

California Monthly Climate Summary
December 2010

Weather Highlights

December 2010 was a warm, wet, record setting month in California. According to the Western Region Climate Center's [California Climate Tracker](#), the monthly average temperature was 44.1°F which is 2.3°F higher than the long-term average of 41.8°F. With a statewide average of 8.37 inches, precipitation for December was 214% of the long term average. For the year 2010, precipitation was 137% of average with all regions reporting above average precipitation. Calendar year summary plots from the Western Region Climate Center's California Climate Tracker are included at the back of the summary.

December 2010 started cool and dry with the presence of high pressure off-shore and a cool air mass over the State. By the end of the week, things changed as a stalled weak front intensified with the arrival of a low pressure system bringing widespread rain and mountain snow. Week two started with the continuation of heavy precipitation as the low pressure system moved across the state. High pressure centered off of Baja California built northward bringing dry warm conditions to the southern part of the State while minor weather disturbances continued shower activity over the northern part of the State. By the end of the week the high pressure system had covered the state trapping cool, moist air in the Central Valley resulting in foggy conditions. The third week began with another low pressure system arriving off-shore of Northern California bringing occasional shower activity while warm dry conditions persisted in Southern California. By the end of the week, a series of strong storm systems pushed into the state bringing heavy rainfall and heavy mountain snowfall. The storms extended into Southern California bringing heavy rainfall that resulted in flooding and mudslides. In the course of a week, many sites in Southern California established new precipitation records for the month of December. Some of the totals surpassed 50% of the expected annual rainfall. Such wet conditions are unusual in light of the current La Niña conditions in the tropical Pacific. High pressure finally built into Southern California to provide a dry and mild Christmas. A new storm moved into Northern California on Christmas day bringing widespread showers. The year ended with a weak ridge off of Southern California and a fast-moving storm hitting Northern California. The heaviest rains were on the North Coast with moderate precipitation reaching the interior portions of the State. Southern California experienced strong winds and off-shore flow.

Preliminary records, reported on the National Weather Service Record Event Report, shows that statewide there were 56 temperature records tied or broken and 45 precipitation records tied or broken for the month. Of the 56 temperature records, 33 were for new high maximum temperatures. Records were set over 20 days of the month. For calendar year 2010, 214 days were record setters. A chart of monthly precipitation and temperature records for 2010 is shown at the end of the summary. Precipitation records were the story for December as several locations in the state set new records for wetness in December. Bakersfield set its record one-day precipitation

total for December on the 18th when 1.37 inches of rain fell. The old record was 1.02 inches set back on December 27th, 1936. The old December 18th record of 0.30 inches was set back in 1921. By December 22nd, Bakersfield had set a new all-time December record for precipitation with 4.95 inches. The old record was 2.98 inches set back in 1931. By December 25th, December 2010 set the record for wettest month ever passing February 1998's 5.36 inches with a reading of 5.37 inches. In Southern California, 5 sites had set new all-time records for December precipitation by the 23rd. The new records and old records and dates are shown in the table below.

LOCATION	DEC 2010 RAIN	PREVIOUS WETTEST DEC/YEAR
LOS ANGELES AIRPORT	7.68	6.49/2004
LONG BEACH AIRPORT	8.91	5.29/1971
CAMARILLO AIRPORT	6.01	5.32/1964
SANTA BARBARA AIRPORT	8.59	6.78/1945
SANTA MARIA AIRPORT	8.24	7.50/1941

On the east side of the Sierra, Bishop set a new daily rainfall record on the 19th when 3.32 inches of rain fell. The old record was 0.15 inches set back in 1987. For the month Bishop recorded 5.36 inches which rates as the second wettest December since records began in 1943. The wettest December was in 1966 when 5.79 inches fell. On the 22nd, Needles set a new rainfall record for the day with 1.01 inches. The old record was 0.71 set in 1965. Needles ended up with the third wettest December on record since 1948 with 1.10 inches. The wettest December in Needles was in 1994 when 1.34 inches fell.

For the California Data Exchange Center's (CDEC) network of temperature gages used in this report, 222 stations recorded a minimum temperature below freezing in December while no stations reached or exceeded 100°F at least once during the month. Statewide extremes from the CDEC network of temperature gages are shown below. Also shown are the monthly average extremes from the CIMIS network. A table of regional average minimum, mean, and maximum temperatures from the CDEC network is also shown at the end of the summary.

