



# The 2012-2014 Drought in Perspective

Jeanine Jones

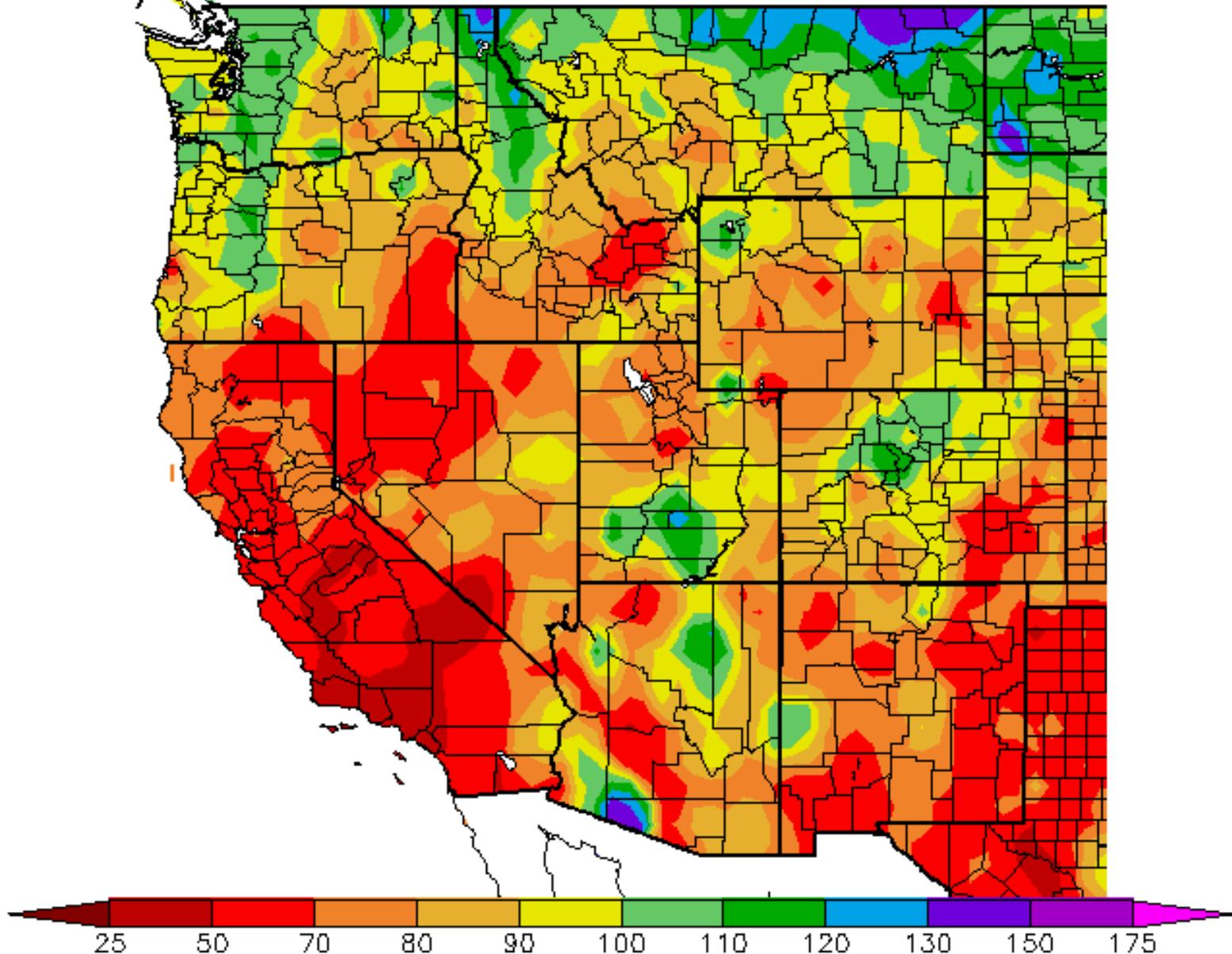


