

# Water Systems and Institutions in California



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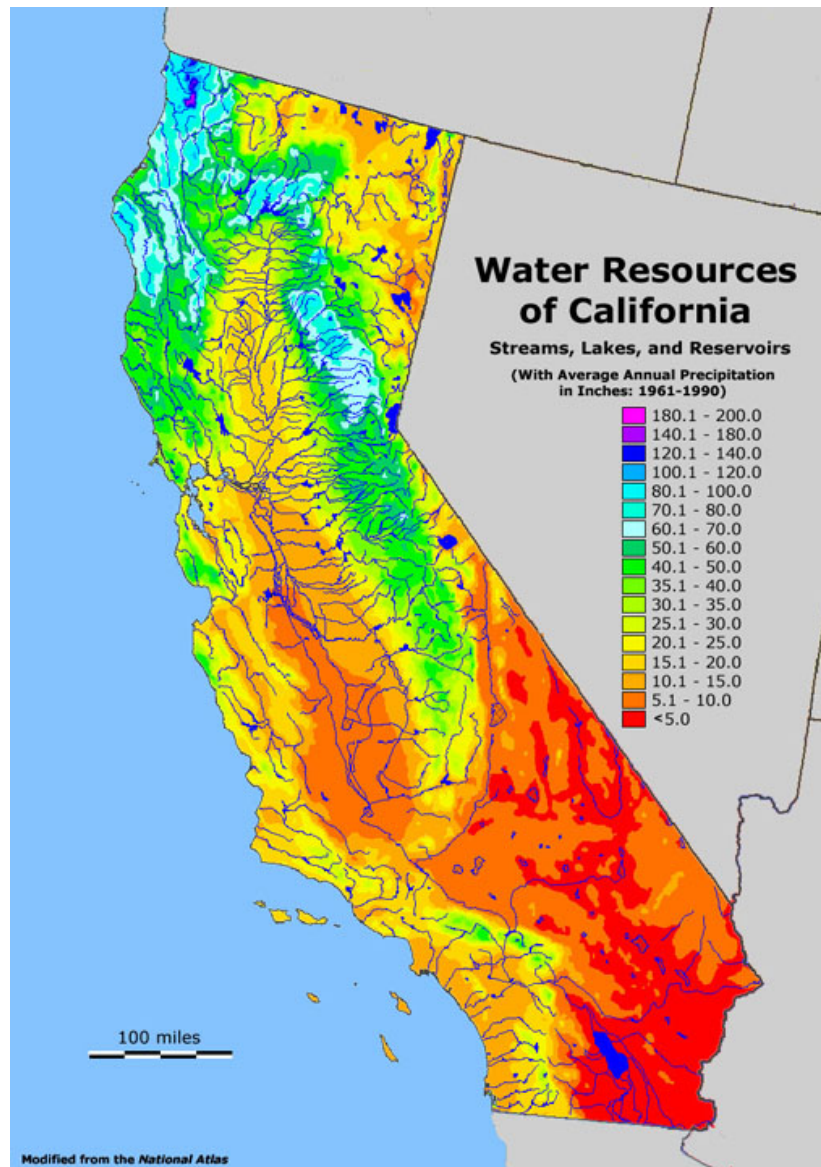
# Outline

- Introduction
- California Climate and Hydrology
- California Water Supply
- California Water Use
- California Water Challenges



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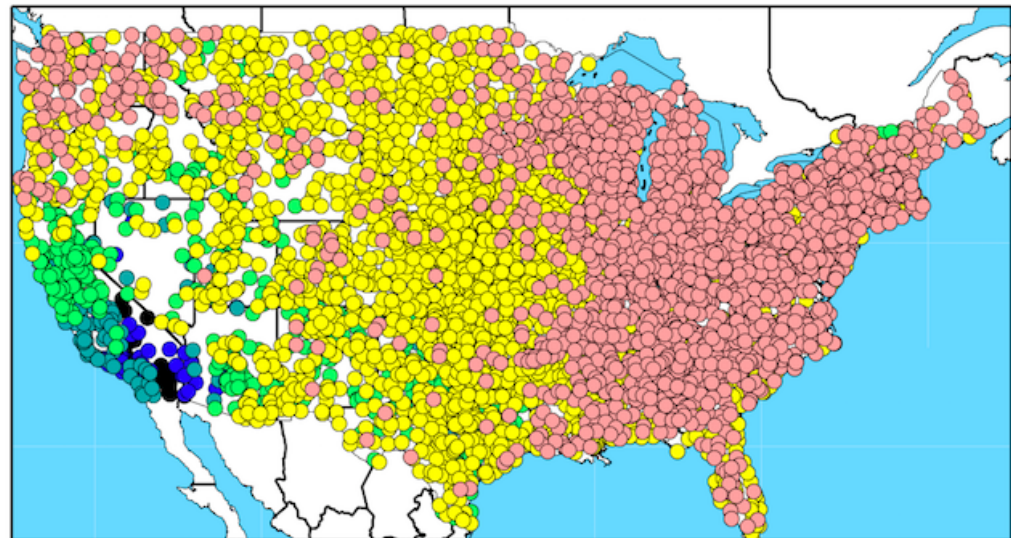
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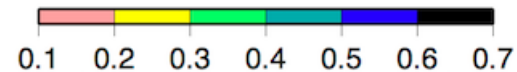
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# Variation in Annual Precipitation

