

# California Water System

*University of Arizona, Tucson  
October 19, 2015*

## Presentation Outline

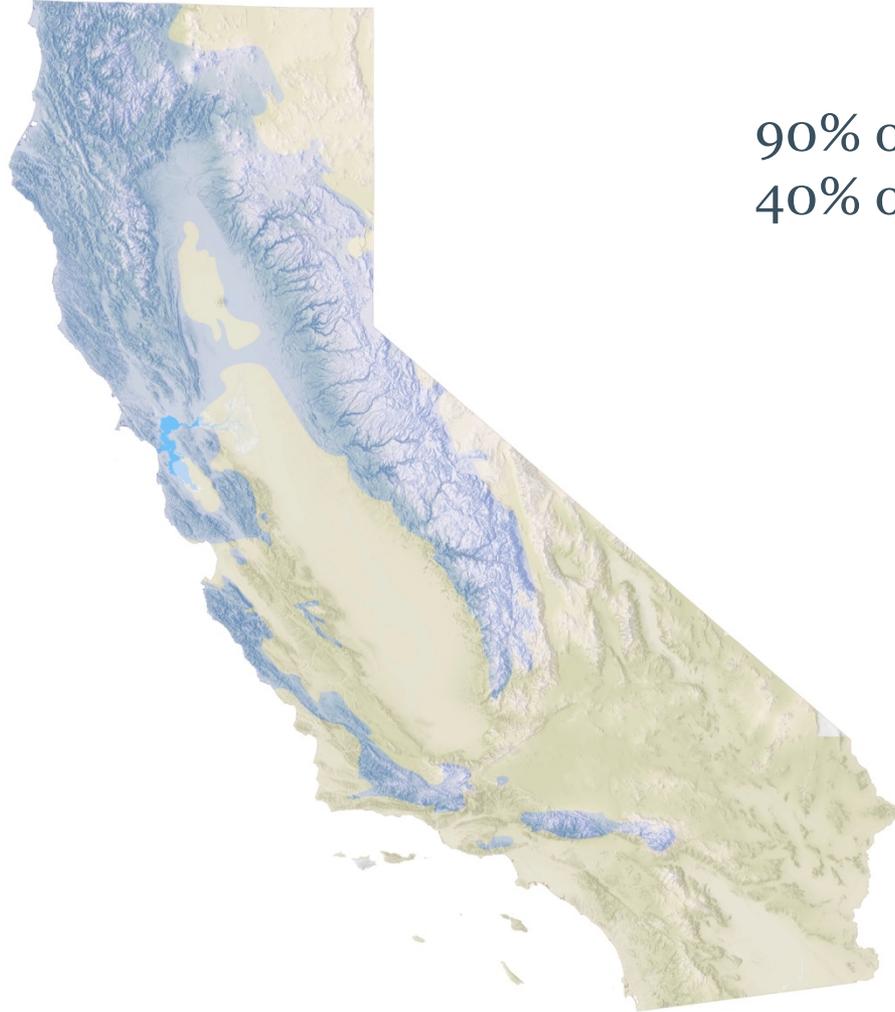
- Historical water development
- Current challenges and opportunities
- Where to from here
- Never let a crisis go to Waste

## Historical Context

- Swamp and Overflow Act
- Central Valley Flood System
- Water System Development

