

# California's Drought: Characteristics and Highlights



**Heather Cooley, Pacific Institute  
Botin Foundation and the Rosenberg International  
Forum on Water Policy  
January 29, 2015**

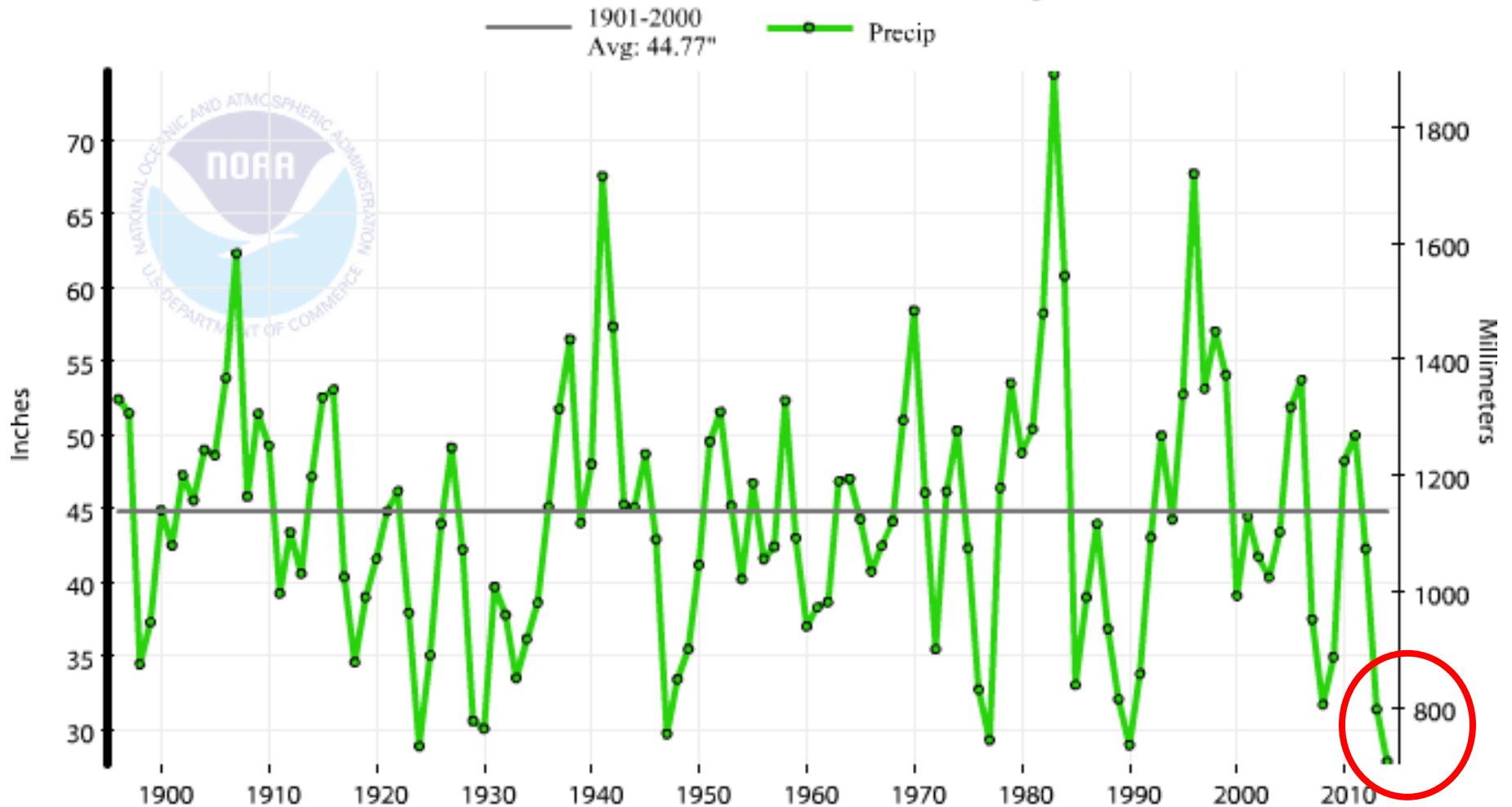
# Talk Overview

- Statewide Precipitation and Temperature
- Drought Severity Index
- Surface and Groundwater Conditions
- Drought Impacts
  - On Agriculture
  - On Urban Areas
  - On Hydropower Generation
  - On Ecosystems



