



Priming the Pump: How Will Southern California Make Up For The Water It Will Lose From The Delta Because Of Pumping Restrictions To Protect Threatened Species?

Introduction

Court-imposed restrictions on pumping in the Sacramento-San Joaquin Delta to protect endangered Delta smelt, longfin smelt, and salmon have reduced southern California's water supply from the Delta by an annual average of approximately 30%. Many experts believe these seasonal restrictions will be in place for years, and perhaps for decades. And there are other loomings on the horizon. Global climate change is expected to reduce snowpack—the largest water reservoir in the state—and to result in earlier releases of snowmelt, both of which will contribute to losses in water delivered from the Delta to southern California. Because we receive up to 50% of all of our water from the Delta, these factors pose a serious challenge to southern California. Given the projected increase in the state's population, particularly in southern California, increasing water use efficiency, combined with diversifying, expanding, and stabilizing southern California's water portfolio take on added importance.

On September 23, 2008, the Aquarium of the Pacific and the Long Beach Water Department convened and facilitated a forum to explore how southern California could make-up for these losses in water supply from the Delta. The situation is compounded by losses from the Colorado River which supplies an additional 15-17% of the region's total water use and which has experienced a severe drought for the past eight years. The forum brought together water experts, policy-makers, water managers, and environmentalists. The forum consisted of formal presentations to provide context and to explore options for diversifying southern California's water supply portfolio, and interactive workshop sessions to review, revise, and refine each of the options. The forum concluded with an opportunity for the entire group to respond to the findings and recommendations for each option and to modify them.

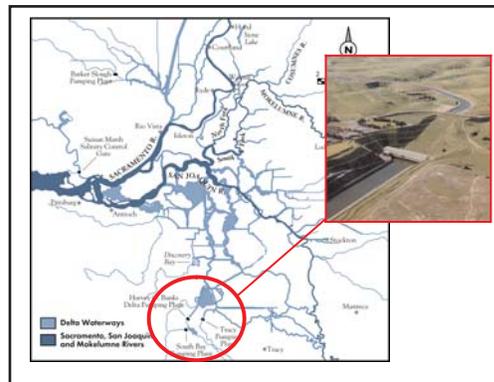
This brief report is a summary of the findings and recommendations. All have the support of most, if not all, of the participants. The full proceedings will be available at www.aquariumofpacific.org by 31 December 2008.

Setting the Stage

The Sacramento-San Joaquin Delta (hereafter referred to as the Delta) figures prominently in the state's past, present, and future. The Delta is a major "switching station" for distribution of northern California's rich supplies of freshwater to other less water-rich areas of the state. It is an important environment for numerous species, both full-time residents and transients such as salmon, striped bass, Delta smelt, and longfin smelt. It is an important recreational, agricultural, and residential area. And it is a mess—ecologically and environmentally, and from the perspective of management and governance in terms of meeting the state's future water requirements. The potential losses of property, lives, and the state's short-term water supply by an event such as a moderate earthquake of high probability or by chronic changes related to global climate change—particularly a rising sea—are large. There are no quick fixes, no silver bullets, and what is most distressing, there is no compelling long-term vision or analysis of pathways to a sustainable future based upon rigorous scenario planning. It is time to reflect and rethink. Every major water supply system in California is over allocated.

Because of the dependency of southern California on the Delta for a predictable and uninterrupted supply of fresh water and the lack of any short-term fixes, this forum focused on identifying, exploring, and evaluating southern California's options for diversifying its portfolio of water supply choices to make it more robust, and decrease the probability of major economic and environmental disruptions. The options identified and examined were

- Conservation
- Capture, treatment and reuse of municipal wastewater
- Capture, treatment and reuse of storm water runoff
- Desalination of ocean and brackish water



Conservation

Southern California as a region does a good job of water conservation. Without the conservation and reclamation projects it has in place, it would need to import much more water than it does. The primary conservation target for substantial increases in water conservation is landscaping. Approximately 50% of home water use in southern California is for landscaping. Educational and incentive programs will be important in transitioning to drought tolerant landscaping, but regulations that prohibit certain outdoor water uses may be necessary.

