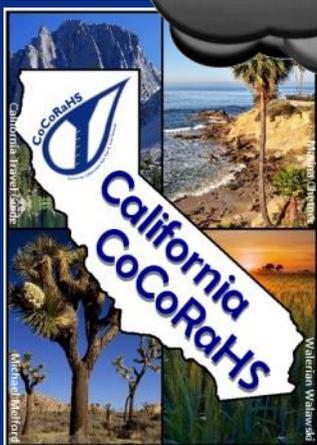




# California Cumulonimbus

Spring/Summer 2021



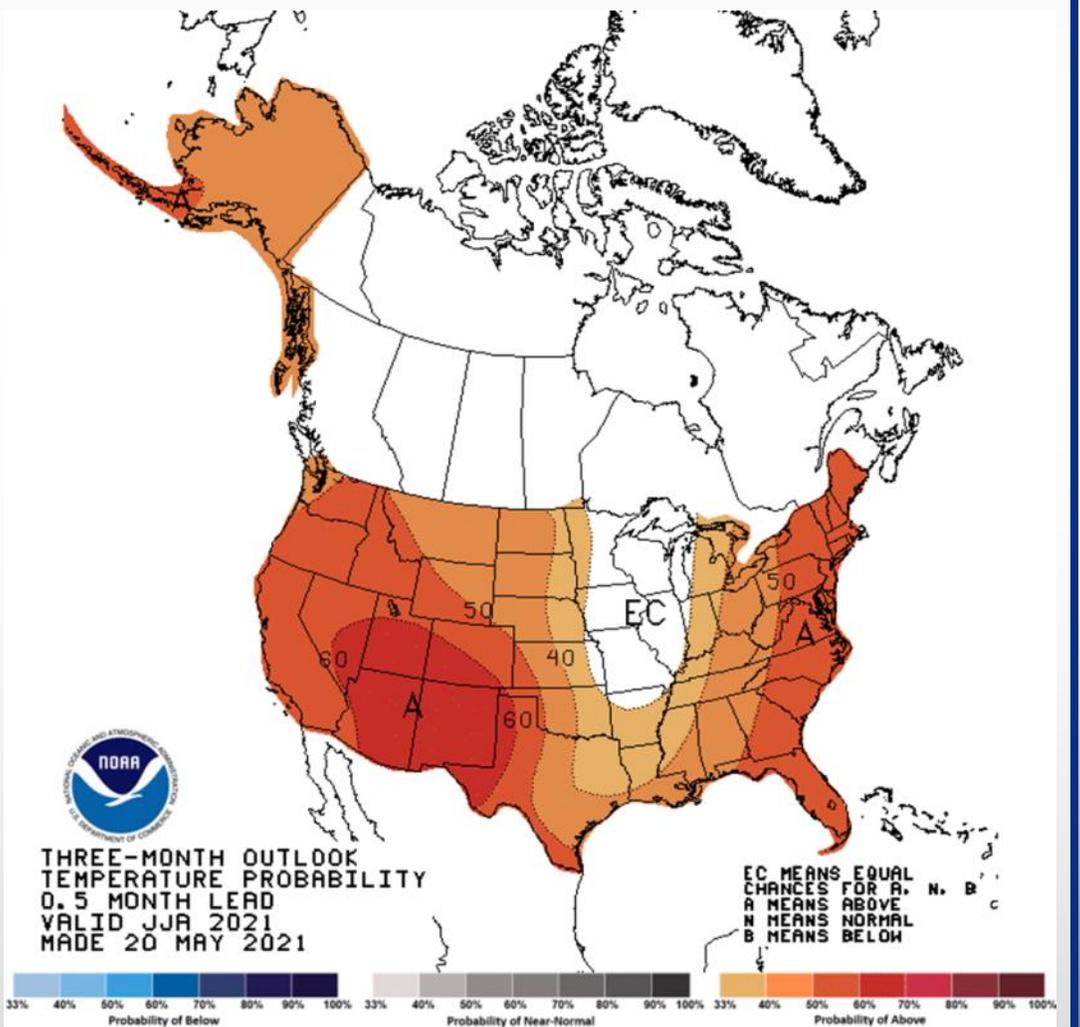
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## Summer Outlook & Drought Conditions

by Sam Connolly

The Climate Prediction Center (CPC) released their latest three month outlook on May 20th. La Niña conditions have ended, and ENSO neutral conditions are expected to continue through the summer. Here are the outlooks for June, July



*Continued on the next page*

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](mailto:samantha.connolly@noaa.gov)!