# California 24-month Precipitation, 1895-2014

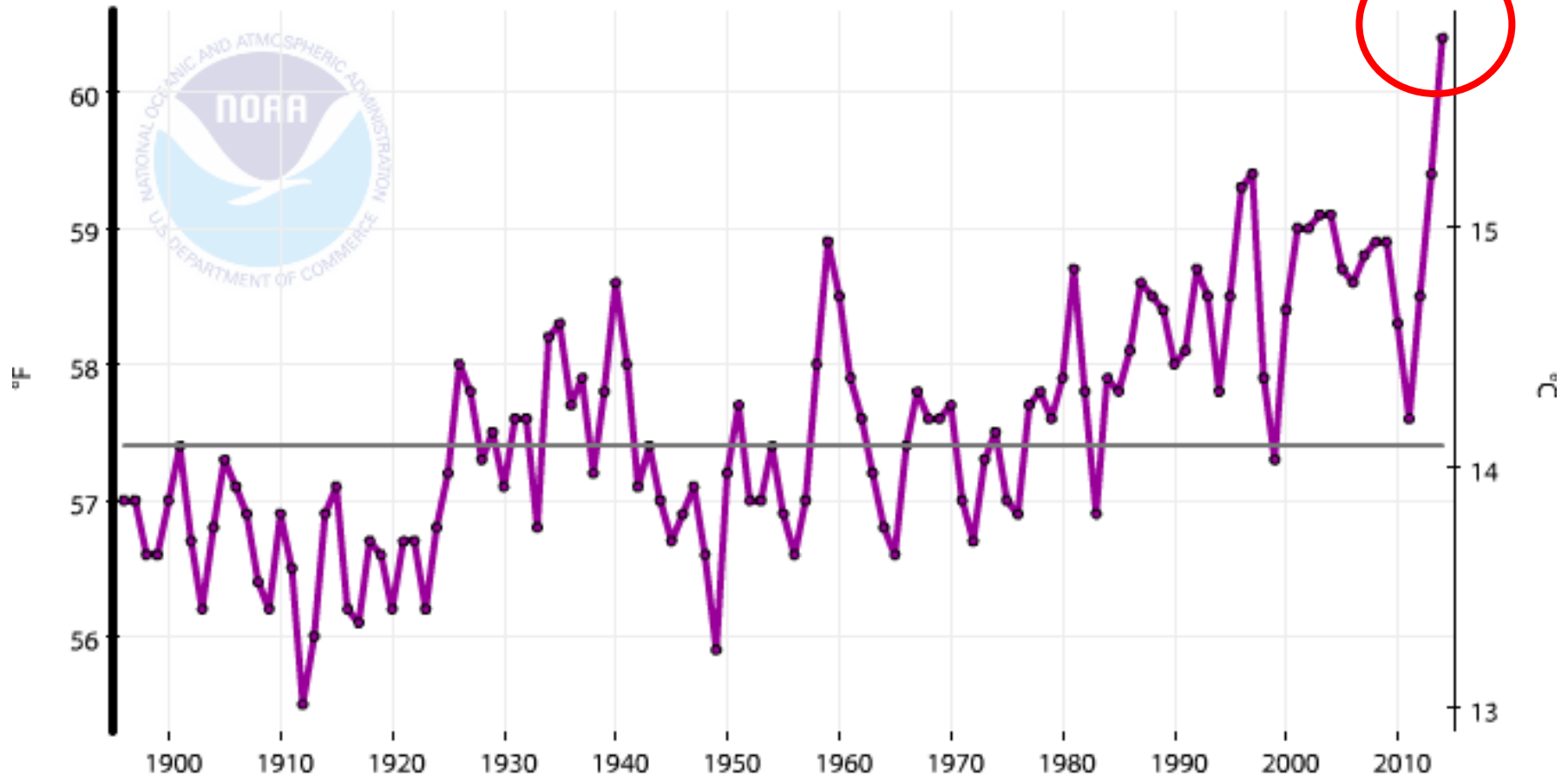
California, Precipitation, 24-Month Period Ending in December



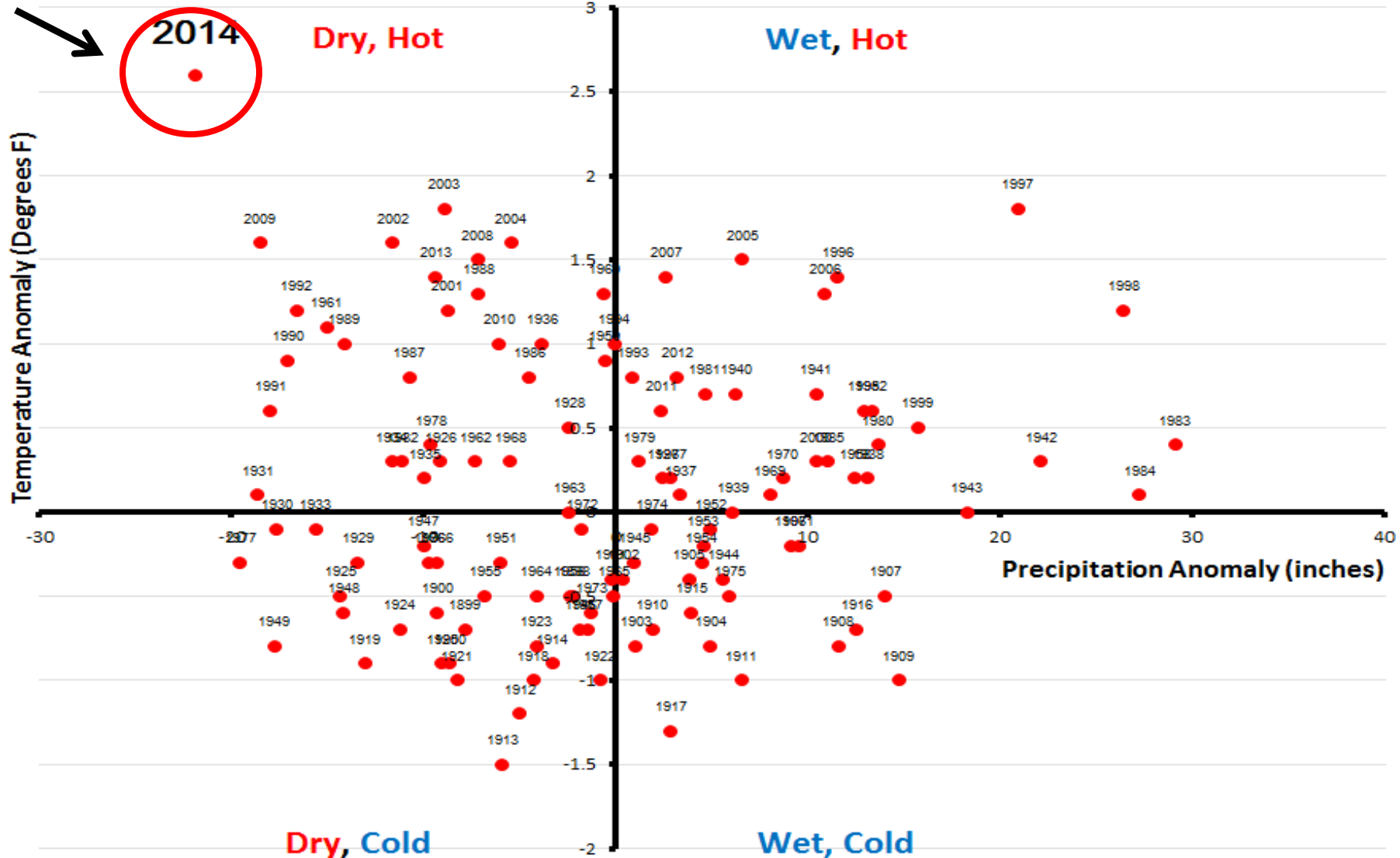
# California 24-month Temperature, 1895-2014

