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California Cumulonimbus

Fall 2015

Welcome Message

by Jimmy Taeger



Map of current California CoCoRaHS observers as of November 16th, 2015. (Source: CoCoRaHS)

Leaves are turning and days are shorter which means...it's time for another edition of the *California Cumulonimbus*! The *California Cumulonimbus* is a biannual newsletter for California CoCoRaHS observers that is issued twice a year; once in the spring and once in the fall.

This edition contains articles on making a preparedness kit, the winter outlook, observer spotlights, the need for more observers, the CA drought, and wet weather in southern CA in July.

If you're not a CoCoRaHS volunteer yet, it's not too late to join! CoCoRaHS, which stands for Community Collaborative Rain

Hail and Snow network is a group of volunteer observers who report precipitation daily. Not only is it fun, but your report gives vital information to organizations and individuals such as the National Weather Service, River Forecast Centers, farmers, and others.

Visit cocoahs.org to sign up, or e-mail Jimmy.Taeger@noaa.gov for additional information.

Enjoy the newsletter!



Make a Preparedness Kit, Today!

by James Thomas

With strong El Niño conditions forecast to continue through this winter season, residents of California may experience their fair share of flooding, mudslides, high elevation snow storms, and coastal erosion. With this in mind, it is essential to



Source: NOAA

be prepared for any natural disaster. Have a plan ahead of time. Know where your nearest emergency services are located and always have a NOAA weather radio with tone alert and extra batteries nearby. It is very important to organize a basic disaster supplies kit.

This kit should consist of...

- water (one gallon of water per person per day for at least three days for drinking and sanitation)
- non-perishable food (at least a 3-day supply)
- battery-powered or hand crank radio
- flash light and extra batteries
- first aid kit
- whistle to signal for help
- dust mask (to help filter contaminated air)
- plastic sheeting
- duct tape
- moist towelettes
- garbage bags and plastic ties (for personal sanitation)
- wrench or plier to turn off utilities
- manual can opener for food
- local maps
- cell phone with chargers, inverter or solar charger

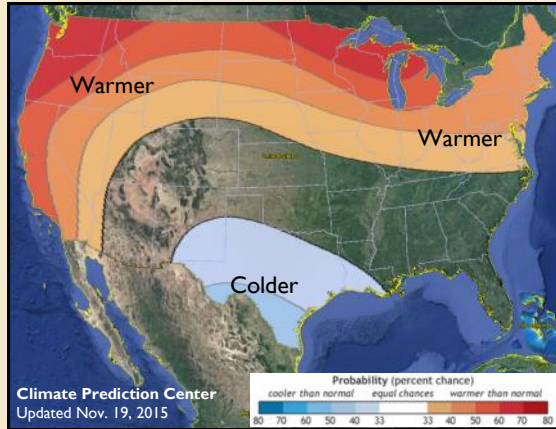
Being prepared for any natural disaster may save your family's life, in addition to your own. Assemble your kit, today!

What Might Winter Bring?

by Chris Stachelski

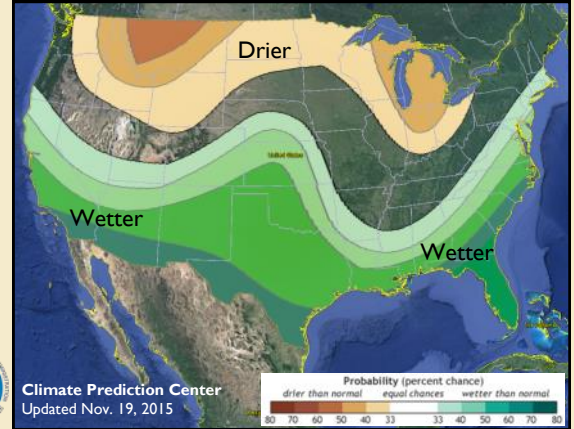
Seasonal Temperature Outlook

December 2015 - February 2016



Seasonal Precipitation Outlook

December 2015 - February 2016



Winter 2015-2016 temperature and precipitation outlook for December through February from the Climate Prediction Center. Most of California is forecast to have greater chances of above normal temperatures and precipitation through the period. (Source: Climate Prediction Center)

