flash Geothermal Plant with a 400°F source, and a 500 MW Combined Cycle plant. It should be noted that exploration, drilling, and other geotechnical costs were not included in this analysis. For each plant, a levelized cost of energy was determined taking into account capital and O&M costs, taxes, depreciation, incentives, debt financing, cost of equity, etc.

The two main cost components of a closed-loop evaporative (wet) cooling system are the cooling tower and the shell-and-tube surface condenser with several other major components. A summary of the plant costs, performance, and levelized cost of energy is shown in Table 7-11.

Table 7-11 Costs and Performance for Power Plants with Closed-Loop Evaporative (Wet) Cooling

	Binary Geothermal	Dual Flash Geothermal	Combined Cycle
Cooling Type	Wet	Wet	Wet
Plant Capacity (MW)	50	50	500
Capacity Factor (%)	93%	93%	93%
Generation (MWh/y)	426,792	426,792	4,267,922
Total Plant Installed Cost ($/kW)	$2,790	$2,777	$908
Cooling System Cost ($/kW)	$24	$16	$10
Total Non-Fuel O&M ($/kW-y)	$150	$135	$54
Water Cost ($/y)	$550,000	$135,400	$1,028,000
Plant Levelized Cost ($/MWh)	**$69**	**$66**	**$77**
Note: Assumes water costs $100/acre-ft.			

Only a direct dry cooling system with a mechanical draft air-cooled condenser was analyzed for the binary and combined cycle plants for this study. Even though indirect systems may be more efficient, the added cost of such a system generally does not improve the performance enough to make it cost effective. Additionally, an air cooled condenser for a dual flash plant has not been done in the United States. Given that the condensate from the turbine exhaust is generally used to help cool the plant, it would not make sense to utilize 100% dry cooling. Therefore, dry cooling for the dual flash plant was not included in this study.

The main cost components for a dry cooling system are the air cooled condenser and the fans. Operating costs for the cooling system only include the power to operate the fans and water usage needed for auxiliary cooling. However, due to the increase of back pressure on the turbine during the hot summer days, there is a large reduction in plant performance during peak demand periods of the day. Table 7-12 provides a summary of the plant costs, performance, and levelized cost of energy.

Table 7-12 Costs and Performance for Power Plants with Dry Cooling

	Binary Geothermal	Combined Cycle
Cooling Type	Dry	Dry
Plant Capacity (MW)	50	500
Capacity Factor (%)	85%	86%
Generation (MWh/y)	389,636	3,965,092
Total Plant Installed Cost ($/kW)	$3,123	$1,112
Cooling System Cost ($/kW)	$247	$146
Total Non-Fuel O&M ($/kW-y)	$147	$50.7
Water Cost ($/y)	$6,000	$123,000
Plant Levelized Cost ($/MWh)	**$81**	**$83**

Hybrid cooling systems employ a combination of both wet and dry cooling technologies. These systems are designed to use a limited amount of water during the hottest periods of the year to mitigate the large losses in the plant performance associated with all dry operation. The operating cost for the system includes power for fans, pumps, and water usage. A summary of the costs, performance, and levelized cost of the systems is shown in Table 7-13.

Table 7-13 Costs and Performance for Power Plants with Hybrid Cooling

	Binary Geothermal	Dual Flash Geothermal	Combined Cycle
Cooling Type	Hybrid	Hybrid	Hybrid
Plant Capacity (MW)	50	50	500
Capacity Factor (%)	90%	92%	91%
Generation (MWh/y)	412,398	420,972	4,170,922
Total Plant Installed Cost ($/kW)	$2,973	$2,910	$997
Cooling System Cost ($/kW)	$147	$105	$69
Total Non-Fuel O&M ($/kW-y)	$155	$150	$54
Water Cost ($/y)	$118,900	$25,200	$232,000
Plant Levelized Cost ($/MWh)	$76	$72	$80
Note: Assumes water costs $100/acre-ft.			

Table 7-14 shows the results of the IEC model when the effects of varied water prices were compared for wet and hybrid cooling. As can be observed in the table, the levelized cost per MW is not very sensitive to the price of water. What this implies is that the power production operation is not very sensitive to the price of water.

Table 7-14 Summary Costs and Performance for Power Plants with Wet, Dry, and Hybrid Cooling

Plant Type	Cooling Type	Plant Capacity (MW)	Capacity Factor (%)	Generation (MWh/y)	Water Cost ($/acre-ft)	Levelized Cost ($/MWh)
Binary Geothermal	Wet	50	93%	426,792	$100	$69
					$250	$72
					$400	$75
Binary Geothermal	Hybrid	50	90%	412,398	$100	$76
					$250	$76
					$400	$77
Dual Flash Geothermal	Wet	50	93%	426,792	$100	$66
					$250	$67
					$400	$68
Dual Flash Geothermal	Hybrid	50	92%	420,972	$100	$72
					$250	$72
					$400	$73

7.3.4 Economic Impact of Developing new Geothermal Plants

An analysis was conducted regarding the economic impact developing new, hypothetical 165 MW geothermal plant using 1000 acre-feet of water annually. Annual operation of the geothermal plant would provide between $.9 M and $3.6 M in added value to the economy and approximately 18 to 71 jobs.

7.3.5 Findings and Conclusions

The following can be concluded from the conducted analyses:

- 16,274 acre-feet is the approximate annual geothermal water demand from IID. This amount will increase by 19,158 acre-feet when all currently planned geothermal projects are developed.
- Dry cooling has technical limits and is not cost effective in desert environments.
- The price per MW of generating capacity is not very sensitive to the price of water.
- Hybrid cooling for Binary or Flash geothermal appears to be relatively cost-effective.
- State and local policy support use of conservation technologies to demonstrate water conservation savings.
- Significant added value can be realized when converting agricultural lands to geothermal.
- Companies that develop geothermal plants face trade-offs related to investing in hybrid technology to reduce water demand if reliant on Colorado River water, b) independently developing alternative water supplies (e.g.; groundwater development, recycled water), or c) coordinating with IID to develop capital projects to provide new water and paying higher rates for water.

7.3.6 Recommendations

IID should work with representatives from the power industry, Imperial County, and the cities to define the most cost-effective approach to developing new water supplies that can be provided to geothermal and other renewable energy projects for cooling in lieu of their use of raw Colorado River water provided by IID.

Power plants should provide engineering and economic data as part of the development review process to make the case for use of wet cooling in lieu of more water efficient technologies if they are to rely on IID Colorado River water.

8 Capital Facility Alternatives

This chapter presents the results and recommendations of the evaluation undertaken to define potential mid-, near-, and long-term water supply alternatives for IID. Capital facilities solutions include the development of infrastructure to expand the supply (increase the size of the box) or prevent losses from IID to the Salton Sea (keep water in the box). Reconnaissance-level evaluations and conceptual capital project alternatives have been developed to meet the anticipated future demands. Based on the evaluation of water management strategies and the findings described in Chapter 6, alternatives were configured, integrating the strategies where it was believed that multiple benefits could be achieved. The alternatives were configured around several major themes, including:

- Desalination of brackish East Mesa Groundwater
- Desalination of Drainwater or Alamo or New River water
- Groundwater Banking
- East Mesa Groundwater Development and Blending
- Recycling of Municipal Wastewater

Chapter 6 also described a number of strategies that could be feasible, but were characterized as being long-term opportunities. These included regional desalination and importation of additional Colorado River or California water, and large-scale regional desalination efforts (e.g., USBR Yuma Project). Other strategies were deemed more appropriate as part of the Imperial IRWMP because of the need to partner with others. Further development of recycled wastewater is deferred to the Imperial IRWMP because the IID Cities own and operate the wastewater facilities. Even though this is the case, the IID Plan includes reconnaissance-level definition of recycled water projects so that prices per acre-foot could be compared with projects where the IID Board could act independently and take action.

Design considerations varied by the type of project:

- Ability to create new water, tap unused resources or capture water lost to the Salton Sea
- Potential to capture and use under-runs or help prevent overruns
- Consistency with existing QSA/Transfer agreements
- Measurable firm yield that could be committed to proposed MCI uses
- Potential to avoid, minimize or mitigate environmental impacts as part of the design

These design considerations were also used to help develop criterion to evaluate, rank or screen the alternatives. A number of technical studies were conducted to refine the design concepts and evaluate the feasibility of potential projects.

- The amount of under-run water available for groundwater banking was investigated by the GEI and Definite Plan Teams who derived similar conclusions in terms of the water available and potential yield. This is discussed in Appendix F, Groundwater Banking Volume and Availability (NRCE, 2009).
- Drain water sources and quality were evaluated to determine if this water could be used as make-up water for the proposed desalination plants. The amount and quality of drain water, New River water, or Alamo River water were evaluated and are presented in Appendix G, Drainwater (NRCE, 2009).
- Groundwater Development Feasibility Study presented in Appendix B.
- The potential for blending groundwater from the East Mesa is presented in Appendix M. Ambient groundwater quality has elevated levels of TDS. The potential to mix water in the All-American Canal is discussed.

8.1 Screening and Prioritization of Project Alternatives

Qualitative and quantitative screening criteria and assumptions were developed in consultation with IID staff. Areas within IID's service area with physical, geographical (i.e., market demand for the water), and environmental characteristics most suited to implementing short- and long-term alternatives were identified. Technical project evaluation criteria included volumes of water that could be delivered/stored by each project, regulatory and permitting complexity, preliminary engineering components, land use requirements, and costs. After the preliminary evaluations, a total of 26 projects were configured: 17 groundwater or drainwater desalination, 2 groundwater blending, 6 recycled water alternatives, and 1 groundwater banking alternative (Table 8-1). The level of detail included in the definition of each project was intended to allow for comparison of the alternatives, preliminary evaluation of project feasibility, definition of major implementation challenges, and development of approximate costs. Complete project alternative descriptions, including cost estimates, project alternative schematics/maps, and potential variations on each project are further detailed in Appendix N, Capital Project Alternatives.

Table 8-1. Capital Projects Alternatives Cost

Name	Description	Capital Cost	O&M	Equivalent Annual Cost	Unit Cost ($/AF)	Yield (AF)
GW 18	Groundwater Blending- East Mesa Well Field Pumping to All-American Canal	$ 39,501,517	$ 198,000	$ 2,482,000	$ 99	25000
GW 19	Groundwater Blending- East Mesa Well Field Pumping to All-American Canal with Percolation Ponds	$ 48,605,551	$ 243,000	$ 3,054,000	$ 122	25000
WB 1	Coachella Valley Groundwater Storage Project	$ 92,200,000	$ 7,544,000	$ 5,736,746	$ 266	50000
DES 4	50 KAF Keystone Desalination with IID Drainwater/Alamo River	$ 147,437,743	$ 15,323,901	$ 23,849,901	$ 477	50000
DES 8	25 KAF East Brawley Desalination with Well Field and Groundwater Recharge	$ 100,991,177	$ 6,166,000	$ 12,006,000	$ 480	25000
DES 14	South Salton Sea 50 KAF Desalination with Alamo River Water and Industrial Distribution	$ 158,619,378	$ 15,491,901	$ 24,664,901	$ 493	50000
AWC 1	Systems Conservation Projects (2)	$ 56,225,000	N/A	$ 4,068,000	$ 504	8000
DES 12	East Mesa 25 KAF Desalination with Well Field and Groundwater Recharge	$ 112,318,224	$ 6,336,000	$ 12,831,000	$ 513	25000
DES 15	South Salton Sea 50 KAF Desalination with Alamo River Water and MCI Distribution	$ 182,975,327	$ 15,857,901	$ 26,438,901	$ 529	50000
DES 2	50 KAF Keystone Desalination with Well Field and Groundwater Recharge	$ 282,399,468	$ 13,158,000	$ 29,489,000	$ 590	50000
RW 1	Disinfected Secondary Effluent from Existing Wastewater Treatment Plants Applied to Adjacent Agriculture	$ 18,779,688	$ 486,671	$ 1,572,702	$ 118	13300
RW 5	Regional Plant Serving Tertiary Water to IID Canal	$ 20,818,710	$ 829,853	$ 2,033,801	$ 308	6600
RW 6	Regional Plant Serving Tertiary Water to Local Service Area and IID Canal	$ 102,374,854	$ 2,280,145	$ 8,200,493	$ 488	16800
RW 3	Upgrade Existing Plants to Tertiary and Deliver Effluent to IID Canal System	$ 90,531,216	$ 2,992,257	$ 7,498,347	$ 562	13300
DES 7	East Brawley 25 KAF Desalination with Well Field	$ 100,409,542	$ 6,157,000	$ 11,964,000	$ 479	25000
DES 11	East Mesa 25 KAF Desalination with Well Field	$ 111,746,590	$ 6,327,000	$ 12,789,000	$ 512	25000
DES 1	Keystone 50 KAF Desalination with Well Field	$ 281,817,834	$ 13,149,000	$ 29,447,000	$ 589	50000
DES 10	East Brawley 5 KAF Desalination with Well Field	$ 24,751,185	$ 1,525,000	$ 2,956,000	$ 591	5000
DES 6	Keystone 25 KAF Desalination with Well Field	$ 160,695,766	$ 7,061,000	$ 16,354,000	$ 654	25000
DES 17	Heber 5 KAF Desalination with Well Field	$ 95,899,356	$ 2,476,000	$ 3,303,000	$ 661	5000
DES 13	East Mesa 5 KAF Desalination with Well Field	$ 33,027,263	$ 1,648,000	$ 3,558,000	$ 712	5000
DES 16	South Salton Sea 5 KAF East Desalination with Well Field	$ 62,177,056	$ 1,971,000	$ 5,567,000	$ 1,113	5000
DES 3	Keystone Desalination 50 KAF with Well Field and Groundwater Recharge and MCI Distribution	$ 306,357,788	$ 13,518,000	$ 31,235,000	$ 625	50000
DES 9	East Brawley 25 kAF Desalination with Well Field, Groundwater Recharge and MCI Distribution	$ 162,175,609	$ 7,084,000	$ 16,463,000	$ 659	25000
RW 2	Upgrade Existing Plants to Tertiary and Deliver Effluent to a Local Market	$ 140,568,145	$ 2,597,145	$ 10,726,215	$ 919	11700
RW 4	Regional Plant Serving Tertiary Water Locally	$ 51,323,358	$ 1,438,723	$ 4,406,758	$ 938	4700
DES 5	Keystone 25 KAF Desalination with Well Field, Groundwater Recharge & Evaporation Ponds	$ 372,088,101	$ 10,232,000	$ 31,750,000	$ 1,270	25000
	Project alternatives were considered to have a lower priority - Unit cost > $600/AF , and were not ranked (NR) in the overall Alternatives Ranking Criteria Matrix					
	Project Alternatives were considered to have a lower priority due to no groundwater banking/storage elements and not enough annual yield production < 5,000 AF, and were not ranked (NR) in the overall Alternatives Ranking Criteria Matrix					
	Project Alternatives were considered to have a lower priority due dependance on outside agency parternability, and were not ranked (NR) in the overall Alternatives Ranking Criteria Matrix.					
(1)	Assumed 50 year lifespan, 5% interest. Other project used 30 yrs and 4%. Costs will be normalized in final report					
(2)	Systems Conservation includes 24 projects, costs from $398/AF to $1169/AF, averaging $504/AF					
(3)	Source water collected from Imperial and proposed Keystone Development					
(4)	Source water collected from Imperial, Brawley, El Centro, Colexic and proposed Keystone Development					

8.2 Analysis of Priorities and Preferences

Capital projects that develop new MCI supplies would be expensive compared to current sources; require debt service; face a range of environmental and economic constraints; take years to implement; and must ultimately be supported by IID rate payers based on a voter initiative (Propositions 218), or by new MCI users willing to enter into contract to develop the supplies. There must be a willingness and ability to pay by either the existing rate payers or those that seek additional water from IID. As such, IID staff and the Board stressed several key factors that were used to categorize project alternatives and establish priorities. Lower priority projects were defined as those projects that were less feasible due to technical, political, or financial constraints. Preferential criteria were those project characteristics that could increase the relative benefits of a project and grant it a higher priority. In conjunction with IID staff, a total of four criteria were identified and used to prioritize projects:

1. Financial Feasibility - Projects whose overall cost was more than $600/AF were eliminated from further consideration.

2. Annual Yield - Project alternatives generating 5,000 acre-feet or less of total annual yield were determined not to be cost-effective and lacking necessary economies of scale.

3. Groundwater Banking - Groundwater banking is recognized as a beneficial use of Colorado River water and necessary to capture and store under-runs and prevent loss of this water. Consequently, project alternatives without groundwater banking were given a low priority.

4. Partnering - Project alternatives in which IID was dependant on others (i.e., private and/or public agencies) for implementation were considered to have a lower priority at this time. This included all project alternatives that involved improvements to treatment and delivery of recycled water.

Using these 4 criteria, a total of 6 desalination, 2 groundwater blending, and 1 groundwater storage project alternatives remained. Table 8-2, Capital Project Alternatives and Cost, provides a listing of the 26 projects showing the estimated total costs, operations and maintenance costs, and annualized costs. The color coding in the table indicates which of the criteria were used to set the project aside from further consideration. It should be noted that the recycled water projects have very competitive per-acre-foot prices and were only deferred due to the need to partner to build projects with the Cities that own and operate the facilities.

Table 8-2 Summary of Capital Project Alternatives

	Table 8-2 Summary of Capital Project Alternatives (2009 Price Level, 4 % real interest rate, 30-year project life)										Table 8-2 Summary of Capital Project Alternatives (2009 Price Level, 4 % real interest rate, 30-year project life)									
	Strategy										Strategy									
	Desal										Desal								Groundwater Blending		Water Banking
	1	2	3	4	5	6	7	8	9		10	11	12	13	14	15	16	17	18	19	1
	50 KAF Keystone Desalination with Well Field	50 KAF Keysone Desalination with Well Field and Groundwater Recharge	50 KAF Keystone Desalination with Well Field, Groundwater Recharge and MCI Distribution	50 KAF Keystone Desalination with Alamo River/IID Drainwater	25 KAF Keystone Desalination with Well Field, Groundwater Recharge and Evaporation Ponds	25 KAF Keystone Desalination with Well Field	25 KAF East Brawley Desalination with Well Field	25 KAF East Brawley Desalination with Well Field and Groundwater Recharge	25 KAF East Brawley Desalination with Well Field, Groundwater Recharge and MCI Distribution		5 KAF East Brawley Desalination with Well Field	25 KAF East Mesa Desalination with Well Field	25 KAF East Mesa Desalination with Well Field and Groundwater Recharge	5 KAF East Mesa Desalination with Well Field	50 KAF South Salton Sea Desalination with Alamo River Water and Industrial Distribution	50 KAF South Salton Sea Desalination with Alamo River Water and MCI Distribution	5 KAF South Salton Sea - East Desalination with Well Field	5 KAF Heber Desalination with Well Field	25 KAF East Mesa with Well Field pumping to All American Canal	25 KAF East Mesa with Well Field pumping to All American Canal - with Percolation Ponds	Coachella Valley Groundwater Storage Project
Yield (KAF)	**50**	**50**	**50**	**50**	**25**	**25**	**25**	**25**	**25**	Yield (KAF)	**5**	**5**	**25**	**5**	**50**	**50**	**5**	**5**	**25**	**25**	
Source Water										**Source Water**											**Coachella Canal**
Treatment Requirements										Treatment Requirements											
Cooling prior to RO	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Cooling prior to RO	Yes	Yes	Yes	Yes	No	No	No	Yes	No	No	
Reverse Osmosis	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Reverse Osmosis	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	
Application of Yield										**Application of Yield**											
IID Distribution System	Bryant, Redwood and Rose	Bryant, Redwood and Rose	Bryant, Redwood and Rose	Bryant, Redwood and Rose	Bryant, Redwood and Rose	Bryant, Redwood and Rose	East Highline and laterals	East Highline and laterals	East Highline and laterals	IID Distribution System	East Highline and laterals	East Highline and laterals	East Highline and laterals	East Highline and laterals					From AAC	From AAC	
New Agricultural Distribution System										New Agricultural Distribution System											
Existing M&I Distribution Systems			Yes							Existing M&I Distribution Systems					Geothermal Plants	Yes	Geothermal Plants	Geothermal Plants			
Replenishment of Source Water										**Replenishment of Source Water**											
Recharge & GW banking	No	Yes	Yes	No	Yes	No	No	Yes	Yes	Recharge & GW banking	No	No	Yes	No	No	No	No	No	Yes	Yes	Yes
Recharge location		East Mesa - Old CC	East Mesa - Old CC		East Mesa - Old CC					Recharge location			East Mesa - Old CC								Coachella Valley
Recharge source	N/A	CO River - IID underruns	CO River - IID underruns	N/A	CO River - IID underruns	N/A	N/A	CO River - IID underruns	CO River - IID underruns	Recharge source	N/A	N/A	CO River - IID underruns	N/A	N/A	N/A	N/A	N/A	CO River - IID underruns	CO River - IID underruns	CO River - IID underruns
Recharge amount (AFY)	N/A	15,000 to 250,000	15,000 to 250,000	N/A	15,000 to 250,000	N/A	N/A	15,000 to 250,000	15,000 to 250,000	Recharge amount (AFY)	N/A	N/A	15,000 to 250,000	N/A	N/A	N/A	N/A	N/A			100,000
Product water use	N/A	IID delivery system for ag use	Keystone dev + City of Brawley	IID delivery system for ag use	IID delivery system for ag use	IID delivery system for ag use	IID delivery system for ag use	IID delivery system for ag use	IID delivery system for ag use	Product water use	IID delivery system for ag use	IID delivery system for ag use	IID delivery system for ag use	IID delivery system for ag use	Geothermal Plants	Geothermal Plants	Geothermal Plants	Geothermal Plants	15,000 to 60,000		
Product water treatment	No	No	yes	No	No	No	No	No	No	Product water treatment	No	No	No	No							
Brine disposal	Injection Well	Injection Well	Injection Well	Injection Well	Evaporation Ponds	Injection Well	Injection Well	Injection Well	Injection Well	Brine disposal	Injection Well	Injection Well	Injection Well	Injection Well	Injection Well	Injection Well	Injection Well	Injection Well	N/A	N/A	
Number of wells	5	5	5	5	N/A	3	3	3	3	Number of wells	1	3	3	1	5	5	1	1			
GW depletion	Severe	Neutral	Neutral	Neutral	Neutral	Severe	Severe	Neutral	Neutral	GW depletion	Maybe	Severe	Neutral	Maybe	Neutral	Neutral	Maybe	Maybe			
Consequence	Unacceptable subsidence	N/A	N/A	N/A	Unacceptable price for evaporation ponds	Unacceptable subsidence	Unacceptable subsidence			Consequence											
Impacts to Drain Water				Potential if drain variant used						Impacts to Drain Water					Potential if drain variant used	Potential if drain variant used					Neutral
Project status	**Eliminated (groundwater depletion)**	Further Review Merited	**Eliminated (cost)**	Further Review Merited	**Eliminated (cost)**	**Eliminated (groundwater depletion and cost)**	**Eliminated (groundwater depletion)**	Further Review Merited	**Eliminated (cost)**	Project status	**Eliminated (less than 5KAF)**	**Eliminated (groundwater depletion)**	Further Review Merited	**Eliminated (less than 5KAF)**	Further Review Merited	Further Review Merited	**Eliminated (less than 5KAF and cost)**	**Eliminated (less than 5KAF)**	Further Review Merited	Further Review Merited	Further Review Merited
Project Costs (May 2009 Price Level, 4 percent real interest, 30-year project life)										**Project Costs (May 2009 Price Level, 4 percent real interest, 30-year project life)**											
Capital Costs	$281,817,834	$282,399,468	$306,357,788	$147,437,743	$372,088,101	$160,695,766	$100,409,542	$100,991,177	$162,175,609	Capital Costs	$24,751,185	$111,746,590	$112,318,224	$33,027,263	$158,619,378	$182,975,327	$62,177,056	$95,899,356	$39,501,517	$48,605,551	$92,200,000
Annual O&M Costs	$13,149,000	$13,158,000	$13,518,000	$15,323,901	$10,232,000	$7,061,000	$6,157,000	$6,166,000	$7,084,000	Annual O&M Costs	$1,525,000	$6,327,000	$6,336,000	$1,648,000	$15,491,901	$15,857,901	$1,971,000	$2,476,000	$198,000	$243,000	$7,544,000
Equivqlent annual cost	$29,447,000	$29,489,000	$31,235,000	$23,849,901	$31,750,000	$16,354,000	$11,964,000	$12,006,000	$16,463,000	Equivqlent annual cost	$2,956,000	$12,789,000	$12,831,000	$3,558,000	$24,664,901	$26,438,901	$5,567,000	$3,303,000	$2,482,000	$1,782,000	$5,736,746
Equivalent annual cost per acre-foot	$589	$590	$625	$477	$1,270	$654	$479	$480	$659	Equivalent annual cost per acre-foot	$591	$512	$513	$712	$493	$529	$1,113	$661	$99	$122	$266
Variants	None	East Mesa - new percolation ponds	East Mesa - new percolation ponds, MCI Distribution	Using Drain flow instead of Alamo River flow	East Mesa - new ponds, Salton Sea evaporation ponds	None	None	East Mesa - new percolation ponds,		**Variants**		None	East Mesa - new percolation ponds,	None	Using Drain flow instead of Alamo River flow, Salton Sea disposal ponds	None	None	None	AAC as Source for overrruns		
Recharge location		Old CC as recharge basin	Old CC as recharge basin		Old CC as recharge basin			Old CC as recharge basin	Old CC as recharge basin	Recharge location			Old CC as recharge basin						Recharge Basins in East Mesa	Recharge Basins in East Mesa	
Recharege source		CO River - IID underruns	CO River - IID underruns		CO River - IID underruns			CO River - IID underruns	CO River - IID underruns	Recharege source			CO River - IID underruns						CO River - IID underruns	CO River - IID underruns	
Recharge amount (AFY)		15,000 to 250,000	15,000 to 250,000		15,000 to 250,000			15,000 to 250,000	15,000 to 250,000	Recharge amount (AFY)			15,000 to 250,000						15,000 to 60,000	15,000 to 60,000	
Environmental constraint		Sensitive Habitat	Sensitive Habitat		Sensitive Habitat			Sensitive Habitat	Sensitive Habitat	Environmental constraint			Sensitive Habitat								
Right-of-way		BLM ownership	BLM ownership		BLM ownership			BLM ownership	BLM ownership	Right-of-way			BLM ownership								
Product water treatment			Yes		No			No	No	Product water treatment			No								
Product water Use			City of Imperial	MCI						Product water Use					Geothermal Plants						
Secondary benefit			Contngent if AAC or CC catastrophic	Does not use groundwater					Contngent if AAC or CC catastrophic	Secondary benefit					Does not use groundwater						
Project status	**Eliminated**	Further Review Merited	Technically feaslble; requires further planning & comp w/other methods	Technically feaslble; requires further planning & comp w/other methods	**Eliminated (cost)**	**Eliminated (groundwater depletion and cost)**	**Eliminated (groundwater depletion)**	Further Review Merited	**Eliminated (cost)**	Project status	**Eliminated (less than 5KAF)**	**Eliminated (groundwater depletion)**	Further Review Merited	**Eliminated (less than 5KAF)**	Technically feaslble; requires further planning & comp w/other methods	Technically feaslble; requires further planning & comp w/other methods	**Eliminated (less than 5KAF)**	**Eliminated (less than 5KAF)**	Further Review Merited	Further Review Merited	Further Review Merited

8.3 Additional Screening

The project that remained after the above screening, along with the recycled water projects, were further evaluated using an Alternatives Evaluation and Ranking Criterion developed in conjunction with IID staff and the Board (Appendix K). The evaluation and ranking criterion were presented to the Board and Board members provided input on the relative importance of each standard. This information was averaged and used to develop a weighting factor for each standard. The projects were then ranked based on standards and performance measures in four categories: IID Plan Objectives, Implementability, Environmental Effects, and Uncertainty/Risk. The results of the relative ranking are presented in Appendix K.

Ideally, application of a Criteria Ranking Matrix would be through a series of workshops that would involve staff, Board members, and stakeholders to review and discuss the range of project alternatives and how the standards and performance measures would apply to the projects being considered. In the interest of time, the consultants applied the criteria to rate each of the projects and developed a score. The project descriptions are summarized below in order of the ranking results.

8.4 Project Descriptions and Summary of Benefits and Risks

8.4.1 Coachella Valley Groundwater Storage Project (WB 1)

Benefit

Annual Yield – 50,000 acre-feet per year

Project Description

Project purpose is to store under-runs through percolation ponds to recharge water into the underlying groundwater basin. Water would be delivered via the Coachella Canal to spreading grounds located in the eastern part of the Coachella Valley. Water would be extracted by existing wells. Yield would be realized through exchange of CVWD Colorado River water for the stored groundwater.