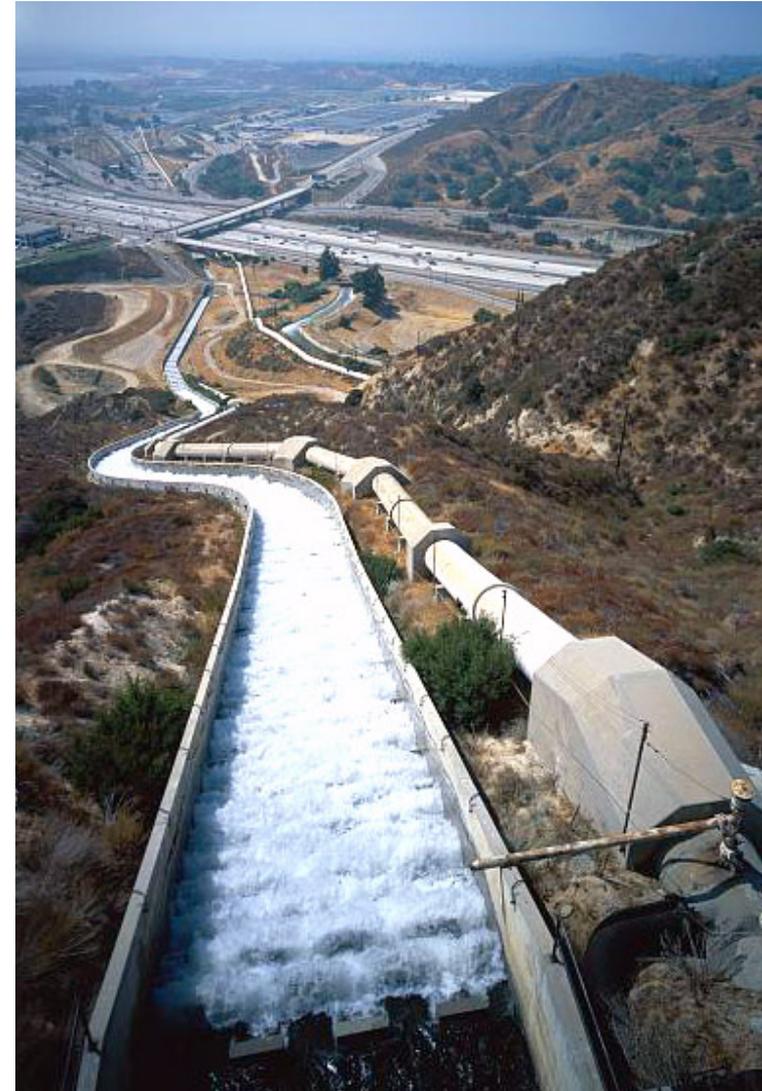


# California Water Systems

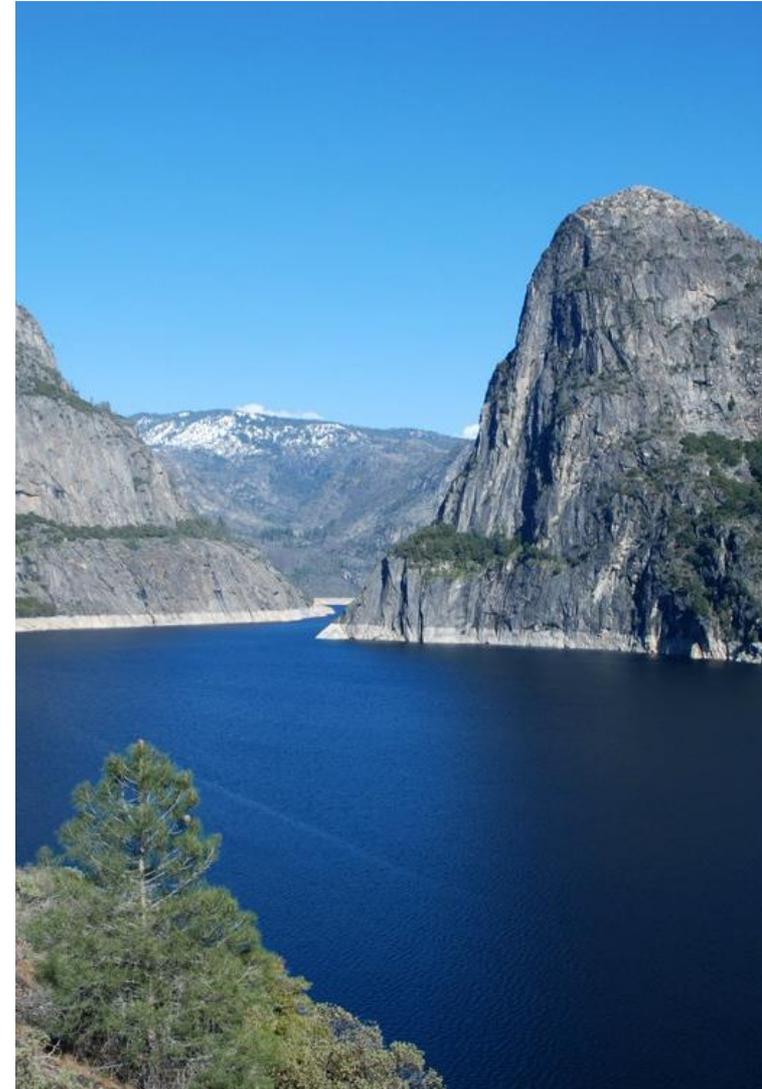
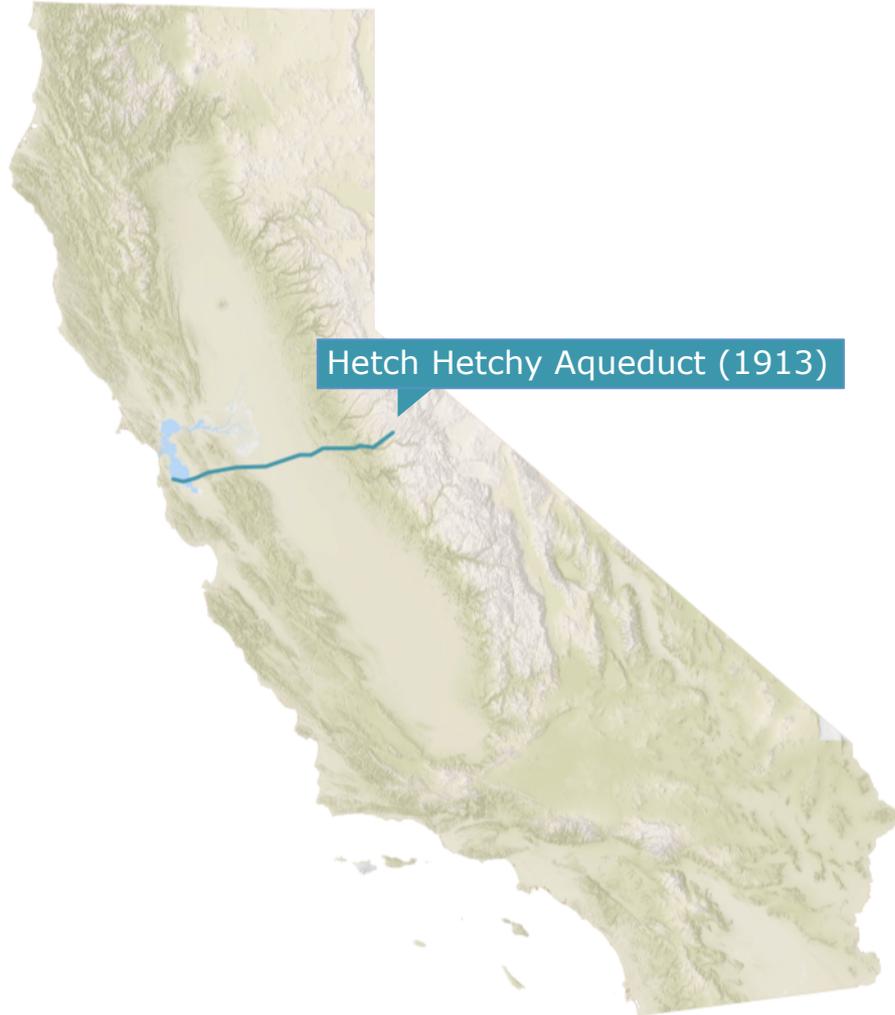


90% of annual runoff occurs in  
40% of the state

# California Water Systems



# California Water Systems



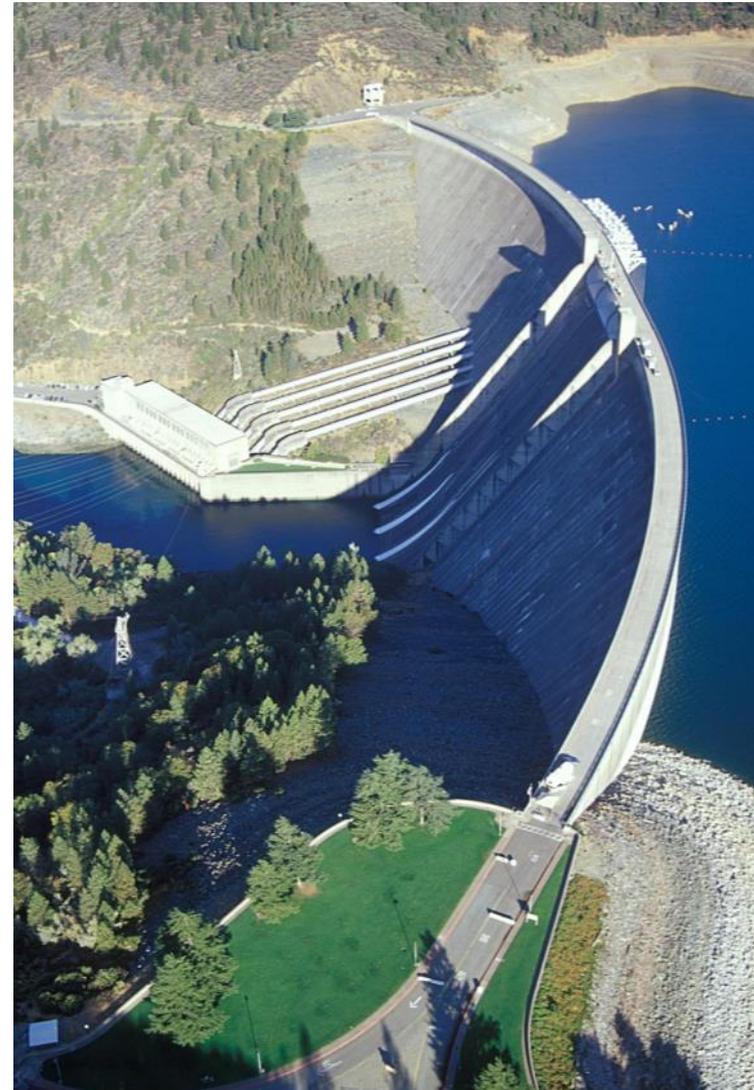
# California Water Systems



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# California Water Systems



Fueled California economy

All had unintended consequences

All are less reliable today

# U.S. Drought Monitor California

## October 6, 2015

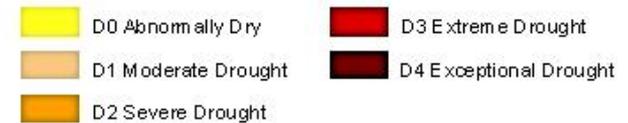
(Released Thursday, Oct. 8, 2015)

