IMPERIAL IRWMP
INTEGRATED REGIONAL WATER MANAGEMENT PLAN

Chapter 6

Review of Resource Management Strategies

Table of Contents

Figures

Tables

Chapter 6. Review of Resource Management Strategies

6.1 Resource Management Strategy Standards

A resource management strategy (RMS) is defined by the California Department of Water Resources (CDWR) as a project, program, or policy that local agencies can implement to manage water and related resources to meet integrated plan objectives. CDWR's standard for RMS review is to encourage diversification of water management approaches, plan for uncertain future circumstances, and comply with state law.[1] Local groups like the Water Forum must consider the RMSs identified in California Water Plan Update 2009 when developing their IRWMP.

This chapter provides a summary of the methodology and results of the Water Forum's review and evaluation of the CDWR RMSs. Region-specific discussion of these strategies and Water Forum Findings and Recommendations are presented in Chapters 7 through 11.

6.2 RMS Review Process

The Water Forum considered The CDWR RMS to build and diversify the Imperial Region water management portfolio. RMS review was part of the IRWMP scoping process to tailor the RMSs to the Imperial Region. The Water Forum RMS review process is shown in Figure 6-1. The process allowed the Water Forum to add, integrate, adapt, eliminate, and/or re-group strategies to meet the Region's mission, goals, objectives, and needs.

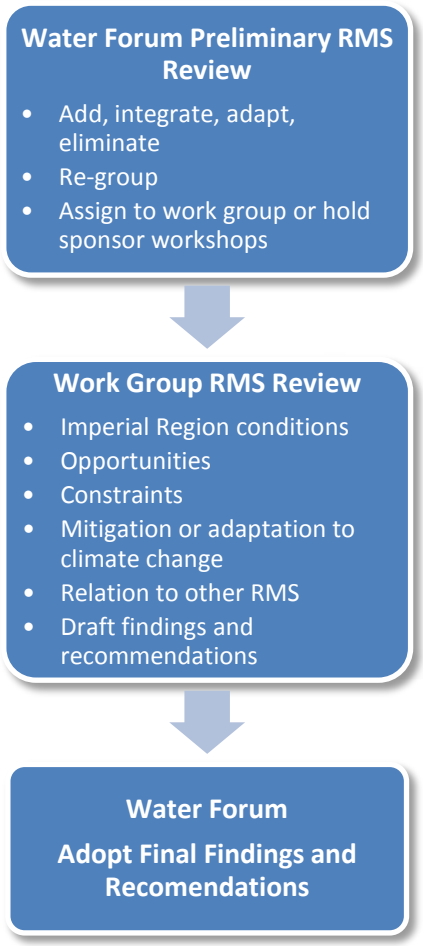

Figure 6-1. Water Forum Review

[1] California Public Resources Code §75026(a) and California Water Code §10541(e)(2).

6.2.1 Preliminary Review

The RMSs are interrelated and linked to other activities in the Region. The Water Forum considered each RMS (see Table 6-1) individually to tailor and regroup them to reflect local conditions.

The Water Forum made findings and recommendations which provide broad guidelines to focus the IRWMP and support development of specific projects, programs and policies to be integrated and, ultimately, to be implemented by agencies with the appropriate jurisdiction and authority.

Table 6-1, Resource Management Strategies as Applied and Grouped for the Imperial Region, lists the CDWR seven management objectives and 33 associated Resource Management Strategies.[2] Table 6-1 provides a summary of how the Water Forum subdivided, regrouped and adapted the CDWR RMS into Imperial Management Objectives to reflect Imperial Region circumstances.

Table 6-2, Resource Management Strategies for Further Development and Integration, lists the five Imperial Management Objective and 17 associated Imperial resource management strategies, and provides the rationale for the approach and the Water Forum determination on how the strategy would be applied. The rationale describes how the strategy could be integrated with other strategies or with existing programs, projects, and policies. The Water Forum determination column indicates the Water Forum's judgment of whether the strategy would meet IRWMP objectives either separately or when integrated with other strategies.

Table 6-3 Resource Management Strategies Set Aside from Further Development, lists 19 strategies that were removed from further consideration after the preliminary review. The Water Forum set aside a strategy if it did not meet Water Forum objectives, was not applicable to the Region, or could meet objectives but was adequately addressed by existing or planned programs. Some elements of an set aside RMS were integrated with other strategies. Strategies can be brought back into subsequent IRWMP updates to respond to changing conditions as part of adaptive management.