Facilities and Operation

- Coachella Canal for conveyance
- Recharge facilities located in East Coachella
- Existing wells to utilize stored water
- Colorado River water exchange
- Pre-treatment of Canal water for sediments and target chemicals

Costs

- Capital Costs: $ 99,200,000

- O&M Costs: $ 7,544,000
- Cost per acre-foot: $266

Relative Ranking

- Score: 288
- Evaluation Matrix Summary
    - Objectives - Project ranks high with respect to meeting IID's Plan objective; groundwater banking has been identified as a key water management strategy and the project captures under-runs.
    - Implementability - Could be implemented in the mid-term. Takes advantage of existing infrastructure. Consistent with QSA. Requires negotiation and agreement with CVWD. Cannot be built in phases. Plenty of groundwater storage space.
    - Environmental - Land currently undeveloped and could have issues with biological resources and habitat. Water quality of blended water would be preserved.
    - Uncertainty/Risk - Access to land needs to be determined. Agreements with CVWD need to be negotiated. As with other projects, need to develop financing and pricing strategy. Land acquisition costs unknown.
    - Technical - Hydrogeologically favorable sites appear to have good basin interconnectivity; high permeability transmissive materials. Site may have some geologic or hydrogeologic considerations that have yet to be identified through the EIR/Design Investigation process.

8.4.2 Desalination Alternative 8 - 25,000 AF East Brawly Desalination with Well Field and Groundwater Recharge

Benefit

Annual Yield – 25,000 acre-feet per year

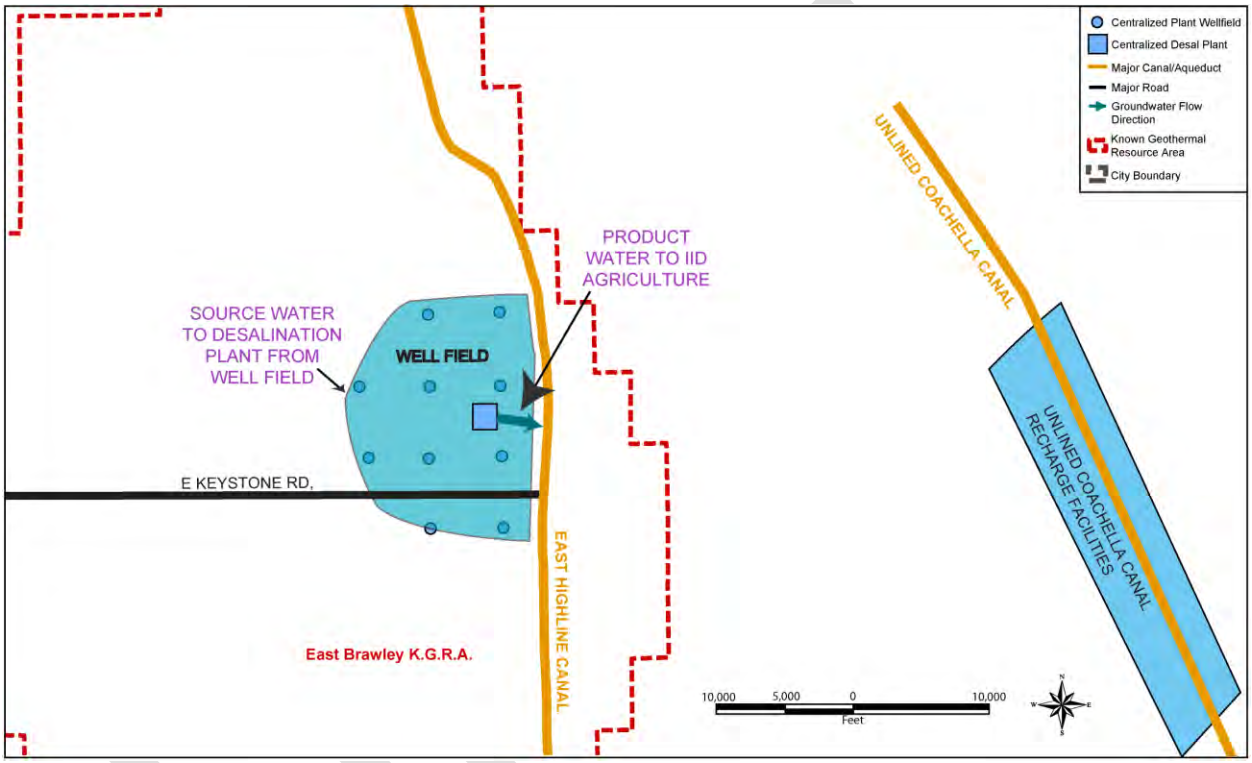
Project Objective

The objective in configuring this alternative was to try to develop a ‗least cost' desalination alternative by minimizing the distribution costs to get well water to a plant, or to distribute produced water to IID facilities or users. To avoid effects of locating on BLM land in East Mesa, wells were located in the East Brawley KGRA. Wells located in IID easements and rights of way. The old Coachella Canal would be developed to provide recharge and banking of Colorado River Water to capture under-runs, mitigate impacts to groundwater, and reduce depletion.

Facilities and Operation

- Desalination Plant located in the East Brawley KGRA within IID boundaries.

- Well field adjacent to East Highline Canal for source water development, collection and transmission to desalination plant.
- East Mesa Recharge Facilities using old Coachella Canal.
- New Injection Wells for brine concentrate disposal.
- Product water distribution to East Highline Canal with water credited to new MCI uses.



Costs

- Capital Costs: $ 100,991,177
- O&M Costs: $6,166,000
- Cost per acre-foot: $480

Relative Ranking

- Score: 273
- Evaluation Matrix Summary:
  - Objectives - Project ranks high with respect to meeting IID‘s Plan objective, as desalination has been identified as a key water management strategy.
  - Implementability - Limited number of permits required; ease of access to conveyance system.

- Environmental - Low to Moderate potential to impact cultural and biological resources. Minimizes impacts to species and habitats on BLM land by locating facilities within IID.
- Uncertainty/Risk - Uncertainty of source water quality. Need to acquire private property or easements to build plant and site wells.
- Technical - No major issues identified.

8.4.3 Groundwater Blending (GW 19) - East Mesa Well Field Pumping to All-American Canal with Percolation Ponds

Benefit

Annual Yield – 25,000 acre-feet per year

Project Description

The purpose of the project alternative is to develop East Mesa Groundwater and create an opportunity to capture and bank under-runs. The project would add 200 acres of percolation basins to the elements identified in Alternative 18 to mitigate for the production of 25,000 AF per year. Yields could be higher depending on the ability to bank under-runs.

Facilities and Operation

- Groundwater development by well fields in the East Mesa (6 to 8 wells)
- Pipeline to All-American Canal
- Pipeline from All-American Canal or Coachella Canal to Percolation/recharge ponds
- 200 Acres of Recharge Ponds

Costs

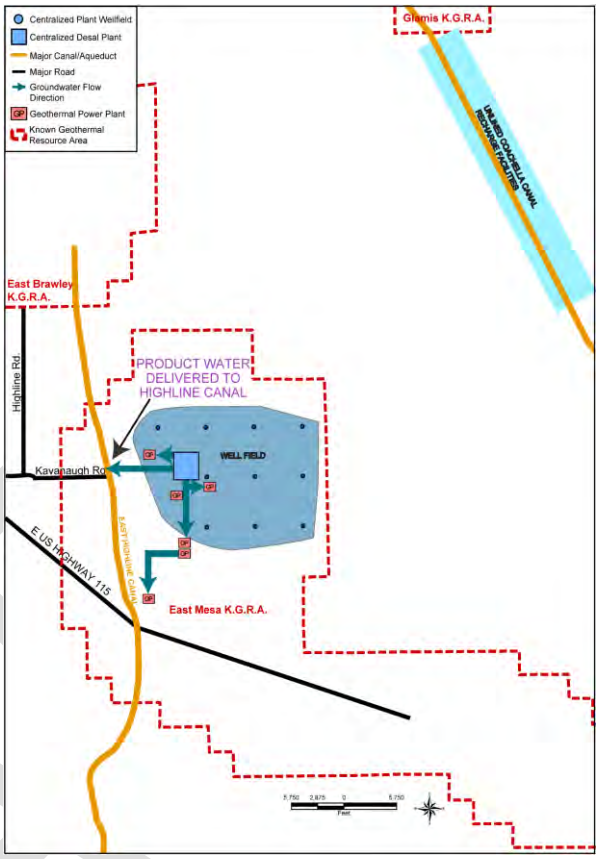
- Capital Costs: $ 48,605,551
- O&M Costs: $243,000
- Cost per acre-foot: $122

Relative Ranking

- Score: 274
- Evaluation Matrix Summary
  - Objectives - Project ranks high with respect to meeting IID's Plan objective since would support capture of under-runs.
  - Implementability - Could be implemented in the mid- to near-term time frame. Relatively complex permitting process due to BLM and need for percolation and recharge ponds.
  - Environmental - Relatively high potential to impact biological and cultural resources in the BLM portion of the East Mesa. Resultant water quality

would have slightly elevated TDS requiring growers to increase application to meet leaching requirements.

- Uncertainty/Risk - Uncertainty of groundwater source water quality. Constrained due to the ownership and management by BLM. Land acquisition costs unknown. Need to evaluate Put and Take Operations and amount of water that could be stored in and recovered from groundwater basin, including evaluation of resultant water quality. Stored Colorado River water quality could be reduced through mixing with groundwater that has higher TDS. Current groundwater levels relatively high with limited storage capacity. Would likely need to pump and blend groundwater to create storage space for Colorado River water.
- Technical - Need to develop power supplies to sites.



8.4.4 Desalination Alternative 12- 25,000 AF East Mesa Desalination with Well Field and Groundwater Recharge

Benefit

Annual Yield – 25,000 acre-feet per year

Project Objective

The purpose of this alternative was to site a desalination plant in the East Mesa KGRA to provide water to current or proposed power plants. The dasalination plant would also be connected to the East Highline Canal to distribute any water not used by the power plants. Groundwater recharge and banking facilities are included to minimize potential negative effects in the groundwater basin, reduce depletion, and capture under-runs.

Facilities and Operation

- Desalination plant in the East Mesa KGRA
- Well field for groundwater development with conveyance to the Desalination Plant
- Recharge facilities located in the Old Coachella Canal

- New injection wells for brine disposal
- Product water distribution to East Highline Canal

Costs

- Capital Costs: $ 112,318,224
- O&M Costs: $6,336,000
- Cost per acre-foot: $513

Relative Ranking

- Score: 277
- Evaluation Matrix Summary:
    - Objectives - Project ranks high with respect to meeting IID's Plan objective since desalination has been identified as a key water management strategy.
    - Implementability - Highly complex permitting process; would require negotiation with BLM for groundwater recharge facilities; geothermal plants located nearby for shorter conveyance of product water.
    - Environmental - Relatively high potential to impact cultural and biological resources.
    - Uncertainty/Risk - Uncertainty of source water quality and highly variable source water temperature; constrained due to the ownership and management of lands by the BLM.

8.4.5 Desalination Alternative 4-50,000 AF Keystone Desalination IID Drainwater/Alamo River

Benefit

Annual Yield – 50,000 acre-feet per year

Project Objective

The purpose of this alternative was to compare the cost and feasibility of using drain or river water as make-up water instead of developing a well field. The objective is to develop 50,000 AF per year of new water from a desalination plant with a surface water supply from IID drainwater or Alamo River.

Facilities

- Desalination Plant in the Keystone area.
- Diversion from the Alamo River for source water development, collection and transmission- or capture drainwater from Holtville Main, Central, and Rose drains.
- Produced water use distributed to IID irrigation canals with water credited to new MCI uses.

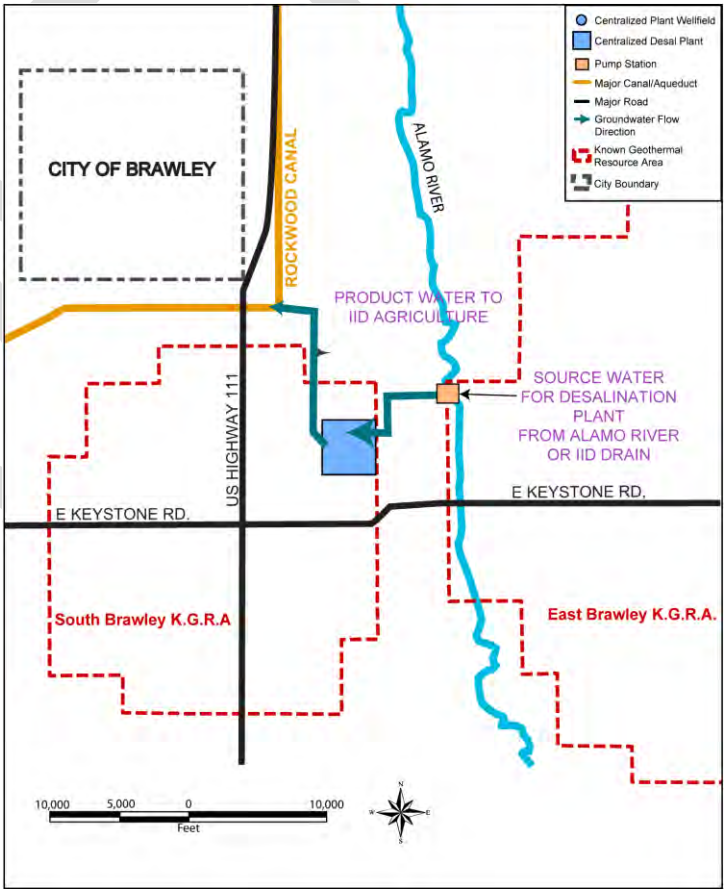
- New Injection Wells for brine concentrate disposal

Costs

- Capital Costs: $ 147,437,743
- O&M Costs: $15,323,901
- Cost per acre-foot: $537

Relative Ranking

- Score: 274
- Evaluation Matrix Summary:
    - Objectives - Project ranks high with respect to meeting IID's Plan objective, as desalination has been identified as a key water management strategy.
    - Implementability - Limited number of permits required; multiple options to expand use of developed water and potential for expanding customer base.
    - Environmental - Moderate potential to impact cultural and biological resources; issues related to loss of water to Salton Sea by capture of drain or river water. Alamo River diversion would require a 404 permit and facilities could be subject to flood damage. Diversion of drainwater, if sumps are located near confluence with the Alamo River, would minimize impacts to habitat in the drains and would likely be easier to permit.
    - Uncertainty/Risk - Variability of source water quality.
    - Technical - Use of drain or river water requires filtration pretreatment. Need to evaluate canal design capacities and limitations.



8.4.6 (GW 18) - Groundwater Blending 25,000 AF East Mesa with Well Field Pumping to All-American Canal

Benefit

Annual Yield – 25,000 acre-feet per year

Project Description

The purpose of this project is to develop and pump untreated groundwater from the East Mesa, and convey it to the All-American Canal to be blended with Colorado River water. Specific well field locations have not been determined and alignments for conveyance need to be defined.

Facilities and Operation

- Source water development - Well Fields in the East Mesa (6-8 wells)
- Pipeline to All-American Canal

Costs

- Capital Costs: $ 39,501,517
- O&M Costs: $198,000
- Cost per acre-foot: $99

Relative Ranking

- Score: 273
- Evaluation Matrix Summary
    - Objectives - Project ranks high with respect to meeting IID's Plan objective, as groundwater development has been identified as a key water management strategy. Would not help capture under-runs or allow for banking of groundwater.
    - Implementability - Could be implemented in the mid-term. Moderately complex permitting process due to use or crossing of BLM Management. Potential to expand the systems by drilling more wells including recharge facilities (see GW 19).
    - Environmental - Potential impacts to biological and cultural resources in the BLM portion of the East Mesa. Resultant water quality in the All-American Canal would increase TDS (20 to 40 ppm) requiring increased application and leaching.
    - Uncertainty/Risk - Uncertainty of groundwater source water quality and hydrogeologic conditions. Could be issues with grower acceptance. Constrained due to the ownership and management by the Bureau of Land

Management (BLM). Final alignments of property to be develop need to be determined. Land acquisition costs unknown.

8.4.7 Agricultural Water Conservation 1- Systems Conservation Projects

Benefit

Annual Yield – 10,400 acre-feet per year

Project Objective

The objective is to construct agricultural water conservation projects that were not included in the Definite Plan due to having costs beyond the current thresholds for that program. These are referred to as the _Not Build' Systems Conservation projects that are a suite of 25 systems improvement projects.

Facilities and Operation

- Includes canal lining, mid-lateral reservoirs, interties, and seepage interception. East Mesa Recharge Facilities using old Coachella Canal.
- Facilities would be tied into revised operating plans identified in the Definite Plan.

Costs

- Capital Costs: $ 56,225,000
- O&M Costs: TBD
- Cost per acre-foot: $504

Relative Ranking

- Score: 273
- Evaluation Matrix Summary
    - Objectives - Project ranks high with respect to meeting IID's Plan objective since it supports agricultural water conservation. Helps maintain historical agriculture, improves overall efficiency, and would not result in conflicts related to existing contracts or agreements.
    - Implementability - Could be tied into current Definite Plan construction and bidding activities and implemented in the mid-term time frame. No complex permitting needed.
    - Environmental - Low potential to impact cultural and biological resources since it is a modification to existing systems. Tier of existing environmental documents.
    - Uncertainty/Risk - Relatively little risk and uncertainty as compared to other projects.

- Technical - None identified that are not known. Likely to be supported by existing agricultural users, known benefits and costs.

8.4.8 Desalination Alternative 15 - 50,000 AF South Salton Sea Desalination with Alamo River Water and MCI Distribution

Benefit

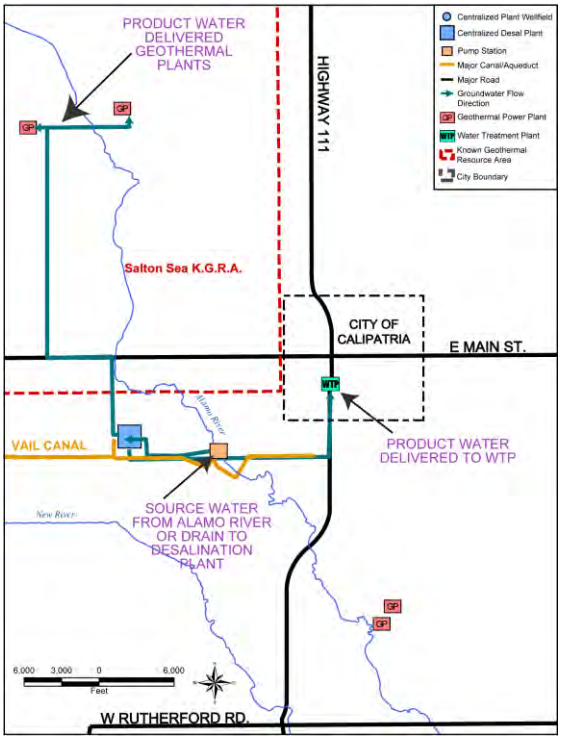
Annual Yield – 50,000 acre-feet per year

Project Description

To provide 50,000 AFY of water from the Alamo River (or drainwater) to the desalination plant located in the Salton Sea KGRA to service these power plants and distribute to the Calipatria water treatment plant for municipal purposes.

Facilities and Operation

- Desalination Plant east of Highway 111.
- Source water development from the Alamo River or drains.
- New injection wells for brine concentrate disposal. A variant could allow brine disposal to occur in borrow pits created during the Salton Sea restoration process.
- Connection to Vail Canal to distribute treated water in excess of power plant or MCI demands.
- Product water will be distributed to geothermal plants on the Salton Sea KGRA as well as MCI distribution for the City of Calipatria.



Costs

- Capital Costs: $ 182,975,327
- O&M Costs: $15,857,901
- Cost per acre-foot: $529

Relative Ranking

- Score: 271
- Evaluation Matrix Summary
  - Objectives - Project ranks high with respect to meeting IID's Plan objective, as desalination has been identified as a key water management

strategy.

- Implementability - Limited number of permits required, but acquisition may be moderately complex due to siting the desalination plant near the Salton Sea; multiple options to expand use of developed water and potential for customer base. Costs are borderline.
- Environmental - Moderate potential to impact cultural and biological resources; issues related to loss of water to Salton Sea by capture of drain or river water. Alamo River diversion would require a 404 permit and be subject to damage from floods. Diversion of drain water, if sumps are located near confluence with the river, would minimize impacts to drains and be easier to permit.
- Uncertainty/Risk - Uncertainty and variability of source water quality.
- Technical - Use of drain or river water requires filtration pretreatment. Need to evaluate canal design capacities.

8.4.9 Desalination Alternative 2 - 50,000 AF Keystone Desalination with Well Field and Groundwater Recharge

Benefit

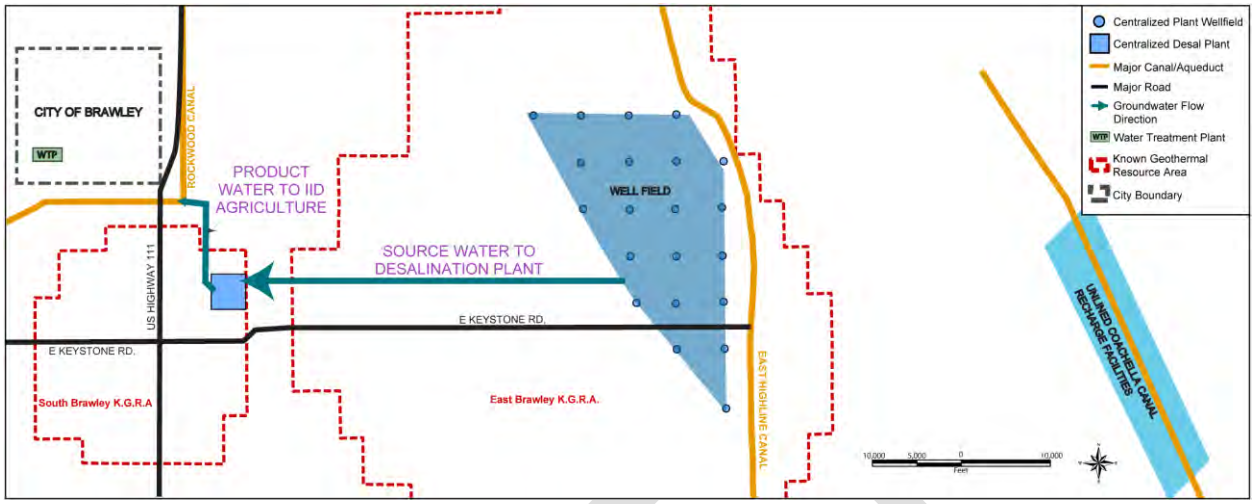
Annual Yield – 50,000 acre-feet per year

Project Objective

Create new supply by developing and desalinating groundwater and include groundwater recharge and banking facilities to the East Mesa to minimize the potential negative effects on the groundwater basin and reduce groundwater depletion. Wells located within IID jurisdiction to avoid impacts to habitat and species on BLM.

Facilities and Operation

- Desalination Plant in the Keystone area in the proposed industrial development zone and the East Brawley KGRA.
- Well field near East Highline for source water development, collection and transmission to desalination plant.
- Canal using IID easements and rights of way.
- Produced water use, distributed to IID irrigation canals with water credited to new MCI uses.
- East Mesa Recharge using old Coachella Canal
- New injection wells for brine concentrate disposal
- Product water distribution facilities



Costs

- Capital Costs: $282,399,468
- O&M Costs: $13,158,000
- Cost per acre-foot: $590

Relative Ranking

- Score: 269
- Evaluation Matrix Summary
    - Objective - Project ranks high with respect to meeting IID's Plan objective, as desalination has been identified as a key water management strategy.
    - Implementability - Could be implemented in the mid-term (5 to 10 years) with a moderate level of regulatory complexity. High degree of flexibility in terms of potential to expand and incorporate other users. Likely to qualify for State or federal support from existing programs. Low ability for IID to act quickly to implement the project without need for additional agreements/funding. Exact location not determined. Property acquisition needed. On the boundary of funding range.
    - Environmental - Relatively complex regulatory and permitting process resulting from potential to impact biological and cultural resources in the East Mesa from recharge ponds. Minimized effects by siting well fields in IID jurisdictional area on existing easements and rights of way. Limited effects or complexity related to Salton Sea since would not reduce drainwater or flow. Would improve delivered water quality.
    - Risk/Uncertainty - Moderate risk that the project could be stopped due to laws and regulations. Ability and willingness to pay is not able to be determined at this time. Constrained due to the access to Old Coachella Canal, Bureau of

Land Management (BLM) land easements and rights of way; uncertainty of source water quality.

- Technical - The temperature of groundwater will influence costs since cooling pretreatment may be needed. Field data collection and investigations are needed to determine make-up water quality and temperature and to design wells and pumping rates.

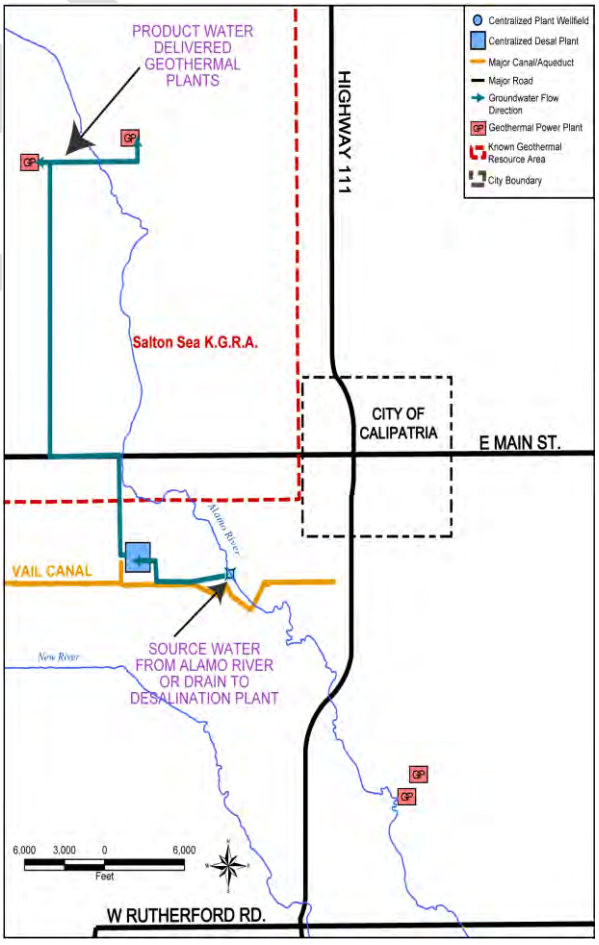
8.4.10 Desalination Alternative 14 - 50,000 AF South Salton Sea Desalination with Alamo River Water and Industrial Distribution

Benefit

Annual Yield – 50,000 acre-feet per year

Project Description

The purpose of this alternative is to provide an alternative that would facilitate conveyance through existing infrastructure and service existing or proposed plants in the Salton Sea KGRA. The project will provide 50,000 AF per year of water from the Alamo River to the desalination plant located in the Salton Sea KGRA. Project would not impact the groundwater aquifer and would not require groundwater recharge to mitigate for pumping.



Facilities and Operation

- Desalination Plant in the South Salton Sea area.
- Source water development from the Alamo River.
- New injection wells for brine concentrate disposal, A variant could allow brine disposal to occur in borrow pits created during the Salton Sea restoration process.
- Product water will be distributed to geothermal plants on the Salton Sea KGRA

Costs

- Capital Costs: $158,619,378
- O&M Costs: $18,473,701
- Cost per acre-foot: $553

Relative Ranking

- Score: 263
- Evaluation Matrix Summary:
  - Objectives - Project ranks high with respect to meeting IID's Plan objective, as desalination has been identified as a key water management strategy.
  - Implementability - Limited number of permits required but acquisition may be moderately complex due to siting the desalination plant near the Salton Sea; multiple options to expand use of developed water and potential for customer base. Lacks the benefit of providing MCI water to Calipatria.
  - Environmental - Moderate potential to impact cultural and biological resources; issues related to loss of water to Salton Sea by capture of drain or river water. Alamo River diversion would require a 404 permit and be subject to damage from floods. Diversion of drainwater, if sumps are located near confluence with the river, would minimize impacts to drains and be easier to permit.
  - Uncertainty/Risk - Uncertainty and variability of source water quality.
  - Technical - Use of drain or river water requires filtration pretreatment. Need to evaluate canal design capacities.