California, Average Temperature, 24-Month Period Ending in December

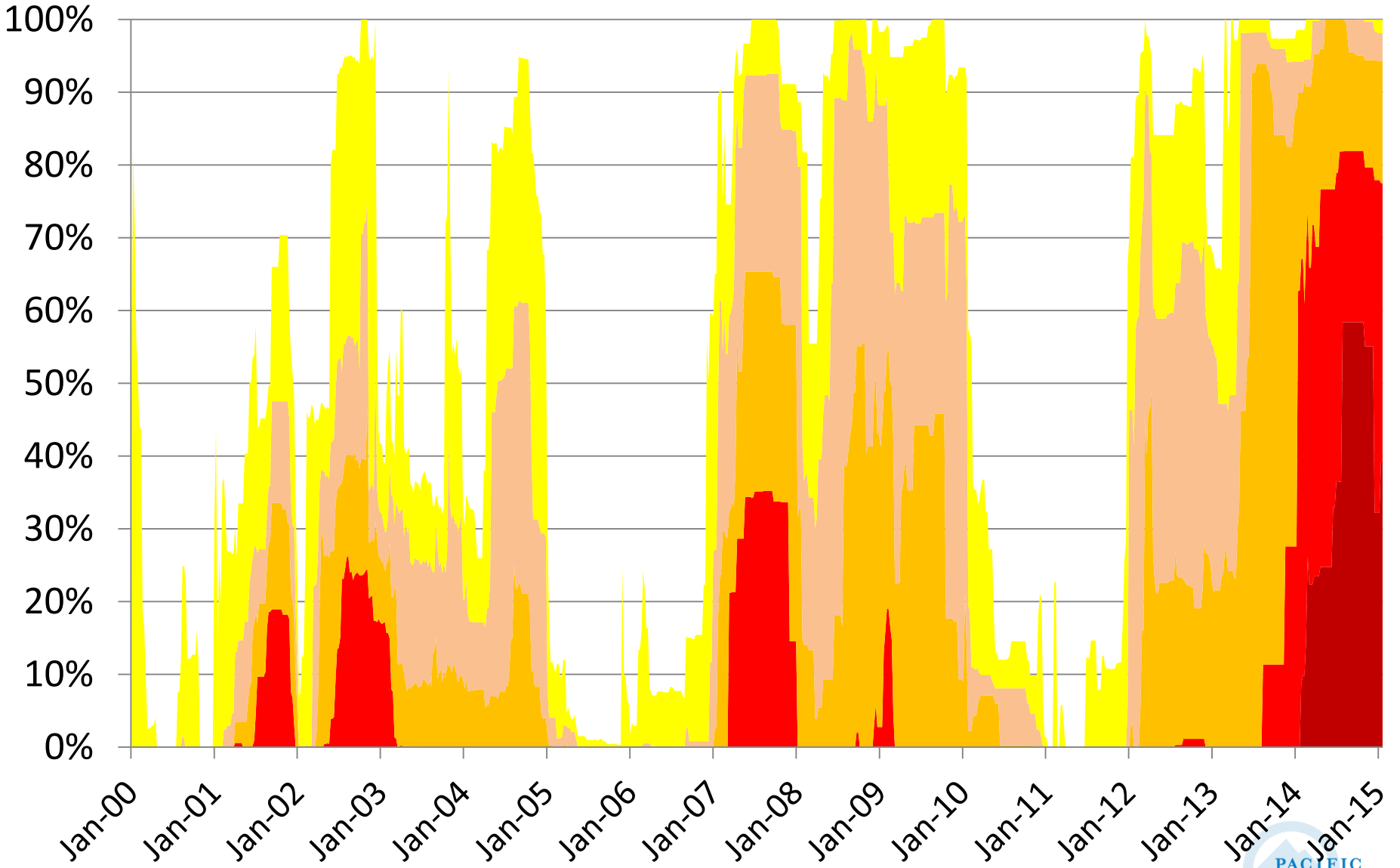
— 1901-2000 Avg: 57.4°F      —●— Avg Temperature



