Imperial IRWMP Scoping and Review of DWR Resources Management Strategies

1.1 Increase Water Supply

Within the Imperial Region, these strategies involve development of capital facility solutions to manage the Colorado River supply (storage); or to create secondary uses of the Colorado River supply (recycling, desalination). Management strategies discussed in this section are organized as follows:

- Groundwater Development, Groundwater Banking , and Conjunctive Use
- Desalination
- Recycled Municipal Water
- Conveyance- Regional, Local, and CALFED
- Surface Storage-Regional, Local, and CALFED
- Precipitation Enhancement

1.1.1 Groundwater Development, Storage and Conjunctive Use

Prior opportunities for groundwater development, banking and conjunctive use were evaluated in the *Draft IID Plan*.[1] [2] [3] These documents will be appendices to the Imperial IRWMP. This information was available to the Water Forum during review of the groundwater strategies. The groundwater banking and storage projects concepts on the East Mesa and in the Coachella Water District were proposed for further development.

Groundwater development is the use of wells to economically extract water from a groundwater basin or aquifer systems for beneficial use. Ideally, the total amount of groundwater extracted annually is balanced with the amount of water recharged naturally or through intentional groundwater recharge.

Groundwater storage and banking is the intentional recharge of surface water in the available and manageable groundwater basin storage space. Recharge can be through spreading ponds, injection wells, where surface water in-lieu of groundwater pumping leaving water in storage in the groundwater basin for subsequent extraction and use at a later time. Groundwater storage

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1 Draft IID Plan, 2009, Appendix B, Groundwater Development and Recharge Potential for the Imperial Valley Imperial Irrigation District (IID). (GEI).

2 Draft IID Plan, 2009, Appendix F. IID Groundwater Banking Opportunities. Technical Memorandum, September 1, 2009, Natural Resources Consulting Engineers, Inc.

3 Draft IID Plan 2009. Appendix N, Capital Project Alternatives (GEI).

and banking includes active monitoring and accounting for all recharge and extraction operations.

Groundwater storage operations would use locally controlled groundwater basins and facilities to store and manage available surface water. Groundwater banking implies providing or subscribing to services for use of facilities and groundwater storage space not directly under control of the entity with surface water for storage. For example, Imperial Region interests could build groundwater storage facilities in the Imperial Region to store IID's Colorado River supplies, but also could provide groundwater banking services to others, thus creating a revenue stream and sharing of costs. Alternately, IID could store its Colorado River water in another groundwater basin through agreements to access available groundwater storage space and use of other agency facilities.

Conjunctive water management is the coordinated and combined use of surface water and groundwater to increase the overall water supply to a region and improve the reliability of that supply. Conjunctive use implies that there are some safe or sustainable yields from the groundwater basin.

1.1.1.1 Findings[4]

Draft Groundwater Development, Storage and Conjunctive Use findings were prepared November 25, 2010; reviewed by the Projects Work Group on November 18, 2010; discussed at the Water Forum on November 19, 2010; and further reviewed by the Projects Work Group January 19, 2011. At the March 2011 Water Forum meeting the Water Forum adopted the following priority for the Imperial IRWMP:

> *"Groundwater banking is the IRWMP number one priority to maximize IID's annual water supply entitlement and minimize underruns."*

On April 14, 2011, the Water Forum adopted the following findings.

- ***IRWMP Goals and Objectives*** - development of groundwater storage and banking of Colorado River Underruns would help to meet the goal to diversify the regional water supply portfolio and ensure a long-term, verifiable, reliable and sustainable supply to meet current and future agricultural, municipal, commercial, industrial and environmental demands. Groundwater banking and storage would help meet objectives by:

[4] Draft Groundwater Development, Storage and Conjunctive Use findings were prepared 11/25/10, reviewed by the Projects Work Group on 11/18/10, discussed at the Water Forum on 11/19/10, confirmed by Projects Work Group 1/19/11.

- Helping to avoid impacts to existing users
- Providing a firm, verifiable, and sustainable supply
- Supporting protection of surface water rights by putting the underrun water to beneficial use and by optimizing the Colorado River entitlements

- ***Complexity***.
  - Groundwater storage and banking locally in the East Mesa would require integration with the desalination strategy. Legal, political and technical issues remain to be addressed but no fatal flaws were identified. Facilities need to be consistent with U.S. Bureau of Land Management plans and policies if federal lands are used, which would also necessitate compliance with NEPA. Technical issues related to water quality, hydrogeology and operations need to be further addressed.
  - Interregional groundwater storage and banking in the Coachella Valley, either through use of CVWD facilities or development of IID facilities within the Coachella Region consistent with the existing QSA agreement, are technically feasible but require further study and analysis of specific site conditions. There are more political and legal complexities when compared to locally controlled facilities or groundwater storage areas.
- ***Resolve Conflicts, Colorado River*** - Groundwater banking and storage of underruns would be consistent with existing agreements, though junior appropriators currently able to use the underruns and would likely resist development of projects to bank this water.
- ***Resolve Conflicts, Imperial Region*** - Groundwater banking and storage of underruns could provide a firm, verifiable, and sustainable supply for new users in lieu of apportioning Colorado River supplies from current users to the new users. This would support land use agencies when making findings and determinations on available supplies and impacts to current users pursuant to state law. This will result in reducing the potential for local conflicts between the IID and the land use agencies; between current and future water users; and between the types of use.
- ***Regional Benefits*** - Groundwater storage and banking would provide regional benefits to all of Colorado River water users by increasing the reliability of the supply, protecting the local water rights and ensuring reasonable and beneficial use.
- ***Timeliness*** - Groundwater banking and storage projects need to be further defined through feasibility study and/or additional pilot and demonstration projects. Project alternatives are still being developed and compared, and a preferred alternative has not been selected. Further explorations, field work, or pilot and demonstration projects would fill data gaps, test and demonstrate the technologies and operational concepts, and support completion of alternatives evaluation and final design of full scale projects.
- ***Political Acceptability, Local*** - With the exceptions of the West Mesa, there is support for groundwater storage and banking of underruns. Such support is expected to increase with greater understanding and awareness of the need to protect Colorado River water rights. Ability to pay and willingness to pay, and cost benefits analysis,

cost distribution and fiscal evaluation have not been fully determined and requires additional economic evaluation to gage acceptability and compare to other structural and non- structural alternatives.

- ***Political Acceptability, Interregional*** - Groundwater storage and banking in Coachella Region could be favorably regarded by the interests in that region depending on the terms and conditions for use of the storage space in their basins.
- ***Adapting to Climate Change***- Groundwater banking and storage would allow the Imperial Region to make maximum use of the IID water rights and improve the ability for the Imperial Region to respond to variable climate conditions. Regardless of the long term effects of climate change to Colorado River Flows, whether increase or decrease to the flows, groundwater banking would help the Imperial Region respond to vulnerabilities, make maximum beneficial use of the current entitlements, and help meet Imperial IRWMP objectives.

Additional Specific Findings

- ***Groundwater Development*** - There are very limited opportunities for further groundwater development due to basins approaching or currently exceeding safe or sustainable yields (overdraft), basins low rates of natural recharge, and/or poor quality waters.
  - ***West Mesa.*** The Ocotillo-Coyote Wells Groundwater Basin[5] area of the West Mesa is at or exceeding the sustainable yield and further development or use of these resources would need to be consistent with the Imperial County Groundwater Ordinance and existing policies to prevent overdraft.
  - ***East Mesa East Mesa*** groundwater development on a large scale (>25 KAFY) may not be sustainable over long-term (50 year planning horizon) since there is limited natural recharge or sustained yield; water quality is variable and in most areas brackish; and the potential for subsidence is unknown.
    - Large scale development may have to be coupled with desalination and a recharge program to be viable.
    - Additional study is needed to determine feasibility of additional groundwater development.
    - Groundwater in storage in the East Mesa is the result of the leakage from the historic operations of the irrigation canals.
    - East Mesa groundwater development coupled with desalination of the brackish groundwater would take advantage of water in storage, but would still result in depletion of groundwater over time unless integrated with strategies to recharge and store Colorado River water.

