

Colorado CoCoRaHS Newsletter

Fall 2021

Welcome: Happy fall everyone! If you're new to CoCoRaHS, welcome! I'm your state coordinator, Peter. I write newsletters for Colorado volunteers periodically to introduce myself, reflect on the storms we have captured in our rain gauges, and take a look at what may be to come.

The days are getting shorter at a rapid pace, and we are about to set the clocks back. Fall is the best time to observe clear, blue skies across the Front Range. This is perhaps a bit boring for a precipitation measurement network, but I have been enjoying it. Last fall we were robbed of several weeks-worth of blue sky days as the Cameron Peak and East Toublesome fires ravaged unprecedented acreage across the northern Rockies. Thank goodness we did not see any repeat of that! In honor of the blue skies, here is a beautiful blue sky and yellow aspen photo courtesy of CoCoRaHS national coordinator, Henry Reges.

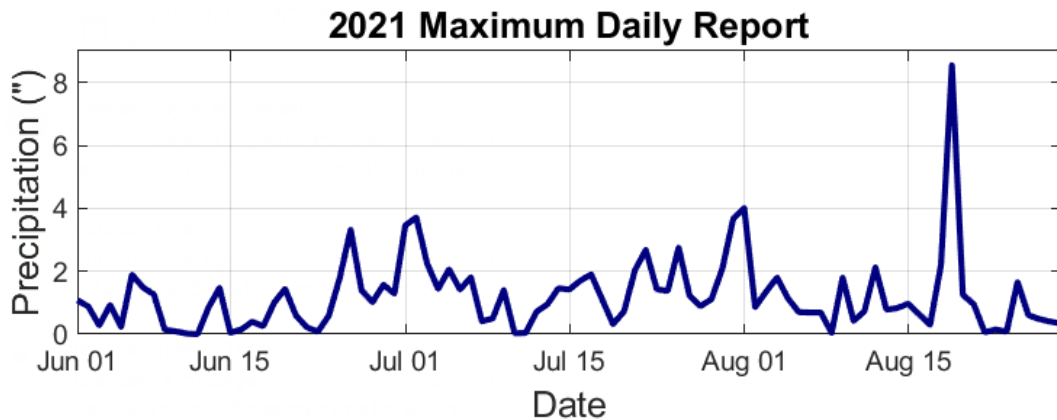
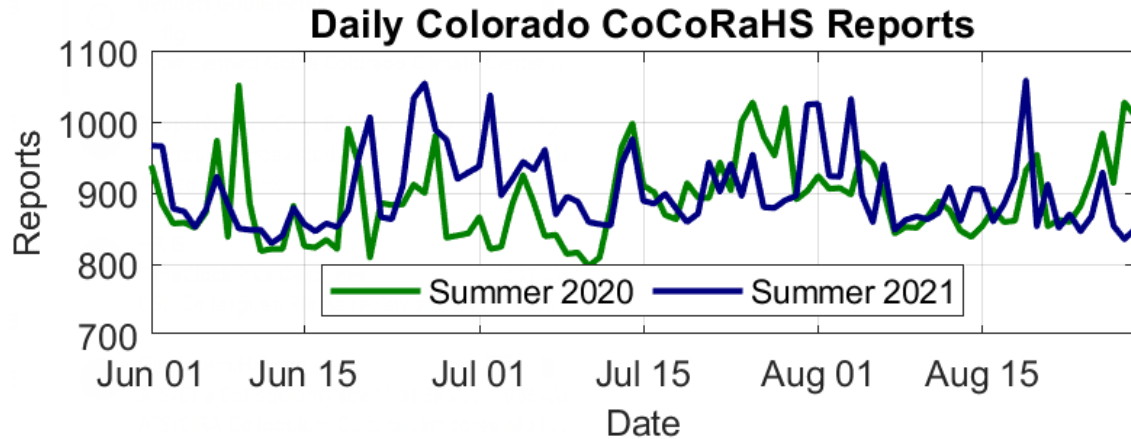


Snow Training: If you have not seen snow yet, you're likely to see your first flakes sometime in the next month. This makes our jobs as weather observers a little bit more difficult. We always lose a fraction of our observer base over the winter, which is totally understandable. We do greatly appreciate those of you snow lovers and data junkies who stick with us all winter long!