Precipitation in December was abundant across the State. For the CDEC precipitation gages for December 2010, the largest amount of precipitation recorded was Bowman on the Yuba River with 32.52 inches. This is 296% of the average precipitation for this station for December. At the other end of the spectrum, Imperial Valley recorded 0.47 inches for the month. For the CIMIS network, Lake Arrowhead in San Bernardino County topped the precipitation charts with 16.13 inches for the month and 8 stations recorded no precipitation. Some CIMIS gages may show large precipitation totals if the gages are not covered during irrigation activities so care should be given to review precipitation data used from this network. The 8-Station Index for northern California precipitation recorded 16.8 inches in December with 28 days showing precipitation. On average, 8.9 inches of precipitation is recorded for the 8-Station index in December. Statewide, the average precipitation for December was 242% of the long-

term average based on the California Data Exchange Center (CDEC) gages. The water year to date average is 202%. Precipitation percentages by region from the CDEC gages are shown in a table at the end of this document. Plots of percent of average precipitation for water year to date and the past calendar year from Western Region Climate Center's Applied Climate Information System are also shown at the end of the document.

CoCoRaHS Update

CoCoRaHS – the Community Collaborative Rain, Hail and Snow Network is now in its third year of operation in California. This group uses citizen volunteers to record rain, hail and snow data. The users enter the data online at the CoCoRaHS web site. The web site provides the opportunity to see spatial detail of rain and snow patterns in participating states. California now has more than 756 volunteers signed up spanning 53 of California's 58 counties. The county with the most volunteers at the end of December is Sonoma with 86 volunteers. For the month of December 10,586 reports were recorded for California. The largest daily rain total for CoCoRaHS- CA in December was in San Bernardino County with 7.88 inches recorded on 12/20/10. Sixteen hail reports were submitted in December with sizes ranging from rice to 3/8th inch. One hundred thirty-eight snow reports were included with the precipitation reports. To join CoCoRaHS or find more information, please visit <http://www.cocorahs.org>.

Snowpack and Water Supply Conditions

Water year 2011 has begun for the water supply index categories. Water year 2010 resulted in a below normal category for the Sacramento Basin and above normal category for the San Joaquin Basin. The first forecast for WY 2011 was made in December with above normal categories for both basins. Water supply information for California can be found at http://cdec.water.ca.gov/water_supply.html. A historical listing of water year categories for both basins can be found at <http://cdec.water.ca.gov/cgi-progs/iodir/WSIHIST>.

Drought Monitor and Seasonal Outlook

December saw further improvements in the depiction of California's drought in the Drought Monitor. The maps for California for November 23, 2010 and December 28, 2010 are shown below. The Drought Monitor maps can be found on the National Drought Mitigation Center's (NDMC) website <http://drought.unl.edu/dm/>. These maps are largely a reflection of precipitation and soil moisture deficit estimates. As of the December 28th depiction, the entire state of California is depicted as either drought free or in D0 (abnormally dry) conditions. Drought free area in California remained at 98.6%. Maps are updated weekly.

The U.S. Seasonal Drought Outlook for January through March from NOAA depicts California with no drought conditions expected. Updates are provided twice per

month. Maps and information can be found at http://www.cpc.noaa.gov/products/expert_assessment/seasonal_drought.html.

ENSO Conditions and Long-Range Outlooks

The El Niño/Southern Oscillation (ENSO) is being classified as a La Niña pattern. Equatorial sea surface temperature anomalies for the tropical Pacific for December have been negative with values of -1.5°C in the Niño 3.4. The October through December 3-month running mean of the Ocean Niño Index (ONI) is -1.4 which is the fifth ONI value exceeding the threshold to qualify for a La Niña event. For conditions to be classified as a La Niña event, five consecutive ONI values need to be less than the threshold value of -0.5. Most forecast models have the tropical sea surface temperatures remaining in La Niña conditions through the early part of 2011. More information can be found at the Climate Prediction Center's web site:

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/

Updates are posted weekly. The latest three month outlook (January through March) from NOAA indicates below normal temperatures for most of the state of California with the exception of the Southeast region which is expected to have above normal temperatures. For precipitation, the far north of the state is forecast to have above normal conditions, below normal conditions south of the latitude of San Luis Obispo, and equal chances for above or below normal precipitation elsewhere. Outlook plots and discussions can be found at <http://www.wrcc.dri.edu/longrang/>. General weather information of interest can be found at <http://www.noaawatch.gov/>. For anomaly information please see http://www.wrcc.dri.edu/anom/cal_anom.html.