[5] Ocotillo-Coyote Wells Groundwater Basin, as defined by US EPA Sole Source Aquifer Designation. CFR Vol 61, No. 176. September 10, 1996.

- ***Blending East Mesa brackish groundwater*** with Colorado River water to extend this supply would increase the salt content and impact agricultural uses, but such blended water could be matched to beneficial uses where a lower water quality may be acceptable.
- ***Central Imperial Valley*** development of brackish groundwater would require desalination.

- ***Groundwater storage and banking*** - Groundwater storage and banking of underruns should be the highest priority for the Water Forum and IRWMP.
  - Local areas for groundwater water management strategies that were carried forward and where reconnaissance level projects have been configured for purposes of comparison and feasibility analysis, include:
    - East Mesa Groundwater development and desalination with recharge
    - East Mesa, Sand Hill, Pilot Knob groundwater storage
    - IID groundwater bank development in Coachella Valley
    - Subscribe to Coachella Valley existing or expanded groundwater bank
  - Potential timely, near-term solution would be to bank IID water through agreements with the CVWD and subscribe to the existing and/or expanded groundwater banks. The Coachella Region has an existing groundwater management plan.
  - Groundwater storage and banking projects are mid- to long- term opportunities. Specific groundwater storage and banking projects require further feasibility study and site investigations to better define water quality, hydrogeology, design parameters; to optimize the recharge/extraction operations; and to compare local and interregional opportunities.
  - The following local and regional groundwater development and storage strategies have been eliminated from further consideration in the IRWMP based on technical feasibility or institutional constraints:
    - Central Imperial Valley Upper Aquifer
    - Central Imperial Valley "Deeper" Aquifer
    - West Mesa groundwater development and large scale banking
    - Arizona groundwater bank
- ***West Mesa*** - The concept of in-lieu groundwater recharge should include providing Colorado River water could to existing high volume industrial water users in- lieu of groundwater pumping to reduce the pressure on local groundwater supplies, and reduce or avoid overdraft.
- ***Groundwater Management Plan*** - The IRWMP will need to include groundwater management plan elements to meet requirements for state grant funding; support storage of Colorado River underruns in the Imperial Region; make best use of the Imperial County and IID authorities and responsibilities; and protect current overlying users.

1.1.1.2 Recommendations[6]

1. The number one priority for the Water Forum should be to develop groundwater storage and banking facilities to capture Colorado River underruns and protect local water rights.
2. Develop groundwater management plan elements of the IRWMP to support groundwater storage and banking projects and meet requirements for state grant funding.
3. Conduct needed feasibility studies and/or pilot and demonstration projects to obtain needed data, select a preferred groundwater banking alternative and develop final project designs and funding requirements.
4. Seek state and federal grant funding to conduct the needed evaluations and pilot projects.

1.1.2 Recharge Area Protection

Recharge areas are those areas that provide the primary means of replenishing groundwater. The objective for protecting recharge is to ensure that areas suitable for recharge, whether natural recharge, or from development of groundwater storage projects, continue to be capable of adequate recharge; and to prevent pollutants from entering groundwater to avoid expensive treatment that may be needed prior to potable, agricultural, or industrial beneficial uses. Protection of recharge areas is necessary if the quantity and quality of groundwater in the aquifer are to be maintained or improved through recharge of freshwater.

For the Imperial Region, recharge area protection is considered as part of the plan to develop groundwater storage facilities by IID; review of the County Ordinance for potential improvements; and developing groundwater management plan elements or recommended actions where gaps are identified. The Counties land use planning process is also important for protecting recharge areas in the unincorporated areas and for the County Groundwater Ordinance. Additional protection of recharge areas through the land use plans, or through the County groundwater ordinance could be considered as part of the groundwater management plan elements of the IRWMP. Protecting groundwater recharge areas also implies working with federal agencies to ensure access to federal lands within the Imperial Region.

Inter-regionally, this implies coordinating with the Coachella Region to protect access to viable recharge areas and protect the region's aquifers and water quality if IID were to develop groundwater storage projects.

[6] Recommendations were numbered for ease of reference.

1.1.3 Recycled Municipal Water

Recycled municipal wastewater is water that, as a result of wastewater treatment, is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is therefore considered a valuable resource.[7] "Recycled water" and "reclaimed water" have the same meaning.[8] Californians have recycled water since the late 1800s and public health protections have been in effect since the early part of the 1900s. California's requirements for water to support continued growth coupled with finite water supplies have generated a renewed interest in water recycling in recent decades. Currently, more than 500,000 acre-feet of treated municipal wastewater are reused in California annually, almost three times more than in 1970. Approximately two-thirds of all recycled municipal wastewater in California is used for irrigation, including 46 percent for agriculture and 21 percent for landscaping, while 14 percent is used for groundwater recharge.

The permitted uses of recycled water increase with advanced levels of treatment.[9] To protect water quality and public health, State regulations mandate that producers and users of recycled water meet waste discharge and water reclamation requirements from the Regional Water Quality Control Boards (RWQCB or Regional Water Boards), including the water recycling criteria adopted by the California Department of Public Health (DPH). These criteria specify approved uses of recycled water, numerical limitations and requirements, treatment methods, and performance standards. Regulations and policies are continuing to be developed, refined, and updated. In January 2009 the California DPH released updates to recycled water-related statues and regulations. Additionally, to establish uniform requirements for the use of recycled water the SWRCB adopted a statewide Recycled Water Policy on February 3, 2009.

The Projects Work Group reviewed the recycled municipal wastewater strategy in December 2010 and January 2011. The Water Forum reviewed and discussed the recycled municipal wastewater strategy January 2011 and February 2011 and adopted the recycled water findings and recommendations over the course of two meetings, on March 24, 2011 and April 20, 2011.

1.1.3.1 Findings

- Recycling municipal wastewater could produce 'new water'; can be integrated with disadvantaged community support strategy; help meet a state goal of 20 percent conservation goal by 2020; and could support development of water exchange strategy.

[7] California Water Code §13050
[8] California Water Code §26
[9] California Water Plan Update 2009: Volume 2 Resource Management Strategies – Ch 11 Recycled Municipal Water, Public Review Draft

- Reclaiming all forecasted future municipal wastewater flows would provide an estimated 36,000 acre-feet per year, approximately 25 percent of the forecasted future demand.[10]

Findings related to the criteria used to screen the CDWR Resource Management Strategies include:

- **Meeting IRWMP Goals and Objectives** - Reclaimed municipal wastewater would help to meet the goal to diversify the regional water supply portfolio and ensure a long-term, verifiable, reliable and sustainable supply to meet current and future agricultural, municipal, commercial, industrial and environmental demands. Reclaimed wastewater would help meet objectives by:
  - Helping to avoid impacts to existing users by providing a new supply
  - Supporting disadvantaged and other communities in meeting wastewater disposal and permit requirements when coupled with as a regional strategy for use of this water and funding facilities
  - Match water quality to appropriate uses and supply treated wastewater to extend use of Colorado River supplies
  - Support meeting 20 percent conservation goals in the region
- **Complexity** - Treatment technologies to reclaim municipal wastewater are well established. Complexity would be related to integrating funding strategies for upgrading existing plants or developing regional wastewater facilities to reclaim wastewater. There are some permitting issues that would need to be resolved and impacts to IID drains and Salton Sea present challenges.
- **Resolve Conflicts, Colorado River** - Reclaiming municipal wastewater would be relatively neutral. This practice would demonstrate the regional commitment to making use of this resource.
- **Resolve Conflicts, Imperial Region** - Reclaiming municipal wastewater could provide a firm, verifiable, and sustainable supply for new users in lieu of apportioning Colorado River supplies from current users to the new users. This would support land use agencies when making findings and determinations on available supplies and impacts to current users pursuant to state law. This would result in reducing the potential for local conflicts between the IID and the land use agencies; between current and future water users; and between the types of use.
- **Regional Benefits** - A regional strategy to reclaiming municipal wastewater could provide regional benefits by helping to meet the requirements to conserve 20 percent by 2020; increasing the reliability of the supply, and supporting economic development.