COEFFICIENTS OF VARIATION OF  
TOTAL PRECIPITATION, WY 1951-2008



fraction



Source: Dettinger et al (2011)



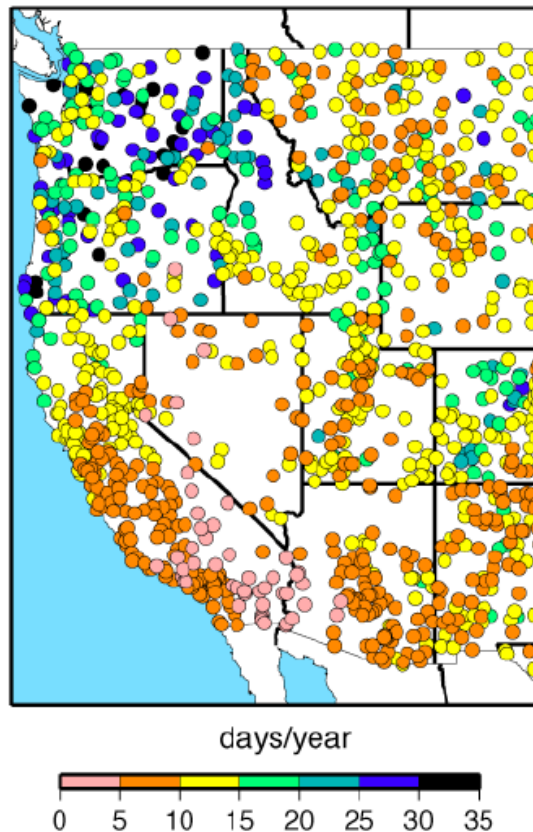
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# The Importance of Large Storm Events

c) AVERAGE NUMBER OF DAYS/YR TO OBTAIN HALF OF TOTAL PRECIPITATION, WY 1951-2008



Dettinger et al, Water, 2011

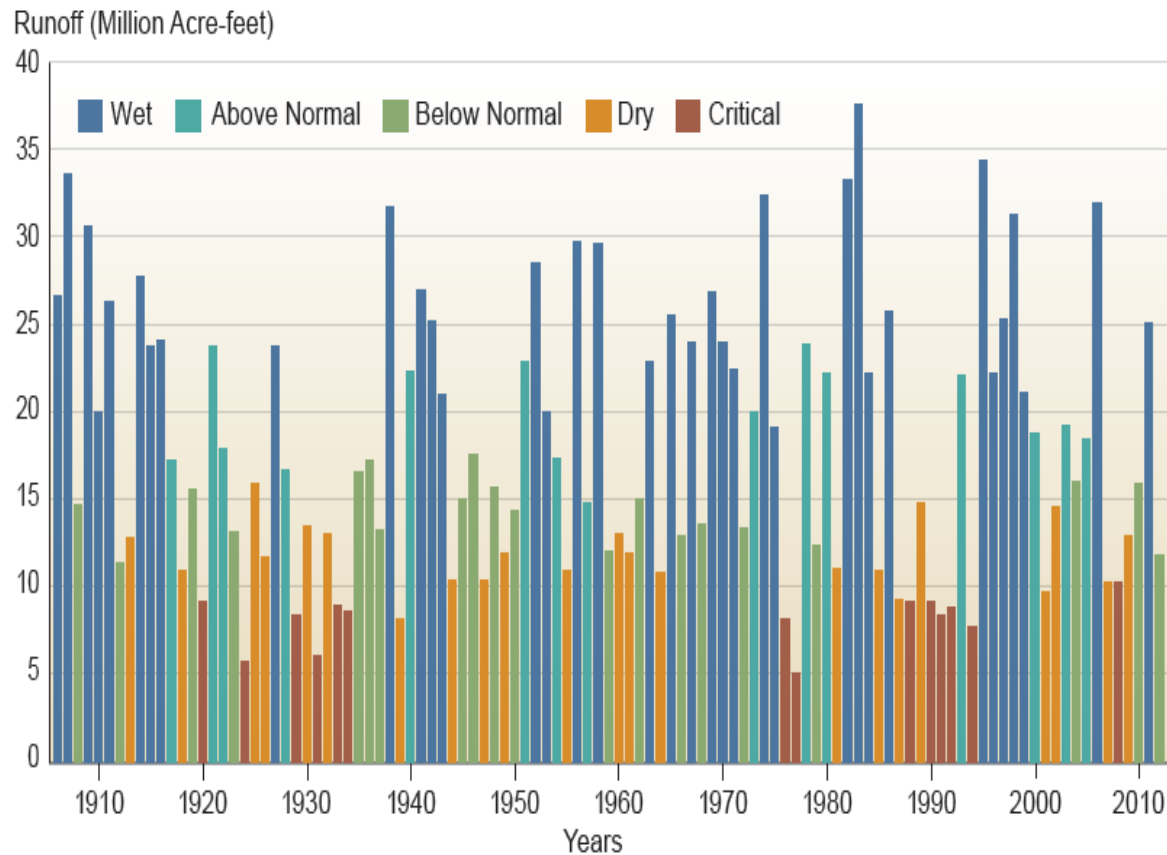


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**Figure 3-7 Sacramento Four Rivers Unimpaired Runoff, 1906-2012**



Note: The Sacramento Four Rivers are Sacramento River above Bend Bridge, near Red Bluff; Feather River inflow to Lake Oroville; Yuba River at Smartville; American River inflow to Folsom Lake.