With all the hoopla about El Niño, it is not a surprise it is a major influence on the outlook for this winter. Given the strength of this El Niño, the official winter outlook from the Climate Prediction Center (CPC) shows above average confidence for warmer than normal temperatures this winter for the December through February period for all of California, with the highest confidence along the coast. Warmer than normal conditions typically occur during stronger El Niño events during the winter across the northern tier of the country, as the severity of Arctic air intrusions tends to be mitigated. By contrast, confidence is higher than average in cooler than normal conditions over much of Texas. This is largely due to the increased frequency of storms across this part of the country as typically in an El Niño, the main storm track tends to focus over the southern part of the country, bringing an increase in clouds and precipitation, which suppresses the amount of heating these areas see.

Given the ongoing drought in California, all eyes are on how the normal 'wet' season for the Golden State will help to relieve it. Confidence is above average that precipitation will be above normal the further south one is in California this winter based on the outlook for December through February from the CPC. Typically in an El Niño, the jet stream tends to be suppressed and take a track along the southern tier of the country and then heads up just offshore of the East Coast. However, the further north one goes in California the confidence in just how much influence El Niño will have on increased precipitation prospects lessens and thus there is an equal chance for above normal, below normal or near normal precipitation by the time one gets to locations in the far northeast part of CA. El Niño years are known for being drier than normal in the Northwest and the latest outlook largely supports this trend by showing above average confidence in drier than normal conditions in the northern Rockies and interior Pacific Northwest.

Precipitation (in.): October-September

Strong El Niño Yrs	Eureka	Los Angeles	Palm Springs	San Diego	San Francisco	Sacramento
30-Yr Climate Normals	40.33	12.82	4.83	10.34	20.65	18.34
1957-1958	48.06	18.93	7.64	14.15	38.50	27.71
1965-1966	34.03	12.59	10.21	14.76	17.65	10.00
1972-1973	36.08	17.28	4.28	10.99	31.08	24.55
1982-1983	63.83	27.99	13.59	18.49	37.26	34.46
1991-1992	21.01	14.85	6.64*	12.48	18.04	13.02
1997-1998	55.98	31.02	5.93	17.16	39.58	31.95

Normal precipitation and precipitation observed for six "strong" El Niño years for cities across California. Most areas across CA tend to observe above-normal precipitation during "strong" El Niño years. *Missing June precipitation. (Source: National Climatic Data Center (NCDC))

California Cumulonimbus

Observer Spotlights: Susan Zerwick and Penelope Gadd-Coster

by Debbie K. Clarkson

SUSAN ZERWICK

In 2012, Susan Zerwick and her husband moved from Alaska to one of our state's rain capitals, Cazadero. Cazadero is located in the western most hills and valleys of Sonoma County. The mountains and valleys are positioned in a way to funnel in clouds, and with orographic lift over the steeply uplifting coastal mountains, they get a good amount of precipitation.

A neighbor was the first to introduce Susan to CoCoRaHS. So far Susan, station CA-SN-98, has not experienced what is considered a "Cazadero wet winter" of close to 100 inches,

due to the drought. The most rain she has received in one day is 9.07" on Nov. 9, 2014. This came during a three-day atmospheric river event with 6.79" on Nov. 8, and 2.50" Nov. 10th. In addition to the CoCoRaHS records, Susan keeps her own records.

Living in an outlying area can have many rewards. The Zerwicks have a wildlife camera near their driveway. Their visitors include many animals, from deer and foxes to bobcats and cougars. They also get wild boar looking for food, especially since the first rain.

Thanks for being such a regular and proficient CoCoRaHS observer, Susan!



Susan next to her rain gauge.



Penelope next to her rain gauge.

PENELOPE GADD-COSTER

Penelope Gadd-Coster and her husband, Frank, have been CoCoRaHS observers since 2009. They saw an article in January 2009 in Sonoma County's local newspaper, Press Democrat, looking for more observers. They reside in eastern Sonoma County in the hills east of Geyserville and Cloverdale, CA.

