

Achieving a Sustainable California Water Future through Innovations in Science and Technology

Technology and Drought Response & Preparedness

Water Technology Summit
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CCST
CALIFORNIA COUNCIL ON
SCIENCE & TECHNOLOGY

CCST

Science & Technology in the State's Interest

- Created 28 years ago to advise California on science policy – a National Academies for California
- Convenes academia, national labs, private sector, as subject-matter experts; includes 3 Nobel Laureates, 81 members of the National Academies, and 11 winners of the National Medal of Science or National Medal of Technology
- CCST produces **peer-reviewed reports** to inform critical policy decisions for California policymakers, such as hydraulic fracturing, STEM education technology, and water



Water Report Steering Committee

- Chair – **Jude Laspa**, Deputy COO, Bechtel (retired)
- **Bryan Hannegan**, Associate Lab Director for Energy Systems Integration, National Renewable Energy Lab
- **Karl Longley**, Professor and Dean Emeritus of Engineering, CSU Fresno
- **Soroosh Sorooshian**, Distinguished Professor, Civil and Environmental Engineering and Earth System Science, & Director, Center for Hydrometeorology and Remote Sensing, UC Irvine
- **Robert Wilkinson**, Adjunct Professor, Bren School of Environmental Science & Management, UC Santa Barbara
- **David Zoldoske**, Director, Center for Irrigation Technology, CSU Fresno, and Assoc. Director, Center for Resources and Policy Initiatives



CCST's 2014 Water Report

- Next step after 2010 legislative request to study CA innovation ecosystem – water emerged as priority
- Two-year effort involving 150 California water experts launched in 2011 – in advance of drought
- Useful tool for policymakers to address today's daunting drought
- Focus on water use cycle as framework for analysis and science and technology-based recommendations
- Innovations in science and technology identified for each step in water cycle.
- Focus on short- and medium-term implementation