Agricultural Data

December saw some harvests continue, winter crops planted and field maintenance take place. Fruit and nut orchards were pruned as weather conditions allowed. Winter grain crops developed nicely with good soil conditions. Citrus harvest continued with some slowing due to the rains. Potatoes and carrots were harvested in Kern County. Winter vegetable crops were planted with some slowing due to wet field conditions. Rangeland conditions continue to improve with the moisture conditions from recent rains. Supplemental feeding was reduced as rangeland conditions improved. Lambing and calving continued. At the end of the month beehives were moved to their winter staging areas. For further crop information see

<http://www.nass.usda.gov/index.asp>.

Other Climate Summaries

[California Climate Tracker](#) (new product of Western Region Climate Center)

[Golden Gate Weather Service Climate Summary](#)

[NOAA Monthly State of the Climate Report](#)

Statewide Extremes (CDEC)

High Temperature – 90°F (Malibu Canyon, South Coast)

Low Temperature – -17°F (Charlotte Lakes, Tulare)

High Precipitation – 32.52 inches (Bowman, Sacramento Basin)

Low Precipitation – 0.47 inches (Imperial Valley, Colorado River Desert)

Statewide Extremes (CIMIS)

High Average Maximum Temperature – 78.3⁰F (Long Beach, Los Angeles County)

Low Average Minimum Temperature – 23.5⁰F (Big Bear Lake, San Bernardino County)

High Precipitation – 16.13 inches (Lake Arrowhead, San Bernardino County)*

Low Precipitation – 0 inches (8 stations)

*Sometimes irrigation water from sprinklers gets counted as precipitation if the gage is not covered.

Statewide Precipitation Statistics

Hydrologic Region	Region Weight	Basin Reporting			Stations Reporting			% of Historic Average	
		Basins	Dec	Oct-Dec	Stations	Dec	Oct-Dec	Dec	Oct-Dec
North Coast	0.27	5	5	5	17	13	12	138.0%	138%
SF Bay	0.03	2	2	2	6	5	4	170.7%	167%
Central Coast	0.06	3	3	3	11	5	4	234.4%	196%
South Coast	0.06	3	3	3	14	12	11	391.7%	291%
Sacramento River	0.26	5	5	5	41	30	28	193.3%	174%
San Joaquin River	0.12	6	6	6	24	18	17	241.8%	220%
Tulare Lake	0.07	5	5	5	28	25	25	351.7%	265%
North Lahontan	0.04	3	3	3	13	8	7	254.8%	236%
South Lahontan	0.06	3	3	3	15	5	5	665.2%	392%
Colorado River	0.03	1	1	1	6	3	3	281.0%	239%
Statewide Weighted Average	1	36	36	36	175	124	116	242.4%	202%

Statewide Mean Temperature Data by Hydrologic Region (degrees F)

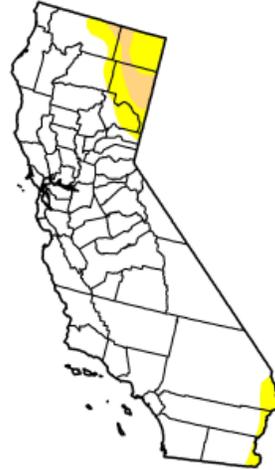
Hydrologic Region	No. Stations	Minimum	Average	Maximum
North Coast	18	22.0	39.8	57.0
SF Bay	8	31.3	46.9	64.0
Central Coast	13	29.1	48.5	74.8
South Coast	50	29.5	51.7	81.0
Sacramento	71	15.9	38.5	58.9
San Joaquin	43	12.4	37.4	63.3
Tulare Lake	14	8.2	35.7	62.7
North Lahontan	26	-0.3	31.0	54.4
South Lahontan	10	6.7	36.1	63.6
Colorado River Desert	5	28.0	54.1	81.2
Statewide Weighted Average	258	17.8	40.2	62.4

