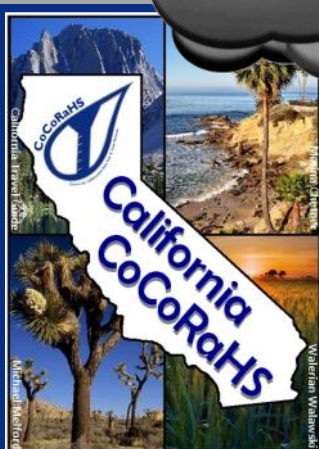


California Cumulonimbus

Fall/Winter 2021



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Wishing Good Luck to Bruno!

by Samantha Connolly

Bruno Rodriguez, the CoCoRaHS newsletter editor since March 2020, departed late this past summer for a position at the National Weather Service Office in Denver/Boulder, Colorado.

We wish him the best of luck in his role in Colorado, and we sure miss him here in California! We appreciate all the hard work he put into the CoCoRaHS program and newsletter.

Samantha Connolly, a forecaster at the National Weather Service San Diego forecast office, will be the new CoCoRaHS newsletter editor. Please reach out to her at samantha.connolly@noaa.gov for any ideas or future suggestions for newsletters!



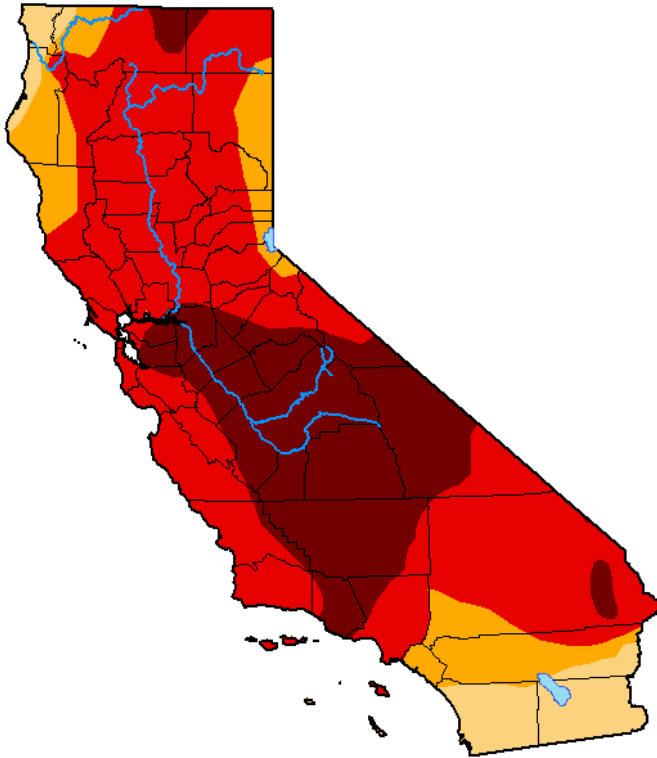
Bruno Rodriguez (right), with Samantha Connolly (center) and Adam Roser (left) at a weather outreach booth in Seal Beach, CA in October 2018. Photo credit: NWS San Diego.

Drought Conditions in California

by Samantha Connolly

U.S. Drought Monitor California

December 14, 2021
(Released Thursday, Dec. 16, 2021)
Valid 7 a.m. EST



Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

David Simeral
Western Regional Climate Center



droughtmonitor.unl.edu

Drought conditions have been persistent across all of California for quite some time. All areas of California are considered in drought status as of December 14th.

Nearly 30 percent of California is classified under category D4, Exceptional Drought, mostly located in the central portion of the state, though the area of this most extreme level of drought has decreased in the last couple of months. A weak to moderate atmospheric river in early December brought beneficial rain to northern and central portions of the state. Despite the beneficial nature of this event, precipitation deficits still exist, and some of California's largest reservoirs remain below average.

Continued beneficial rainfall this winter will hopefully lessen the drought across the state. An active, wet weather pattern is looking possible for the last half of December. Here's to hoping for the beneficial rain to continue across California!



What are Atmospheric Rivers?

Adapted from noaa.gov

The “rivers in the sky” — Atmospheric rivers are relatively long, narrow regions in the atmosphere that transport water vapor out of the tropics. These long columns of water vapor move with weather systems, and when they make landfall, the atmospheric river releases this water vapor in the form of rain or snow. A well-known example of an atmospheric river is the “Pineapple Express”, an atmospheric river that brings moisture from the tropics near Hawaii to the West Coast of the U.S.

The science behind atmospheric rivers

An atmospheric river (AR) is a flowing column of condensed water vapor in the atmosphere responsible for producing significant levels of rain and snow, especially in the Western United States. When ARs move inland and sweep over the mountains, the water vapor rises and cools to create heavy precipitation. Though many ARs are weak systems that simply provide beneficial rain or snow, some of the larger, more powerful ARs can create extreme rainfall and floods capable of disrupting travel, inducing mudslides and causing catastrophic damage to life and property. Visit www.research.noaa.gov to learn more.

A strong AR transports an amount of water vapor roughly equivalent to 7.5–15 times the average flow of water at the mouth of the Mississippi River.