[10] Original Water Forum finding edited to be consistent with the updated demand forecast.

- **Timeliness** - A number of potential reclaimed municipal wastewater facilities are currently in the planning and design stages, and a number of projects are near or ready to proceed. Regional strategies and policies to account for the conserved water and use of this source in lieu of Colorado River water, and a regional approach to mitigating impacts are needed. Development of regional plants to realize economies of scale and increase cost effectiveness will take more time.
- **Political Acceptability, Local** - Upgrade to individual plants without subsidy by new water users would encounter political opposition due to increase in rates required to fund upgrades to existing plants. Regional plants could be resisted due to loss of control of individual facilities. Regional strategies for accounting for the conserved water also could face opposition. Grower resistance related to marketability of crops. Ability to use IID distribution systems. Stranded investment/sunk cost investment cycle.
- **Political Acceptability, Interregional** - Reclaiming municipal wastewater is not expected to encounter resistance by other Lower Colorado River users or regions, and would likely be supported as a means of reducing Colorado River demands.
- **Adaptability to Climate Change** - Reclaiming municipal wastewater would help to adapt to climate change by secondary uses and by providing flexibility in operations and increase ability to respond to changing conditions.

1.1.3.2 Recommendations

1. There are a number of projects that could be immediate (grant ready) or near- term. Recycling municipal wastewater should also be integrated with a regional mitigation banking strategy.
2. Support current wastewater facility plant upgrades that propose reclaiming municipal water for use in renewable energy projects that are planned for Niland, Brawley and Imperial and include as part of the near term strategy.
3. Require mitigation to meet state and federal requirements for loss of flows to IID drains and to the New and Alamo Rivers and other waterways through development of a regional mitigation bank; seek to provide regional benefits, create partnerships and meet multiple IRWMP goals by using reclaimed wastewater for this purpose where cost effective and timely.
4. Consider regional municipal water reclamation projects to increase cost-effectiveness of project development and operation, provide benefits to multiple parties, and improve opportunities to reuse the water (reduce cost of purple pipe network).
5. Provide policy and financial incentives for public/private partnerships to construct municipal recycling facilities and for crediting the produced water to sponsoring entities (public/private) to allow for exchange of produced water for delivery of Colorado River water (Water Exchange).
6. Continue to evaluate the cost-effectiveness and political viability of regional municipal wastewater treatment facilities that include reclaiming wastewater as part of the mid- and long- term water management strategy.

7. Imperial County and IID should coordinate and adopt appropriate policies to require use of recycled municipal water in-lieu of Colorado River water to mirror CEC and SWRCB policy.

1.1.4 Desalination

Prior project concepts and opportunities for desalination of brackish groundwater and drain/tile water desalination were evaluated in the *Draft IID Plan*. This information was available to the Water Forum during review of the desalination strategies.

There are two different methods for large-scale production of desalted water—distillation and reverse osmosis. Distillation uses heat to evaporate water that is then captured and condensed as fresh water leaving the dissolved solids in the waste stream. This is reliable, but is an energy intensive process and is primarily used in fuel-rich areas of the world and is not considered an option for the Imperial IRWMP.

Reverse osmosis is a more energy-efficient process that uses semi-permeable membranes to separate fresh water from salt water. The water is forced at very high pressures through tightly wrapped membranes, which then facilitates the passing of water molecules, smaller than almost all impurities, through the membranes. Recent improvements in reverse osmosis technologies have significantly reduced the amount of energy required to produce fresh water and these advances have significantly reduced the cost of desalination of brackish water sources. Desalination of brackish water is becoming cost-competitive with other water supply options available in water stressed region.

The Water Forum adopted the following desalination findings and recommendations on March 24, 2011.

1.1.4.1 Findings[11]

- Desalination of brackish groundwater could be a near- or mid- term project opportunity and could provide a new source of water to be used in place of imported Colorado River water.

[11] The desalination materials and briefings were reviewed by the Projects Work Group 11/18/10 and 12/08/10, introduced and discussed at Water Forum 12/08/10, further reviewed by the Projects Work Group 1/19/11, and further reviewed and discussed by the Water Forum 1/20/11 and 2/24/11.

- Desalination of brackish drain water has more constraints but could be an opportunity for long term development, but this is likely to require higher mitigation costs and environmental compliance requirements.
- Large scale desalination, coupled with interregional conveyance could be a long term opportunity but is considered costly when compared to other water supply strategies, and is not considered a near- or mid- term opportunity for purposes of the IRWMP.

Findings related to the criteria used to screen the desalination resource management strategy include:

- ***IRWMP Goals and Objectives*** - Desalination of brackish groundwater, drain water, the New River or Alamo River, and other local saline water sources could help to meet the goals to diversifying the regional water supply portfolio and could help to ensure a long-term, verifiable, reliable and sustainable supply to meet current and future agricultural, municipal, commercial, industrial and environmental demands. Desalination would help meet objectives by proving a new water source to avoid impacts to existing users.
- ***Complexity***
  - Desalination technologies for brackish water are relatively well defined, and relatively cost effective as compared to other opportunities to develop new water supplies.
  - Constraints to be overcome include:
    - Access to sites in the East Mesa.
    - Mitigation requirements to potential impacts to drain habitat, riparian resources and Salton Sea.
- ***Resolve Conflicts, Colorado River*** – Desalination of the source water proposed would not be expected to increase conflicts with the Colorado River users.
- ***Resolve Conflicts, Imperial Region***
  - Desalination could reduce conflicts over existing Colorado River water supplies by providing a firm supply for new users and projects in-lieu of Colorado River supplies.
  - Reduced flow from drains or river water could have impacts to the Salton Sea and increase conflicts related to responsibility and costs of mitigation.
- ***Regional Benefits*** – Desalination would provide regional benefits by increasing the supply and by providing water for economic development while protecting current agricultural uses.
- ***Timeliness***
  - Projects to desalinate brackish groundwater could be developed in the near- to mid- term since IID and the County could work cooperatively with industry to develop and permit such projects.
  - Adding a groundwater recharge component could slow project development and implementation, but an integrated project could be developed in phases over the mid- to long- term.

- Desalination projects to use drain or river water would likely require greater environmental review and a longer time period to design, permit and implement and could encounter significant regulatory compliance requirements.

- ***Political Acceptability, Local***
  - The method of financing and distribution of cost needs to be determined. Ability to pay and willingness to pay for desalination has not been fully determined and requires additional economic evaluation.
  - Desalination of drain and river water will likely have higher mitigation costs, greater potential impacts and potentially higher political resistance as compared to groundwater desalination.
- ***Political Acceptability, Interregional***
  - Drain and river water projects would face higher degree of scrutiny due to potential effects on the Salton Sea as compared to brackish groundwater and could create political controversy.
- ***Adaptability to Climate Change*** – Desalination of brackish water sources would develop an untapped resource and improve the ability for the Imperial Region to respond to variable climate conditions.