Valid 8 a.m. EDT

*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	0.14	99.86	97.33	92.36	71.08	46.00
<b>Last Week</b> <i>9/29/2015</i>	0.14	99.86	97.33	92.36	71.08	46.00
<b>3 Months Ago</b> <i>7/7/2015</i>	0.14	99.86	98.71	94.59	71.08	46.73
<b>Start of Calendar Year</b> <i>12/31/2014</i>	0.00	100.00	98.12	94.34	77.94	32.21
<b>Start of Water Year</b> <i>9/29/2015</i>	0.14	99.86	97.33	92.36	71.08	46.00
<b>One Year Ago</b> <i>10/7/2014</i>	0.00	100.00	100.00	95.04	81.92	58.41

### Intensity:



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

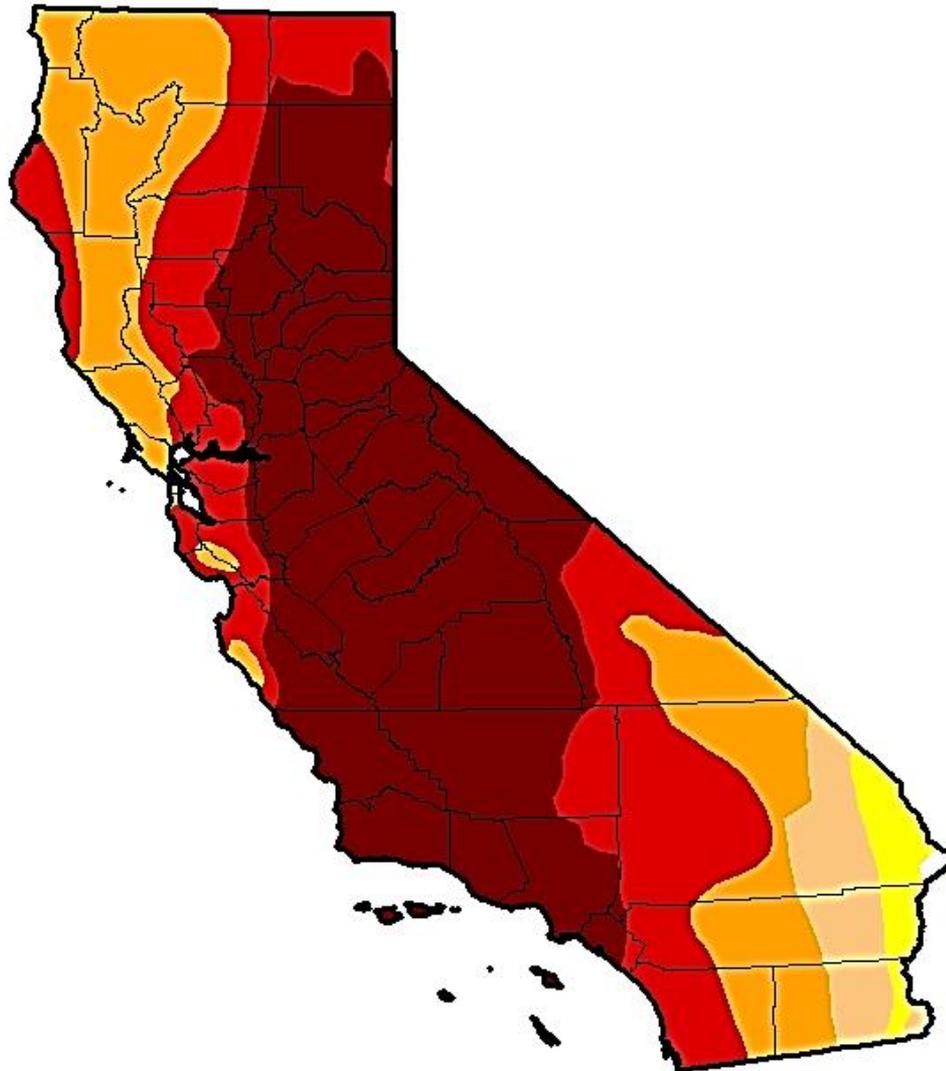
### Author:

