

Weather and Climate Summary and Forecast

April 2021 Report

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Summary:

- Cooler than average¹ March over the majority of the western US. The extreme cold in the mid-section of the country in February flipped to a very warm March across the eastern half of the country.
- March ended drier than average over the bulk of the western US, continuing a relatively dry winter.
- No reprieve from the drought concerns with over 60% of the west in severe to exceptional drought. Some areas of the PNW have continued to get better, but longer-term concerns linger for most of the west, and additional areas in Texas and the southern to northern Plains are likely to see drought development further.
- A relatively mild start to April will give way to relatively a cool month for most of the west. A few systems may bring precipitation to the PNW, but doubtful for much of anything south into California and the southwest. Continuing from last month, for April the east is forecast to be warm while the west is likely cool.
- The cool, dry conditions will elevate frost risk for what looks like the entire month of April for much of the west coast, especially inland valleys.
- La Niña conditions are weakening in the Tropical Pacific. The Gulf of Alaska and the coastal Pacific SSTs have turned colder and are likely to have a strong play on the cool April forecast. If prolonged we are likely to see a slow start to the summer, if fleeting then a rapid warm-up into May/June likely.

The forecast for a cool March played out over the western US with temperatures below average most everywhere but the inland PNW, northern Rockies, and eastern Montana (Figure 1). The inland PNW was near average for the month, while the western valleys of the PNW, all of California, and the Great Basin ranged from 1 to nearly 4°F below average for the month. The warm conditions from the northern Plains to the center of the country are evident in Figure 1, where temperatures were an amazing 4-6°F above average for the month, the complete opposite from the extremely cold February. The rest of the eastern US was moderately warmer than average, except western Texas which was closer to average (not shown). Precipitation for the month of March was less than forecasted with lower than average amounts across the PNW, California, the southwest, and northern Rockies (Figure 1). The substantially wetter than average conditions in the Front Range of Colorado extended out into the central Plains and were due to snow and other severe storms spinning into the central Plains and Mississippi and Ohio river valleys (not shown).

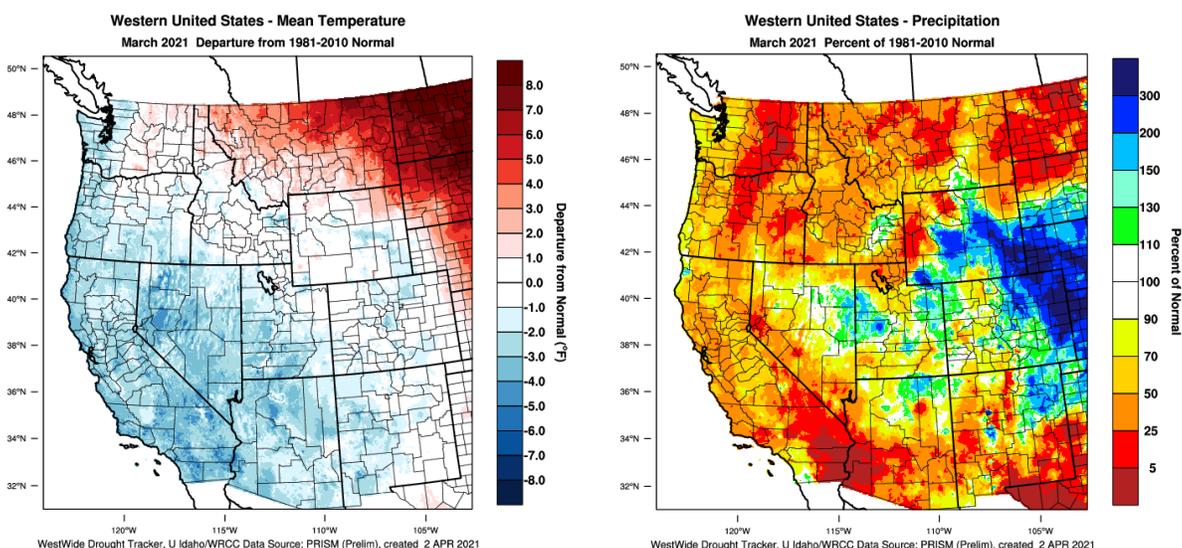


Figure 1 – Western US March 2021 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

¹ Note that all references to normal or averages in this report are to the 1981-2010 climate normal for each weather/climate parameter unless stated otherwise.

