Rethinking Water Resource Management in California: How We Can Solve California’s Water Crisis

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• Largest economy in the United State
• 9th largest economy in the world
• Largest population in the United State
• Population is about 38 Million (Based on 2011 census data) and expected to reach 50 Million by 2049
Water Resources vs. Population Distribution

Average Annual Precipitation (Inches), California
Period: 1961-1990

Source: U.S. Census Bureau
Census 2000 Summary File 1
population by census tract.
All California Water Projects

- Major Rivers
- State Projects
- Federal Projects
- Local Projects
- All Water Projects

[map from CDWR 2002]
Competing Demands in California

- Domestic
- Agriculture
- Power & Industry
- Navigation
- Recreation
- Wildlife
How does California use its water?

- Urban: 20%
- Agriculture: 80%

[Map of California with water use data]
California has an elaborate system to move water

The Delta is the “heart” of California’s water system.
Sacramento-San Joaquin Delta

- Historically – a very rich inland aquatic ecosystem.
- It is the center of California’s water distribution system: from North/Sierra to South/Coastal.
- Ecosystems are collapsing there and new laws and court rulings say water must be returned to the environment.
California is dealing with

- Population growth
- Growing Water Demand
- Neighboring states (Arizona-Nevada)
- Shrinking Water Resources
- Water quality regulations and environmental requirements
- Shrinking snow pack
- Climate Change
  - Time shift in water supply

Aging Infrastructure

California’s water Challenges

Rethinking our portfolio of solutions
Now add severe drought to the list of challenges and ...
July 21, 2015
(Released Thursday, Jul. 23, 2015)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

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<th>None</th>
<th>D0-D4</th>
<th>D1-D4</th>
<th>D2-D4</th>
<th>D3-D4</th>
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<tbody>
<tr>
<td>Current</td>
<td>0.14</td>
<td>99.86</td>
<td>97.35</td>
<td>94.59</td>
<td>71.08</td>
<td>46.00</td>
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<td>Last Week</td>
<td>0.14</td>
<td>99.86</td>
<td>99.71</td>
<td>94.59</td>
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<td>46.00</td>
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<td>3 Months Ago</td>
<td>0.14</td>
<td>99.86</td>
<td>98.11</td>
<td>93.44</td>
<td>66.60</td>
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<td>Start of Calendar Year</td>
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<td>100.00</td>
<td>98.12</td>
<td>94.34</td>
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<td>Start of Water Year</td>
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<td>100.00</td>
<td>100.00</td>
<td>95.04</td>
<td>81.92</td>
<td>58.41</td>
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<tr>
<td>One Year Ago</td>
<td>0.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>81.89</td>
<td>36.49</td>
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</table>

Intensity:
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
David Simmeral
Western Regional Climate Center

http://droughtmonitor.unl.edu/
CURRENT RESERVOIR CONDITIONS

July 2015
Source: DWR
Groundwater Storage

USGS, 2009
Drought Impact on Energy Production

Hydroelectric Power Generation in California by Month (megawatt-hours)

- 2001-2011 Average
- 2012
- 2013
- 2014
- 2015
Chronic Challenges/opportunities

• Regulatory fragmentation
• Lack of comprehensive water data
• Aging and outdated infrastructure
• Water rates not reflecting real cost
• Lack of access to financing
From Fragmentation to Integration

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<th>Entity</th>
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<td>Bureau of Reclamation</td>
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<td>Army Corps of Engineers</td>
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<td>Environmental Protection Agency</td>
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<td>Geological Survey</td>
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<tr>
<td><strong>Other Entities</strong></td>
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<td>Tribal governments</td>
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<td>Cities and counties</td>
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<td>Special districts</td>
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<tr>
<td>Private water companies</td>
<td>X</td>
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A Hidden System

Relative capital investment to revenue for several utility services in the US

Source: Global Water Intelligence, 2010
Water Use vs. Price

FIGURE 10.
Tariff Price and Domestic Use per Capita, 2012

Source: Standard & Poor’s 2012.
Note: The tariff price includes water and wastewater tariffs and it is the average price among cities in that country.
Traditional solutions are tapped out, or no longer appropriate (or are the problem!)

Opportunity to rethink our water supply portfolio and diversify it
Building a Diverse Portfolio

• Rethink “demand”
  – Reduce waste and increase efficiency, rethink economic priorities and choices, education

• Rethink “supply”
  – Conjunctive use, treated wastewater, innovative coordination and transfers, desalination, rainwater harvesting, storm water capture

• Rethink “management”
  – New institutions, improve existing institutions, cross-sector resource management, better water monitoring, integrated management
What we have accomplished up to this year!

• Sustainable Groundwater Management Legislation
• Water meters are now required
• Water bond passed (7.5 Billion)
• Water recycling permitting process expedited
• Mandatory water demand reduction
• Low Impact Development (LID) now required for new construction.
• Proactive approaches to address sea level rise and flooding