California Water Plan Update 2013

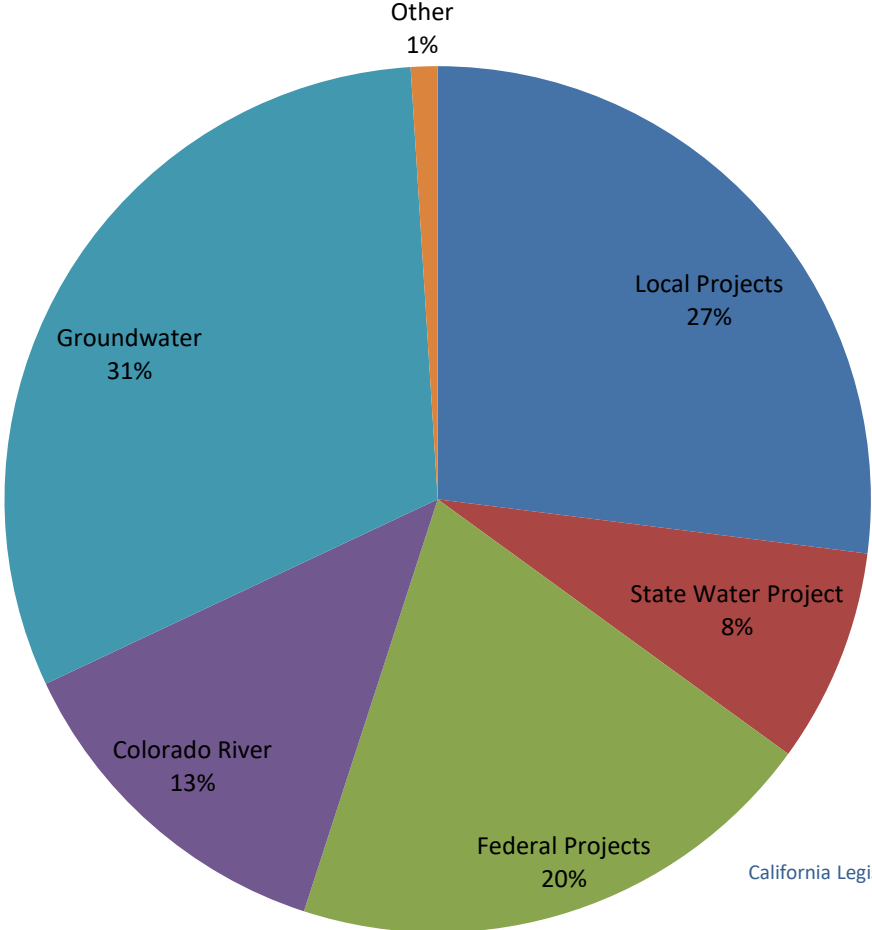


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# California's Water Sources



California Legislative Analyst's Office, September 8, 1999



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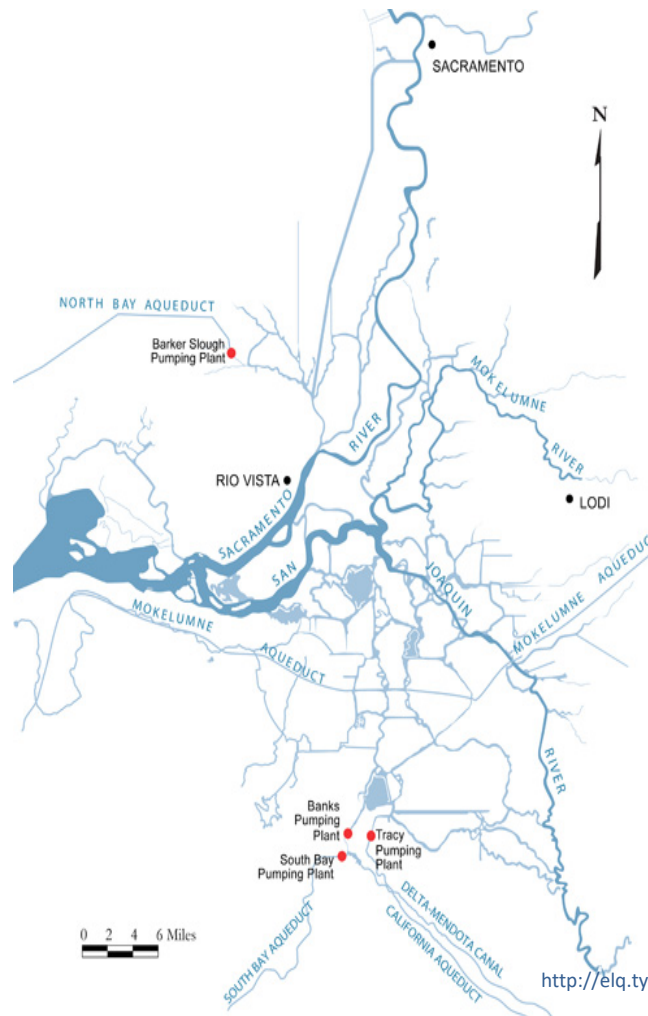
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# Sacramento-San Joaquin Delta