With the end of March, we can close the books on the winter of 2020-21. The western US saw mostly a near-average to warmer than average winter (Figure 2), with California, portions of the southwest, Nevada, northern Cascades, and scattered areas in the Rockies seeing 1-3°F above average. For the rest of the country, the northern Plains ended up with a warmer than average winter, while areas to the south into Texas ended up seeing a colder than average winter due to the extreme event in February, and the entire eastern seaboard was warmer than average (not shown). Precipitation amounts for the winter in the western US saw most regions seeing between 5-85% of normal (Figure 2). Portions of western Oregon and the Cascades, much of Washington, and portions of Idaho and Montana ended the winter with near average to wetter than average conditions. Snowpack's recovered some across these same regions in the north. The snowpack in California and southern regions are below average with the bulk of the precipitation period behind us, and the pattern in Figure 2 continues to be reflected in Figure 3 for the current and projected drought concerns in the west (see Drought section below). The dry conditions in the west extend across the Rockies and into the northern Plains and south into Texas while the bulk of the eastern third of the country finished the winter with a near-average to slightly wetter than average season (not shown).

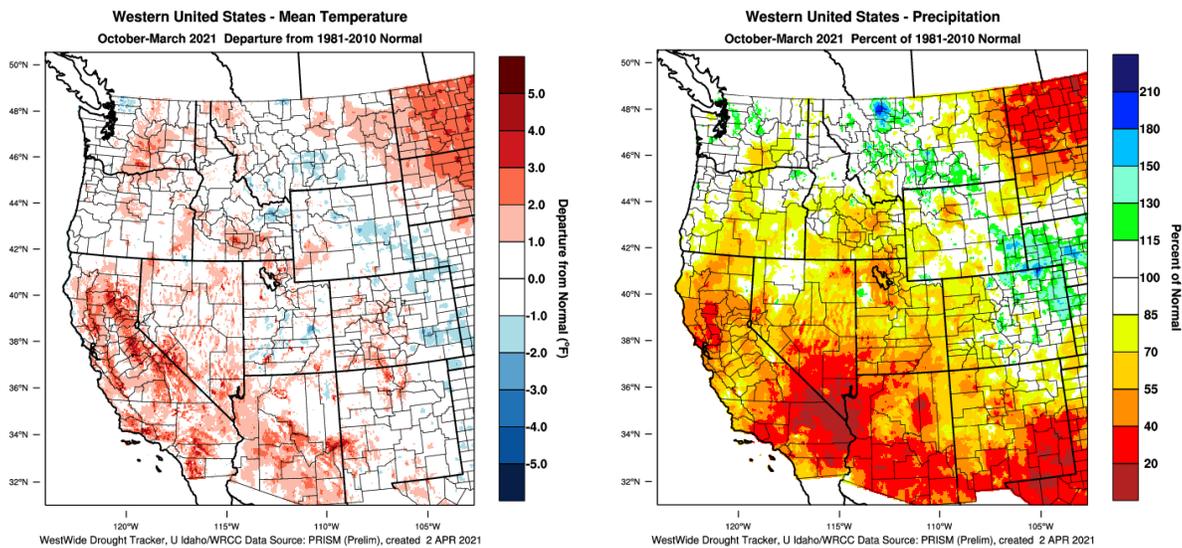


Figure 2 – Western US water year October 2020 through March 2021 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

Drought Watch – The southwest continues to be the epicenter for the western US drought (Figure 3). However, the expanding drought zones now extend from Texas throughout the Rockies and into the northern Plains and even the Great Lakes region. Nearly 90% of the western US continues in some category of drought with over 60% in severe to