[2] California Water Plan Update 2009 Volume 2 and CDWR 2010 IRWMP Guidelines

Table 6-1.*Resource Management Strategies as Applied and Grouped for the Imperial Region*

CDWR Management Objective	CDWR RMS	Imperial RMS	Imperial Management Objective
Reduce Water Demand	Agricultural Water Use Efficiency	Agricultural Water Use Efficiency	Reduce Water Demand (Chapter 8)
	Urban Water Use Efficiency	Urban Water Use Efficiency	
		Renewable Energy Sector Water Use Efficiency	
Improve Operational Efficiency and Transfers	System Reoperation	System Reoperation – Regional, Interregional	(Table 6-3)
	Water Transfers	Transfers – Into and Out of Region	
	Conveyance – Delta (Table 6-3)		Increase Water Supply (Chapter 7)
	Conveyance – Regional/Local	Conveyance -– Regional, Interregional (Table 6-3)	
		Conveyance – Local, Planned	
		Conveyance – Municipal Systems Interconnections	
Increase Water Supply	Conjunctive Management and Groundwater Storage	Groundwater Development, Storage, Banking and Conjunctive Management	
	Desalination		
	Recycled Municipal Water		
	Surface Storage – Regional/Local	Surface Storage – Local	
		Surface Storage – Regional (Table 6-3)	
	Surface Storage – CALFED (Table 6-3)		
	Precipitation Enhancement (Table 6-3)		
Improve Water Quality	Matching Water Quality to Use		
	Drinking Water Treatment and Distribution		Improve Water Quality (Chapter 10)
	Pollution Prevention (Table 6-3)		
	Salt and Salinity Management (Table 6-3)		
	Groundwater and Aquifer Remediation (Table 6-3)		
	Urban Runoff Management		Improve Flood Management (Chapter 9)
Improve Flood Management	Flood Risk Management	Regional Flood Control	

Table 6-1. Resource Management Strategies as Applied and Grouped for the Imperial Region, Continued

CDWR Management Objective	CDWR RMS	Imperial RMS	Imperial Management Objectives
Practice Resources Stewardship	Agricultural Lands Stewardship		Practice Resources Stewardship and Other Strategies (Chapter 11)
	Economic Incentives (Loans, Grants and Water Pricing)		
	Ecosystem Restoration		
	Forest Management (Table 6-3)		
	Land Use Planning and Management[1]		
	Recharge Area Protection (Table 6-2)		
	Water-Dependent Recreation (Table 6-2)		
	Watershed Management[2] (Table 6-3)		
Other Strategies	Crop Idling for Water Transfers (Table 6-3)		
	Irrigated Land Retirement	Irrigated Land Retirement for Local Apportionment	
	Dewvaporation or Atmospheric Pressure Desalination		
	Fog Collection		(Table 6-3)
	Rainfed Agriculture		
	Waterbag Transport, Storage Technology		

[1]Land Use Planning and Management: Imperial County Use Permits for Solar Development IID Temporary Land Conversion Fallowing

[2]Crop Idling for Water Transfers: IID Equitable Distribution Plan, Temporary Land Conversion Fallowing Policy, and proposed fallowing for In-lieu MCI Exchange (Table 6-3 & Recycled Water RMS &)

Table 6-2.*Resource Management Strategies for Further Development and Integration*

Imperial Management Objective	Imperial RMS	Rationale	Water Forum Determination
Increase Water Supply (Chapter 7)	Conveyance – Local	Includes currently planned conveyance facilities identified in local capital improvement plans for City or County systems. IID system improvements are part of IID System Conservation Program.	Integrate to meet objectives
		Can integrate new conveyance infrastructure as part of recycling, groundwater banking or other local projects. Include concepts for interties to connect municipal drinking water treatment or wastewater treatment systems.	
	Groundwater Development: Storage, Banking and Conjunctive Management	Groundwater storage and/or banking could help meet Water Supply goals and objectives; facilitate management of overrun/underrun of IID's Colorado River entitlement, increase operational flexibility, and help mitigate and adapt to climate change.	Meets objectives
		Unlikely to develop groundwater supplies in quantity needed to meet forecasted MCI demand. Very limited opportunities due to basins approaching or exceeding safe or sustainable yields (overdraft), low rates of natural recharge, and/or poor quality water.	Integrate to meet objectives
		Integrate East Mesa brackish groundwater development into desalination concepts.	
	Desalination	Potential new water source (secondary use of Colorado River supply). Could provide water for proposed In-lieu MCI Exchange/in-valley use.	Meets objectives
	Recycled Municipal Water	Potential new source (secondary use of Colorado River supply). Match to appropriate water use based on treatment level and water quality. Could support renewable energy (geothermal) industry by providing supply for cooling water, support DACs through upgrade of treatment plants and help mitigate or adapt to climate change. Could provide water for proposed In-lieu MCI Exchange/in-valley use.	Meets objectives
	Surface Storage – Small Local for Raw or Treated Water	Small surface storage is integrated into system optimization and conservation strategies in the IID System Conservation Plan. Could include wholesale water delivery system, operational storage improvements, and municipal raw or treated water storage to address deficiencies identified during DAC outreach and Projects Work Group meetings.	Integrate to meet objectives
	Matching Quality to Use	Moved to Increase Water Supply to emphasize use of brackish water to increase supply for economic activity: match recycled municipal wastewater to appropriate use under state requirements and put brackish water to beneficial use where cost effective (e.g. algae production).	Meets objectives