David Miskus

NOAA/NWS/NCEP/CPC



<http://droughtmonitor.unl.edu/>

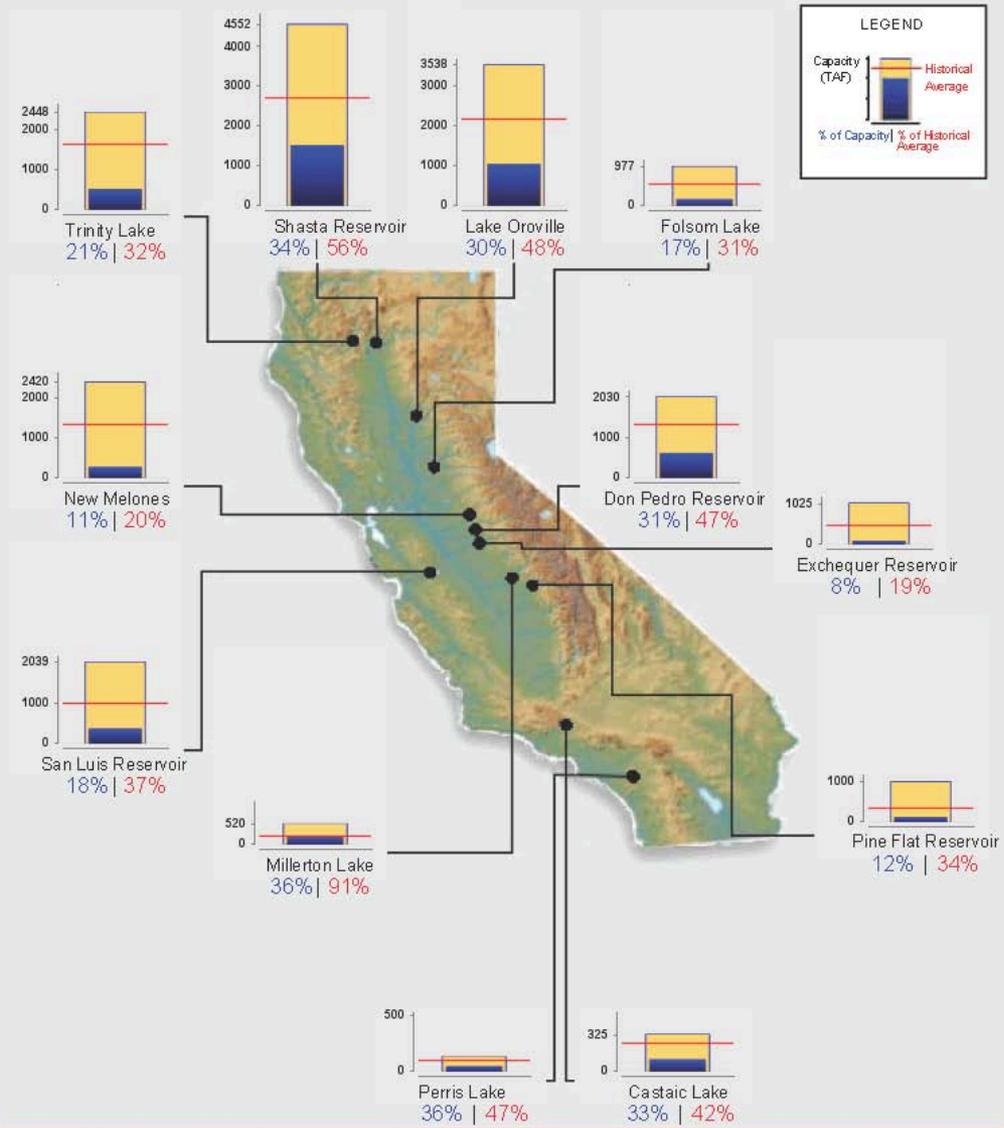




# Reservoir Conditions

Ending At Midnight - October 11, 2015

## CURRENT RESERVOIR CONDITIONS

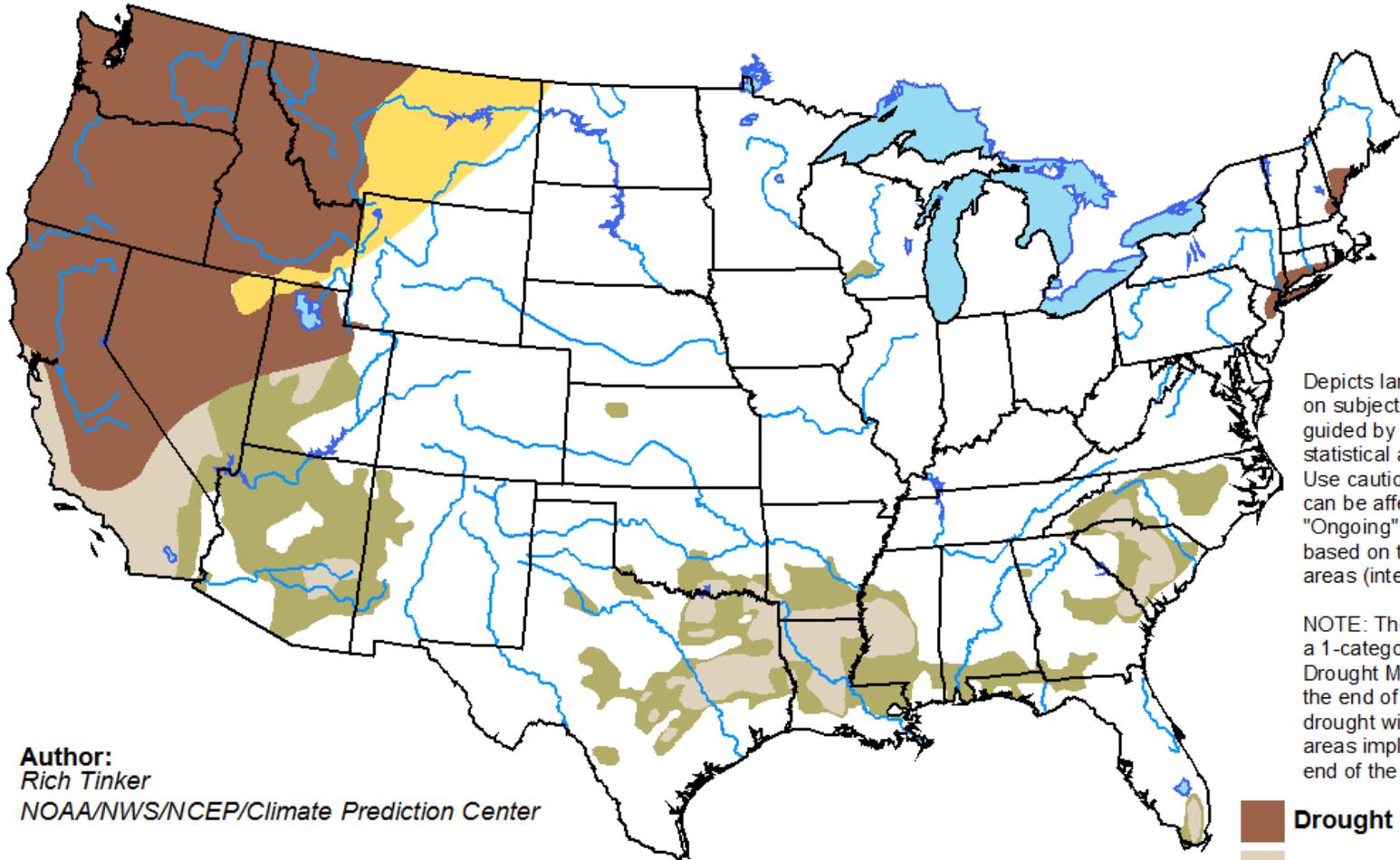


# Lake McClure, 2010 / 2015



# U.S. Seasonal Drought Outlook *valid for September 17-December 31, 2015*

## Drought Tendency During the Valid Period *Released September 17, 2015*

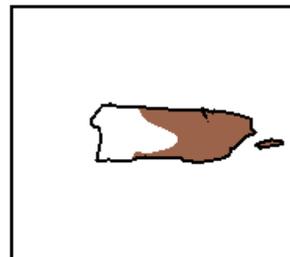
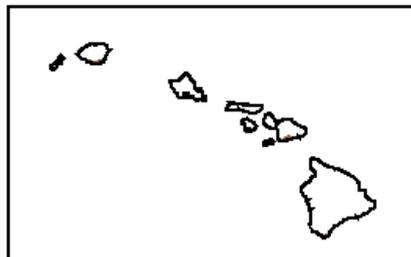
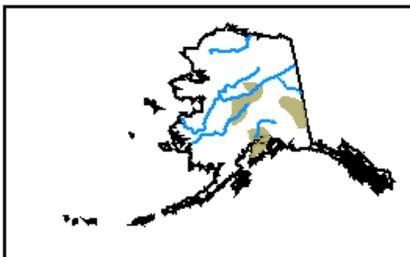


Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

**Author:**  
Rich Tinker  
NOAA/NWS/NCEP/Climate Prediction Center

-  **Drought persists/intensifies**
-  **Drought remains but improves**
-  **Drought removal likely**
-  **Drought development likely**

