

Climate Change and the Water Resilience Portfolio

June 19, 2019

Caitrin Chappelle

California Water Commission



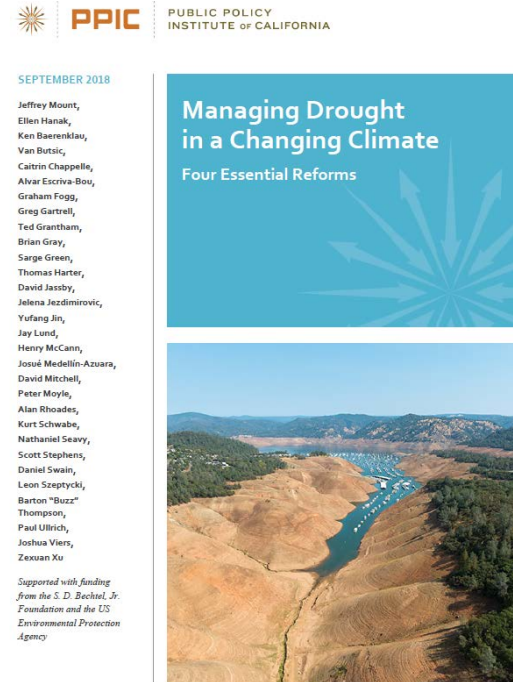
PPIC

PUBLIC POLICY
INSTITUTE OF CALIFORNIA

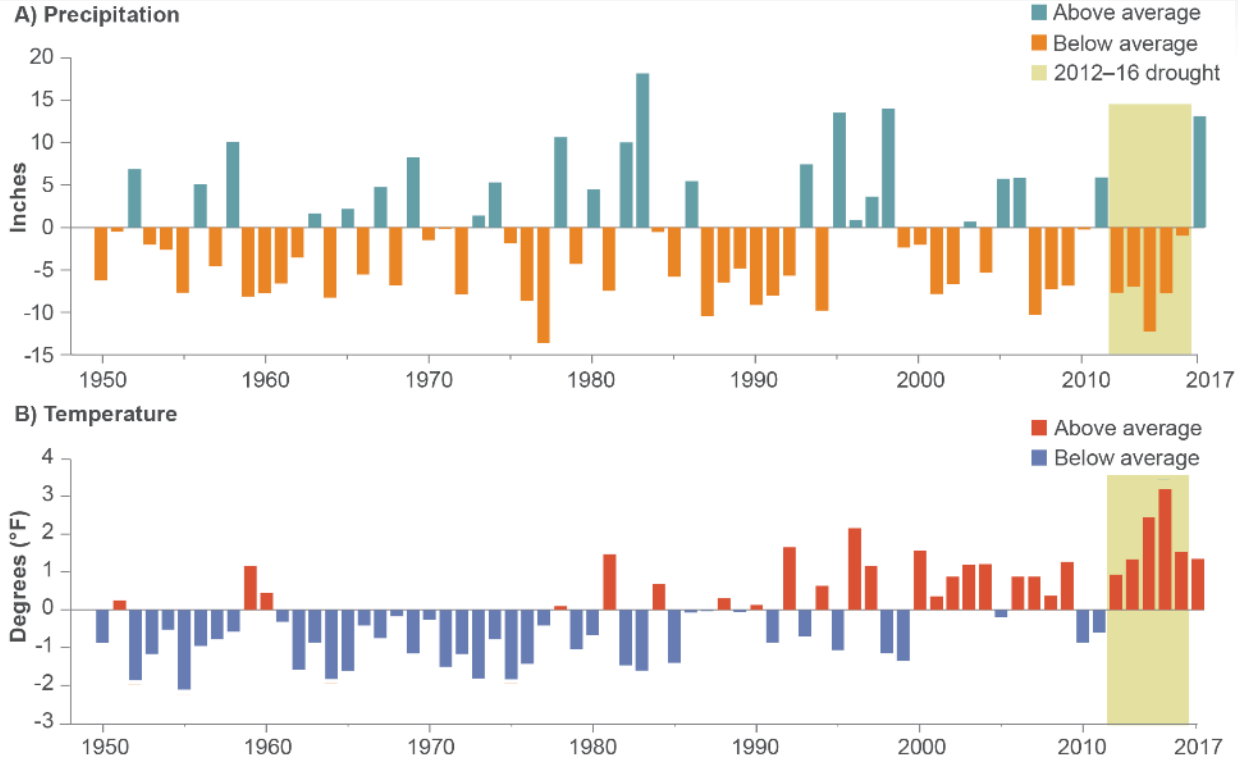
PPIC WATER POLICY CENTER

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

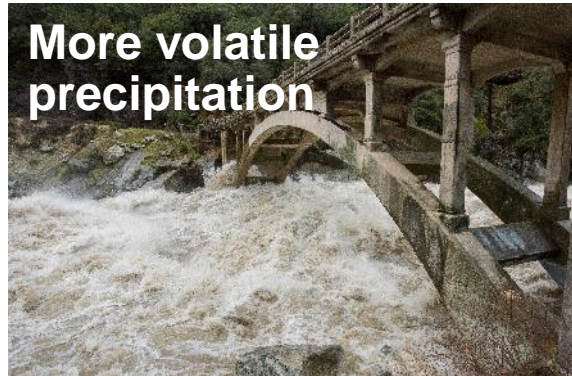
- Drought reveals strengths and weaknesses in water systems
- How will a changing climate add to the challenges?
- Actions to prepare for droughts of the future will benefit water management today



