2015 IRP Issue Paper Addendum

Draft Outline

1 Opening Material

Frames the story. Provides context

- Executive Summary — **Summary of process and results**
- Table of Contents — **Hyperlinked to report contents**
  - Conservation
  - Groundwater and Stormwater Recharge
  - Recycled Water
  - Seawater Desalination
  - Stormwater Direct Use
  - Graywater
  - Conclusion
- Introductions/ Background

Purpose

Background

- 2010 Issue Paper
- Addendum
- Resource areas

Process

- Member agency and other input
- Workshops/meetings

Structure of the report

- Challenges/Barriers
- Opportunities
- Lessons Learned
- Recommendations

2. Conservation

Section

2a Background

Provides an overview of conservation

- Background / Overview

Background

- Record drought conditions
- Governor's April 1, 2015 Executive Order with statewide mandatory conservation and reporting
- Metropolitan's conservation budget increased
- Intense consumer demand for conservation rebates
- Meanwhile, 20x2020

Categories

- **Programs** (Rebates, incentives, grants)
- **Measures: Mandatory/Voluntary** (Standards, ordinances, mandates, requests)
- **Communication** (Outreach, education, messaging)
- **Retail Water Pricing** (Rate design)
- **Overall**

2b Challenges

Challenges and barriers to implementation

- Programs
  - Cost-benefit evaluation
  - Financial sustainability
  - Unpredictable water savings
  - Disparity of staffing/manpower/priority between water conservation field vs. energy conservation field
  - Conflicting/mismatched policies between conservation retrofit programs and permits/rules within the same municipality
- Measures
  - Diverse and conflicting stakeholders
  - Enforcement and savings
  - Varying behavior
  - There is a very large number of water agencies; difficult to coordinate
  - No state-adopted value for embedded energy savings
  - Conflicting/ mismatched policies between conservation retrofit programs and city-side permits/rules

➢ Communication	• Measuring impacts • Customer access to water use data • Sustained water savings • Need to communicate an effective storyline of what really contributes to actual savings; counteract distracting/confusing storylines • Business sector awareness – getting messages through to the people who actually pays the water bill (may be a faraway corporate office, not local plant operator)
➢ Retail Water Pricing	• Retail water pricing • Political support • Public perception • Economic impact • Prop 218 makes tiered rate structures more difficult
➢ Overall	• Demand hardening • Maintaining conservation efforts • Short-term vs. long-term actions • Costs/Funding o Avoided cost is calculated differently by different entities • Recycled water impacts • Feast and/or famine cyclical nature: e.g., feast with money, famine with water (right now); Conservation a hot topic in drought, and not in normal/wet years

2c Opportunities

Opportunities for increased conservation

➢ Programs	• Integration/Partnerships o Partnerships and education between different departments to resolve tension between innovation and unintended regulatory/permitting burdens • Various funding sources • Commercial and outdoor
➢ Measures	• Immediate benefits • Ordinances for new construction • New plumbing codes

➢ Communication	• Social norm messaging
	• Information sharing
	• Multimedia
	• Water billing –
	  o Water bills are confusing but can be improved
	  ▪ e.g. consistency in billing units and more user-friendly terms
	  o Have comparisons of water use vs. neighbors, neighborhoods with similar climates, other states, or other countries

➢ Retail Water Pricing	• Budget-based rates • Study successes • Rate BMPs
➢ Overall	• New technology/software o Water Alert electronic notifications (akin to Amber Alerts, Flood Alerts) • Research • Drought – heightened water awareness and new regulatory pathways; • Partnerships

2d Lessons Learned

Major lessons learned

➢ Programs	• Need mechanisms for financial sustainability
➢ Measures	• Accounting for savings credit • Can be effective if enforced
➢ Communication	• Message source variety is effective • Peer pressure is effective
➢ Retail Water Pricing	• Can be successful • May still have high gpcd • Case studies

➢ Overall	• Reporting requirements can have powerful effect on conservation
	  o Simple reporting is most effective
	• Research is critical
	• Legislative backing makes a difference
	  o AB 2100 protects homeowners from HOA penalties for brown lawns
	• Statewide push for mandatory conservation has been
	• Investor-owned utilities are in a difficult situation of trying to justify tiered rates and promote conservation while losing revenue