<http://elq.typepad.com/currents/2010/03/currents37-03-frank-2010-0319.html>



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# 2015 Drought

## SWP Allocations

- December 1      10%
- January 15      15%
- March 2          20%

## CVP Allocations

Year		
2015	Contractors	Feb 27, 2015
	North of Delta	
	Agricultural Contractors (Ag)	0%
	Urban Contractors (M&I)	25%*
	Wildlife Refuges (Level 2)	75%**
	Settlement Contractors/Water Rights	75%**
	American River M&I Contractors	25%*
	In Delta - Contra Costa	25%*
	South of Delta	
	Agricultural Contractors (Ag)	0%
	Urban Contractors (M&I)	25%*
	Wildlife Refuges (Level 2)	75%**
	Settlement Contractors/Water Rights	75%**
	Eastside Division Contractors	0%
	Friant - Class 1	0%
	Friant - Class 2	0%



# 2019 Wet (Snowpack 161% of Normal)

## Allocations

- SWP
  - March 20 70%
  - Last 100% was 2006
- CVP
  - North 100%
  - South 55%



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Colorado River Basin- MAP- CRBC- Chris Harris.jpg



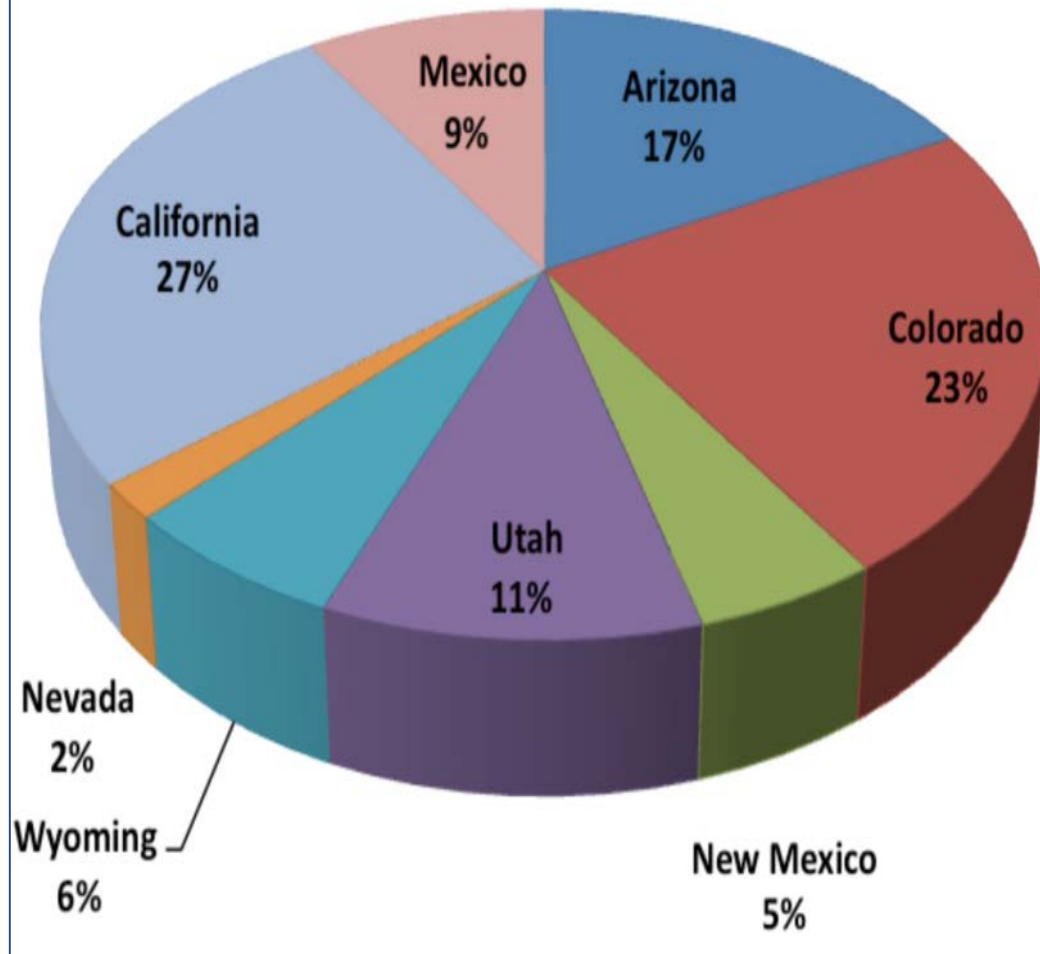
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# Colorado River Apportionment