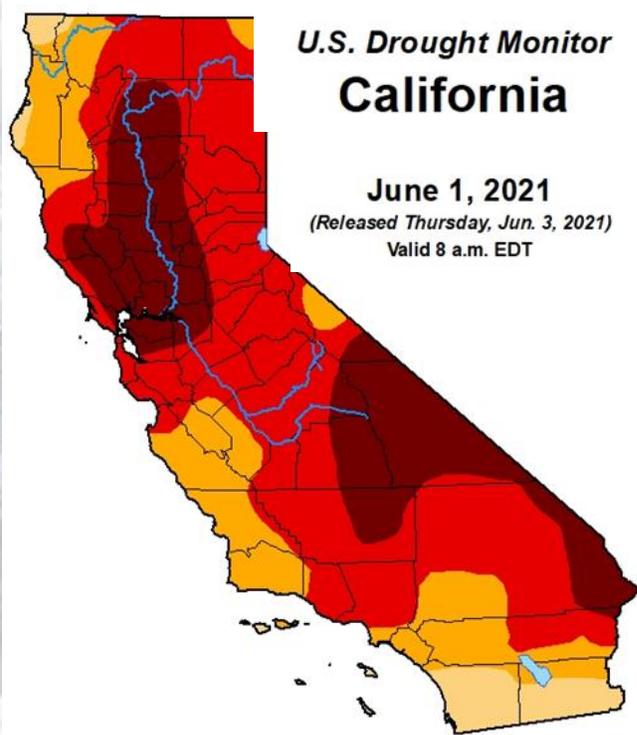
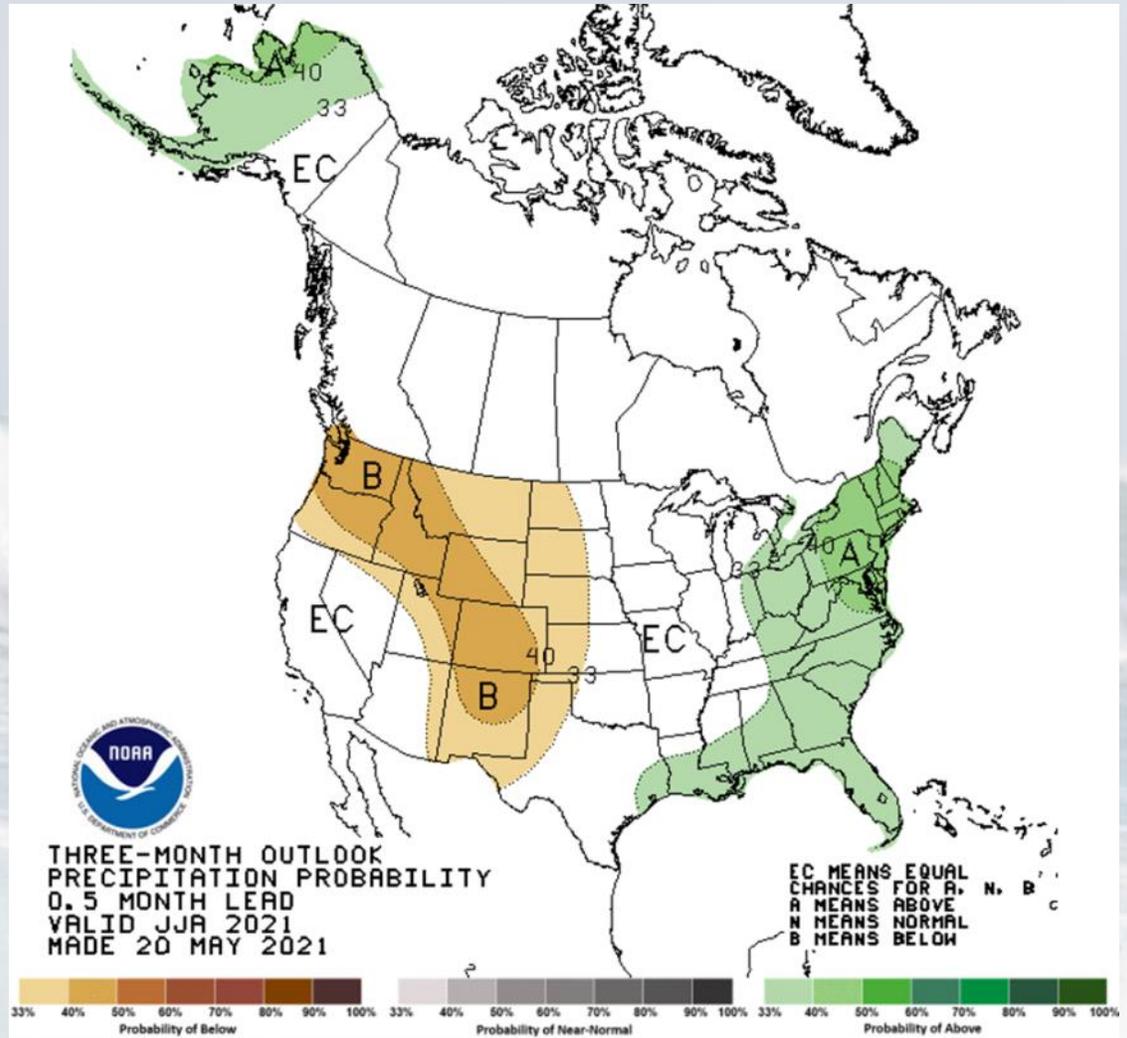
# Summer Outlook & Drought Conditions (continued)

