



# Statewide Water Analysis Network

Evaluating Resource Management Strategies Under Future Uncertainty



Update 2013  
California Water Plan

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## Acknowledgements

- ◆ Evan Bloom, RAND Corporation
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## Goals from February 13<sup>th</sup> SWAN Workshop

- ◆ Describe data, analytical tools & methods used for California Water Plan Update 2013 to evaluate how water management is affected by factors like climate, land use decisions, and population growth out to the year 2050.
- ◆ Interactively review preliminary results from a water management vulnerability assessment conducted for the Sacramento River, San Joaquin River, and Tulare Lake Hydrologic Regions.
- ◆ Seek feedback on the technical approach and potential enhancements and seek guidance on including results within Update 2013.



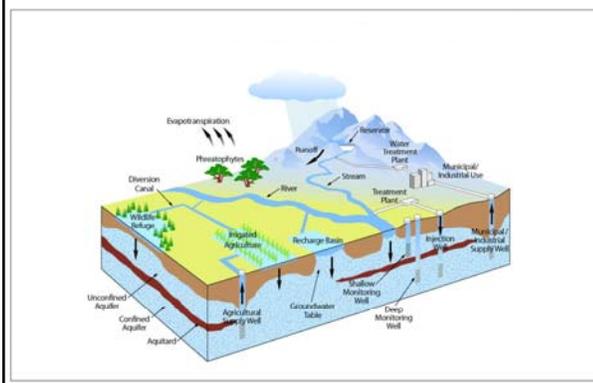
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## Outreach for Update 2013 Analysis of Future Water Management Conditions (Future Scenarios)

<b>Deliverable &amp; Purpose</b>	<b>Date</b>
SWAN Workshop – Straw proposal for Update 2013 Future Scenarios	August 2010
SWAN Workshop – Proof of Concept	May 2011
Land Use Focus Group – Growth Scenarios	January 2012
Assumptions & Estimates Report with Plan of Study	April 2012
Land Use Focus Group – Growth Scenarios	June 2012
SWAN Workshop – Vulnerability Assessment	February 2013



## Improvements to analytical tools allow for more comprehensive evaluation



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## Improvements to analytical tools allow for more comprehensive evaluation

- ◆ Testing comprehensive analysis for three regions in Central Valley
  - Phased approach
- ◆ Will quantify a subset of strategies & strategy benefits
- ◆ Representation of regional groundwater and surface water systems
- ◆ Use monthly rainfall-runoff, water use, and water system operations data



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## Water Management Models Evaluate System Across Many Scenarios

### Statewide Model

- ◆ Statewide
- ◆ Evaluation of monthly water demands by hydrologic region
- ◆ Reflect demographic and climate uncertainty

### Central Valley Model

- ◆ Sacramento, San Joaquin, and Tulare Lake hydrologic regions
- ◆ Simulation of monthly demand, supplies, and management under uncertainty
- ◆ Evaluation of water management strategies

Both models built in user-friendly modeling environment to support collaboration



## Plan of Study Components



## Response Packages Define Combinations of Management Strategies

Water Management Response Package	Water use efficiency	Reuse and conjunctive management	Additional environmental flows and groundwater recovery	New surface storage
Currently planned	currently planned	current	current	none
Diversification Level 1	moderate	moderate	currently planned	none
Diversification Level 2	aggressive	moderate	moderate	none
Diversification Level 3	aggressive	aggressive	moderate	one facility
Diversification Level 4	aggressive	aggressive	aggressive	two facilities

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## Central Valley Model Estimates Future System Performance



### Urban unmet demand

- o Reliability
- o Magnitudes of shortages



### Agricultural unmet demand

- o Reliability
- o Magnitudes of shortages



### Environmental performance

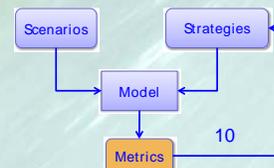
- o Reliability of meeting In-stream Flow Requirements