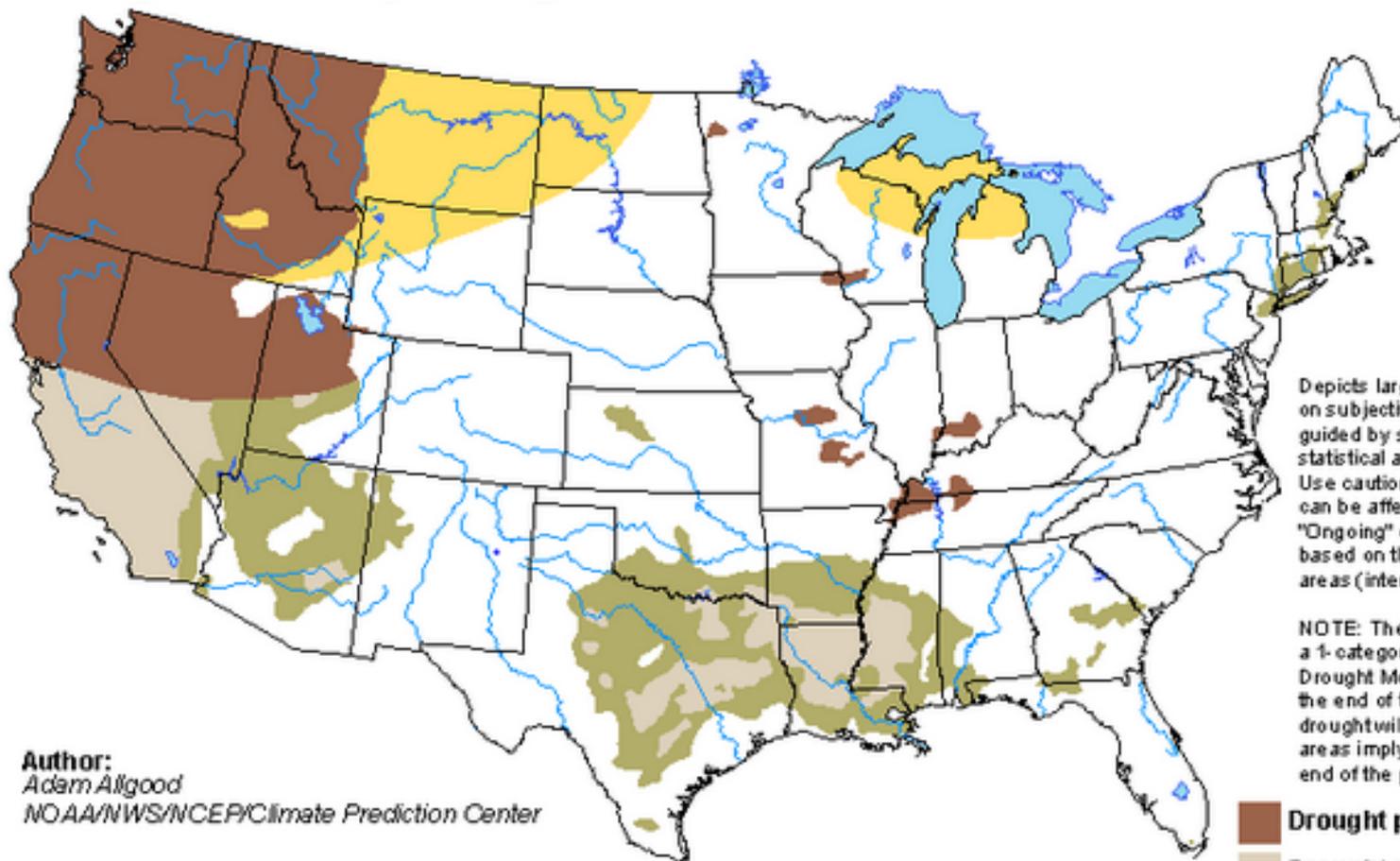


<http://go.usa.gov/3eZ73>

# U.S. Seasonal Drought Outlook

## Drought Tendency During the Valid Period

Valid for October 15 - January 31, 2016  
Released October 15, 2015

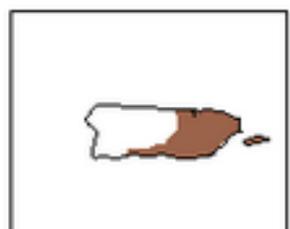
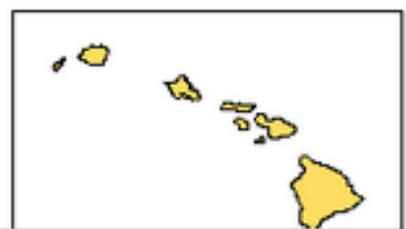


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Author:  
Adam Allgood  
NOAA/NWS/NCEP/Climate Prediction Center

-  Drought persists/intensifies
-  Drought remains but improves
-  Drought removal likely
-  Drought development likely



<http://go.usa.gov/3eZ73>

## Half Dome—3/19/2011



## Half Dome—3/19/2012



## Half Dome—3/19/2013



## Half Dome—3/19/2014



## Half Dome—3/19/2015



# Water System Challenges

- Increasing Population
- Aging infrastructure
- Groundwater overdraft
- Degraded ecosystems
- Increasing conflict
- Management fragmentation
- Uncertainty due to climate change



# Addressing the Challenge

- Achieving sustainable water management through:
  - Integrated Water Management
  - Groundwater Management
  - Urban Water Use Efficiency
  - Stormwater Capture
  - Recycled Water
  - Reservoir Reoperation
  - Flood Management



# Groundwater in Context

- About 40% of supply in an average year; 60% in dry
- Many urban/rural areas 100% dependent
- Critical part of integrated management
- Excellent drought buffer (at risk)
- Groundwater overdraft impacts



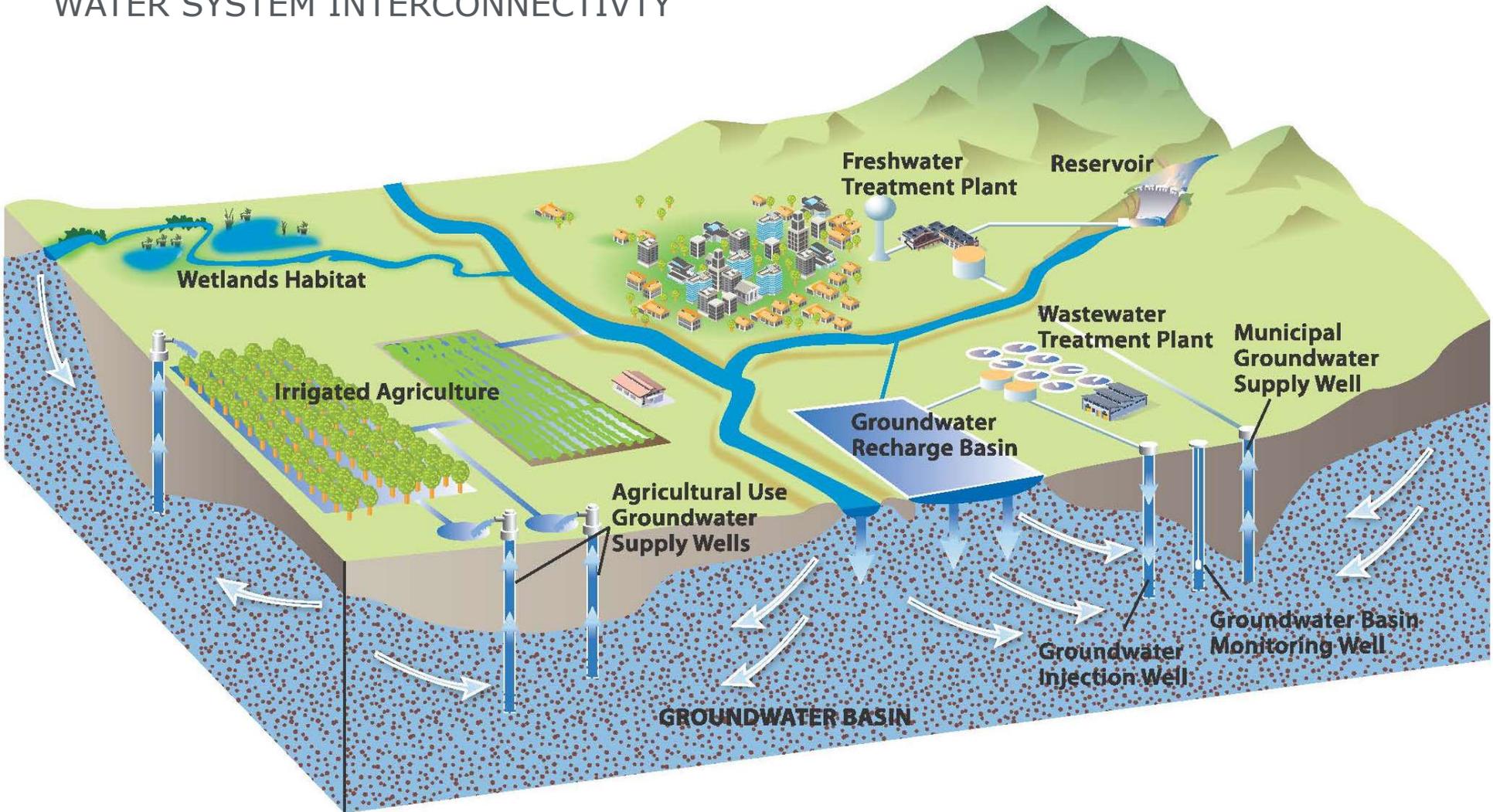
## Groundwater in Context

- Several decades of increasing use
  - Reduction in surface supplies
  - Hardening of demand
- Increasing landowner conflicts



