



Managing Drought in a Changing Climate

Four Essential Reforms

September 10, 2018

Ellen Hanak

Research supported by the S. D. Bechtel, Jr. Foundation
and the US Environmental Protection Agency



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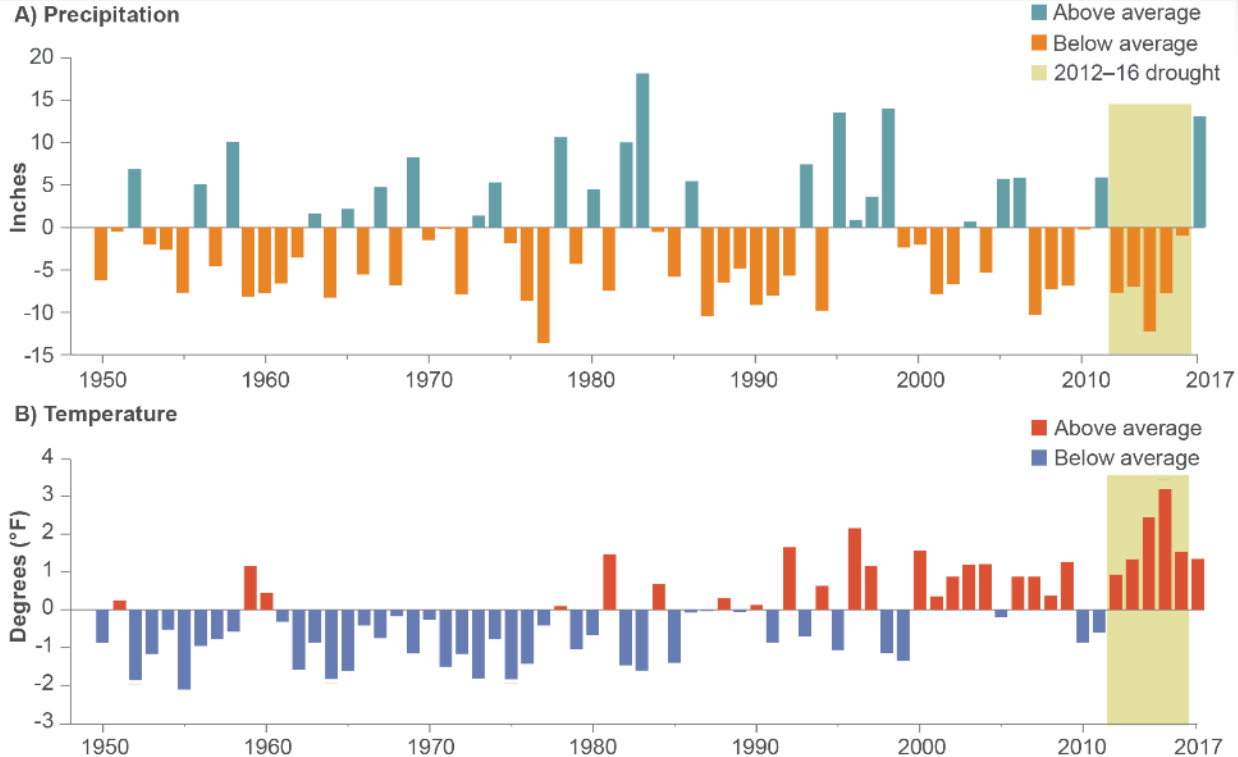
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Managing water is at the forefront of climate change adaptation in California

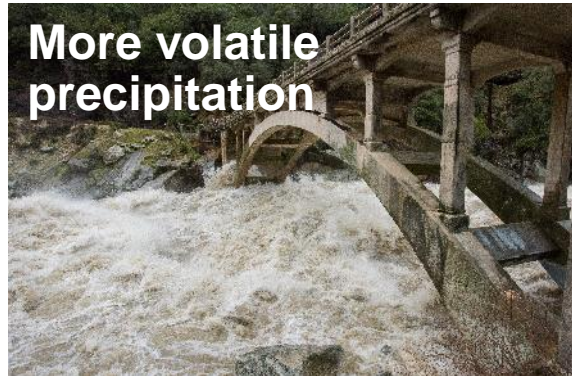
- Drought reveals strengths and weaknesses in water systems
- Actions to prepare for droughts of the future will benefit water management today



The unusually warm drought of 2012–16 was a window into the future



Five climate pressures are impacting California's water system



Reducing vulnerability to climate pressures requires concerted action

Four essential reforms:

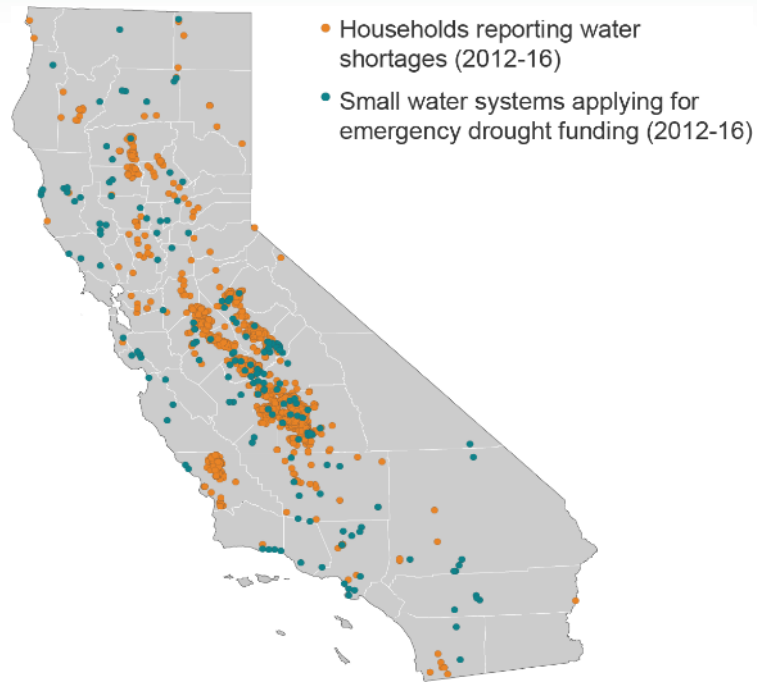
1. Plan ahead
2. Upgrade the water grid
3. Update water allocation rules
4. Find the money