US Department of the Interior Reclamation Bureau, 1971 - 2005



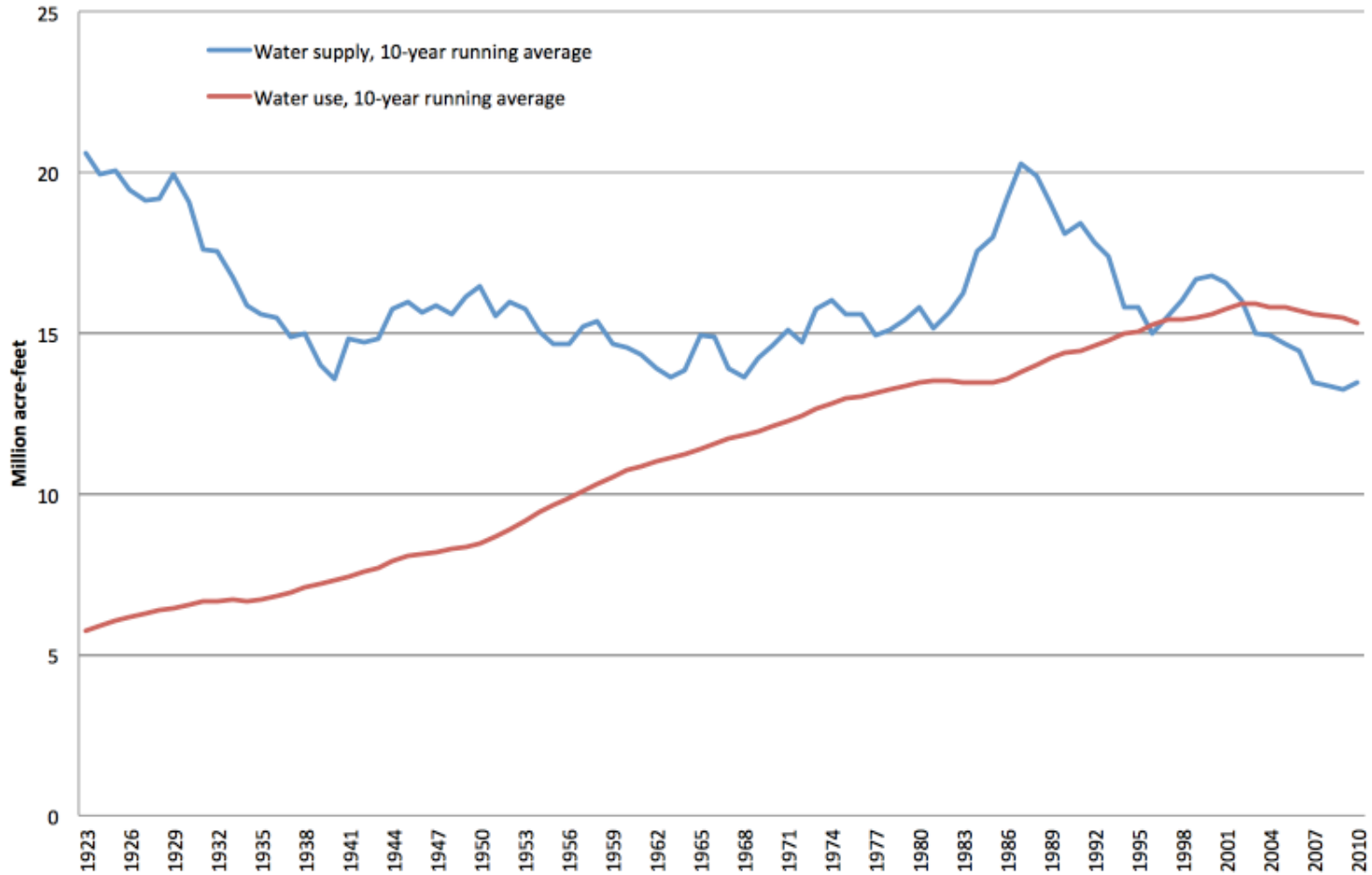
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## Water supply and water use in the Colorado River Basin



<http://palm.mydesert.com/2014Projects/2014ClimateChange/WaterSupplyUse800.png>



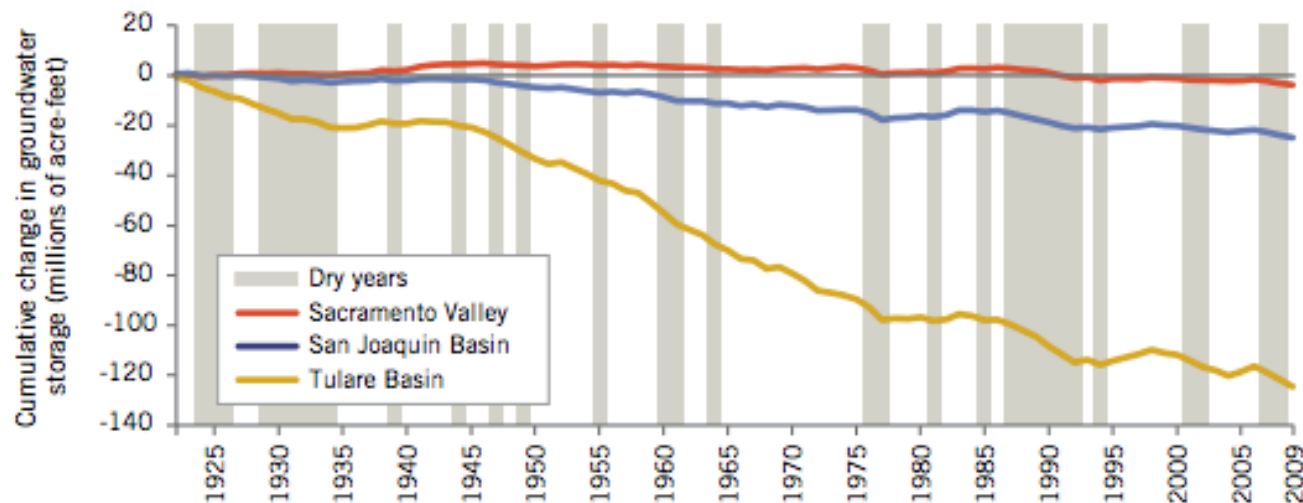
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# Groundwater Levels

## UNSUSTAINABLE GROUNDWATER PUMPING IS DEPLETING RESERVES IN THE CENTRAL VALLEY



SOURCE: The Nature Conservancy, using California Department of Water Resources data and models.

