Near Term Actions Related to Water Supply Reliability
California Department of Water Resources
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A long-term vision for sustainable management of the Delta necessarily includes long-term actions – ambitious public works that will take at least 8 to 10 years to complete after they are approved and funded, and perhaps much longer. However, there are actions that can be implemented more quickly to improve ecosystem function and improve the reliability of water supplies and Delta conveyance. In addition, there are actions that will take many years to implement but already have major funding sources identified. Work has already begun on many of these "near-term" actions. An important strategy for the maintenance of ecosystem function and water supply reliability will be to increase implementation efforts for these near-term actions and identify and implement additional near-term actions, while simultaneously working to implement long-term solutions for Delta sustainability.

The ***California Water Plan Update 2005*** identifies two initiatives to ensure reliable water supplies: (1) implement integrated regional water management, and (2) improve statewide water management systems. Long-term public works projects identified in the Delta Vision are part of California's statewide water management system, but they are not the only elements of a statewide system that can improve reliability. Some other **system improvements** are already receiving funding or can be started immediately:

Protect statewide conveyance systems from flood damage by improving flood capacity. As part of the Governor's FloodSAFE Program, setback levees and new or expanded flood bypasses are being encouraged. These approaches to flood protection should be given first priority because they protect the system that serves as both flood conduit and water supply conveyance, while simultaneously restoring important seasonal floodplain habitat. These projects also attenuate flood peaks, and this attenuation can protect the Delta from catastrophic failure.

Restore the elevation of Delta islands to reduce the severity of Delta floods. Promising research has documented the ability to reverse Delta subsidence and restore land elevation. Demonstration projects and full-scale subsidence reversal projects should receive high priority because they can reduce the impacts of Delta levee failure by reducing the flood-prone volume of Delta islands. Additional investigation of the economic sustainability of this approach is needed.

Although a focus of the Delta Vision effort has been the Delta exports of the SWP and the CVP, most of California's water supply is developed and delivered by local and regional entities. These entities will continue to provide most of the state's water supply and will be able to take the most effective action to ensure water supply reliability. In recognition of this fact, recent policy emphasis and grant availability has been placed on integrated regional water management. During the time that new surface storage and

Delta conveyance improvements are being planned and constructed, regional efforts can maintain and even improve water supply reliability. These **regional efforts** include:

Develop IRWM plans that identify and pursue all appropriate opportunities to improve water supply reliability in the context of regional resource management. Regional planning for water management is still a relatively new trend, and some regional plans can be refined or improved. Plans should include a comprehensive assessment of options and a rigorous selection of the most effective strategies.

Implement water management measures that will accomplish the most reliability improvement. Each region will find that a different mix of strategies is most appropriate, but certain strategies are likely to be highly effective almost everywhere. Water conservation is a prime example.

Develop incentives and sanctions to ensure that inefficient water use by some users does not threaten the water supply reliability of others. Water users that are carefully examining all options and making defensible water management decisions should have access to state assistance programs such as water management grants. One way to strengthen this would be a certification system for agencies' planning and implementation efforts. Water suppliers that consume excess resources and jeopardize the reliability for everyone should face sanctions that discourage excessive use and encourage better resource management.

The table below summarizes funding status and implementation timing information for these near-term actions.

Table 1. Water Supply Reliability Actions, Funding Status, and Timing

Action Category	Funding Status	Implementation Timing
System Improvements		
Develop Setbacks and Bypasses	Available in Props. 1E, 84	Under way; up to 10 years or longer to implement
Implement Delta Island Restoration	Available in Props. 1E, 84	Pilot projects under way; 70 years or longer to complete
Regional Efforts		
Develop and Implement IRWM Plans	Available in Props. 50, 84	Under way; new grant funding available 2008
Emphasize Most Effective Measures	Available in Props. 50, 84	Under way; new WUE grant funding in 2008
Develop and Implement Incentives and Sanctions	Not capital-intensive, some funding needed	Some incentives enacted (e.g. AB 1420); additional development in 2008

Potential water available as a result of implementation of near-term actions is estimated in two recent publications. The ***California Water Plan Update 2005*** describes 24 resource management strategies and presents the water potential of selected strategies in

maf/year. For example, the year 2030 potential for urban water use efficiency is 1.2 to 3.1 maf/yr.