8.5 Recommendations and Conclusions

CF 1) Based on the results of the screening and ranking criteria, it is recommended that IID move forward with further feasibility analysis of the project alternatives for the groundwater blending projects and the Coachella groundwater storage project. This could include drilling of test wells, sampling groundwater quality, and conducting pilot projects.

CF 2) IID should prioritize those recommended project alternatives within the desalination category and select the top projects for further evaluation in the IRWMP process.

CF3) IID should work with the local Cities as part of the IRWMP to review and evaluate the feasibility of the recycled water projects since these have potentially competitive costs.

9 Program/Policy Elements Alternatives

9.1 Introduction

IID is evaluating its roles and responsibilities in managing and apportioning water when there is a change in the place and type of water use. In performing this role, IID must ensure reasonable and beneficial use of the Colorado River entitlement and satisfy other elements of the framework governing IID's access to Colorado River water.

IID is also seeking to better define the District's role in the land use/water use development review process. Water is needed from new, clearly-defined sources to meet growing MCI water demands and to promote economic development. Changes in State legislation over the past ten years now require that land use agencies and water supply agencies, such as IID, communicate and coordinate during the planning and development review process for such projects. These changes place informational and procedural requirements on both IID and the land use agencies. Currently, IID lacks specific policies or standards that define what information is needed to support its determinations and to direct how it will make decisions on new water uses.

A "Policy Briefing on Integrating Water Supply and Land Use Planning" (GEI, January 2009) was prepared early in the planning effort to identify state requirements and opportunities to better integrate land use and water supply plans and the processes used to make land use decisions and connect water to new MCI demands. A separate briefing on Policy Alternatives was prepared and used to facilitate discussions at meetings in August 2009 with staff and Board members. The purpose of this briefing was to help focus discussion on the following key questions and policy options:

1. Can IID solve a 50 to 80 thousand acre-foot per year (TAF/yr) mismatch between supplies and demands without capital projects?
2. What are the policy alternatives and approaches that could be used separately or as part of a more integrated solution to provide for MCI water demands?
3. What would be the optimal combination of capital project and policy solutions?
4. What policies does IID need to deal with land use conversion from agricultural to MCI uses?
5. What policy/programmatic actions need to be implemented to fund capital projects?
6. What is the IID Board's role as a legislative body in apportionment of water?
7. How should IID consider using its powers and authorities to address future MCI demands?
8. What policies are needed to help IID manage overruns and capitalize on the opportunities for banking of under-runs?
9. How can IID support future MCI users to develop and manage new supplies?
10. What are the market-based solutions and how should IID facilitate such solutions?

An overarching objective of these discussions was to explore the role policy mechanisms can play in increasing the certainty of water supplies for future MCI users.

9.2 Background

9.1.1 Equitable Distribution Plan (EDP)

The EDP was adopted on December 11, 2007 and revised on November 18, 2008. Numerous management approaches were studied during development of these regulations, and there was significant outreach and stakeholder involvement. The work was conducted in three phases:

1. Confidential background interviews with water users
2. Analysis of the different methodologies and discussion with the affected stakeholders
3. Preparation of a final set of recommendations for consideration by the Board

The analysis evaluated four primary apportionment methods:

1. Straight line
2. Historical use
3. Assessed valuation
4. Crop based

The District's criteria for apportionment would:

- Be equitable
- Be practical
- Be predictable
- Be flexible
- Minimize economic harm to the local economy
- Be reasonably inexpensive to administer
- Require minimum intrusion by the District

The straight line method was ultimately chosen by the IID Board. It was clearly recognized that apportionment methods do not establish a water right or assign water ownership, but instead provide an option for IID to effectively manage its constrained water supply on a short term basis during periods when demands exceed supplies.

During development of the EDP, apportionment was viewed as only applicable in years with overruns and was not considered as a routine method for annually distributing water. The Board is now looking to build upon the experience gained through development and implementation of the EDP and consider regulations for annual apportionment. During the process to develop an annual apportionment program, many of the policy issues and alternative concepts that arose during formulation of the EDP are likely to be revisited. The seven criteria listed above are still relevant to any proposed changes to the EDP to support implementation of an annual apportionment.

9.1.2 State and County Requirements for Geothermal Power Water Use

The primary driver for evaluation of how IID would supply water to new MCI uses was the need to determine how to respond to requests by developers of proposed power plants. The greatest future use of water will likely be for cooling water for geothermal power plants. Although the need for cooling water is evident to IID, the District does not have a policy for addressing requests to provide water for this purpose.

IID's involvement in the Imperial County development review process of proposed power plants provides a case study for how IID, as the wholesale water provider and trustee for Colorado River water rights, interacts with land use authorities (Imperial County/IID Cities) when new projects are being considered that would intensify water use, increase demands or change the type or place of water use within IID's service area.

9.2.1.1 County Geothermal Plan Objectives

Imperial County Objectives in the "Geothermal, Alternative Energy, and Transmission Element of the County General Plan" (2006)[82] state that the County will "maintain at least the present level of agricultural production while encouraging efficient water use." This objective is consistent with IID Plan objectives. As such, if water were to be redirected from agriculture to geothermal uses without mitigation, this would be contrary to both County and IID objectives. The County also has objectives to:

- Provide for geothermal and alternative energy water use of 180,000 AF of water per year.
- Grant geothermal development first priority for use of "saved" and/or excess water over other uses for which the County has jurisdiction.
- Encourage the efficient utilization of water in geothermal/alternative energy operations and foster the use of non-irrigation water by these industries.
- Encourage recognition of the importance of water to fish and wildlife resources and to recreational uses of Imperial County.

9.2.1.2 State Regulatory Environment for Power Plant Cooling

The California Water Code (CWC § 3550) defines power plant cooling as a wasteful use of potable water and mandates that recycled water be provided where the source of recycled water is of adequate quality, sufficient quantity and reasonable cost. It also directs that there be no adverse affect to existing water rights, public health, or downstream water quality or habitat.

The California Energy Commission (CEC) governs permitting of power plants over 50 MW. In its "Developers Guide of Practices and Procedures," the CEC states that it seeks "to minimize the impact on the state's water resources by encouraging use of less water-intensive technologies."

[82] Currently being updated

The CEC has no water regulations of its own but defers to the SWRCB regarding reasonable and beneficial use of water. The SWRCB has adopted the "Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling: (Resolution No. 75-58)," which states that "fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound." The policy requires that power plant cooling water should come from, in order of priority:

- Wastewater being discharged to the ocean
- Ocean water
- Brackish water from natural sources or irrigation return flow
- Inland waste waters of low total dissolved solids
- Other inland waters

While the SWRCB's first two priorities do not apply to IID, the East Mesa is a viable source of brackish groundwater, while the sources of inland wastewater include the treatment plants for all the incorporated cities. It is uncertain how the Salton Sea would be viewed as a source of supply under this policy. The State priority implies that IID raw water would be the last source of supply for geothermal power plants and would be considered only after other supply sources had been determined to be unavailable.

The SWRCB also has a "Policy with Respect to Water Reclamation in California (Resolution 77-1)," which specifically addresses wastewater and encourages its reuse rather than disposal. The resolution is directed primarily toward municipal wastewater producers, but the impact of this policy on power generation is similar to the above Resolution No. 75-58.

9.3 IID's Role and Responsibility in Water and Land Use Decisions

IID holds rights to surface water from the Colorado River, which it historically has managed, distributed, and defended. Under its California water rights permit and its contract with the Department of the Interior, IID has the responsibility to ensure that the District's diversion from the Colorado River is reasonably and beneficially used. An aspect of IID's responsibilities is the duty to review and approve changes in place and type of use. At this time, the District's review responsibility comes into play when Imperial County or the IID Cities are reviewing land use changes and proposed projects. However, it may be valuable for the District to develop a separate process to review and approve changes in place or type of water use so that this review becomes an independent function in addition to being a response to actions initiated by the County or the Cities.

IID Cities and Imperial County have the powers and authorities to regulate land use, develop general plans, and review and approve new development proposals. In this respect, they are the lead agencies for making land use decisions, approving projects, and for ensuring compliance with CEQA. IID Cities and Imperial County are also responsible for ensuring that impacts from developmental projects are mitigated or avoided.

9.3.1 State Requirements for Water Supply Assessments and Verification of Supply

Water supply planning and the role of water agencies during the land use planning process have received increased attention from both the State Legislature and the California Courts. Recent legislation[83] and judicial rulings[84] have increased the requirements for IID, IID Cities, and Imperial County to adhere to more rigorous planning standards and to consult when projects are proposed that could intensify water use or have an effect on water supplies or current users. These changes to the state statutes and judicial decisions provide guidance as to how IID, as a wholesale water agency, and the Cities and Imperial County, as the lead agencies for land use decisions, should interact to evaluate changes in land use.

SB 610 (Chapter 643, Statutes of 2001) and SB 221 (Chapter 642, Statutes of 2001) are companion measures that seek to promote more collaborative planning between local water suppliers and cities and counties. Both statutes require detailed information regarding water availability to be provided to city and county decision-makers prior to approval of specified large development projects. Both statutes also require this information be included in the administrative record that serves as the evidentiary basis for an approval action by the city or county.

A foundational document for compliance with both SB 610 and SB 221 is the UWMP. Both statutes identify the UWMP as a planning document that, if properly prepared, can be used by water suppliers to meet the standards set forth in the law. Cities, counties, water districts, property owners, and developers will all be able to utilize these documents when planning for and proposing new projects.

A Water Supply Assessment (WSA) is required for any project subject to review under CEQA that meets the definition of a project as presented in the Water Code.[85] The WSA is to be prepared by the lead agency or municipal water supplier. IID is not a municipal water supplier, and as such, the Cities, retail water purveyors or the County would either prepare the WSA or require that a project applicant submit a WSA as part of the land use permitting process.

The WSA is intended as a communication mechanism between the land-use agencies and water supply agencies. In particular, the WSA and verification requirements support determination of whether projected water supplies will meet the water demands associated with the proposed project during normal, single-dry, and multiple-dry water years over a 20-year forecast period

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[83] Senate Bills 610 and 221 significantly elevated the planning function of UWMPs by creating water supply assessments and verification requirements (CWC § 10910 *et seq*). A supplier relying on IID surface water sources to meet its customers' demands would be required to provide detailed information regarding the limitations of that source and, to the extent available, the historical uses of the basin.

[84] Several major court decisions have interpreted CEQA in ways that place more requirements on land use and water planners. See Planning and Conservation League v Dep't of Water Resources, 83 Cal.App. 4th 892 (2000) (disapproving contract reformation between DWR and SWP contractors; Santa Clarita Org for Planning and the Environment (SCOPE) v Count of Los Angeles, 106 Cal. App. 4th 715 (2003) (finding that CEQA prohibits reliance on ~~"~~paper water," specifically water from the SWP; recent California Supreme Court ruling, Vineyard Area Citizens For Responsible Growth, Inc. V City Of Rancho Cordova, Sunrise Douglas Property Owner Assn., Super.

[85] Water Code § 10910(a) specifically defines. Basically 500 unit development or project that would use the same amount of water (approximately 250 AF.

without impinging on the public water system's existing and planned future uses, or surrounding uses including agriculture and manufacturing.

In developing a WSA, the Cities, County, or water supplier must disclose and document the quantity of water received from the various sources using the following:

- Written contracts or other proof of entitlements.
- Copies of a capital outlay program for financing the delivery of a water supply.
- Federal, State, and local permits for construction of infrastructure associated with delivery of the water supply.
- Any necessary regulatory approvals that are required to be able to convey or deliver the water supply.

As discussed in Chapter 8, current UWMPs do not provide adequate representation of the existing water supply situation within the IID. Also, Imperial County is not required to have an UWMP and would rely on the General Plan or other documents to evaluate WSAs.

In this setting, IID's role could be to support the Cities and County by providing needed documentation and could develop written contracts or a permitting process to provide proof of entitlements. The final IID Plan, once it is approved and certified pursuant to CEQA, could identify a capital outlay program for financing of actions to augment water supplies that could be referenced in IID Cities' UWMPs and by the County as the source for verification. Alternately, an IID permitting process that would include review and approval of changes in place or type of use could be used during review of WSAs and other actions.

To formalize IID's procedure for reviewing WSAs, the District should draft guidelines patterned after the DWR Guidelines (DWR, 2002). This approach would standardize the information submittal requirements and provide a template for use in preparation of WSAs by project proponents and review by IID staff. This information could include data to enable project proponents to prepare pre- and post-project water budgets using uniform baseline information. The guidelines could also present standard terms and conditions, developed in cooperation with the City and Counties, to expedite review.

9.3.2 CEQA and Impacts of Concern for IID

Pursuant to CEQA, IID is a responsible agency with jurisdiction for reviewing city or county land use plans or development proposals that could affect IID activities, such as water supply, contractual requirements, or other environmental commitments. As a Responsible Agency under CEQA and is required to cooperate with the Lead Agency in order to ensure that the impacts of a proposed project are appropriately assessed and mitigated. IID is also required to comply with CEQA as a pre-condition to committing to supply water to new non-agricultural projects within its water service area. While the local land use authority is typically the Lead Agency for such an assessment, in some cases these assessments may also serve as the basis for and/or facilitate IID water supply decision making.

The accurate portrayal of water supply conditions, water use demands, runoff, and related environmental and biological issues are of primary interest to the IID its existing long-term water management and environmental mitigation responsibilities.

When determining whether to approve a water supply agreement or to issues a permit for any non-agricultural project, IID will determine whether potential environmental and water supply impacts of such proposed projects have been adequately assessed, the appropriate mitigation developed and necessary conditions adopted by the relevant land use permitting/approving agencies before the IID approves any water supply agreement or permit for a proposed project.

IID has responsibilities related to reviewing and approving changes in water supply and related requirements that result from change in land-use or a project being considered by one of the land use agencies.

IID needs to demonstrate that all of the water diverted and applied under the IID Colorado River Entitlement is reasonably and beneficially used, that all types of water use, whether agricultural, industrial or domestic, are applying best management practices and conserving water when economically and technically feasible.

IID needs to work with the Lead Agency to ensure that direct, indirect and cumulative impacts of individual projects on agriculture; agricultural water supplies; loss of return flows to IID drains, the Alamo or New Rivers; or impacts to IID facilities, that are the result of individual projects, are adequately assessed and, if needed, appropriate levels of mitigation are formulated and implementation of such mitigation measures are made a condition of the Lead Agency's approval and permit for the project.

Once the impact is defined, the opportunities to avoid, minimize or mitigate the impact can be determined. There needs to be a logical nexus between the impact and mitigation to require that the impact be funded and implemented. Even if the direct physical solutions is not firmly known but is anticipated or planned, then a mitigation fee could be assessed. Under state law, such a mitigation fund can be developed, but once established, the monies can only be for the planned mitigation. For example, if the IID Plan includes a range of physical solutions that result in new water supplies, a project proponent could buy mitigation credits and deposit funds into the mitigation fun in-lieu of direct physical mitigation. Ultimately, when enough funds are collected, the project would then be built. There are very strict legal rules and guidelines for this type of mitigation fund, but such an approach allows incrementally building the funding need to develop new supplies.

9.4 Purveying Water to Cities or Other Retail Providers

Retail water purveyors are different that agricultural accounts in that there are far fewer IID urban accounts, and the Cities or retail purveyors involve many different users with high reliability and water quality requirements. Many water districts in California have contracts that spell out the terms and conditions between the District as wholesale provider and the retail water purveyor.

IID should consider developing contracts between retail purveyors and the District to formalize these relationships and define terms and conditions of use. The purpose of such agreements would be to quantify municipal apportionment; identify the municipalities as the delivery agent; and set pricing, shortage priority, and other important terms. The conditions on developers and the process for IID consideration during the land use planning would also be defined, for example how the Cities and IID interact during development review and consideration of WSA, UWMP, sphere amendments, adoptions of specific plans or updates of general plans. All of

these are the responsibility of the Cities as part of their land use authorities, but providing water to meet planned demands is the responsibility of IID. Therefore, the timing and level of IID involvement in these proceedings needs to be better defined at the City and County level to expedite development reviews and comply with state code requiring interaction between land use and water supply entities.

9.5 Example Alternatives

This section describes example policy approaches. The information was provided to the Board to obtain guidance that could then be used to craft more specific and detailed policies, guidelines, standards or regulations. It can also provide the basis for discussion with other stakeholders. For each example alternative, the basic approach, potential yield, advantages and drawbacks, considerations and variants are presented. The alternatives covered include:

- No Action Alternative
- Minimalist-IID Develop Policy/Project Proponent Develop Solutions
- Full Apportionment/Fallowing/Managed Industrial Water Pool
- Full Apportionment/Fallowing/Free Market Exchange
- Land Conversion/Industrial Water Portfolio
- –Option" Market for Fallowing during SDI

9.5.1 No Action Alternative

Approach: This would be continuation of the status quo. IID would continue the current case-by-case project review without development of additional policy guidance from the Board, and no changes to regulation or standards would be implemented.

Advantages: No additional staff, legal or consultant costs to develop specific policies, standards or guidelines. Complete flexibility to make decisions based on ad hoc review.

Drawbacks: Inconsistent information provided by developers to Cities, Imperial County, and IID; continued confusion as to available water supply; ad hoc and case-by-case project reviews with the potential for arbitrary and inequitable decisions; continued conflicts with Cities and Imperial County over roles and responsibilities; probability of litigation; slow decisions; lack of certainty on the part of developers; and impacts to economic development.

9.5.2 Minimalist Approach- IID Develop Policy/Project Proponent Develop Solutions

Approach: IID would develop policies that define increased industrial use as an impact to current agricultural water users and supplies, stating that the impacts must be mitigated and leaving it to the project proponents to find supply solutions and to the Cities and Imperial County to require the mitigation and condition development. The IID policy could disallow some water sources that would not produce _new' or _wet' water, or because such solutions could affect IID's supply or current agricultural users. These would include extraordinary agricultural conservation, fallowing, or desalination and reuse of drain waters. Project proponents would

then be required to find or develop other water sources such as industrial water conservation, imported water, recycled municipal wastewater, groundwater development and/or desalination of groundwater. IID staff would review changes in land use, EIRs and development proposals, provide comments, correspond with cities and developers, and make findings as to whether the project had fully mitigated the impacts.

Yield: Could result in new water being developed by project proponents. Yields would vary depending on the assumptions and willingness of project proponents to fund and develop their own solutions. Each project proponent would be likely to develop projects which would yield only the water necessary to support the proposed development. For example, developers of a new geothermal power plant having a 6500 AF demand could design, build, and operate a groundwater desalination plant that would produce this water.

Advantages: Puts responsibility for conceiving and funding solutions on developers and project proponents and on the land use agencies to recognize impacts and enforce implementation of projects as a condition of the new development. Provides a high incentive for the market to solve the problem and determine an economically efficient solution. Would be relatively easy on IID staff since Board intent is clear and can be equitably applied. Staff would be charged with review of proposed projects to determine consistency with Board-defined policy, make findings of consistency and communicate with Cities and County. Staff would also ensure that significant impacts are mitigated and projects are conditioned appropriately. IID would not have to set rates or charges, apportion water or costs, or run an initiative to obtain project funding and increase rates.

Drawbacks: Does not provide revenue to implement larger capital facility solutions with higher yield and greater economies of scale; does not explicitly define water supply capital projects or provide near-, mid-, or long-term solutions or mitigation for projects currently under development; does not exert IID authority or leadership for developing water supply capital projects. Could result in need for IID to litigate if lead agencies do not recognize impacts to IID supplies and therefore do not fully mitigate impacts during the project review and approval process. Does not retain or assert IID title to percolated groundwater from prior operations. Likely to require additional staff to support development review and ensure consistency in review, comment, and enforcement of Board standards.

Considerations/Variants

- IID would need to ensure that any recycled water use incorporates mitigation for loss of water to the IID drains, New or Alamo Rivers, or Salton Sea such that these costs are not externalized to IID or others.
- Imperial County may need to revise the groundwater ordinance to allow for groundwater overdraft and depletion. Would need to clarify IID rights to water in the groundwater basin that originated from IID canals.

9.5.3 Full Apportionment /Fallowing /Managed MCI Water Portfolio

Approach: The program would build upon elements of the current fallowing and EDP program. The concept includes annual apportionment; rotational fallowing to provide a source for new MCI water within the IID area; coordination of an Agricultural Water Exchange to facilitate

agricultural-to-agricultural exchanges during supply and demand imbalances and minimize overruns; development of an MCI water pool and MCI water exchange to broker water obtained through fallowing or development of new supplies. Fallowing could be by private growers similar to the existing fallowing program and/or by IID on the Western Farmlands. The concept is for either private entities or IID, through the Western Farm Lands, to rotationally fallow lands, putting the resultant water into an MCI water exchange, and for IID to then reapportion water to new MCI uses. Differential price points would allow for collection of money from MCI users to both pay for the fallowing of land and to capitalize a mitigation fund to be used to construct new water supply projects (e.g., groundwater development; groundwater or drain water desalination; recycled water, etc.).

Yields: No new water would be produced in the short term, but new water would be developed in the longer term. Yield would vary based on projects defined in the IID Plan. Water would be reapportioned between uses until such time as projects were capitalized and constructed. Amount of water made available through exchange would vary based on grower participation and amount of trust land IID would agree to fallow to generate a firm supply established by goals set by the IID Board consistent with commitments from the MCI pool.

Advantages: Industry has certainty in supply; Cities and County can verify and validate water availability and it leaves decisions to fallow with the landowners. Impacts to agricultural users of water are mitigated and could be implemented relatively quickly. Future fallowing would not be needed once projects were constructed and provide new supplies. Funds are collected to develop new supplies and to possibly match state and federal grants. IID would manage the water apportionment process consistent with its authorities, and there would be relatively little interference by IID in the land use planning process; integrates land use and water supply planning process. It could be relatively simple to implement through permitting or other review and approval processes for all proposed fallowing and for apportioning water from the MCI water account.

Drawbacks: No new water would be produced in the near term; could still impact current agricultural uses in overrun years unless mitigated. Need for further economic and fiscal analysis to finalize a pricing model and structure. It is not clear how mitigation for loss of drain water would be implemented. There are political, legal, and administrative issues that need to be resolved. The program could negatively affect agricultural operations on leased land; could compete with the current fallowing program; would require policing to ensure land is fallowed by participants in the program; and would likely increase need for staff.

Considerations/Variants

- Coordinate with Imperial County on land use conversions and planning and rezoning efforts to identify marginal agricultural lands that could be used for MCI purposes; introduce renewable energy overlay zoning and accounting for land that will come out of agricultural production in the future.
- Environmental review requirements need to be determined.
- Board could set a limit on the amount of land to be fallowed and the duration of fallowing and could sunset the program once funds have been generated to construct capital projects.

9.5.4 Full Apportionment /Fallowing /Free Market Exchange

Approach: The approach would be to create an exchange for the transfer of water between willing buyers and sellers at price points established on an open market. This was similar to the concepts reviewed during the development of the EDP. A managed market would be established based on the willing participation of buyers (MCI users) and sellers, either private growers or IID using Western Farm Lands. IID's role could vary, but would likely be to facilitate and establish the "exchange" by establishing accounting and verification procedures. Agricultural land would be fallowed on a temporary or permanent basis, and transferred to a different type and place of use within IID. No external transfers would be allowed. For example, MCI users could purchase and fallow land to allow for water use on a small portion of the parcel, or transfer to another parcel. There would need to be requirements to mitigate for dust, air quality impacts, loss of drainage, and/or socioeconomic effects.

Advantages: A "free market" approach could result in economically efficient solution and water moving to the use with the highest economic value. This would include conscious business decisions by agriculture to fallow land and by MCI water users.

Drawbacks: Loss of agricultural production and potential third party effects; need to leave some water behind to mitigate dust impacts; loss of agricultural habitat; need to mitigate for drain effects; political resistance and lack of acceptability in the community.

9.5.5 Land Conversion/ MCI Water Portfolio

Approach: IID would develop policies that account for water savings that would result from conversion of agricultural lands to urban residential and commercial land uses; documenting the savings and apportioning the water to an MCI water portfolio to be managed by IID to mitigate for the increased MCI demands. IID would adopt policies that define information submittal requirements (water budget), and establish standards and acceptable methods for calculating the water budget and basis for review; define basis and price for apportioning saved water in the portfolio to new users to mitigate for their impacts. New users would make a request to IID and pay the defined rate, and a new annual industrial rate would be developed. This money would be committed to the development of capital projects. An example in Table 9-1 shows the water saved from agricultural to urban conversions. This assumes that the new land use is for residential, commercial and light industrial uses, and that all urban water conservation best management practices are implemented (Chapter 8; plumbing and landscape codes and ordinances are implemented). Table 9-1 also includes a revenue model to show how much revenue would be generated through conversion based on the difference between agricultural and urban water rates.

Yields: Variable depending on how much water is assumed to be saved upon conversion and the rate of new development. The assumptions could be established by policy declaration. For this example it was assumed that agriculture uses 5.25 AF/acre, which is the number used in the EDP. It was also assumed that the resultant average residential, commercial and industrial urban land use would be 3.5 AF/acre; there is an annual urban growth rate of two percent; and that water requirements for generation of geothermal power would be 50,000 acre-feet by 2020. As can be observed in the table, the amount of water saved does not provide enough water for the power plants on the assumed schedule. The revenue benefits are significant, but the water yield is marginal. Funding generated from such a program could be used as a source of revenue for

construction of capital projects to make up the difference in MCI water demands. Also, real savings are hard to verify over the long term. Residential water demands may use as much as agricultural, up to six AF/acre.

Advantages: Relative ease of application by IID staff, understandable, clearly related to the impact of new demands, can be tied to fiscal model, asserts IID legislative authority over water management and accounting. It would increase IID annual revenues as a result of the shift between agriculture to urban rates.

Drawbacks: Though it is likely that in the long run there could be savings from conversion of agriculture to commercial or residential urban uses, these savings will only accrue over the long term and are not immediately available or easily apportioned to the large increases in MCI demands which are likely to occur in the near-term. Assumes all best management practices would be implemented as conditions of approval. Though this type of accounting would be important to understanding the long-term water balance, it would not be a near-term solution. It could delay real action on capital projects if established as a standalone policy without a capital facility element. It would be growth inducing. It is hard to predict future economic conditions and rate of land conversion.

Considerations/Variants

- ~~L~~Look Back" Accounting - Quantify water savings from prior agricultural to urban conversions over the past ten years to account for water saved which could then be apportioned to new MCI water demands.
- As with the Full Apportionment/Fallowing/Managed/MCI Water Pool, there are opportunities to tie the water planning to land use planning and efforts to rezone for purposes of renewable energy development.