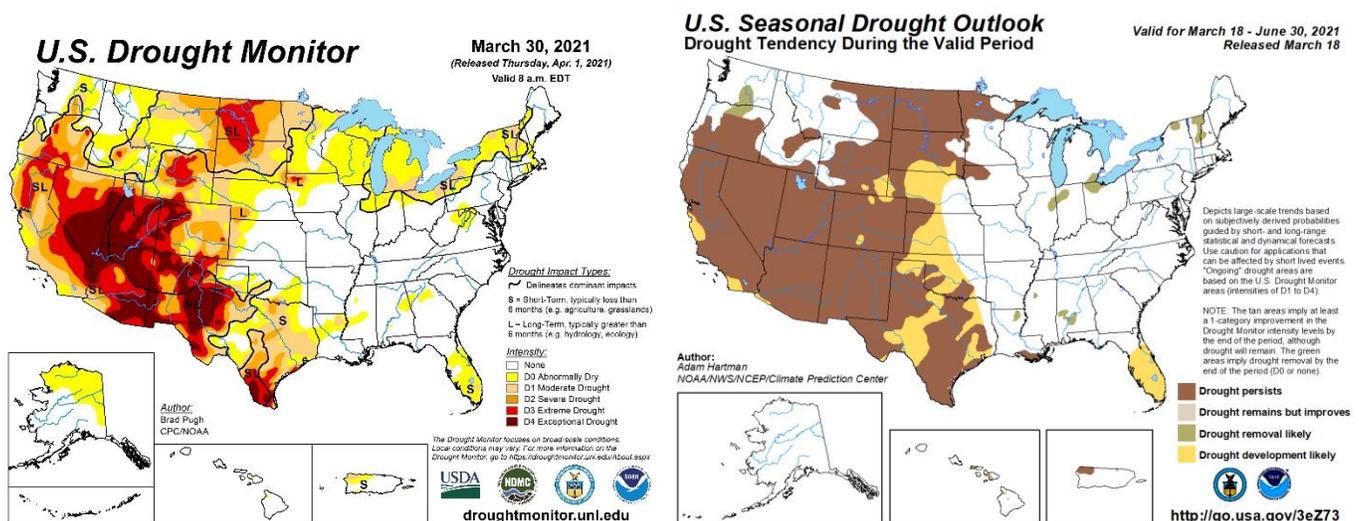


Figure 3 – Current US Drought Monitor and seasonal drought outlook.

exceptional drought conditions. Western Washington, northwestern Oregon, and the northern Cascades along with isolated areas in eastern Washington/Oregon, and Idaho and Montana are the only regions of the west that are not currently listed in a drought category. The longer-term outlook for the US through June continues the forecasted dry conditions for much of the west with further development expected in the southern Plains, Texas, and even south Florida. Winter precipitation in the PNW has lowered drought concerns there, extending along the northern border with Canada and along the far northern California coast (Figure 3, right panel).

ENSO Watch – Weakening La Niña conditions are evident in the Tropical Pacific (Figure 4). As of mid-March, the Climate Prediction Center (CPC) reported that SSTs in the east-central Pacific have dropped to roughly 0.3°C (0.5°F) below average, with patterns in all key atmospheric variables consistent with weakening La Niña conditions. A large majority of model forecasts point to the Tropics returning to near-normal during spring, though a La Niña advisory remains in effect for now. The official CPC/IRI outlook and other agency outlooks are consistent with these model forecasts, calling for a likely transition in the AMJ three-month period. Winter saw some of the typical La Niña conditions in the west with a wet-north and dry-south pattern (see Figure 2). The weakening La Niña still has some play on the overall pattern in the three-month forecast in Appendix Figure 1 where the PNW has a greater chance of being wetter/ cooler than average, while California and the southwest have a greater chance to remain dry.