# California Temperature and Precipitation Anomalies (1895-2014) (36-month periods)



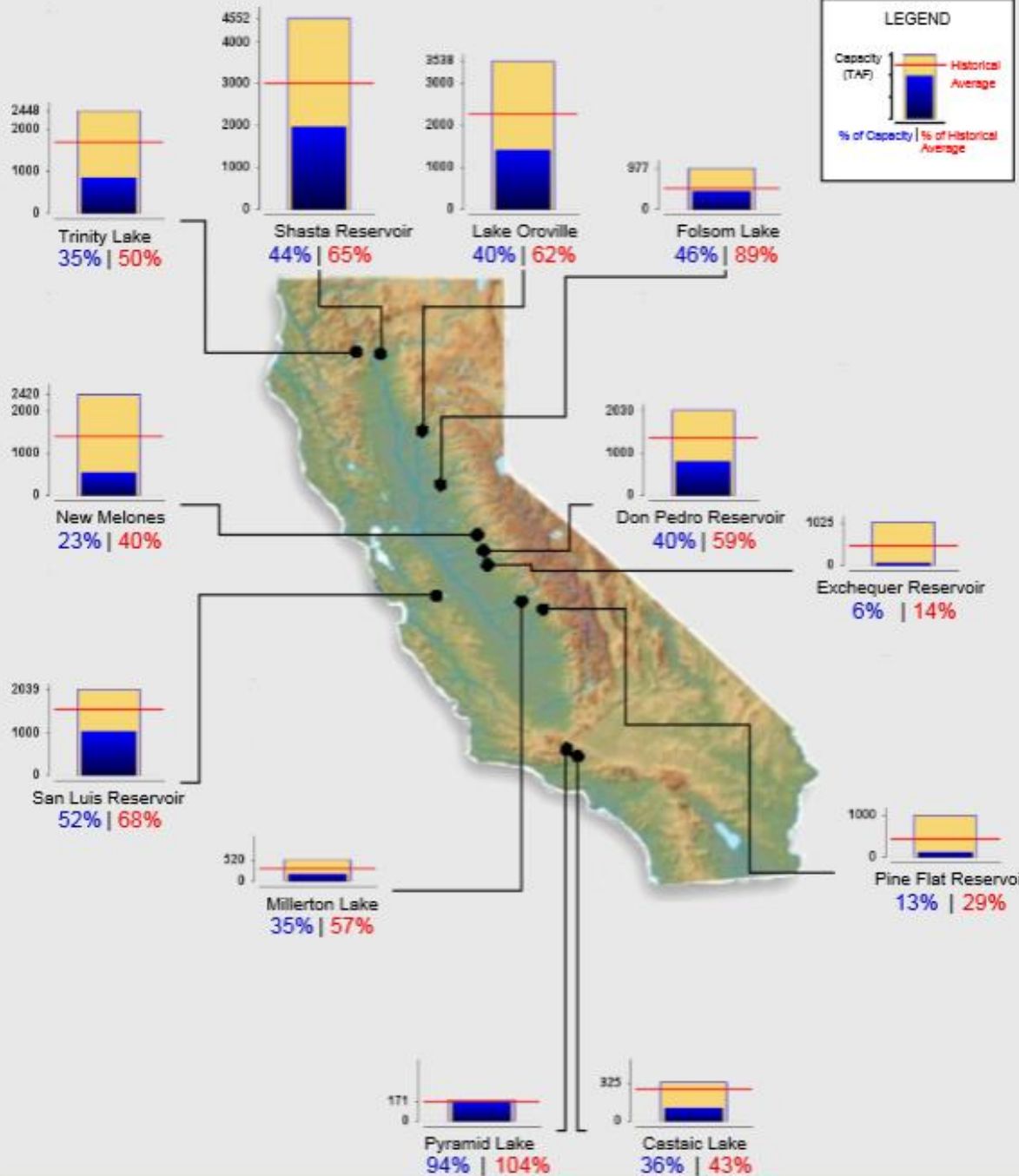
■ Exceptional Drought    
 ■ Extreme Drought    
 ■ Severe Drought  
■ Abnormally Dry    
■ Moderate Drought