The ***CALFED Water Use Efficiency Comprehensive Evaluation*** published in August 2006 presents a "look-forward analysis" of the potential of agricultural water use efficiency, urban water use efficiency, recycling and desalination. Only general information is included for recycling and desalination. For urban and agricultural water conservation, the analysis examines five levels of effort and a theoretical technical potential at intervals from 2000 to 2030. A central assumption of the Comprehensive Evaluation is that the availability of grant funding to implement conservation measures will directly affect the potential water made available from implementation of efficiency measures. The analysis was completed before November 2006 voter approval of $1 billion in IRWM funds from Prop. 84 but includes hypothetical scenarios with similar funding availability.

Several precautions are advised when using information presented in the tables below. These estimates are based on existing levels of base exports; significant reduction in exports could affect the potential of some strategies. In addition, these projections are based on "average year" analysis. Drought conditions might be worse. The analyses cited here are all statewide analyses. Some localized areas may not have access to these strategies and could be more impacted by cuts in exports. Most of these strategies provide urban water supply. Agricultural supply may be more impacted by cuts in exports.

Importantly, regions will have to respond to other uncertainties that will affect water supply, such as variability in imports from Colorado River, and general climate change effects. Any flexibility that these increases in regional self-sufficiency might provide cannot automatically be assumed to result in reduced dependence on the Delta.

Finally, the tables below cite information from other studies. The number of significant digits suggests more accuracy than actually exists. These are all estimates, and there is considerable uncertainty surrounding them.

Table 2 below was compiled from data in the Comprehensive Evaluation. It provides projected total urban and agricultural conservation potentials for several likely future scenarios.

Table 2. Future Conservation Potential by Scenario

Conservation Effort and Funding Scenario	Potential Savings (taf)		
	2010	2020	2030
Urban agencies step up conservation programs to implement all locally cost-effective measures. Agriculture implements measures with local investments only.	856	1,631	1,971
Urban agencies continue to implement Best Management Practices at current levels, receive an additional $15 million/yr in grant funding. Agricultural agencies receive an additional $15 million/yr in grant funding. (This $30 m per year is roughly comparable to current Prop. 84 investments plus future funding that would maintain this level of investment.)	615	1,237	1,584
Urban agencies step up conservation programs to implement all locally cost-effective measures, receive an additional $15 million/yr in grant funding. Agricultural agencies receive an additional $15 million/yr in grant funding. (Roughly comparable to Prop. 84 investments.)	972	1,859	2,293
Urban agencies step up conservation programs to implement all locally cost-effective measures, receive an additional ~$30 million/yr in grant funding. Agricultural agencies receive an additional ~$30 million/yr in grant funding. (This substantial new investment in efficiency was projected to be $40 m per year from 2005-14, and $10 m per year from 2015 to 2030, but for simplicity was evaluated as $30 m per year by CALFED.)	1,035	1,930	2,328

It is more difficult to project the potential for future recycling and desalination based on available data. The CALFED Comprehensive Evaluation compiled a list of 565 proposed recycling projects, but cautions that the list should be considered a "bookend" for the potential range of recycling because the list may include speculative projects and duplication. The Comprehensive Evaluation also notes that the projected yield from these listed projects approaches the entire flow that could pass through wastewater treatment plants, another indication that the projection might be optimistic. The ***California Water Plan Update 2005*** provides a potential range of recycled water for 2030. Finally, there are projected ranges in ***Water Recycling 2030: Recommendations of California's Recycled Water Task Force, June 2003***. Another estimate was prepared for the CALFED finance plan in 2004. All these projections are summarized in the table below.