NOTES: Dry years are those classified as critical or dry in the Sacramento Valley based on the California Cooperative Snow Survey.



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# California Water Rights (Groundwater)

- Adjudicated Basins
- 2014 Groundwater Law
  - Local Management with State Oversight
  - Sustainable Management Plans by 2020
  - Implemented by 2040

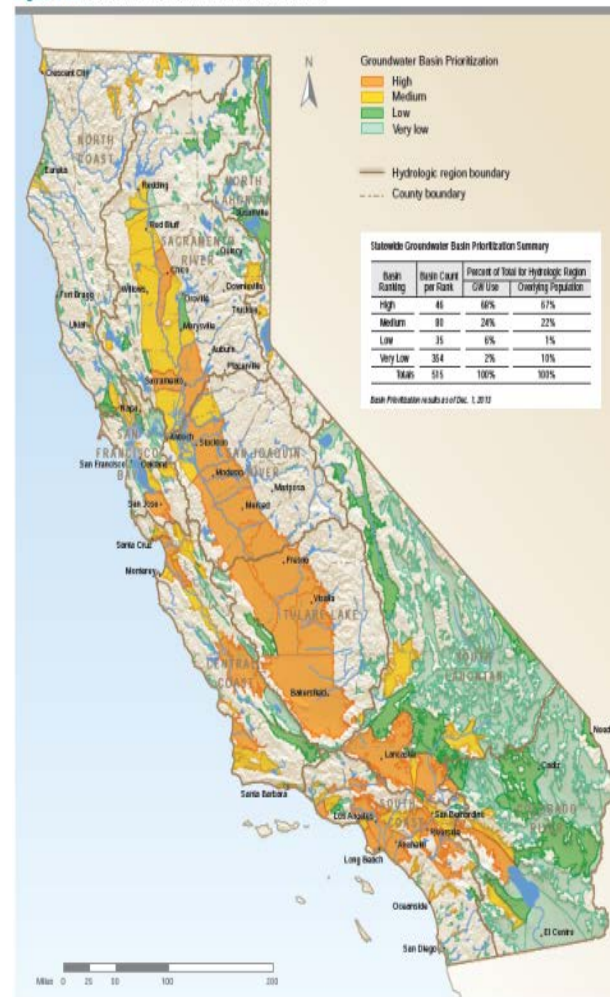


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# Groundwater Basin Prioritization

Figure 3.31 CASGEM Final Basin Prioritization Results



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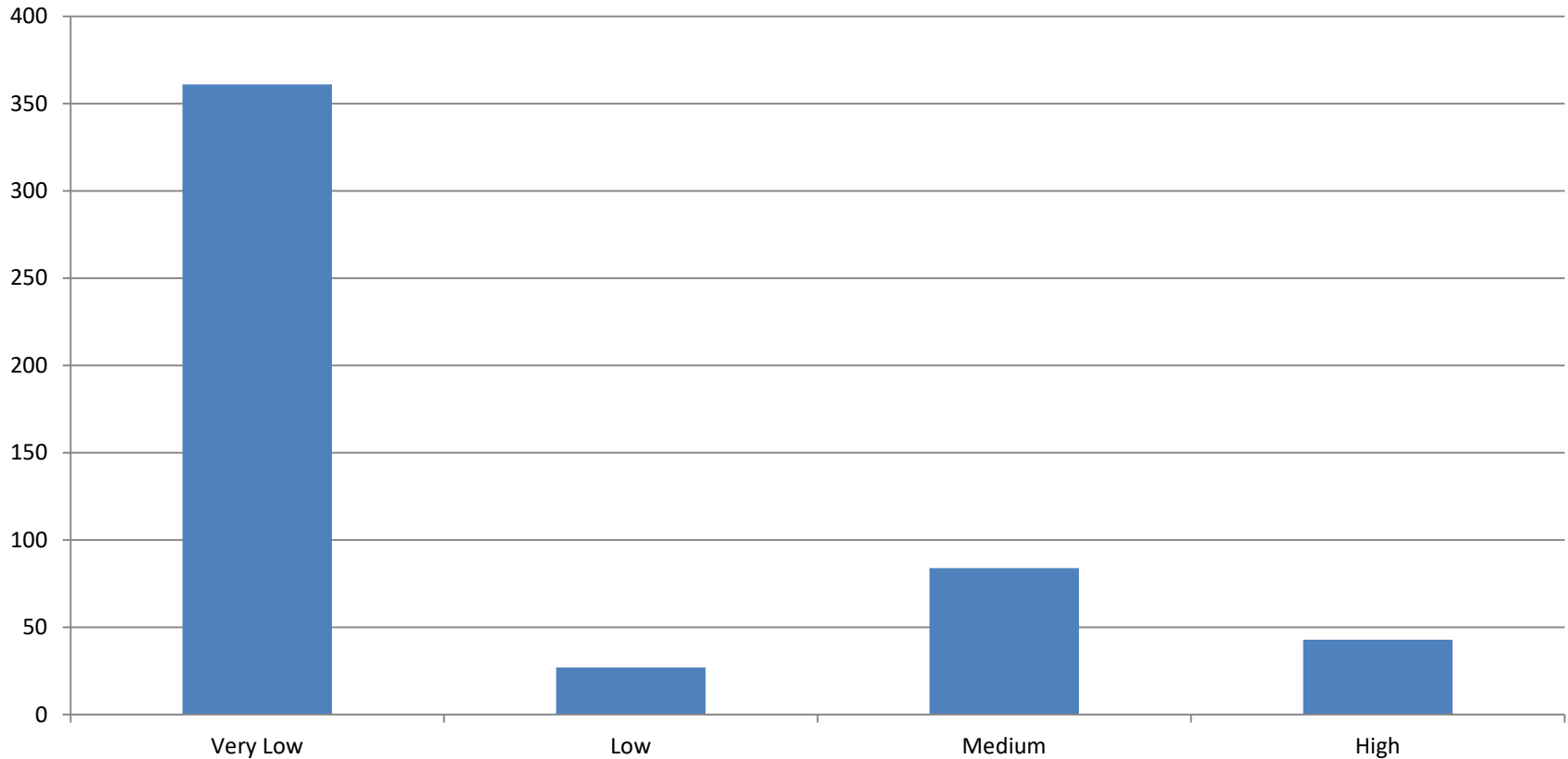