### Groundwater storage

- o Change over time

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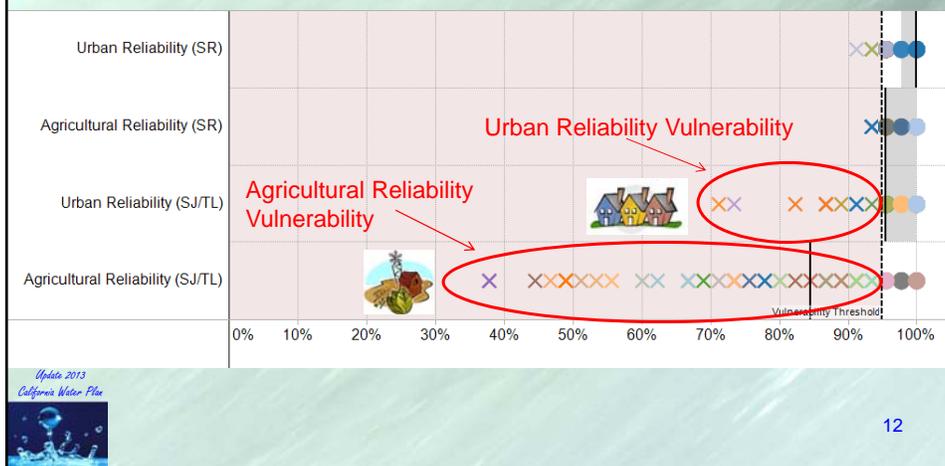
## California Water Plan to Evaluate Uncertain Future Water Management Challenges and Solutions

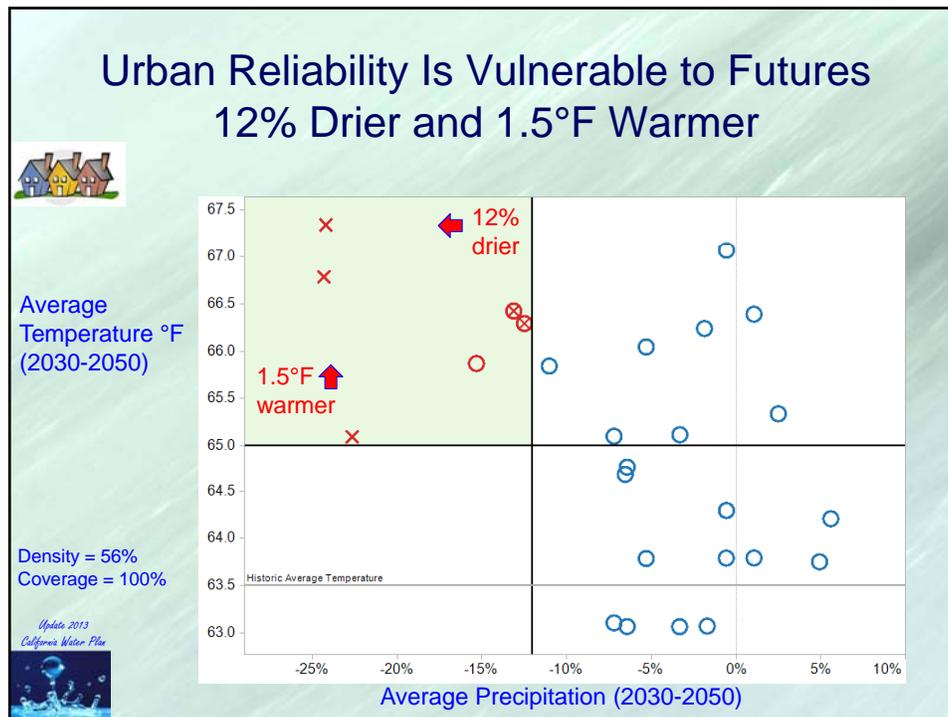
- ◆ How might demand, supply, and other water management conditions change between now and 2050?
- ◆ Which uncertain drivers are the most important?
- ◆ How can different water management strategies and response packages improve outcomes?
- ◆ What are the key tradeoffs among different strategies?



## What Future Conditions Drive Poor Performance?

### Urban and Agricultural Reliability





## Key Results from Vulnerability Analysis

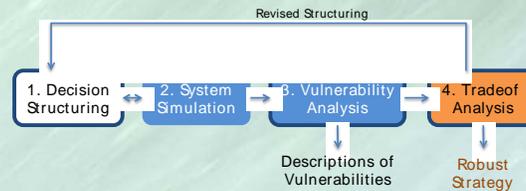
- ◆ The San Joaquin River and Tulare Lake hydrologic regions vulnerable to some plausible future conditions
  - Urban reliability:
    - Driest and warmest of climate model projections
  - Agricultural reliability:
    - All but the wettest and coolest of historical and climate projections
    - Groundwater conditions vulnerable to similar conditions

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## Next Steps for Analysis

- ◆ Complete vulnerability analysis
- ◆ Evaluate performance of resource management strategies
  - Reductions in vulnerability
  - Identify tradeoffs



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## Where to find Future Scenario Content in Update 2013

- ◆ Assumptions & Estimates Report – Plan of Study for Future Scenarios
- ◆ Highlights Document – Policy messages for managing under an uncertain future
- ◆ Volume 1, Chapter 5 – Overview of scenarios, analytical approach, results, and policy findings
- ◆ Regional Reports – region specific information on growth, climate, and vulnerabilities



## Contact Information

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