Data Source: US Drought Monitor

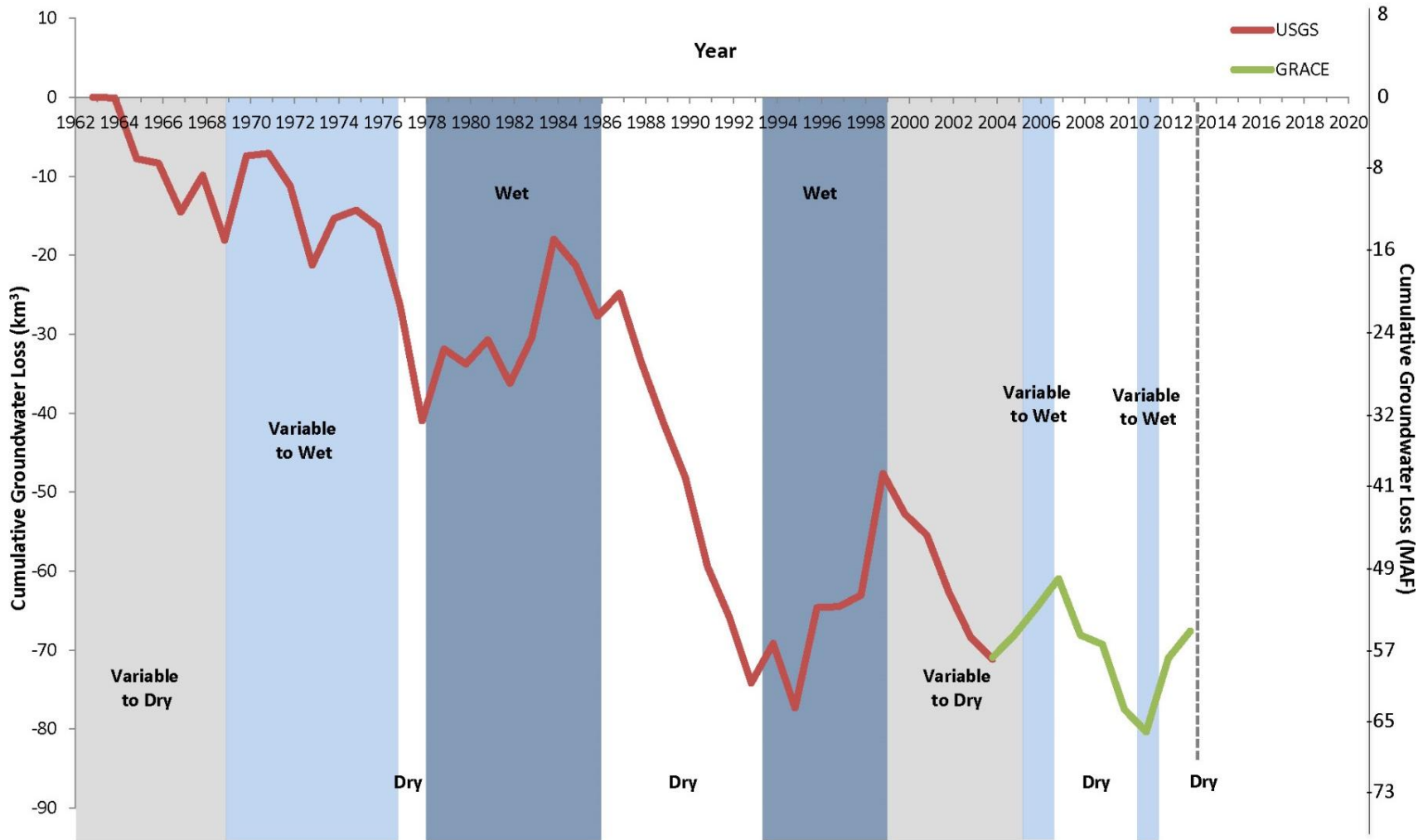


# Current Reservoir Conditions



Statewide, California's major reservoirs (34 km<sup>3</sup> of storage) are at **38% of capacity** and **61% of average** for this time of year.

