

California Monthly Climate Summary  
November 2012

**Weather Highlights**

November 2012 was a warm, wet month for California. According to the Western Region Climate Center's [California Climate Tracker](#), the monthly average temperature was 49.9°F which is 1.8°F higher than the long-term average of 48.1°F. This is the first warmer than the 1949-2005 average November in 3 years. With a statewide average of 3.05 inches, precipitation was 108% of average. The majority of this precipitation materialized at the end of the month in an atmospheric river event that hit northern California. Regional plots of mean temperature and precipitation rankings for the month are shown at the end of the report along with plots of the last 12 months of mean temperature and precipitation relative to the historical distribution.

November started with high pressure building in behind a storm system that moved through Northern California on Halloween. Santa Ana wind conditions in Southern California prompted red flag warnings. A cold front pushed over Northern California at the end of the first week bringing light precipitation to the north. A second stronger cold front passed through in the second week of the month bringing snow to the Sierra Nevada and frost to the Valley floor. Temperatures across California were below normal. A severe thunderstorm developed near Fresno on the 17<sup>th</sup> with cloud tops reaching 33,000 feet and producing 0.5 to 0.75 inch hail. The hail zone was 4 miles wide and extended for 30 miles. Over an inch of rain fell in this storm which then decayed as it moved into the Sierra. Alternating high pressure systems and cold fronts continued to pass over the State until the end of the month. November finished with a series of atmospheric river events bringing heavy rainfall to the northern part of the State. River stages rose over 15 feet in some places with flood stage reached on some North Coast Rivers. The main stem of the Sacramento River rose enough to cause wier flow into designated flood bypasses.

Preliminary records, reported on the National Weather Service Record Event Report, show that statewide there were 91 temperature records tied or broken and 9 precipitation records set or tied for the month. The San Diego Weather Forecast Office recorded records on 10 days of the 15 days records were set in California for November 2012. Of the 91 temperature records set, 50 were for new high maximum temperatures and 17 were for new high minimum temperatures. On November 5<sup>th</sup> San Jose set a new high maximum temperature record with a reading of 84°F. The old record of 82°F was set back in 1901. On the same day, the Salinas Airport recorded 96°F for the high temperature which broke the 1934 record of 86°F. Also on November 5<sup>th</sup>, Redding airport reached 87°F which broke the 1898 reading of 86°F. The heat continued on November 6<sup>th</sup> when Salinas Airport tied a 1941 record with a high temperature of 88°F and King City broke its 1941 daily maximum temperature record with a reading of 92°F. The old record was 90°F. On November 11<sup>th</sup>, Paso Robles set a new low minimum temperature record with a reading of 26°F. The old record was 28°F set back in 1948. Camarillo dipped to 36°F on the 11<sup>th</sup> breaking the old low temperature record of 37°F set back in 1950. For precipitation, Crescent City set a new

daily precipitation record on the 29<sup>th</sup> when 4.14 inches of rain fell. This smashed the 1995 record of 2.00 inches.

For the California Data Exchange Center's (CDEC) network of temperature gages used in this report, 203 stations recorded a minimum temperature below freezing while only 1 station 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 stations is also shown at the end of the summary.

Precipitation in November was above average in the northern part of the State and below average in the Southeastern part of the State. For the CDEC precipitation gages, the largest amount of precipitation recorded was at Strawberry Valley in the Sacramento Basin region with 24.54 inches. This is 219% of the average precipitation for this station for the month. At the other end of the spectrum, 7 stations reported zero precipitation for the month. For the CIMIS network, Oakville in Napa County topped the precipitation charts with 10.55 inches for the month and 16 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 13.0 inches in November. On average, 6.0 inches of precipitation is recorded for the 8-Station Index for the month. Statewide, the average precipitation for the month was 124% of the long-term average based on the California Data Exchange Center (CDEC) gages. Precipitation percentages by region from the CDEC gages are shown in a table at the end of this document.