Table 9-1. Agricultural to Urban Land Conversion and Accounting for New Water Use

	Annual Ag to Urban Land Conversion	Cumulative Land Conversion	Historical Ag Use (1)	Cumulative Historical Ag Savings	Annual New M&I Use(2)	Cum M&I	Net Annual Savings	Cumulative Annual Savings	New Annual Industrial Demand	Cumulative Annual New Indusrial Demand	Industrial Portfolio Balance	Ann Ag Rev Lost	AnnUrb Rev	Ann Ind Rev	total net Rev
Year	Acres	Acres	AF		AF	AF	AF	AF	AF	AF	AF				
2010	250	250	1313	1313	875	875	438	438		0	438	$22,313	$68,250	$0	$45,938
2011	255	505	1339	2651	893	1768	446	884	12000	12000	-11116	$45,071	$137,865	$3,000,000	$3,092,794
2012	260	765	1366	4017	910	2678	455	1339	3500	15500	-14161	$68,285	$208,872	$3,875,000	$4,015,587
2013	265	1030	1393	5410	929	3606	464	1803	7600	23100	-21297	$91,963	$281,300	$5,775,000	$5,964,336
2014	271	1301	1421	6830	947	4554	474	2277		23100	-20823	$116,115	$355,176	$5,775,000	$6,014,061
2015	276	1577	1449	8279	966	5520	483	2760	7600	30700	-27940	$140,750	$430,529	$7,675,000	$7,964,779
2016	282	1859	1478	9757	985	6505	493	3252	5000	35700	-32448	$165,877	$507,390	$8,925,000	$9,266,512
2017	287	2146	1508	11265	1005	7510	503	3755		35700	-31945	$191,507	$585,788	$8,925,000	$9,319,280
2018	293	2439	1538	12803	1025	8535	513	4268	10000	45700	-41432	$217,650	$665,753	$11,425,000	$11,873,103
2019	299	2737	1569	14372	1046	9581	523	4791		45700	-40909	$244,316	$747,318	$11,425,000	$11,928,003
2020	305	3042	1600	15971	1067	10648	533	5324	4300	50000	-44676	$271,514	$830,515	$12,500,000	$13,059,000
2021	311	3353	1632	17603	1088	11736	544	5868		50000	-44132	$299,257	$915,375	$12,500,000	$13,116,118
2022	317	3670	1665	19268	1110	12845	555	6423		50000	-43577	$327,555	$1,001,933	$12,500,000	$13,174,378
2023	323	3993	1698	20966	1132	13977	566	6989		50000	-43011	$356,418	$1,090,221	$12,500,000	$13,233,803
2024	330	4323	1732	22698	1155	15132	577	7566		50000	-42434	$385,859	$1,180,276	$12,500,000	$13,294,416
2025	336	4660	1766	24464	1178	16309	589	8155		50000	-41845	$415,889	$1,272,131	$12,500,000	$13,356,242
2026	343	5003	1802	26266	1201	17511	601	8755		50000	-41245	$446,519	$1,365,824	$12,500,000	$13,419,305
2027	350	5353	1838	28104	1225	18736	613	9368		50000	-40632	$477,762	$1,461,390	$12,500,000	$13,483,628
2028	357	5710	1875	29978	1250	19985	625	9993		50000	-40007	$509,630	$1,558,868	$12,500,000	$13,549,238
2029	364	6074	1912	31890	1275	21260	637	10630		50000	-39370	$542,135	$1,658,295	$12,500,000	$13,616,160
2030	371	6446	1950	33841	1300	22560	650	11280		50000	-38720	$575,290	$1,759,711	$12,500,000	$13,684,421
2031	379	6825	1989	35830	1326	23887	663	11943		50000	-38057	$609,109	$1,863,156	$12,500,000	$13,754,047
2032	386	7211	2029	37859	1353	25239	676	12620		50000	-37380	$643,603	$1,968,669	$12,500,000	$13,825,065
2033	394	7605	2070	39929	1380	26619	690	13310		50000	-36690	$678,788	$2,076,292	$12,500,000	$13,897,504
2034	402	8008	2111	42040	1407	28027	704	14013		50000	-35987	$714,676	$2,186,068	$12,500,000	$13,971,392
2035	410	8418	2153	44193	1436	29462	718	14731		50000	-35269	$751,282	$2,298,039	$12,500,000	$14,046,757
2036	418	8836	2196	46389	1464	30926	732	15463		50000	-34537	$788,620	$2,412,250	$12,500,000	$14,123,630
2037	427	9263	2240	48630	1494	32420	747	16210		50000	-33790	$826,705	$2,528,745	$12,500,000	$14,202,040
2038	435	9698	2285	50915	1523	33943	762	16972		50000	-33028	$865,552	$2,647,570	$12,500,000	$14,282,018
2039	444	10142	2331	53246	1554	35497	777	17749		50000	-32251	$905,175	$2,768,771	$12,500,000	$14,363,596
2040	453	10595	2377	55623	1585	37082	792	18541		50000	-31459	$945,591	$2,892,397	$12,500,000	$14,446,806
2041	462	11057	2425	58048	1617	38699	808	19349		50000	-30651	$986,816	$3,018,495	$12,500,000	$14,531,679
2042	471	11528	2473	60521	1649	40348	824	20174		50000	-29826	$1,028,864	$3,147,115	$12,500,000	$14,618,250
2043	481	12008	2523	63044	1682	42030	841	21015		50000	-28985	$1,071,754	$3,278,307	$12,500,000	$14,706,553
2044	490	12499	2573	65618	1716	43745	858	21873		50000	-28127	$1,115,502	$3,412,123	$12,500,000	$14,796,621
2045	500	12999	2625	68243	1750	45495	875	22748		50000	-27252	$1,160,124	$3,548,616	$12,500,000	$14,888,491
2046	510	13509	2677	70920	1785	47280	892	23640		50000	-26360	$1,205,639	$3,687,838	$12,500,000	$14,982,199
2047	520	14029	2731	73651	1821	49101	910	24550		50000	-25450	$1,252,065	$3,829,845	$12,500,000	$15,077,780

Assumptions

Growth Rate	2.0%

Rates	$/af
Ag rate	17
urban rate	78
Ind	250

Unit Demand		(AF/acre)
	Ag Use	5.25
	Res/Comm	3.5

9.5.6 "Option Market" for Fallowing during SDI

Approach: Create an "options" market that would allow new users of water to buy water use options based on their annual demands such that they could then exercise the option at a higher payment rate during SDI times to help cap overruns and provide firm water for industry. Similar to the existing fallowing program, options would be paid to growers that voluntarily participate in the program.

There could be a number of approaches. One example is described. A new project would pay an impact fee into a ***mitigation fund*** based on their anticipated annual demand. Paying a buy-in and annual option rate into the option program would be considered mitigation for the new water demand. Funds would be managed by IID in a separate mitigation account for purposes of paying for the fallowing of lands or developing new supplies. Growers would voluntarily subscribe to the program and agree to fallow land subject to payment from the mitigation account. IID would do all accounting to manage the optioned water and mitigation fund. Growers would sign up to accept the pre-negotiated option price for water. Fallowing would ensure delivery to the M&I users in years with a supply and demand imbalance or as part of the program to cap overruns and ensure reduction in use. Table 9-2 provides an example of how this might work with annual new MCI demands as indicated (Column 2). For purposes of the example, an initial buy-in cost of $250/AF before 2017 and $450/AF after 2017 was assumed, resulting in annual initial buy-in revenue (Column 4). This is to encourage people to subscribe to the program to build up the mitigation fund in the event that there are years where the option would need to be exercised early in the planning horizon.

IID would also collect an Annual Option Rate of $150 per acre foot based on the annual demand. The annual option rate would ensure the ability to exercise the option in an SDI or when the Board determines exercise of the option is necessary to reduce overruns. Again, it is assumed the rate would go up after 2017 to $200/AF. This further serves to provide annual mitigation fund revenue (Column 6) and maintain a viable mitigation fund balance (Column 7).

An amount of land that would need to be fallowed (Column 8) to meet an option call would be determined based on an assumed per acre demand (6 AF/acre). To provide incentives for grower participation in the mitigation fund and fallowing program, it is assumed that there would be an annual payout to growers that opt to subscribe (Column 9), and the IID would recoup administrative costs assumed to start at $200,000 and escalating at three percent on an annual basis (Column 10).

It is also assumed that some of the options would be exercised in years when a full SDI is not actually implemented, but has a high probability of occurring. For purposes of the example, it is assumed that 50 percent would be exercised by the Board in 10 years during the 30-year planning horizon to represent years with a high probability of an overrun. In years when the SDI is declared and implemented, it is assumed that 100 percent of the options are exercised in 12 years of the 30-year planning period. (Note: Column 12 is a logic variable used to determine when 50 percent or 100 percent payback is to be made in this theoretical analysis. Years of fallowing and option calls should be more closely tied to the hydrologic record or probability of SDI exceedence.)

Table 9-2. Model of Option Contracts

Year	Annual New Ind Project Demand (af)	Cumulative Annual Ind Project Demand (af)	Initial Buyin Revenue	Buyin Balalance	Annual Revenue	Total AnnualFund Revenue	Fallow Acres Needed (acres)	Annual Option Pay Out to Growers	IID Annual Admin Cost	Culultive Fund Balance	Option Calls	Voluntary Option Payout	Mandatory Option Payout	FundBal after Option Call
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2010		0	$0	$0	$0	$0	0	$0	$200,000	-$200,000	2	$0	$0	-$200,000
2011	12000	12000	$3,000,000	$3,000,000	$1,800,000	$4,800,000	2000	$102,000	$206,000	$4,492,000	1	$510,000	$0	$3,982,000
2012	3500	15500	$875,000	$3,875,000	$2,325,000	$6,200,000	2583	$131,750	$212,180	$5,856,070	2	$0	$1,550,000	$4,306,070
2013	7500	23000	$1,875,000	$5,750,000	$3,450,000	$9,200,000	3833	$195,500	$218,545	$8,785,955	2	$0	$2,300,000	$6,485,955
2014		23000	$0	$5,750,000	$3,450,000	$9,200,000	3833	$195,500	$225,102	$8,779,398		$0	$0	$8,779,398
2015	7500	30500	$1,875,000	$7,625,000	$4,575,000	$12,200,000	5083	$259,250	$231,855	$11,708,895	2	$0	$3,050,000	$8,658,895
2016	5000	35500	$1,250,000	$8,875,000	$5,325,000	$14,200,000	5917	$301,750	$238,810	$13,659,440	1	$1,508,750	$0	$12,150,690
2017		35500	$0	$8,875,000	$4,825,000	$13,700,000	5917	$301,750	$245,975	$13,152,275	2	$0	$3,550,000	$9,602,275
2018	10000	45500	$4,500,000	$13,375,000	$6,825,000	$20,200,000	7583	$386,750	$253,354	$19,559,896	1	$1,933,750	$0	$17,626,146
2019		45500	$0	$13,375,000	$6,825,000	$20,200,000	7583	$386,750	$260,955	$19,552,295	1	$1,933,750	$0	$17,618,545
2020	4500	50000	$2,025,000	$15,400,000	$7,725,000	$23,125,000	8333	$425,000	$268,783	$22,431,217		$0	$0	$22,431,217
2021		50000	$0	$15,400,000	$7,725,000	$23,125,000	8333	$425,000	$276,847	$22,423,153	2	$0	$5,000,000	$17,423,153
2022	4300	54300	$1,935,000	$17,335,000	$8,585,000	$25,920,000	9050	$461,550	$285,152	$25,173,298		$0	$0	$25,173,298
2023		54300	$0	$17,335,000	$8,585,000	$25,920,000	9050	$461,550	$293,707	$25,164,743	1	$2,307,750	$0	$22,856,993
2024		54300	$0	$17,335,000	$8,585,000	$25,920,000	9050	$461,550	$302,518	$25,155,932	2	$0	$5,430,000	$19,725,932
2025		54300	$0	$17,335,000	$8,585,000	$25,920,000	9050	$461,550	$311,593	$25,146,857		$0	$0	$25,146,857
2026	8000	62300	$3,600,000	$20,935,000	$10,185,000	$31,120,000	10383	$529,550	$320,941	$30,269,509	1	$2,647,750	$0	$27,621,759
2027		62300	$0	$20,935,000	$10,185,000	$31,120,000	10383	$529,550	$330,570	$30,259,880		$0	$0	$30,259,880
2028		62300	$0	$20,935,000	$10,185,000	$31,120,000	10383	$529,550	$340,487	$30,249,963	2	$0	$6,230,000	$24,019,963
2029	4500	66800	$2,025,000	$22,960,000	$11,085,000	$34,045,000	11133	$567,800	$350,701	$33,126,499	1	$2,839,000	$0	$30,287,499
2030		66800	$0	$22,960,000	$11,085,000	$34,045,000	11133	$567,800	$361,222	$33,115,978	2	$0	$6,680,000	$26,435,978
2031	8200	75000	$3,690,000	$26,650,000	$12,725,000	$39,375,000	12500	$637,500	$372,059	$38,365,441		$0	$0	$38,365,441
2032		75000	$0	$26,650,000	$12,725,000	$39,375,000	12500	$637,500	$383,221	$38,354,279	2	$0	$7,500,000	$30,854,279
2033		75000	$0	$26,650,000	$12,725,000	$39,375,000	12500	$637,500	$394,717	$38,342,783		$0	$0	$38,342,783
2034		75000	$0	$26,650,000	$12,725,000	$39,375,000	12500	$637,500	$406,559	$38,330,941	1	$3,187,500	$0	$35,143,441
2035		75000	$0	$26,650,000	$12,725,000	$39,375,000	12500	$637,500	$418,756	$38,318,744	1	$3,187,500	$0	$35,131,244
2036		75000	$0	$26,650,000	$12,725,000	$39,375,000	12500	$637,500	$431,318	$38,306,182		$0	$0	$38,306,182
2037		75000	$0	$26,650,000	$12,725,000	$39,375,000	12500	$637,500	$444,258	$38,293,242	1	$3,187,500	$0	$35,105,742
2038		75000	$0	$26,650,000	$12,725,000	$39,375,000	12500	$637,500	$457,586	$38,279,914	2	$0	$7,500,000	$30,779,914
2039		75000	$0	$26,650,000	$12,725,000	$39,375,000	12500	$637,500	$471,313	$38,266,187		$0	$0	$38,266,187
2040		75000	$0	$26,650,000	$12,725,000	$39,375,000	12500	$637,500	$485,452	$38,252,048	2	$0	$7,500,000	$30,752,048

Yield: No new yield of water in the near term, but capital projects and new water would be created in the long-term through the mitigation fund. Water for purposes of the new development would be provided based on the increased demand.

Advantages: Allows for use of water for M&I purposes in under-run years to minimize loss to other junior appropriators on the Colorado River; preserves grower choice and flexibility; sets prices in advance; provides for verifiable mitigation; creates a manageable market. Puts IID in a position for project development and creates a cash flow not subject to political initiative. The program would put the cost burden on the beneficiary consistent with the principal that those that benefit should pay the cost and would help to manage overruns and provide a positive gain to growers in years when they may need to fallow due to EDP.

Disadvantages: Could end up in initial debt if multiple SDI years occur early in the program. Increases management burden to IID; would require development of systems of accounting; could require additional staffing; necessitates voluntary grower participation that cannot be ensured. Need resolution of method for calculation of water savings to allow for apportionment to the option in SDI years. It would further institutionalize fallowing as a management practice.

Variants:

- Use the mitigation account to also fund capital project development.
- Account for fallowing on IID lands.
- Unknown level of grower participation. Would need to refine model to play with different price points to account for lost agricultural revenues.
- Other community impacts not evaluated or reflected in the example.

9.6 Economics of Land Conversion

As the IID Plan's elements take shape and the decision-making process becomes increasingly focused, IID must carefully balance a wide range of competing and complementary interests, opportunities, and constraints. Foremost among these are local concerns regarding the potential impacts of any IID Plan action that may constrain or eliminate agricultural activity within the IID service area. Agriculture remains a primary economic engine within the region and an important source of private sector employment. As such, there is tremendous local community sensitivity to any policy that may ultimately have an adverse impact on the region's agricultural economy. An economic evaluation was conducted to assess the potential regional economic impacts within Imperial County that may result from converting the use of water from agricultural to non-agricultural uses (Stratecon, 2009). Two likely scenarios for the potential non-agricultural use of water as alternatives to irrigation: 1) the development of a geothermal power plant ("Power Project") and, 2) new residential development to support the region's growing population and associated non-agricultural economy.

To assess the potential economic impacts of converting agricultural water to non-agricultural uses within IID, the gross value of crop production within the District that would be lost if

the consumptive use of water for irrigation in any year, all else equal, was reduced by 1,000 acre-feet was calculated. Once the estimates of the potential decrease in farmer crop sales (Initial Impact) within the local economy were derived, the resulting associated potential decline in regional output were calculated as the Initial Impact would be expected to work its way through the economy (referred to as secondary or multiplied output effects).

The direct and secondary effects on employee compensation, employment, and value added[86] impacts expected to result from the anticipated decline in farm output, were calculated using the input-output model software IMPLAN (for impact planning) published by the Minnesota IMPLAN Group. IMPLAN is a widely accepted tool for estimating the potential economic impacts of an event within a defined region that is expected to cause changes in the movement/spending of money (Model INPUT). The model accounts for the dollar flow relationships between different sectors of an economy and is therefore able to calculate the direct effects as well as the secondary (or multiplier) effects of each dollar change in spending in particular economic sectors, like construction or vegetable and melon farming (Model INPUT), as they work their way through an economy to other sectors (Model OUTPUT).

Once the output and other economic impacts of a reduction in the consumptive use of 1,000 acre feet of water for irrigation within IID were estimated, the economic impacts of using that same amount of water for the alternative purposes of power generation and new residential development were examined for comparative purposes. The objective was to determine the extent to which the potential adverse economic impacts due to a reduction of irrigation, such as job loss, might be offset by using that water for other non-agricultural economically productive purposes.

The Power Project would directly create new spending and jobs (and associated employee compensation) in the local economy during its construction and subsequent operation. The spending and employee compensation projections were input into the appropriate economic sectors within the model to estimate the resulting potential secondary output, employee compensation, employment and value added impacts within the Local Economy. It was conservatively assumed that the employment directly generated by the Power Project‘s development and operation would have no material impact on residential development within the County; i.e., that the jobs would be staffed by a combination of current residents of the County, commuters from nearby counties and/or new migrants to the County whose housing needs would be met by the County‘s existing housing stock.

For the residential development scenario, it was assumed that 1,000 acre-feet is enough water to meet the annual municipal demand of almost 1,100 new residences in the County and the associated commercial and industrial water demand resulting from the corresponding expansion of the Local Economy. The underlying assumption for this scenario is that the

[86] Value added refers to the incremental dollar value generated by the conversion of intermediate goods to a final product through the input of land, labor, and capital goods; i.e., factors of production). Value added is thus comprised of employee compensation, proprietor‘s income (compensation to business owners for their labor), other property income (returns to owners for land and other capital production inputs), and indirect business taxes (compensation to public entities).

construction of new residences made possible by additional municipal and industrial water supplies is a necessary condition for growth of the region's population and associated expansion of the local non-agricultural economy. It was assumed that: 1) the spending that would occur within the Local Economy to build 1,100 new residences, and 2) the subsequent economic expansion associated with growth in the region's population made possible by the new residences.

Table 9-3 presents the estimated long run potential output, employee compensation, employment (jobs) and value added impacts of converting 1,000 acre feet of water consumptively used for irrigation to municipal and industrial uses within IID. The table show that the estimated potential positive economic impacts of using the water either for power generation or new residential development (and associated non-agricultural economic growth) is greater than the estimated potential economic losses from the associated reduction in the consumptive use of water for irrigation. In the case of new residential development, the estimated positive impacts are order of magnitudes greater than the estimated adverse impacts from a reduction in irrigation. This is before consideration of the substantial short term potential economic impacts from the construction phase of the Power Project or residences.

Table 9-3. Estimated Ongoing Annual Economic Impacts Alternative Scenarios for the Consumptive Use of 1,000 acre-feet of Water (Millions of 2008 dollars)

	Output	Employment (Jobs)	Employee Compensation	Value Added
Irrigation (scenario 2)	$0.67	6	$0.12	$0.26
Power Project (low end of range)	$1.3	12	$0.8	$0.9
Power Project (upper end of range)	$5.0	47	$3.0	$3.6
Residential Development	$83.6	1,467	$31.4	$49.5

Source: Minnesota Implan Group, 2009; Cal Energy, 2009; IEC Corporation, 2009; Stratecon, Inc., 2009

9.7 Policy Guidelines and Direction

As with most evaluations of water policy alternatives, different persons applauded or disparaged different elements of the example policies. After reviewing and discussing the smorgasbord of policy alternatives, the Board, with support of senior staff, developed broad policy concepts. These policy concepts were then presented to the Water Planning Group composed of two members of the IID Board and two members of the Board of Supervisors. The major policy direction provided is listed below.

1. Annual apportionment to all water users: IID board should make a yearly determination of forecasted water use – among all categories of users – and apportion in a manner that is consistent with existing equitable distribution program guidelines.

2. Joint land-use conversion policy: Imperial County, as the land-use planning entity, and IID, as the purveyor of water to the region, would agree to the establishment of designated corridors that would facilitate the conversion of agricultural lands to the development of renewable energy production.

3. Joint groundwater study: Imperial County and the District would conduct a joint feasibility study to ascertain the availability and accessibility of groundwater resources throughout the region.

4. Fallowing for in-valley water utilization: IID will consider rotational fallowing of District-owned Western Farm Lands and/or private lands to generate water for MCI purposes.

5. Water storage and banking projects: IID will pursue storage projects it has already identified within its service area and banking opportunities outside the region. While projects to augment the existing water supply are generally more expensive to build and implement than the policy options listed above, the District recognizes that storage is vital to the long-term management of its water supply and provides the most durable and defensible means of addressing fluctuations in usage from year to year.

6. Commitment to regional planning model: In concert with Imperial County, IID will develop a regional water plan that actively solicits and relies on stakeholder advice and consent in balancing the needs of diverse interests. It will be guided in this process by the twin goals of multiple use and sustained yield.

The information provided below is intended to support the discussion with stakeholders and lead to the development of specific actions to develop and implement IID policies.

9.8 Concepts Eliminated from Consideration

Discussion with the Board also resulted in clear determinations as to what was not to be considered as part of any integrated strategy.

9.8.1 Free Market Exchange for Water

The EDP report found that while virtually all respondents saw merit in creating an intra-district water bank as part of an apportionment method, respondents differed on the operational aspects, and many disagreed with an unregulated free market exchange of water between sellers and buyers if price is allowed to be set by competition based on supply and demand. In discussions with the Board and staff, it was determined that establishment of a relatively unregulated free market for exchange of water, where the price would be set by parties to an exchange within IID, without IID involvement, was still politically unacceptable and was eliminated from further consideration.

9.8.2 Fallowing for Transfer Out of the IID Area

The Board also wanted to strongly confirm its commitment to prohibition of fallowing for purposes of out of Valley Transfer as expressed in Policy 25-2005, which prohibits fallowing beyond that currently required to meet existing commitments.

9.9 Key Concepts for Crafting Policy and Developing the Program

The Board and staff identified key concepts to be further refined and used to craft final policies. A final policy and program will be based on additional public input and the involvement of the land use agencies, agriculture and other stakeholders.

Annual Apportionment. Water would be annually apportioned using the methods identified in the existing EDP. The apportionment program would remain an important element for managing overruns during supply/demand imbalance. The purpose would also be to facilitate a grower exchange (ag-to-ag); and to create an MCI *water exchange* and program to account for *land use conversions*.

District Agricultural Water Exchange. An IID managed mechanism and accounting procedure for exchanges between growers under the Annual Apportionments using the same mechanisms as in the current ordinance defining the District Water Exchange (EDP Regs. Sections 4.0).

MCI Water Portfolio. A water portfolio established and apportioned by the Board which identifies —wet" water available for new MCI demands. The portfolio would be tracked and accounting procedures established by the IID. Water to fill the portfolio would come from: 1) development of capital projects funded by the new MCI demands that produce _new' water (e.g.; desalting of groundwater or drain water; groundwater banking recycled water; groundwater blending; conservation above the QSA, Definite Plan and Systems Conservation Plan, or other measures as defined by the IID Board), 2) an _In-Valley' fallowing program (temporary), or 3) land use conversions (permanent, long term) under a process for IID to explicitly manage changes in place and type of use of the Colorado River entitlement.

MCI Water Exchange. The process managed by IID to account for water to be placed into, or apportioned from the MCI Water Portfolio as a result of land use conversion or fallowing (rotational/short term, long term). An accounting mechanism and payment schedule will be developed.

'In-Valley' Fallowing. *This represents a temporary change in the place and type of use of water from fallowing of land.* Rotational fallowing of private lands or IID Western Farm Lands to provide wet water to the MCI Water Exchange and ensure water is available to meet new demands. There could be different approaches to _In-Valley' fallowing, but basically, the new MCI water users would have to pay an amount necessary to fallow lands on an annual basis to ensure that demands were reduced from agriculture to cover the change in demand represented by the MCI demand. Fallowing could be rotational with the period for rotation established by policy similar to the existing EDP approach. Alternately, with an option program, an MCI water user would pay into an account, but the land would only be fallowed when an overrun situation is pending. Otherwise the new use would be using

_under-run' water when it is available and supporting full use of the IID Colorado River Entitlement.

Land Use Conversion. *Permanent change in the place and type of use of water related to rezoning, sphere amendments, or other land use decisions by the City and County.* This is the process for consideration and accounting for long term-changes in the type or place of water uses that are related to changes in land use. The goal is no net increase in demand that is not mitigated. Changes in place or type of use could be subject to review and approval under an IID permit system. Pre- and post-project water budgets and WSAs would be prepared as part of the application process, and net changes to the water use for a specific property and project would be determined. Prior use would be based on agricultural apportionment set by policy based on a straight-line value (e.g., 5.25 AF/acre). Future uses would be based on duty factors for different land uses or project types established by IID.

Any water savings resulting from a land use change would be credited to the MCI Water Portfolio for apportionment by IID. Any increases in use would need to be apportioned from the MCI Water Portfolio. If a property did not have a history of water use (no agriculture use; no history of paying standby and availability fees), this would be considered a new water use and would need to be fully apportioned from the MCI Water Portfolio.

Changes to specific zoning may imply changes to water use, for example, if a parcel is rezoned from agriculture to a renewal energy/power production category, and water use would be reduced (e.g., solar farm), the water previously used for agricultural purposes would be assigned to the MCI water portfolio such that it could be reapportioned to the new land use either on the rezoned property or elsewhere.

Permit Process. Currently, IID has been contracting with new MCI water users. Water from the MCI Water Portfolio would be apportioned by IID through a permit system to be defined by IID policy and regulation. The permit would serve as a notice of intent to provide water and allow a project proponent to move through the land use process with certainty of a supply, provide documentation of the supply to the IID Cities or Imperial County; and expedite development of a WSA, thus allowing the land use agencies to make appropriate findings consistent with state law.

A permit process is recommended over individual contracts since it could be more consistent and transparent. A water exchange or apportionment permit process would be tied to land use decision making, and would preserve IID and the City/County authorities, while furnishing IID with a mechanism to ensure that impacts to water supplies are fully mitigated. Further, it would help IID assure that all of the water used under its entitlement is being put to reasonable and beneficial use and that all new water users are being held to the same standard as the District's agricultural customers.

MCI Water Mitigation Fund. A fund managed by IID for purposes of collecting impact fees and revenues, paying the cost of exchanging water, reducing third party impacts, and financing capital facilities to develop new water supplies. An IID permit and payments to the mitigation fund would allow Cities and Imperial County to approve land uses that intensify water use and to comply with state law.

Tiered Pricing. Tiered pricing, also known as conservation pricing or inverse block rate pricing, increases rates with increasing volumes of water use. This provides incentives to conserve and disincentives to waste and is a tool used throughout the state. Pricing for water allocated from the MCI Exchange could be based on a tiered rate structure. Tiered pricing could also be applied to residential, commercial, and other MCI uses.

9.10 Findings and Conclusions

9.10.1 IID Responsibilities

State law requires that IID, the Cities and Imperial County cooperate and work together to better integrate land use and water supply plans and planning processes and to use both water management and land use planning authorities to provide water for new MCI demands while minimizing impacts to current agricultural users.

IID is a responsible agency with jurisdiction by law and has the necessary powers and authorities to review and approve changes in the place or type of water use of IID's Colorado River entitlements that would occur as a result of any land use decisions by Imperial County or the incorporated cities.

IID is in a position to manage its water rights to ensure reasonable and beneficial use of water by all types of users and to review and approve any change in place or type of water use that is temporary (_In-Valley' Fallowing) or permanent changes (Land Use Change).

IID could fulfill its responsibilities and assert its authorities through a permitting process to review and approve temporary (_In-Valley' Fallowing) or permanent changes (Land Use Change) in place or type of water. Such a process could parallel the County process and ensure that IID water rights are reasonably and beneficially used and impacts are mitigated. An IID permit system would ensure equity and fairness, increase consistency in decision making, be less subject to ad hoc and arbitrary decisions, compliment the Cities and Imperial County land use authorities, provide a basis for the Cities and the County to make legally defensible findings, and create certainty for project proponents.

9.10.2 Impacts and Mitigations

Land use changes that result in intensification of water use could have a negative effect on agricultural water supplies unless mitigated since MCI demands are granted a higher reliability by IID and are less subject to cut back in response to overruns or shortages on the Colorado River as a result of drought or climate change. Overruns and supply/demand imbalances require agriculture to implement extraordinary conservation measures including fallowing. Increased MCI use could increase the frequency or amount of land to be fallowed.

IID needs to work with the Lead Agency during project reviews to ensure that direct, indirect, and cumulative impacts of individual projects on agriculture; agricultural water supplies; reduction of return flows to IID drains, the Alamo or the New Rivers; or impacts to IID facilities are adequately evaluated. If needed, appropriate levels of mitigation are to be formulated and implementation of such mitigation measures is to be made a condition of the Lead Agency's approval and permit for the project.