Department of Water Resources

June 2014

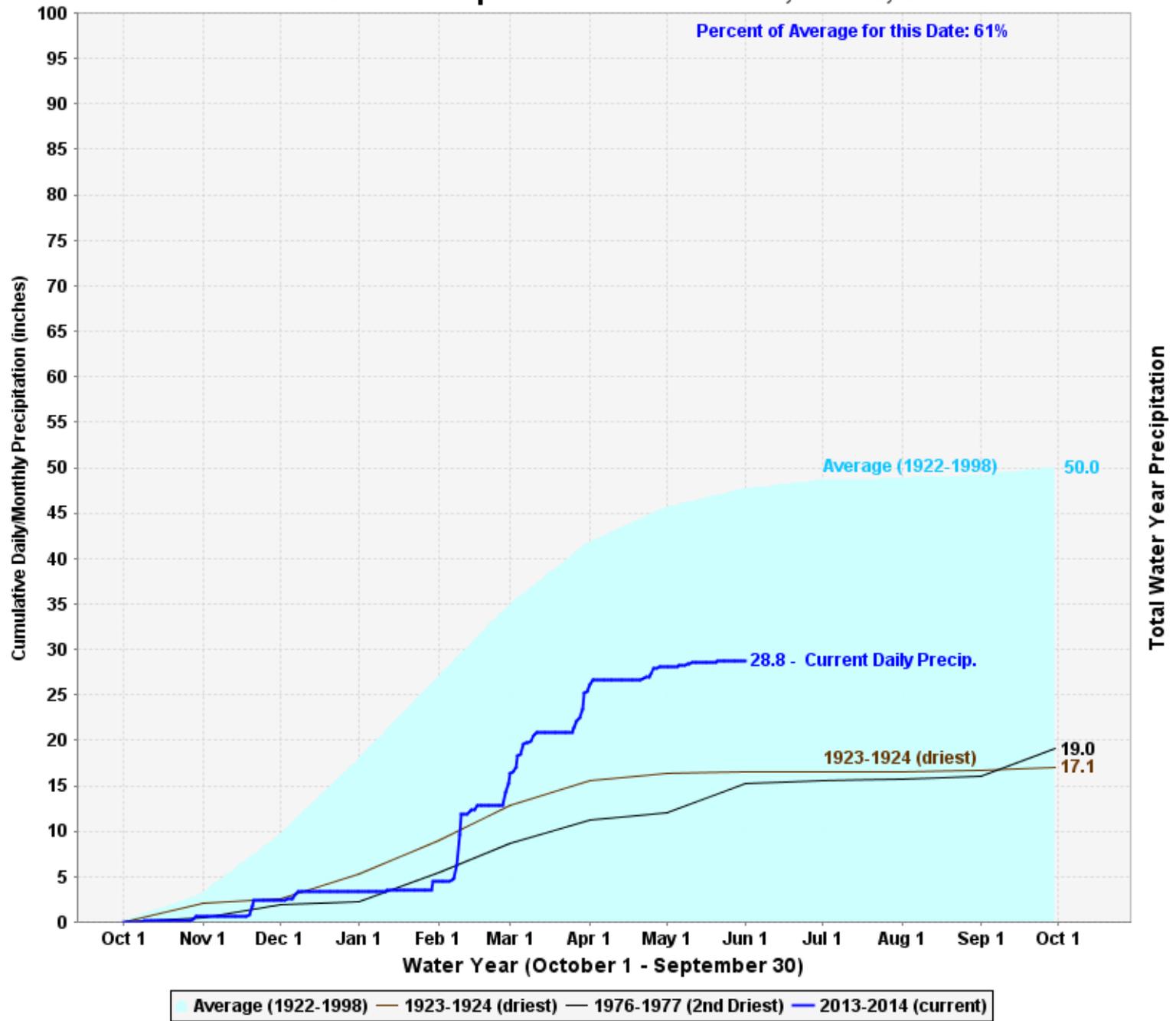
# Percent of Average Precipitation (%)