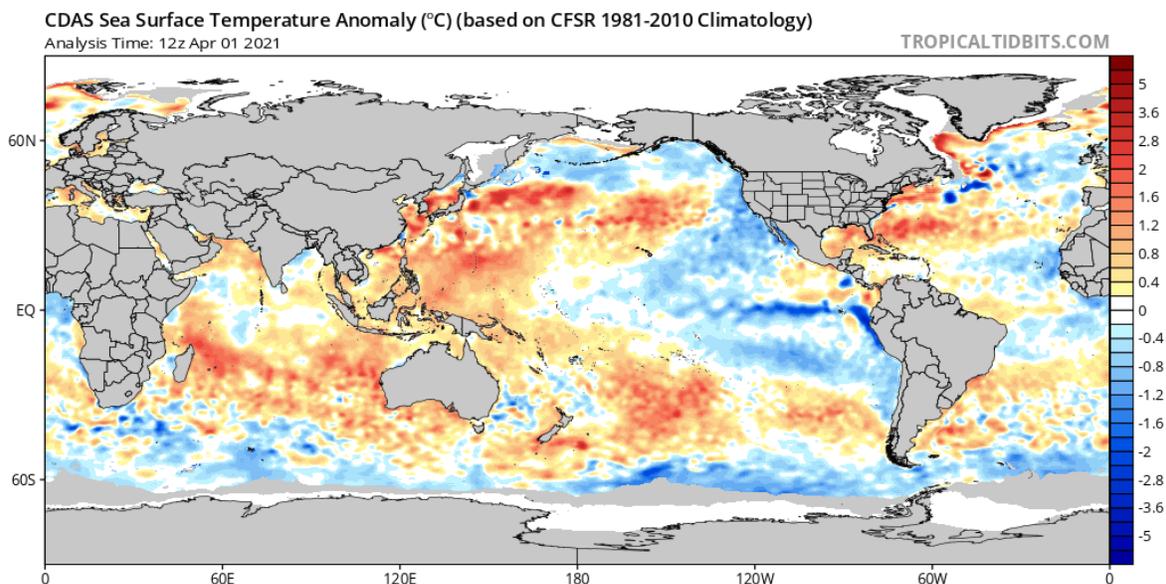


Figure 4 – Global sea surface temperatures (°C) for the period ending April 1, 2021 (image from Tropicaltubits.com).

North Pacific Watch – The big transition in the Pacific over the last 30 or so days has been the cooling in the Gulf of Alaska, along the PNW coast, and south and southwest out toward Hawaii (Figure 4). While there remains a large area of warmer than average SSTs in the central and western North Pacific, the rapid cooling in the surface waters from Alaska to Baja surprised many. This shift moves the Pacific Decadal Oscillation (PDO) to the negative or cold phase. This already has had an influence on the western US with March being cooler than average and now April forecast to be cooler than average for the PNW or near average for California (see below). Is this cooling a response to the weakening La Niña in the Tropical Pacific or shifts in the higher latitude circulation and wind field, and if so, then how long will it remain in place. If long term, the west coast could see a relatively cool start from spring into early summer. If short term, we could transition out of the cool MAM into a rapid warm-up for the summer. However, one thing does appear more likely and that is that much of the western US will remain dry heading into summer.

Forecast Periods:

Next 5 Days: Mild start to the month of April with near-average to slightly below-average temperatures over the next five days. Two chances of precipitation during this period, but mostly confined to northwest Oregon and western Washington. Dry from Southern Oregon and throughout California and into the southwest.

6-10 Day (valid April 10-14): The western US will likely remain near average in coastal California to cooler than average into the PNW during this forecast period. Frost conditions in play for many, especially the PNW, with generally dry conditions over the next two weeks. Possibility of a couple of cold fronts with some precipitation in the PNW, but likely more wind events than precipitation producing events. The rest of the country is forecast to see slightly warmer than average temperatures during this period with chances of precipitation greatest in the northern Plains and southeast.