ARs are a primary feature in the entire global water cycle and are tied closely to both water supply and flood risks, particularly in the Western U.S.

On average, about 30–50% of annual precipitation on the West Coast occurs in just a few AR events and contributes to the water supply — and flooding risk.

ARs move with the weather and are present somewhere on Earth at any given time.

ARs are approximately 250–375 miles wide on average.

Scientists' improved understanding of ARs has come from roughly a decade of scientific studies that use observations from satellites, radar and aircraft as well as the latest numerical weather models. More studies are underway, including a 2015 scientific mission that added data from instruments aboard a NOAA ship.

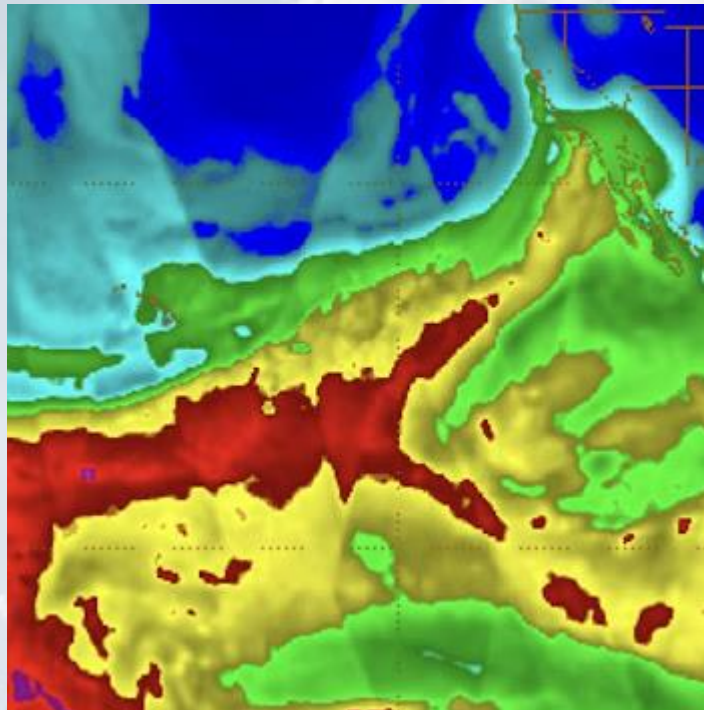
Image not to scale.

NOAA

Atmospheric rivers come in many different shapes and sizes. Those that contain the largest amounts of water vapor and strongest winds can create heavy rainfall and floods. Intense, heavy rainfall can result in debris flows on vulnerable burn scars, flash flooding, and can cause catastrophic damage to life and property.

However, not all atmospheric rivers produce catastrophic flooding. Most are weaker systems that bring beneficial rain and snow that is crucial to water supply. Atmospheric rivers also contribute to beneficial increases in snowpack.

Scientific research continues to evolve on the topic of atmospheric rivers. This research yields important data that helps weather forecasters warn for potential heavy rain and flooding in areas prone to impacts, as much as five to seven days in advance.