Table 6-2. Resource Management Strategies for Further Development and Integration (continued)

Imperial Management Objective	Imperial RMS	Rationale	Water Forum Determination
Reduce Water Demand (Chapter 8)	Agricultural Water Use Efficiency	IID Definite Plan and System Conservation Plan identify efficiency conservation projects, programs and policies to be implemented. Up to 8 KAFY of system efficiency conservation costing more than $500/AF may be possible above that required to meet IID QSA/Transfer Agreements obligations.	Meets objectives
	Urban Water Use Efficiency	Further definition of local and regional program is needed. Could integrate IRWMP and UWMP.	Meets objectives
	Renewable Energy Sector Water Use Efficiency	Renewable energy sector (geothermal) water use efficiency is added to reflect water use for cooling as the largest component of forecasted future water demand. Development of renewable geothermal energy is part of County General Plan and economic development strategy; supported by IID Board; sector has unique BMPs for conservation; and addresses specific state/federal requirements. The Imperial IRWMP supports regional and state goals for increasing renewable energy production to reduce greenhouse gasses and to mitigate and adapt to climate change.	Added to meet objectives
Improve Flood Management (Chapter 9)	Urban Runoff Management	Address stakeholder concerns with management of stormwater runoff from cities. Integrate efforts to improve urban runoff water quality consistent with NPDES stormwater permit requirements. Potential to create regional benefits and projects. Could integrate with habitat management. Could consider altering purpose of IID drainage system to meet multiple objectives. Would be expensive, and DACs have few resources.	Integrate meet objectives
	Regional Flood Control	Coordinate urban runoff management efforts to create a regional approach to flood management. No cost-effective major regional flood control projects have been identified; however, regional policies could be developed.	Integrate to meet objectives
Improve Water Quality (Chapter 10)	Drinking Water Treatment and Distribution	Address system deficiencies. Potential for consolidation of facilities to provide economies of scale and achieve cost-effectiveness.	Integrate to meet objectives

Table 6-2. Resource Management Strategies for Further Development and Integration, Continued

Imperial Management Objective	Imperial RMS	Rationale	Water Forum Determination
Practice Resources Stewardship (Chapter 11)	Economic Incentives (Loans, Grants and Water Pricing)	Identify opportunities to integrate projects and compete for state and federal grants. Could develop water rates that provide economic incentives to conserve and generate revenues to implement projects that provide an alternative supply to the Colorado River and/or for secondary uses of Colorado River water. However, DAC status militates against rate increases. Would integrate with water substitution or exchange concepts.	Integrate to meet objectives
	Ecosystem Restoration	Could integrate with recycled municipal wastewater strategy to mitigate for potential impacts of reduced flow to IID drains. Could develop regional habitat mitigation banking concept.	Integrate to meet objectives
	Water-Dependent Recreation	Could integrate with groundwater banking, stormwater/ flood management and habitat mitigation banking where feasible to provide multiple economic and other benefits. IID 2011 recreational delivery was 33.9 KAF to duck clubs, golf courses, lakes, and recreational/wildlife areas.	Integrate to meet objectives
	Recharge Area Protection	Could be integrated into any groundwater recharge and storage program. Part of proposed Groundwater Management Plan (GMP) element of the IRWMP.	Integrate to meet objectives
	Irrigated Land Retirement for Local Apportionment	Long term retirement of agricultural lands through conversion to other permanent uses consistent with city or County general plans would provide water for long term in-valley apportionment. Integrate with other strategies; coordinate with land use planning and management. Could apply administrative or legal mechanisms to permanently reduce agricultural water use on a property (e.g.; conservation easement, title changes). IID Temporary Land Conversion Fallowing Program suggests there will be no long-germ retirement unless for urban & MCI development for lands in city & County general plans.	Integrate to meet objectives