6/2/2011 - 6/1/2014

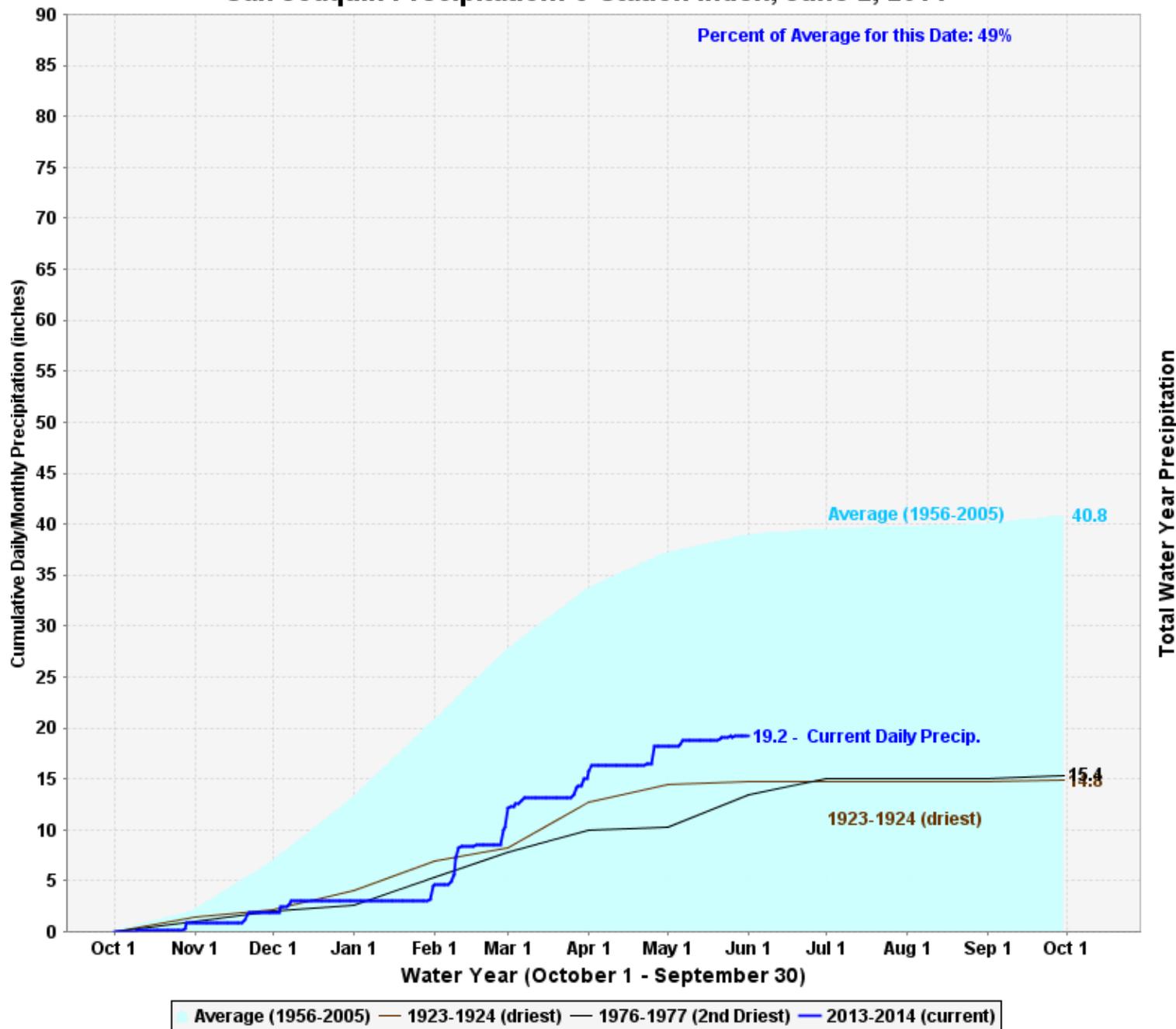


Generated 6/02/2014 at WRCC using provisional data.

# Northern Sierra Precipitation: 8-Station Index, June 2, 2014



# San Joaquin Precipitation: 5-Station Index, June 2, 2014



# USGS Computed CA WY Runoff Dozen Driest years -- (rank out of 113)

- |         |                   |          |                   |
|---------|-------------------|----------|-------------------|
| 1. 1977 | 113 <sup>th</sup> | 7. 2001  | 107 <sup>th</sup> |
| 2. 1931 | 112 <sup>th</sup> | 8. 1934  | 106 <sup>th</sup> |
| 3. 1924 | 111 <sup>th</sup> | 9. 1992  | 105 <sup>th</sup> |
| 4. 1991 | 110 <sup>th</sup> | 10. 1976 | 104 <sup>th</sup> |
| 5. 1994 | 109 <sup>th</sup> | 11. 1929 | 103 <sup>rd</sup> |
| 6. 1990 | 108 <sup>th</sup> | 12. 1998 | 102 <sup>nd</sup> |