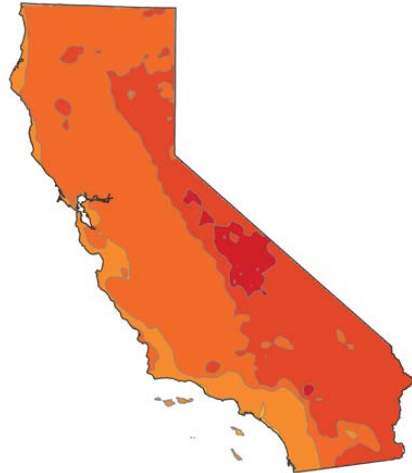
The unusually warm drought of 2012–16 was a window into the future



Five climate pressures are impacting California's water system



California is warming



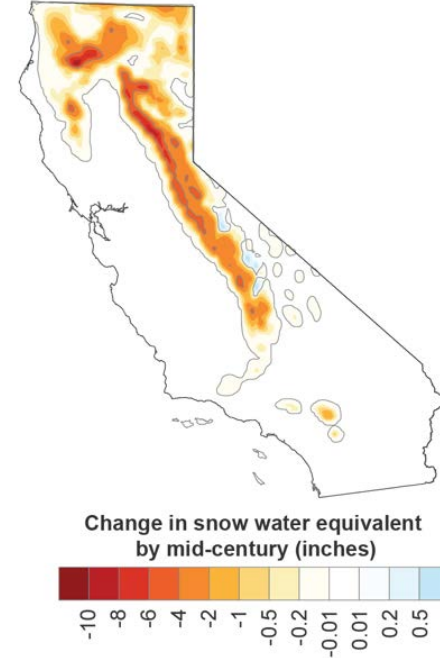
Temperature change
by mid-century (degrees °F)



- Temperature impacts:
 - Evaporative loss
 - Soil moisture deficits
 - Urban and agricultural irrigation demand
 - Surface water quality
 - Increasing demand for wetlands and instream flows (cold water)