Long Beach has been a leader in water conservation. Through a variety of voluntary and mandatory programs and an aggressive marketing campaign, the Long Beach Water Department has reduced the city's water usage in 2008 to 10% below its 10-year average.

Primary Findings and Recommendations

- Move the efficiency of water use up to a new level that reflects current "best management practices."
- Invest in enhancing water use efficiency. Payoffs in water and in energy savings and in dollars could be substantial.
- Create a tiered use approach to the cost of water with appropriate incentives and disincentives with protection for disadvantaged populations.
- Invest in public education to raise awareness of the options and their potential for water savings and avoided costs.
- Involve community-based organizations in educating the public about the latest developments increasing water use efficiency.
- Monitor/meter exterior home water use to promote water use efficiency.
- Promote use of new technologies such as ET controllers to control water use in real time in response to changing weather.
- Mandate changes in building codes to reflect high efficiency devices and integrate with retailers so the public can make better decisions and execute those decisions.
- Develop grey water use guidelines.
- Create policies and ordinances that make certain outdoor water uses illegal in southern California and that promote greater efficiencies in all water uses.

Forum Speakers:

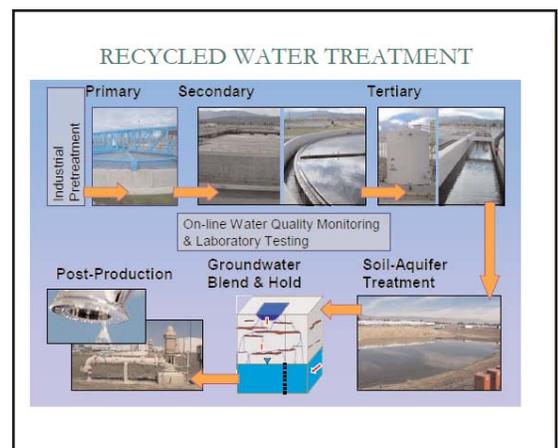
- **Ryan Alsop**, Manager of Government & Public Affairs, Long Beach Water Department
- **Steve Arakawa**, Group Manager, Water Resources Management, Metropolitan Water District
- **Martha Davis**, Executive Manager, Inland Empire Utility Agency
- **Jared Huffman**, Chair, Assembly Water, Parks and Wildlife Committee
- **Charles Keine**, Chief, Department of Water Resources, State of California
- **Suja Lowenthal**, Councilmember, City of Long Beach
- **Matthew Nobriga**, Staff Environmental Scientist, California Department of Fish & Game
- **Jerry Schubel**, President, Aquarium of the Pacific
- **Christine Swanson**, Executive Director, The Bay Institute
- **Kevin Wattier**, General Manager, Long Beach Water Department
- **Robert Wilkinson**, Director, Water Policy Program, Bren School, UCSB

Capture, Treatment, and Reuse of Municipal Wastewater

Capture, treatment, and reuse of municipal wastewater has many advantages. It counts 100% toward meeting state conservation mandates, provides a one-for-one replacement of imported water, and can be an important and reliable component of a region's base water supply. The last factor is particularly important during periods of greatest water stress when availability of resilient supplies becomes critical. To take advantage of recycled wastewater requires an infrastructure that integrates the treated wastewater with other water supplies, and with a recovery and distribution system that offers flexibility in segmenting and matching water of appropriate quality with appropriate use.

Primary Findings and Recommendations

- Just because it is "wastewater" doesn't mean we can afford to waste it.
- Recycled wastewater should be an integral part of every water supply portfolio: it is a stable, reliable, economical supply that reduces reliance on imports and counts 100% toward conservation.
- Education of the public and water managers is key to their understanding the value of recycled wastewater in the water portfolio in terms of supply and energy.
- Sources of financing—federal, state and other sources—must be integrated to make the recycled water option attractive.
- In some basins, recycled wastewater can be treated with soil filtration, recharged into groundwater, and blended with water from other sources.
- The level of treatment and the quality of water should be matched to the intended uses—irrigation or drinking water, for example.
- Exploitation of recycled wastewater requires an integrated and flexible supply, treatment, recovery, and distribution infrastructure system.
- Appropriate incentives should be provided for users and distributors to promote the use of recycled wastewater.
- Acceptance of recycled wastewater requires champions at planning and policy levels.