# Integrated Water Management

## WATER SYSTEM INTERCONNECTIVITY



## CWF Groundwater Efforts

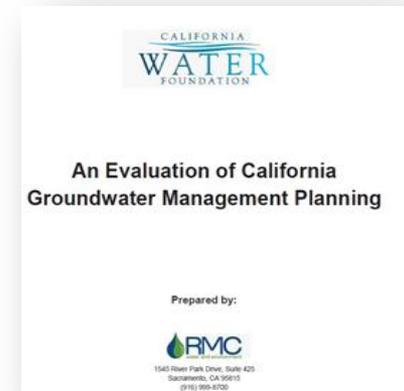
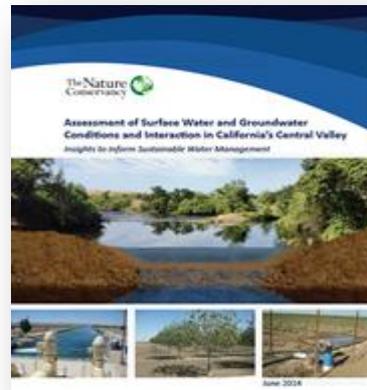
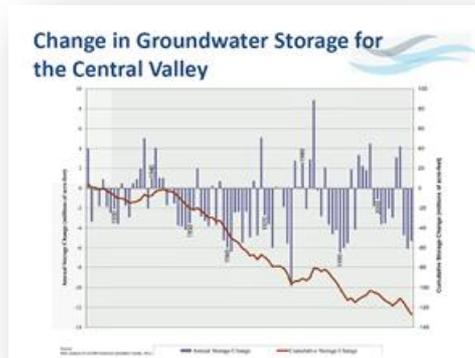
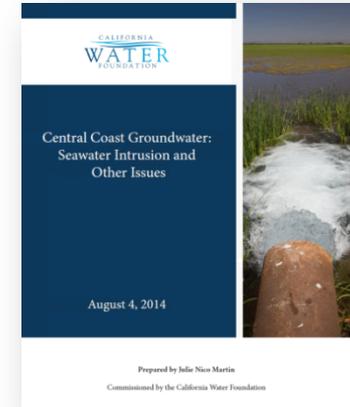
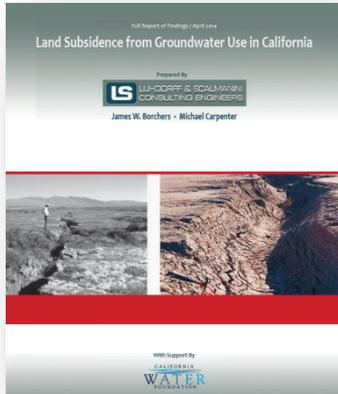
- Develop and protect leadership
- Reframe the debate/compelling information
- New coalitions
- Policy reform



# Leadership



# Compelling Information



## Reframing the Debate

EVERYONE'S TALKING ABOUT WATER.  
FOR ONCE, THEY'RE SAYING THE SAME THING



## Coalitions and Support

- Water Agencies
- Business Groups
- Environmental Nonprofits
- Ag Leaders
- Administration & Legislature

## Media Statistics Editorials and Op-eds

- 18 positive editorials statewide
  - 4 supporting groundwater reform
  - 12 supporting specific legislation
  - 2 urging Governor to sign bills
  - 4 million print impressions, 31 million online
- 13 positive opinion pieces published
  - 5 by groundwater voices
  - 4 by Lester Snow
  - 4 by other supportive orgs, individuals
  - 750k print impressions, 1 million online