# California's 20<sup>th</sup> & 21<sup>st</sup> Century Statewide Droughts

- 1918-20
- 1922-24
- 1929-34
- 1947-50

- 1959-61
- 1976-77
- 1987-92
- 2007-09

# Comparison of Water Project Allocations in Dry Years

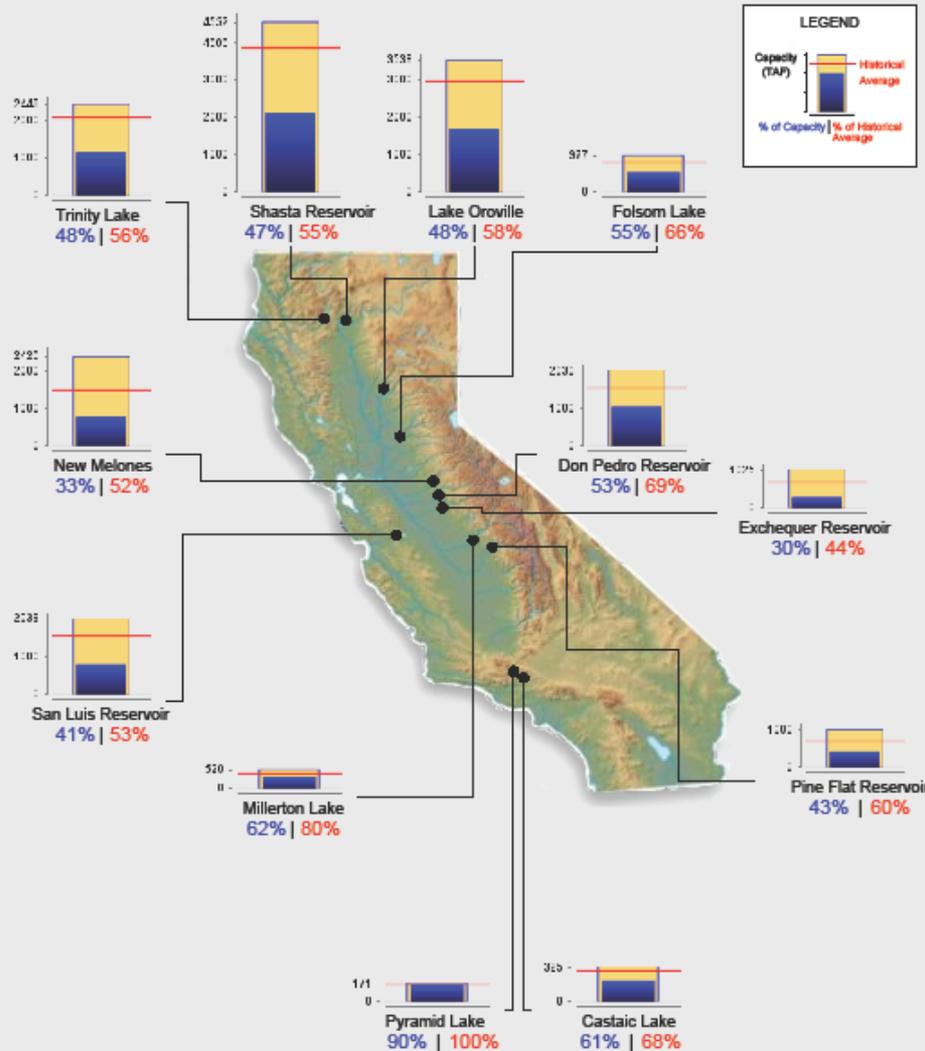
	1991	2009	2014
SWP	30% / 0%	40%	5%
SWP water rts	50%	100%	100%
CVP N of Delta Ag	25%	40%	0
CVP S of Delta Ag	25%	10%	0
Friant	100%	100%	0
CVP Sac water rts	75%	100%	75%
CVP SJ water rts	75%	100%	65%