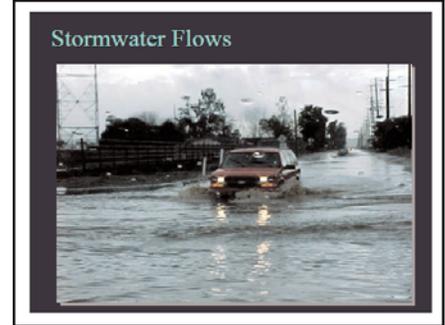
Capture of Runoff and Groundwater Recharge

Most of southern California's rainfall occurs in intense rainfall events and much of the water runs off into the ocean with little delay. The situation is compounded by the large percentage of the landscape that has been hardened by structures and paved surfaces. Capturing this runoff and recharging it into the groundwater can be an important contribution to the water supply. Depending upon where the capture takes place different degrees of treatment may be required. Level of treatment also is a function of the intended use of the water. Where the rainfall occurs, opportunities to capture runoff, and places where it can be stored often are not coincident. To fully exploit the capture of runoff option requires development of more effective regional infrastructure and far greater regional collaboration than has been achieved thus far.

Bringing people together to find sustainable solutions to southern California's persistent water problems should be a high priority. To be effective they must involve experts, policy-makers, and a broad cross-section of stakeholders and must be done on a recurrent basis as part of a process; one that has a client who is committed to using the results.

Primary Findings and Recommendations

- Identify responsible agencies for each basin, review past precipitation and runoff patterns and develop quantitative targets for capture of run-off for recharge.
- Bring smaller agencies together to collaborate through facilitated discussion.
- Promote recycled water for conjunctive use and include regulatory agencies in the discussion.
- Promote development of integrated infrastructure on a regional basis to capture run-off and recharge groundwater.
- Slow down the hydrograph to increase runoff capture efficiency: protect existing recharge areas and create new ones where possible.
- Facilitate discussions of water managers, policy-makers, and stakeholders to explore the roles of water rights, swapping credits, etc. to develop regional plans for recharge, recovery, and distribution of groundwater.
- Develop incentives and credits to fund projects.



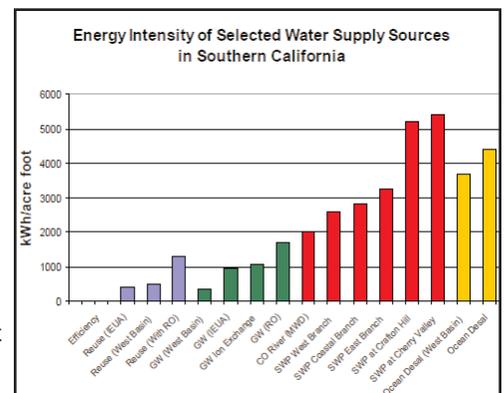
Ocean and Brackish Water Desalination

Ocean desalination has the potential to provide an essentially infinite supply of high quality potable water on a sustainable basis, unaffected by droughts. There are a number of challenges—real and perceived—to this particular option however, and it is seen by many as the least desirable option. The opposition stems largely from concerns about environmental effects of the intake process—entrainment and entrapment of marine life—and costs associated primarily with energy use. However, current data clearly show that some of today's imported water options are more energy intensive than the most energy efficient ocean desalination option. Education is key to public acceptance of ocean desalination.

The state and federal government should take the lead in funding research efforts to develop the scientific and technical information needed to reduce the environmental impacts and costs of ocean desalination. The costs and benefits of ocean desalination need to be evaluated in the context of all other options. This needs to be done on a regional level and must include an assessment of all true costs, including energy costs. At the present time 18% of the state's total electrical energy use and 33% of its total natural gas use (excluding power plants) goes to the conveyance of water.