### **CoCoRaHS Update**

November 2012 is part of California's 5<sup>th</sup> year with CoCoRaHS – the Community Collaborative Rain, Hail and Snow Network. 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. A map from November 30<sup>th</sup>, 2012 is shown at the end of the document. Currently, California has 956 volunteers signed up spanning 53 of California's 58 counties. The counties without volunteers are Alpine, Colusa, Glenn, Modoc, and Tuolumne. The county with the most volunteers is Sonoma with 94 volunteers. For the month of November, 10,801 reports were recorded for California. The largest daily rain total for CoCoRaHS- CA for the month was in Sonoma County where 6.82 inches was recorded on 11/30/2012. This was during an atmospheric river event that brought heavy rainfall to the northern part of the State. Forty-two snow reports were filed with the largest daily snowfall of 19 inches reported on 11/10/2012 in Placer County. Four hail reports from three different Counties were entered. Kings County reported hail on 11/9/2012, Shasta County recorded quarter inch sized hail on 11/8/2012, and Humboldt

County recorded rice and quarter-inch sized hail on 11/8/2012. For more information on CoCoRaHS, please visit <http://www.cocorahs.org>.

### **Snowpack and Water Supply Conditions**

At the end of November the Northern region snowpack held 4 inches of snow water equivalent (SWE) which is 12% of the April 1<sup>st</sup> average and 75% of the average for the date. The Central region SWE was reported to be 3 inches which is 11% of the April 1<sup>st</sup> average and 65% of the average for the date. The Southern region SWE was reported to be 2 inches which is 8% of the April 1<sup>st</sup> average and 57% of the average for the date. The WSI for WY2012 for the Sacramento Basin fell into the below normal category and the San Joaquin fell into the dry category. Water supply information for California can be found at [http://cdec.water.ca.gov/water\\_supply.html](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/cqi-progs/iodir/WSIHIST>.

### **Extreme Precipitation Monitoring Network**

The National Oceanographic and Atmospheric Administration (NOAA) Earth System Research Laboratory (ESRL), Scripps Institute of Oceanography, and the California Department of Water Resources have been working on the installation of new observing equipment to monitor characteristics of extreme precipitation events associated with atmospheric rivers. Initial data is starting to flow from this network and some data is available for the precipitation events that occurred in November of 2012. Some samples are shown here for the rainfall event between 11/27/2012 and 11/30/2012 when 53% of the monthly total of the 8-station index precipitation fell. The first image is of six snow level radar from Happy Camp, CA south to Pine Flat reservoir for the 48 hour time period from 11/29 to 11/30. The image shows the progression of the rain event from north to south with no cold front passing in this time period. Examination of individual radar data at Shasta Dam shows 21 of the 48 hours with precipitating conditions with the snow level varying from 5762 feet to 8045 feet. Ten of twelve sites with this type of instrumentation are installed and operating. The second image shows a map of atmospheric water vapor monitoring sites in California with readings from 11/28/2012. Values over 2 cm extend from the North Coast inland to the Sierra Nevada showing the width and direction of the main moisture paths associated with this event. The sharp gradient at the southern end of the event is also visible. Approximately 40 atmospheric water vapor monitoring sites will be installed with this effort. More instrumentation will be coming online this winter including an atmospheric river observatory at Bodega Bay in the beginning of December. More information from this network will be presented in the coming months. Data can be viewed on the NOAA ESRL website: <http://hmt.noaa.gov>.

### **Drought Monitor and Seasonal Outlook**

The maps for California for October 30, 2012 and November 27, 2012 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 November 27<sup>th</sup> depiction, 1.14% of the State is depicted in the D3 or extreme drought category, 27.02% of

California is depicted in the D2 or severe drought category, 42.31% of California is depicted in the D1 or moderate drought category. An additional 22.76% of the state is depicted as D0 or abnormally dry. Maps are updated weekly.

The U.S. Seasonal Drought Outlook for December through March from NOAA depicts California with some improvement in drought conditions throughout most of the State with persisting drought conditions expected in the southeast part of the State. This forecast is based primarily on climatology and forecast models. Visit [http://www.cpc.noaa.gov/products/expert\\_assessment/seasonal\\_drought.html](http://www.cpc.noaa.gov/products/expert_assessment/seasonal_drought.html) for more information. Updates are provided twice per month.

For more information on drought conditions in California, visit <http://www.water.ca.gov/waterconditions/>. A table showing end-of-November reservoir storage by hydrologic region is shown at the end of this document.