U.S. Drought Monitor

California

November 23, 2010
Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	90.1	9.9	2.4	0.0	0.0	0.0
Last Week (11/16/2010 map)	90.1	9.9	4.6	0.2	0.0	0.0
3 Months Ago (08/31/2010 map)	85.4	14.6	8.1	0.2	0.0	0.0
Start of Calendar Year (01/05/2010 map)	6.6	93.4	72.8	9.0	0.0	0.0
Start of Water Year (10/05/2010 map)	85.4	14.6	8.1	0.2	0.0	0.0
One Year Ago (11/24/2009 map)	8.4	91.6	73.6	17.3	0.0	0.0



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D3 Drought - Extreme
- D4 Drought - Exceptional

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

<http://drought.unl.edu/dm>



Released Wednesday, November 24, 2010
Author: M. Brewer, NOAA/NCDC

U.S. Drought Monitor

California

December 28, 2010
Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	98.62	1.38	0.00	0.00	0.00	0.00
Last Week (12/21/2010 map)	94.86	5.14	0.00	0.00	0.00	0.00
3 Months Ago (09/28/2010 map)	85.44	14.56	8.08	0.24	0.00	0.00
Start of Calendar Year (12/29/2009 map)	6.56	93.44	72.16	9.24	0.00	0.00
Start of Water Year (09/28/2010 map)	---	---	---	---	---	---
One Year Ago (12/22/2009 map)	6.56	93.44	72.16	9.24	0.00	0.00



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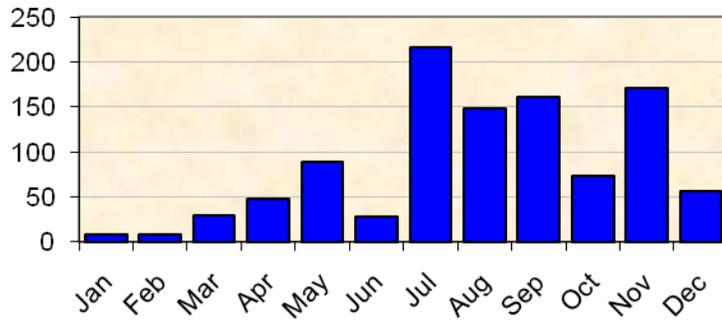
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<http://drought.unl.edu/dm>

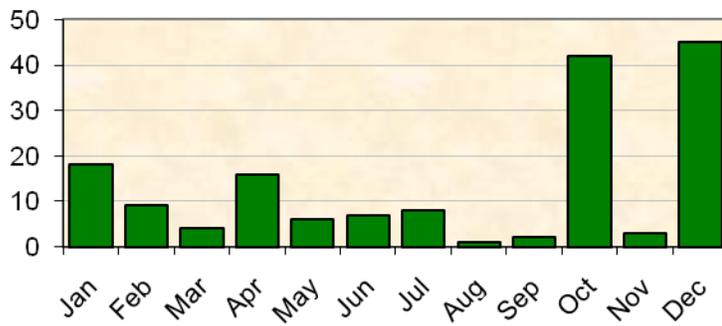


Released Thursday, December 30, 2010
National Drought Mitigation Center

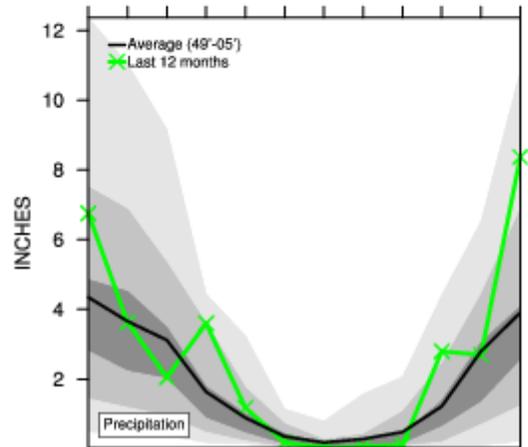
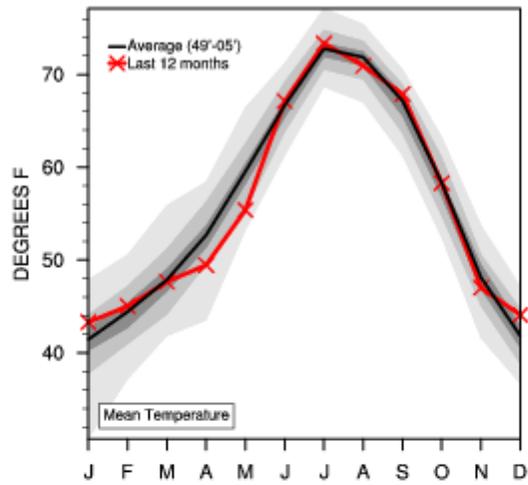
**Temperature Records by Month for
Calendar Year 2010**



