Drought and ENSO Monitoring
Current conditions and Outlook

Climate 2014-15

October 16, 2014

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NWS San Diego

Orange County
San Bernardino County
Riverside County
San Diego County

Lake Hodges
Drought Expansion through 2014

July 2012
July 2013
August 2014
NOW
Drought Status

D4
D3
D2
D1

Intensity:
- D0 - Abnormally Dry
- D1 - Moderate Drought
- D2 - Severe Drought

- D3 - Extreme Drought
- D4 - Exceptional Drought

Short and Long Term Drought
Drought Change past year

April 1, 2014 compared to April 2, 2013
January to September 2014
Record Warmest

California - Mean Temperature
January-September 2014 Percentile

WestWide Drought Tracker - WRCC/UI Data Source - PRISM (Prelim), created 11 OCT 2014
# Average Temperature Since January 2014

As of September 26, 2014 rankings in red

<table>
<thead>
<tr>
<th>Location</th>
<th>Temperature Ranking</th>
<th>Next Warmest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riverside (Fire stn)</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; – 72.0 - 2006</td>
<td>70.8 - 2014</td>
</tr>
<tr>
<td>San Diego (SAN)**</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; – 68.9 - 1984</td>
<td>68.3 – 1981, 67.9 - 2014</td>
</tr>
<tr>
<td>Santa Ana (Fire stn)</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; – 70.0</td>
<td>68.4 - 1984</td>
</tr>
<tr>
<td>Anaheim</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; – 70.9</td>
<td>69.6 - 2006</td>
</tr>
<tr>
<td>Big Bear</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; – 52.3*</td>
<td>52.0 – 1996 and 2002</td>
</tr>
<tr>
<td>Idyllwild</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; – 60.0***</td>
<td>58.1 - 2002</td>
</tr>
<tr>
<td>Palm Springs</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; – 80.3 – 2006</td>
<td>79.7 - 2014</td>
</tr>
<tr>
<td>El Cajon (1979)</td>
<td>69.0 – 1996</td>
<td>68.2 - 2014</td>
</tr>
<tr>
<td>Chula Vista</td>
<td>67.1</td>
<td>66.8 - 1992</td>
</tr>
<tr>
<td>Palomar Mtn</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; – 61.4 – 1981</td>
<td>61.2 - 2007 and 2014</td>
</tr>
<tr>
<td>Victorville</td>
<td>68.0 – 1994 and 2007</td>
<td>67.9 - 2014</td>
</tr>
</tbody>
</table>

- *Warmest minimum temperature at 39.0 for 2014 (37.0 in 1996)
- ** MaxT 73.8 (3<sup>rd</sup>) and MinT 62.2 (3<sup>rd</sup>)
- *** Idyllwild missing days in 1944-5 and 1952
California average temperature
January to September

California, Average Temperature, January-September

1901-2000
Avg: 59.6°F

<table>
<thead>
<tr>
<th>DATES</th>
<th>VALUE</th>
<th>RANK</th>
<th>ANOMALY (59.6°F) 1901-2000 BASE PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>201401 - 201409</td>
<td>63.7°F</td>
<td>120</td>
<td>4.1°F</td>
</tr>
<tr>
<td>193401 - 193409</td>
<td>62.4°F</td>
<td>119</td>
<td>2.8°F</td>
</tr>
<tr>
<td>199201 - 199209</td>
<td>62.1°F</td>
<td>118</td>
<td>2.5°F</td>
</tr>
</tbody>
</table>
Warm coastal waters
high humidity and warmer night temps

2 to 5°F above normal

9-3-2014
2nd warmest Global Ocean (January to August 2014)
1st warmest Ocean for Northern Hemisphere
3rd warmest Global Ocean and Land

Land & Ocean Temperature Departure from Average Jan–Aug 2014
(with respect to a 1981–2010 base period)
Data Source: GHCN–M version 3.2.2 & ERSST version 3b