### **ENSO Conditions and Long-Range Outlooks**

The El Niño/Southern Oscillation (ENSO) has transitioned to neutral conditions. Equatorial sea surface temperature anomalies for the tropical Pacific have moved towards positive values with the Niño 3.4 region posting a reading of 0.2°C anomaly at the end of November. The September through November 3-month running mean of the Ocean Niño Index (ONI) is 0.6. Five consecutive ONI values need to be above the 0.5 threshold need to be observed for classification as an El Niño event (five consecutive values below the threshold of -0.5 for conditions to be classified as a La Niña event). Most forecast models have the tropical sea surface temperatures moving to neutral conditions during the remainder of 2012 and early 2013. More information can be found at the Climate Prediction Center's web site: [http://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/enso\\_advisory/](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/). Updates are posted weekly. The latest three month outlook (December through February) from NOAA indicates equal chances of above average, near average, or below average temperatures for the whole State except the south Lahontan region which is expected to have a greater chance of above-normal temperatures. For precipitation, equal chances of above, near, or below normal precipitation are forecast for the southern part of the State while the majority of the state is forecast to have an increased probability of below normal precipitation. 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](http://www.wrcc.dri.edu/anom/cal_anom.html).

### **Agricultural Data**

November 2012 saw harvest continue and winter preparations begin. Cotton and rice crops were harvested with cotton being rated mostly good to excellent. Harvested fields were cleared or plowed under. Alfalfa continued to be cut and baled. Kiwi, pomegranate, persimmon, apples, pears, quince and late season grapes were picked. Wine grape harvest was complete in Napa County. Almond harvest was complete and post harvest activities were ongoing. Late variety walnut and pistachio harvests continued. Vegetable harvests of eggplant, cucumbers, peppers, squash, tomatoes and

other vegetables continued. Winter vegetable planting began with some fields already starting to emerge. Range conditions showed signs of improvement with rainfall with drier, poor conditions persisting in the South. Supplemental feeding continued to increase. Sheep and cattle were moved from higher elevation pastures for winter. Fire danger remained high. 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 – 103°F (Beverly Hills, South Coast)

Low Temperature – -5°F (Charlotte Lake, Tulare Basin)

High Precipitation – 24.54 inches (Strawberry Valley, Sacramento River)

Low Precipitation – 0.0 inches (7 stations)

**Statewide Extremes (CIMIS)**

High Average Maximum Temperature – 82.4°F (UC Andrade, Imperial County)

Low Average Minimum Temperature – 24.9°F (Big Bear Lake, San Bernardino County)

High Precipitation – 10.55 inches (Oakville, Napa County)\*

Low Precipitation – 0 inches (16 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	Nov	Oct-Nov	Stations	Nov	Oct-Nov	Nov	Oct-Nov
North Coast	0.27	5	4	4	17	10	10	125%	108%
SF Bay	0.03	2	2	2	6	5	5	202%	166%
Central Coast	0.06	3	3	3	11	6	6	114%	99%
South Coast	0.06	3	3	3	14	10	10	46.7%	51%
Sacramento River	0.26	5	5	5	41	31	31	189%	154%
San Joaquin River	0.12	6	6	6	24	19	19	127%	108%
Tulare Lake	0.07	5	5	5	28	24	22	66.6%	65%
North Lahontan	0.04	3	3	3	13	8	8	109%	95%
South Lahontan	0.06	3	3	3	15	5	4	11.9%	81%
Colorado River	0.03	1	1	1	6	4	1	0.0%	0%
Statewide Weighted Average	1	36	35	35	175	122	116	123.6%	109%