by Sam Connolly

For much of the West (and East too!), the CPC predicts a 50 to 60 percent chance of above average temperatures this summer. In the Midwest, chances are less for above average temperatures.

The precipitation outlook for this summer is a little less clear for California. The CPC is predicting equal chances of below, near or above normal precipitation. Below normal precipitation is favored for the rest of the West, while above normal is favored for the East.

The latest Drought Monitor was released on June 1. All of California is in some level of drought, and nearly 75 percent of the state is in either “Extreme” or “Exceptional” drought. This is a drastic change from one year ago when only 47 percent of the state was in drought. The worsening drought conditions can be attributed to back-to-back dry winters, as well as rapidly decreasing snowpack in the mountains this spring.



Drought Conditions (Percent Area)

	None	D0-D1	D2-D4	D3-D4	D4	
Current	0.00	100.00	100.00	94.61	74.46	26.04
Last Week 05-25-2021	0.00	100.00	100.00	94.61	74.46	26.04
3 Months Ago 03-02-2021	0.75	99.25	90.89	56.98	29.54	3.75
Start of Calendar Year 12-29-2020	0.00	100.00	95.17	74.34	33.75	1.19
Start of Water Year 09-29-2020	15.35	84.65	67.65	35.62	12.74	0.00
One Year Ago 06-02-2020	41.80	58.20	46.67	20.84	2.97	0.00

**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:**  
Brian Fuchs  
National Drought Mitigation Center



## Debris Flow Planning—A Case Study

by Alex Tardy and Bruno Rodriguez

In late November and the first half of December 2020, a series of Santa Ana winds impacted a dry Southern California region with high fire danger. The result of the high winds and low humidity was new wildfire starts.

CalFire was able to keep most fires under 500 acres, but another large wildfire named Bond erupted in a remote, rugged region of the Santa Ana Mountains in Orange County, California. The fire started in a home, but spread rapidly into surrounding vegetation. The wildfire consumed 7,000 acres before it burned into the old Irvine Lake and the Silverado Fire scar from October 2020. The Bond fire was relatively small compared to other fire scars in 2020, and even for historical wildfires in Southern California. However, the soil was severely burned (deep) and the vegetation burned was on steep canyon walls along and south of Silverado Canyon.

Due to this increased post-fire debris flow risk, California initiated a CalFire Watershed Emergency Response Team (WERT) to analyze the burn severity for input into USGS debris flow modeling. The region has a history of fatalities, including several in 1969 and another from a rockslide. The USGS modeling indicated the potential for significant and potentially-damaging debris flows for rainfall above 20 mm/hour (0.75 inch).