Shasta Reservoir during drought

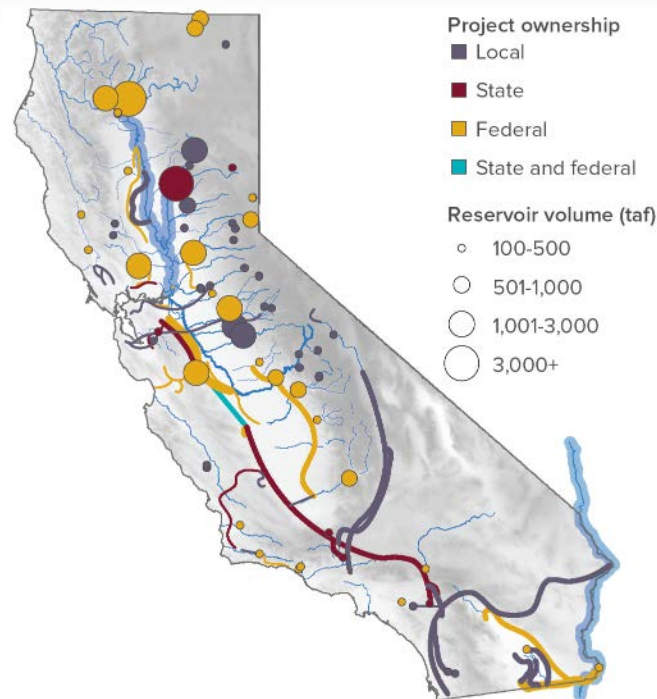
Reform 1: Plan ahead

- Successful adaptation requires advance planning at local and regional scales.
- Top priorities:
 - Strengthen urban water management plans
 - Ensure effective groundwater sustainability plans
 - Develop drinking water plans for rural communities
 - Prepare ecosystem drought plans



Reform 2: Upgrade the water grid

- Modernizing California's "water grid" can help reduce costs of future droughts
- Top priorities:
 - Improve conveyance and storage capacity
 - Modernize and integrate operations



Reform 3: Update water allocation rules

- Facilitate equitable and efficient allocation during dry times, promote capture and storage during wet times
- Top priorities:
 - Promote groundwater recharge
 - Streamline trading and banking
 - Give the environment a water budget
 - Improve water rights administration

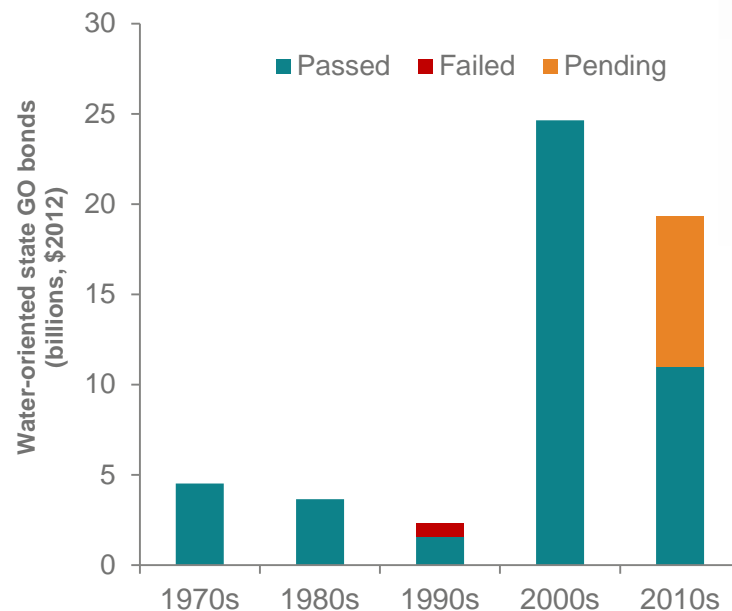


Sacramento National Wildlife Refuge

Reform 4: Find the money

- Reliable sources of funding are crucial for adapting to climate change
- Top priorities:
 - Use general obligation bonds for public benefit
 - Fill the gap for fiscal orphans
 - Reform water pricing law

CA General Obligation Water Bonds



Reasons for optimism

- Urban sector has been adapting and investing
- Agriculture has been innovating, improving efficiency, and working toward groundwater sustainability
- Progress is under way on safe drinking water supplies in rural communities



The environment needs a fundamental change in course

- Efforts to date haven't stopped species decline
- Climate pressures increasing the risk
- More flexible, ecosystem-based management is needed



Lower Yuba River

Getting ready for droughts of the future will require strong leadership





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