**Statewide Mean Temperature Data by Hydrologic Region (degrees F)**

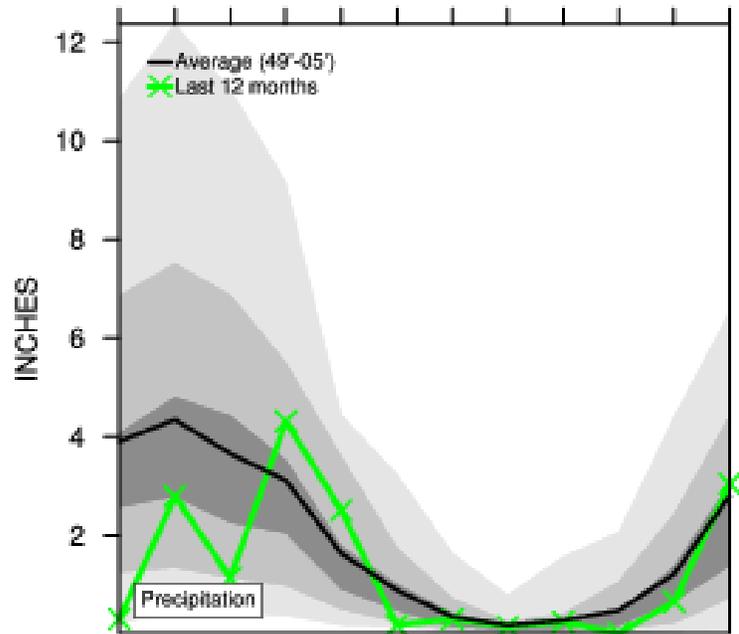
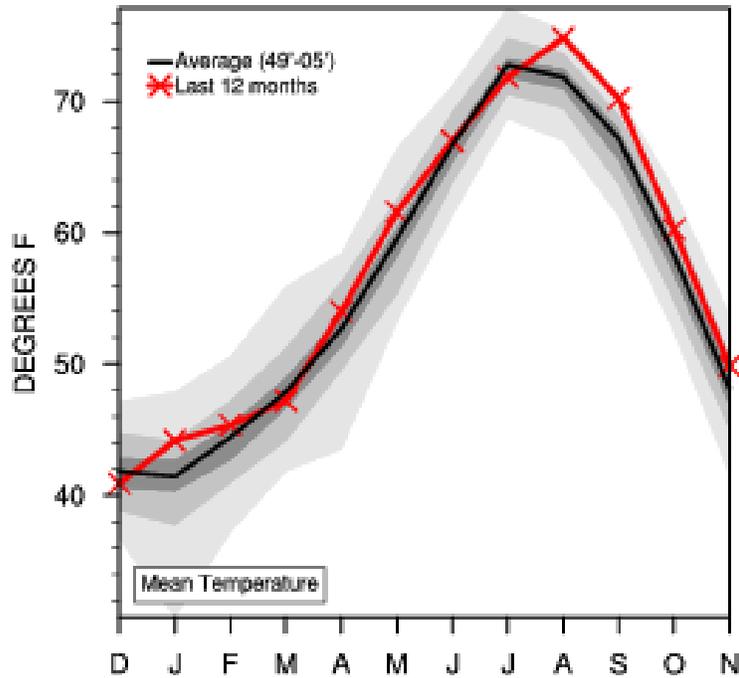
<b>Hydrologic Region</b>	<b>No. Stations</b>	<b>Minimum</b>	<b>Average</b>	<b>Maximum</b>
North Coast	21	26.0	45.2	74.5
SF Bay	10	36.0	53.4	79.0
Central Coast	12	32.4	54.5	89.1
South Coast	42	35.1	58.1	88.6
Sacramento	76	23.4	45.7	76.7
San Joaquin	44	20.4	44.7	75.7
Tulare Lake	18	13.8	39.2	66.2
North Lahontan	26	9.0	36.7	63.9
South Lahontan	13	15.2	42.8	71.1
Colorado River Desert	6	36.0	63.0	92.5
Statewide Weighted Average	268	24.0	46.5	76.4

**End-of-November Reservoir Storage by Hydrologic Region**  
**Storage in Thousand Acre-Feet (taf)**

<b>End-of-November Reservoir Storage</b>	<b>Number of Reservoirs</b>	<b>Average Storage (taf)</b>	<b>2012 Storage (taf)</b>	<b>% of Average</b>
North Coast	6	1,892	2,120	112%
San Francisco Bay	17	399	419	105%
Central Coast	6	516	474	92%
South Coast	29	1,279	1,208	94%
Sacramento	43	9,478	9,344	99%
San Joaquin	34	6,276	5,915	94%
Tulare	6	647	398	61%
North Lahontan	5	459	496	108%
South Lahontan	8	267	241	90%
Total	154	21,217	20,618	97%