2e Recommendations	Recommendations for increased conservation
➢ Programs	• Evaluate existing programs • Explore new programs and devices • Expand partnerships
➢ Measures	• Explore developing model ordinances • Have measures that address water efficient technologies o e.g. waiver of permits to install High Efficiency toilets
➢ Communication	• Explore ways to communicate water use to the end user • Outreach/educate city/regional planners
➢ Retail Water Pricing	• Study successes
➢ Overall	• Explore research opportunities and technology development • Develop information sharing opportunities • Explore integrating approaches

3. Groundwater and Stormwater Recharge

Section

3a Background	Sustainable groundwater management

➢ Background / Overview	**Significant Supply for Region**
	• Historical average is 1.5 MAFY
	• Meets about 40 percent of total demand
	Sustainable GW Management
	• Balanced average recharge and production
	• Effect of consecutive multiple dry years
	Current Conditions
	• Groundwater Production
	• Recharge
	  o Passive and active stormwater
	  o Recycled water
	  o Imported water
	• Reduced storage level due to multiple dry years
	• Amended groundwater adjudications

3b Challenges	Challenges and barriers to groundwater sustainability
➢ Potential Threats to Sustainable Groundwater Production	**Urbanization** • Reduced passive recharge of groundwater • Increased runoff **Reduced Safe Yield** • Reduced landscape irrigation due to drought • Reduced return flows to groundwater **Climate Change** • Less frequent, more intense storms • Potential reduction in passive and active stormwater recharge

➢ Costs/Funding	**Groundwater**
	• Groundwater recovery program
	• Potential lack of capital funds
	Stormwater
	• Range of costs
	  o Distributed vs. centralized stormwater capture
	  o Why aren't low cost projects being done?
	• Project funding
	  o Grants
	  o Long-term O&M Funding
	Recycled Water
	• Advanced Water Treatment projects are expensive
	• Balance cost vs. treatment and blending requirements

➢ Institutional	**Adjudications** • Some judgments don't allow additional pumping rights for stormwater projects • Recent changes in the Central and West Coast Basins' judgments may allow for storage accounts **Broadening agency mission** • May limit agency cooperation and/or multi-benefit approaches
➢ Groundwater Quality	**Remediation of groundwater contamination** • Funding • Technical Feasibility **Recycled water recharge regulatory constraints** • Blend water • Retention time • Basin Plan Objectives • Advanced Water Treatment vs. Tertiary **Basin salt loading**
➢ Operations and Environment	**Endangered species** • Need to integrate endangered species requirements into surface water operations • May affect capture and spreading of stormwater, conveyance and spreading of recycled and imported water **Operations** • Flood control vs. groundwater recharge • Treated vs. untreated water supplies • Quagga mussels in untreated Colorado River water • Shortage of State Project water **Sediment removal** • Reduced capacity for stormwater capture • Potential clogging in basins reduces infiltration rates

3c Opportunities

Opportunities for groundwater storage and sustainable management

➢ Basin Management	**Available groundwater storage space increased due to drought** **Amended basin adjudications** • Increased opportunity to store water in groundwater basins • Increased flexibility for Watermasters to manage basin
➢ Regulatory	**Changes to Recycled Water Recharge Regulations** • Blend Water Requirements • Treatment Guidelines **Upcoming Regulations on surface water augmentation**
➢ Technical	**New treatment and brine disposal technologies** • Improved opportunity for groundwater recovery and recycled water recharge
➢ Collaboration	**Multi-benefit approach** • May increase opportunity for stormwater capture for water supply • Partnerships for utilization of available supplies and groundwater storage space

3d Lessons Learned

Learning from the past

➢ Groundwater	**Able to pull down groundwater storage lower than anticipated** **Decreases in imported water supply availability have resulted in increased local supply development** **Watershed planning is most effective** **Pilot and demonstration projects provide valuable data**
➢ Stormwater Recharge	**Centralized vs. distributed project types** **Land acquisition** • Good recharge areas already utilized • Difficult to site new recharge projects • Modification of existing recharge locations necessary **Public relations** • Important to success of projects **Costs** • Capital • Long-term O&M • Grant funding