9.10.3 Geothermal Water Use

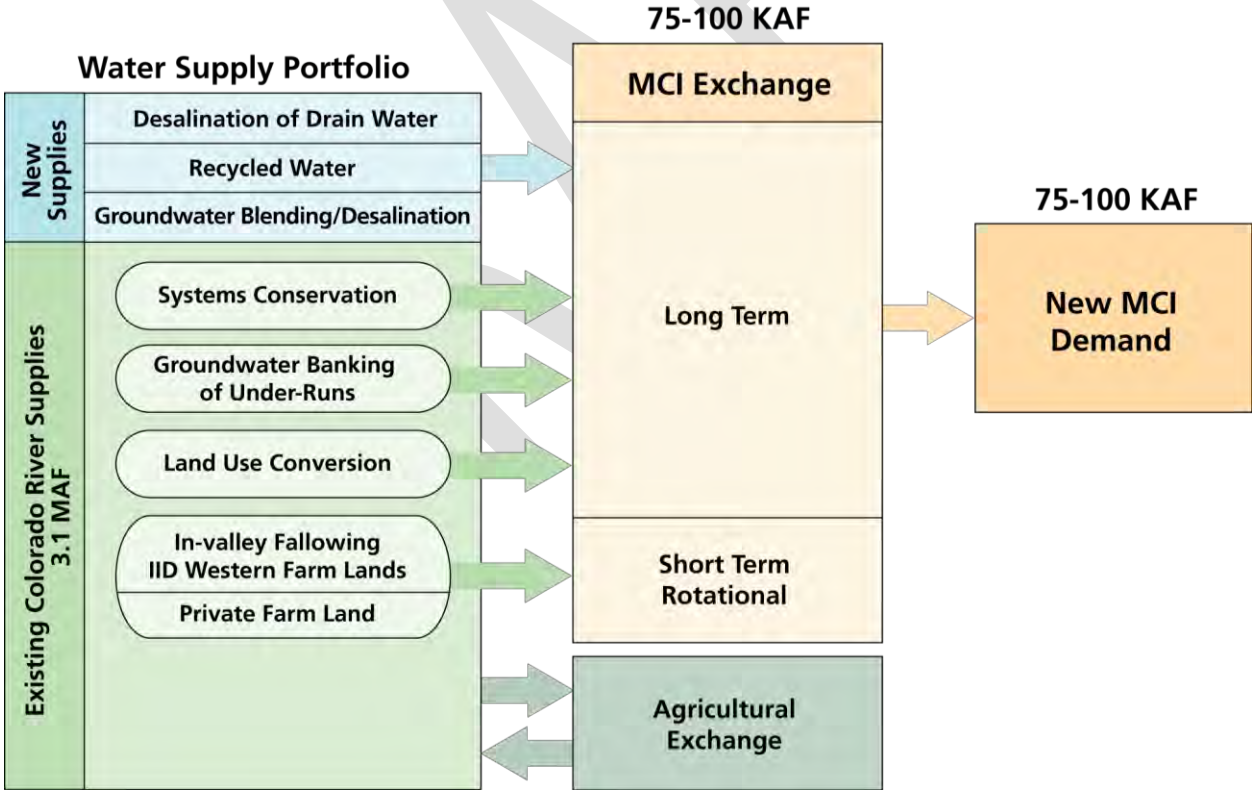
County and State policies encourage the efficient utilization of water for power production and encourage the use of sources other than inland surface water by these industries.

IID raw water should be the source of last resort for use in geothermal plant cooling unless impacts are mitigated through use of water conserving technologies (hybrid cooling); development or acquisition of new water supplies by the project proponent; and/or by participation in an IID program to capitalize and build new supply projects or an _In-Valley' fallowing effort.

9.10.4 Alternative Solutions

The Board and staff identified key concepts to be used to further craft a final policy alternative. Developing a final alternative requires the involvement of the land use agencies, agriculture and other stakeholders if it to be successful. The concepts for an MCI Exchange and IID Water Supply Portfolio are shown conceptually in Figure 9-1.

Figure 9-1. MCI Exchange/IID Water Supply Portfolio



Revenue/fiscal models and pricing structures require further development, but an options model provides a viable mitigation and financing model to introduce an _In-Valley' Fallowing program as a bridge to capitalizing projects that would create new sources of supply.

The EDP and current fallowing program provide a basis from which to build new programs and policies which ensure impacts are appropriately mitigated and water is reasonably and beneficially used. The EDP and fallowing program have resulted in approaches to track annual supplies and demands, trigger and respond to an SDI declaration, and manage overruns.

To ensure fairness and equity in any agricultural or MCI water exchanges, IID should be responsible for managing and tracking the process.

Land use conversions from agricultural to residential, commercial and light industrial uses (non-water intensive) do not provide enough water savings to meet proposed and currently planned new MCI demands.

The conversion of 1,000 acre-feet of water use from agricultural use to residential or power production use would have a positive economic effect.

9.11 Recommendations

P1) Conduct outreach efforts, workshops and hearings to engage the community in the process of developing and establishing policies and designing the final programs for an MCI exchange.

P2) **Develop policies and firmly define IID's role** in reviewing and approving of new MCI water uses changes in place and type of use. This includes:

- Working with the land use agencies to **streamline the development review** process so that there is transparency and certainty in the process for obtaining water for new MCI water demands.
- **Updating the IID Developer Guidelines to define standards for information** submittal requirements, water budgets, WSAs and Water Supply Verifications;
- **Developing a permit system** to review and approve changes in the place and type of use; land use conversions; and apportionment of water to new MCI water users.
- **Defining and communicating** the potentially significant effects and impacts that could result from new MCI water uses so that there is awareness of the need to avoid, minimize or mitigate these impacts, and so that project proponents, the Cities and Imperial County can work with IID to define and implement appropriate solutions.

P3) **Hire and retain staff** for reviewing and supporting the proposed permitting process for evaluation of changes in place and type of use; applying Board policies; reviewing Water Supply Assessments; making findings related to the impact on IID supplies; and ensuring that any identified third party effects or impacts are fully mitigated.

P4) **Develop a comprehensive Geothermal Power Plant Water Use Policy.** Require that proposed power plants, regardless of their generating capacity and as part of the effort to mitigate for intensifications of water use, first seek to develop brackish water from natural sources, irrigation return flows, inland wastewaters of low total dissolved solids

(recycled water) or other sources (e.g., imports) for purposes of wet cooling, or that hybrid cooling be required if IID inland surface water from the Colorado River is to be relied upon.

P5) **Develop a system for annual apportionment** of water that includes tracking of and accounting for re- apportionment of water related to permanent changes in place and type of use from Land Use Conversions or temporary changes to place and type of use associated with an _In-Valley‘ Fallowing program.

P6) Develop an **‘In-Valley’ Fallowing program** as a ~~–b~~ridge” to provide quantifiable water for an MCI Water Portfolio and for generating capital to build projects that provide new supplies for the Imperial region and mitigate for impacts to agriculture from new MCI uses and intensification of water use.

P7) **MCI Water Pool Option Program** is recommended to allow for new industry to use water in under-run years, while paying into a mitigation fund to either a) build capital projects, or b) compensate private interests and/or IID for using water that results in fallowing land in overrun years and provides industry with a reliable water supply and with Cities and Imperial County the means of approving development and mitigating impacts. .

P8) **Develop a mitigation fund** whose purpose is to capitalize physical facilities, match state or federal grant or loan funds, or fund approaches that allow IID, Cities and Imperial County to provide tangible mitigations and make appropriate findings pursuant to CEQA and the California Water Code.

P9) **Implement tiered pricing** to provide incentives to conserve water.

10 Funding Alternatives

As part of IID's Plan research has been conducted on alternative funding opportunities specific to the implementation of conceptual projects.

Grants and/or loans are available in various categories including: water conservation, water recycling, groundwater management, desalination, water quality, and feasibility studies to enhance local water supply reliability and quality. Key federal, state, and local agencies have long-term objectives to provide technical assistance that will enable the implementation of better management practices and address development of local water resources. State and federal funding sources may be used to help preserve and diversify IID's Water Supply Portfolio. Furthermore, projects that can demonstrate, identify, improve, and promote practices that will lend themselves to local water quality improvements are also pivotal in this era of diminishing resources and have been identified by key state and federal agencies as priority projects. State bond funds are also intended to reduce reliance, or make maximum use of imported water supplies like IID's use of Colorado River water. Outside sources of funding may help IID realize the IID Plan objectives and reduce the costs to local rate payers or to project proponents that require a new water supply.

This chapter will provide a summary of grant and/or loan opportunities that are directly applicable to the projects developed through the IID Plan and potentially through the proposed Imperial Region Integrated Water Resources Water Management Plan (IWRMP). The overall objective of these funding opportunities is to implement water management strategies and encourage more water-efficient practices in the commercial, industrial, municipal, and agricultural sectors.

A brief description is provided below for each of the Propositions referenced in this report:

Proposition 50 (2002)	Water Security, Clean Drinking Water, Coastal and Beach Protection Act
Proposition 84 (2006)	The Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Bond Act
Proposition 204 (1996)	Safe, Clean, Reliable Water Supply Act
Proposition 1E (2006)	Disaster Preparedness and Flood Protection Bond Act
ARRA (2009)	American Recovery and Reinvestment Act 2009

Also included is a grant funding matrix for IID's use in the further evaluation of these funding sources. This matrix can be used to facilitate comparisons and help identify key issues, comments, application deadlines, etc.

10.1 IRWMPs

The Integrated Regional Water Management Grant Program's intent is to promote and practice integrated regional water management to ensure sustainable water uses, reliable water supplies, better water quality, environmental stewardship, efficient urban development, protection of agriculture, and a strong economy.

Funding for the Imperial IRWMP is derived from two propositions:

- Proposition 50, the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002, passed by California voters in November 2002. Implementation of the Proposition 50 Chapter 8, bond funding is jointly administered by DWR and the SWRCB.
- Proposition 84, the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Costal Protection Act, passed by California voters in November 2006. Administered by DWR, Proposition 84 includes funding for the IRWM Grant Program.

The Integrated Regional Water Management planning process is a local and regional water management approach preferred by DWR and SWRCB. It is aimed at securing long-term water supply reliability within California by first recognizing the inter-connectivity of water supplies and the environment and then pursuing projects yielding multiple benefits for water supplies, water quality, and natural resources. The completed Imperial IRWMP will provide a mechanism for coordinating, refining, and integrating existing planning efforts within a comprehensive, regional context; identifying specific regional and watershed-based priorities for implementation projects; and providing funding support for the plans, programs, projects, and priorities of existing agencies and stakeholders. Preference to a regional approach is strongly prioritized for the receipt of grant funding identified below.

Proposition 84. Funding is still available through DWR through Proposition 84, the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Costal Protection Act, passed by California voters in November 2006. Administered by DWR, Proposition 84 includes funding for the IRWMP grant program and provides approximately $1 billion in additional funding for IRWMP and projects, of which $36 million has been allocated to the Colorado River Funding.

As part of Proposition 84, a RAP has been developed and is used to evaluate and accept an IRWMP Region. DWR is the overseer of applications submitted in the RAP process. Currently, the Salton Sea is recognized as an IRWMP Planning Region. DWR is developing the solicitations for future funding expected to be derived from Proposition 84.

10.1.1 Grants: State, Federal, NGOs

10.1.1.1 Planning Grants

The Planning Grants are intended to foster development or completion of IRWMPs or components thereof, to enhance regional planning efforts, and to assist more applicants to become eligible for Implementation Grant funding. The first RAP spans 2008/2009. Final decisions are anticipated in fall 2009. Potential uses for these funds include development of a

Regional IRWMP for IID County and Cities. As well as potential application towards the development of Environmental Impact Reports associated with projects that result from the IRP/IRWMP process.

10.1.1.2 Implementation Grants

Proposition 50, Chapter 8, provided approximately $380 million for two types of competitive grants for the IRWM Grant Program, planning and implementation. Implementation grants funded projects that met one or more of the program objectives of protecting communities from drought, protecting and improving water quality, and improving local water security by reducing dependence on imported water. All grant funds from Proposition 50 have been allocated; however, it is anticipated that DWR will allocate funds from Proposition 84 to help fund future implementation grants. Schedule and solicitation guidelines are currently under development.

10.1.2 Loans: State, Federal

Current legislation has approved a proposed 2010 Budget of $3.9 billion for the EPA Water Revolving Loan Program. The language in the budget outline states that the Administration will support –program reforms" that will put the clean water and drinking water State Revolving Fund (SRF) on a –firmer foundation" and will work with State and local partners to develop a sustainability policy including management and pricing for future infrastructure funded through SRFs to encourage conservation and to provide adequate long-term funding for future capital needs. Portions of these funds may be applied to regional IRWMP programs that focus on urban water conservation programs that would benefit the entire IID service area.

Federal Water Bank Fund

In addition to the increases for the EPA water revolving funds, the budget outline proposes $5 billion per year for a new Infrastructure Bank designed to deliver funding to priority projects with significant national or regional economic benefit. The Federal Water Infrastructure Bank would be authorized to borrow money from the federal Treasury at very low rates. In turn, the bank would make low-interest loans for larger projects that typically are too big to access the SRF. Proposals for an infrastructure bank and a water trust fund are under congressional discussion and under the formative stage. If IID were to embark in a regional IRWMP funds from the bank could be obtained for projects providing a regional benefit (i.e., Keystone Regional Water Recycling Plant).

Water Trust Fund

Representatives have recently introduced the Water Protection and Reinvestment Act of 2009 (HR 3202). This legislation would create a water trust fund that would generate $12 billion annually from fiscal year 2010 through fiscal year 2014, for total funding of nearly $60 billion to local communities to address drinking water and wastewater infrastructure needs. The fund would be paid for with several small taxes on industries that produce and consume water-based goods, as well as items that are flushed into sewer systems.

Proposals for an infrastructure bank and a water trust fund are under congressional discussion and in the formative stage. IID could benefit from the development of regional projects that would serve to address regional drinking water and infrastructure needs. It is anticipated that

each $1 billion spent on water infrastructure could create approximately 35,000 jobs. This is particularly important for IID whose plan identifies economic growth and stimulus as a priority in the Region.

Reliable Water Supply Bond Act of 2008

This bond (Senate Bill 59), if approved by voters, would authorize the issuance of bonds in the amount of $3.95 billion. Of this amount, $500 million would be available for the planning, design, and construction of locally managed conjunctive use and groundwater storage projects, which are consistent with an adopted IRWMP. Additionally, a total of $200 million would be available for agricultural and urban water use efficiency projects, which are consistent with an adopted IRWMP. If approved by voters, it is anticipated that this funding source would become available in late 2008/early 2009. Schedules are still pending.

Recycled Water/ Desalination Funding Programs

Financial assistance programs play a critical role in the development of local resources including recycled and brackish groundwater supplies. There are a number of state and federal financial assistance programs available to IID which are further described in this chapter and include: the SWRCB's grant and low-interest loan programs; the U.S. Bureau of Reclamation's Title XVI Grant Program; federal Propositions, and other local partnership and funding opportunities. Together, these programs could provide funding assistance for any proposed IID desalination or recycled water projects, from initial planning and design to construction and operation. Several of the funding opportunities mentioned in the section below have elements of the program that apply to both recycled water and desalination projects.

Reclamation Wastewater and Groundwater Study and Facilities Act - Title XVI

The USBR Title XVI Program is a significant source of funding for area water recycling projects. Title XVI of Public Law 102-575, the Reclamation Wastewater and Groundwater Study and Facilities Act, authorizes the federal government to fund up to 25 percent of the capital cost of recycling projects, which can include an interconnected system of recycling projects serving the IID's service area.

Also known as Title XVI, the act directs the Secretary of the Interior to undertake a program to investigate and identify opportunities for water reclamation and reuse of municipal, industrial, domestic, and agricultural wastewater, and naturally impaired ground and surface waters, and for design and construction of demonstration and permanent facilities to reclaim and reuse wastewater. It also authorized the Secretary to conduct research, including desalting, for the reclamation of wastewater and naturally impaired ground and surface waters.

State Revolving Fund (SRF) / Water Recycling Loan Program (WRLP) / Water Recycling Grants (WRG)

The SRF, WRLP, and WRG provide agencies with low-interest construction loans for water recycling and groundwater development projects. These loans carry an interest rate equal to half of the State's general obligation bond interest rate. This below market interest rate can result in substantial savings on debt service. WRGs, subject to availability, provide up to 25 percent of eligible construction costs with a maximum $5 million cap per agency. Planning grants of up to $75,000 maximum are also provided for eligible facilities planning/feasibility study costs. Each Program is further described in detail below.

Clean Water State Revolving Fund

The Federal Water Pollution Control Act (Clean Water Act or CWA), as amended in 1987, provides for establishment of a Clean Water State Revolving Fund (CWSRF) program. The program is funded by federal grants, state funds, and revenue bonds. The purpose of the CWSRF program is to implement the CWA and various State laws by providing financial assistance for the construction of facilities or implementation of measures necessary to address water quality problems and to prevent pollution of the waters of the State.

The CWSRF Loan Program provides low-interest loan funding for construction of publicly-owned wastewater treatment facilities, water recycling facilities, as well as, expanded use projects such as implementation of non-point source (NPS) projects or programs, development and implementation of Estuary Comprehensive Conservation and Management Plans, and storm water treatment.

Eligible applicants are local public agencies, non-profit organizations, and private parties. Eligible project types include publicly-owned wastewater treatment facilities, local sewers, sewer interceptors, and water reclamation facilities, as well as, nonpoint source pollution control projects. There is approximately $200 to $300 million available annually within California, with a continuous application process. The SWRCB is currently accepting applications. To date, the only entity that has been issued SRF (ARRA) funds is the City of Brawley who has been allocated $24 million dollars to fund Waste Water Treatment Plant Upgrades.

Water Recycling Funding Program (WRFP)

The SWRCB provides funding for the planning, design, and construction of water recycling projects. Water recycling planning grant funding is available to assist public agencies with their feasibility study and planning efforts. Construction projects may be funded with a combination of grants and loans. Privately owned water utilities that are regulated by the Public Utilities Commission are also eligible to apply for construction grants.

Program Funding Sources that support the Water Recycling Program are listed below:

1. The Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002.

2. Proposition 50 (2002): Chapter 7, Section 79550(g) authorizes grants for water recycling projects that meet the goals and objectives of the California Bay-Delta Program (CALFED) and are consistent with the CALFED Record of Decision.

3. SRF Loan Program: The SRF loan program provides low-interest loans to public agencies for planning, design, and construction of projects that recycle water to replace the use of the State and/or local water supply.

4. The Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection

5. Proposition 13 (2000): The funds for construction grants and loans from Proposition 13 have essentially been exhausted. However, a small amount of money comes into the program each year from loan repayments. This provides the source of funds for the planning grant program. As the size of the planning grants is small ($75,000 maximum), the repayment funds are sufficient to maintain this program.

Water Recycling Facilities Planning Grant Program (FPGP)

The Water Recycling FPGP, a subprogram under the WRFP, provides grants to public agencies for facilities planning studies. The purpose of the FPGP is to assist agencies in the preparation of facilities planning studies for water recycling using treated municipal wastewater and/or treated groundwater from sources contaminated. In addition to encouraging new recycling planning studies, these funds are intended to supplement local funds and enhance the quality of local planning efforts.

FPGP Grants are provided for facilities planning studies to determine the feasibility of using recycled water to offset the use of fresh/potable water from state and/or local supplies. Pollution control studies, in which water recycling is an alternative, are not eligible. The grant will cover 50 percent of eligible costs up to $75,000.

Construction Funding Program

Funding for the construction of water recycling facilities is primarily provided from Proposition 50 and the SRF loan program. Table 10-1 below summarizes the various project categories under the Construction Funding Program.

Table 10-1. Description of Project Categories

Category Type	Description
Category I – State Water Supply and the Delta	• Provide for treatment and delivery of municipal wastewater or groundwater contamination, for uses (including groundwater recharge) that will offset State water supplies; and • Provide benefits to the Delta by: • increasing the average water flow into the Delta, or • reducing water pumping from the Delta.
Category II – State Water Supply	Provide for treatment and delivery of municipal wastewater or groundwater contamination remediation, for uses (including groundwater recharge that replace the use of the State water supply with recycled water, but do not provide benefits to the Delta.
Category III – Local Supply Water	Provide for treatment and delivery of municipal wastewater to users that replace the use of local water supply with recycled water.
Category IV – Local Groundwater Reclamation	Provide treatment and reuse of groundwater contaminated due to human activity; and provide local water supply benefits
Projects within the following two categories, Category V and VI, may only be considered for funding by the SRF Loan Program for the objective of pollution control, if applicable.	
Category V – Pollution Control	Provide for the treatment and disposal of municipal wastewater to meet waste discharge requirements imposed for water pollution control.
Category VI – Miscellaneous	Are projects that do not have identifiable benefits to the State or local water supply.

Agricultural Drainage Program

The Agricultural Drainage Loan Program was created by the Water Conservation and Water Quality Bond Act of 1986 to address treatment, storage, conveyance, or disposal of agricultural drainage water that threatens waters of the State. There is a funding cap of $20 million for implementation projects and $100,000 for feasibility studies. Loan repayments are for a period of up to 20 years.

Eligible applicants include any city, county, district, joint powers authority, or other political subdivision of the State involved with water management. Projects must address treatment, storage, conveyance, or disposal of agricultural drainage that threaten waters of the State (i.e., the Alamo River and the New River). The SWRCB is currently accepting applications and has a total funding pool of $11.3 million.

Agricultural Drainage Management Loan Program

The Agricultural Drainage Management Loan Program, created by Proposition 204 and distributed through the Agricultural Drainage Management Subaccount, provides loan and grant funding for Drainage Water Management Units. Drainage Water Management Units are land and facilities for the treatment, storage, conveyance, reduction, or disposal of agricultural drainage water that, if discharged untreated, would pollute or threaten to pollute the waters of the State. This program is available to any city, county, district, joint power authority, or other political subdivision of the State involved with water management. Projects must address treatment, storage, conveyance or disposal of agricultural drainage that threaten waters of the State (i.e., the

Alamo River and the New River). The SWRCB is currently accepting applications and has a total funding pool of $6.67 million.

Small Community Wastewater Grant

The Small Community Wastewater Grant (SCWG) Program, most recently funded by Propositions 40 and 50, provides grant assistance for the planning, design, and construction of publicly-owned wastewater treatment and collection facilities. Grants are available for small communities (i.e., with a population of 20,000 persons or less) with financial hardship (i.e., annual median household income [MHI] is 80 percent of the Statewide MHI, or less).

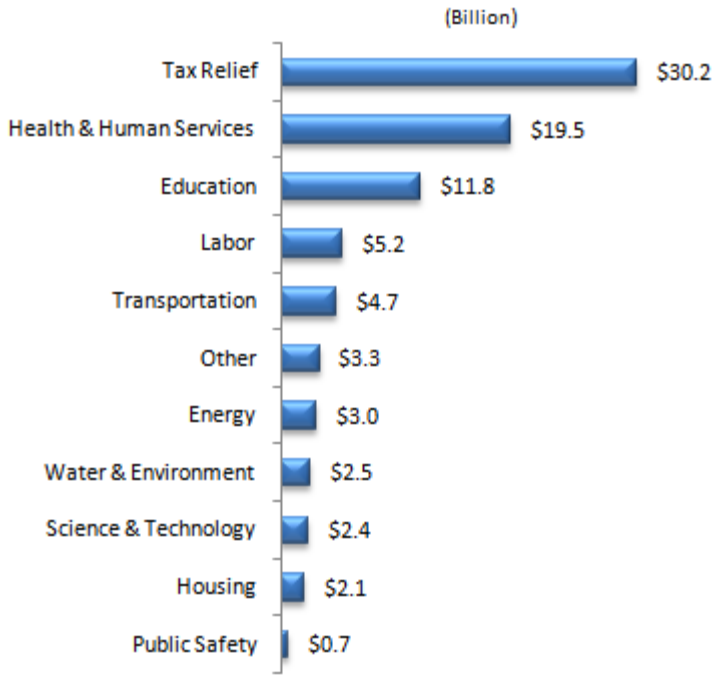
American Recovery and Reinvestment Act (ARRA)

In the face of an economic crisis, the Federal government has provided resources through the American Recovery and Reinvestment Act providing stimulus funding for economic growth and infrastructure improvements represents a strategic and significant opportunity for IID.

HR 1, the American Recovery and Reinvestment Act provides for significant emergency funding for public works infrastructure as part of a $787 billion package of spending and tax cuts. The package includes over $7 billion for drinking water and wastewater projects. The EPA clean water and drinking water SRF programs will receive $6 billion, including $4 billion for the clean water SRF and $2 billion for the drinking water SRF.

Through the American Recovery and Reinvestment Act, California will receive $2.5 billion (Figure 10-1) to complete some of the water and environmental projects whose funding sources have been suspended.

Figure 10-1. ARRA $ 85 Billion for California[87]



Water for America Initiative

USBR is responsible for administering and managing the Water for America Initiative Program. However, there are opportunities that the United States Geological Survey (USGS) brought in as a managing partner depending on whether or not the focus of the project is agriculturally related. For all of the subprograms that fall under the Water for America Parent program, each January a new solicitation is put together and released. The next opportunity for programs mentioned below is January 2010.

Advanced Water Treatment Grants

The Advanced Water Treatment Grants will provide funding for pilot or demonstration projects that will test the viability of advanced water treatment technologies. These grants will help create new water supplies to address water supply imbalances. Advanced water treatment technologies generally include methods that remove salt, other difficult to remove dissolved and suspended matter, including viruses and bacteria that are not removed by conventional treatment (i.e., simple screening, coagulation/ flocculation, chlorination, chloramination, or ozonation).

Preferred projects include projects that demonstrate reverse osmosis membranes, pre-treatment processes, concentrate disposal, or other advanced water treatment processes. The purpose of these projects is to demonstrate the technical and economic viability of using an impaired water source within a specific locale. These grants will not be available for the construction of a full scale plant.

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[87] American Recovery and Reinvestment Act 2009 , California

Water Marketing and Efficiency Grants

Through the Challenge Grant Program - Water Marketing and Efficiency Grants, Reclamation provides 50/50 cost share funding to irrigation and water districts and states for projects focused on water conservation, efficiency, and water marketing. Projects are selected through a competitive process, based on their ability to meet the goals identified in Water for America Implementation Plan. The focus is on projects that can be completed within 24 months that will help sustainable water supplies in the western United States. The Water for America Initiative is a multi-agency, U.S. Department of the Interior initiative that will help communities meet increasing demands on limited water supplies through collaborative projects, water conservation technologies, and expanded information sharing.

The Water for America Implementation Plan sets for three overall initiatives/strategies.

Reclamation will focus its efforts on two of the three strategies: (1) Plan for Our Nation's Water Future, (2) Expand, Protect, and Conserve Our Nation's Water Resources, and (3) Enhance our Nation's Water Knowledge; will be undertaken by the USGS.

The strategy to Plan for Our Nation's Water Future includes Reclamation's long-standing Investigations Program and a new Basin Studies Program that will focus on comprehensive water supply and demand studies to assess the impact of increased water demands.

The second strategy, Expand, Protect, and Conserve our Nation's Water Resources, will include two existing programs, the Challenge Grant Program (formerly part of Water 2025) and the Water Conservation Field Services Program. Through another component of this strategy, Reclamation will accelerate Endangered Species Act compliance activities to maintain and improve existing populations of listed or proposed species and critical habitat affected by Reclamation's projects and programs.

This Program's overall initiative parallels that of IID plan that aims to improve and enhance local and regional water resources.

System Optimization Review Grants

System Optimization Reviews are the newest program to Water for America. A System Optimization Review is a broad look at system-wide efficiency focused on improving efficiency and operations of a water delivery system, water district, or water basin. The Review results in a plan of action that focuses on improving efficiency and operations on a regional and basin perspective. Those recommended improvements may then be eligible for the Water Marketing and Efficiency Grant funding. Applicants must include an irrigation and/or water district, tribal water authority, state governmental entity with water management authority, or entities created under state water law with water delivery authority within the 17 western states.

Recycled/Desalination Local Funding and Partnership Opportunities

Sources of local funding to local agencies will include individuals or entities (both public and private) that benefit from Lower Colorado River water, including those within the IID's service area and those operating outside Imperial Valley who would be interested in increasing their volume and reliability of Colorado River water.

In examining successful partnership histories and those that received funding, three types of partnering/funding relationships can be identified:

1. Partners provide financial support for projects that provide new yields from desalination or water recycling in exchange for equal yields from the Colorado River.