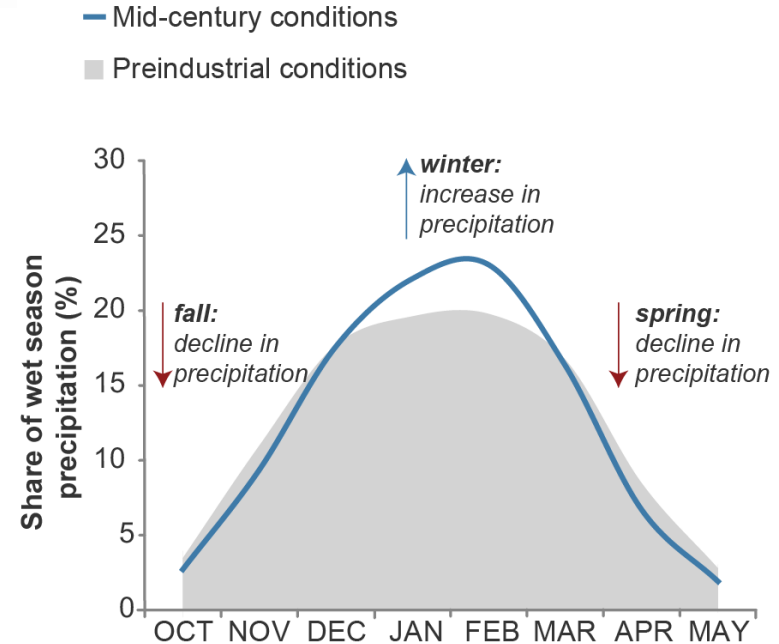
Snowpack is shrinking, “snow droughts” common

- Snowpack impacts:
 - Montane groundwater recharge
 - Total water budget and timing
 - Water available for recharge
 - Water quality
 - Reservoir temperatures



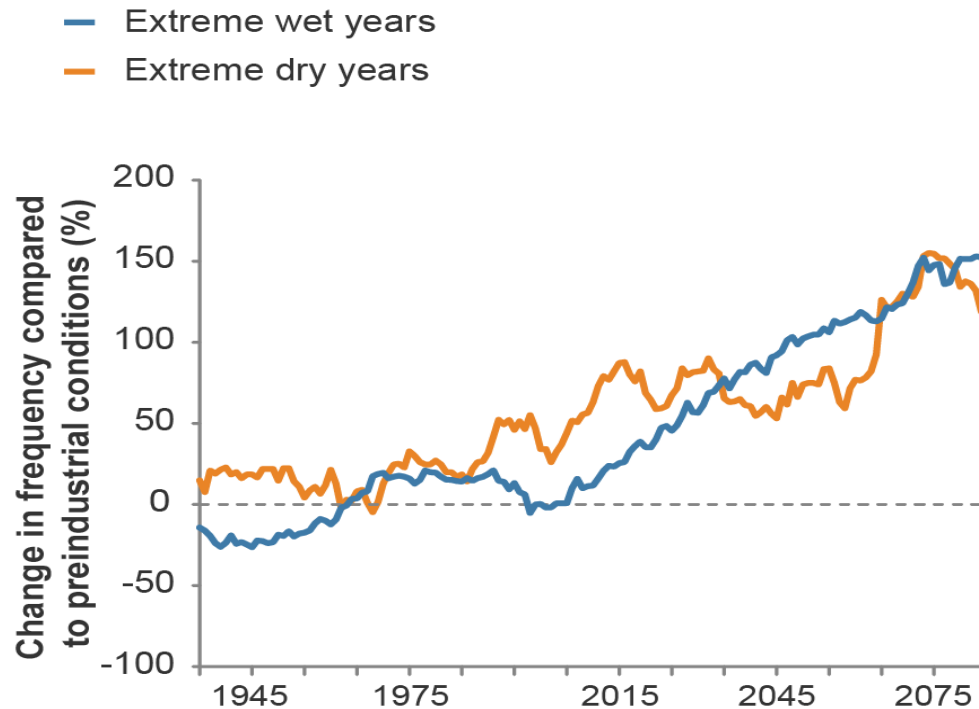
“Seasonality” is increasing

- Seasonality impacts:
 - Early and late season irrigation demands
 - Increased demand for spring and fall wetland and river ecosystem water
 - Reduced spring inflow to reservoirs and irrigation systems
 - Opportunities for managed recharge