Working with NWS San Diego, it was decided that given the difficult and restricted evacuation routes, as well as the fact that several homes in White and Wildcat Canyons were directly in the path of potential debris flows, the final rainfall thresholds used to guide Flash Flood Warning issuances would be lowered closer to 0.50"/hr, in line with other burn scars such as El Dorado in San Bernardino County.



Orange County Public Works assessed the mud and debris impact in Silverado Canyon the day following the heavy rainfall.



## Debris Flow Planning—A Case Study (cont.)

by Alex Tardy and Bruno Rodriguez

For real-time monitoring, NWS San Diego worked closely with Orange County Public Works agency, who were able to rapidly install a new ALERT rain gauge just west of the Bond fire to measure 60-minute accumulation, which updates at 5-minute intervals. Since the WERT briefing, there have been special Orange County emergency management planning calls and additional planning meetings with CalOES. Orange County also held a virtual public information session to discuss the threats with citizens and how weather could result in evacuation warnings and orders, as well as road closures. Citizens in this region were already challenged with power outages and road closures in addition to evacuations during the early December 2020 wildfire.

In late January 2021, the burn scars were tested with heavy rainfall from 3 weather systems. The final system produced rainfall rates reaching up to 0.50 inches per hour which is the USGS threshold for the most sensitive burn scars. The rainfall resulted in significant mud and gravel movement onto roadways in the middle of night and onto property of 4 homes in the Santa Ana mountains of Orange County, with minor damage resulting.



Images from KTLA showed the extent of the damage from debris flows in March of 2021. Multiple vehicles were carried by the flow of mud and rocks, with minor damage to some structures reported in the area.



## Observer Spotlight: CA-IN-1, CA-IN-4, CA-IN-12

By Jenn Varian

The Eastern Sierra Regional Airport in Bishop, California is one of NWS Las Vegas's primary climate sites. In May 1995, an Automated Surface Observing System (ASOS) was installed at the airport to make up for the lack of 24-hour staffing. This install allowed for 24-hour weather observations to pick back up at this climate site for the first time since the late 1940s. However, due to the fully automated nature of this site, a back-up site is required both for snowfall measurement and in the event of an equipment or communications failure of the ASOS. From 1996 to 2005, a local fire station was able to provide back-up observations, but since then, local spotters/observers have provided NWS Las Vegas with reliable back-up and snowfall observations.

In 2009, a CoCoRaHS observer, CA-IN-1 was used for back-up precipitation given their close proximity to the Eastern Sierra Regional Airport. In 2015, this back-up responsibility was transferred to CA-IN-4, located 1.7 miles from the center of the Bishop climate site. Finally, in 2018, CA-IN-12 took over, also at 1.7 miles from the center of Bishop, and is used as NWS Las Vegas's official snowfall observation and back-up precipitation observer.

A great thanks to these CoCoRaHS observers for helping NWS Las Vegas maintain a reliable and consistent climate record in Bishop, California! This wouldn't be possible without you.



View of the Sierra Nevada mountain range from Bishop, CA (NWS Las Vegas)