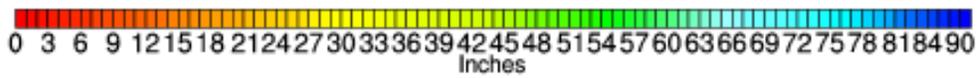
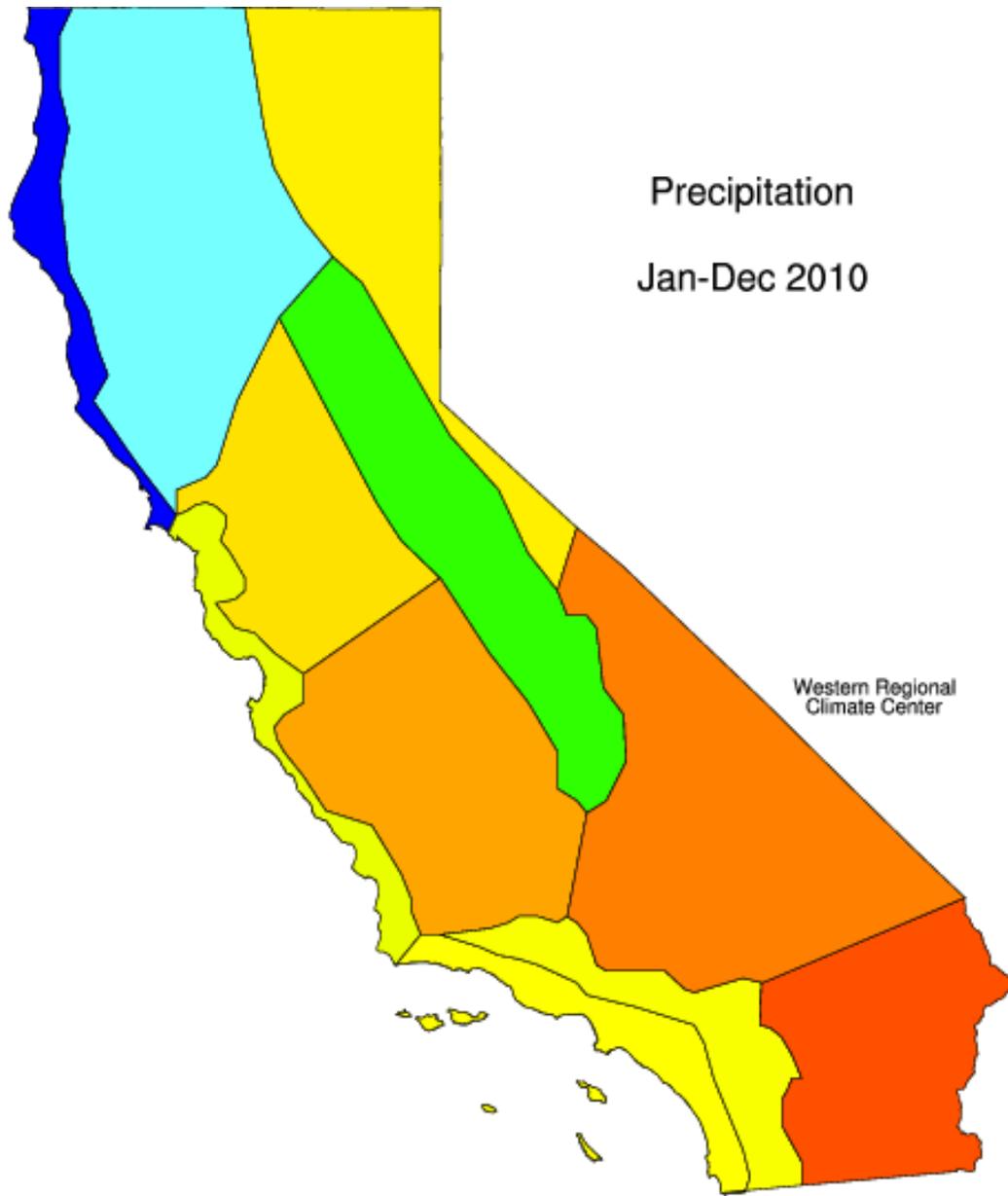
**Precipitation Records by Month for
Calendar Year 2010**