1.1.4.2 Recommendations

1. Desalination of brackish groundwater in the East Mesa is a near- to mid- term proposition and could be sustainable when integrated with recharge projects elements.
   - Pilot and demonstration projects should be undertaken to provide a basis for design and to determine the feasibility of large scale projects.
   - Federal or state funding opportunities for development of pilot projects should be pursued if local funding match can be developed.
2. Imperial County and IID should coordinate and adopt appropriate policies to allow for and promote development and desalination of East Mesa groundwater resources. Such policies could be targeted to requiring use of desalination or recycled water in-lieu of Colorado River water to mirror CEC and SWRCB policy.
3. Operational concept- Consider and further evaluate economic and political feasibility for including desalinated water in a regional water exchange where by those that fund development of desalination facilities would receive credit for the produced water and receive Colorado River water in exchange.
   - Cooperative public/private partnerships should be investigated for purposes of creating a new water supply for non-agricultural water users using desalination technologies.
   - Economic incentives and pricing would need to be worked out to finalize a business model, and additional economic evaluations are recommended.

1.1.5 Conveyance- Local /Regional/CALFED[12]

Conveyance provides for movement of water and includes natural water courses and infrastructure like canals, pipelines, diversion structures. Local conveyance includes the locally owned and managed conveyance infrastructure such as the IID canals used to deliver wholesale water and city pipelines that convey treated water to retail customers.

Inter-regional conveyance also includes facilities like the All American Canal that moves water within the Colorado River Hydrologic Region and services both the Imperial and Coachella IRWMP Regions. Inter-regional conveyance strategies could include consideration of how large interregional facilities like the Central Valley Project, State Water Project, and Colorado River Aqueduct that move water between major hydrologic regions within the state, could be operated or used in such a way that they would impact or benefit the Imperial Region.

A number of concepts for large inter-regional conveyance facilities to import seawater into the Imperial Region have been proposed for inclusion in the Imperial IRWMP. The reference to large inter-regional conveyance facilities below, are related to these concepts.

1.1.5.1 Findings

Findings related to the criteria used to screen the CDWR Resource Management Strategies are listed below:

- ***IRWMP Objectives*** – Large interregional conveyance coupled with water quality treatment could meet IRWMP goals and objectives, but the current cost estimates are higher than any current users would be willing to pay in the near-term. A large interregional conveyance designed primarily for the restoration of the Salton Sea is beyond the scope of this IRWMP.
- ***Complexity*** – Large scale interregional conveyance projects would be very complex and face permitting, economic and engineering challenges. Projects could involve complex international boundary water issues.
- ***Resolve Conflicts, Colorado River*** - Large interregional conveyance could avoid conflicts on the Colorado River by providing a new source of supply. This is balanced by unknowns related to costs and benefits, and potential for legal conflicts between competing interests.
- ***Resolve Conflicts, Imperial Region*** - Until the projects are better defined, it is hard to evaluate whether they would increase or reduce current conflicts or help avoid future conflicts.

[12] Conveyance strategies were reviewed by the Imperial Water Forum Projects Work Group 1/19/2011; Discussed at Water Forum 1/20/1, 2/24/11, 3/24/11, and findings and recommendations adopted 4/20/11.

- ***Regional Benefits*** **-** Large interregional conveyance has the potential to provide multiple benefits to multiple participants, but this is balanced against unknown environmental, economic and other impacts and the complexity of development.
- ***Timeliness*** - Large interregional conveyance require further definition and feasibility study to resolve technical, environmental, economic and institutional issues and would be considered a mid- to long term prospect.
- ***Political Acceptability*** - Local- Unknown until better defined. Neutral at this time.
- ***Political Acceptability Colorado River*** – Unknown until better defined. Neutral at this time.
- ***Adaptability to Climate Change***- could support alternative water supplies to the region and help adapt to uncertainties related to climate change.

Other general Water Forum findings and recommendations are listed below.

- ***Community Benefits*** - IIDs conveyance and water distribution system provides benefits to the entire region that needs adequate resources to be maintained.
- ***Local IID Conveyance Infrastructure***
  - There are no major local conveyance improvements to the IID system that were identified as stand- alone projects for inclusion in the Imperial IRWMP.
  - The IID conveyance infrastructure provides regional economic benefits to all of the water users.
  - IID regional supply, conveyance and distribution infrastructure is aging and faces a backlog of maintenance. The backlog of maintenance is not being met due to revenue constraints. Additional investment is needed to preserve and protect these assets.
  - IID does not currently have a policy for other agencies or interests to use their distribution canals and should adopt a wheeling policy[13].
  - Existing IID drainage facilities convey flood water to the New or Alamos Rivers from the developing urban areas, but were not designed as flood/stormwater conveyance and need improvements to meet these objectives.
- ***Integration of Local Conveyance Improvements with other Strategies***
  - Conveyance needs or requirements for individual or regional projects will be integrated into those projects.
  - Local conveyance will be integrated evaluated in context of individual Imperial IRWMP water supply or flood/stormwater management projects.

[13] IID subsequently developed and has adopted a wheeling policy.

- IID Definite Plan and System Conservation Plan identify conveyance systems improvements to conserve water that are not currently being implemented and these improvements could be included in the IRWMP through the agricultural demand management strategy.

- ***Disadvantaged Community Water Supply and Quality Needs***
  - System reliability- Improvements to local conveyance to provide supply reliability and back up in the event of catastrophic supply interruptions. Cities could realize regional benefit by planning and designing regional interconnections for domestic or wastewater systems.
  - Water quality- conveyance and systems interconnection should also be factored into evaluation of larger regional efforts for wastewater treatment and recycling; and drinking water treatment and distribution.
  - System expansion and annexation- Continue to evaluate connecting areas that surround existing larger water systems and are served by individual pipe connections to the larger municipal water systems.
- **Large Interregional Conveyance** projects should be integrated with other strategies like desalination, and could be long term prospects for inclusion in updates of the IRWMP, but such projects are low priority for action at this time.
- ***CALFED Conveyance*** - CALFED conveyance projects are not directly related to the Imperial Region, though increased conveyance as anticipated by CALFED and the CWP could increase reliability of State Water Project and Central Valley supplies to southern California, potentially reducing competition for Colorado River supplies. The reverse is also true.

1.1.5.2 Recommendations

1. The Water Forum should support IID in defining the long term maintenance requirements for the regional conveyance infrastructure and a cost distribution model to preserve these assets for the Imperial Region.

1.1.6 Surface Storage- Regional/Local/CALFED

Surface storage includes new reservoir and surface storage facilities—large scale reservoirs, smaller operating reservoirs, and smaller storage facilities—for raw or treated water.

1.1.6.1 Findings and Recommendations

Water Forum general Water Forum findings and recommendations are listed below.

- ***Small Local Storage Projects***
  - No stand- alone projects for small local storage have been identified.
  - Cities in the region have identified a need for raw or treated water storage facilities to meet state and local requirements and support responses to supply

interruption and damages due to catastrophic events as was experienced in the recent 2010 earth quake.

- Small Local Storage Projects will be integrated into other efforts, including the Agricultural water use efficiency and conservation strategy through the Definite Plan and System Conservation Plan; and a Disadvantaged Community strategy and may be used to meet raw water storage needs.

- ***Large Local or Regional Surface Water Reservoirs*** - Large surface water reservoirs would not be cost-effective or feasible in the Imperial Region when compared to other supply and groundwater storage opportunities. Constraints and basis for eliminating from further consideration include:
  - No local runoff or yield of Imperial Region watersheds, high evaporation rates.
  - Development of surface storage of imported water would include high cost for construction and pumping lifts to reservoir sites.
  - Potential for significant environmental impacts; major permitting and regulatory compliance issues.
- ***Colorado River Storage*** - No opportunities exist for additional large-scale reservoir facilities on the Colorado River. Lake Powell and Lake Mead have sufficient storage.
- ***CALFED surface storage*** - CALFED surface storage is unrelated to the Imperial Region, though increased surface storage statewide could increase reliability of State Water Project and Central Valley supplies to southern California, potentially reducing competition for Colorado River supplies.