3e Recommendations	Moving forward
➢ Groundwater	**Short-term** • Evaluate performance of existing storage programs • Review strategy of storage and transfers **Long-term** • Explore options to facilitate more effective utilization of groundwater • Explore innovative participation in local resources development • Continue to explore opportunities for partnerships between water and wastewater agencies
➢ Stormwater	**Short-term** • Evaluate performance of existing programs **Long-term** • Evaluate a business case for providing stormwater incentives o Regional benefit o Dry-year yield **Ongoing** • Continue to encourage regional collaboration/discussion • Seek opportunities to work together • Continue to develop regional forums

4. Recycled Water

Section

4a Background	Provides an overview of recycled water
➢ Background / Overview	• **Purpose and reference to 2010 IRP** • **Recycled water uses** • **Treatment train** for non-potable reuse (NPR), indirect potable reuse for groundwater recharge and surface water augmentation (IPR), and direct potable reuse (DPR) • **Different recycled water uses** have unique challenges and opportunities

4b Challenges	Challenges and barriers to recycled water
➢ Cost	• **Project costs are high** – Local Resources Program (LRP) helps o LRP does not encourage development of low-cost projects • **On-site retrofit costs are high** – On-site Retrofit Pilot Program (ORP) helps • **Lack of capital** to build low-cost projects • **Cost of advanced treatment** for DPR and IPR (for injection or 100% recycled water) • **Groundwater recharge** may require development of new spreading basins or injection wells • **Cost of conveyance and infrastructure** • **Competing projects** – fear of stranded facilities o IPR vs. NPR o DPR vs. IPR
➢ Permitting	• **Define the role** of each permitting agencies • **Inconsistency** in implementation of regulations – some local permitting agencies make it difficult • **Long lead times** for permitting and California Environmental Quality Act (CEQA) review due to lack of staffing • **Lack of regulations** for DPR and IRP for surface water augmentation o No history o Timing o Limited data and experience • Recycled water is considered and treated as a waste by some regulatory agencies
➢ Public Health and Perception	• **Conflicting messaging** confuses the public about the safety of recycled water • **Industries are concerned** about public image if they use recycled water in their processes • **Need for education and public outreach** regarding recycled water • **Public health concern** by agencies and public • **Public perception** for drinking recycled water
➢ Water Quality	• **Industrial /commercial customers' need** – impact on cooling towers or other systems • **Source control** - Source water quality impacts treatment process and recycled water quality • **Impact of conservation and drought** • **Salt management** is needed for all types of uses and groundwater protection • **Need for a brine disposal** (e.g., brine line or additional treatment for zero liquid discharge (ZLD))

➢ Supply and Demand	• **Lack of regional database and GIS**
	  o Market saturation is some areas (recycled water availability with limited end-users)
	  o Fully subscribed in some areas (recycled water not available for existing users and growth)
	• **Environmental needs vs. customer needs**
	• **Reduced wastewater flows** due to conservation and drought

➢ Operational	• **Need to maximize use** of recycled water **for groundwater recharge**
	  o **Need blend water** (but competing with flood control)
	  o **Advanced treatment** for off river spreading or direct injection
	• **Limited availability of spreading basins**

4c Opportunities	**Opportunities for recycled water**

➢ Technical	• **Technological advancement** to help with quality, quantity, and cost
	• **Real-time monitoring** to help address issues with DPR
	• **Information sharing** to help agencies better design and operate projects
	• **Recycled water fill-stations and street sweeping**
	• **Working with regulatory agencies on streamlining and simplifying regulations and permitting process**
	• **Regional studies**
	  o Database and GIS
	  o Feasibility studies
	  o identify cost-effective projects
	  o Identify potential partnerships for recycled water transfers

➢ Partnership	• **Partnership** among water and wastewater agencies and groundwater basin managers
	• **Facilitate cooperation and partnership** between agencies
	• **Public education and outreach**
	  o Regional standard messaging, tailoring by local agency to fit
	  o Develop a forum for information sharing to help reduce cost and expedite project development

➢ Regulatory/Permitting	• **Recent changes to regulations** for use of recycled water for groundwater recharge help increase use of recycled water • **Upcoming regulations** for IRP and DPR • **Streamline** and expedite permitting process
➢ Funding	• Prop 1. • LRP, ORP, and SDCWA's Local Water Supply Development Program • Partnerships and Reimbursable Services Program (RSP)
4d Lessons Learned	**Lessons learned over three decades**