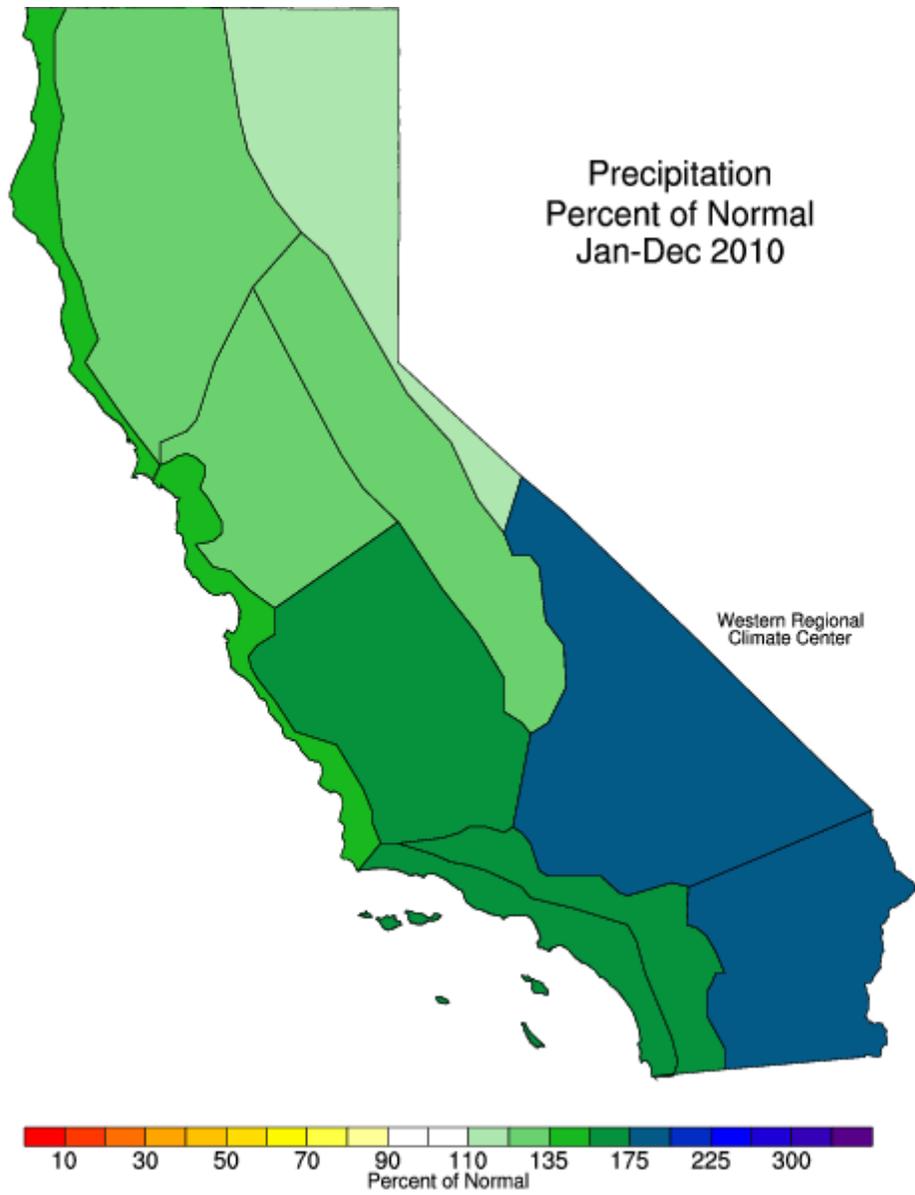


California Statewide Last 12 Months

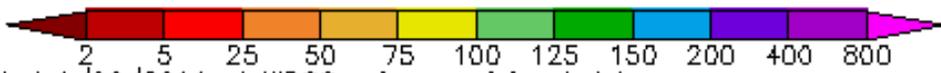
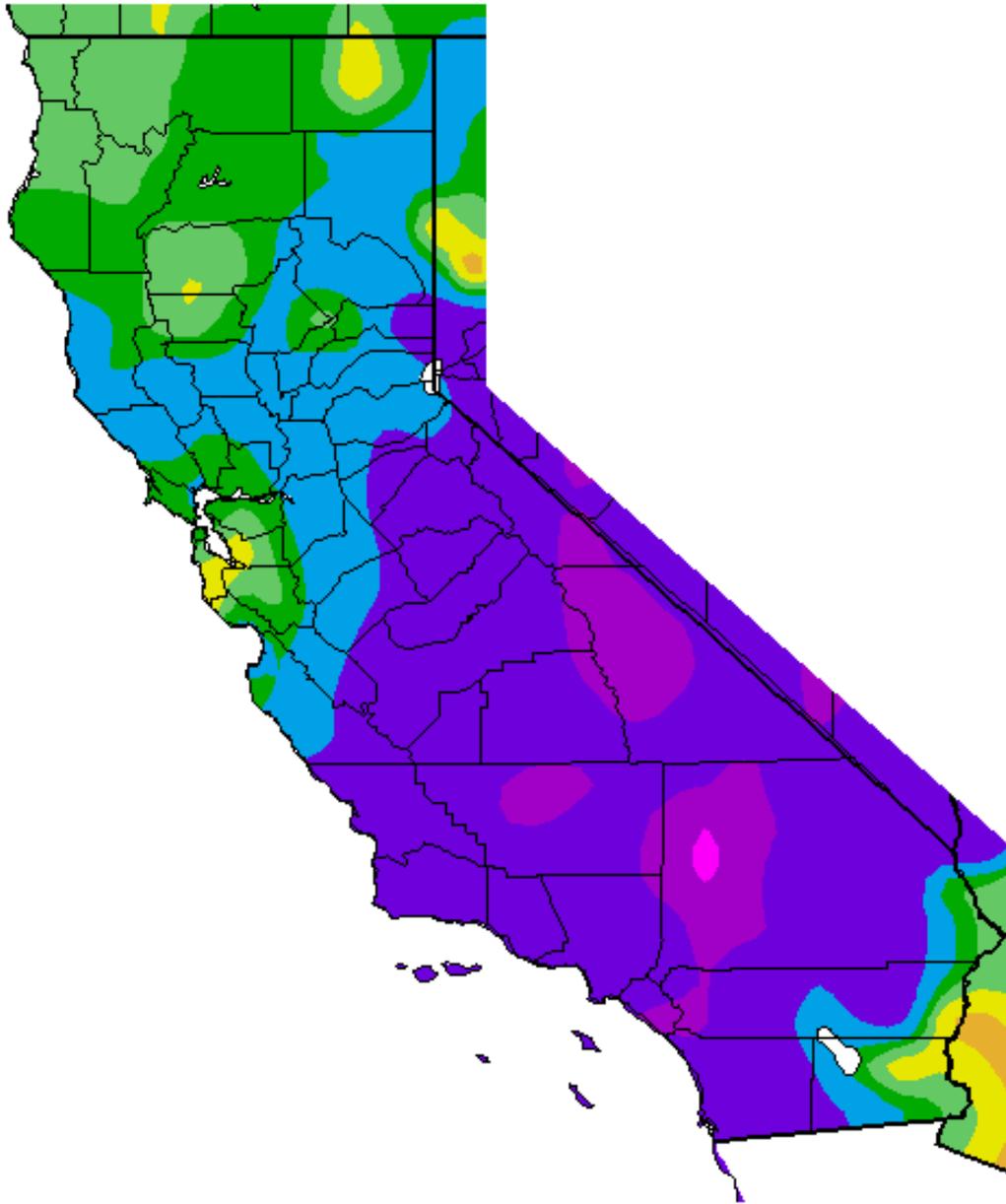


dark shading - 33-66 percentile
 medium shading - 10-90 percentile
 light shading - extremes
 Western Regional Climate Center





Percent of Average Precipitation (%)
10/1/2010 – 1/5/2011



Generated 1/06/2011 at WRCC using provisional data.
NOAA Regional Climate Centers