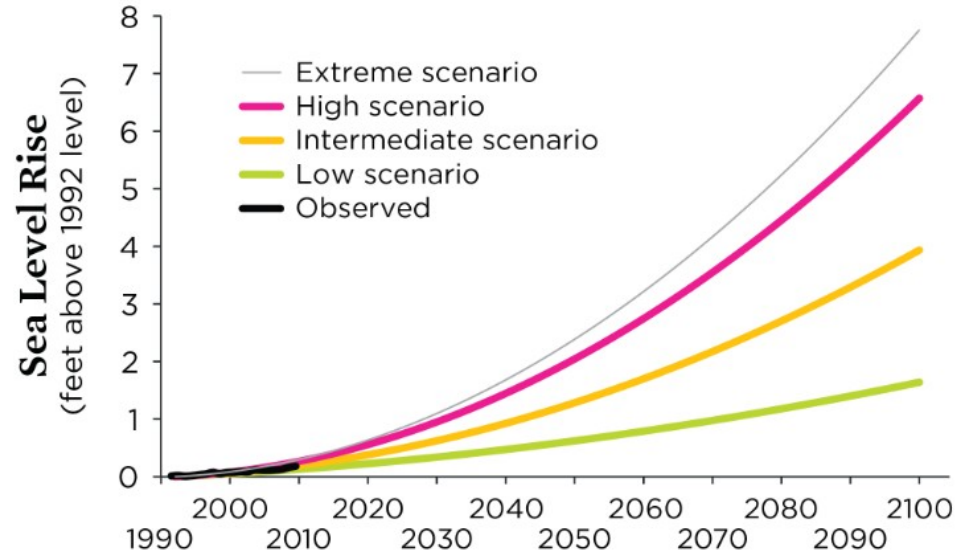
Precipitation is becoming more volatile

- Increased pressure to expand flood reserve in multipurpose reservoirs
- Increased pressure to maintain carryover storage in reservoirs
- Increased uncertainty about flood recharge opportunities
- Increased demand for aquifer storage and pumping



Accelerated sea level rise

- Sea level rise impacts:
 - Challenges to manage salinity in coastal aquifers
 - Threats to water quality and levee stability in the Sacramento-San Joaquin Delta (15% of statewide supply, 25% of SJV)



UNION OF CONCERNED SCIENTISTS

Reducing vulnerability to climate pressures requires concerted action

Four essential reforms:

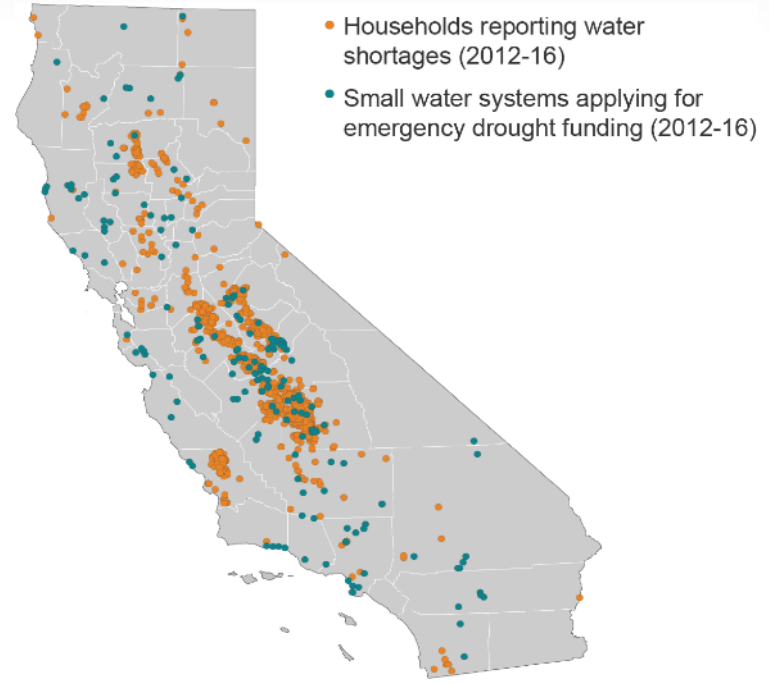
1. Plan ahead
2. **Upgrade the water grid**
3. **Update water allocation rules**
4. Find the money