1.1.7 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.

1.2 Reduce Water Demand

The Imperial IRWMP review of the Water Use Efficiency (WUE) Resource Management Strategies was separated into three areas:

- Energy (Geothermal)
- Urban (Municipal, Commercial, and Industrial)
- Agriculture

These strategies are primarily related to how Colorado River supplies could be conserved by existing users such that saved water could be made available to other uses in the Imperial Region; or how new users could minimize the use of the imported Colorado River supply.

CDWR's Urban Water Use Efficiency resource management strategy includes energy water use efficiency. The renewable energy industry represents the largest new forecasted future demand in the Imperial Region. For purposes of the Imperial IRWMP, a specific Imperial Region resource management strategy for Geothermal/Renewable Energy Water Use Efficiency (WUE) was developed by the Water Forum. This projected water demand for the renewable energy industry (without conservation) was based on the Imperial County General Plan Geothermal/Alternative Energy and Transmission Elements (County of Imperial, 2006) which identifies a geothermal/solar thermal demand of 180,000 AFY. Forecasted future geothermal/solar thermal demands with conservation are 146,000 AFY.

The current Colorado River supplies are fully committed to current agricultural, municipal, commercial and industrial, and environmental demands. Agricultural demands currently use 97 percent of the available supply. All other current municipal, commercial and industrial (MCI) demands represent 3 percent and are likely to increase to approximately 6-8 percent of total demand over the planning horizon. This means that in the absence of any new supplies, any increase in future MCI demands in the IID water service area would be provided through reapportionment of existing Colorado River supplies from current agricultural uses to the proposed future use. Further, the increase in future MCI demands may represent a decrease in the supply available for agricultural users. This effect is more significant in times when there is a supply and demand imbalance (overrun) since under these conditions, MCI demands represent a "hardened" demand that is not easily cut back.[14] Under current IID policies, cut backs are made to the agricultural supply in times of a supply and demand imbalance in order to provide a higher degree of reliability to MCI uses. Even though the demand is a relatively small percentage of the overall current or forecasted future use, MCI users need to demonstrate they are implementing reasonable conservation measures.

1.2.1 Geothermal/Renewable Energy Water Use Efficiency

The findings and recommendations from the Draft IID Plan related to Renewable Energy Production (Chapter 7 – Demand Management) and related Policies (Chapter 9- Policy Alternatives) were presented to the Demand Work Group and Water Forum to inform their discussions. In December 2010 and January 2011, the Demand Work Group reviewed and discussed the findings and recommendations from Draft IID Plan, prior studies and technical information, state requirements for cooling water for energy facilities, and a range of management strategies. Meetings were also held with an energy stakeholder interest group to discuss the states Renewable Energy Action Team recommended best management practices for desert environments (REAT, 2010), and the prior Draft IID Plan technical information and

[14] The Equitable Distribution Plan defines how the region responds to shortage and grants a higher reliability of supply to MCI users and cut backs in agricultural supplies. http://www.iid.com/index.aspx?page=141

findings. Based the work group and energy stakeholder input, draft findings and recommendations were presented to the Water Forum in February 2011 for review and comment. Draft findings and recommendations were prepared and further discussed by the Water Forum in March 2011 and an energy stakeholder interest group meeting in April 2011. Final draft findings and recommendations were reviewed and adopted by the Water Forum in June 2011.

1.2.1.1 Findings

Impacts, Benefits and Mitigations

- Renewable energy provides economic benefits to the Imperial Region.
- A goal of the IRWMP is to optimize the use of available supplies and/or to create additional water supplies to address increased MCI demands, and mitigate impacts where needed.
- Renewable energy projects that result in intensification of water use could have a negative effect on agricultural water supplies unless mitigated. 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.
- To the extent that water is proposed for power plant cooling, the developer shall demonstrate that alternative water supply sources and alternative cooling technologies are unavailable environmentally undesirable or economically unsound.

BMPs for Geothermal/Renewable Water Sources, Cooling Alternatives and Other Uses

- State policy supports the use of dry or hybrid cooling to conserve water in desert environments.
- Current dry cooling technology has limits and is not presently cost effective in the Imperial Region.
- Hybrid cooling should be encouraged if Colorado River water is used in order to demonstrate reasonable beneficial use of Colorado River entitlements.
- The feasibility of changing wet cooled plants to dry or hybrid cooled plants may be cost prohibitive for the remaining life of the plant.
- A critical factor for conserving water used for cooling and other uses is the water quality. The higher the incoming water quality, the more cooling cycles can occur, resulting in both less use and reduced wastewater discharge.
- Use of recycled municipal water or desalination of brackish water for cooling and other uses in lieu of Colorado River water would mitigate for potential impacts to current agricultural water users, and would demonstrate reasonable beneficial use of Colorado River entitlements.
- Storage of Colorado River water in a groundwater bank would provide a supply for renewable/geothermal energy water use and could serve to mitigate or eliminate impacts to existing agricultural water users.

- Use of recycled municipal water or desalination of brackish water for cooling purposes could provide multiple regional benefits. Project, program and policy recommendations should be developed through the Imperial IRWMP process.
- Encouraging use of recycled municipal water for cooling and other uses could support local communities by providing a source of revenue to upgrade treatment plants so as to improve water quality.
- Recycled municipal water or desalinated brackish water maybe cost-effective when compared to the price of water from voluntary fallowing, and would serve to mitigate third party impacts to agriculture.
- Industrial customers shall be required by IID to follow appropriate water use efficiency BMP's, including but not limited to those established by the California Urban Water Conservation Council and California Energy Commission, as well as other water use efficiency standards, adopted by the District or local government agencies. (Interim Water Supply Policy (IWSP No. 11). IID may prescribe additional or different BMPs for certain categories of Municipal and Industrial Water Users (IWSP No. 12).

1.2.1.2 Recommendations

1. Integrate Geothermal/Renewable Energy Water Use Efficiency Resource Management Strategies with related strategies (Increase Water Supply and Practice Resource Stewardship) as part of the Imperial IRWMP to address geothermal/renewable energy water needs, promote economic development and ensure mitigation of any environmental and third party effects.
2. The lead jurisdiction agencies (IID, Imperial County and the Cities) need to work together during project review to ensure that direct, indirect, and cumulative impacts of individual energy projects are adequately evaluated with input from agriculture and other local stakeholders. Potential impacts could occur to agriculture and agricultural water supplies; habitats and flows in IID drains, the Alamo River, New River and/or Salton Sea, IID facilities, DACs and other impacted stakeholders. If needed, appropriate levels of mitigation are to be formulated, and implementation of such mitigation measures are to be made conditions of the IID, County and Cities approval and permits.
3. The Imperial IRWMP should compare the cost of developing new water supplies, efficiency conservation, voluntary fallowing or other measures related to coordinated land use/water supply (e.g.; apportioning water saved when land use changes), including mitigation costs if required.
4. IRWMP should recommend local policies and standards for geothermal/renewable BMPs that are consistent with the Renewable Energy Action Team Report.
5. IRWMP should recommend a consistent review process to ensure that geothermal/renewable energy projects have mitigated all impacts and meet the local, state and federal agency BMP requirements.