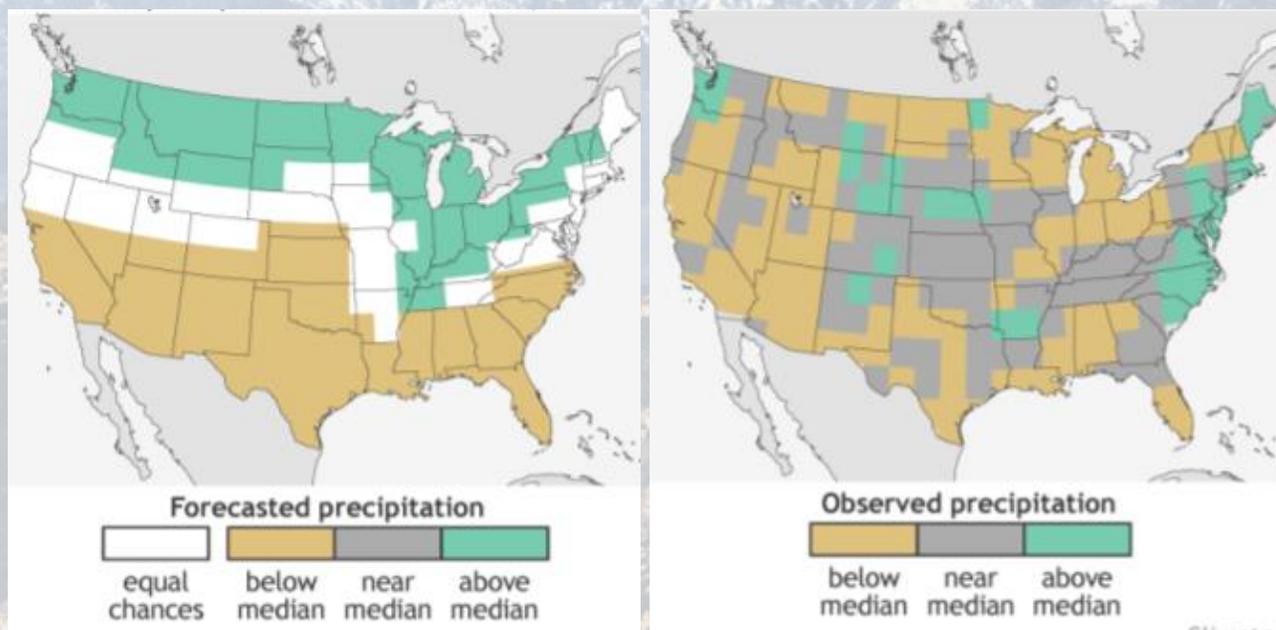
## Reviewing the 2020-21 Winter Outlook

By Miguel Miller

The 2020-21 winter precipitation outlook favored wetter-than-average conditions across the northern tier of the US and drier-than-average conditions over the southern tier. This pattern is similar to the precipitation patterns expected during La Niña winters. Which makes sense because we definitely had a La Niña this past winter.

What transpired was more on the drier side for most of the country. While much of the dry signal verified across the southern tier, the dryness that extended to the northern tier of the United States was not expected. In contrast, the Pacific Northwest and the eastern seaboard observed a wetter-than-average winter. This meant the forecast verified for the South and the Pacific Northwest, but not for the Mid-Atlantic through coastal Northeast.

### Forecasted precipitation versus actual, Dec 2020-Feb 2021



You should never base how well the forecast did just on how it looks to your eyes. Instead, the scientists at the Climate Prediction Center use a verification metric known as the Heidke Skill Score (HSS). The HSS looks at not just how often the outlook hits or misses the mark, but also how often the forecast would have been right just by luck. Any HSS greater than zero means that the outlook was better than just randomly guessing one of the three categories. The higher the number, the better the forecast. Taking everything into account, this winter's precipitation outlook HSS was essentially zero, clocking in at -0.22 for the contiguous US and -0.29 if we just looked at areas where forecasters favored one category over the others (aka all places where the forecast wasn't equal chances).

# California CoCoRaHS



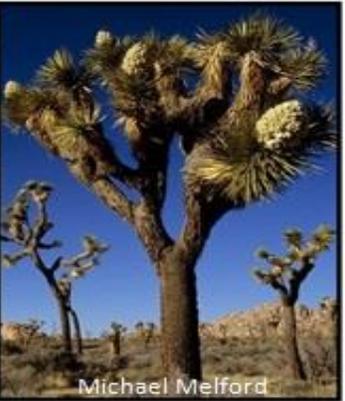
Marina Chetner



California Travel Guide



Walerian Walawski



Michael Melford

## California Cumulonimbus

### SPRING/SUMMER 2021 CALIFORNIA CUMULONIMBUS CONTRIBUTORS

- **Samantha Connolly, California State Co-Coordinator:** Contributing Author  
NWS San Diego
- **Miguel Miller, Meteorologist:** Contributing Author  
NWS San Diego
- **Jenn Varian, Cooperative Observer Program Lead (Las Vegas):** Contributing Author  
NWS Las Vegas
- **Miguel Miller, Warning Coordination Meteorologist:** Contributing Author  
NWS San Diego
- **Bruno Rodriguez, California State Co-Coordinator:** Editor, Contributing Author  
NWS San Diego

### 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 [cocorahs.org](http://cocorahs.org) to sign up. Join CoCoRaHS, today!



Rain gauge required for the program.



[cocorahs.org](http://cocorahs.org)



[California CoCoRaHS State Webpage](#)



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[weather.gov](http://weather.gov)