

Increase Water Supply

CDWR resources management strategies for water supply include:

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

This document presents a summary of the findings and recommendations for how these strategies may be applied and integrated in the Imperial IRWMP.

1.1 Groundwater Development, Groundwater Banking and Conjunctive Use

Prior opportunities for groundwater development, banking and conjunctive use were evaluated in the *Draft IID Plan*, and the highest priority projects within the Imperial Region that were to be carried forward for further feasibility analysis were identified (IID, 2009)^{1 2 3}. The groundwater banking and storage projects concepts focused on the East Mesa and Coachella opportunities. Presented below is the evaluation of the concepts against the criteria used to evaluate the RMS and findings based on discussion at the Projects Work Group.

Preliminary Findings (includes input from PWG 11/18/10 and 12/08/10)

Findings related to the criteria used to screen the CADWR resources management strategies include:

- 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

¹ Draft IID Plan, Appendix F. IID Groundwater Banking Opportunities. Technical Memorandum, September 1, 2009, From: Natural Resources Consulting Engineers, Inc. To: Matt Zidar.

² Draft IID Plan, Appendix B, Groundwater Development and Recharge Potential for the Imperial Valley Imperial Irrigation District (IID). (GEI).

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

environmental demands. Groundwater banking and storage would help meet objectives by:

- 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 beneficial.**
 - **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.
 - Development of groundwater banking and storage of underruns would not be favorably regarded by other junior appropriators to the Colorado River who are currently able to take this water when it is not diverted by IID.
 - Alternately, these interests have a high ability and willingness to pay and seek partnership and subsidize local projects for a percentage of the project's yield.
 - 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 and Recommendations

- **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** 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** groundwater development would not be sustainable over the long term since there is no natural recharge or sustained yield, and water quality is limited
 - 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.
 - **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 in the would require desalination.

- **Groundwater storage and banking.** Groundwater banking and storage 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; and
 - 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 are mid- to long- term propositions. 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.

Recommendations

- 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.
- Develop groundwater management plan elements of the IRWMP to support groundwater storage and banking projects and meet requirements for state grant funding.
- 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.

- Seek state and federal grant funding to conduct the needed evaluations and pilot projects.

1.2 Desalination

Preliminary Findings (Reviewed by PWG 11/18/10 and 12/08/10)

Findings related to the criteria used to screen the CADWR resources management strategies 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, 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.
 - Disposal of brines provides;
 - 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.
 - Interregional interests have a high ability and willingness to pay and may subsidize local projects for some of the project yield and help create political support.
 - Large scale desalination would likely be viewed favorably and could provide partnering opportunities that could reduce costs to local rate payers.
- 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.

Additional Specific Findings and Recommendations

- Desalination of brackish groundwater in the East Mesa is a near- to mid- term propositions 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.
- 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.
- 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.

1.3 Recycled Water

Preliminary Findings (Reviewed by PWG 12/08/10)

Findings related to the criteria used to screen the CADWR resources management strategies include:

- Meeting IRWMP Goals and Objectives - Reclaimed 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 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% conservation goals in the region.

- Complexity - Treatment technologies to reclaim 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. Accounting approach
- Resolve Conflicts, Colorado River - Reclaiming wastewater would be relatively neutral. This practice would demonstrate the regional commitment to making use of this resource.
- Resolve Conflicts, Imperial Region - Reclaiming 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 wastewater could provide regional benefits by helping to meet the requirements to conserve 20% by 2020; increasing the reliability of the supply, and supporting economic development.
- Timeliness - There are a number of potential reclaimed wastewater facilities 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 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 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.

Additional Findings and Recommendations

- Support current wastewater facilities plant upgrades that propose reclaiming water for use in renewable energy projects that are planned for Niland, Brawley and Imperial and include as part of the near term strategy.

- Require mitigation for loss of flows to IID drains through development of a regional mitigation bank; seek to provide regional benefits, creating partnerships and meet multiple IRWMP goals by using reclaimed wastewater for this purpose where cost effective and timely.
- Consider regional reclamation projects to increase cost effectiveness of project development and operations, provide benefits to multiple parties, and improve opportunities to reuse the water (reduce cost of purpose of purple pipe network).
- Provide policy and financial incentives for public/private partnerships to construct 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).
- Continue to evaluate the cost effectiveness and political viability of regional wastewater treatment facilities that include reclaiming wastewater as part of the mid- and long- term water management strategy.
- Imperial County and IID should coordinate and adopt appropriate policies to require use of recycled water in- lieu of Colorado River water to mirror CEC and SWRCB policy.
- Reclaiming all forecasted future wastewater flows would still only provide an estimated total of 36,000 acre-feet per year, which is a little more than one third of the future forecasted demand in the Imperial Region and is well in excess of 100,000 acre- feet. If all the wastewater available was reclaimed, it would only provide a percentage of the future demand.