1.2.2 Urban Water Use Efficiency

The 2009 California Water Plan acknowledges the importance of water conservation as an element of statewide water management and identifies urban water conservation and increases in urban water use efficiency as an important statewide CDWR strategy. Benefits of water use efficiency extend beyond the improvement of water supply reliability and include:

- Saving capital and operating costs for utilities and consumers,
- Delaying capital cost of new infrastructure to treat and deliver water,
- Reduced demand for wastewater treatment,
- Environmental protection,
- Making best use of imported Colorado River water.

The State is setting aggressive conservation goals and increasing the emphasis for water conservation for areas like the Imperial Region that are reliant on imported Colorado River supplies, also tying funding[15] for projects to implementation of Demand Management Measures (DMMs). Urban water conservation and implementation of DMMs are intended to lower demand, stretch existing Imperial Region water supplies, and demonstrate urban users in the Imperial Region are making reasonable beneficial use of Colorado River supplies.

The MCI water uses are those associated with municipal areas and urban development. The 2010 Urban Water Management Plan updates identify water use efficiency practices and DMMs to be implemented within the Region.

In January 2011, the Demand Work Group held discussion to review the Draft IID Plan Urban WUE findings, recommend revisions and refer them to the Water Forum. The Water Forum reviewed the revised Urban WUE findings at the February 2011 meeting, but did not take action pending participation of key stakeholders that were unable to attend. Written comments were requested and minor comments were received. In March 2011, the Water Forum reviewed the proposed revisions and adopted the Urban WUE Findings presented below.

1.2.2.1 Findings

- Urban water use efficiency improvements are consistent with IRWMP Plan goals and objectives; could serve to reduce current or potential conflicts in the Imperial Region by demonstrating that the MCI users are committed and investing in demand management measures (DMMs) to conserve water.

[15] 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 CDWR, the SWRCB, or the California Bay-Delta Authority, with certain exceptions, to be conditioned on the implementation of the water demand management measures (DMMs) described in the urban water management plan.

- Additional programmatic evaluation and design, including economic analysis of costs and benefits, are 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 can be used in the Imperial Region to lower demand, help meet future needs, and stretch existing water supplies.
- The state has set aggressive urban water use conservation goals and has increased the requirements for urban water conservation, especially in areas like Imperial Region that are reliant on imported supplies.
- IID, as a wholesaler, is not required to produce UWMP, and the agency's role in urban water conservation has been limited. The greatest return on investment can be achieved by IID working with the Cities to target urban water use efficiency and conservation by future water uses, while playing a supporting role for water conservation efforts targeted towards existing users.
- Review of the 2005 UWMPs demonstrates that there has been limited implementation of the DMMs in Imperial Region Cities.
    - The Imperial Region Cities are DACs with a rate base that has a limited ability to pay, necessitating that existing revenues be directed at higher priorities such as maintaining and operating drinking water treatment plants and distribution infrastructure, and ensuring water quality standards and regulatory requirements are met.
    - 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.
- 2010 UWMP updates need to be consistent with the new state requirements and the Imperial IRWMP.
    - Urban water use efficiency measures (DMMs) should be undertaken to ensure MCI users are reasonably and beneficially using the water; that MCI users are being held to the same high standards as agriculture; and that all practical conservation measures are being implemented.
    - State Grant funding for projects is tied to having and approved UWMP and documented implementation of DMMs.
    - Consistency between the Imperial IRWMP and UWMP will support streamlining the development review and permitting process, reduce costs for environmental review, and help to integrate land use and water supply plans consistent with state law.

- The IRWMP can help to define regional opportunities to cost effectively support programs to implement DMMs and regional opportunities to comply with requirements.
- Constraints to implementing DMMs include the administrative costs to develop and implement programs; 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, resulting in unnecessary hardships imposed on the community if straight line water conservation quotas are imposed.
- Urban Water Use Efficiency enables local agencies to both adapt to increased dryness and to mitigate greenhouse gas (GHG) emissions by reducing water and energy use. Improving water use efficiency is a mitigation strategy because of the relationship between GHG emissions and the use of fossil fuels to create the energy required to produce, convey, treat, and distribute water. This required energy varies from community to community, depending on local circumstances. Increasing water use efficiency serves as a way to mitigate and adapt to climate change.

1.2.2.2 Recommendations

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.
2. The Cities, through the Water Forum or successor, should coordinate the ~~2010~~ 2015[16] UWMP updates.
   - Define urban water conservation regional funding mechanisms and approach
   - Develop a Regional UWMP
   - 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 2015 UWMP
   - Prepare an annual report to document regional progress
   - Develop an in-school education program in English and Spanish

[16] Amended for purposes of integrating 2015 UWMPs. Cities did not to coordinate the 2010 update.

3. IID and Imperial Region Cities should place emphasis on conservation by 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 project approval.
   - Work with the Cities and Imperial County as part of the Imperial IRWMP to specifically consider using the Draft CDWR California 2010 Plumbing Code as a standard for new development and for development or update of local ordinances.
   - Work with the Cities and Imperial County as part of the Imperial IRWMP to specifically consider using the Draft CDWR Model Water Efficient Landscape Ordinance (Draft July 15, 2009) as a standard for new development and development or update 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

4. Imperial Region Cities should implement a conservation rate structure (increasing block rates).
5. Imperial Region Cities should develop standardized MCI water use categories 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.

1.2.3 Agricultural Water Use Efficiency

Agricultural water use efficiency is identified as Resource Management Strategies in the California Water Plan Update 2009 that can be used as part of an IRWMP to meet a management objective of reduced demand. Agricultural water use efficiency strategies can be used by the Water Forum to provide multiple water and resource benefits, diversify the water portfolio and become more regionally self-sufficient. IID and Imperial Region growers are working aggressively to implement systems wide and on- farm agricultural water conservation measures.

Future agricultural demands are assumed to be the same as those forecasted in the Definite Plan and Systems Conservation Program, and 2007 Water Conservation Plan (IID, 2008). Future agricultural demands assume that all the planned on-farm and systems conservation programs will be implemented. These plans are incorporated by reference into the Imperial IRWMP and it is anticipated that future updates to the plans will reference the IRWMP.

Draft IID Plan preliminary findings were updated to provide the basis for consideration by the Demand Management Work Group and Water Forum. Potential water conservation efficiency and reclamation sources, quantities, and costs are shown in Table 1. These sources are in addition to those needed for QSA/Transfer Agreements water conservation. Water conservation opportunities were identified in IID's *Efficiency Conservation Definite Plan* (Definite Plan, IID 2007) and *System Conservation Plan and Delivery Measurement Description* (SCP, System Conservation Plan, IID 2009). Information from review and development of the Interim Water Supply Policy was used to update the 2007 Definite Plan information and numbers, where applicable. Descriptions of these sources are included in analysis section of this scoping report.

The Water Forum made following findings at the March 24, 2011 Meeting.

Table 1. Potential Water Sources Currently Not Designated for QSA/Transfer Agreements

	Maximum AFY	Average Cost Estimate ($/AF)	Constraints
System Conservation Projects			
Full IID system automation	30,000	$1,376	SCP Construction Schedule
Not-built QSA projects	8,000	$590	
Additional canal lining	700	$416	
System Total	*38,700*	$1196	
Voluntary On-Farm Conservation Projects			
TRS, drip, linear move, etc	60,000	$481	W\QSA programs, 322 KAC enrolled
Temporary, Voluntary Fallowing (on an AWUE measure)			
Voluntary starting in 2018	60,000	$500 & up	W\QSA programs, 400 KAC enrolled

Table Notes:

1. Full IID system automation and Not-built QSA project costs include $67/AF for administration & $90/AF for environmental mitigation.
2. On-farm conservation cost range varies with the farmer payment option.
3. On-farm & fallowing programs are likely mutually exclusive – cannot add 60 KAFY on-farm + 60 KAFY fallowing
4. Acreage constraint: QSA on-farm efforts require 300 KAC to meet targeted 200 KAFY; Voluntary Fallowing (above) requires 12 KAC to meet 60 KAFY; Voluntary On-farm projects (above) require 22 KAC to meet 60 KAFY; this would mean a total of 334 KAC enrolled in voluntary programs out of 475 KAC farmable acres in IID service area.
5. Mitigation requirements (community impacts, environmental impacts, etc) for these water sources are unknown.