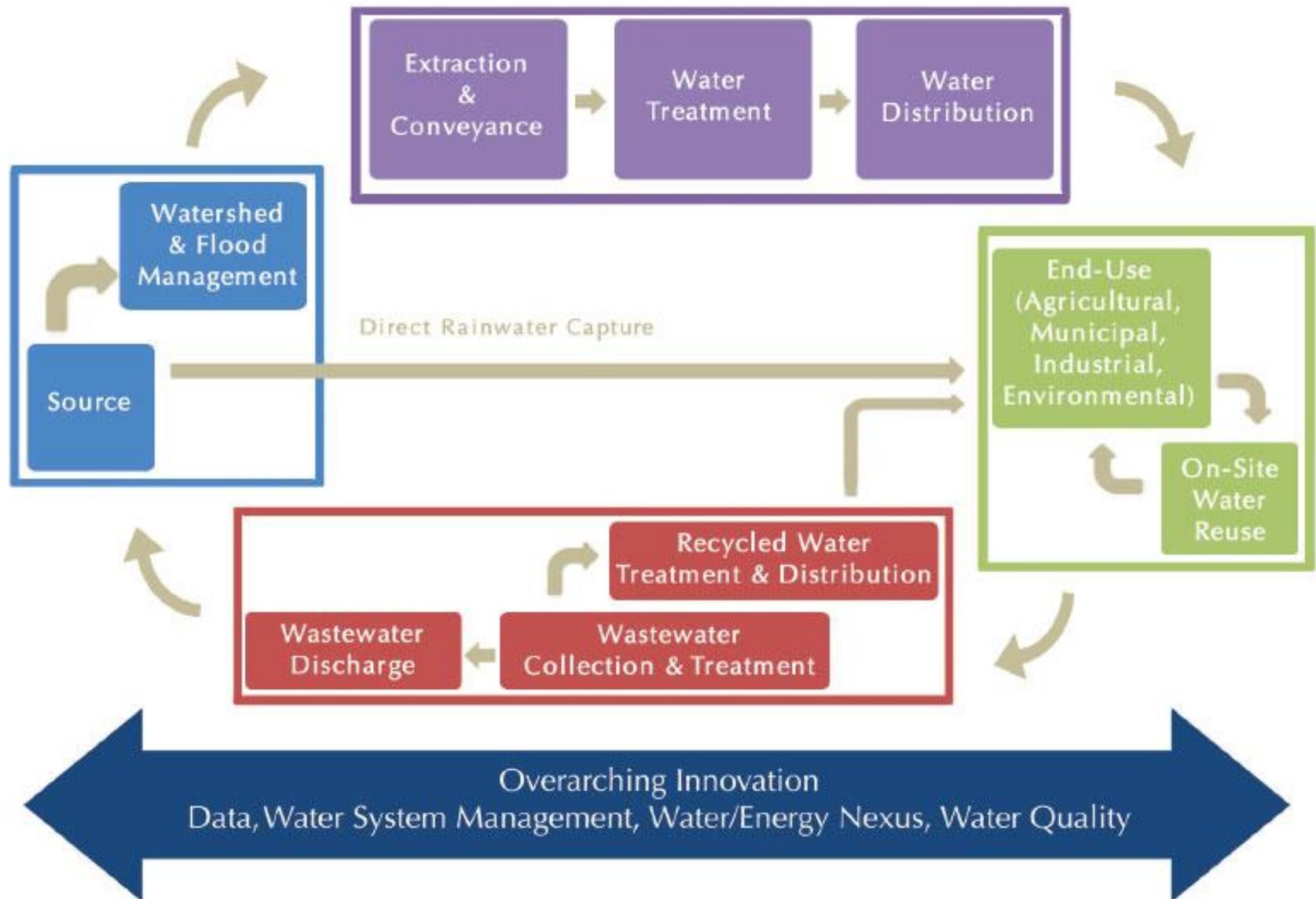


CCST's 2014 Water Report Process

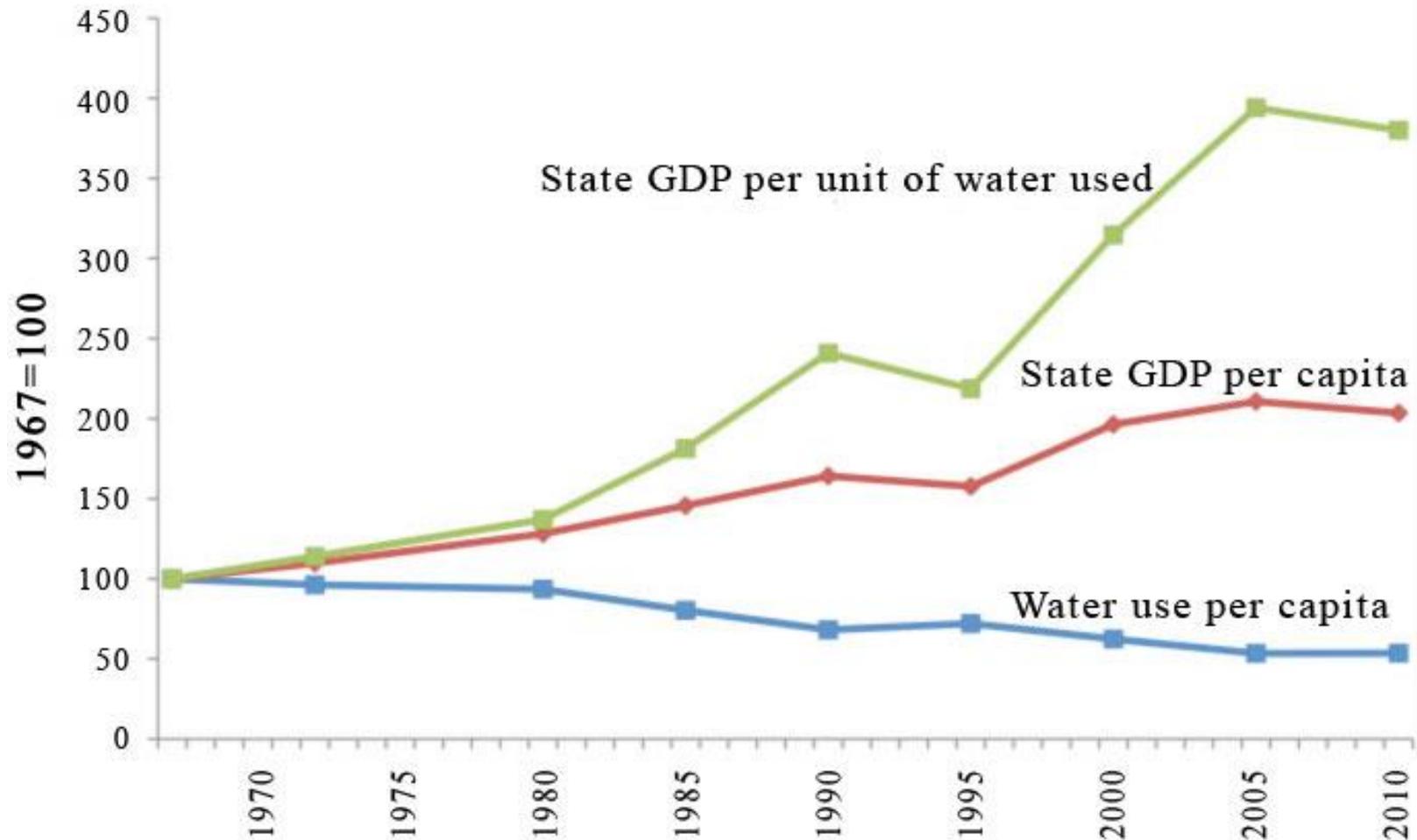
- Collaborated with Department of Water Resources to inform the science and technology portions of the California Water Plan Update 2013
- Outreach to and survey of the water technology and research community
- Peer review by experts, CCST members and affiliates