Penelope works at Rack & Riddle, a custom blending winery. She has a small, one acre vineyard on her property with many different varieties. This enables Penelope as a microbiologist to see how varieties are responding to each

year's weather for sugar content and possible harvest. CoCoRaHS observations help with this. Frank keeps busy with his many cameras and their animals. He has many opportunities to photograph landscapes and wildlife in the hills where they live.

So far at their station, CA-SN-29, the highest one day rain total they have measured is 5.65" on Feb. 7, 2015. They also receive more rain than other areas from orographic lift over the hills. Although, they do not receive as much precipitation as Cazadero.

Thanks, Penelope and Frank, for being proficient and long-time CoCoRaHS observers!

Wanted: CoCoRaHS Observers

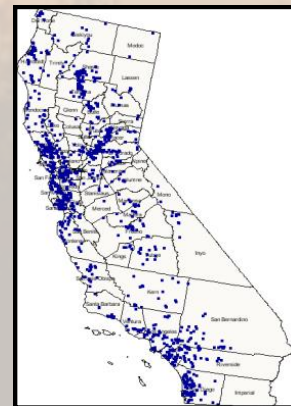
by Jimmy Taeger



As California's drought continues, it is vitally important to record any and all precipitation that falls this winter. Knowing how much rain and snow that falls with each event will help state officials, hydrologists, and meteorologists, and many more with important jobs and forecasts.

While some cities in California have a good number of observers, many areas still lack precipitation observations. Areas of the mountains and deserts are especially deficient in observers.

If you know of anyone who may be interested in observing precipitation at home, work or school, please encourage them to [sign up for CoCoRaHS](#), today!

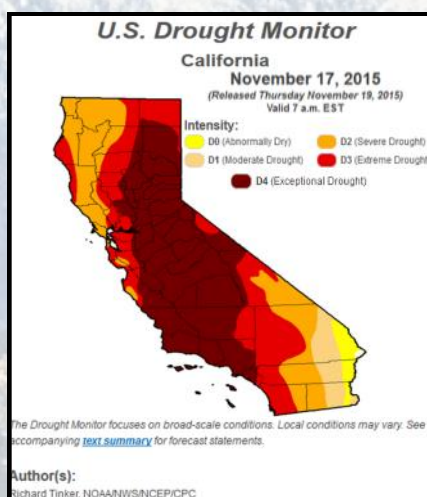


CoCoRaHS observers as of November 16, 2015. (Source: CoCoRaHS)

California Fall Drought Update

by James Brotherton

The "U.S. Drought Monitor" is a versatile tool to indicate the severity of drought based on several different factors that can vary considerably across a given area. These factors include: crop/pasture losses, water shortages/restrictions, and shortages of water storage in reservoirs, streams, and wells potentially creating water emergencies for communities. As of the latest U.S. Drought Monitor, released on November 19, 2015, almost all of California remains in some level of drought classification, with the worst of drought conditions remaining across 92% of the state, including most of the central and southern portions of the state.



Status of the CA drought as of November 17, 2015 from the U.S. Drought Monitor. Almost half of California was in exceptional drought. (Source: U.S. Drought Monitor)

History of the Drought

The California Drought started in 2012 and intensified during 2013 to 2014 when precipitation reached all-time record low levels for many regions of the state. Reports of impacts from around the state have been diverse and included: smaller communities resorting to having to truck water in for survival, significant cropland gone fallow and unproductive, severe impact to local agricultural economies, and significant impact to ecology, such as the Sacramento Delta. It is important to note that the U.S. Drought Monitor does not take into account future trends in drought; rather it is a snapshot on the latest state of the drought. Please see related images of the progression of the California Drought.