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# Number of Basins by Prioritization Level



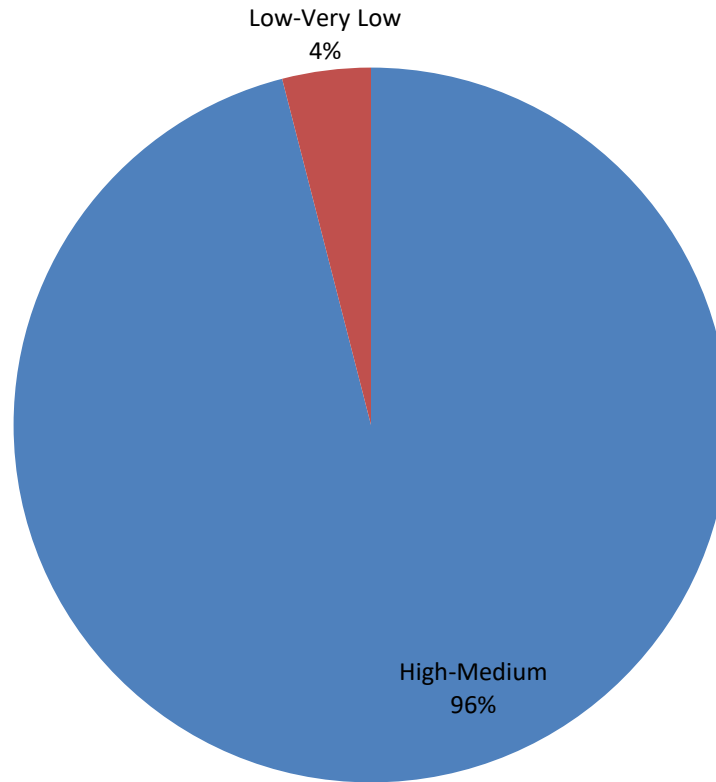
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# Percentage Water Use by Basin Prioritization



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# California Water Usage

247 km<sup>3</sup> Precipitation

20 km<sup>3</sup> Groundwater Withdrawals

- 88 km<sup>3</sup> Runoff
- 69 km<sup>3</sup> Agricultural Use
- 19 km<sup>3</sup> Urban Use
- Remainder is mostly Forest and Rangeland



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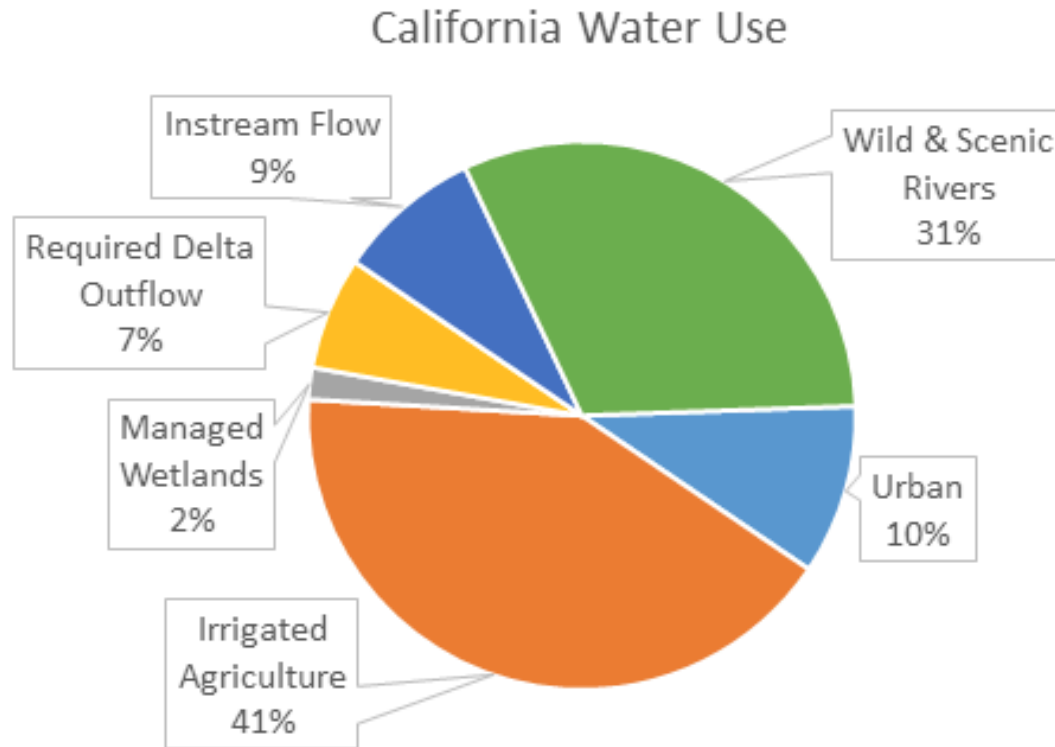
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# CA Water Facts