# Groundwater Policy



## Recommendations for Achieving Groundwater Sustainability

*Prepared by the Association of California Water Agencies*

*April 2014*

CALIFORNIA  
**WATER**  
FOUNDATION



## Recommendations for Sustainable Groundwater Management:

Developed Through a Stakeholder Dialogue  
May 2014

## Crisis Into Opportunity

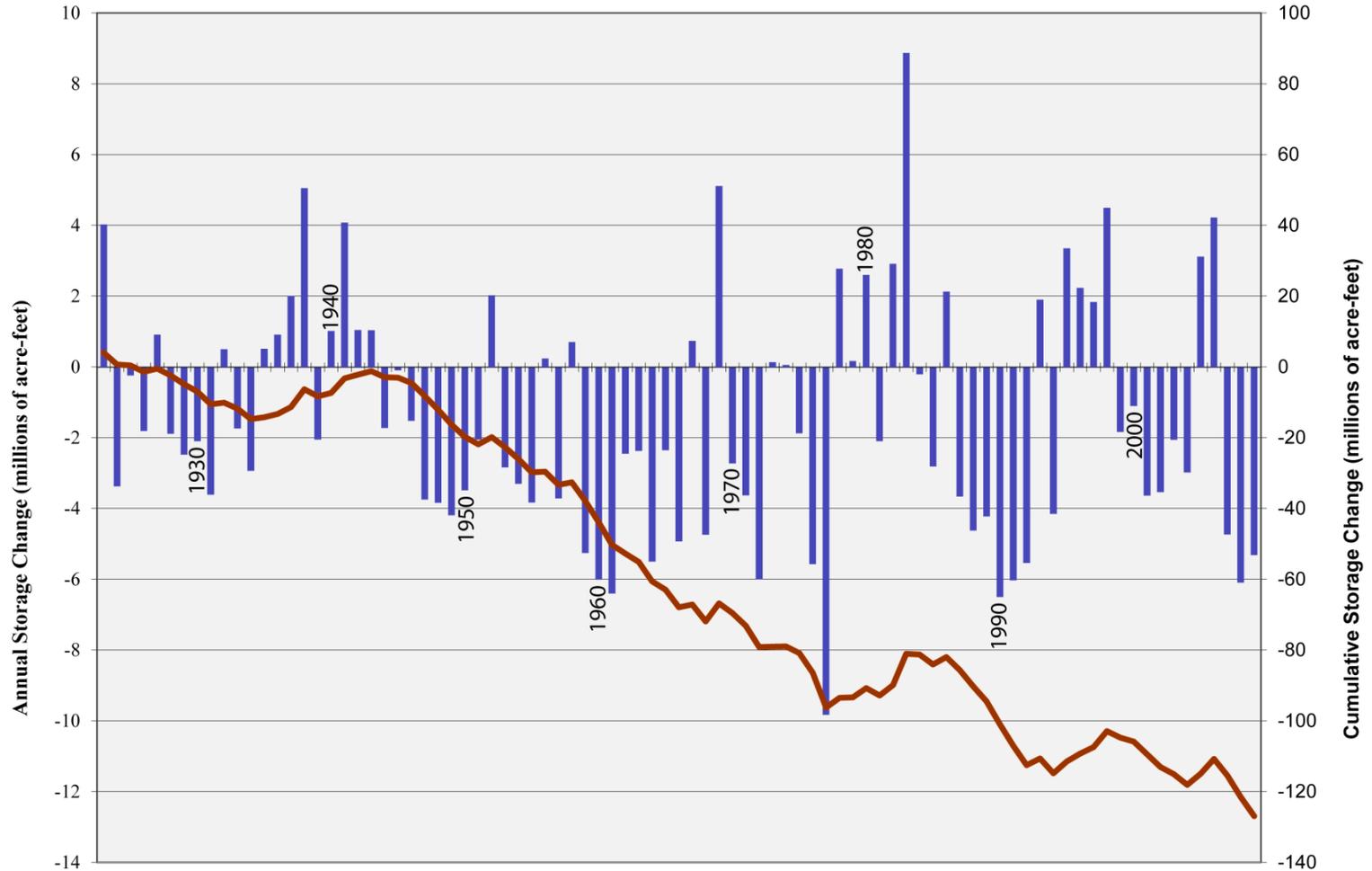


# Problems With Overdraft

- Subsidence threatens infrastructure
- Reduced surface water flow/ecosystem impacts
- Reduced surface supplies
- Increased drilling/pumping costs/ghg emissions
- Increased costs for taxpayers, business, farmers



# Change in Groundwater Storage for the Central Valley

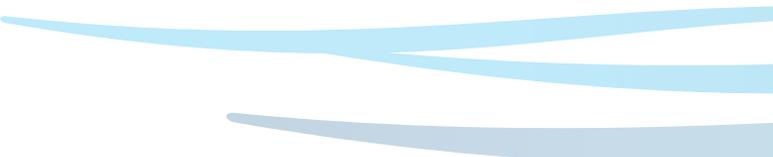


Source:  
RMC analysis of C2VSIM historical simulation results, 2012.

■ Annual Storage Change

— Cumulative Storage Change

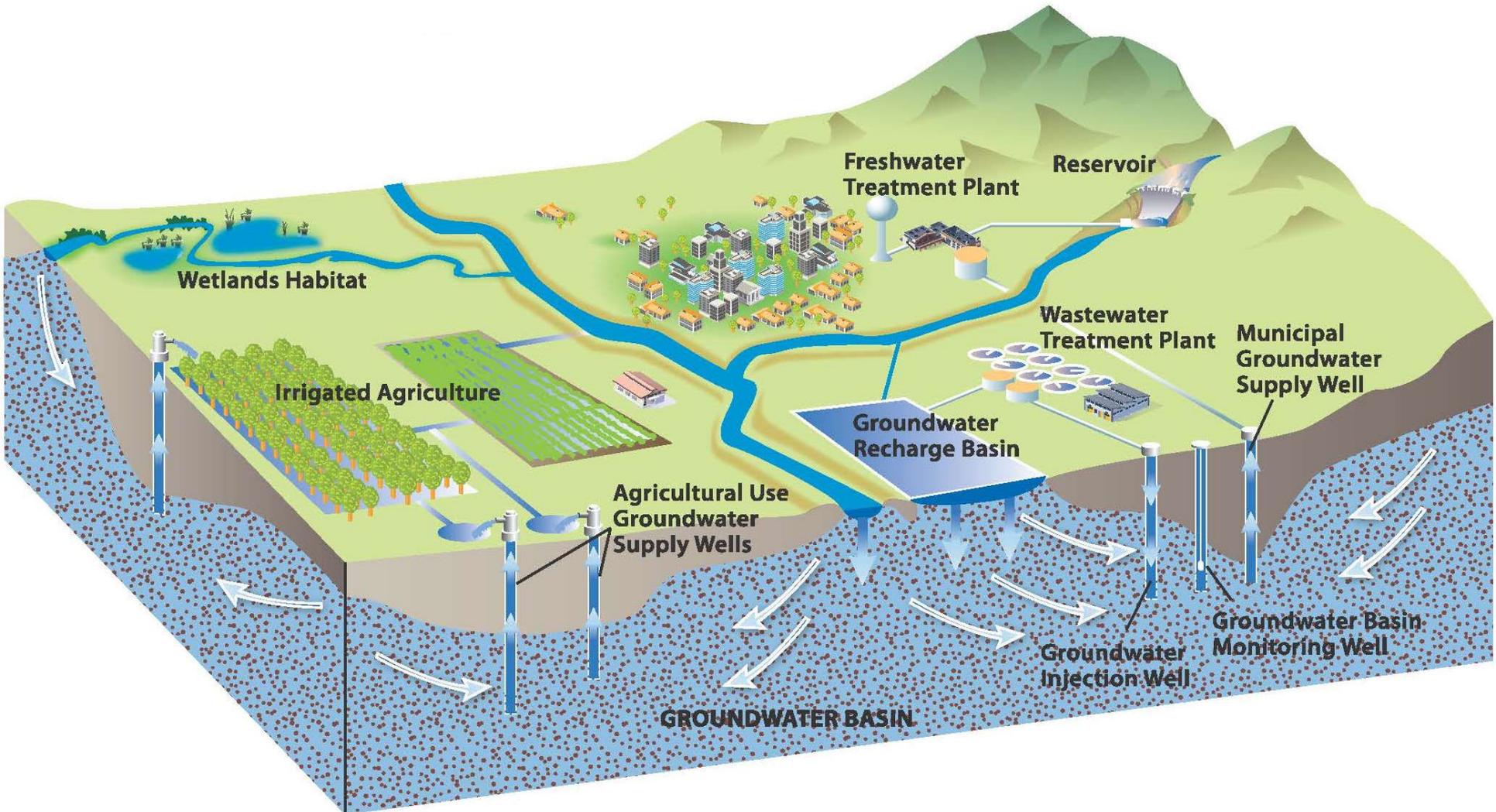
## Sustainable Groundwater Management Act (SGMA)

- Fundamental change in groundwater management
  - Sustainability Goal (20 years with 5 year milestones)
  - Local Empowerment
    - Local authorities to manage groundwater
    - Local agency formation (GSAs)
    - Local plans (GSPs)
    - “Exempts” adjudicated basins
  - State Role
    - Assistance (financial and technical)
    - Plan Review
    - Back-Stop
- 

*Sustainability:* Manage groundwater to prevent undesirable results (significant & unreasonable):

- Chronic lowering of groundwater levels
  - Reduction of groundwater storage
  - Seawater intrusion
  - Degraded water quality
  - Land subsidence
  - Depletions of interconnected surface water
- 

# Integrated Water Management



## **Transformative Moment for California Water**

- Invest in water infrastructure
- Create markets to move water
- Drive water conservation
- Ensure everyone has safe, reliable water

## **Invest in Water Infrastructure**

- Water reuse and recycling
- DAC connection and treatment
- Stormwater capture and use
- Storage and Conveyance (small and large)
- Infrastructure Funding
  - Bonds, Fees, 218

## Time Frame for Success

Time	Action
6/30/2017	Formation of GSAs
1/31/2020	Completion of GSPs in critically overdrafted basins
1/31/2022	Completion of GSPs in all other basins
20-year implementation period	Implementation of GSPs under local management

Taking these actions shields local managers from state intervention

## The “Backstop” State Board Intervention

After	Cause of Intervention
6/30/2017	No GSAs
1/31/2020	In critically overdrafted basins, no GSA or GSP is inadequate
1/31/2022	In other basins, no GSA or GSP inadequate and basin in long-term overdraft
1/31/2025	GSP is inadequate and significant depletions of interconnected surface waters