Some of you are new, and some of you will make mistakes when you go to measure snow. That is okay. You'll have the hang of it before you know it. If this is your first time measuring snow, and you have questions, know that CoCoRaHS has a bounty of resources available for you. We have a wonderful YouTube series on snow measurement: <https://www.youtube.com/user/cocorahs>. If you're more of a reader, we have written snowfall measurement instructions as well:

<https://media.cocorahs.org/docs/MeasuringSnow2.1.pdf>. Please feel free to email me with any questions as well.

Colorado CoCoRaHS Stats: Our participation numbers across the state are up ever so slightly from last summer. We averaged 892 reports/day in June-August of last year, and 904 reports/day this year. Our highest reporting day last summer was 1053 reports. This summer it was 1060 reports. I was actually a little surprised our reporting numbers weren't down. Lots of people stayed home in summer 2020 since we were in a different phase of the pandemic. If you were like me, you were probably excited to get out and do some travel this summer, leading to fewer daily reports and more multi-day reports.

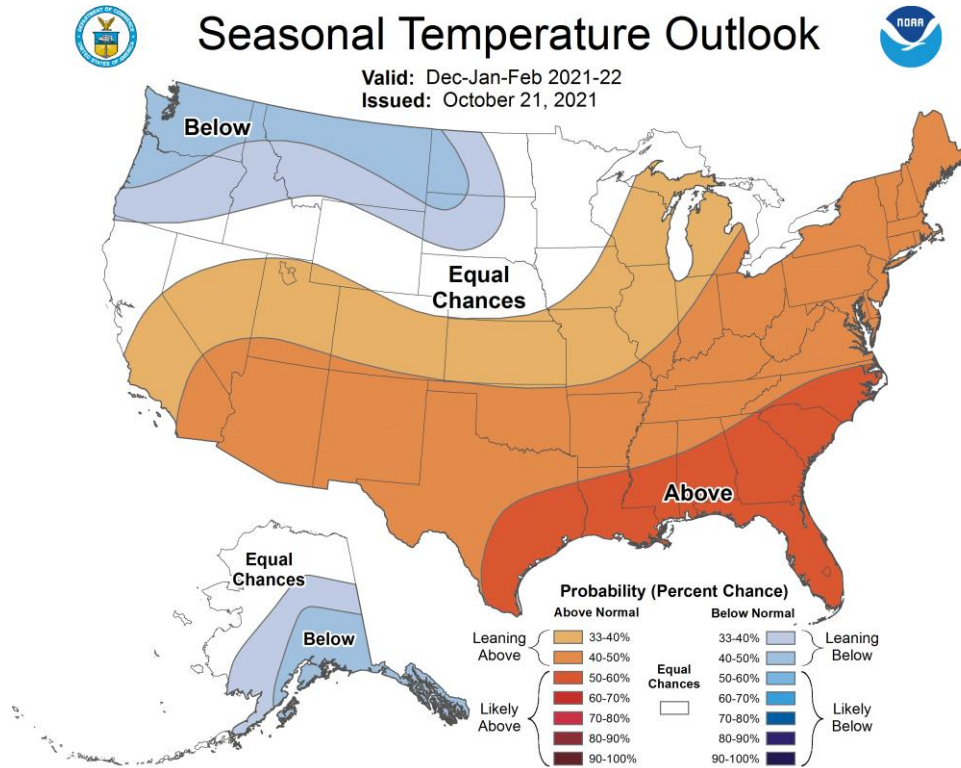


For the third summer straight nobody recorded over 5.00" of precipitation on any summer day. After this happened the first time, I bet it would the next year. When it didn't happen again, I doubled down again. This is how you come home from Vegas penniless, if you can even get a ride! We did have at least one such extreme event occurred in Holyoke, CO on August 19th, 2021. Over eight inches of precipitation hit our CoAgMET weather station over the course of six hours! This was undoubtedly a 100yr rainfall event. For nearly two months, our highest CoCoRaHS report from this event was 4.23". But then, on October 13th, 2021 a true hero stepped to the plate, CO-PH-49, and backfilled their data. They recorded 8.55"! We love these rainfall reports. Don't be embarrassed to go back and fill in data. Better late than never.