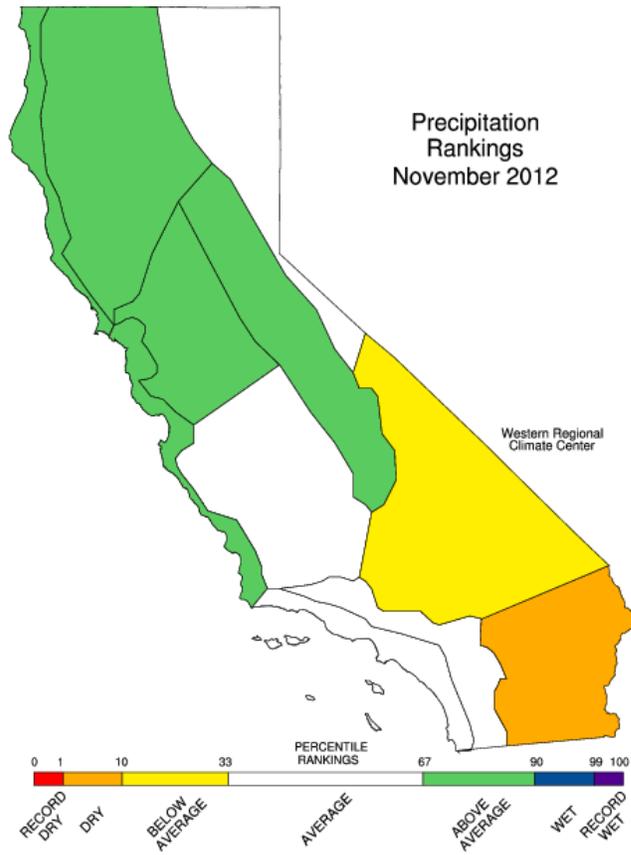
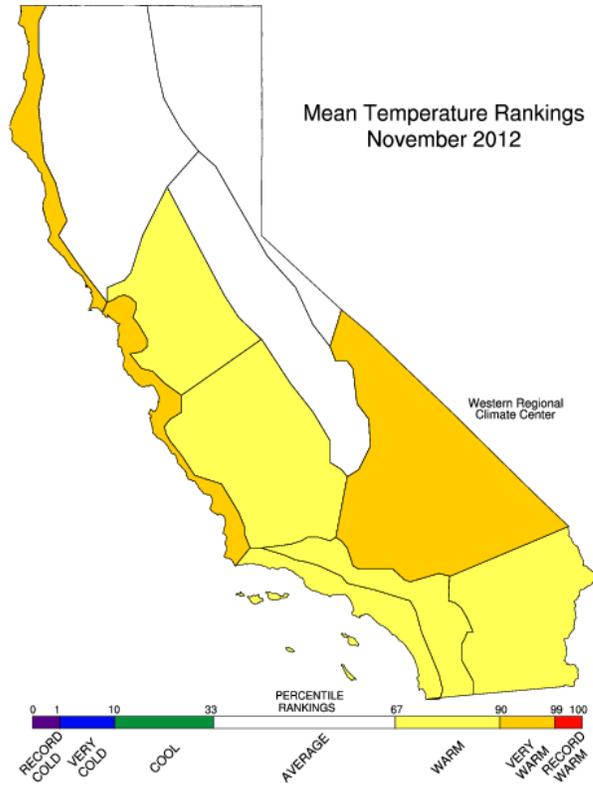
California Climate Tracker Images

### California Statewide Last 12 Months



dark shading - 33-66 percentile  
medium shading - 10-90 percentile  
light shading - extremes