➢ Public perception	• **Public perception has improved for all types of recycled water use**
	  o Focus groups
	  o Stakeholders meetings
	• **Water shortages raise awareness** for alternative ways to conserve bringing more attention to recycled water

➢ Partnerships	• **Partnerships work**
	  o Provide some examples of partnership between water and wastewater agencies. For example, partnership between Orange County Water District and Orange County Sanitation District help develop 100,000 AFY of recycled water for groundwater recharge and seawater barrier
	• **Helping neighboring agency**
	  o Provide examples of cooperation between two agencies for serving customers. For example, Central Basin MWD provides recycled water to Upper San Gabriel Valley MWD

➢ Case studies	• **Several technical, research, pilot and demo project** • **Foundational Actions Funding program (FAF)** • **WateReuse, NWRI, Universities**
➢ Advocating groups	• WateReuse Association, American Water Works Association (AWWA), and California Urban Water Agencies (CUWA) collaboration
➢ Funding	• **LRP and ORP** help increase use of recycled water in the region • **Incentives may not work alone;** grants and State Revolving Fund loans are needed to build projects • **Adaptive LRP incentive rates** may be effective
4e Recommendations	**Recommended actions for advancing recycled water development**
➢ Legislation	• **Continue to work with member agencies on legislation** to facilitate the development and use of recycled water
➢ Partnership	• **Continue to explore opportunities for partnerships** between water and wastewater agencies to develop projects

➢ Studies	• **Consider joint studies with member agencies and other agencies on technical research and development** • **Consider joint studies with member agencies and other agencies on feasibility and planning studies** • **Explore working with member agencies to develop a regional GIS system** • **Explore integration approaches**
➢ Education	• **Pursue aggressive messaging, especially during times of shortage** • **Promote consistent messaging** • **Shift the perception that recycled water is not a waste but a reliable source of supply**

5. Seawater Desalination

Section

5a Background	**Brief overview of seawater desalination** **Seawater Desalination Benefits** *(but not silver bullet)* **Project status update**
➢ Table of Contents	

➢ Background / Overview	**Overview of Seawater Desalination**
	• **2010 IRP Issue Paper**
	• **Seawater Desalination data and facts**
	Expanded Benefits Section
	• **Diversified resource portfolio (**Discuss “last resort” and “loading order” issues)
	• **Reliability**
	  o Drought, climate resistant
	  o Not reliant on variable source waters:
	  ▪ Alternative new supplies dependent on source water reliability
	  ▪ Address reliability of transfers
	• **New water supply**
	  o Not limited by existing water rights
	  o Does not impact downstream users
	  o Other “raw” sources also have environmental impacts
	  ▪ Surface water: dams and diversions, deltas
	  ▪ Groundwater: seawater intrusion, subsidence, surface water
	• **Flexible:** Dispatchable when needed
	• **High quality:** Requires post-treatment, but otherwise low salinity, directly potable
	Desalination project status update
	• Update project status tables
	• Provide brief description of each project

5b Challenges	**Challenges and barriers to implementation**

➢ Environmental Context	**Pre-Existing challenges facing California’s marine environment**
	  o Coastal productivity / sensitivity
	  o Fishery declines
	  o Pollution, plastics, discharges, dead zones
	  o Harmful algae blooms, acidification
	Desalination can be sustainable

➢ Regulatory Challenges	**New Ocean Plan Regulations:**
	• **Application**
	  o Discuss new limitations to co-location
	  o Discuss need to identify desalination project in regional plans
	• **Project size**
	  o UWMPs and other plans must show need for project
	• **Intakes**
	  o Discuss requirements for subsurface intakes
	  o Discuss need for entrainment studies
	• **Outfalls / discharges**
	• **Mitigation**
	  o Stringent requirements
	  o APF/ETM model required
	  o Discuss lack of available coastal wetlands for mitigation
	Coastal Commission Intake Expert Panel
	Once Through Cooling regulations enacted
	Marine Protected Areas established