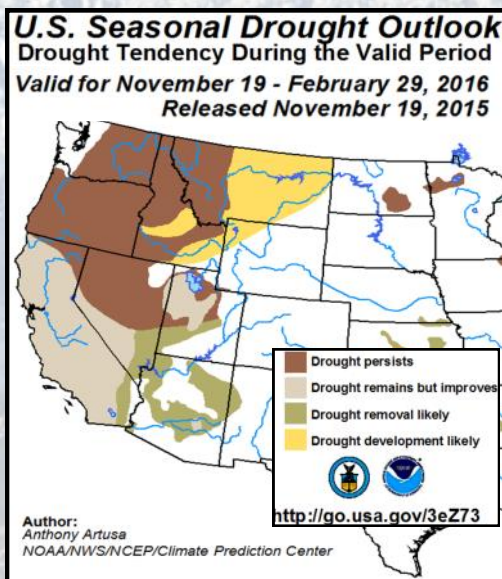
What does this mean for California?

Scientists tend to agree that the California Drought was caused by natural origins, however according to NOAA's Drought Task Force, it may have been exacerbated by excessive heat related to global climate change. Continued extreme to exceptional drought in California would mean continued impacts

as mentioned above, and possibly additional impacts to municipal water supplies/agricultural-based economies.

Drought Outlook

The NOAA/Climate Prediction Center issues the Seasonal Drought Outlook once a month, and it takes into account the latest thinking in climate pattern trends. The latest outlook, issued on November 19th, indicates that most of Southern California will see drought persisting over the next few months, but with some improvement. This would mean areas currently in Extreme Drought should expect to see at least a category improvement to Severe Drought. The most predominant climate trend responsible for



Drought outlook for most of this winter. The drought in CA is expected to remain, but somewhat improve. (Source: Climate Prediction Center)

the expected improvement in the SoCal Drought is based on a strong El Niño-Southern Oscillation cycle, which we are currently experiencing. Although the correlation between a strong El Niño and above normal precipitation is not a guarantee, it is a known strong statistical correlation for Southern California, eastward into Southern Arizona and across the Gulf Coast of the Southern United States. Be sure to check out the latest El Niño and Drought Outlook updates to see how these projections change.

For more on the California Drought and El Niño, please see the following websites:

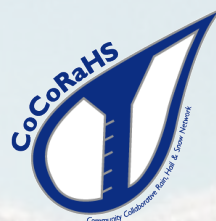
<http://ca.gov/drought/>

www.wrh.noaa.gov/sxg/hydro/drought.php?wfo=sgx

<http://droughtmonitor.unl.edu...DroughtMonitor.aspx?CA>

http://www.cpc.ncep.noaa.gov.../sdo_summary.php

elnino.noaa.gov/



"...most of Southern California will see drought persisting over the next few months, but with some improvement."



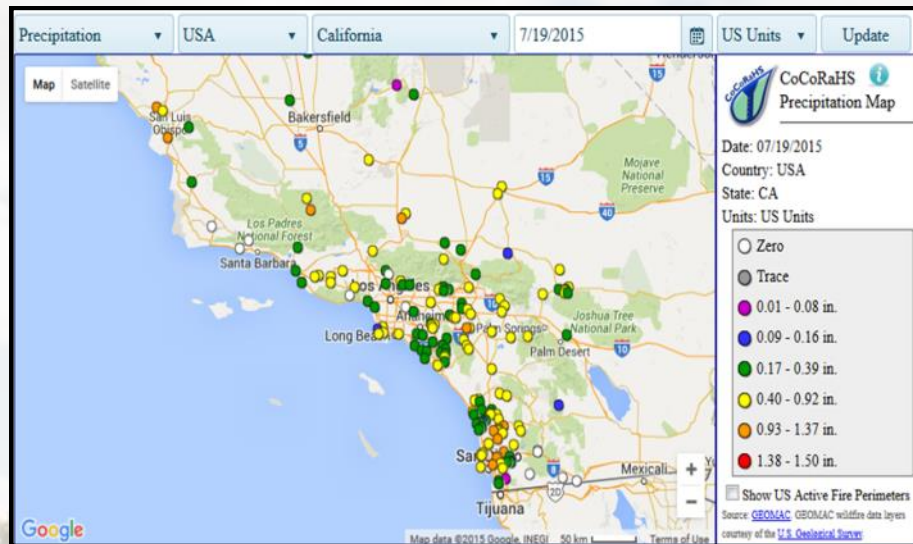
California Cumulonimbus

Dolores Drenches Southern California

by Stefanie Sullivan

On July 18-19th, 2015, remnant moisture from what was once Hurricane Dolores brought record-breaking rainfall, flooding, debris flows, wind damage, and copious amounts of lightning to Southern California.