Western Regional  
Climate Center

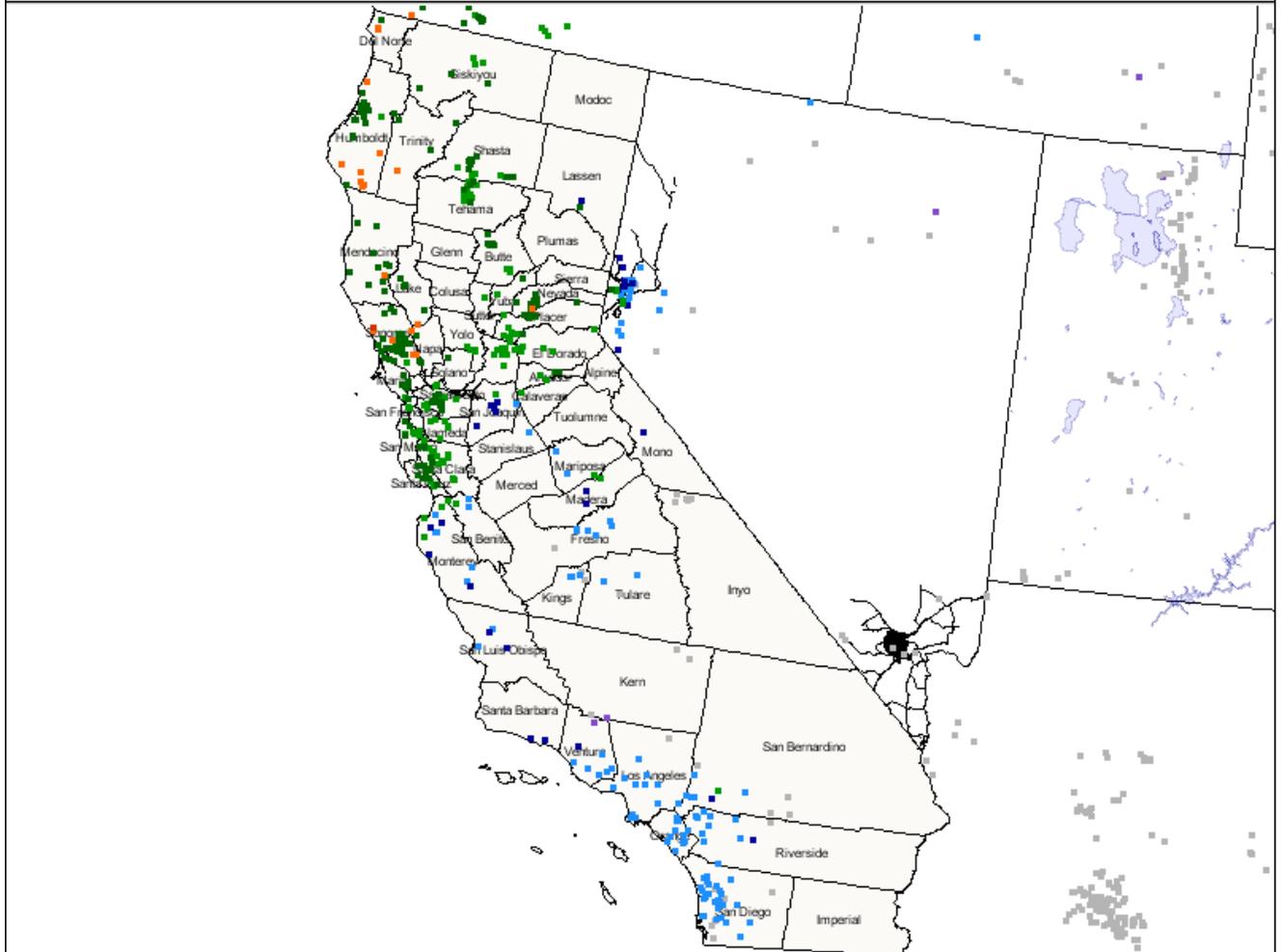


# CoCoRaHS Map

Daily Precipitation (inches x.xx), for the 24 hour period ending ~7:00 am

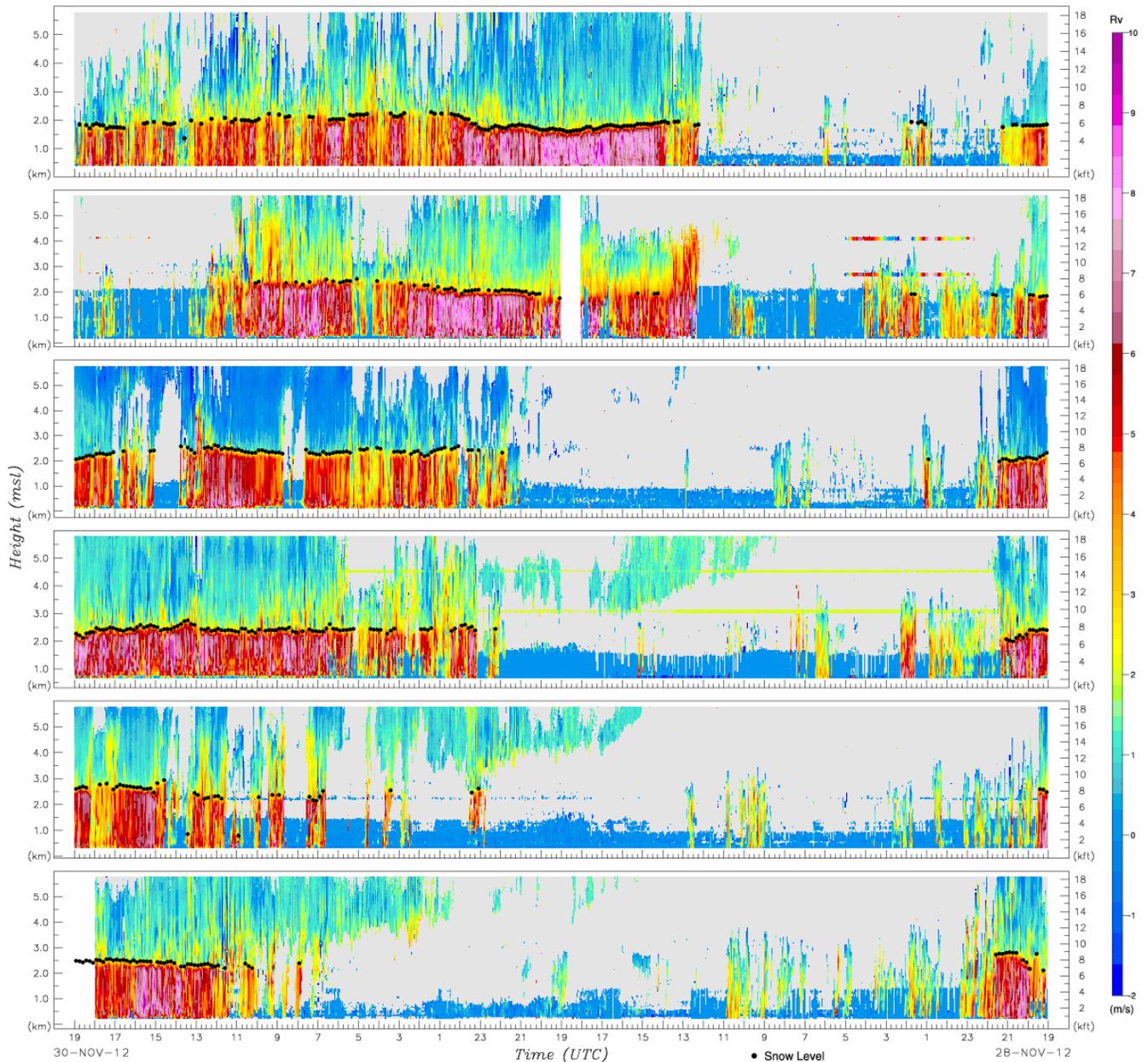