135 years records
Precipitation Ranking Past Year
2013-14
October to September 2014 Precipitation Ranking

California - Precipitation
October-September 2014 Percentile

West Wide Drought Tracker - WRCC/UI Data Source - PRISM (Prelim), created 11 OCT 2014
California Precipitation Past year and past 36 months

California, Precipitation, October-September

California, Precipitation, 36-Month Period Ending in September

<table>
<thead>
<tr>
<th>DATES</th>
<th>VALUE</th>
<th>RANK</th>
<th>ANOMALY (22.45&quot;) 1901-2000 BASE PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>189510 - 189609</td>
<td>24.73&quot;</td>
<td>80</td>
<td>2.28&quot;</td>
</tr>
<tr>
<td>189610 - 189709</td>
<td>25.17&quot;</td>
<td>86</td>
<td>2.72&quot;</td>
</tr>
<tr>
<td>189710 - 189809</td>
<td>15.16&quot;</td>
<td>10</td>
<td>-7.29&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DATES</th>
<th>VALUE</th>
<th>RANK</th>
<th>ANOMALY (67.32&quot;) 1901-2000 BASE PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>201110 - 201409</td>
<td>45.88&quot;</td>
<td>1</td>
<td>-21.44&quot;</td>
</tr>
<tr>
<td>197410 - 197709</td>
<td>47.58&quot;</td>
<td>2</td>
<td>-19.74&quot;</td>
</tr>
<tr>
<td>192810 - 193109</td>
<td>47.86&quot;</td>
<td>3</td>
<td>-19.46&quot;</td>
</tr>
</tbody>
</table>
Statewide Rankings
past 36 and 24 months

California Precipitation Rankings as of July 2014

**Record Driest**

<table>
<thead>
<tr>
<th>PERIOD</th>
<th>PRECIP</th>
<th>20TH CENTURY AVERAGE</th>
<th>DEPARTURE</th>
<th>RANK</th>
<th>WETTEST/DRIEST SINCE</th>
<th>RECORD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug 2011 - Jul 2014</td>
<td>45.03&quot;</td>
<td>67.31&quot;</td>
<td>-22.28&quot;</td>
<td>1st Driest</td>
<td>Driest to Date</td>
<td>2014</td>
</tr>
<tr>
<td>36-month period</td>
<td>(1,143.76 mm)</td>
<td>(1,709.67 mm)</td>
<td>(-565.91 mm)</td>
<td>117th Wettest</td>
<td>Wettest since: 2013</td>
<td>1981</td>
</tr>
</tbody>
</table>

**24 month 2nd Driest**

<table>
<thead>
<tr>
<th>PERIOD</th>
<th>PRECIP</th>
<th>20TH CENTURY AVERAGE</th>
<th>DEPARTURE</th>
<th>RANK</th>
<th>WETTEST/DRIEST SINCE</th>
<th>RECORD</th>
</tr>
</thead>
<tbody>
<tr>
<td>24-month period</td>
<td>(726.69 mm)</td>
<td>(1,140.46 mm)</td>
<td>(-413.77 mm)</td>
<td>117th Wettest</td>
<td>Wettest since: 2013</td>
<td>1983</td>
</tr>
</tbody>
</table>
### 3 year precipitation since January 2011

<table>
<thead>
<tr>
<th>Station</th>
<th>3 year precipitation</th>
<th>3 year deficit</th>
<th>Lost precipitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Diego (SAN)</td>
<td>24.19 inches</td>
<td>14.74 inches</td>
<td>1 ½ season of precip</td>
</tr>
<tr>
<td>Santa Ana (Fire stn)</td>
<td>23.96 inches</td>
<td>23.68 inches</td>
<td>2 seasons of precip</td>
</tr>
<tr>
<td>Riverside (Fire stn)</td>
<td>21.28 inches</td>
<td>15.63 inches</td>
<td>1 ½ season of precip</td>
</tr>
<tr>
<td>Palomar Mtn</td>
<td>74.84 inches</td>
<td>23.84 inches</td>
<td>1 season of precip</td>
</tr>
<tr>
<td>Idyllwild</td>
<td>65.64 inches</td>
<td>23.31 inches</td>
<td>1 season of precip</td>
</tr>
<tr>
<td>Palm Springs</td>
<td>9.39 inches</td>
<td>9.74 inches</td>
<td>2 season of precip</td>
</tr>
</tbody>
</table>
Past 36 months ending August
Precipitation Index