Table 6-3. ***Resource Management Strategies Set Aside from Further Development***

Imperial Management Objective	Imperial RMS	Rationale	Water Forum Determination
Improve Operational Efficiency and Transfers	System Reoperation – Regional, Interregional	Regional (local) system reoperation is part of IID Definite Plan and System Conservation Program. Interregional reoperation is integrated with concepts for groundwater storage in the Coachella Valley IRWM Region. Lower Colorado River operations are directed by USBR rules.	Existing program
	Transfers – Out-of-basin	Out-of-basin transfers do not meet Imperial Region IRWMP objective to provide a firm, verifiable, and sustainable supply to meet current and future demands. Out-of-basin transfers beyond those in the QSA/Transfer Agreements are not part of the IRWMP.	Set Aside
	Transfers – Into Region	All water delivered by IID enters the Region from the Colorado River. No further transfer into the Region is proposed by any public agency. Public and private interests may seek to transfer water into region if cost effective. Could be part of long-term adaptive management strategy.	Set Aside
	Conveyance – Delta	Could influence competition for Colorado River supplies on the part of South Coast and Coachella Valley IRWMP regions dependent on Delta supply; not directly applicable.	N/A
Increase Water Supply (Chapter 7)	Conveyance – Regional, Interregional	Large interregional project concepts to support Salton Sea enhancement and/or integrate with desalination to provide new supplies and facilitate transfers are cost prohibitive compared to other alternatives. Limited local political support. Could be future long-term strategy.	Set Aside
	Surface Storage – Regional	Large surface storage reservoirs not feasible due to flat terrain, cost, environmental compliance requirements, high evaporation rate, and regulatory constraints.	Set Aside
	Surface Storage – CALFED	Could influence competition for Colorado River water by South Coast and Coachella Valley; not directly applicable.	N/A
	Precipitation Enhancement	Not applicable to Region (desert climate).	N/A
Improve Water Quality (Chapter 10)	Pollution Prevention	Programs are adequate at this time.	Existing program
	Salt and Salinity Management	IID and growers have a long history of salt and salinity management to maintain agricultural productivity.	Existing program
	Groundwater/ Aquifer Remediation	Programs adequate at this time; generally limited to salt management and leaching practices.	Existing program
Practice Resources Stewardship and Other Strategies (Chapter 11)	Crop Idling for Water Transfers	Crop idling is part of IID Equitable Distribution Plan and SDCWA transfer/Salton Sea mitigation (2003-2017).	Set Aside
		Additional crop idling is contrary to IID and County policy. County Use Permits (CUPs) for solar development and IID Temporary Land Conversion Fallowing Policy could result in supply to meet certain QSA/Transfer Agreements, obligations or forecasted MCI use. Integrate with other strategies; coordinate with land use planning and management.	
	Agricultural Lands Stewardship	To preserve and protect agricultural water supplies is a Region objective. Existing programs for to preserve and protect ag lands and IID's water supply are exemplary.	Existing Program
	Forest Management	Not applicable to Region.	N/A
	Watershed Management	Coordinate with state and federal agency activities.	Set Aside
	Dewvap/Atmospheric Pressure Desal	Not applicable to Region (low humidity, average rainfall around 3 inches per year.)	N/A
	Fog Collection	Not applicable to Region.	N/A
	Rainfed Agriculture	Not applicable to Region.	N/A
	Waterbag Transport,	Not applicable to Region.	N/A

6.2.2 Work Group RMS Review

Work group and workshop meetings allowed discussion of an RMS in small group settings. The Demand Management Work Group reviewed strategies associated with the Reduce Water Demand management objective, and the Projects Work Group reviewed the strategies in the Increase Water Supply and Improve Operational Efficiency objectives. Workshops were conducted for Improve Flood Management, Improve Water Quality, and Ecosystems Restoration management objectives. The Charter Work Group drafted the Imperial IRWMP Water Forum and RWMG Charter. IID, as lead regional water agency, and the County, as the lead regional land use agency, engaged in discussion of coordinated approaches to land use planning and water supply management through the IID/County Water Planning Group.[3] Water Forum, work group, and workshop participants were provided access to prior reports, briefing materials, and presentations, including:

- Description of the CDWR standards and resource management strategies
- Documentation of Imperial Region conditions and how the resource management strategies are being applied
- Analysis of opportunities relevant to future application of the strategies in the Imperial Region
- Documentation of constraints and challenges within the Region
- Identification of the relationship to other resource management strategies
- Draft findings and recommendations

