

i2i Water Phase II Report

Report and Discussion with
California Water Quality Monitoring Council

November 28, 2012

Dr. Karl Longley, PE
California Water Institute
California State University, Fresno

The Role of CCST – Science and Technology in the State's Interest

- Not for profit, 501 c(3) comprised of over 200 of CA's top talent
- Committed to serving the State in all aspects of S&T
- Sustaining institutions: UC, CSU, CCC, Stanford, USC, Caltech
- Affiliate members: LBNL, LLNL, Sandia, SLAC, NASA Ames, JPL

CCST is Comprised of:

- 16** Board Members
- 30** Council Members (2/3 Academia, 1/3 Industry)
- 136** Senior Fellows
- 12** Cal Teachers Advisory Council Members
- 10** S&T Policy Fellows

And includes:

- 5** Nobel Laureates
- 81** National Academies' Members
- 11** National Medal of Science or Technology
- 6** National Board Certified Teachers

CCST Explores S&T Issues

Science, Values, and Public Policy

- Many policy decisions have S&T components that policy makers are not trained to handle
- Clear communication, trust and accountability are paramount
- A technical topic is inherently difficult to explain
- Scientific method can be at odds with personal feelings such as outrage, irrational hope or groupthink

SELECT RECENT CCST ACTIVITIES

- SCIENCE AND TECHNOLOGY POLICY FELLOWS
- SMART METERS
- CELL PHONES IN THE PRISONS
- CALIFORNIA ENERGY FUTURES
- CLIMATE CHANGE RESEARCH DATA BASE
- INNOVATE TO INNOVATION (I2I)
 - Digital Education
 - Water

i2i Water Phase II Report Recommendations



✧ Develop California Water Future S&T Roadmap

10/25/50 year plan integrated with the State's ongoing long-term water planning efforts.

✧ Collaborate with Department of Water Resources as part of the SWP 2013 update

Identify and expand information associated with statewide and regional needs, opportunities, and challenges for developing and implementing new water technologies in California.

Status of Ph III i2i Water Project

- ✧ S.D. Bechtel, Jr. Foundation providing funding
- ✧ Phase III Project has three phases:
 - ✧ Phase 1: Scope – Identify innovative technology and/or system approaches that can be used to address state priorities
 - ✧ Survey currently underway. Have you completed yours?
 - ✧ Phase 2: Scan – Develop an inventory of innovative technology (online database), map technologies by type and feasibility
 - ✧ Phase 3: Summarize – Develop key findings and recommendations

Survey Overview

Among other information, the questionnaire asked respondents to identify:

- Existing technologies with the potential for broader application
- Emerging technologies with similar potential
- Water technologies the state should invest in
- Projected impacts of all of the above
- Principal barriers to implementation or reform

Survey Overview

- 40% of respondents so far are from either state or federal agencies, with the largest state contingent coming from DWR and the Waterboards and federal agencies.
- 20% are from UC campuses, primarily Santa Barbara and Davis.
- Responses were also obtained from:
 - DOE Laboratories
 - NASA
 - Industry (consultants)
 - Nonprofit environmental organizations
 - CSU campuses
 - Other

Survey Overview

Most respondents stated that technologies:

- Exist to significantly improve California's water supply and management.
- Can be immediately implemented or can be commercialized/scaled up within three to five years.

Survey Overview

The most common technologies suggested included:

- Better access to and use of data and modeling;
- Onsite monitoring of water quality and environmental conditions;
- Use of remote sensing to evaluate snowpack and other water supply conditions; and
- Water treatment technologies such as membrane filtration and desalination.

Survey Overview

Other recommendations have included –

- Increased water use efficiency (agricultural and residential),
- More closely tying the price of water to actual costs.

Survey Overview

- Recommendations for state investment have varied depending on the technologies advocated by the respondents –

Sizeable minority suggested --

- > Minimal investment is necessary,
 - > Main challenge is one of access to and use of data.
- Surprising percentage of respondents indicated that investment in IT technologies is not necessary as they believe that adequate computing capacity already exists.

Survey Overview

- Many respondents are highly critical of existing water management policies.

Cite lack of coordination and distributed information as primary obstacles to implementation of greater efficiencies in management.

- Several respondents indicated that vested interests in the current system impede or would likely impede reform efforts.
- **Primary barrier cited by nearly every respondent to better water management is lack of funds.**

Focus Group and Individual Interviews

1. OPTIMIZING DATA MANAGEMENT AND USE
2. DATA ACQUISITION – MONITORING
3. TREATMENT – MEMBRANE AND OTHER SALT CONCENTRATION PROCESSES
4. TREATMENT – USE OF SOLAR TECHNOLOGY
5. WATERSHED MANAGEMENT
6. AGRICULTURAL & URBAN WATER USE EFFICIENCY

California Water Plan 2009 Extracts

Investment in analytical capabilities lags far behind the growing challenges facing water managers and resource planners

Needs include :

- *Decision-making in light of uncertainties*
- *Supporting integrated water management, including integrated flood management, regionally and statewide*

Analytical approaches need to:

- *Be improved to effectively quantify where scientific uncertainties exist,*
- *Allow for collaborative decision-making to help overcome political and social disagreements, and*
- *Identify actions that will have sustainable outcomes.*

California Water Plan 2009 Extracts

Investment in analytical capabilities lags far behind the growing challenges facing water managers and resource planners

California needs to create a new water information exchange and management system and more integrated analytical tools that can be used to document and share knowledge.

CONCLUSIONS

1. Respondents provided a variety of recommendations for state investment in various technologies, depending on their areas of expertise:
 - Sizeable minority suggested that minimal investment is actually necessary and that the main challenge is one of better access to and use of data.
 - Some respondents indicated that this challenge is primarily procedural rather than technological, asserting that adequate computing and networking capacity already exists.

CONCLUSIONS

2. Procedural issues impeding data sharing and use appears to be symptomatic of deeper disconnects between different sectors of those involved in water technology development, implementation, and analysis.
 - Many respondents expressed criticism of varying existing water management policies, frequently citing a lack of coordination and distributed information as primary obstacles to implementation of greater efficiencies in management.
 - Respondents also cited disconnects between policymakers, regulatory officials, academia, and the public (including the agricultural sector).

CONCLUSIONS

3. Most commonly cited barrier by nearly every respondent to better water management is lack of funds.
 - For some, the lack of funds reflects a generally inadequate level of investment in water technology and maintenance
 - For others, the issues are, in whole or in part, logistical, with funding going to the wrong sources or being administered in a way that does not support efficient technology development or implementation.

**Thank You for Your
Assistance with This
Important Project**