2. Partners provide financial support to compensate existing facilities in exchange for water from the Colorado River.

3. Potential revenue from increased water rates is used to build new desalination or water recycling facilities.

Clean Renewable Water Supply Bonds

Clean Renewable Water Supply Bonds introduced by U.S. Representatives Xavier Becerra (D-CA) and Jon Porter (R-NV) introduce legislation in the House of Representatives to authorize the use of tax credit bonds in the financing of desalination, water recycling, and groundwater clean-up projects. Water Supply Bonds can be issued by public agencies. The issuing process would parallel the process currently used to issue traditional tax exempt municipal bonds. The Clean Renewable Water Supply Bonds would have a 20 year bullet maturity, meaning that no principal repayment would be required until the 20th year. At that time, the debt could be refinanced with traditional tax exempt municipal debt.

MWD endorses legislation to authorize tax credit bonds to help finance the growing need for new water supply infrastructure. As a member of the New Water Supply Coalition, a national organization comprised of water agencies encouraging the development of new desalination, groundwater treatment, and recycling facilities, MWD is joined by many other member agencies seeking federal financial assistance for new water supply projects.

Metropolitan Water District of Southern California

Desalination Research and Innovation Partnership (DRIP)

DRIP, managed by MWD, passed the eight-year mark of a nine-year program aimed at developing and demonstrating next-generation desalination and disinfection technologies that are designed to economically treat large volumes of brackish water for potable and non-potable uses. This partnership includes applied research conducted by California utilities, universities, and private industry to evaluate innovative technologies for treating surface water, municipal wastewater, brackish groundwater, and agricultural drainage water applications.

Community Partnering Program

MWD's CPP provides sponsorships to non-profit community organizations, educational institutions, public agencies and professional associations for short- and long-term water-related projects, events and activities.

Funding of any combined sponsorship, i.e., community partnering program, special activities, and/or events, will be awarded for only two consecutive (fiscal) years per organization, followed by a one-year hiatus. After the hiatus, an applicant may apply for funding of an entirely new or different program. Funding will not be awarded for previously funded programs.

MWD is currently accepting applications for both categories of sponsorship.

San Diego County Water Authority

Like MWD, the SDCWA represents a potential partnership opportunity for IID. The SDCWA maintains membership in the El Centro, Brawley, Calexico and Imperial chambers of commerce and is partnering in such programs as the Imperial Valley Economic Development Corp., the San Diego Regional Economic Development Corp., and the Mega-Region Grant initiative, an effort aimed at attracting industrial development to a region that includes both the Imperial and San Diego counties to promote the economic strength of the mega region.

Along with partnering in key programs, the SDCWA sponsors community events, such as the California Mid-Winter Fair & Fiesta, the Imperial Valley Economic Development Summit, the Brawley Cattle Call Rodeo and Parade, and the Mariachi Festival in Calexico.

SDCWA has a vested interest in Imperial Valley, and would most likely benefit from programs/projects which provide additional water supplies, thereby relieving future demand on the Colorado River. SDCWA maintains several funding programs that may help in the implementation of recycled and/or desalination projects within Imperial Valley.

SDCWA Reclaimed Water Development Fund (RWDF)

The RWDF provides financial assistance up to $100 per acre foot for the development of recycled water projects capable of relieving a demand on the SDCWA. Project expenses must exceed project revenues. Funding is available for up to 25 years based on financial need.

SDCWA Financial Assistance Program (FAP)

FAP provides loans for water recycling facilities planning, feasibility investigations, preliminary engineering studies and research projects related to water recycling and/or groundwater development. The SDWCA provides funding on a 50:50 cost sharing basis up to $50,000 for any given project activity. The total FAP funds allocated to one water recycling project or groundwater basin cannot exceed $150,000. Agencies receiving FAP funds are required to reimburse the SDCWA when implementation of the project results in funding from other sources, such as the RWDF or LRP, or within 5 years of certification of the project environmental report, whichever occurs first.

FAP funds are also now available for research and development in the form of grants. In order to receive FAP funding for these types of studies, a local agency must have secured partial funding from at least one other source such as the American Water Works Association Research Foundation, DRIP, Water Environmental Research Foundation (WERF), Proposition 13, etc. Two or more local agencies grouping together for research and development studies will not be required to secure funding from other sources. Funding will be limited to 25 percent of the remaining local agency study cost, up to a maximum of $25,000.

Water Environmental Research Foundation Partnership Program

Water Environmental Research Foundation actively pursues opportunities to leverage funding and knowledge through research partnerships with other organizations. Research partners are typically nonprofit organizations or government entities with research objectives similar to those of the Foundation. Partnership agreements leverage resources and develop and disseminate broad-based knowledge. They also provide access to diverse audiences and foster a spirit of cooperation. WERF will often allocate a set amount of funding in anticipation of projects to be identified by the partners. WERF also enters into multi-year partnership programs with government or quasi-governmental agencies.

Example partners include:

- Alberta Environmental Protection
- American Water Works Association
- California Energy Commission
- Commonwealth Scientific and Industrial Research Organization (CSIRO)
- Cooperative Research Centre for Water Quality and Treatment
- Drinking Water Inspectorate
- Global Water Research Coalition
- Groundwater Foundation
- International Water Association
- Japan Water Works Association
- KIWA NV - Water Research
- New York State Energy Research and Development Authority
- Public Utilities Board Singapore
- Sandia National Laboratories
- Other public, private and non-profit organizations located nationally and abroad

These partnerships focus in depth on particular topics and come together in the joint planning and co-funding of multiple projects. This opportunity would help IID in the identification of future partnerships for Project Alternatives that fall in line with the Partnership Program objectives.

In 2009 the Partnership Program will undertake efforts in the following areas:

- Assessment of Water Reuse as an Approach for Meeting Future Water Supply Needs – A comprehensive study of the potential for water reclamation and reuse of municipal wastewater to expand and enhance the nation's available water supply alternatives. Research Partner: The National Academies.
- Critical Assessment of Implementing Desalination Technology – Will examine the full range of water quality, environmental, economic, and social considerations regarding the implementation of desalination technology, based on a review of literature, survey of existing facilities, and case study analysis. Research partner: UKDWI.
- Integrated Urban Water Management Approaches – Will identify and document approaches for integrated urban water management that achieve sustainable urban water solutions balancing social, environmental/ecological, and economic criteria. Research partner: CSIRO.
- Framework for Developing Water Reuse Criteria With Reference to Drinking Water Supplies – Documents existing standards and their rationale/basis (i.e., public health and/or other parameters), defines merits and weaknesses of existing approaches, identifies gaps in existing knowledge, and develops a rationale for setting standards/guidelines based upon pathway/risk end point. Research partners: UKWIR and WERF.
- Beneficial Uses and Non-Traditional Uses of Concentrate – Provides a comprehensive review and comparison of the full range of alternate uses of concentrate and assesses the feasibility of implementation, economic considerations, and environmental safety. Also evaluates both direct uses of concentrate and the potential for recovery and marketing of individual salts separated from concentrate. Research partners: WateReuse Foundation, U.S. Bureau of Reclamation, and WERF.
- Regional Solutions to Concentrate Management – Surveys concentrate disposal and management practices and develop a decision methodology for manager, regulators and stakeholders to use in assessing the viability of concentrate disposal options on a regional and local basis. Research partners: WateReuse Foundation, USBR, and WERF.

10.1.3 Findings/Recommendations

A brief summary of each funding opportunity that is applicable and available to IID in the future consideration of Projects has been developed through the IRP process. A summary of the funding amounts, eligibility requirements, and timing and schedule for review and to decide which funding source might be identified as the best match for funding. The Project Team has also developed Project Alternative Ranking Criteria to assist IID in determining which project best meets IID IRP objectives, CA Water Management Strategies, and State, federal and private priority funding criteria.

Table 10-2. Grant Funding Matrix

Program	Brief Description	Key Points	Key Application Dates	Contact Info
Federal Stimulus (American Recovery & Reinstatement Act) in California				
CDPH, Safe Drinking Water State Revolving Funds	Projects that assist in achieving or maintaining compliance with the Safe Drinking Water Act (SDWA). Includes source water protection projects	$160M available plus regular annual allocation of - $80M Planning, design & construction projects; $20M max/yr/project, 20 yr payback; $30M max/yr/entity, 20 yr payback Planning only: $100k max/project, 5 yr payback; Current interest rate: 2.3%; principal forgiveness or negative interest loans may be available	The Universal Pre-application is now open until Feb 27, 2009. It is anticipated invitations to submit a full application will go out in April 2009, then applicant has 60 days to complete application (June 2009) and 60 days later must begin construction (Aug 2009).	www.cdph.cagov/service/funding/Pages/SRF.aspx 916-449-5600 sdwsrf@cdph.ca.gov
SWRCB, Clean Water State Revolving Fund	Eligible applicants; POTW (local public agencies) & NPS (local public agencies, non-profit organizations, and private parties) Eligible Projects: - Publicly owned treatment facilities such as: wastewater treatment, including installation and major rehabilitation of sewer lines, and storm water prevention/reduction - Water recycling projects - Nonpoint source and estuary enhancements projects (expanded use)	No state matching required. Program funding: $284.6M No upper limit for project; however maximum annual funding cap of $50M per agency per year.	Applications under Economic Stimulus Package due March 24 through FAAST.	www.swrcb.ca.gov/water_issues/programs/grants_loans/srf/ CleanWaterSRF@waterboards.ca.gov Christine White 916-341-5795 cwhite@waterboards.ca.gov
USBR CALFED Bay Delta		$50M as stated in ARRA		
USBR Title XVI	Recycled water feasibility investigations, preliminary engineering studies and research projects. Brackish water desalination is also considered.	$126M as stated in ARRA		

Program	Brief Description	Key Points	Key Application Dates	Contact Info
State				
Drinking Water, General – CA Department of Public Health (CDPH)				
CDPH, Prop 50 Chapter 3: Water Security	Projects designed to prevent damage to water treatment, distribution, and supply facilities, to prevent disruption of drinking water deliveries, and to protect drinking water supplies from intentional contamination.	Minimum: $5,000 Maximum: $2,000,000 No match required 25% of funds set aside for disadvantaged communities (DACs).	Applications not currently open; the prior pre-application period closed in September 2008. The Universal Pre-application also used for DWSRF is opened until February 27, 2009, but is currently only for Economic Recovery Funds and therefore not open for Prop 50 funds until after February 27, 2009	www.cdph.ca.gov/services/funding/Pages/Prop50.aspx 946-449-5600 prop50@cdph.ca.gov
CDPH; Prop 50 Chapter 4a1: Small Community Water System Facilities	Grants to small community water systems to upgrade monitoring, treatment, or distribution infrastructure. The water system must be in non-compliance with a safe drinking water standard.			
CDPH, Prop 50 Chapter 4a2: Demo Projects for New Containment Treatment and Removal Technologies	Development and demonstration of new treatment and related facilities for water containment removal and treatment. (Must demonstrate new technology).			
CDPH, Prop 50 chapter 4a3: Community Water Systems Monitoring Facilities	Community water system water quality monitoring facilities and equipment. (Must be in non-compliance with safe drinking water standard).			
CDPH, Prop 50 chapter 4a4: Drinking Water Source Protection	Source Water protection projects to protect contamination of water supply. Fund may be used for planning, preliminary engineering, detailed design, construction, education, land acquisition, conservation easements; equipment purchase, and implementing the elements of the SWP program.			

Program	Brief Description	Key Points	Key Application Dates	Contact Info
CDPH, Prop 50 chapter 4a5: Disinfection Byproduct Facilities	Treatment facilities necessary to meet DBP safe drinking water standard. (Must be in non-compliance with US EPA Stage 1 DBP Rule). If the project is receiving funds under Ch.6, it is not eligible under this chapter.	Minimum: $5,000 Maximum: $10,000,000 No match required. 25% of funds set aside for DACs.		
CDPH, Prop 50 Chapter 4b: Southern California Projects	Projects that assist in meeting drinking water standards and in meeting state's requirement to reduce Colorado River use to 4.4 MAF (Priority ranking based on population, volume of Colorado River water use reduction, and cost/volume saved). This program does not include recycled water.	Minimum: $50,000 Maximum: $20,000,000 1:1 match 25% of funds set aside for DACs. No match required for DACs or small water systems.		
CDPH, Prop 50 Chapter 6b: Containment removal	Containment treatment or removal technology (for Petroleum, NDMA, Perchlorate, Radionuclides, pesticides, heavy metals, pharmaceuticals).	Minimum: $50,000 Maximum: $5,000,000 1:1 match 25% of funds set aside for DACs. No match required for DACs or small water systems.		
CDPH, Prop 50 chapter 6c: UV and Ozone Disinfection	Projects using UV or Ozone Technology. (Must address MCL compliance violation).			
CDPH, Prop 84 Section 75021: Safe Drinking Water Emergency Funding	To fund emergency and urgent actions to ensure that safe drinking water supplies. Eligible projects include, but are not limited to, the following: Providing alternate water supplies including bottled water where necessary to protect public health. Improvements in existing water systems necessary to prevent contamination or provide other sources of safe drinking water including replacement wells. Establishing connections to adjacent water system. Design, purchase, installation and initial operation costs for water treatment equipment and systems.	Minimum 50% cost share Maximum: $250,000 per project	Applications not currently open; the prior pre-application period closed in September 2008. The Universal Pre-application also used for the DWSRF is open until February 27, 2009, but is currently only for Economic Recovery Funds and therefore not for Prop 84 funds until after February 27, 2009.	www.cdph.ca.gov/services/funding/Pages/Prop84.aspx 916-449-5600 prop84@cdph.ca.gov

Program	Brief Description	Key Points	Key Application Dates	Contact Info
CDPH, Prop 84 Section 75022: Small Community Infrastructure Improvements for Chemical and Nitrate Contaminants	These funds may be used for grants for small community drinking water system infrastructure improvements and related actions to meet safe drinking water standards. Priority shall be given to projects that address chemical and nitrate contaminants, other health hazards and by whether the community is disadvantaged or severely disadvantaged. Special consideration shall be given to small communities with limited financial resources.	Minimum: 50% cost share Maximum: $5,000,000 per project.		
Integrated Regional Water Management (IRWM)				
DWR, Prop 84 chapter 2 & Prop 1E Article 4: Integrated Regional Water Management (IRWM)	Projects that assist local public agencies to meet long-term state water needs, including delivery of safe drinking water, protection of water quality, and protection of the environment. For: Development/Revision of IRWM plans, or Implementation projects of IRWM plans.	$1,000,000M total $900M for Regional allocations North Coast: $37M Sacramento River: $73M San Francisco Bay: $138M San Joaquin River: $57M Central Coast: $52M Tulare Lake: $60M Lahontan: $27M Los Angeles Sub region: $215M Santa Ana Sub region: $114M San Diego Sub region: $91M Colorado River: $36M $100M for inter-regional allocations No Maximum grant amount. 25% minimum cost share.	All IRWM regions must be approved via the Regional Acceptance Process (RAP) prior to grant application submittal. RAP guidelines are currently in draft form. Original schedule called for RAP applications due in March with Regional acceptance in April 2009. Current schedule is not known. 1st round of implantation later in 2009.	Norman Shopay (916) 951-9218 nshopay@water.ca.gov

Program	Brief Description	Key Points	Key Application Dates	Contact Info
Groundwater				
CDPH, Prop 84 Section 75025: Groundwater Contamination	Grants to prevent or reduce contamination of groundwater that serves as a source of drinking water.	CDPH is currently working on development of these criteria based on Senate Bills SB X2 1 and SB 732 (signed into law on 9/30/08)	Applications not currently open; the prior pre-application period closed on September 2008. But not for Prop 84 funds until after February 27, 2009.	www.cdph.ca.gov/services/funding/Pages/Prop84.aspx 946-449-5600 prop84@cdph.ca.gov
DWR, Prop 84: Local Groundwater Assistance Program	Groundwater studies, groundwater monitoring, groundwater management	Program funds: $6.4M Up to $250,000 per applicant	Next application period expected Spring/Summer 2009.	www.grantsloans.water.ca.gov/grants/assistance.cfm Harley H. Davis 916-651-9229 hdavis@water.ca.gov
SWRCB, Underground Storage Tank Cleanup Fund	Federal and state governmental entities are not eligible for reimbursement from the Fund. This program was created to provide a means for petroleum UST owners and operators to meet the federal and state requirements. The Fund also assists in a large number of small businesses and individuals by providing reimbursement for unexpected and catastrophic expenses associated with the cleanup of leaking petroleum USTs.	$1.5 million less the eligible claimant's applicable level of financial responsibility (or deductible).	Applications accepted on a continuous basis.	www.waterboards.ca.gov/water_issues/programs/ustcf/ 1-800-813-FUND
Recycled Water				
SWRCB, Prop 13/50: Water Recycling Funding Program-Construction Grants	Grants provided for design and construction of water recycling facilities. All proposed projects must be placed on the SWRCB's WRCP Competitive Project List (CPL) and/or the SRF Priority List to be considered.	25% of the eligible construction cost up to $5M	Applicants accepted on a continuous basis.	www.waterboards.ca.gov/recycling/construction.html Claudia Villacorta 916-341-5735 cvillacorta@waterbo

Program	Brief Description	Key Points	Key Application Dates	Contact Info
SWRCB, Prop 13/50: Water Recycling Funding Program- Construction Grants	Grants are provided for facilities planning studies to determine the feasibility of using recycled water to offset the use of fresh/potable water from state and /or local supplies. Pollution control studies, in which water recycling is an alternative, are not eligible.	50% of eligible costs up to $75,000	Applicants accepted on a continuous basis.	ards.ca.gov
Storm Water / Stream & Habitat Restoration				
CA State Parks, Prop 1E: Habitat Conservation Fund Program	Eligible funding categories: Deer/Mountain Lion Habitat: Land acquisition Rare, Endangered, Threatened, or Fully Protected Species Habitat: Land acquisition Wetlands Habitat Projects: Acquisition, enhancement, or restoration Anadromous salmonids and Anadromous trout habitat: Acquisition, enhancement, or restoration Riparian habitat: acquisition, enhancement, restoration Trails: acquisition or development of trails Program: Event or series of events intended to bring urban residents into areas with indigenous plants and animals	$2M Available No Min/Max; Recommended maximum $200,000 Required match of 50%	Applications deadline the first work day of October annually. Next application due date: Oct. 2, 2009	www.parks.ca.gov/pages/1008/files/hcf_guide_2007_final_draft_5-15-07.pdf Deborah Viney 916-651-8572 dvine@parks.ca.gov or
CA State Parks: Land and Water Conservation fund	Acquisition or development of lands and facilities that provide or support public outdoor recreation.	No Min/Max; 2007 awards (13) ranged from $30,000 to $210,000 Required match of 50% Funds are divided: 60% for SoCal, 40% for NorCal	Applications deadline generally the first week of March annually. Local Agencies: Applicants accepted on a March 2, 2009 State Agencies: June 1, 2009	www.parks.ca.gov/?page_id=21360 Betty Ettinger 916-653-7423
CA Wildlife Conservation Board: Various	The Wildlife Conservation Board's three main functions are land acquisition, habitat restoration and development of wildlife oriented public access facilities. Wildlife Conservation Board programs: California Forest Conservation Program (CFCP) California Riparian Habitat Conservation Program (CRHCP) Ecosystem Restoration on Agricultural Lands (ERAL)		Applications accepted continuously.	www.wcb.ca.gov/Pages/wcb_grant_information.asp Dave Means 9156-445-1095

Program	Brief Description	Key Points	Key Application Dates	Contact Info
	Habitat Enhancement and Restoration Program (General)			dmeans@dfg.ca.gov
DWR, Prop 84 Chapter 4: Feasibility Studies	Conduct feasibility-level investigations of proposed flood risk reduction projects to address short term flood control needs such as levee inspection and evaluation, floodplain mapping and improving the effectiveness of emergency response	$10M in FY 2007-2008 $10M in FY 2008-2009	TBD	www.grantsloans.water.ca.gov/grants/irwm/integregio.cfm Joe Yun 916-651-9222 DWR_IRWM@water.ca.gov
DWR, Prop 84 Chapter 5: Urban Streams Restoration Program	Eligible uses include: Creek cleanups, eradication of exotic or invasive plants, channel reconfiguration to improve stream geomorphology and aquatic habitat functions, acquisition of parcels critical for flood management, coordination of community involvement of projects. Eligible applicants: local public agencies, non-profit/citizens' groups. Partnership is required.	Program funding: $9M Max/Min per project: $4M / $1M Eligible applicants: local public agencies, non-profit/citizens' groups.	Next round: TBD	www.grantsloans.water.ca.gov/grants/streams.cfm Bill Hoffman 916-651-9626 whoffman@water.ca.gov
SWRCB, Prop 84: Clean Beaches Initiative Grant	Water quality improvement projects that protect beaches and coastal waters from pollution and toxic contamination, such as sewer collection system improvements or storm water runoff reduction programs. Two types of concept proposal applications: implementation projects and research projects	$90M; to be distributed as follows: $35M to assist local public agencies comply with the discharge prohibition into Areas of Special Biological Significance. $18M to the Santa Monica bay Restoration Comm. $37M to the Clean Beaches Initiative program. Potential award limits (based on 2007 proposals): $125,000 to $5M 20% matching for projects > $1M 15% match for projects < $1M Matching for DACs waived	First Round of solicitation closed January 23, 2009; Second round TBD.	www.waterboards.ca.gov/water_issues/program/beaches/cbi_projects/index.shtml Jennifer Toney jtoney@waterboards.ca.gov 916-341-5646

Program	Brief Description	Key Points	Key Application Dates	Contact Info
SWRCB, Prop 84: Storm Water Grant Program	Projects designed to reduce and prevent storm water contamination of rivers, lakes, and streams.	Program funds: $82M Award limits: $5M Solicitations on hold. Future updates will be available.	TBD; No projects have been awarded funding (program on hold).	www.waterboards.ca.gov/water_issues/program/grants_loans/prop84/index.shtml Erin Ragazzi 916-341-5733 eragazzi@waterboards.ca.gov
Federal				
U.S. Army Corps of Engineers-Section 206 Wetland Restoration Grants	For local government projects to restore aquatic ecosystems. Projects are evaluated to determine if they benefit the environment through restoring, improving, or protecting aquatic habitat for plants, fish and wildlife. Proposed projects are also reviewed to determine if they are technically feasible, environmentally acceptable, and provide cost effective environmental benefits. Each project must be complete within itself and not part of a larger project.	Maximum federal expenditure per project is $5M Project costs are shared 65% federal and 35% non-federal.	Continuously soliciting programs to carry out the program objectives	Doug Putnam, Continuing Authorities Program Manager 503-808-4733
USEPA: Targeted Watersheds Grant Program	Designed to encourage community-based approaches and management techniques to protect and restore watersheds	Unknown future funding	TBD	
USEPA, Region 9: Wetland Program Development Grants	Provide eligible applicants an opportunity to conduct projects that promote the coordination and acceleration of research, investigations, experiments, training, demonstrations, surveys, and studies relating to the causes, effects, extent, prevention, reduction, and elimination of water pollution.	Total anticipated funding = $1.9M 6 to 15 awards anticipated and likely range from $50k to $350k EPA funding max = 75%	Applications due March 30, 2009	Suzanne Marr 415-972-3468 marr.suzanne@epa.gov
USBR CALFED Bay Delta		$50M as stated in ARRA	Continuously soliciting programs to carry out the program objectives	

Program	Brief Description	Key Points	Key Application Dates	Contact Info
USBR Title XVI	Recycled water feasibility investigations, preliminary engineering studies and research projects. Brackish water desalination is also considered	$126M as stated in ARRA	TBD	www.usbr.gov/lc/socal/titlexvi.html Dennis Wolfe dwolfe@lc.usbr.gov 951-695-5310
USBR Water for America: Plan for our Nations Water Future				
Investigations Program	For planning studies on specific water resource problems conducted by USBR on a geographically defined basis with state, local and federal partners		TBD	www.usbr.gov/wfa/investigate.html www.usbr.gov/wfa/basin.html William Steele 951-695-5310 wfa@do.usbr.gov
Basin Study Program	Comprehensive water supply and demand studies to assess the impact of increasing water demands. USBR will work with the state and local partners to initiate and perform 2 to 3 comprehensive water supply and demand studies in the west.	-50/50 cost sharing -2 year duration -to be conducted on major river basins and subbasins		
USBR Water for America: Expand, Protect and Conserve our Nation's Water Resources				
Water for America- Water Marketing and Efficiency Grants	For providing funding to implement water conservation and marketing programs (i.e. implement the plan developed under the SOR grant).	Up to $300,000 per project -Minimum 50% non-federal cost share -Completion of project in 2 years	Application period closed 1/14/09	www.usbr.gov/water2025/ www.usbr.gov/waterconservation/ William Steele 951-695-5310 wfa@do.usb.gov
Water for America-System Optimization Review (SOR) Grants	For studies to evaluate means of saving water via conservation and to develop a plan that includes elements of water conservation, water management, water marketing and preventing conflicts over water.		Application period closed 1/28/09	
Water for America-Advanced Water Treatment Grants	For pilot or demonstration projects that will test the viability of advanced water treatment technologies.		TBD	

Program	Brief Description	Key Points	Key Application Dates	Contact Info
Water for America-Species of Concern Grants	For planning, design and construction proposals that will benefit federally listed species that are affected by a Reclamation facility or action or that benefit federal recognized candidate species		TBD	
Water Conservation Field Services program	For water conservation and efficiency improvements.	$100,000 max in federal funding per project	TBD	
USBR Water for America: Enhance our Nations Water Knowledge (Administered jointly by the USGS and USBR) – To assess water availability, increase new technologies in water planning and management, and to map the geologic and hydrogeologic framework of the Nation's aquifers				
National Streamflow Information Program	Support upgrade of data transmission radios at stream gages and Support regional-scale for selected watersheds and aquifers	$2M available $3M available	TBD; However, the USGS is requesting feedback on the program at http://water.usgs.gov/wsi/stakeholder_feedback.html	Eric Evanson USGS 609-771-3904 eevenson@usgs.gov
Groundwater Resources Program	To develop and apply methods to enhance the quality of water use information, groundwater data accessibility and undertake regional-scale groundwater studies	$3M available		
National Cooperative Geologic Mapping Program	To enhance geologic mapping, geophysics, and hydrogeologic knowledge of regions being studied	$1.5M available		
Local				
Metropolitan Water District: Local Resources Program	New and expansion of existing water recycling and groundwater recovery projects. Includes construction of new substantive treatment or distribution facilities. Existing projects or those that have commenced construction prior to application submittal are ineligible.	$250/AF maximum incentive reimbursement (Applications must be made through the applicant's respective Metropolitan member agency).	Project applications will be accepted on an open and continuous basis until the target yield of 174,000AFY is fully subscribed	www.mwdh2o.com/index.htm#grants (middle of page) Andy Hui 213-217-6557 ahui@mwdh20.com

11 Developing the Imperial Region IRWMP

This Chapter provides a description of the proposed governance, structures, and roles for oversight and management for the development of the proposed Imperial Region IRWMP. It describes the proposed Imperial RWMG members, their role in the Imperial IRWMP process, regional water management responsibilities, and the level of IRWMP participation. It is anticipated that at the end of the planning process, each of the participating entities would adopt the Imperial IRWMP. Decisions on long-term governance and oversight for implementation of the regional projects and programs that come out of an IRWMP would need to be made once the Imperial IRWMP is completed.

11.1 Decision Making Structure and Purpose

The proposed governance structure will facilitate the planning process and the sustained development of regional water management strategy, both now and in the future. A basic organizational chart is shown in Figure 11-1 showing functional relationships and responsibilities including: the Regional Water Management Group operating at the policy and elected officials level; an Steering Committee operating at the executive or senior staff level; IID operating as the contract administration and program management level; and the Imperial Water Forum (Water Forum), which will served as the mechanism for stakeholder and public involvement.

Figure 11-1. Imperial Region IRWMP Governance and Management Structure

The governance structure of the Imperial Region IRWMP is intended support development of a collaborative water management portfolio. The purpose of the governance structure is to:

- Support prudent decisions and allow for timely completion of the Imperial IRWMP
- Provide opportunities for diverse interests to contribute to the Imperial IRWMP
- Improve coordination of individual plans, programs and projects for the mutual benefit of the Imperial Region
- Support identification, development and implementation of a collaborative process that results in projects that may be beyond the scope or capability of a single public agency or group, but that would be of mutual benefit if implemented among multiple parties in the Imperial Region
- Foster coordination, collaboration and communication among public agencies and interested stakeholders to achieve greater efficiencies and to enhance public service and public support for projects vital to the Imperial Region‘s economic growth
- Assist disadvantaged communities (DACs) in the Imperial Region
- Implement a representative decision-making process

Current members of the RWMG will work together to address complex issues, develop and negotiate solutions, and demonstrate their ability to function and produce results as an oversight body.