In developing the specific strategies for the Imperial Region, the Water Forum considered:

- ***Objectives*** – how well does the strategy work to meet the Imperial IRWMP objectives?
- ***Complexity*** – does the strategy face complex legal, political, or technical hurdles that would impede the ability to design, permit, or implement it?
- ***Resolution of conflicts, Colorado River*** – would the strategy help to resolve or avoid conflicts on the river?
- ***Resolution of conflicts, Imperial*** – would the strategy help to resolve or avoid conflicts within the Imperial Region?
- ***Regional Benefits*** – would the strategy provide region-wide benefits to multiple participants?
- ***Timeliness*** – is the strategy well defined for the Imperial Region; are potential projects ready to proceed; does a project have a feasibility study, preliminary design, and environmental clearance and approvals?
- ***Political Acceptability, Local*** – would the strategy be widely supported within the Imperial Region; could it receive local funding and support?
- ***Political Acceptability, Interregional –*** would the strategy be widely supported within the Colorado River basin; would it generate political controversy; could it receive state or federal funding and support?
- ***Integration Opportunities –*** would the strategy provide additional benefits when combined with other strategies?

[3] The IID/County Water Planning Group consists of two members from the IID Board of Directors and two members from the County Board of Supervisors.

- ***Adaptability to Climate Change –*** would the strategy help mitigate climate change within the Colorado River basin; would it help the Region adapt or respond to climate change?

6.3 WATER FORUM FINDINGS

Findings and recommendations that the work groups drafted were presented to the Water Forum, where they moved through the planning process to Water Forum final action. Following considerable discussion, collaboration and wordsmithing, the Water Forum reached consensus and adopted all findings and recommendations presented in the IRWMP.

Chapters 7 through 11 of the IRWMP present an expanded discussion of the RMSs identified by the Water Forum for further development, grouped by Imperial Management Objective. These chapters present the Water Forum's consensus findings and recommendations and provide information that supported the findings. Findings adopted by the Water Forum define the scope of the IRWMP, and ultimately provide guidance for developing and integrating stakeholder projects, programs and policies.

6.4 RATIONALE FOR STRATEGIES SET ASIDE FROM FURTHER CONSIDERATION

The following strategies are either being implemented through an existing program, were determined to be not applicable, or were set aside for reasons identified below. Future IRWMP updates may include these strategies as part of the adaptive management process.

6.4.1 System Reoperation – Regional, Interregional

The IID Definite Plan and System Conservation Plan include system reoperation to improve water delivery and reduce operational spill. Development of groundwater storage and banking projects could involve reoperation of the All American and Coachella canals as part of the groundwater storage, banking, and conjunctive use strategy. Interregional system reoperation of the Coachella Canal and other facilities for groundwater storage by IID in the Coachella Valley IRWM Region would be coordinated between CVWD and IID.

Lower Colorado River operations are directed by USBR rules. Any interregional system reoperation would be under their direction consistent with their operations policies (e.g. Annual Operating Plan, and Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lakes Powell and Mead).

6.4.2 Transfers – Out-of-basin

Out-of-basin transfers do not meet Imperial Region IRWMP objective to provide a firm, verifiable, and sustainable supply to meet current and future demands in the Imperial Region. IID holds legal title to all its water and water rights in trust for landowners within the district (CWC Code §§20529 and 22437:

Bryant v. Yellen, 447 U.S. 352, 371(1980), fn.23). The Water Forum determined the QSA/Transfer Agreements to be out of scope for the IRWMP, and no out-of-basin transfers beyond those identified in the QSA/Transfer Agreements are included in the IRWMP. The Water Forum set aside this strategy from further consideration.

6.4.3 Transfers – Into Region

All water delivered by IID enters the Region from the Colorado River. No further transfer into the Region is proposed by any public agency. However, transfers of water into the Imperial Region could include public agency or private procurement of a transfer agreement from a third party and compliance with wheeling policies to convey (wheel) the water through the All-American Canal, Coachella Canal or other canals.[4] Opportunities for procurement of a water right from a Colorado River water rights holder are limited. The water would have a high price due to the competitive market and would not be cost effective. Nothing would preclude the Cities or urban water suppliers to independently obtain and transfer water into the Imperial Region.[5] This strategy is not currently proposed by any public agency engaged with the Water Forum. Private interests have considered transferring water into the basin; however, to date these concepts have not proven cost effective. Such transfers could be part of long-term adaptive management. The Water Forum set aside the strategy from further consideration for this version of the IRWMP.