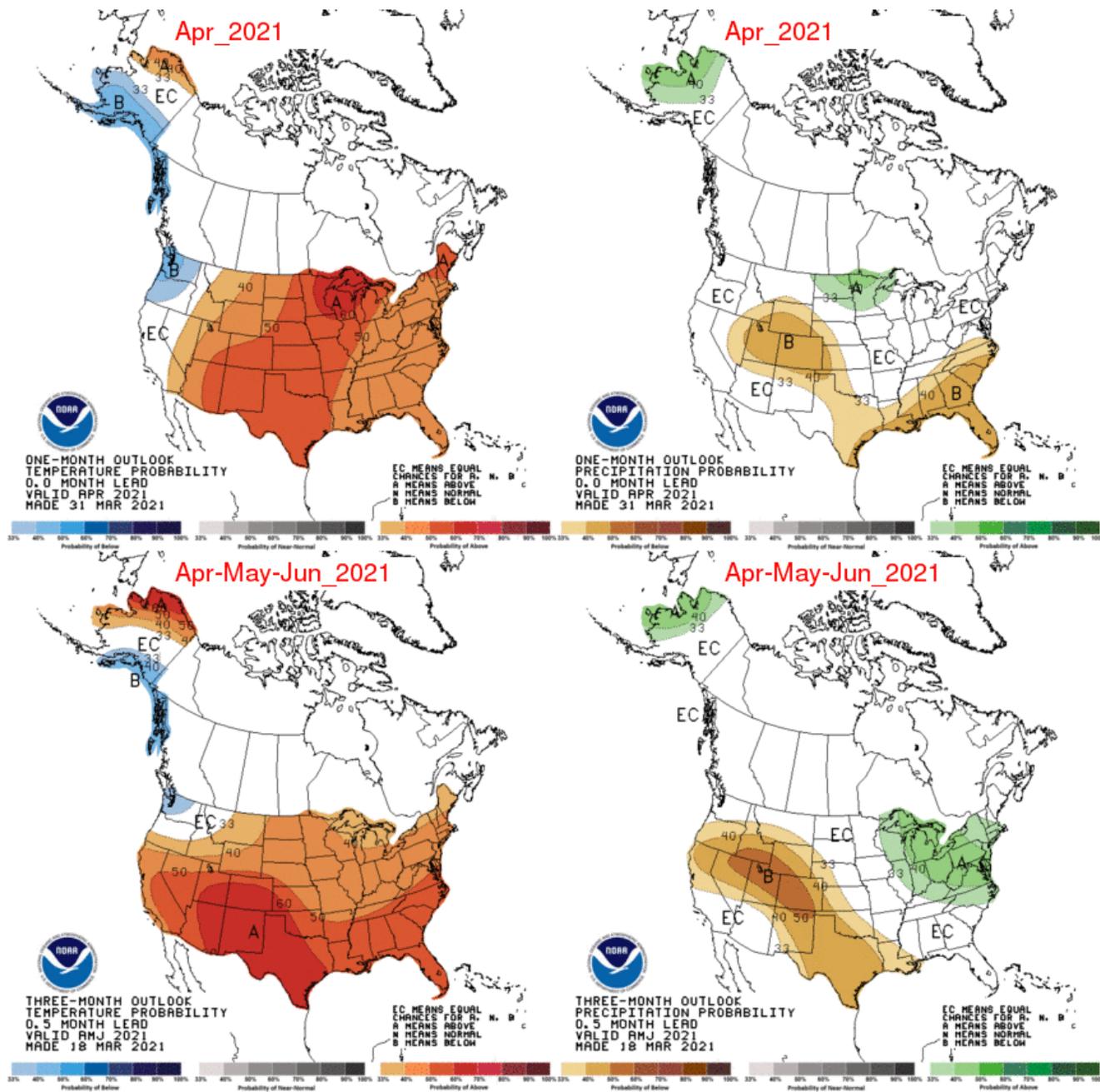
8-14 Day (valid April 12-18): Slight warm up from the last forecast period but still relatively cool for April. PNW likely to see the coolest conditions, while California likely to remain near average, and the interior western states likely to see above-average temperatures. Overall precipitation forecast through mid-month remains on the dry side with the bulk of the western US not likely to see much if any significant rain or snow. The rest of the US is forecast to see largely warmer than average conditions, especially in the Great Lakes region, while precipitation is forecast to be close to the average for the eastern US.

30 Day (valid April 1-30): After a mild start to the month, followed by a generally cool mid-month, April appears headed to a cooler than average month overall in the PNW and near average for California (see Appendix Figure 1). The potential for some precipitation in the last ten days of the month will likely shift much of the west coast to near average amounts for the month. The Four Corners area and the Rockies are likely to see a dry month overall, as is the Gulf Coast states and southeast, while the rest of the country is forecast to see an average month. Temperatures are forecast to warmer than average across the country, except in the PNW and near average conditions in California.

90 Day (valid April-May-June): Over the next three months the bulk of the US is expected to see warmer than average temperatures, except the PNW which has equal chances to be slightly below to slight above (see Appendix Figure 1). The precipitation pattern forecast also continues the dry conditions with the bulk of the area from the PNW southeast to Texas likely to stay on the dry side. Near-average precipitation is forecast for the southwest, the Great Plains southeast to Florida, while the Great Lakes to New England are forecast to see above-average amounts for the season.

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Appendix Figure 1 – Temperature (left panel) and precipitation (right panel) outlooks for the month of April (top panel) and April, May, and June (bottom panel) (Climate Prediction Center, climate.gov).