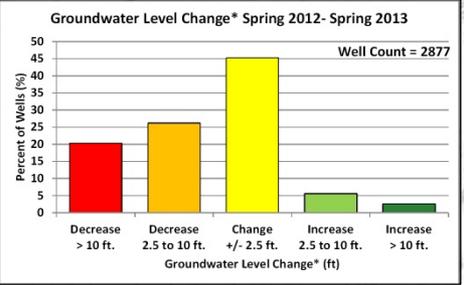
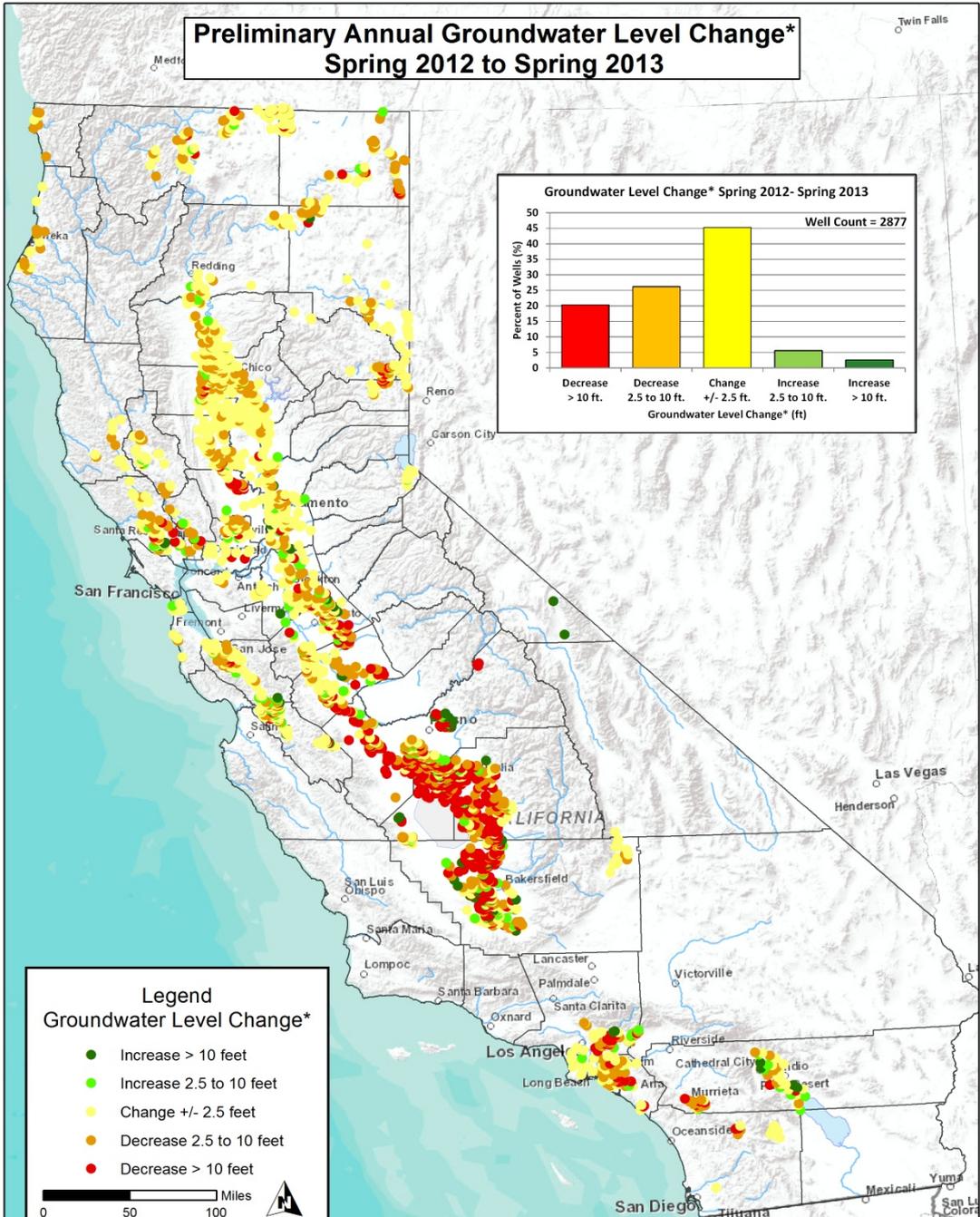
# Reservoir Conditions