California's Water Use Cycle



California State GDP per Unit of Water Used



CCST's "Top Five" Recommendations

Essential to Address California Drought

- 1. Develop and implement an integrated water information-management system**
2. Expand use of monitoring technology and management practices: meter all sources, uses
3. Improve agriculture water use efficiency
4. Improve urban water use efficiency (residential, commercial, industrial)
5. Expand water reuse of all kinds



#1 – Integrated Water Information Management System

- Measure water supplies, uses and quality
- Expand *in situ* and remote monitoring
- Link to integrated data management system
- Create a common portal for key reports, transparency, using common standards
- **Near term: Determine what is realistic to do, design data collection and management system, determine data gaps and resulting policy recommendations**



#2 – Measure All Sources, Uses

- Expand use of monitoring and measurement practices, including meters and advanced metering infrastructure
- Monitor groundwater withdrawals
- Implement management practices for sustainability
- **Near-term: encourage/incentivize metering of all urban and ag water use**



#3 – Improve Agriculture Water Use Efficiency

- **Increase the adoption of water management (flow & total) and soil moisture sensing technologies**
- Promote the expanded use of high efficiency irrigation distribution systems
- Encourage the universal adoption of one or more technologies for irrigation scheduling including remote sensing; weather based, and/or crop/soil based.
- **Near-term: All of the above**



#4 – Improve Urban Water Use Efficiency

- Incentivize appropriate landscapes, irrigation systems
- Continue to expand use/retrofit of high-efficiency plumbing fixtures and other water-using devices as well as leak-detection systems
- **Near-term: accelerate metering and all of the above**



#5 – Expand Water Recycling/Reuse

- Expand use of recycled water
- Make desal a priority
- Expand use of on-site graywater and rainwater/stormwater harvesting
- **Near-term: focus on new construction and major retrofit projects**

Response to Report

- Very positive feedback from stakeholders
- Drought only recently center stage
- Politics of water have resurfaced with deluge of reports, op-eds



Next Steps

- Resolve impediments and barriers
 - Demonstrate WHY important
 - Make business case to quantify impact
 - Address resistance of major stakeholders
- Develop consensus, policy recommendations, integrate with other key initiatives
- Budget and staff