➢ Costs	**Costs are still a barrier** (provide updated cost table) • Capital Costs • Unit Costs (Rising electricity costs)
➢ Climate Change / Energy Use	**Water Energy Nexus** • Energy Use (provide updated energy use information) • Energy comparison (energy use of desalination vs. air conditioning, server, etc.) **Sea-level Rise**
➢ Public Outreach	**Local Opposition to seawater desalination**
5c Opportunities	Opportunities for removing development barriers
➢ Permitting	• Administrative agreements between permitting agencies • Address Governor's Water Action Plan • Discuss MOA between SWRCB and CCC/SLC
➢ Funding	• Local Resource Program • Foundational Action Funding Program • State Funding Program: DWR, CEC , SWRCB • USBR programs and facilities
➢ Innovation	**Intake technology** • Wedge-wire screens • HDD, other subsurface technologies **New desalination technologies** • Process design • Forward osmosis • Graphene • Desalination on a chip **Energy** • Renewable energy • Load shifting
➢ Approaches for Minimizing Risk	**Partnerships** • Dry-year/ wet-year partnerships • Public/private partnerships **Project Phasing**
5d Lessons Learned	Lessons learned from case studies and project development experience
➢ California Case Studies	• Carlsbad • Santa Barbara • Santa Cruz / Soquel Creek
➢ International Case Studies	• Australia • Spain • Israel / Middle East

➢ System Integration Survey	• Summary of findings from Metropolitan's 2011 study of international seawater desalination integration practices • Other system integration studies
5e Recommendations	Potential actions for advancing regional development
➢ Recommendations	**Consider new research and studies** • Intake technology: screened and subsurface • Entrainment, brine discharge impacts • Siting / integration • Mitigation • Member agency studies **Explore legislative / regulatory / communications opportunities** • CalDesal, Southern California Salinity Coalition and the Multi-States Salinity Coalition • Messaging • Funding: research / project **Consider opportunities for capacity building** • Planning software • Technical training **Other?**

6. Stormwater Direct Use

Section

6a Background	**Provides background and definition of terms for stormwater direct use.**

➢ Background / Overview	**Overview of Stormwater Direct Use**
	• Definition
	• Example Projects
	  o Rain Barrels
	  o Cisterns
	  o Non-potable use
	  o Subregional/Regional capture

6b Challenges	**Challenges for additional stormwater use and barriers to implementation**
➢ Availability	**Source water only available during rainy season** • Limited benefits on summer peaking • Demand impact
➢ O&M	**Operation and Maintenance of Devices or Facilities**
➢ Groundwater Impacts	**Groundwater Impacts** • Reduction in recharge • Water quality? • Water rights
6c Opportunities	**Opportunities for additional stormwater use**
➢ Non-potable municipal	**Municipal non-potable use** • Restrooms • Onsite irrigation • Subregional/regional storage
➢ Public Outreach	**Public Awareness of Water Issues** **Educational Opportunities**
6d Lessons Learned	**Lessons learned from current projects**

➢ O&M	**Facilities not maintained** • Often homeowners' responsibility • Homeowners don't maintain properly **Grant funding** • Grant funding doesn't include O&M • Difficult to sustain funding
➢ Project Schedule	**Municipal projects** • Take additional time • Permitting
➢ Case Studies	**Example Projects**

6e Recommendations	**Stormwater direct use recommendations**
➢ Business Case of Incentives	**Current Incentives** • Rain barrels **Analyze a Business Case for Additional Incentives** • Regional benefit • Dry-year yield
➢ Continue coordination	**Discussion of regional opportunities** **Open dialogue and coordination**

7. Graywater

Section

7a Background	**Provides an overview of graywater**
➢ Background / Overview	**Graywater defined** • Graywater is a byproduct from washing • Graywater includes wastewater from bathtubs, showers, bathroom washbasins, clothes washing machines, and laundry tubs • Graywater does not include wastewater from toilets, kitchen sinks, or dishwashers, or wastewater from diaper cleaning • Graywater is not black water, recycled water, or stormwater **Graywater in California** • California formerly had some of the most stringent standards in the country • Significantly reduced instructional barriers since 2009 • For practical purposes, still mostly limited to outdoor reuse; indoor reuse requires treatment **Graywater in the 2010 IRP** • Foundational Action • No recommended MWD action to develop graywater until an Impact Study determines regional potential and resolves issues of effects on other resource investments, such as recycled water and wastewater