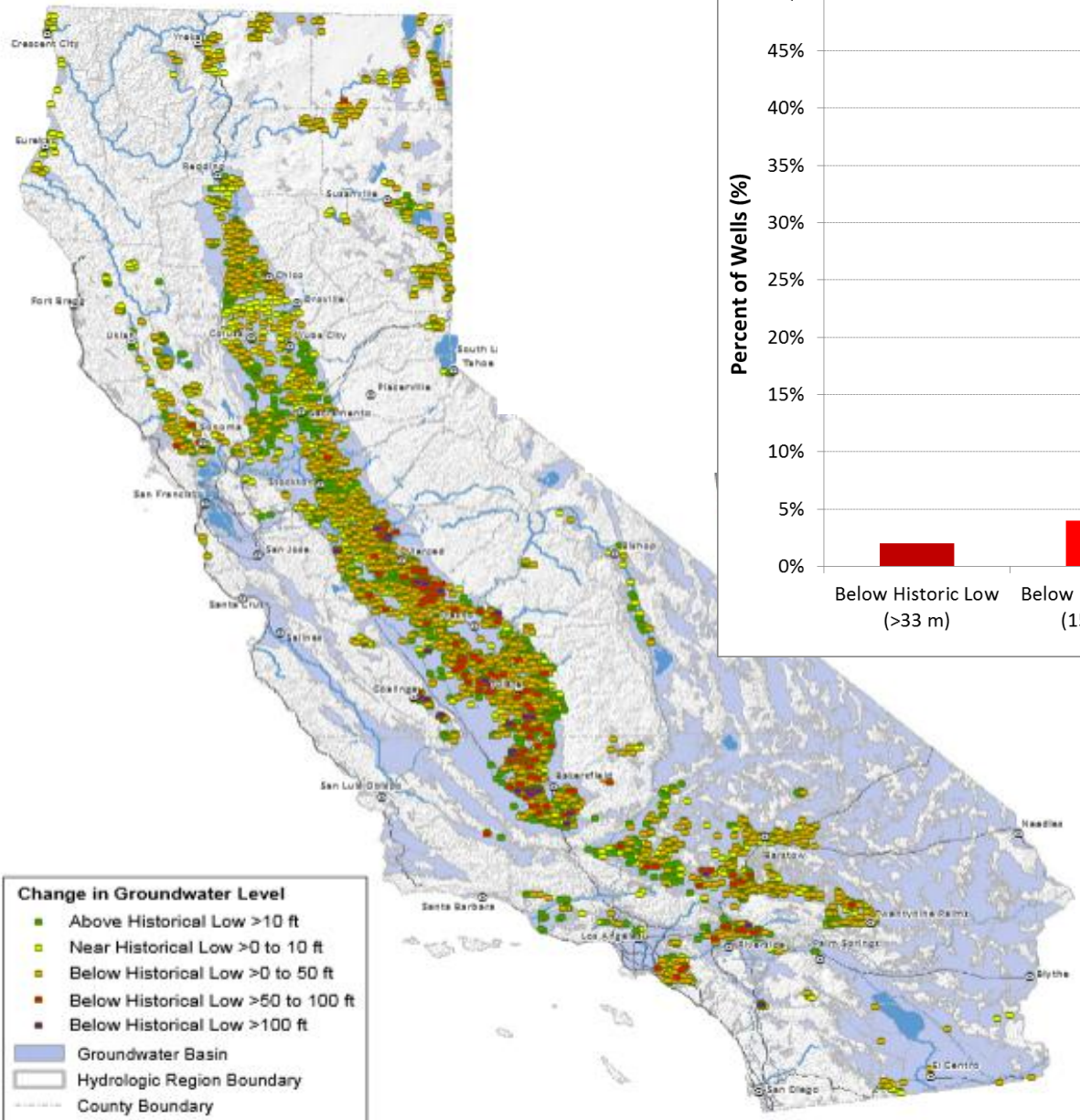
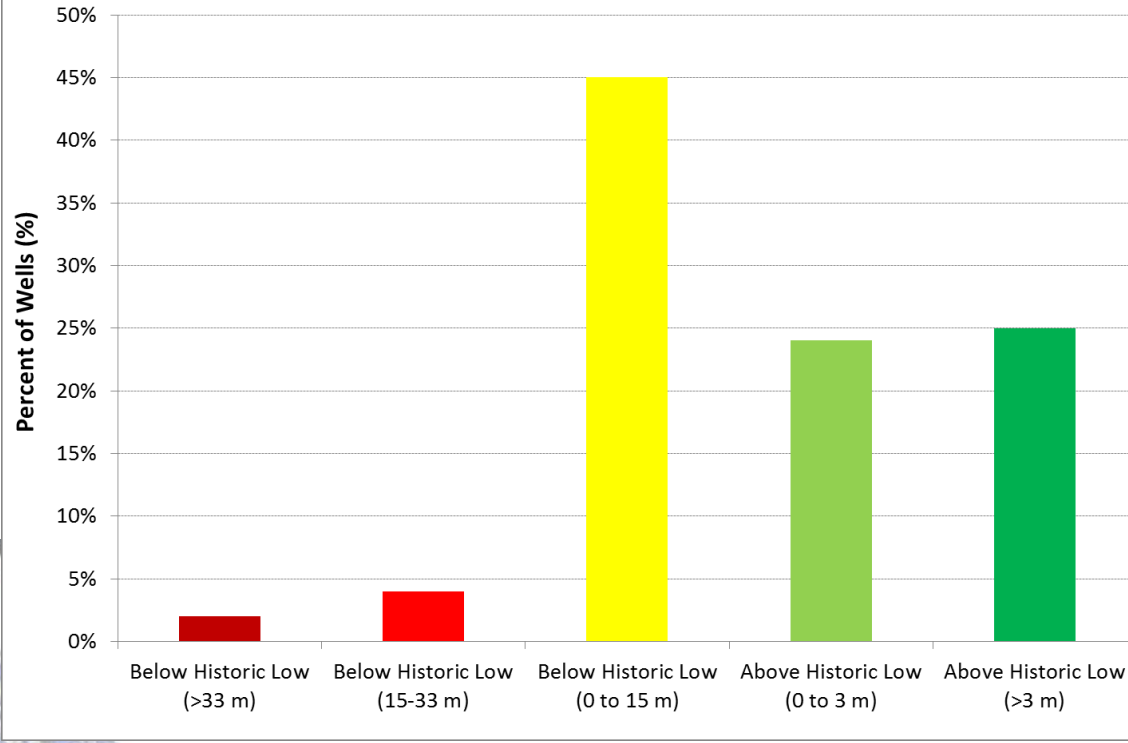
# Loss of Groundwater Storage in the Central Valley