Ending At Midnight - June 3, 2014

## CURRENT RESERVOIR CONDITIONS



# Preliminary Annual Groundwater Level Change\* Spring 2012 to Spring 2013



### Legend Groundwater Level Change\*

- Increase > 10 feet
- Increase 2.5 to 10 feet
- Change +/- 2.5 feet
- Decrease 2.5 to 10 feet
- Decrease > 10 feet

0 50 100 Miles

\*Groundwater level change determined from water level measurements in wells. Prepared June 17th, 2013. ESRI, NAVTEQ, DeLorme

State of California The Resources

Agency Department of Water

Resources

**Public Update for Drought Response Groundwater Basins  
with Potential Water Shortages and Gaps in  
Groundwater Monitoring**



**April 2014**

Edmund Brown Jr.  
Governor  
State of California

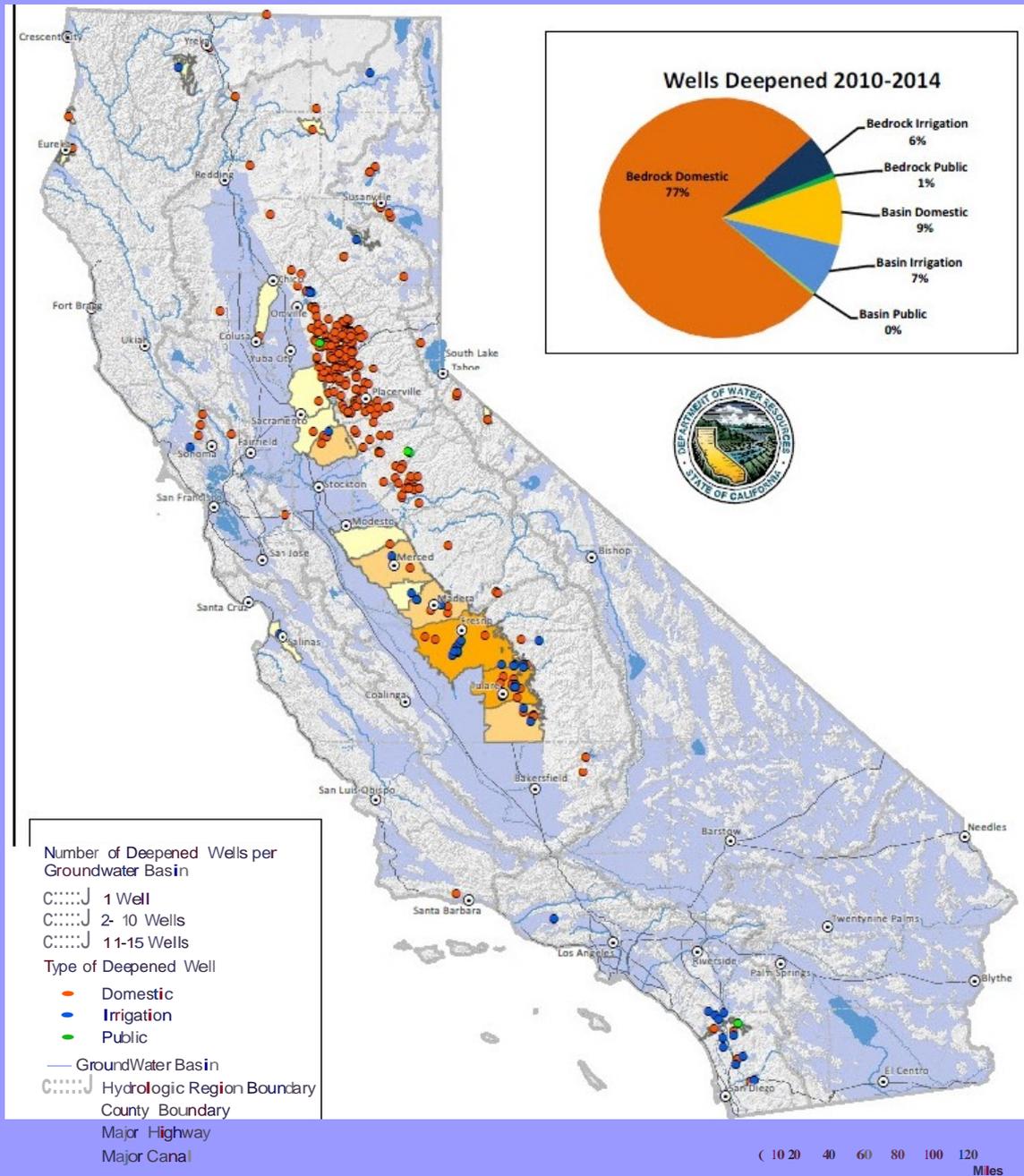
John Laird  
Secretary for Resources  
The Resources Agency