6.4.4 Conveyance – CALFED

Delta conveyance is not directly related to the Imperial Region. It is indirectly related to the Imperial Region through CALFED conveyance water through the Sacramento San Joaquin Delta to the State Water Project (SWP). Improved Delta conveyance could have a strong influence on the volume, reliability and availability of SWP supplies that flow to water agencies in the South Coast (MWD, SDCWA) and Coachella Valley (CVWD) IRWM regions. Increased competition with other regions, especially those with large voter population, tax base, and legislative clout, would affect the price of the Colorado River supply and create additional political pressure on the Imperial Region's Colorado River supply. Should there be a catastrophic disruption in the SWP delivery; Imperial Region Colorado River supply could be impacted. The Water Forum set aside this strategy from further consideration for purposes of the Imperial IRWMP.

6.4.5 Conveyance – Regional, Interregional

The IID Systems Conservation Plan identifies regional conveyance improvements and use of the old, unlined Coachella Canal was integrated into the groundwater storage, banking, and conjunctive use strategy.

[4] In practice, no one on the Colorado River system transfers water rights; water transfer agreements are entered into to preserve existing water rights.

[5] The UWMP Act requires urban water providers to evaluate exchanges or transfers of water on short-term or long-term basis (CWC 10631(d)). Also see Chapter 11 for discussion of Imperial Region water exchanges.

Large interregional conveyance concepts have been proposed by private sector interests. The concepts are related to restoring the Salton Sea or facilitating additional transfers of water into and out of the Imperial Region. One example is the Sea to Sea Project which would include a number of variants to bring in Sea of Cortez ocean water into the Imperial Region and remove hypersaline Salton Sea water to the Sea of Cortez. Other evolving concepts, if cost effective could be part of the long-term strategy to address regional and interregional water demands. The elements of such a strategy may provide long-term opportunities, but are not sponsored by any public agency; would involve complex agreements and permitting requirements, and none of the projects was well defined or ripe for a decision. As such, this strategy is not included in this version of the Imperial IRWMP, but could be included in an update of the Imperial IRWMP as part of adaptive management.

6.4.6 Surface Storage — Large Local/Regional

Regional large-scale surface storage is not feasible due to the Region's flat terrain, high evaporation rates and environmental issues. There is no practical location in the Imperial Region at which to site a large scale reservoir. Furthermore, evaporative rates in some portions of the region are upwards of eight feet per year and environmental constraints are great. The Water Forum determined that opportunities to store additional water off of the Colorado River would be better realized through groundwater storage and banking.

Smaller surface storage reservoirs on the IID system would provide operational flexibility; 36 mid-lateral reservoirs are listed in the IID System Conservation Plan. Other surface storage opportunities, if identified and cost effective, would be integrated into the Increase Water Supply management objective.

Following a protracted 11-year drought, which began in late 1999 and ended in 2010, and full use of Colorado River water rights, there is excess reservoir storage capacity on the Colorado River. IID continues to evaluate opportunities to use Lake Mead's available storage; however, this must be coordinated with USBR Lower Colorado River Region and with other holders of Lower Colorado River water rights. No local or regional large scale surface storage opportunities are available, and the Water Forum set aside this resource management strategy from further development.

6.4.7 Surface Storage — CALFED

CALFED surface storage projects are not directly related to the Imperial Region. They are indirectly related to the Region because CALFED storage has a strong influence on the volume, reliability and availability of Sacramento-San Joaquin Delta water and SWP supplies that flow to water agencies in the South Coast (MWD/SDCWA) and Coachella Valley (CVWD) IRWM regions. Increased competition with other regions, especially those with large voter population, tax base, and legislative influence, would create additional political pressure on the Imperial Region's Colorado River supply. Should there be a catastrophic disruption in the SWP delivery; Imperial Region Colorado River supply could be impacted. The Water Forum set aside this strategy from further consideration for purposes of the Imperial IRWMP.

6.4.8 Precipitation Enhancement

Imperial Region rainfall averages less than three inches a year (the same as Cairo, Egypt). There are no opportunities for precipitation enhancement, and the strategy was set aside from consideration.

6.4.9 Pollution Prevention

In general, a pollution prevention approach to water quality is a more cost effective than end-of-the-pipe treatment of wastes or advanced domestic water treatment for drinking water. Pollution prevention measures can be more cost-effective than traditionally engineered treatment systems since they generally require less initial capital investment and have lower operation and maintenance costs. For the Imperial Region, all domestic water supplies are served with Colorado River water, state and federal programs are deemed sufficient to protect beneficial uses, and additional pollution prevention programs are not a priority.