Source: UC Center for Hydrologic Modeling (UCCHM) 2014



### Groundwater Level Change - Historical Low Spring (1900 -1998) to Drought Low Spring (2008-2014)



**Change in Groundwater Level**

- Above Historical Low >10 ft
- Near Historical Low >0 to 10 ft
- Below Historical Low >0 to 50 ft
- Below Historical Low >50 to 100 ft
- Below Historical Low >100 ft

■ Groundwater Basin  
 ■ Hydrologic Region Boundary  
 - - - County Boundary  
 — Major Highway  
 — Major Canal



Source: DWR 2014



# Agricultural Response and Impacts

- Pumping more groundwater
- Fallowing (~16,400 km<sup>2</sup> in the Central Valley, or 6%)
- Crop switching
- Adopting practices to improve water use efficiency
- Water transfers
  
- Initial projections for the Central Valley (Howitt et al. 2014)
  - 3% reduction in crop revenue, or \$740 million
  - Increased groundwater pumping costs of \$450 million

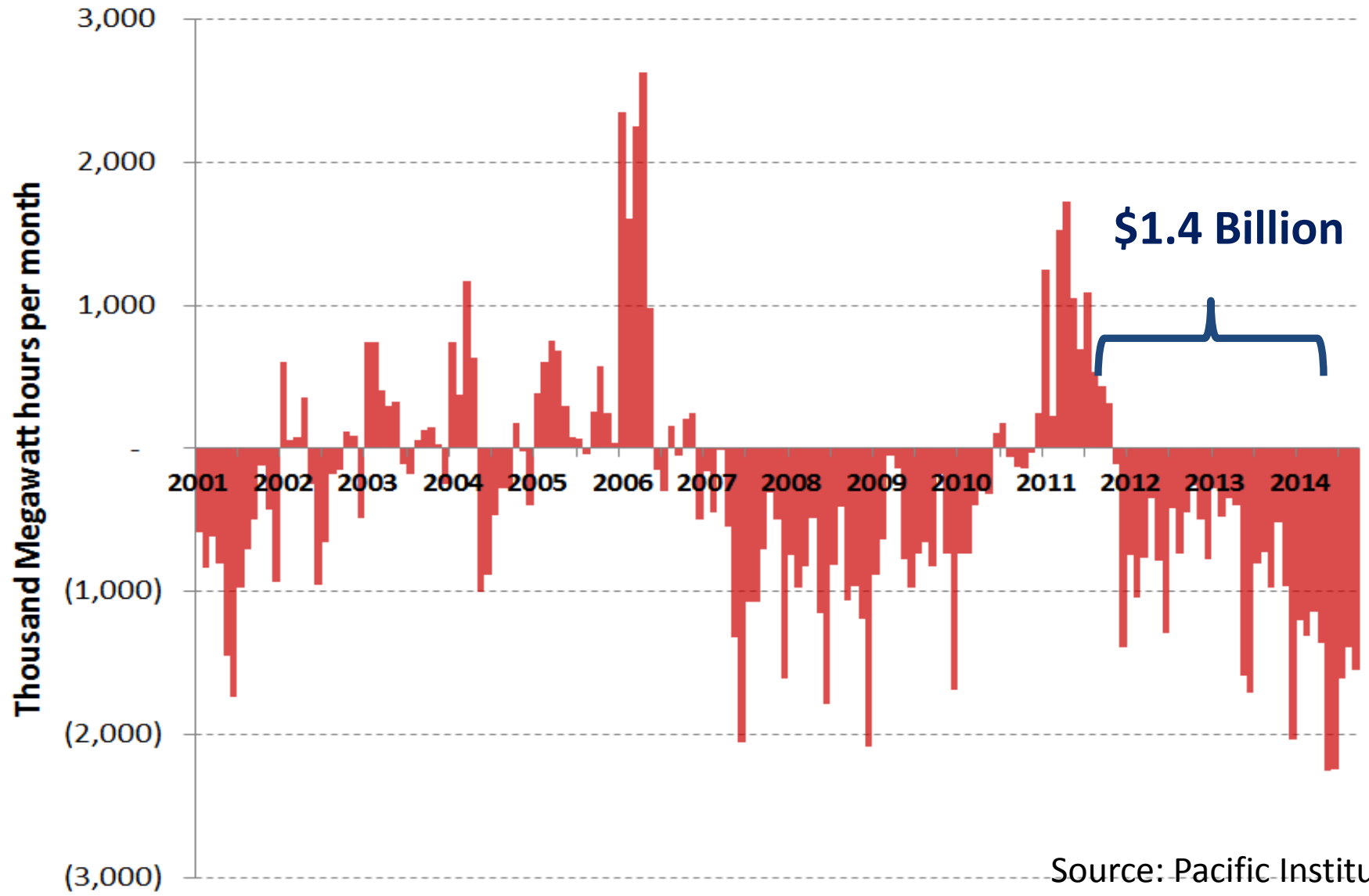


# Urban Response and Impacts

- January 2014: Governor called for a 20% reduction in urban water use statewide (achieved 10%)
- Utilities imposed voluntary and in some areas, mandatory restrictions
- Expanded conservation and efficiency investments