Seasonal Prediction: We have already discussed the fact that snow is on the way. But what kind of a snow season are we in for? Our office pays close attention to the NOAA Climate Prediction Center's

seasonal forecasts. We use our state's records to decipher what their seasonal forecasts will mean for us here. I tend to get most involved with seasonal forecasts this time of year because as a skier I'm always curious what kind of a snow season we're in for.

In short, the Climate Prediction Center is projecting an elevated probability of a warmer than normal winter. They are also projecting an elevated chance of a drier than normal winter in southern Colorado and equal chances of above and below normal precipitation in northern Colorado.

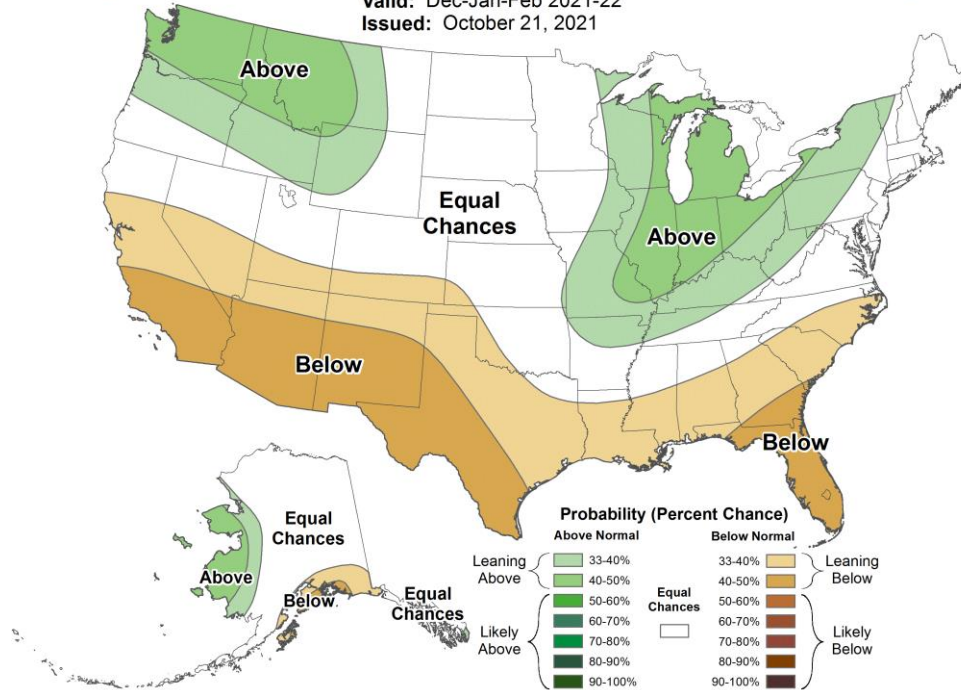




Seasonal Precipitation Outlook

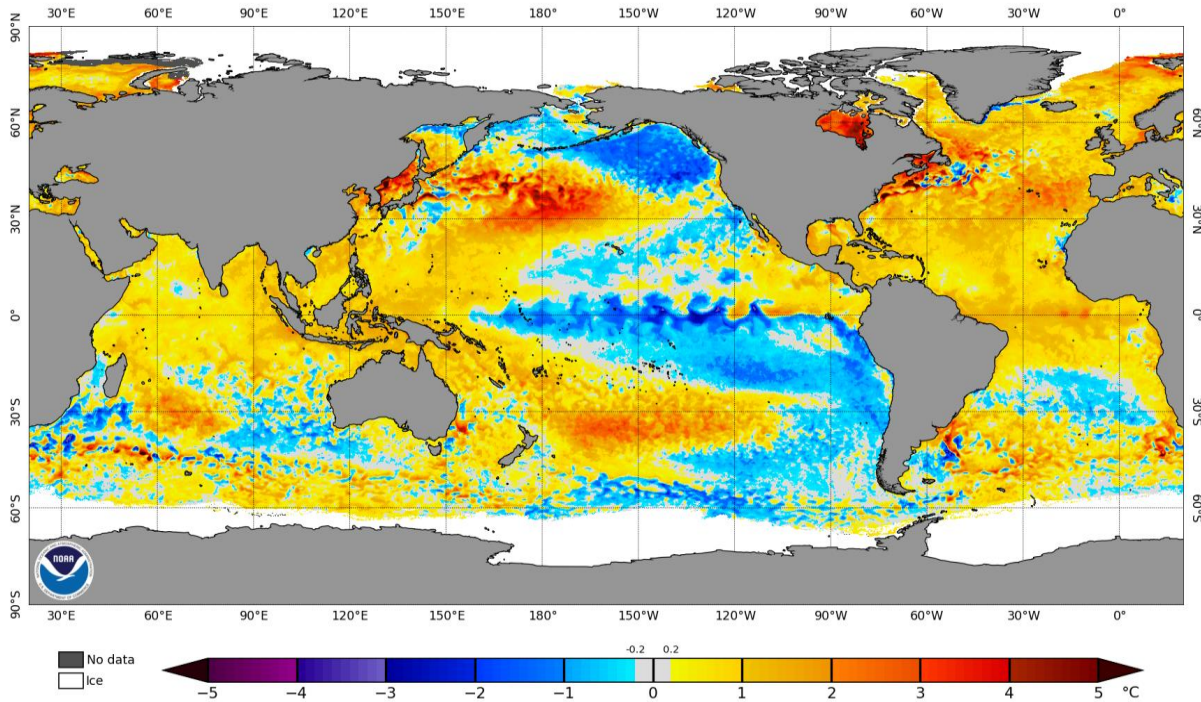


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Let's add a little bit of context to these numbers. Firstly, the numbers do factor in trends, so it's no wonder there is an elevated probability of a warmer than normal winter. Our climate is warming, so all else equal, temperatures are likely to be above historical averages. Our winters are quite variable, so cold winters do still happen. Even so, all else equal, a tilt in probability towards a warmer than normal winter is reasonable. Furthermore, we are entering a La Niña winter. We can see in the sea surface temperature figure below that temperatures over the eastern and central equatorial Pacific are below normal. This is the classic calling card of La Niña. Storms over the tropical Pacific are often responsible for getting the movement started that ultimately generates storms over higher latitudes. La Niña generally produces warm and dry winter conditions across the southern US with wetter and cooler than normal conditions over the northern contiguous US. For Colorado, La Niña does historically raise the probability of a snowier than normal winter in the northern Rockies, but tends to lean dry over the rest of the state. Furthermore, this is our