Primary Findings and Recommendations

- Develop and implement a comprehensive state policy on ocean desalination that includes: rationale, criteria, performance standards, energy, where desalination fits with other water supply options, and monitoring and research requirements.
- Evaluate ocean desalination in the context of all other options on a case-by-case basis examining all costs and benefits.
- Develop comprehensive funding strategies that encompass priorities for local, state and federal funds, grants, and subsidies.
- Generate more and better data on environmental impacts of ocean desalination plants and create an open data base that includes results from all appropriate national and international studies.
- Learn from desalination experiences in other countries: overcoming environmental impacts, permitting, operating, monitoring, etc.
- Clarify, codify, and streamline the permitting process by working with the executive and legislative branches and regulatory agencies. The present process is uncertain, cumbersome, protracted, and costly.
- Tie California's program to the National Academy of Sciences report on desalination which recommends \$25 million/year in federal support for research on reducing environmental impacts and costs. Clarify the roles and responsibilities of state, local and federal governments in funding research and in making the results widely available.
- Identify BMPs for large inland de-salters and relate to the need for regional collectors for concentrate management.
- Educate the public about the true costs and benefits of ocean desalination in the context of all options.
- Include requirements to utilize sustainable energy such as wind and solar in permit requests.



Summary Findings & Recommendations

By the end of the day a number of conclusions received broad support. These included:

- Because every major water supply in California is over allocated and because of an uncertain water future for the state as a whole, and particularly for southern California, it is important to explore alternative pathways to the future using scenario planning to map out the range of probable futures and to develop a set of robust strategies that will work across all scenarios.
- Each water district in southern California needs to develop a diversified portfolio of water sources that includes a scenario for the total loss of all imports from the Delta for one, two, or more years—perhaps even on a permanent basis.
- The best balance of water sources in a portfolio will vary with location and with time at any given location. The first target of opportunity should be increasing water use efficiency--conservation. After this, the opportunities to recycle wastewater and to capture stormwater runoff should be evaluated in the context of recharging groundwater. Ocean desalination should be evaluated along with other options on a case-by-case basis using true environmental and economic costs and benefits.
- Investing in increasing water use efficiency has the potential to produce great savings in water, energy, environmental impacts, and dollars. It should receive the highest priority.
- Taking advantage of a flexible portfolio of water sources requires integrated infrastructure systems at a variety of spatial scales from individual water districts to regions. The only sustainable solutions will be regional in extent.
- We need new institutional mechanisms to promote and facilitate new ways of thinking about water problems and opportunities on a regional scale that will lead to wise decisions in the context of adaptive management.
- We should match the right water quality with the appropriate water use. This requires systems flexible enough to accommodate larger 'gulps' of imported water and recaptured stormwater runoff when they are available.
- Good decisions depend upon good information: gathering critical data, transforming the data into information in a timely way, and making it widely available. The existing data and information should be synthesized around a carefully-crafted set of important water management and policy questions. This also will reveal new data and information needs.
- The largest single use of water in and around homes is for landscaping which accounts for 50-70% of total home water use. Increasing the use of native, drought-tolerant vegetation should be promoted through education, and incentives and disincentives.
- It is time for California to examine the largest water use in the state—agriculture—which uses more than 75% of the state's developed water, and to identify strategies to reduce the amount of water used without sacrificing California's leadership in agriculture.
- Because water is a national and international issue and because California has so much at stake, defining a new approach to a sustainable water future can not only reduce California's water problems to manageable levels, but position the state as an international leader.

"Things that can't go on forever, don't" — Herb Stein

Working Group Facilitators:

- Mark Beuhler, Assistant General Manager, Cochella Valley Water District
- William Cooper, Director, Urban Water Research Center, University of California Irvine
- Conner Evert, Executive Director, Southwest Watershed Alliance
- Tedi Jackson, Public Affairs Manager, Western Municipal Water District

The Aquarium of the Pacific's Aquatic Forum is dedicated to exploring important, complex, and often contentious issues with environmental, social, and economic dimensions. The Aquatic Forum is an activity of the Marine Conservation Research Institute (MCRI).



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