11.1.1 Imperial Region RWMG Composition and Authorities

The Imperial Region RWMG is essentially an extension of an existing Water Planning Group that consists of two members of the IID Board of Directors and two members of the Imperial County Board of Supervisors, with the inclusion of three representatives from Imperial Region cities, at least two of which will be from DACs. IID and Imperial County are the two agencies with statutory water management authorities and have strongly endorsed the development of the Imperial IRWMP. The RWMG purpose is:

- To serve as a consensus building, negotiating, and conflict resolution body
- To provide policy direction and overall guidance during the development of the Imperial IRWMP
- Increase communications and create a link between agencies to convey information to, and provide input from, the elected bodies
- Support adoption of the Imperial IRWMP
- Encourage staff to develop integrated projects or projects that fit into the regional portfolio of water management strategies

Each participating agency‘s governing board will specifically authorize the agency to participate in the planning process and assign representatives to participate in the RWMG

and Steering Committee. The RWMG will be responsible for developing the Imperial IRWMP, including public outreach, oversight, and review of the draft plan, briefing their governing boards, obtaining plan adoption, and coordinating with the other entities. Additional agencies are expected to join at a later date by indicating their support of the planning process through a resolution approved by their governing boards. It is the responsibility of each public agency to provide existing water management plans or to identify the need for water management strategies for each service area carried out in the individual agencies jurisdiction.

It is anticipated that each agency will adopt the Imperial Region IRWMP. It is intended that the Imperial IRWMP provide critical information that participating land use agencies are able to incorporate directly or by reference into other related documents such as the pending 2010 UWMP updates and any future city or Imperial County general plan updates.

Imperial Irrigation District. IID is an irrigation district organized under the California Irrigation District Law, codified at §§ 20500 et seq. of the California Water Code, and delivers Colorado River water in Imperial County, California for potable and irrigation purposes. By a decisive favorable vote at an election held on July 14, 1911, the people of the valley organized the IID and the vote was made effective by resolution of the Board of Supervisors of Imperial County on July 24, 1911. IID is governed by a five-member Board of Directors. While elected by vote of all qualified voters, each member represents a separate geographical division of the District. Directors serve a four-year term. Critical functions of the IID are: 1) diversion and delivery of Colorado River water, 2) operation and maintenance of the drainage canals and facilities, and 3) generation and distribution of electricity.

Imperial County. The County has statutory authority for groundwater resource management in Imperial County as codified under the County Groundwater Ordinance (Title 9, Division 22) adopted in May 2004 for the purpose of preserving, protecting, and managing the groundwater within the County. The County therefore exercises permit requirements on all projects related to groundwater within its boundaries. In addition, the Imperial County Groundwater Management Act of 1992 (i.e., Groundwater Management Plan) defines the County‘s responsibility for groundwater management within Imperial County. Under this Act, the County is responsible for the preservation and management of groundwater within Imperial County for the protection of domestic, commercial, agricultural, industrial, municipal, and other uses. The County also has land use authority in the unincorporated areas.

Imperial Region Cities. The incorporated cities are responsible for water treatment, distribution, and sales through their municipal utilities or by franchise agreements with investor-owned utilities. They also have land use authorities, prepare Urban Water Management Plans, and operate the wastewater treatment facilities within their jurisdiction.

11.1.1.1 Imperial Region RWMG Steering Committee

The Imperial Region RWMG will appoint staff members to the Steering Committee from their respective organizations. The Steering Committee will provide staff review, support to

the planning process and be responsible for the ongoing and regular coordination of the IRWMP planning process. The Steering Committee will:

- Facilitate communications between the RWMG and the Imperial Water Forum
- Set and coordinate agendas for the Imperial Water Forum
- Identify needs and make recommendations to the RWMG
- Track progress
- Find, coordinate, and pursue funding opportunities
- Make interim decisions and commitments
- Form and coordinate ad hoc work groups as needed
- Coordinate with the contractor and Water Forum facilitator

The Steering Committee will include, at minimum, the IID program management staff as appointed by the IID General Manager, a representative of the County Administrative Officer, and representatives appointed by the City Manager.

11.1.1.2 IID: Contract Administration and Program Management

IID has retained the services of a consultant to support development of the Imperial IRWMP. IID will provide overall contract administration and program management. Some of the activities associated with this task include:

- Administration of the professional services contract
- Issuing task orders to consultants
- Acting as liaison to the state
- Reviewing the consultant‘s work
- Managing project budget and schedule
- Reviewing consultant invoices
- Coordinating with agencies and other stakeholders
- Project reporting
- Coordinating grant writing for IRWMP-related funding
- Preparing Water Forum meeting agendas, minutes, and coordinating follow-up actions

11.1.1.3 Imperial Water Forum

The Water Forum will be the primary mechanism for stakeholder involvement in the process. The role of the Water Forum is to allow for obtaining a diverse range of perspectives on water management strategies, projects and policies and to make recommendations to the

RWMG that can then be further presented to the respective decision making bodies for action. Participation will be sought from a wide array of stakeholder groups and organizations as described in the next Section. The purpose of the Water Forum is to:

- Share information, provide comment and feedback to the consultant
- Refine and enhance the purpose and need, goals, and objectives
- Review, comment, prioritize, and make recommendation to the RWMG on water management strategies
- Identify projects concepts for further evaluation
- Establish criteria for ranking alternatives, review the results of the alternatives, and advise the RWMG on a priorities
- Develop an implementation plan, including review and definition of funding strategies and define long-term governance

11.1.1.4 Ad Hoc Working Groups

The RWMG or Water Forum may form Ad Hoc Working Groups composed of IID Staff, consultants, stakeholders, and other technical resources to address specific issues or topics and to bring recommendations back to the Water Forum and RWMG. Work groups will be used as needed to provide technical or policy level review of projects or policies concepts. Examples of Work Groups include Outreach/Communications, Governance, or Finance and Funding; and/or will evaluate specific project or management strategies (e.g., recycled water, groundwater banking).

11.1.2 Decision Process and Functions of the Water Forum

A decision process is needed for purposes of negotiating and conflict resolution. The elements of the decision process and functions of the Water Forum are discussed below. The independent agencies give up none of their powers or authorities and are the ultimate entities to decide the direction of their respective organizations related to participation in the Imperial IRWMP and any of the projects that may be proposed.

Decisions are made by members of the RWMG, listed above. Decisions will be by consensus. If consensus cannot be achieved, a majority vote will be used. An alternate is authorized to vote if the appointed representative is absent. Representatives serve staggered four-year terms and are appointed by an agency‘s legislative body, but are not required to be a member of that legislative body. The following sections provide examples of the RWMG‘s decision-making process including establishing IRWM plan goals and objectives, prioritizing projects, financing RWMG and IRWMP activities, implementing plan activities, making future revisions to the IRWM plan, and hiring and managing consultants.

Decisions and recommendation to the RWMG by the Water Forum will be based on consensus of the Water Forum members. Should consensus be lacking, the facilitator and consultant will work to ensure minority positions are communicated to the RWMG. The overall process and approach is discussed below.

11.1.2.1 Share information

The Water Forum will allow interested parties to provide critical data, ideas and prior analysis results to support project development, justify projects proposed by sponsoring entities, and conduct further engineering or economic feasibility studies. White papers, briefings, and presentations will be made to the Water Forum to obtain input and provide feedback to the consulting team.

11.1.2.2 Refine and Enhance Purpose and Needs, Goals, and Objectives for IRWMP

Preliminary Purpose and Needs, Goals, and Objectives for the Imperial Region IRWMP have been developed by the IID Board and will be used as a starting point for consideration by the RWMG and Forum. The stakeholder process will be used to refine the purpose and need for the Imperial IRWMP and gain a consensus and common understanding of the problems to be addressed. In order to lay the foundation for agreement and practicable solutions, it is critical that RWMG and Water Forum members understand the nature and extent of the issues facing the Imperial Region.

The Water Forum will refine and enhance the planning goals and objectives for the Imperial Region IRWMP. Specific planning objectives will be developed based on:

- Previous regional efforts
- Local planning documents, such as UWMPs and City or County General Plans
- Studies performed by IID and/or the RWMG
- Discussions among RWMG and stakeholders
- Consensus of the Water Forum
- Final adoption by the RWMG member‘s boards and councils

Based on preliminary information it is evident that the Imperial IRWMP will be designed to provide a roadmap for long-term water supply reliability and water demand management in the Imperial Region. Additional objectives are likely to be included early in the IRWMP process through stakeholder involvement.

11.1.2.3 Review Water Management Strategies

The Water Forum will be briefed on water management strategies recommended by DWR for IRWMP inclusion. In developing water management options, each water management strategy included in the California Water Plan Update 2009 will be examined to determine its applicability to an integrated approach for the Imperial Region. The water management strategies are the building blocks for the Imperial IRWMP and will help support further project definition and integration opportunities.

The consultant will develop a preliminary analysis of the strategies and priorities for review and discussion by the Water Forum and, along with IID staff, will support development of a consensus on the final recommendations to the RWMG. The Forum will review and comment on the strategies and preliminary analysis and provide input on recommended

integration approaches and priorities to the RWMG. Separate work groups may be formed to consider applicable strategies in greater detail, refine project concepts, and make recommendations to the full Forum and RWMG. Any participant in the Water Forum may recommend projects to the full group.

A final consensus on strategies is to be achieved as an outcome of the process. The outcome of this task will be a determination of the Water Management Strategies that are most likely to meet the objectives of the Imperial Region and that should be considered in the Imperial IRWMP. Because the Imperial IRWMP is intended to meet multiple water management objectives, multiple strategies will be identified. Therefore, an important aspect of this task will be to describe how individual strategies will be integrated into strategic options that present a cohesive program for land and water use in the Imperial Region.

11.1.2.4 Identification of Projects, Develop Integrated Management Strategies for Region

Specific project options will be evaluated in the context of individual and integrated water management strategies to determine feasible projects that generate the greatest regional benefits at acceptable levels of impact and cost. Candidate strategies or groups of strategies will be assembled into strategic options and decision support methodologies will be applied to assist local decision makers in identifying strategic options that are responsive to the objectives of the Imperial IRWMP.

Use of decision support methodologies will be important for framing project options in ways that clearly define the advantages and disadvantages of each project option and describes the interrelations between project elements and water management strategies. In this way key issues and potential solutions can be presented to stakeholders in a manner that facilitates discussion, enables participants to focus on central issues, and leads to well informed, insightful decision making. The goal of this process is to enable the strategic options that move forward in the planning process to be those that are technically sound and that generate broad support.

Specific projects to be ranked and prioritized will be identified. Any participant in the RWMG and Forum can recommend specific projects within any one of the water management strategies, or based in a combination of the strategies (e.g., groundwater development coupled with desalination). Ideally, regional projects would include multiple participants, provide multiple benefits, and would integrate multiple water management strategies. Ideally, benefits would accrue to the region and help meet regional objectives, rather than provide limited benefits or meet singular objectives.

11.1.2.5 Establishing of Criteria for Ranking Alternatives

The IID Plan has reviewed and ranked projects that the IID Board has considered. A specific project identification and prioritization process will be used for gaining support of the RWMP and Forum. The IID Plan project evaluation criterion have been developed by the consultant and used to rank projects. This work will be revisited by the Forum and RWMG for purposes of ranking regional projects. The stakeholders may have additional projects that need to be factored into the process. The criterion would be refined and applied by a Working Group for purposes of the IRWMP, and projects would be prioritized to meet

regional water use objectives. Some of the prioritization factors to be considered will likely include: urgency for the project (whether there is a safety issue or a fine associated), consistency with objectives and priorities, whether the project generates significant regional benefits at acceptable levels of impact and cost, and contribution of the project to meeting planning goals.

11.1.3 Implementation Plan Activities

The RWMG makes decisions regarding the implementation of plan activities by:

- Looking at all alternatives
- Incorporating public and stakeholder input
- Maintaining an open process
- Making decisions using a stakeholder driven process
- Establishing a long-term governance mechanism
- Establishing long-term funding and financing
- Adoption of the Imperial IRWMP by key water and land use agencies
- Adaptive management and IRWMP update and revision

An implementation schedule that extends beyond the adoption of the Imperial IRWMP will be developed. This will include review and evaluation of funding and financial strategies and the long-term program for oversight and governance during plan implementation.

11.1.4 Future Revisions to the Imperial IRWMP

The RWMG will conduct an open review process, as required by statute, for any updates or revisions to the Imperial IRWMP. Priorities may need shifting or adjustments as needs of the Imperial Region and its stakeholders change with time. The RWMG structure will allow periodic changes to the plan, which are expected over the life of the plan.

11.2 Financing the Imperial RWMG and Imperial IRWMP Activities

The development of the IID Plan has been funded by IID using impact fees on new industrial water users and developers collected by IID. This seed money has been collected and provided by IID to help support preparation of the IID Plan and initiate development of the Imperial IRWMP, development of project concepts, and to support the RWMG during the beginning stages of the IRWMP process. IID will likely seek grant funding from DWR to further develop the Imperial IRWMP and to support a facilitator and the community outreach and stakeholder efforts.

In the future, a finance plan could be developed and presented at a regularly scheduled meeting for RWMG adoption. Potential sources of funding for the projects and continued implementation of the Imperial IRWMP will be identified. The finance plan will be designed to have an appropriate weighting and scheduling of local and external funding.

11.3 New Members

The RWMG would incorporate new members into the Water Forum as needed to be representative of the larger community and to ensure that there is a diverse range of perspectives and interests representing different sectors, regardless of their ability to contribute financially to the Imperial IRWMP. New members will be incorporated into the governance structure by indicating their support of the planning process through a resolution approved by their governing boards. The Water Forum is open to all stakeholders. A balance of interested persons and entities will be achieved through stakeholder and public outreach and involvement. Interested parties will be invited and encouraged to participate in regularly scheduled meetings, workshops, the public review process, and the stakeholder and public review and comment period.

11.4 Working Relationships

The planning process will seek to improve interagency liaisons and working relationships. Of course, regionally, there are several agencies and organizations that conduct planning activities that must collaborate to deliver a truly integrated plan for the area. The IRWMP planning process must consider these other activities. The process must know the scope and impacts of future actions developed by neighboring jurisdictions and other organizations that co-exist within the region. This necessary coordination will prevent duplication, avoid missed opportunities, and make sure there are no gaps in the IRWMP.

Other planning in the region include efforts such as land use planning (e.g., update of the Imperial County and City General Plan), the Salton Sea (including Salton Sea Authority input and the DWR Salton Sea Ecosystem Restoration Program), the QSA/Transfer Agreements, and economic development (alternative energy, recreation, etc.). It is important to structure the IRWMP process to allow and encourage effective coordination among planning efforts. The plan integration process should:

- Utilize existing organizational structures where possible.
- Ensure other planning agencies participate as stakeholders in the IRWMP. This would mean not just inviting, but encouraging or insisting upon participation.
- Seek common objectives between planning efforts where possible.
- Collect common information that can be shared by agencies.
- Look for joint strategies between and/or among plans.
- Tier or coordinate actions among agencies so they complement each other and address mutual objectives.
- Look for duplication in planning efforts and minimize them.
- Incorporate agencies as funding partners where strategies align.
- Check back with agencies after compilation of the Imperial IRWMP to ensure no conflicts exist.

11.5 Stakeholder and Public Involvement

11.5.1 Stakeholder Outreach and Involvement

The Imperial Region is developing the IRWMP through a collaborative, multi-stakeholder process and the RWMG has created a geographically inclusive region where diverse views and water management issues are represented. This section provides a description of how stakeholders, including DACs, are identified and invited to participate, further listing the procedures and processes that promote access to, and collaboration with, people or agencies with diverse views within the region. Along with the information on the management structure above, it is intended to present how the outreach efforts will address the diversity of water use issues, geographical representation, and stakeholder interests in the Imperial Region; and how stakeholders can help develop integrated, multi-benefit, regional solutions and incorporate environmental stewardship.

Stakeholder outreach is a significant part of the IRWMP planning process. The Water Forum will provide the framework and a facilitated process for an earnest exchange of ideas; help reduce polarization; create understanding; and recognize common interests and solutions. The facilitated dialog will continue through the development and adoption of the Imperial Region IRWMP and then, while at a somewhat reduced effort, will continue as part of the daily business practice of the RWMG as the Region‘s work continues and the plan is implemented.

Objectives for Stakeholder Involvement include:

- Promote Imperial IRWMP as the mechanism for addressing water supply issues
- Prevent surprises for the IID Board of Directors, customers or other stakeholders; for Imperial County Board of Supervisors; and for City Councils
- Demonstrate desire to engage the inform customers, stakeholders, and the public on the part of IID‘s Board of Directors, the County‘s Board of Supervisors, and the City Councils
- Create awareness, and get consensus on solutions, including funding strategies
- Reduce the potential for conflicts, manage expectations, and develop strategies to respond to identified issues and concerns

The Imperial Region shares common attributes, a common watershed (South Salton Sea watershed), adjacent groundwater basins, and service by IID as a common water wholesaler to most of the water users in the Region. Through the IRWMP process, the RWMG will represent the Imperial Region to fairly and efficiently manage water resources and implement environmental stewardship practices. The RWMG recognizes that to provide fair representation for the stakeholders, it is imperative that they implement a collaborative, multi-stakeholder process. The stakeholder outreach process includes a comprehensive effort to activate and engage stakeholders, including DACs and the public in the IRWM planning process.

For the most part, Imperial County, Imperial Region cities and the development community are totally reliant on IID for water. These customers will be significantly affected by decisions on the Imperial IRWMP and during implementation of the actions defined in the IRWMP. The consultants held discussions with the IID, Imperial Region Cities and Imperial County, and it is clear that there is a desire to be kept informed as the plan develops, and to participate actively in the IRWMP process. There are great expectations for the Imperial IRWMP and the plan is perceived by the non-agricultural interests as the mechanism for solving a number of outstanding issues and for reducing uncertainty related to what water is available for future development and non-agricultural use.

The expectations of both the agricultural and urban water use communities need to be managed; perceptions and alternative views need to be shared between these groups; facts need to be presented; and the vitality and creativity within the community need to be productively channeled so that there is ultimate acceptance of the Imperial IRWMP, and so that the plan does not become a source of conflict, rather than the means to resolve current conflicts. In addition to the primary agricultural and non-agricultural customers, other stakeholders could strongly influence decisions. These ~~"in~~fluencers" include groups like the Farm Bureau, Chamber of Commerce, labor groups, building industry association, and various non-governmental organizations.

By directly contacting currently identified stakeholders and inviting and encouraging them to participate in the Imperial IRWMP efforts, the stakeholders will be able to voice their interests and issues to the Region's decision makers. Through the RWMG's proactive stakeholder outreach efforts, additional stakeholders will be identified and invited to participate in the Imperial IRWMP efforts. The more stakeholders that are involved in the process, the more the RWMG can enhance its understanding of the water use issues in the region as a whole, which will ultimately promote the development of a truly integrated regional water management plan.

11.5.1.1 DAC Outreach

The RWMG is actively engaging and proudly advocates for economically-disadvantaged communities. The Median Household Income (MHI) in the Imperial Region was $31,672 based on US Census Bureau Estimates for 2000. The RWMG has specifically identified DACs within the Imperial Region and will include them in planned outreach efforts. DACs were specifically identified by utilizing census tracts and census blocks to analyze and determine the MHI for the area. Table 11-1 excerpts the MHI and other information by city for the RWMG membership. All communities, with the exception of Imperial, have MHIs below the threshold of 80 percent of the statewide MHI ($37,994), the current ceiling for disadvantaged status. DACs will be represented by cities and communities with full membership in the development of the Imperial IRWMP and will provide input and comments. This participation will ensure that their water supply and water quality are protected and enhanced. The RWMG will employ specific mechanisms to assist DACs in identifying projects to include in the Imperial IRWMP development process. Regular RWMG meeting locations will rotate and will be held periodically in DAC cities.

Table 11-1. Demographic information for the Participating Imperial Region Cities

City or Developed Area	Median Household Income
Brawley	$31,277
Calexico	$28,929
Calipatria	$31,302
El Centro	$33,161
Heber	$28,221
Holtville	$36,318
Imperial	$47,494
Niland	$25,592
Seeley	$31,058
Westmorland	$23,365

1. Based on 2000 Census information, 2006 data not available.
2. Disadvantaged communities.

11.5.1.2 Stakeholder Outreach Process

The proposed stakeholder outreach process for the development of the Imperial IRWMP includes the following items and activities.

11.5.1.2.1 Develop Stakeholder List and Final Communications Plan

The RWMG has developed a working list of stakeholders in the region (Table 11-2) and through outreach efforts the RWMG will expand the existing list. The RWMG will initially contact stakeholders in writing. The RWMG will specifically notify the stakeholders when the meetings are held for the Imperial IRWMP. Additional stakeholders will be identified and included during the Imperial IRWMP development process.

A draft communications plan and strategy has been prepared and the RWMG and IID, as program manager, intend to finalize a detailed communications plan specifically for the Imperial IRWMP process. With input obtained from stakeholders at the proposed kick-off meeting, the RWMG will develop a final communications plan that documents the method and process that will allow the stakeholders to participate in the planning process, ensuring that their opinions can influence decisions about water use and management. Because meetings will be regularly scheduled throughout the Imperial IRWMP process, interested stakeholders will have many opportunities to provide input during the development of the Imperial IRWMP. By participating in the Water Forum meetings, stakeholders will have a mechanism for review, comment and input throughout the development of the Imperial IRWMP. Subject to budget limitations, a website may be developed or existing agency Web resources may be used.

Table 11-2. Stakeholders Participation in the Imperial Water Forum

City and County Government	
Imperial County	City of Brawley
Imperial Valley Association of Governments	City of Calexico
Imperial County Local Agency Formation Commission	City of Imperial
County Community Services Districts	City of El Centro
City of Westmoreland	City of Holtville
Imperial Valley Economic Development Corp	Salton Sea Authority
Others	
Non- Governmental Organization	
Imperial County Farm Bureau	Imperial County Joint Chambers of Commerce
IID Water Conservation Advisory Board	Coalition of Agriculture, Labor and Business
Coalition of Ag Labor and Business	Sierra Club, Imperial Chapter
Center for Socio-Economic Justice	California Rural Legal Assistance
Building Industry Association	Desert Wildlife Unlimited
Others	
State and Federal	
California EPA, Colorado River Regional Water Quality Control Board (Region 7)	U.S. Bureau of Reclamation
California Department of Fish and Game	U.S. Fish and Wildlife Service
California Department of Water Resources	California Department of Public Health
Other	

11.5.1.2.2 Initial Water Forum Kick-off Meeting

The RWMG will hold an initial Water Forum kick-off meeting to solicit input from the community regarding the preparation of an IRWMP. The RWMG will publicly announce the meeting in local newspapers, on the radio, and on their web site, inviting stakeholders to attend. The RWMG will specifically contact currently identified stakeholders to ensure they receive an invitation. The purpose of the meeting is to present the stakeholders with information about the proposed Imperial IRWMP planning process and receive comments from interested parties. The presentation will describe the region encompassed by the Imperial IRWMP. RWMG members or their representatives will be at the meeting to answer questions, solicit input, and increase public awareness of the proposed Imperial IRWMP. Documentation of the meeting and the comments received from the public will be recorded and made available to the public.

11.5.1.2.3 Regular RWMG and Water Forum Meetings

A final schedule of meetings will be developed once stakeholder input is obtained as a result of the kick-off meeting. The RWMG may meet monthly at the onset of the project, then as needed at key milestones. It is anticipated that the RWMG Steering Committee will meet monthly to plan Water Forum Meetings and act on the direction from the RWMG. The Water Forum will meet monthly or as key meeting milestones and deliverables are produced.

11.5.1.2.4 Work Group Meetings

Special meetings for RWMG assignments, plan actions and/or workshops will be held as necessary by Working Groups.

11.5.1.2.5 Existing Decision Making Bodies

The RWMG is comprised of appointed members of their respective elected bodies. Members of the RWMG, with support from their Steering Committee representatives, will convey information back to their respective elected bodies for further discussion and to provide input at regularly scheduled public meetings. This provides the opportunity to more directly and closely communicate within their respective communities during regular business meetings of the Board of Directors, Board of Supervisors, and City Councils.

11.5.2 Public Outreach

The final communications plan will describe the process to be used that makes the public both part of and aware of the regional management and Imperial IRWMP efforts. It will further describe the transparent process and ways for the public to gain access to the RWMG and IRWMP process for information, and how they could provide input.

In order for the RWMG to fairly and comprehensively represent the cities, communities, and agencies of the Imperial Region, it will incorporate public outreach through existing programs and communications channels during the Imperial IRWMP development efforts. The people of the Imperial Region are ultimately the beneficiaries of the Imperial IRWMP and their input is imperative to the process. Similar to the stakeholder outreach process outlined, the RWMG plans to engage the public, including DACs, and encourage their involvement.

The RWMG plans to utilize a variety of media in its public outreach efforts to publicize the IRWM process and encourage public participation, including the internet, newspaper, radio, written announcements, brochures, reports and existing newsletters. The RWMG intends to leverage existing resources at IID to fulfill public relations functions. A speaker‘s bureau of RWMG and the RWMG Steering Committee members will be developed along with standard presentations and public affairs materials suitable for distribution at RWMG or other stakeholder offices or during other regularly schedule business meetings.

Subject to budget constraints, development of a website will be investigated to publish draft and final technical memorandums, briefings, presentations, meeting agendas and minutes, and draft and final Imperial IRWMP. Links could also be provided on City Council and RWMG member websites. Meeting agendas should be posted before the meeting and regular meeting notices will be announced at least one week before the meeting. The meeting minutes will be posted as soon after the meeting as possible. Contact information should be posted on the website, with directions on who the public may contact with comments, questions, and concerns.

In addition to the RWMG website, meeting announcements will be made via local newspapers, local radio stations, and posted in public places. Any individual RWMG

decisions related to IRWMP adoption would be posted on individual RWMG member websites, at the meeting location, and in public locations such as city libraries and city buildings in accordance with regular process and state requirements.

The proposed public outreach process is summarized below.

11.5.2.1 Public Involvement Plan

The communications plan will refine the method and process that will allow the public to participate in the Imperial IRWMP process and ensure that their opinions can influence decisions during IRWMP development. Since much of the Imperial Region public is Spanish speaking, materials will need to be produced in both English and Spanish. Interested members of the public will have many opportunities to provide input throughout the IRWMP process at regularly scheduled Water Forum meetings and on the RWMG website.

A draft of the Imperial IRWMP Purpose and Need, Goals and Objectives has been developed. Once finalized, specific messages can be crafted and brochures or other public affairs materials can be developed and delivered to the Customers/Stakeholders (target audience) using appropriate tools and media.

11.5.2.2 Initial Public Meeting

As described above, the RWMG plans to hold Water Forum meetings to solicit input from the community regarding the preparation of an IRWMP. These meetings will be open to the public. The RWMG will publically announce the meeting in local newspapers, on the radio, and on their website, inviting all members of the public to attend. The meeting will be announced and the agenda will be made available no less than 72 hours prior to the meeting.

The purpose of the meeting is to present the public and stakeholders with information about the proposed Imperial IRWMP planning process and receive comments from interested parties. The presentation will describe the region encompassed by the Imperial IRWMP. RWMG members will be at the meeting to answer questions, solicit input, and increase public awareness of the proposed Imperial IRWMP. Documentation of the meeting and the comments received from the public will be recorded and made available to the public via the RWMG‘s website, the City Council websites, the local library, and the RWMG members‘ websites.

11.5.2.3 Public Meeting on Draft Imperial IRWMP

Within two weeks after the draft Imperial IRWMP has been made available, a hearing will be held for the general public to address concerns and provide their comments on the Imperial IRWMP. Members of the RWMG and the consultant will answer questions and facilitate public involvement.

11.5.2.4 Imperial IRWMP Implementation

As part of the development of the draft and final Imperial IRWMP, the RWMG will consider development of a broader Public Outreach and Communications Plan whose purpose would be to gain support for funding and implementation of the proposed solutions. Such a plan would provide a strategic foundation and direction for specific tasks to be conducted to gain

support for IRWMP implementation. This will be critical if a Proposition 218 election or other voter approval is needed, and would create a more broadly targeted public affairs effort aimed to the wider decision making community and the general public. Such a program could utilize a combined approach of community relations tools and media to reach the target audiences. The plan would evaluate which tools and media would be used to reach specific audiences, and which media would be used for communicating the specific message concepts.

11.6 Findings and Conclusions

From discussions with IID Cities, Imperial County, and other stakeholders it can be observed that the community is fragmented and stakeholders have an expressed desire to be more engaged in District decision making.