Since there are very long lead times to bring a water recycling plant on line, and the Delta Vision Task Force is focusing on the next 8 to 10 years, a review of existing information available from the SWRCB on recycling projects that are in planning, permitting, or construction phases might give a more accurate projection of water availability.

Table 3. Recycled Water Potential

Source of Projection	Interim Yield (taf) (year)	2030 Projected Yield (taf)
Comprehensive Evaluation	--	3,079
California Water Plan	--	900 – 1,400
Recycling Task Force	440 – 590 (2010)	1,400 – 1,670
CALFED Finance Plan	300 (2014)	--

Projections of future desalination are also much less detailed than projections of conservation. The Comprehensive Evaluation compiled a list of 172 potential projects that may include duplication or speculative projects. Another source of projections is Water Desalination: Findings and Recommendations of the Water Desalination Task Force, October 2003. This report includes both brackish groundwater desalination and ocean or estuarine desalination. Projections are shown in the table below.

Table 4. Desalinated Water Potential

Source of Projection	Interim Yield (taf) (year)	2030 Projected Yield (taf)
Comprehensive Evaluation	--	1,279
Desalination Task Force	530 (2013)	--

As California's needs grow, the demand on groundwater basins will increase significantly. Reduced deliveries of imported water through the Delta will lead to increased groundwater pumping, some of it in basins that are already overdrafted, and potentially reductions in the amount of water recharged in currently operating groundwater storage programs. Longer term uncertainty, such as that posed by climate change, will require that groundwater basins be used more effectively to store water when it is available. Significant expansion of monitoring networks and programs, improved characterization of the hydrogeology and water budgets of groundwater basins, and development of groundwater management plans by local agencies will be needed to ensure that groundwater resources are used sustainably. The Local Groundwater Assistance Grant program will provide funding to local agencies to implement monitoring programs, develop groundwater management plans, and study the feasibility of groundwater storage.

The ***California Water Plan Update 2005*** provided two estimates of the potential for conjunctive management of groundwater and surface water to provide additional water deliveries. Conservatively, the water plan estimated that 500,000 acre-feet of average annual water yield could be developed through new and expanded conjunctive management projects. Integrated Regional Water Management funding from Propositions 50 and 84 is available to assist local agencies in developing this capacity. The water plan estimates that as much as 2,000,000 acre-feet of new water supply could be developed with more aggressive approaches, that would include reoperation of

existing surface storage, expanding conveyance capacity, and greatly expanding recharge and extraction capacity. Maximizing the potential for groundwater storage will depend on deliveries of surplus imported water, better acceptance of using highly treated wastewater for groundwater recharge, and resolution of a number of institutional and legal factors.

Table 5. Conjunctive Water Management Potential

Source of Projection	Interim Yield (taf) (year)	2030 Projected Yield (taf)
California Water Plan	500 (2012)	2,000

Conclusion

Collectively, strategies including urban water conservation, agricultural water conservation, water recycling, desalination, and conjunctive water management offer great potential to maintain and improve water supply reliability in the near-term and the long-term. The potentials described above are not strictly additive. For example, urban conservation measures may reduce opportunities for water recycling. However, these estimates suggest that within a decade these strategies show the potential to contribute up to about 2.5 million acre-feet per year to California's water supply reliability. It would not be unreasonable to expect 0.5 to 1.0 maf per year of conservation, about 0.5 maf per year of recycling, 0.5 maf per year of desalination, and 0.5 maf per year of additional managed groundwater use. By 2030, these strategies offer the potential to provide 3 to 6 maf or more.

These numbers suggest that the draft Delta Vision elements of reduced reliance on the Delta (at least in terms of percent of total supply) and increased regional self sufficiency are feasible if California makes the investments and takes the actions needed to achieve the potential of the water management strategies that are available to us. However, it is important to note the caution expressed above: when water is conserved, recycled, or desalinated, it does not automatically translate to reduced demand on the Delta.