7b Challenges	**Challenges for graywater and barriers to implementation**
➢ Permitting and Regulations	• Difficult to track (mostly unpermitted) • Confusing, time-consuming, and costly permitting processes • Some technologies are not permitted or otherwise impractical in CA • Graywater owners may not be aware of the long-term commitment in terms of time and monetary costs needed to maintain their systems prior to installation • Regular maintenance needed • Monetary benefits alone do not justify costs to the owner
➢ Potential Health Impacts	• Improper use or storage can potential lead to pathogens or vectors. • Human contact and storage are prohibited. • However, no reported cases of illness related to graywater systems.
➢ Potential Soil Impacts	• Difficult to track (mostly unpermitted) • Confusing, time-consuming, and costly permitting processes • Some technologies are not permitted or otherwise impractical in CA

➢ Potential Conflict with Other Resources	• Aquifer risks – graywater can add unwanted salts to water tables if the water table is high • Sewer systems – large scale implementation could create low-flow conditions in sewer collection systems which could impede solids transport; also increases concentrations of remaining blackwater which affects treatment operations • Recycling projects – graywater reduces wastewater flow to existing recycling projects; increased concentrations of feedwater may affect treatment and blending requirements • Conservation – graywater is an enabling resource that may have unintended impacts to water use • Customers may decide to defer changes to their landscaping due to availability of graywater
6c Opportunities	**Opportunities for graywater**
➢ Policy	• Three-tier permitting standards that include basic "laundry-to-landscape" systems o "Laundry-to-landscape" systems no longer require permits or inspections • Local government may not prohibit in CA o Local jurisdictions may only adopt standards that are more restrictive than state requirements o An ordinance must include local conditions that necessitate more restrictive • Governor's 2015 Executive Order o Among other provisions, directed enforcement of statewide mandatory urban water restriction by 25% compared with 2013 use, and directs CA Energy Commission , jointly with DWR and SWRCB, to implement a Water Energy Technology (WET) program to deploy innovative water management technologies ▪ "Integrated on-site reuse systems" mentioned in the executive order, point #17
➢ Administrative	• Consolidation of authority for graywater standards under California Building Standards Commission • Some local jurisdictions are streamlining permit processes
➢ Education and Acceptance	• Increasing public awareness and interest o Laundry to Landscape systems now legal and simple to implement o Drought and water rationing measures • Mainstreaming efforts by industry, NGOs, and local governments o Greywater Guerillas rebranded as Greywater Action
6d Lessons Learned	**Lessons learned from past projects**
➢ Costs and Limitations	• Customers need to be made aware of potentially prohibitive costs and limitations o Of the 6 permitted graywater systems discussed in the 2009 IRP issue paper, only 1 remains. The others were removed or abandoned because maintenance was more than expected. o Users have less incentive to use water-efficient clothes washers, or to wash clothes efficiently, in order to produce enough graywater for irrigation
➢ Permitting	• Customers can be intimidated by permitting requirements • Administrative burden on customers can be eased in compliance with new regulations o Local jurisdictions can streamline permit processes
6e Recommendations	**Recommendations**
➢ Research	• Continue to encourage research on graywater potential and impacts
➢ Education	• Public information efforts needed to build awareness of graywater opportunities and cost

8. Conclusion

Section

8a Resource Interrelations	**Common elements and resource interconnections**
➢ Background / Overview	**Water resources connectivity**
➢ Challenges	**Water Quality** **Regulatory** (lengthy, variable process) **Cost** • High capital and O&M • How to evaluate cost-benefits **Lack of public awareness and negative perception**

➢ Opportunities	**Collaboration** • Integrate resources **Funding** **Technology** • Case studies • New technology • Research **Regulatory, Drought** • New pathways • Heightened awareness **Drought actions**
➢ Optimizing Resources	**Groundwater recharge – Integrate resources** • Stormwater • Recycled water • Imported water **Storage** • Groundwater, surface water, in-region, out-of-region **Resource interactions** • Balancing benefits and impacts
➢ Recommendations	**Collaboration** • Explore partnership opportunities **Analyze integrating regulatory efforts** **Explore research and technology development** opportunities and programs **Investigate integrating public outreach and education efforts** **Explore integrating resource approaches** **Explore integrating program approaches**
8b Overall	**Weaving it all together**
➢ Summary	Summary of results and recommendations
➢ Next Steps	Board discussion on implementation policies Foundational actions