What started as a quiet, albeit warm and muggy morning, quickly turned to anything but. Shortly after 6 AM on July 18th, thunderstorms began to erupt across San Diego County. These storms moved north through the afternoon as the moisture from Dolores surged into the region. In addition to the rain, downburst winds from a thunderstorm caused tree damage in parts of San Diego. Over 2,000 cloud-to-ground lightning strikes were observed that day – quite impressive for Southern California! Several small fires were started by the lightning, including a group of palm trees in La Quin-



Precipitation reports for observations from the morning of July 18th through the morning of July 19th. (Source: CoCoRaHS)



24-hour observed lightning strikes ending at 2 pm on July 18, 2015. (Source: National Weather Service San Diego)

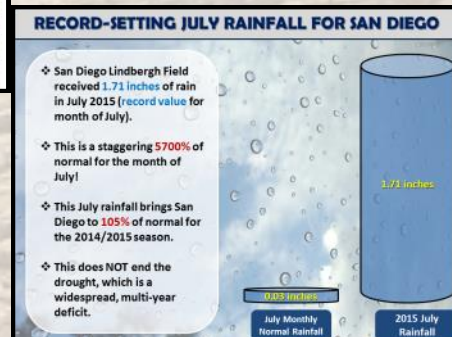
ta. There were even multiple reports of cars being struck. Storms tapered off by the evening, but the fun wasn't over yet. With much moisture still around the following day, another round of rain and thunderstorms wreaked havoc in the afternoon.

These storms produced flash flooding in

several places including Ramona, La Mesa, Perris, Moreno Valley, Palmdale, and Phelan. A storm also triggered a debris flow in the Silverado Fire burn area in the Santa Ana Mountains, as well as rock slides in several locations in the San Bernardino County Mountains. For the first time in years, both the Padres and Angels baseball

games were rained out.

A few long-standing precipitation records were blown out of the water after this event. Precipitation for the month of July in San Diego was 1.71" (1.69" of the total fell on the 18th and 19th), breaking the previous record of 1.29" set back in 1865. The city of San Diego received more precipitation in those two days than the entire four month stretch from January to April (1.65")! The normal precipitation for San Diego in July is only a meager 0.03". Riverside also set an impressive record of 1.94", breaking the old record of 1.26" set in 1956. Riverside's normal precipitation is only 0.04" for July. Needless to say, this was quite an event and something we may not see again for many years!



Record rainfall for San Diego in July 2015. (Source: National Weather Service San Diego)



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California Cumulonimbus

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What is CoCoRaHS?

CoCoRaHS, which stands for Community Collaborative Rain Hail and Snow Network, is a non-profit group of volunteer precipitation observers. Anyone can join, and it's easy to report the information. All you need is a 4 inch rain gauge, the internet, and a few minutes each day. The website is easy to navigate and has different instructional materials for anyone to learn how to record an observation.

The site also has daily maps of observer's reports showing where precipitation fell the day before. It's fun to compare the different amounts of precipitation that can fall in an area from just one storm. Not only is the information interesting to look at, it is very valuable for organizations such as the National Weather Service, hydrologists, farmers and many others.

Visit cocoahs.org to sign up, or e-mail Jimmy.Taeger@noaa.gov for questions. Join CoCoRaHS, today!



Rain gauge required for the program.



cocoahs.org



[California CoCoRaHS State Webpage](http://CaliforniaCoCoRaHS.org)



[California CoCoRaHS](http://CaliforniaCoCoRaHS.org)



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