1.2.3.1 Findings

- Until QSA requirements are met, other potential on-farm and system improvement/practices are held in reserve due to the uncertainty related to program water yield and verification.
- **Definite Plan and System Conservation Plan Implementation.** By 2026 and for the term of the QSA/Transfer Agreements, IID has to conserve the full 303,000 AFY under these plans at an average cost of around $300 per acre-foot.
  - Definite Plan and System Conservation Plan programs represent over $300 million investment in on-farm and system improvements by IID and Imperial Valley growers and owners in return for the transfer and sale of water to agencies in the South Coast and Coachella Valley of up to 303,000 AFY of conserved water through increased agricultural (system and on-farm) water use efficiency that does not decrease agricultural production. Without an agreement regarding returns from the purchase of conserved water and protecting IID water rights, this level of investment would be neither possible (e.g., if these costs were to be distributed to the existing rate payers in the Imperial Region) nor politically acceptable.
  - The most cost-effective conservation measures have already been implemented, or will be implemented to meet QSA/Transfer Agreements obligations as laid out in IID's Definite Plan and System Conservation Plan. Thus, potential conservation projects that remain are costly. In addition, the potential water yield is uncertain, because yield of the planned measures will not be known with certainty until the measures proposed for the QSA/Transfer Agreements have been implemented and the monitoring and measurement history is available.
- **Achievable System Efficiency Conservation and On-Farm Fallowing.** Of the potential water conservation projects only a limited amount of additional yield is achievable.
  - System efficiency conservation projects not currently planned for implementation as part of the Definite Plan and System Conservation Plan could provide as much as 38,700 AFY: 30,000 AFY from full system automation and 8,000 AFY from not-built QSA projects (both can be built in phases, but would have to be built in conjunction with System Conservation Plan construction), and 700 AFY from additional canal lining projects.
  - The cost for system efficiency conservation is estimated to be $1211 per acre-foot for 38,000 AFY and $1196 per acre-foot for 38,700 AFY. These projects were identified from materials used in the review and development of the Interim Water Supply Policy and from the Definite Plan.
    - 38,700 AFY from full IID system automation may be available, but water yield will be uncertain until a history of operation for the Definite Plan and System Conservation Plan has been observed.

        - Of the identified not-built QSA projects, in the near- to mid-term canal lining could provide 700 AFY of water for MCI uses.
    - Cost for on-farm fallowing is estimated to vary and could be over $500 per acre-foot and water yield is related to the amount of land fallowed by willing growers or owners. Incentives that are: 1) performance/result-based and/or 2) conservation practice payment incentives could be used to motivate farmers and/or landowners to participate. The degree of participation that might occur is unknown. This uncertainty makes it hard to quantify firm yield of additional water that could be apportioned to MCI uses. This is not an agricultural water use efficiency practice.

- **Infeasible Actions**. Agricultural conservation actions determined not applicable or feasible include:
    - Replacing concrete-lined canals with pipelines to reduce evaporation (about 650 AFY) is a non-feasible option due to high costs.
    - Reduction in tilewater is not considered a conservation opportunity, because of the leaching requirements to manage salts and maintain crop productivity.
    - Crop selection is a grower decision made in response to market conditions. Any related water conservation would be hard to verify and defend, and this is not considered an agricultural water use efficiency practice.
    - Yield reduction could involve eliminating one irrigation and one cutting on alfalfa, which might achieve 0.5 acre-feet per acre at a cost similar to water savings from fallowing (over $500 per acre-foot). Potential exists to conserve up to 50,000 AFY from alfalfa, as over 100,000 acres of alfalfa are grown in the valley. However, the level of acreage enrolled in the QSA on-farm programs would likely limit enrollment in such a program. Enrollment would be influenced by the payment incentive offered, and would need monitoring for compliance. This could be part of a longer-term IWRWMP adaptive management strategy to be reconsidered once the Definite Plan on-farm efficiency program is fully implemented and an operational history is available by which to gauge the success of the agricultural water efficiency conservation efforts. Any practice that results in yield reduction is not considered an efficiency practice.

- **Voluntary Fallowing – not an agricultural water use efficiency practice**. A well managed in-valley fallowing program could provide water for new MCI uses; however, substantive political, economic and environmental constraints need to be addressed to ensure third-party effects and impacts are addressed.
    - Through 2017, IID will continue the Fallowing Program started in 2003 to meet interim IID/SDCWA water transfer and Salton Sea mitigation requirements under the terms of the QSA/Transfer Agreements. The Fallowing Program will require enrollment of five to 10 percent of farmable IID land in order to produce the

120,000 AFY to 150,000 AFY[17] needed for years 2011 through 2017. In 2018, the Fallowing Program will be discontinued. As a result, additional fallowing for purposes of MCI supply in the years before 2018 is likely to be constrained. After that time, fallowing could be implemented, and the resulting water use reduction quantified and apportioned to new MCI uses.

- Acreage constraint: QSA on-farm efficiency conservation efforts are projected to require 300,000 acres to meet the 200,000 AFY target; voluntary fallowing would require 100,000 acres to provide 100,000 AFY; this would mean a total of up to 400,000 acres enrolled in voluntary programs out of 475,000 farmable acres in the IID service area.

- IID would have to develop programs and policies to accommodate temporary or long-term fallowing as part of a managed in-valley water exchange. Long-term fallowing would damage farming infrastructure.
- The cost of water from fallowing could vary $500/AF and up) and water yield is related to the amount of land fallowed by willing growers or owners, or of IID Western Farm Lands. Costs for fallowing IID Western Farm Land would be related to the cost for payment of the bonds on the land.
- No IID or Imperial County policies were identified that would prohibit fallowing for purposes of providing water for non-agricultural in valley uses, but significant political challenges and potential third-party and environmental effects must be addressed if expansion of current fallowing program were to be considered.

1.2.3.2 Recommendations

1. Proceed with implementation of the Definite Plan and System Conservation Plan actions planned as part of the QSA/Transfer Agreements, evaluate the program once there is an operational history, and use an IRWMP adaptive management strategy to plan additional measures for implementation once the effectiveness of the program can be better measured – after 2020.
2. Move forward to finance and construct the 'not-built' QSA projects as a near- to mid-term solution to provide measurable water for industrial use. These projects could provide up to 8,000 AFY for future MCI uses; to be included in some type of water exchange; or to cover water included in the Interim Water Supply Policy.
   - Aggressively develop a funding mechanism and policies that can be put in place to allow for use of this conserved water for purposes of mitigation for the potentially significant environmental impacts associated with increased industrial

[17] Source: QSA by and Among IID, MWD and CVWD, Exhibit C
http://www.iid.com/Modules/ShowDocument.aspx?documentid=882 (p39 of 44)

water demands for geothermal projects or other projects already in the Imperial County Planning queue.

3. Reserve on-farm efficiency conservation beyond that anticipated in the Definite Plan to meet QSA/Transfer Agreements requirements from further consideration as part of the IRWMP program; cannot be considered as a potential source for future MCI supplies.
   - Additional on-farm efficiency conservation has to be integrated with implementation of Definite Plan projects and/or should be part of a longer-term IRWMP adaptive management strategy to be reconsidered once the Definite Plan has been implemented and there is an operational history by which to gage the success of the agricultural water conservation efforts.