California 11/30/2012

0.0 Trace 0.01 - 0.34 0.35 - 0.68 0.69 - 1.70 1.71 - 4.09 4.10 - 6.14 6.15 - 6.82



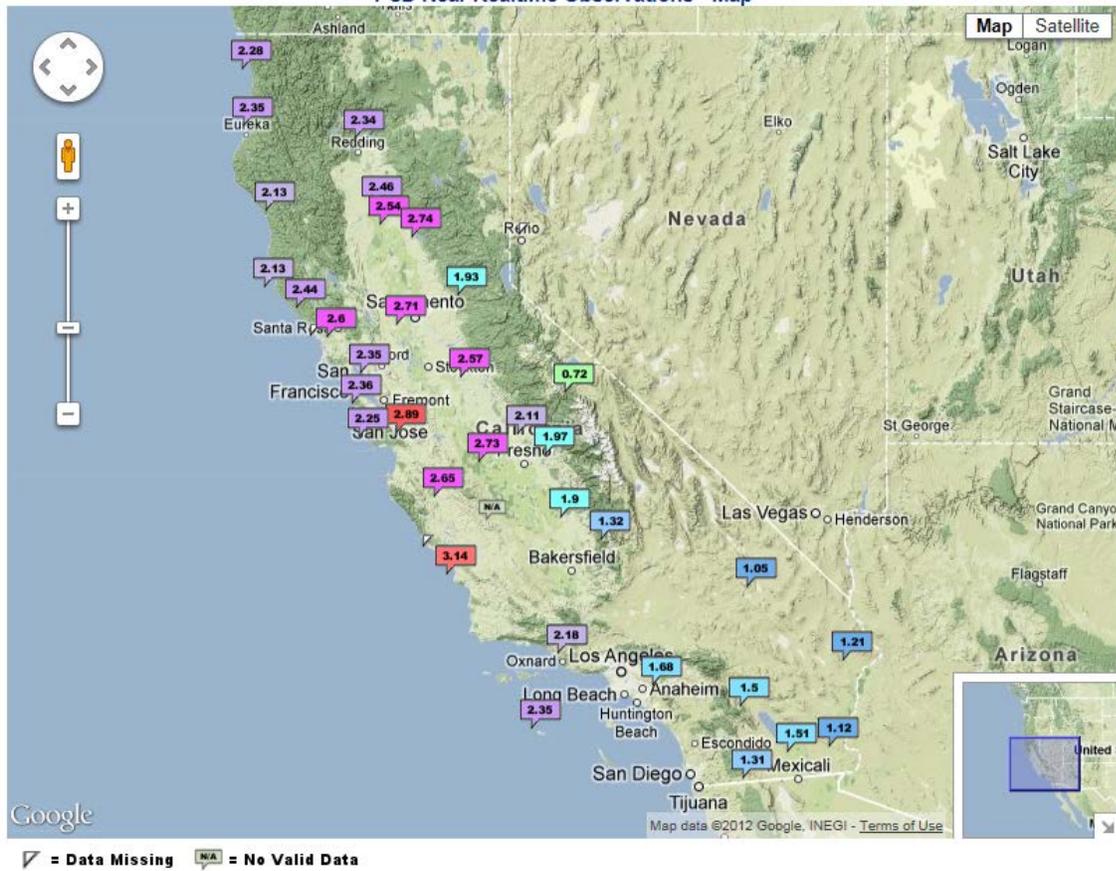
# Extreme Precipitation Monitoring Network Images