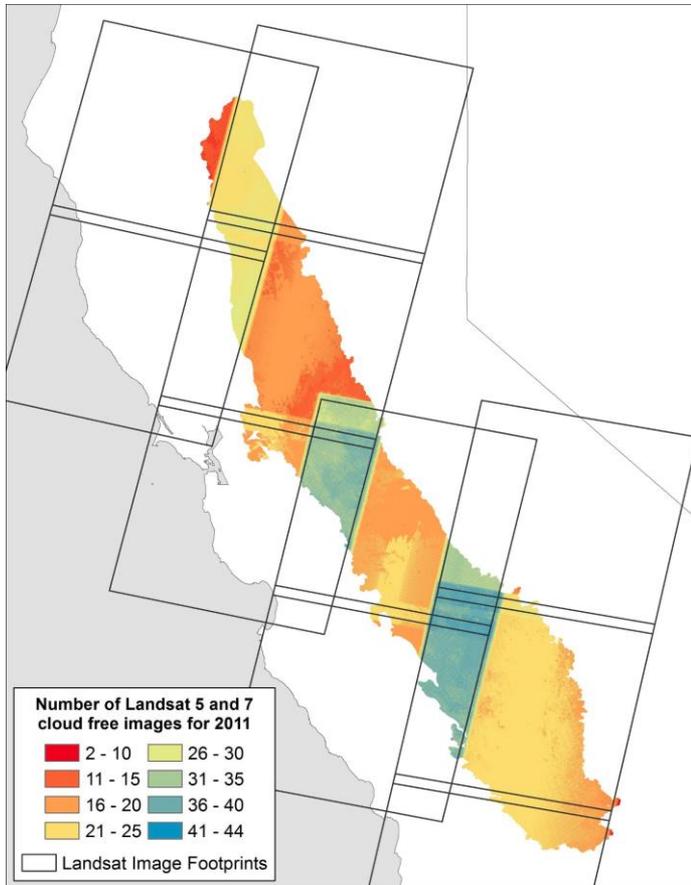
What California Must Do

- Take a statewide “systems” approach to the complex problem of water
- Measure all sources and uses of water – urgently fund deployment of tools that **independently** monitor uses
- Ensure a conjunctive approach to storage including both groundwater and surface storage and the associated dams and conveyance facilities
- Continue and significantly expand the use of science and technology
- Ensure a roadmap that will help us do more with less
- CCST can help with next steps; YOU can help with next steps

Mapping Crop Evapotranspiration from Satellite

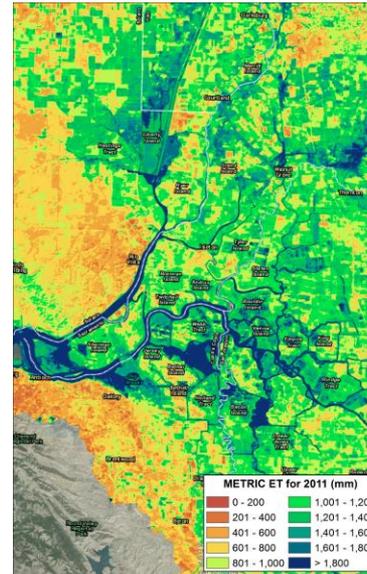
PROJECT TEAM: Desert Research Institute, NASA Ames Research Center, California State University Monterey Bay

- Fully automated, python-based implementation on NEX
- Testing Monte Carlo based simulation for hot-cold pixel calibration
- Validating against surface flux measurements collected in CA

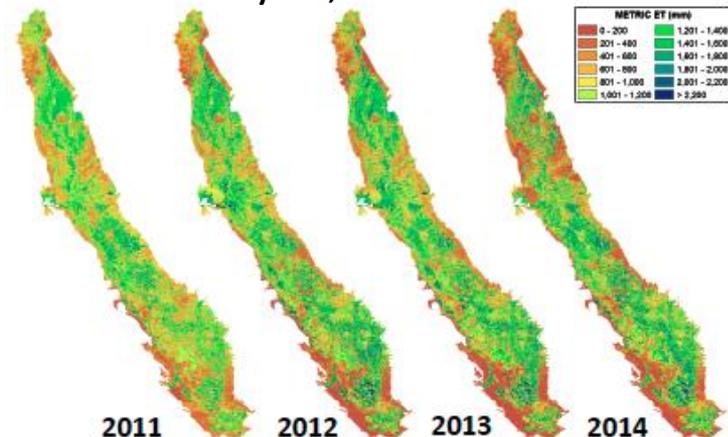


Landsat Scenes over the California Central Valley

California Delta ET, 2011



Central Valley ET, 2011-2014



CCST Role

- Continued education of policymakers
- Convene experts to review new water technologies
- Ensure detailed review of specific technologies for state, local government; help avoid the “snake oil salesmen”
- Develop website for S&T deployment in agriculture
- Help California use S&T to ensure a sustainable future!



CCST's Standing Water Committee

- USE THIS SLIDE TO HIGHLIGHT THE FOCUS OF THIS COMMITTEE.
- Members John Hall (Chair), Zee Duron (Vice Chair), Jeff Dozier, Jude Laspa, Amber Mace, Soroosh Sorooshian, and Julie Meier Wright
- Focus?
- Plans?



*For more information, or to
download the full report,
visit our website:*

<http://ccst.us>