second year in a row of La Niña. In recent second year La Niñas we see a bit of a shift, where only the northwest and northeast corners of the US are wetter than normal. The whole central US is warm and dry. Our last two 2nd year La Niñas were 2012 and 2018, which were both poor snowpack years. To make the story just a little worse, the current sea surface temperature pattern also shows cooler than normal waters from Hawaii to California. Many of our best winter precipitation events occur when a moist current of air sets up from Hawaii to California. As this air moves eastward it can carry an atmospheric river all the way to Colorado, where the moisture falls over our mountains as snow. If the sea surface temperatures are cooler than normal from Hawaii to California then less moisture will evaporate into these atmospheric rivers, leading to weaker snowfall events. All of these factors do not mean a snowy winter is impossible, it just means the proverbial card deck is not stacked in our favor. It's like trying to play poker with a deck that is missing a couple aces and kings.

NOAA Coral Reef Watch Daily 5km SST Anomalies (v3.1) 3 Nov 2021



If you like your seasonal forecasts to be scientific, you should stop reading here. If you like your seasonal forecasts with a side of superstition, then you should also consider the possibility that years ending in '2 may be hexed. Both 2002 and 2012 were awful years for moisture in Colorado. 2000-2002 was arguably our worst drought in modern Colorado history. 2012 was a dry spring, and a punishingly hot summer. It was simply terrible for agriculture. Much like 2002, 2022 will be following two hot, dry-leaning years, and we will be vulnerable to serious hydrologic drought should the winter snows fail us. As discussed above, second-year La Niña means this year bears a similarity to 2012. I predict a dry winter followed by a spring with lots of pressure on the atmosphere to deliver. I'll stop short of making any spring predictions. Here's hoping I'm wrong. I would rather be wrong and get a lot of hate mail than be right.