ESRL Physical Sciences Division  
FMCW S-band Snow Level Radar



From top to bottom :	Happy Camp,CA (HCP) 41.79 N, 123.39 W, 366 m	Shasta Dam,CA (STD) 40.72 N, 122.43 W, 183 m	Oroville,CA (OVL) 39.53 N, 121.42 E, 114 m	Colfax,CA (CFF) 39.08 N, 120.94 W, 644 m	New Exchequer,CA (NER) 37.60 N, 120.28 W, 274 m	Pine Flat Dam,CA (PFD) 36.83 N, 119.31 W, 184 m
Current snow level :	1831 m / 6005 ft	None	2148 m / 7047 ft	2275 m / 7463 ft	2647 m / 8683 ft	2474 m / 8116 ft

### PSD Near Realtime Observations - Map



# U.S. Drought Monitor

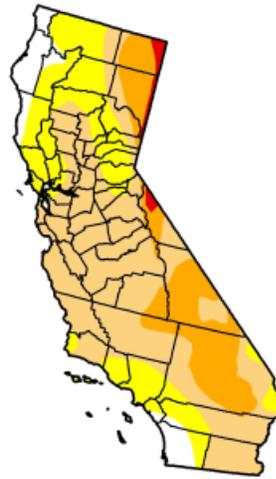
## California

October 30, 2012  
Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	6.73	93.27	68.48	19.10	1.14	0.00
Last Week (10/23/2012 map)	6.75	93.25	68.48	19.10	1.14	0.00
3 Months Ago (07/31/2012 map)	11.64	88.36	63.80	23.60	0.29	0.00
Start of Calendar Year (12/27/2011 map)	33.91	66.09	5.41	0.00	0.00	0.00
Start of Water Year (09/25/2012 map)	11.95	88.05	69.41	22.27	1.14	0.00
One Year Ago (10/25/2011 map)	89.25	10.75	0.00	0.00	0.00	0.00

**Intensity:**

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- 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://droughtmonitor.unl.edu>



Released Thursday, November 1, 2012  
Michael Brewer, National Climatic Data Center/NOAA

# U.S. Drought Monitor

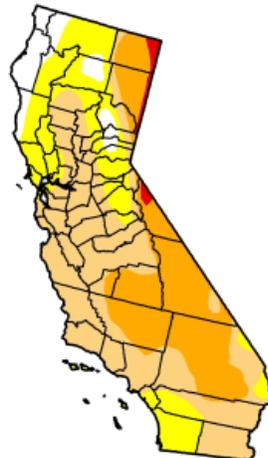
## California

November 27, 2012  
Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	6.77	93.23	70.47	28.16	1.14	0.00
Last Week (11/20/2012 map)	4.82	95.18	67.67	21.61	1.14	0.00
3 Months Ago (08/28/2012 map)	11.74	88.26	69.44	23.05	1.14	0.00
Start of Calendar Year (12/27/2011 map)	33.91	66.09	5.41	0.00	0.00	0.00
Start of Water Year (09/25/2012 map)	11.95	88.05	69.41	22.27	1.14	0.00
One Year Ago (11/22/2011 map)	88.42	11.58	0.00	0.00	0.00	0.00

**Intensity:**

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- 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://droughtmonitor.unl.edu>



Released Thursday, November 29, 2012  
National Drought Mitigation Center,