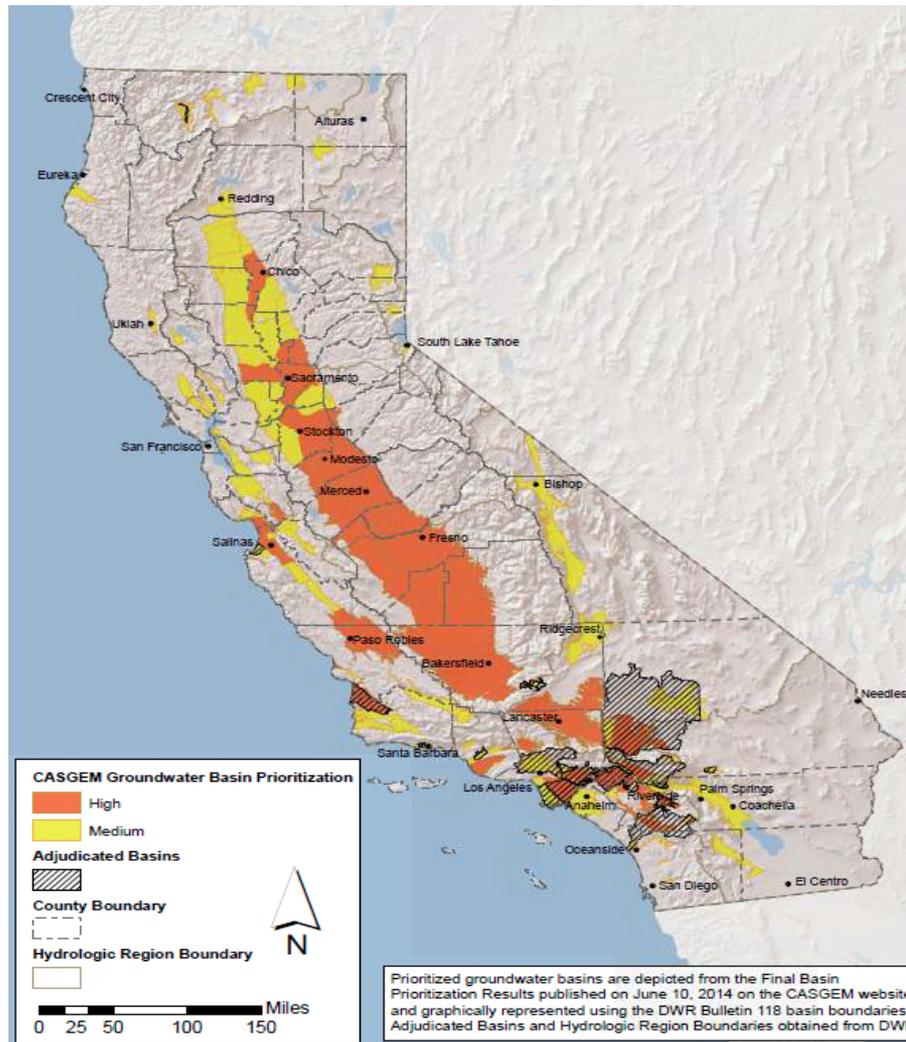
In all triggering events, interventions is the result of a failure by the locals to create a GSA and adopt and implement a GSP.

## Moving to Implementation

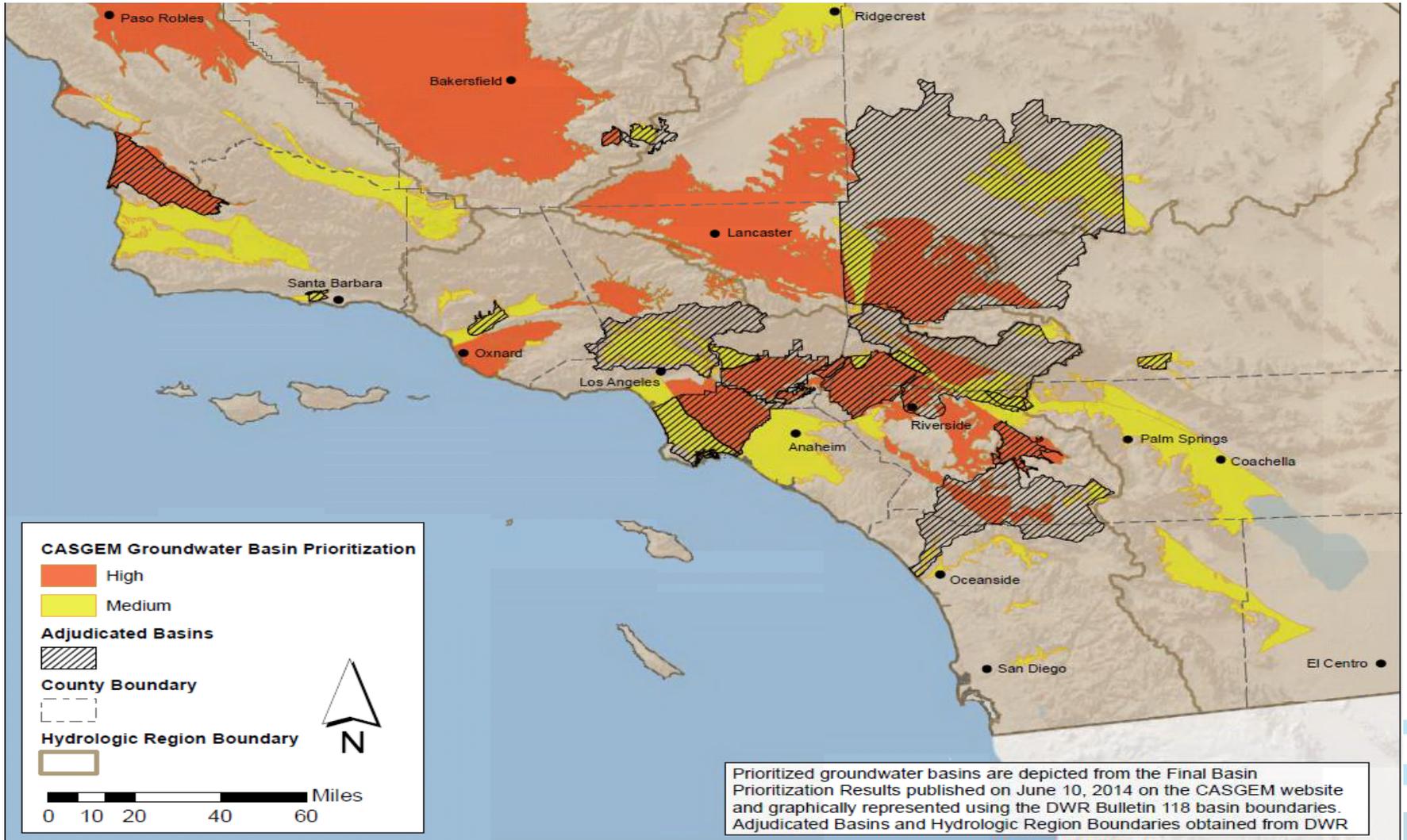
- Shape agency rules
- Support progressive leaders
- Manage legislative follow-up



# CASGEM Groundwater Basin Prioritization



# CASGEM Groundwater Basin Prioritization Southern California



# Problems with Overdraft