- 53 km<sup>3</sup> Surface Storage
- 185+ km<sup>3</sup> Groundwater Storage
- 19 km<sup>3</sup> Snowpack
  - Decreasing to 12-14 km<sup>3</sup> with Climate Change



# California Dedicated Water Uses



California Water Plan Update 2013

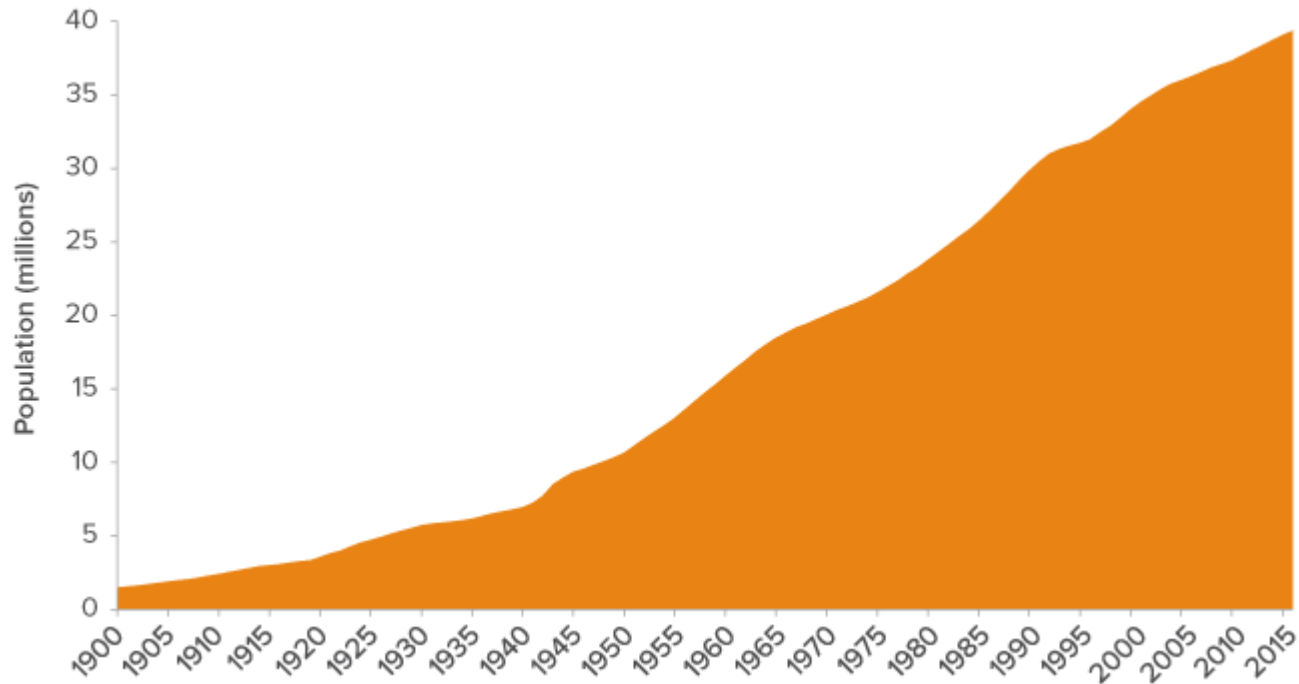


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# California Population



Source: Public Policy Institute of California



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# California Agriculture Facts

- 80,000 + farms
- \$46+ billion industry
- 10.5 million hectares of agricultural lands
  - 5.2 million hectares pasture and rangeland
  - 3.8 million hectares of irrigated cropland
    - 2.4 million hectares annuals
    - 1.2 million hectares orchards/vineyards



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# California Agriculture

- #1 US producer of 78 commodities
- Only US producer of 14 commodities (99% or greater)



Almonds	Kiwifruit	Pomegranates
Artichokes	Olives	Rice, Sweet
Dates	Peaches, Clingstone	Seed, Ladino Clover
Figs	Pistachios	Walnuts
Grapes, Raisin	Plums, Dried	

Source: USDA, NASS, "California Agricultural Statistics, 2011 Crop Year".



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# California Water Challenges

- Colorado River Drought Contingency Plan
- Sacramento-San Joaquin Delta Ecosystem and Flows
- In-Stream Fish Flows
- The Next Drought
  - 200,000 Hectares Idled
- Groundwater (SGMA)
  - 200,000 – 300,000 Hectares Idled



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# Thank You



Web: [ucanr.edu/drought](http://ucanr.edu/drought) Twitter: @ucanrwater



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