California - 36 month SPI
August 2014
### Longest Driest Period

#### San Diego

<table>
<thead>
<tr>
<th>Value</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>24.19</td>
<td>Jan 2011 to Sep 1, 2014</td>
</tr>
<tr>
<td>24.23</td>
<td>Jan 1953 to Dec 31, 1956</td>
</tr>
<tr>
<td>24.93</td>
<td>Jan 1959 to Dec 31, 1962</td>
</tr>
<tr>
<td>25.03</td>
<td>Jan 1999 to Dec 31, 2002</td>
</tr>
<tr>
<td>27.13</td>
<td>Jan 2006 to Dec 31, 2009</td>
</tr>
<tr>
<td>7.11</td>
<td>Jan 2007 to Dec 31, 2010</td>
</tr>
<tr>
<td>20.26</td>
<td>Jan 2011 to Sep 1, 2014</td>
</tr>
</tbody>
</table>

#### Riverside

<table>
<thead>
<tr>
<th>Value</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>20.26</td>
<td>Jan 2011 to Sep 1, 2014</td>
</tr>
</tbody>
</table>

#### Santa Ana

<table>
<thead>
<tr>
<th>Value</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>23.96</td>
<td>Jan 2011 to Sep 1, 2014</td>
</tr>
<tr>
<td>31.71</td>
<td>Jan 1987 to Dec 31, 1990</td>
</tr>
</tbody>
</table>
Departure from Normal Weather Pattern (storm track)

Blocking Semi-permanent upper level high pressure

October 2013 to April 2014
Energy Release Component

SIG - South Coast
1973 - 2013

May 14
Sept 1

97%
90%

3 Day Periods

Model: 7G
6945 Wx Observations
FF+4 0.2 05/26/2014-09:48

Energy Release Component

Burn Scar
View from Escondido, start of San Marcos Cocos
Record Energy Release and Driest 100 hour dead fuels
Snowpack 2014

Lake Tahoe Donner Summit
January 5, 2014

Big Bear
February 2014
Snow pack in the Sierra Nevada

Snow Water Equivalent – Percent of Average

Northern – 0 to 5%
Central – 2 to 7%
Southern – 2 to 7%

Percent of Average

May 2014
Late Season Precipitation

Northern Sierra Precipitation: 8-Station Index, May 27, 2014

Percent of Average for this Date: 61%

1982-1983 (wettest) 88.5

2012-13

2014

50 average

Average (1922-1998) 50.0

28.8 - Current Daily Precip.

1976-77

19.0

Water Year (October 1 - September 30)

Cumulative Daily/Monthly Precipitation (inches)

Total Water Year Precipitation
Water Supply

Oroville Dam - DWR

Folsom Lake (18 percent full)
Surface Drinking Water Sources for the State of California

Map produced for The Nature Conservancy (TNC) 2012. TNC uses the most current and complete data available. GIS data and product accuracy may vary.

Areas delineated as having "No known protection" may include water district lands and easements on private lands.

Using GIS products for purposes other than those for which they were intended may yield inaccurate or misleading results.

Sources: Protected Areas Database of the U.S. 2010, USGS National Hydrography Dataset, National Land Cover Database 2006, TNC inferred and the website(s) of the utilities provider(s).