Mark W. Cowin  
Director  
Department of Water  
Resources

# A Few Report Highlights

- Since spring 2008, groundwater levels have experienced all-time historical lows in most areas of the state
- In many areas of the SJV, groundwater levels are more than 100 feet below previous historical lows
- Of California's 515 alluvial groundwater basins, 169 are fully or partly monitored under CASGEM; 40 of the 126 high and medium priority basins are not monitored
- The greatest concentration of recently deepened wells is the fractured rock foothill areas of Nevada, Placer, & El Dorado Counties

Figure 4 - Water Wells Deepened 2010-2014



# California Groundwater Basins

Preliminary Subject to Change



**Hydrologic Study Area**

- Hydrologic Study Area
- Groundwater Basin

**Hydrologic Study Areas**

- CC - Central Coastal
- CD - Colorado Desert
- NC - North Coastal
- NL - North Lahontan
- SB - Sacramento Basin
- SC - South Coastal
- SF - San Francisco
- SJ - San Joaquin Basin
- SL - South Lahontan



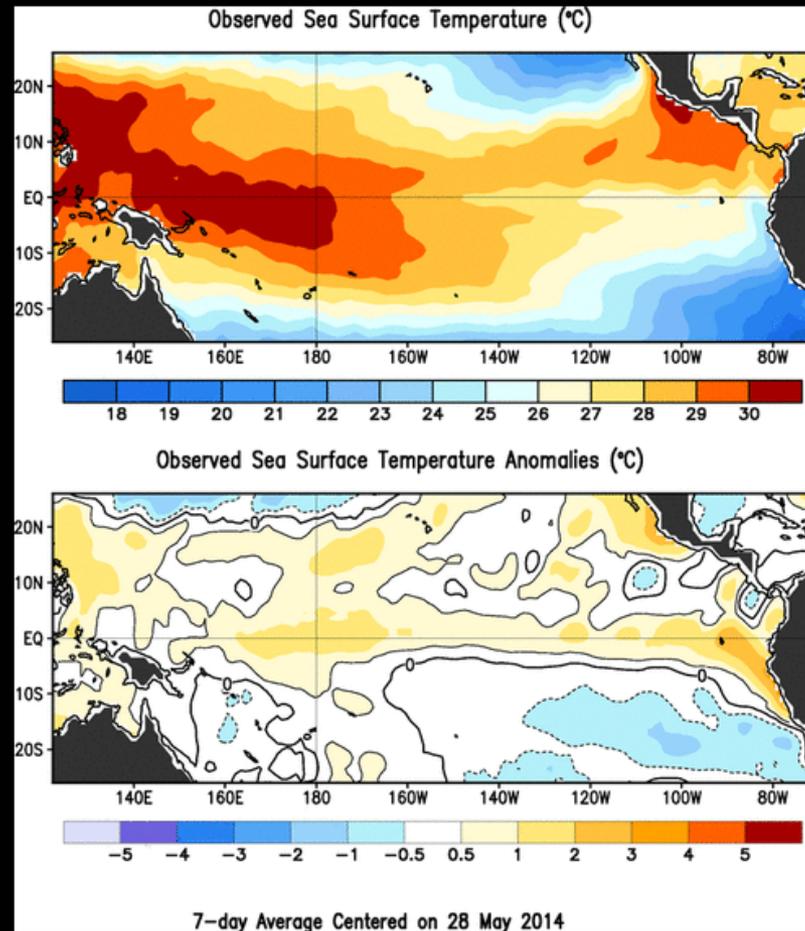
# One of DWR's Taskings in April 2014

## Proclamation

- 11. The Department of Water Resources will conduct intensive outreach and provide technical assistance to local agencies in order to increase groundwater monitoring in areas where the drought has significant impacts, and develop updated contour maps where new data becomes available in order to more accurately capture changing groundwater levels. The Department will provide a public update by November 30 that identifies groundwater basins with water shortages, details remaining gaps in groundwater monitoring, and updates its monitoring of land subsidence and agricultural land following.
  - CASGEM groundwater level monitoring
  - NASA land subsidence contract
  - NASA land following monitoring