To comply with US Environmental Protection Agency (USEPA) requirements and avoid termination of canal water service, residents in the IID water service area who do not receive treated water 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 that are required by the California Department of Public Health (CDPH) to have alternate drinking water service. IID maintains a small-acreage pipe and drinking water database, and provides an annual compliance update to CDPH.

In 2000, the Colorado Region Basin Regional Water Quality Board (RWQCB) developed a Total Maximum Daily Load (TMDL) for Imperial Valley waterways which requires agricultural dischargers to reduce the amount of substances such as silt and nutrients that leave their fields. The Imperial County Farm Bureau (ICFB) in collaboration with IID developed an award-winning TMDL program, which they describe as follows:

> *TMDLs have had a huge impact on Imperial Valley agriculture and the Imperial County Farm Bureau developed a voluntary compliance program to help defend growers from the onslaught of TMDLs. The TMDL program is voluntary, however nearly all farmers in Imperial Valley participate in the program because it offers growers and landowners a straightforward path to compliance with the mandatory TMDL regulation. Farmers implement a variety of Best Management Practices (BMPs) to reduce silt and mineral runoff on their own farms, and maintain a record of their efforts, and attend annual meetings to keep up-to-date and share information relating to BMPs and TMDL management on their farms.*

> *Since implementation, the Farm Bureau's TMDL program has prevented more than 33,000 tons of silt from entering the New and Alamo rivers, achieving the goal for the New River within three years. The program has seen a significant reduction at the Alamo River well ahead of the 12-year implementation schedule.*[6]

No additional pollution prevention actions were identified during initial scoping phase or during project definition, and no further measures are included in this IRWMP. Existing programs, monitoring and other ongoing efforts are acknowledged and integrated into the IRWMP.

6.4.10 Recharge Area Protection

Most areas in the Imperial Region that could be developed for groundwater recharge are on public lands that are managed under federal plans and regulations. Others are in natural drainages and floodways and protected under the County General Plan, Flood Plain Management Plan, zoning and County codes. Project designs will seek to avoid, minimize, and mitigate any potential impacts to recharge areas.

6.4.11 Salt and Salinity Management

Due to the desert climate and salinity of Colorado River water delivered to IID users (averaged 744 ppm over the 21 years, 1990-2010);[7] Imperial farmers incorporate salt and salinity management as a routine management practice. IID maintains approximately 1,406 miles of drainage ditches used to collect surface runoff and subsurface drainage from 32,000 miles of tile drains underlying 475,000 acres of farmland. The tile drains act as conduits for percolating applied water that serves to carry salts that would otherwise be accumulated out of the root zone. Most of the IID drainage ditches discharge into either the Alamo River or New River, which flow to the Salton Sea, while some discharge directly to the Salton Sea. The Water Forum found that existing programs and strategies for salt and salinity management adequate to protect water quality and maintain agricultural productivity. Even if new programs are not developed in the IRWMP, salt and salinity management is discussed in Chapter 7 since this strategy is important for the Imperial Region.

While inflows to the Salton Sea contain elevated concentrations of salt, the main cause of high salinity in the sea is concentration of salts through evaporation. Efforts to manage the salinity concentrations in the inflow waters could reduce the amount of salt entering the system, but the salinity concentration in the closed basin lake will continue to increase. The Salton Sea Ecosystem Restoration Plan (California Natural Resource Agency, 2007) includes a number of alternatives that address increasing salt concentrations in the sea, including blending of inflow and sea water, and with differing configurations and sizes of habitat and open water areas. The plan also recognizes that the Salton Sea will be managed as a saline water body, and many of the alternatives include some variant of a saline brine sink as part of

[6] Source: Imperial County Farm Bureau website. "TMDL Voluntary Compliance Program." 5 Jul 2012. <http://www.icfb.net/tmdl.html>
[7] Every acre-foot of Colorado River imported into the Region carries a ton of salt.

the design. All of the alternatives to manage Salton Sea salinity are expensive, require an interregional solution and local, state, and federal cooperation. While the State of California has legislatively assumed responsibility for Salton Sea restoration; funding and specific roles and responsibilities have not been identified; and the cost of the preferred alternative, at $9.8 billion, is very expensive.

The extent and magnitude of managing the sea's salt concentrations are beyond the scope of work for the Imperial Region. Salt management on the Colorado River is an interstate and international issue. Constraints related to disposal of a residual brine stream from potential desalination projects are addressed Chapter 7. Export of salts by constructing large conveyance facilities to import seawater and export highly saline Salton Sea water has not proven cost effective or feasible.