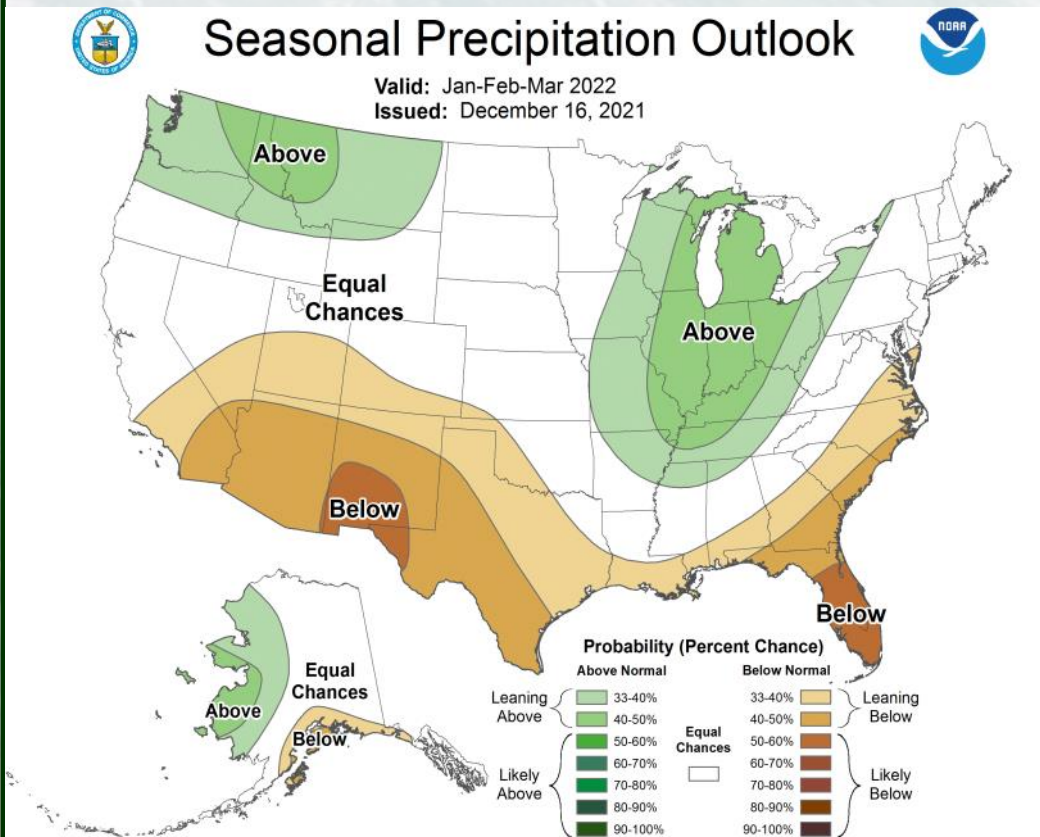
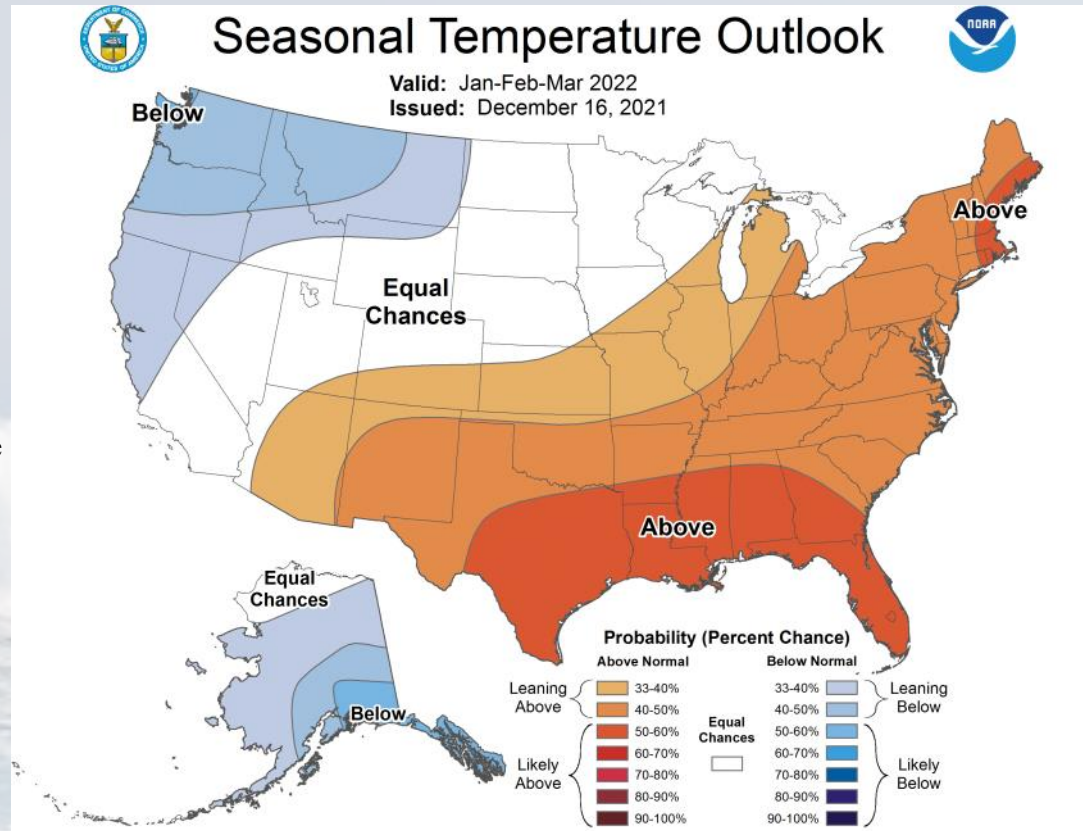
Water vapor imagery of an atmospheric river aimed at Southern California on February 14, 2019. Imagery courtesy of NESDIS.

January/February/March 2022 Outlook

By Samantha Connolly

The Climate Prediction Center (CPC) has released its outlook for January through March 2022. For the temperature outlook, the northern portion of California has a small chance (33-40% chance) of below normal temperatures during that time period. For central and southern portions of California, it's a toss up between below, at or above normal temperatures — there are equal chances for any of those temperatures.

Meanwhile, for the southern plains, the south, and the eastern seaboard, signs are pointing towards a warmer than normal January/February/March.



For the seasonal precipitation outlook, the CPC continues to forecast below normal precipitation for southern and portions of central California. For the rest of California, there are equal chances for below, at, or above normal precipitation.

This outlook favors a La Niña pattern for California, where Southern California is typically drier. La Niña is currently present, with cold water anomalies present in the Equatorial Pacific

La Niña is favored to continue through the northern hemisphere winter, then transition to ENSO-neutral during Spring 2022.



Marina Chetper



California Travel Guide



Walerian Walawski



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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. Join CoCoRaHS, today!



Rain gauge required for the program.



cocoahs.org



California CoCoRaHS State Webpage



California CoCoRaHS



weather.gov

Do you have any ideas or suggestions of future topics that you would like to see covered in this newsletter? If so, simply send an email to Sam at samantha.connolly@noaa.gov!