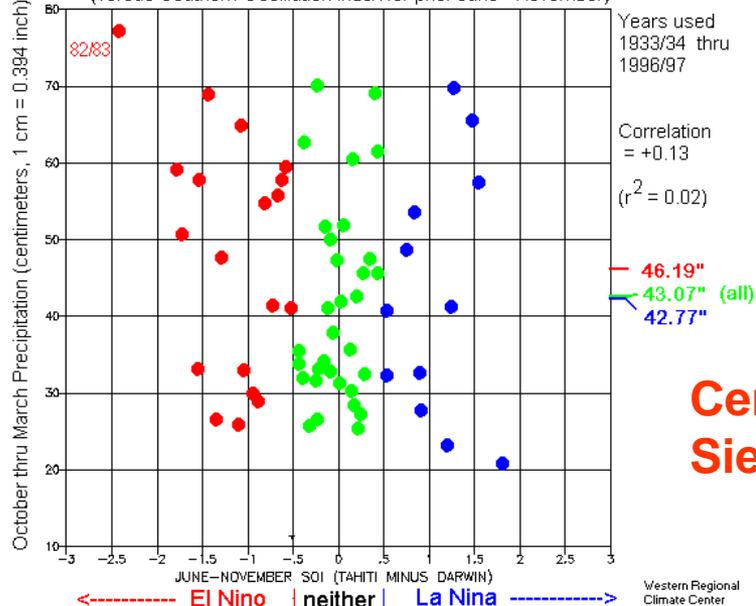
Do past big droughts share common climate characteristics?

(And can we infer anything about WY 2015 prospects?)



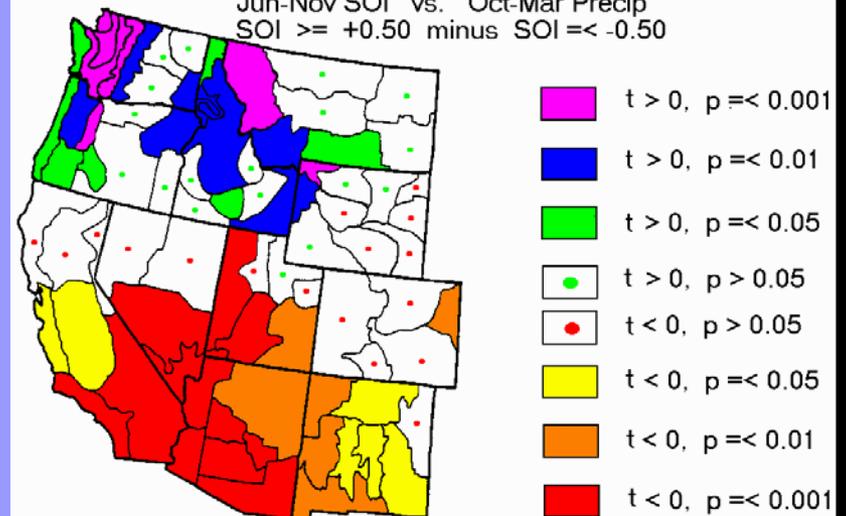
# ENSO & Precipitation Correlation (courtesy of Kelly Redmond, DRI)

**California 8-Station Index October thru March Precipitation**  
(versus Southern Oscillation Index for prior June - November)



**Central  
Sierra**

Split Samples:  
Jun-Nov SOI vs. Oct-Mar Precip  
SOI  $\geq +0.50$  minus SOI  $\leq -0.50$



Updated from Redmond and Koch (1991). Winters of 1933/34 - 1994/95.  
Reddish: Composite El Nino winters are wet, La Nina winters are dry.  
Bluish/greenish: Composite El Nino winters are dry, La Nina winters are wet.

**Redmond & Koch,  
1991, updated.**

Redmond, K.T., and R.W. Koch, 1991. Surface climate and streamflow variability in the western United States and their relationship to large-scale circulation indices. *Water Resources Research*, 27(9), 2381-2399.

# What Does it Take to End a Drought?