Shasta Reservoir during drought

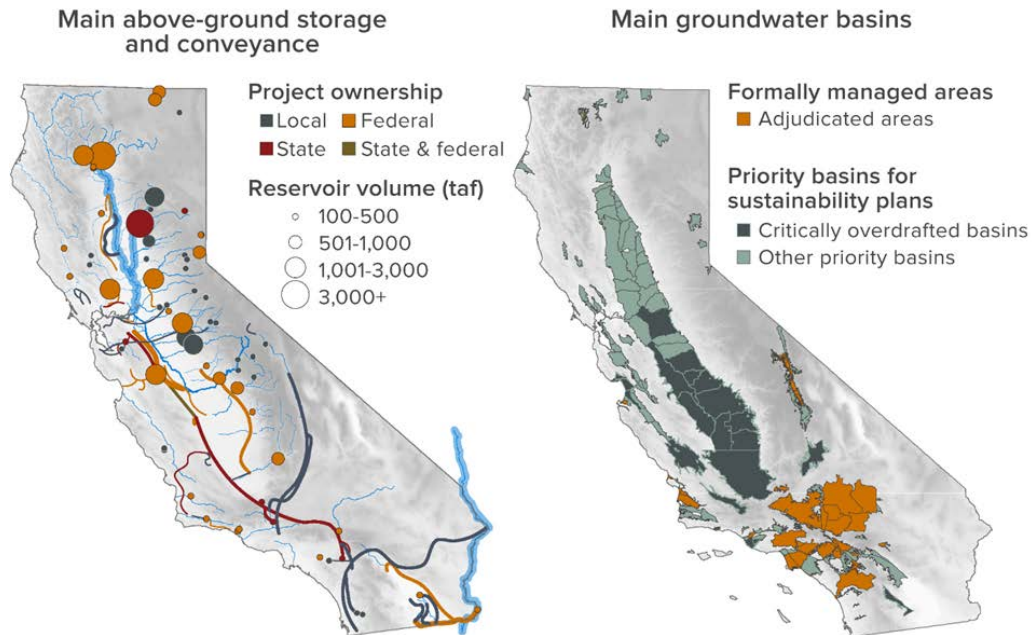
Reform 1: Plan ahead

- 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 our “water grid” can help reduce costs of future droughts
- Top priorities:
 - Improve capacity of conveyance and storage (reservoirs + aquifers)
 - 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

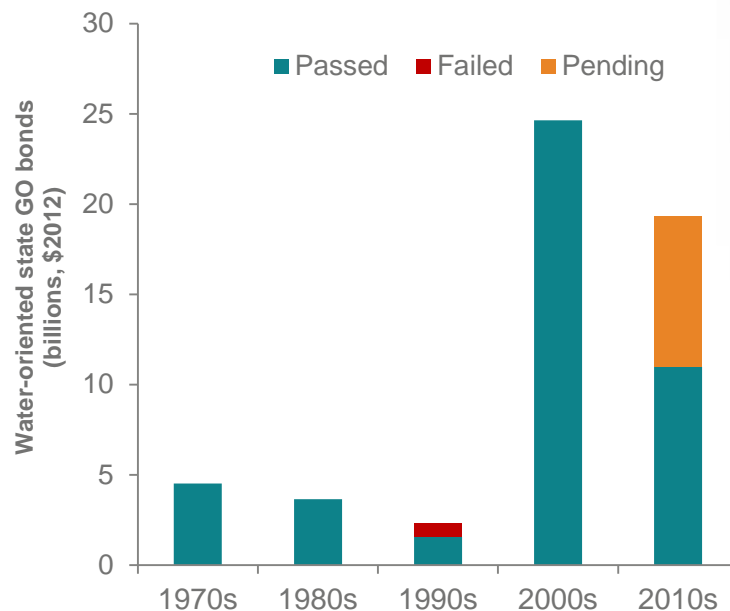


Sacramento National Wildlife Refuge

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 the future will require strong leadership