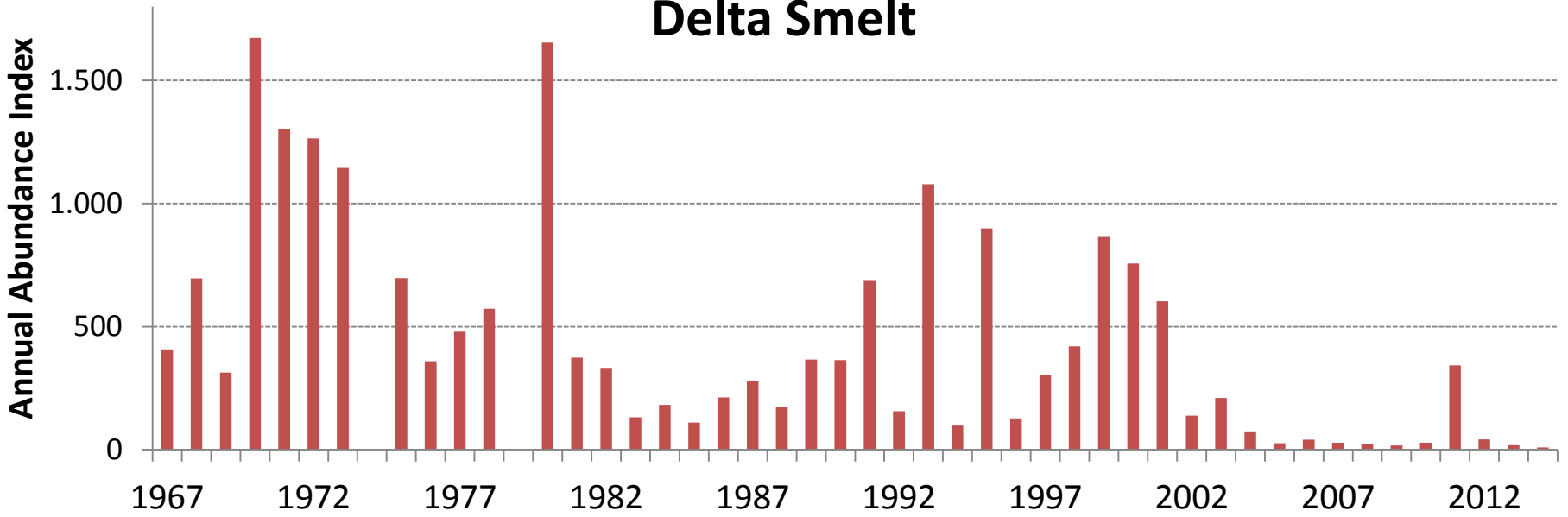


# California Drought Has Cut Hydroelectricity Generation

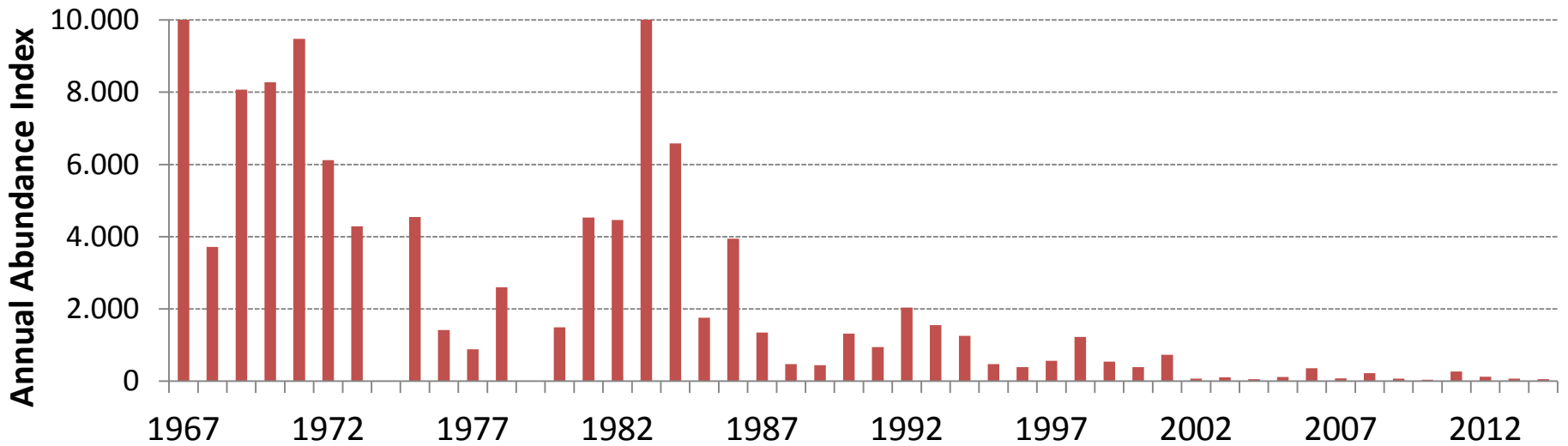


Source: Pacific Institute

## Delta Smelt



## Striped Bass



Data Source: California Department of Fish and Wildlife

# Conclusions

- California is facing one of the most severe droughts on record.
- Drought is already having impacts on people, the economy, and the environment.
- The drought is showing no sign of letting up and thus drought conditions are likely to persist.
- Silver lining: focusing attention on much-needed changes in how we use and manage water.

# Thank you!

For copies of our work: [www.pacinst.org](http://www.pacinst.org)

For drought update: [www.californiadrought.org](http://www.californiadrought.org)