The Imperial Region shares common attributes, a common watershed (South Salton Sea watershed), adjacent groundwater basins, and service by IID as a common water wholesaler to most of the water users in the Region.

The proposed Imperial IRWMP governance structure would facilitate the planning process and the sustained development of regional water management strategy, now and in the future.

The proposed Imperial RWMG operating at the policy and elected officials‘ level; a Steering Committee operating at the executive or senior staff level; IID operating as the contract administration and program management level would provide an appropriate structure for decision making, negotiation, and conflict resolution. Through the IRWMP process, the RWMG would represent the Imperial Region to fairly and efficiently manage water resources.

An Imperial Water Forum (Water Forum) would serve as the mechanism for stakeholder and public involvement, providing the opportunity to increase community awareness of the water management issues and opportunities and serving as a conduit for obtaining feedback from a wide cross-section of the community.

Each participating agency‘s governing board should specifically authorize the agency to participate in the planning process and assign representatives to participate in the RWMG and Steering Committee so that information is communicated and transmitted from and to each organization, and so that representatives are empowered to negotiate and make decisions.

Public workshops should include large and small group discussions with structured agendas and ground rules, and these meetings should be professionally facilitated and supported by technical staff able to answer questions, conduct research, and provide factual information. Workshops and meetings should be held in more than one location throughout the valley. There should be opportunities for IID Directors and the elected officials of the County and Cities to interact and engage with the members of the community.

11.7 Recommendations

The Phase I report (Hanemann and Brooks, 2005) documented areas of agreement and disagreement. From conduct of the user interviews it was found that the comity is increasingly fragmented and stakeholders expressed a strong desire to be more engaged in District decision making. Regrettably, since the report was produced, there remains an environment of litigation and conflict.

It is suggested that public workshops include large and small group discussions with structured agendas and ground rules, and that these meetings be professionally facilitated and supported by technical staff able to answer questions, conduct research and provide factual information. Workshops and meetings should be held in more than one location throughout the valley. There should be opportunities for IID Directors and the elected officials of the County and Cities to interact and engage with the members of the community.

IRWMP 1) Initiate development of the IRWMP to build consensus and resolve conflicts through planning and dialog rather than through costly and time consuming litigation.

IRWMP 2) The Proposed IRWMP outreach process should be reviewed with stakeholders and refined to initiate a broader community dialog on priorities for a water supply portfolio and for action.

IRWMP 3) A Master Meeting schedule needs to be developed to put the outreach process in sync with the State timelines for grant applications for Proposition 84 and 50 funding to get a consensus and drive the program to the finish line.

IRWMP 4) Use professional facilitation services to run Regional Water Management Group and Imperial Water Forum meetings.

IRWMP 5) Prepare a final communications plan to describe the process to be used that makes the public both part of and aware of the regional management and Imperial IRWMP efforts.

12 Next Steps Implementation Plan

The IID Plan contains an extensive amount of materials and analysis results that led to the findings, conclusions, and recommendations presented in the key chapters. The Plan should be regarded as a further step in IID's ongoing efforts to plan and manage the area's water resources, as well as make decisions and resolve conflicts. This chapter reviews the results of the planning process, describing how the pieces are related and summarizing the major findings. It identifies the next steps to be taken in the immediate term to further engage the community, obtain commitments on a shared course of action, design and build new projects, expand the available supply, and implement programs and policies to manage the available water in the IID Water Supply Portfolio.

12.1 Project Results

The results of the planning effort are documented in the IID Plan and need to be communicated to the community. The effort and results are summarized here with reference to the sections of the report where the more detailed information is provided. The public and stakeholders in the region need to be familiarized with the Plan and develop a high level of awareness and understanding so that the IID Plan is viewed as a building block for achieving a unified solution to water problems in the area.

12.1.1 Purpose, Need, Conflicts

The planning process started with definition of the problems, purpose and need for action. The Board reviewed the purpose and need for the IID Plan and discussed the conflicts faced by IID and by the community at large. The effort sought to candidly identify, document and build agreement on problems which needed to be addressed by the IID Plan. If problems are not defined, there can be no accountability, and there is little incentive to seek or fund solutions.

It is clear that there has been a lack of consensus in the community regarding how IID's existing supplies can best be managed and apportioned to meet growing MCI needs, support economic development, and protect agricultural water uses. There are residual conflicts related to implementation of the QSA/Transfer Agreements that changed the management environment and basic assumptions regarding water supply availability. It is also apparent that IID, the IID Cities, and Imperial County can improve the development review process and coordination between IID and entities responsible for land use planning. IID's role is also changing, and needs to change, if it is to support the IID Cities, Imperial County, and development interests by providing well-defined water supplies to its existing customers while supplying water to new MCI users. The IID Plan reflects that Board's recognition of these conflicts and is an expression of the Board's desire to address the challenges.

12.1.2 Goals and Objectives

With a clear definition of the purpose and need for the IID Plan and candid recognition of the conflicts, the Board established the program goal and the objectives. These were used to guide the review and selection of water management strategies that could be implemented or combined into integrated approaches for meeting the goal and objectives.

12.1.3 Baseline Conditions

The baseline or existing conditions were described, including how the IID Plan, IWSP, and proposed Imperial IRWMP were related. The baseline conditions are important for shaping both the technical and policy assumptions and for establishing a starting point. Recognition of existing conditions also helps identify areas of risk or uncertainty, as well as opportunities for integrating facilities, agency authorities, current plans and land use/water supply policy. The Baseline conditions include the QSA/Transfer Agreements, Definite Plan, EDP, HCCP/NCCP, and existing policies, standards and regulations. The City and County General Plans, specific land use plans and UWMPs also define the baseline conditions for the planning environment. The ‗Law of the River' and a host of operating decisions, rules and requirements related to the Colorado River also define how IID manages its Colorado River entitlements. Finally, the California water law, SWRCB policies, and many other complex conditions shape the regulatory and policy environment.

12.1.4 Historical and Forecasted Future Demands, Existing Supplies, and Water Budget

There is a great deal of misunderstanding regarding the volume of water in the current IID Water Supply Portfolio as indicated by the current UWMPs and water supply assessments submitted to the land use agencies. This lack of awareness has resulted in conflicts surrounding how future needs can be met. IID Colorado River supplies are described in Chapter 5 along with the discussion of limitations and opportunities.[88] This information is intended to help generate a common understanding and to support IID Cities, Imperial County, and development interests in preparing Water Supply Assessments, UWMPs, or updated land use plans. IID has a very stable and relatively reliable supply as a result of the senior water rights to the Colorado River. This being said, the supply is fully apportioned to current users and any changes to water use or type of water use could have an effect on the current users.

Historical demands and future forecasted demand were quantified.[89] The results demonstrate that use patterns will change and more MCI uses can be anticipated. These uses have higher reliability requirements and are less able to be cut-back in times of drought or shortage. The largest increase will be for power plants for cooling water. The change in demand to more MCI uses implies reallocation of the water from existing uses, primarily agriculture, if no new

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[88] NRCE, June 2009. Technical Memorandum 2.1- Document Existing Colorado River Water Supplies, Appendix C.

[89] GEI, April 2009, Final September 2009. Technical Memorandum 2.2 Historical and Forecasted Municipal, Commercial, and Industrial Water Demand. Appendix D.

supplies are developed to meet increasing demands. A goal of developing or managing an additional 100,000 AF/yr was set based on the demand forecast. Some of this demand could be met by building facilities to produce new water or by apportioning water between historical uses and future uses.

The evaluation of the water budget indicates a number of basic approaches to managing the supply to meet new demands. The IID Plan seeks to identify a Water Supply Portfolio of 100 TAF to meet MCI and environmental water demands through 2047 by:

- Groundwater banking to make best use of the existing IID supply
- Developing available supplies and recapturing water discharged to the Salton Sea
- Demand management-efficiency/conservation
- Apportionment of water within the existing IID 3.1 MAF supply

A set of target planning objectives is recommended and includes development of 50,000 AF by the year 2020, expansion by an additional 25,000 AF by 2047, and provision for a contingency of 25,000 acre-feet.

12.1.5 Water Management Strategies

Water management strategies are recommended by DWR for inclusion in an integrated plan. These were evaluated for their relevance to IID and the findings and conclusions are summarized in Chapter 6.[90] The water management strategies help local agencies consider a range of opportunities when developing their integrated plans. This effort resulted in preliminary findings and conclusions that were presented to the Board in April 2009. There was little comment or changes to the preliminary findings that were then used to guide the development of specific project concepts and alternatives, and as such these findings and conclusions still provide a basis for the recommendations and action.

12.1.6 Demand Management Alternatives

IID needs to ensure that all of its Colorado River entitlement is reasonably and beneficially used in order to protect its water rights and avoid challenges.

Agricultural, urban, and industrial water conservation strategies were reviewed to identify opportunities to stretch every drop of water and make best use of the available water supply. IID has a history of agricultural water conservation, and as a result of the QSA/Transfer Agreements and the financial support provided, IID irrigation and distribution systems and IID growers are using state-of-the-art practices to conserve water and are already working to conserve over 400 TAF. As a result, there are limits to how much additional water could be saved for other uses in the IID service area. There is likely to be additional agricultural conservation savings, but it is

[90] GEI, June 2009. Appendix A. Project Scoping Report- Review of & Evaluation of Water Management Strategies. Appendix A.

uncertain how much until such time as the Definite Plan is implemented and has an operational history. The IID Plan identifies about 10,000 AF of system improvements that could conserve water and be made available for new MCI uses.

Urban Water Conservation Plans are the responsibility of the IID Cities or retail water purveyors that provide water to MCI uses. The UWMPs should recognize the opportunities and constraints to existing IID supplies and be consistent with the IID Plan. The County does not purvey water and does not have an UWMP. The County General Plan or other County policies would be where conservation-related actions are defined. The County could develop a water element to the General Plan and may also consider updating the groundwater plan if needed to support further development of groundwater supplies. Opportunities for saving water are primarily related to ensuring that future uses implement demand management measures to conserve water and minimize water demands and could generate savings of 20 to 40 TAF. These savings would reduce the need for new projects or reallocation of water among uses.

Geothermal uses could increase demands upward of 35,000 AF/yr and could save water in the cooling process through hybrid cooling technologies. The County Geothermal Element of the General Plan is being updated, but prior plans have projected upwards of 100,000 AF/yr of new demand for renewable energy, including geothermal power plants. IID and Imperial County need to cooperate to decide on appropriate standards for water use for cooling at power plants.

Findings and conclusions are provided for each of the agricultural, urban and industrial sectors. The findings are used to make recommendations for the Board to consider for each demand management section.

12.1.7 Capital Facilities Alternatives

There are a wide range of capital projects that could be built to increase the available water supply. These will require debt service and have unit costs higher than those previously observed in the IID area. The potential project alternatives include:

- One dedicated groundwater banking project
- An integrated agricultural water conservation program consisting of 24 separate actions including canal lining, interties, operations storage reservoirs and other improvements
- Two groundwater development and blending projects, one with percolation facilities for groundwater banking and one with only a well field
- Three desalination projects using drainwater or alamo river water
- Fifteen desalination projects to develop local groundwater
- Six recycled water projects

Some for the projects could be implemented by IID; others, such as the recycled water projects, would require partnerships. Projects were screened and ranked two different ways. A high priority is placed on projects that include groundwater banking so that IID can capture under-runs and prevent the loss of this water to the District. Chapter 8 provides a summary of projects,

costs and priorities based on project screening and evaluation criteria. Detailed project descriptions are presented in Appendix N. The appendices also document feasibility studies conducted to support project development.

Projects were developed at a reconnaissance level and additional pre-design and feasibility work is needed prior to selection of a preferred alternative or set of alternatives that can be combined with other policy actions that would allow apportioning of water among users. Findings and conclusions are provided that summarize the results of the chapter. The findings are used to make recommendations for the Board to consider.

12.1.8 Policy and Program Alternatives

Ultimately, implementation of the Water Management Portfolio will likely include some combination of demand management, capital projects, and policies/programs to apportion water among uses. Selection of the policy/program approach to be used by the Board is likely the most challenging action to be taken and will involve hard decisions related to how to pay for projects and/ or how to apportion water between historic and future uses and ensure that there are no third party effects or impacts to existing users. Chapter 9 lays out the policy choices and alternatives.

The information was provided to the Board to obtain guidance that could then be used to craft more specific and detailed policies, guidelines, standards or regulations. For each example alternative the basic approach, potential yield, advantages and drawbacks, and considerations and variants are presented. The alternatives covered include:

- No Action Alternative
- Minimalist- IID Develops Policy/Project Proponents Develop Solutions
- Full Apportionment/Fallowing/Managed Industrial Water Pool
- Full Apportionment/Fallowing/Free Market Exchange
- Land Conversion/Industrial Water Portfolio
- ~~O~~ption" Market for Fallowing during SDI

It is clear that the no action alternative is not viable and would perpetuate the current conflicts by not providing certainty in water supply to new MCI uses, IID Cities and Imperial County.

Based on discussions with the Board and staff, there appears to be a general consensus that there is a need for a program that includes some type of Annual Apportionment, In-Valley Fallowing and a Managed Industrial Water Pool. A program for annual apportionment could take many forms but is likely to build on the current Equitable Distribution Plan and existing fallowing programs. There were elements of the other alternatives which garnered support, including the need for a program to account for water savings or increases during land conversion.

The idea of an Options program similar to the one discussed in Chapter 9, or similar to the programs being implemented in other parts of California and in the PVID, would be desirable

and allow for fair and equitable compensation should fallowing be needed to provide water to meet future demands.

As presented in Chapter 9, the Board adopted Guiding Principles and obtained a consensus with members of the County Board of Supervisors to further shape the direction. Immediate-term actions are shaped by these policies.

Findings and conclusions are provided that summarize the results of the policy and program review in Chapter 9. The findings and conclusion were used to make recommendations for the Board to consider and act on. A final program will be configured once public input is provided and all the stakeholders have been provided an opportunity to comment.

12.2 Approach to Implementation

Before the Board can select a final policy/programmatic approach, and balance the mix of capital projects and demand management alternatives, there will be public input and workshops to explain the options. Once the Board receives the input it will make a final decision on a course of action to finalize the IID Plan and to develop an implementation and funding strategy. The Board may act quickly on some of the recommendations to begin implementing priority programs or projects.

12.2.1 Policy and Project Development and Design

A preliminary schedule for implementation is shown in Figure 12.1. The figure shows urban conservation, agricultural water conservation, policy/program and capital project actions. Once the Board decides on their priorities more detailed work plans and schedules can be prepared to:

- Develop detailed policies for consideration and adoption
- Conduct needed feasibility studies and develop preliminary designs
- Complete economic evaluations and develop a financing plan
- Acquire land easements and rights of way
- Negotiate necessary agreements
- Define environmental compliance strategies
- Develop environmental documents and seek permits
- Prepare final designs

The capital projects actions define next steps in a Gantt chart format for GW 18, GW19, and GWB 1. DES8 and RW1 and RW 5 also have preliminary schedules, but the subtasks have been rolled up to reduce details and allow for clearer presentation. Since the projects have not been prioritized they are all shown as starting in 2010. The figure also shows the Planned Yield of the alternative and the timing for when the yield could be realized.

For example, for GW 18, Groundwater Blending, the project is estimated to be completed in 2013, coming online in the near-term and producing 15,000 AF/yr. If all the projects came on line in the mid-term, in 2017 or 2018, then upwards of 150 TAF could be produced through a combination of policy/program actions and capital projects. It is unrealistic to think that all projects are needed, would be funded or could be built, but the figure indicates how capital projects and policy/program actions could be combined into a preferred alternative to time the yield to match new demands as they come online. Annual funding requirements can be better estimated once priorities are set and the scheduled increases in demand can be further determined.

The Coachella Groundwater Bank is expected to be developed as a single project phase. Some of the projects could also be integrated and/or developed in phases. For example, GW 18 and GW 19 are variations on the groundwater blending theme. GW 18 could be built to begin producing groundwater and blending with AAC water in a first phase, with a second phase to include the construction of dedicated groundwater recharge and banking facilities to capture under-runs and bring additional supply online at a later date. Phasing is also an option for the Desalination and Recycled water projects since plants can be configured in modular fashion to be brought on line as demands increase and as the rate base grows and funding is made available.

The Board may also decide to defer actions and decisions on some projects pending initiation of the Imperial IRWMP and formation of the RWMG and the proposed Imperial Water Forum.

12.2.2 Immediate-Term Actions

The schedule seeks to identify immediate-term actions for 2010 based on the Policy Guidelines and Direction provided by the Board and the need for an IWSP. The following actions were defined to be initiated immediately and completed in the time frame identified.

The IWSP is being considered by the Board as an immediate-term action. This will allow projects currently in the Imperial County land use process to move forward and avoid further delay.

Action	Start Date	End Date
Adopt Interim Water Supply Policy	Sept. 09	Nov. 09
Establish Mitigation Fund	May 10	July 10
Draft and Adopt Annual Apportionment, MCI Exchange Policy/ Program	Oct. 09	April 10
Coordinate with County on Joint Conversion Policies	Oct. 09	April 10
Environmental Review for Annual Apportionment, MCI Exchange, Land Use Conversion Policy	May 10	Aug. 10
Conduct Joint Groundwater Study (1)	Jan. 10	Dec .10
Preliminary Designs and Feasibility Study of Priority Projects	Nov. 09	Aug. 10
Economic Evaluations of Priority Projects	Mar. 09	Aug 10
Develop Imperial IRWMP	Oct. 09	July.10
Develop Projects CEQA Strategy	Jan. 10	Mar 10
Initiate CEQA on IRWMP or IID Plan	Aug 10	Mar. 10

Action	Start Date	End Date
Projects		
Develop IRWMP Grant Applications	Aug. 10	Jan. 10
Develop Regional UWMP	Mar. 10	Sept. 10

[(1)]Related to GW 19 and 19, Groundwater Blending Project

The Board's strategic plan set an objective to begin implementing the IID Plan in 2010. Once the priority mix of project and policy actions is selected from the alternatives a final schedule and detailed work plans can be established, resource needs defined and committed, and implementation can begin in earnest. Additional Board workshops and business meetings will be held to help the Board define the preferred mix of actions and meet the strategic plan goal for implementing key elements of the Plan in 2010.

12.3 Imperial IRWMP

The support for the Guiding Principles and the IID Plan provide the basis for initiating the Imperial IRWMP. Chapter 11 discusses the process for development of the IRWMP; a process that will be refined upon further discussion between IID, Imperial County, and the Cities that would make up the RWMG. Should the Board and the community decide to commit to the development of an Imperial IRWMP, this IID Plan could serve as a foundation and could be readily adapted.

The development of the Imperial IRWMP would be driven by the DWR schedule, with the goal of having an Imperial IRWMP ready to support the Imperial Region in seeking grant funding for IRWMP implementation. Seeking and obtaining consensus will be an intensive effort that will rely on information in the IID Plan to facilitate discussions. In order for other stakeholders to come to the same level of understanding, it is suggested that the RWMG and the Imperial Water Forum follow a similar process as the IID staff and Board when developing the IID Plan, including:

- Review and accept the purpose and need for an Imperial IRWMP
- Discuss the conflicts to be resolved through the integrated planning process
- Accept or refine the goal and objectives, adopt the goal and objectives
- Review and validate the findings from the Project's Scoping Report - Review and Evaluation of the DWR Water Management Strategies.
- Identify proposed capital project alternatives, demand management measures, or programs/policies for inclusion in the Imperial IRWMP
- Review, refine, or accept the evaluation criteria for ranking project alternatives
- Apply the evaluation criteria to proposed projects and establish regional project priorities
- Review and evaluate funding and financial strategies
- Produce a final Imperial IRWMP
- Adopt the IRWMP

12.3.1 Environmental Review

There are a number of interrelated actions that will be subject to CEQA review.

- IWSP
- Proposed Annual Apportionment, MCI Exchange, Land Use Conversion Policy/Program
- The IID Plan or IRWMP
- Individual Projects

The IWSP Actions would allow IID to move forward to identify sources of water for projects in front of the County for decisions. This is a discretionary act of the Board that is subject to CEQA. The Board should move forward with the Interim Policy as the IID Plan implementation strategy is finalized.

Currently, it is assumed that the IID will develop and adopt some Annual Apportionment, MCI Exchange Policy/Program, and work with the County on a Joint Land Conversion Policy. These will be subject to CEQA, and at this time, it is assumed that these would be acted on as a project and reviewed separately to allow for quick action.

Environmental review requirements and a strategy for environmental compliance for a final IID Plan and/or Imperial IRWMP will also be established once feasibility study, preliminary designs, and a preferred mix of policy and projects have been established. Without establishing a preferred alternative, defining a strategy for compliance with CEQA and NEPA is problematic. The IID Plan or Imperial IRWMP may or may not require an EIR or EIS depending on how the Board intends to use the plan to define and implement subsequent actions. There are advantages and disadvantages to reviewing an IRWMP or documents like the IID Plan at a programmatic level and development of the most cost effective strategy needs further review.

If capital projects are to be implemented, these will require project-level environmental review. It is not possible to firmly determine the scope, timing and extent of environmental review requirements without more detailed project designs. If projects will rely on federal funding, permits, or effect federal land, NEPA will be triggered and a joint EIR/EIS would be required. It also remains to be seen whether a programmatic, project, or combined program/project EIR/EIS would be appropriate.

For seeking IRWMP funding from the State, a project‘s readiness to proceed is an important criterion and having a certified environmental documents is one of the bases for decision making. A final environmental strategy will be developed by mid-2010.

12.3.2 Project Funding and Economic Evaluation

Local resources will be needed to continue funding the development of the IRWMP and to conduct further feasibility studies, field investigations, and preliminary designs work. Local funding for implementation of policies and for any in-valley fallowing will also be needed. The cost of fallowing is discussed in Chapter 9 and project capital costs are presented in Chapter 8.

Fallowing via policy can happen relatively quickly and current projects appear to have a willingness to pay. The final pricing strategy and costs are still being developed. The distribution of costs between current users and new project proponents will be a policy decision of the Board.

It is recommended that the Board seek to develop policies that cover the cost of any in-valley fallowing program, but plan cost structures to generate and accrue revenue to build capital projects that create new supplies or would allow for groundwater banking of under-runs.

It is important to emphasize that the economic evaluation conducted for the IID Plan was limited to an assessment of the potential influence on the Imperial County economy of converting water from agricultural to municipal and/or industrial uses in terms of County employment, industrial output and other relevant economic indicators. The IID Plan did not evaluate the economic viability of the conservation/fallowing, water storage or other alternatives available to the District for increasing its water supplies to avoid or at least mitigate the need for water conversion. The intent of the latter analysis would be to identify those project concepts that offer the greatest return in terms of water supply for the associated investment. This type of economic evaluation is a logical next step in the IID Plan evaluation process. Accordingly, the analysis would necessarily include an examination of the relative costs versus benefits of the water supply enhancement alternatives under consideration, and the willingness and/or ability of local water users to defray the associated costs through their water bills considering different rate structure options.

There is the possibility that DWR funding from the IRWMP Planning grant program could be obtained for purposes of conducting the CEQA work and developing the EIR, but as of this date, the timing for applications and distribution of the funding is uncertain. Previously, DWR also funded groundwater investigations through the Local Groundwater Assistance Program, but this program is also on hold pending sale of additional bonds. IID staff and the consulting team will work with the Board and other local stakeholders to identify alternative funding sources and to define opportunities to match local needs with available funding.

Figure 12-1- Schedule of Actions and Yields

	Planned Yield (AF/Yr)	Immediate	Near Term					Mid Term	Long- term
		2010	2011	2012	2013	2014	2015	2016-2020	2021-2047
Urban Water Conservation Actions									
Convene and Urban Water Management and Conservation Committee									
Define funding									
Develop a Regional UWMP									
Drought, catastrophic interruption plans									
Urban Conservation Public Information									
In- School Programs									
Development Standards									
Landscape Code, Ordinance, Standards									
Plumbing Code, Ordinance, Standards									
Standards for Dual Plumbing New Development									
Conservation Rate Structures									
Agricultural Water Conservation Actions									
Implement Definite Plan and Systems Conservation Plan									
Revisit and Review Definite Plan (Adapt/Revise)									
AWC 1 Canal Lining and 'Not Built' QSA Systems Conservation Projects	10400								
Policy/Program Actions									
Interim Water Supply Policy (1)	TBD								
Annual Apportionment with MCI Water Exchange									
Design Adopt Annual Apportionment, MCI Exchange Policy/Program									
Coordinate with County on Joint Conversion Policies									
Establish Mitigation Fund									
Environmental Review Apportionment, MCI Exchange, Land Use Conversion Policy									
In- Valley' Fallowing Program (2)									
Western Farm Lands (2000 acres rotational program)	7400								
Private Fallowing (1000 acre rotational program)	3700								
Land Use Conversion - normal urban growth (3)	1600 -14000								
Land Conversion - Rezoning Ag to Industrial (4)	1850- 1370								
Preliminary Project Designs									
Economic Analysis									
Develop CEQA Strategy									
Develop Imperial IRWMP									
Develop IRWMP Grant Application									
Develop EIR Program/Project EIR									
Capital Facility Actions									
Conduct Joint Goundwater Study									
GW 18 Groundwater Blending, East Mesa Well Field	15000								
Preliminary Design									
Environmental Review (if needed)									
Permitting									
Final Design									
Construct									
GW 19 Groundwater Blending, East Mesa, Banking/Percolation Ponds	25000- 35000								
Preliminary Design									
Environmental Review (if needed)									
Permitting									
Final Design									
Construct									
GWB 1 Coachella Groundwater Bank	50000								
Feasibility Study (land acquisition, Negotiations)									
Preliminary Design									
Environmental Review									
Permitting									
Final Design									
Construct									
DES8 East Brawley Desalination with Well Field and Groundwater Recharge									
Feasibility Study (land Acquisition, Negotiations)									
Preliminary Design									
Environmental Review									
Permitting									
Final Design									
Construct									
RW 1 - Disinfected Secondary Effluent at Existing Wastewater Treatment Plants Applied to Adjacent Agriculture	13300								
Feasibility Study (Negotiations)									
Preliminary Design (wells)									
Environmental Review									
Permitting									
Final Design									
Construct									
RW 5 Regional Plant Serving Tertiary Water to IID Canal	6600								
Feasibility Study (Negotiations)									
Preliminary Design (wells)									
Environmental Review									
Permitting									
Final Design									
Construct									

Timing of Industrial Water Portfolio Planned Yields (AF)

MCI Exchange: Policy for Land Use Conversion and In Valley Fallowing	Unit Cost ($/AF)	Timing of Yield (AF/yr)							
In Valley Fallowing w/ Option Program (2)									
Western Farm Lands	$200		7400	7400	7400	7400	7400	7400	
Private Fallowing	$200		3700	3700	3700	3700	3700	3700	
Land Use Conversion - normal urban growth (3)	$0		1600	1600	1600	1600	1600	4300	14000
Land Conversion - Rezoning Ag to Industrial (4)	$0		1850	1850	1850	1850	1850	3700	3700
Capital Facilities, IID Developed									
GW 18 Groundwater Blending, East Mesa Well Field	$91					15000	15000	15000	15000
GW 19 Groundwater Blending, East Mesa Well Field, Percolation Basins (5)	$129						25000	25000	25000
WB 1 Coachella Valley Groundwater Storage Project	$265							50000	50000
DES 8 East Brawley Desalination with Well Field and Groundwater Recharge	$480							25000	25000
AWC 1 Canal Lining & 'Not Built' Systemwide Projects	$504						10,400	10,400	10,400
Capital Facilities, Recycled Water, Multiple Participants									
RW 1 Disinfected Secondary Effluent from Existing Wastewater Treatment Plar	$118						13300	13300	13300
RW 5 Regional Plant Serving Tertiary Water to IID Canal	$308							6600	6600
Total Potential Combined Yield		0	14550	14550	14550	29550	78250	164400	163000

(1) IWSP savings Linked and accounted for as part of In Valley Fallowing actions.
(2) In Valley fallowing would be in addition to the QSA/Transfer Fallowing as assumes. 2000 acres of Western Farm Lands and 1000 private acres at 3.7 AF/acre
Initial Western Farmlands Fallowing for Interim Water Supply Policy. Yield will vary by participation in the program. Yield set as a goal to match new demands.
Plan is to include "Option" Contracts exercised in over run years as part of managing the cap.
(3) Based on average growth and 1.75 AF/acre savings from land conversion over the periods identified.
(4) Assume 500 acres, between 2010 and 2015; 500 additional 2016-2020 at 3.7 AF/acre
(5) Yield is conservatively estimated pending field study and modeling. With Recharge could go to 50,000 AF

References

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