Within the Region, salt and salinity management is already a part of farmer's and IID operations (drainage system and delivery of water sufficient for required leaching) and no new salt or salinity management programs or actions have been identified for further development in this version of the Imperial IRWMP. Removal of salts from drain water or brackish groundwater is being considered in the Region's desalination strategy as a possible strategy to meet the IRWMP objective to "provide a firm, verifiable, and sustainable supply of 50 to 100 thousand acre-feet per year for new MCI demand by 2025 (IRWM Goals, 2009). Imperial IRWMP projects that result in decreased drain flows could increase salinity and TMDL load and any negative impacts may need to be mitigated.

6.4.12 Groundwater Remediation/Aquifer Remediation

Groundwater remediation involves extracting contaminated groundwater from the aquifer, treating it, and discharging it to a water course or using it for some other purpose, or injecting it back into the aquifer.[8] Contaminated groundwater can result from of both naturally occurring and anthropogenic sources. Remediation can result in an additional water source that would not be available without remediation. A wide array of regulatory programs have the sole purpose to prevent or remediate pollution of groundwater. Additional regulatory programs were not identified or recommended for inclusion in the IRWMP. Desalination of brackish groundwater or drainwater is a strategy that is being carried forward as part of the Increase Water Supply objective. No other groundwater remediation projects, programs, or policies are anticipated for inclusion in the IRWMP.

6.4.13 Water-Dependent Recreation

The IRWMP environmental protection and enhancement goal includes an objective to:

> *Identify opportunities for open spaces, trails, parks and other recreational projects in the Imperial Region that can be incorporated with water supply, water quality or flood protection projects, consistent with public use and property rights.*

[8] For the Imperial Region, the only groundwater extraction and recharge is for geothermal energy production; however, the water is not treated before being injected back into deep aquifers not used for domestic water supply.

Where cost effective, opportunities to include recreational features and benefits will be integrated into other IRWMP projects. For example, created wetlands will seek to accommodate public access; and IID will continue to deliver operational spill, if available, to local fresh water lakes, duck ponds, etc. Water-dependent recreation will not affect nor be affected by the proposed strategies being considered in the IRWMP. None of the primary IRWMP 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 by the Water Forum in this level of scoping and project conceptualization to be carried forward for further review.

6.4.14 Agricultural Lands Stewardship

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

6.4.15 Forest Management

The Imperial Region, with rainfall of less than three inches a year, does not have any forested land. There are no opportunities for forest management, and the strategy was set aside from consideration as not applicable to the Region.

6.4.16 Watershed Management

The Imperial Region includes or is surrounded by extensive areas of federally owned public lands. Federal agencies are responsible for land/watershed management plans on federal lands, and a number of federal plans are in development or undergoing environmental review. The Water Forum recognizes federal land management planning efforts (See Chapter 4) and the effects that these plans may have on the Imperial IRWMP and on project development in the Imperial Region. The federal plans have an influence on the Imperial IRWMP. For example, groundwater recharge facilities could be located on federal property. Also, the complexity of leasing and permitting photovoltaic and other renewable energy facilities on federal lands has resulted in project proponents seeking to locate facilities on private (agricultural) lands that are covered under the County General Plan. Locating solar photovoltaic facilities on lands currently in agricultural production would change water use on that land and affect the IID water budget.

The Water Forum did not identify any watershed management practices during scoping that would significantly contribute to the realization of the IRWMP goals and objectives. The Water Forum set aside this strategy from further consideration in the interest of addressing higher priority water supply and management priorities.

6.4.17 Dewvaporation or Atmospheric Pressure Desalination

Dewvaporation is not applicable or appropriate to the desert climate. Atmospheric Pressure Desalination could meet small project requirements and demands, but would not be cost effective for the size and scale of the projects being considered in the IRWMP. Costs are estimated at approximately $500 to $1,100 per acre-foot, depending on the source of energy used.[9]

6.4.18 Fog Collection

Not technically feasible given the desert climate.

6.4.19 Rainfed Agricultural

Not technically feasible given the desert climate. Growers factor rainfall into their irrigation scheduling and water orders. IID also factors local rainfall into its Colorado River water order from the USBR. Historic data demonstrates the sensitivity of agricultural water demands to rainfall and recordable precipitation results in decreased water orders.

6.4.20 Water Bag Storage Technology

Not technically feasible or applicable in the Imperial Region since there is no connection to an ocean.

[9] USBR, 1999. <http://www.usbr.gov/pmts/water/publications/reportpdfs/report052.pdf>

IMPERIAL
IRWMP
INTEGRATED REGIONAL
WATER MANAGEMENT PLAN

GEI Consultants