4. Review the development of an in-valley fallowing program that expands on or modifies the current Fallowing Programs.
   - Developing such a program should involve the full participation and input of the Imperial Region stakeholders. Fallowing for in-valley uses and economic development could provide a sure method to reduce agricultural demand 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 and is voluntary with the support of the farm community. This needs to be closely tied to the development of funding and policy alternatives.

1.3 Improve Flood Management

The 2009 California Water Plan Update, the CDWR utilizes numerous Resource Management Strategies to address flood and stormwater management.

During the initial stakeholder interviews and subsequent evaluation of Disadvantaged Communities (DACs) needs, the communities in the Imperial Region identified stormwater management as a high priority to convey water from developed areas, reduce localized flooding, and improve economic development potential within the urban areas. The Projects Work Group discussed stormwater and flood control issues in the early meetings, and special Flood/Stormwater Workshop was held in May of 2011 to develop findings and recommendations. The findings and recommendations were introduced to the Water Forum in June 2011 without action.

For purposes of the IRWMP the Urban Runoff Management and Flood Risk Management were integrated into the IRWMP Improve Flood Management grouping of strategies. The Imperial IRWMP seeks to integrate water quality benefits into any project and programs related to urban runoff management.

1.3.1.1 Findings

- Stakeholder Assessments and DAC Needs Analysis have documented localized stormwater and runoff issues and an awareness of the need for regional solutions.
- Economic development of the planned urban areas will be constrained without management structures, capital facilities and funding mechanisms to provide regional localized drainage solutions and benefits.
- The Preliminary Drainage Master Plan prepared by IID and other city or county master plans that exist or are in preparation, provide a basis for discussion of structural solutions; and for development of project priorities for engineering of regional drainage facilities.
- IID, Imperial County and the Cities cannot solve flood and stormwater management problems independently. The lack of a regional organization with a stable funding mechanism and a clear mission is the largest constraint to solving stormwater and flood problems.
    - IID is not chartered as a flood control district. IID has drainage facilities that meet their intended design purpose within the service area. These facilities could provide the underlying infrastructure which could be improved to provide additional regional stormwater benefits and solutions to the developing areas.
    - The Cities will develop and have the potential to increase runoff and create water quality issues unless mitigated. The Cities have the largest need for improved regional stormwater management and conveyance, but do not have authority or capacity to deal with regional drainage or manage areas outside of their jurisdiction.
    - Imperial County has the broader regional mission, powers and authorities; over the larger geography of the Imperial Region.
    - The land use authorities have the ability to require improvements, condition new development and make exactions to develop stormwater facilities and mitigate for increased runoff or water quality impairments.
- Imperial County has the appropriate jurisdictional authorities to take the lead in formation of a regional flood control district, or of a joint powers authority to combine land use authorities of the County and the Cities to address both urban stormwater runoff, and the larger regional flood control issues.
- IID, Imperial County and the Cities all face financial limitations. Competing for funding within the Imperial Region, and not combining resources and authorities to address the issues, will limit the ability to successfully obtain grant funding and compete with other regions.
- CDWR funding is available through the Imperial IRWM Stormwater Flood Management (SWFM) grant program; however, it will require 50 percent cost-

sharing by the local region and the local funds must be secured or in place in advance of applying for 50 percent matching funds from CDWR.

1.3.1.2 Recommendations

1. Use the Water Forum's process to evaluate and set up a framework for a regional flood control district, including evaluating alternative institutional structures, management programs, funding mechanisms for project solutions to stormwater and flood control.
2. Imperial IRWMP should seek to include both program solutions and potential integrated stormwater/flood projects that would qualify for CDWR's grant funds under Propositions 84 and 1E, and serve to demonstrate regional stormwater planning concepts.
3. Imperial IRWMP Work Group should have sessions that focus on preferred projects for the region that can collectively reduce flood damages, show multiple objective benefits and be competitive in future SWFM grant solicitations. One or more of those projects could be singled out as a regional stormwater retention project or similar flood reduction project.
4. Identify a regional stormwater retention project to serve as a case study and demonstrate economic costs and benefits of regional facilities planned in advance to serve developing areas.
   - Fund through an MOU of multiple partners willing to provide the local match and document the approach.
   - Provide basis for future planning efforts aimed at detailed study of the populated development areas in Imperial Valley to identify specific drainage system improvements and provide a model for how the Cities, county, and IID can coordinate.
5. Initiate high level policy discussion between select members of the Board of Supervisors, IID Board of Directors and representatives of City Council's to engage elected representatives in creation of a legal entity and formation of Flood Control District or Joint Powers Authority (JPA). This larger entity will likely be needed to secure region-wide funding that benefit more than one single local water supply or one local storm water interest.
6. The IRWMP should lay out a program that can be phased in over time. Water Forum's implementation should consider the following priorities:
   - Possible loss of life or injury to people would take precedence over major property damage, while major property damage should take precedence over occasional flooding which results in inconvenience and annoyance;
   - More highly developed areas should be protected prior to less developed areas;
   - Main drains which serve as collectors for tributary reaches should have priority over more localized reaches.
   - Improvement of a downstream reach would have priority over an upstream reach.

7. Develop a Hydrology Manual or similar set of standards that would define consistent methods for engineering evaluation of pre- and post- project runoff. This would help during development review, defining retention requirements, and sizing facilities. It would also support regional analysis of runoff for each of the drainage areas contributing to storm flow to the watershed areas drained by IID facilities, New River and Alamo River.
8. Develop stable funding needed to: a) establish the program and needed policies, b) draft engineering plans and prepare engineering report to seek voter approval for a benefits assessment zones; c) implement programs approved by voters.
9. Any regional funding program for multiple agencies will likely require a significant public outreach component, particularly if the regional agency will be securing local cost-sharing funds through a Proposition 218 Assessment or other similar means.

1.4 Practice Resource Stewardship and Other Strategies

This grouping of CDWR strategies generally includes those that are related to non-structural water management actions that seek to ensure sustainability and/or provide a mechanism to integrate other strategies.

1.4.1 Ecosystem Restoration

The CDWR has 2009 update to the California Water Plan defines the Resource Management Strategies (RMS) that serve as tools for local entities to include in their IRWMP. Ecosystems Restoration is included in the practice resources stewardship grouping. The ecosystems restoration strategy focus is on restoration of aquatic, riparian and floodplain ecosystems because these are the natural systems most directly affected by water and flood management action and climate change. The Draft IID Plan discussed an ecosystems restoration and management strategy to create or recreate habitat.

The Water Forum sponsored a workshop in June 15, 2011 on ecosystems enhancement and restoration. This group made draft findings that were subsequently presented to the Water Forum on June 16, 2011. The Water Forum made revisions and requested comments from all of the stakeholders. None were received and the Water Forum made the following findings.

1.4.1.1 Findings

- Restoration of the Salton Sea is beyond the scope of work of the Imperial IRWMP due to the scale and scope of the restoration effort and the limited focus of the IRWMP goals and objectives.
- Water Forum should seek to identify opportunities for interregional coordination to address Salton Sea issues and maintain communications with agencies involved in Salton Sea restoration and mitigation.

- Seek to identify ecosystems restoration and enhancement opportunities that could be integrated into proposed IWRMP projects.
- The existing IID HCP/NCCP can be used as an example for evaluating individual and cumulative impacts of projects on drains (one method).
- Recycled water and energy projects should not be delayed pending implementation of a mitigation bank.

1.4.2 Water-Dependent Recreation

During the review of the CDWR strategies and as a result of the preliminary discussions early in the planning process, the Water Forum recommended integrating water-dependent recreation strategies into the design of projects for groundwater banking, stormwater/flood management and habitat mitigation banking where feasible.