The Nature Conservancy
Protecting nature. Preserving life.
NOTE: Figures reflect reported conditions as of Oct. 1, 2014.
Reservoir Storage

15 million acre feet
57% of average
1977 had 9.7 million acre feet
1992 had 15.7 million acre feet

25 to 35% capacity
This summer percent of normal
July 1 to September 30, 2014
View of ENSO El Nino and Outlook

What strength is forecast?

Neutral

El Nino
El Nino composite (what does it mean)
more of a consolidated elongated Pacific Jet
Niño Region SST Departures (°C) Recent Evolution

The latest weekly SST departures are:

- Niño 4: 0.5°C
- Niño 3.4: 0.3°C
- Niño 3: 0.5°C
- Niño 1+2: 1.1°C
During the last four weeks, equatorial SSTs were above average across most of the Pacific.
Sub-Surface Temperature Departures in the Equatorial Pacific

The downwelling phase of a Kelvin wave emerged in mid August 2014, as reflected by the eastward shift of positive temperature anomalies.

Positive subsurface anomalies are evident across most of the Pacific, except for a small region of negative anomalies in the eastern Pacific.
The CFS.v2 ensemble mean (black dashed line) predicts El Niño starting around October-December 2014 and lasting through early 2015.
ENSO forecast

Yellow Line is Average

El Nino/ Warm SST

IRI/CPC

strong

weak
Departure from Normal Weather Pattern (storm track)

Blocking Semi-permanent upper level high pressure

October 2013 to April 2014 (red)

October 2014 to April 2015 (yellow)?
Past Years

Does El Nino mean wet weather and drought relief?

• Would need 150 percent of normal precipitation in the Sierra Nevada for “drought buster”

• Past El Nino seasons have resulted in variable precipitation
Similar El Niño but different result

October to April precipitation

Precipitation Anomalies (inches)
Oct to Apr 2004-05
Versus 1981-2010 Longterm Average

Precipitation Anomalies (inches)
Oct to Apr 2006-07
Versus 1981-2010 Longterm Average
Similar El Nino but different result

October to April precipitation

0.8 ONI 0.8

Precipitation Anomalies (inches)
Oct to Apr 1976–77
Versus 1981–2010 Longterm Average

Precipitation Anomalies (inches)
Oct to Apr 1977–78
Versus 1981–2010 Longterm Average

Dry 1976-77

Wet 1977-78
Precipitation and Temperature outlook December to February 2015

Precipitation Outlook

Temperature Outlook

Winter Outlook
Proposed Zone Changes

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Community Preparedness

Alex Tardy
Community Preparedness

- County
- Cities
- Private
- University
- Schools and Districts
- Utilities

Prepare Now

Take Action
Strengthening Partnerships

**WRN Ambassador Initiative**

How can organizations be a part of and contribute toward building a Weather-Ready Nation?

- All levels of government
- Weather, Water, Climate Enterprise
- Academia
- Businesses & non-profits

Formal recognition of organizations that work with NOAA toward building a Weather-Ready Nation

- Promote WRN messages and themes
- Engage with NOAA on potential collaborations
- Share success stories
- Serve as an “Example”

Visit: [www.noaa.gov/wrn](http://www.noaa.gov/wrn)
Monitor Hazards

http://www.wrh.noaa.gov/wrh/whv/?wfo=SGX
(all graphical hazards)

visit http://weather.gov/sandiego

for WATCHES, ADVISORIES and WARNINGS

Links

Alex Tardy
Warning Coordination Meteorologist

Monitor Hazards

http://www.wrh.noaa.gov/wrh/whv/?wfo=SGX
(all graphical hazards)

http://preview.weather.gov/edd/
http://preview.weather.gov/graphical/

NEW

Monitor weather

http://www.wrh.noaa.gov/sgx/gmap/index.php

http://www.weather.gov/forecasts/wfo/sectors/sgx.php (digital forecast graphics)

visit http://weather.gov/sandiego

for WATCHES, ADVISORIES and WARNINGS