

Weather and Climate Summary and Forecast

April 2020 Report

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Summary:

- March was relatively cool for much of the western US, slowing what appeared to be an early spring. Temperatures were slightly above normal to 2.5°F below normal over most of the west.
- March extended the relatively dry winter over most of the western US, with northern California to the PNW seeing below normal precipitation. Mountain snowpack for the winter remains below average in California and portions of Oregon but remains above average for much of the northern Cascades and Rockies.
- Drought concerns continue for much of California, Oregon, and portions of eastern Washington.
- The short-term forecast is pointing to a cool/wet period through mid-month, with scattered frost potential depending on the timing of clearing skies between systems.
- The April through June seasonal forecast for the west coast is pointing to a cool and wet April, and then a warm and dry May and June. The overall outlook for the western US to likely end up slightly warmer than normal but staying drier than average for much of the PNW, northern California, and the central Great Basin.

March brought a near average to cooler than average month over the western US (Figure 1). Temperatures ranged from +1.0 warmer to -2.5°F cooler than average. Portions of inland areas in the PNW and Great Basin saw closer to normal while much of California, western Oregon, and Washington were below normal. The last ten days of March brought the coolest conditions relative to average in the month. From the Rockies eastward, the rest of the country was warmer than normal for the month, with areas from Texas along the Gulf Coast states and into the Northeast running 4-8°F warmer than average (not shown). March ended up mostly drier than average across the west with northern California, the PNW, and areas in the Rockies see 10-70% of average rainfall for the month. Areas that experienced a wetter than average month were the central coast of California across into the southeast (200-300% of normal) and a small portion of the Sierra Nevada, Great Basin, and Rockies (Figure 1). For the rest of the country, New Mexico and western Texas experienced a very wet month as did much of the Midwest and Great Lakes, while the northern Plains, the mid-Atlantic, southern Texas, the Gulf Coast, and Florida were moderately to substantially drier than average (not shown).

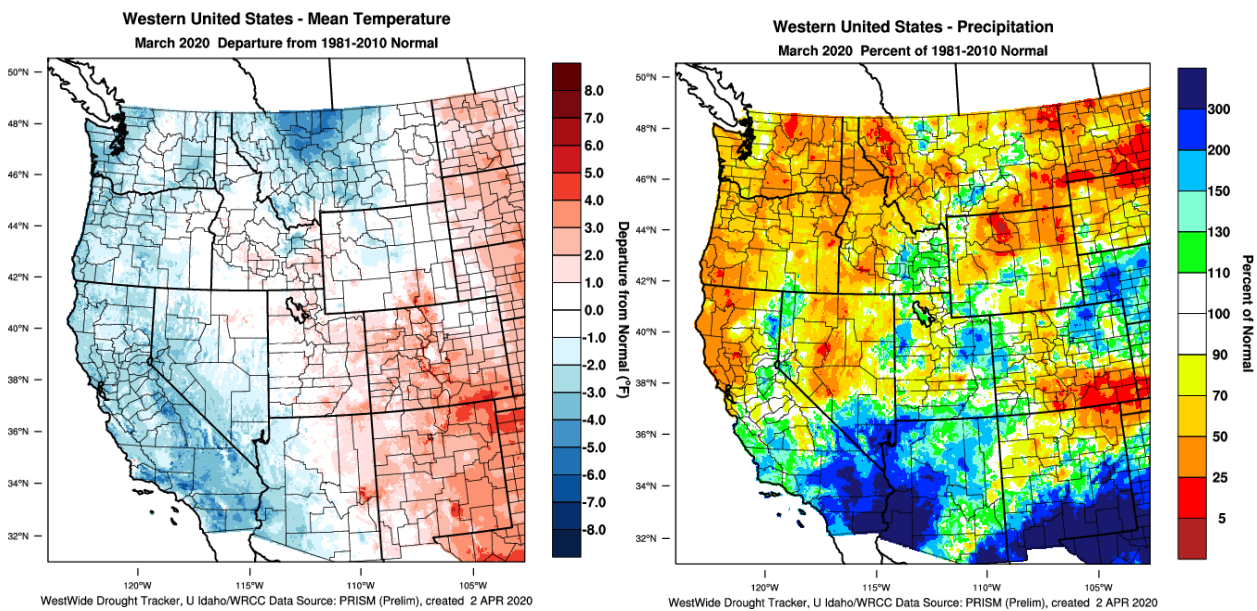


Figure 1 – Western US March 2020 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

The cool March kept the water year (starting in October) near average temperatures but mostly dry over the western US (Figure 2). California continues mostly warmer than average with only portions of inland southern California slightly below normal. Overall Oregon and Washington have been near average to slightly warmer than average for the water year. The rest of the west is running mostly cooler than average, especially the central to northern Rockies (Figure 2). The southwest, Rockies, and northern to central Plains are the only areas of the country running colder than average (1-3°F below normal) while the rest of the eastern US has been seeing temperatures 1-5°F above normal (not shown). The water year so far is running 20-85% of average precipitation over much of the western US with only western Washington, the Blue Mountains, and a few isolated areas in the Rockies closer to average. The most above-average region is Southern California and the southwest, where recent cut off lows brought rains south into those regions (Figure 2). The relatively dry first half of winter is adding to longer-term drought concerns (see Drought section below). Much of the rest of the country has seen wetter than average conditions for the water year, except Texas and across the Gulf Coast which continues to be much drier than average (not shown).

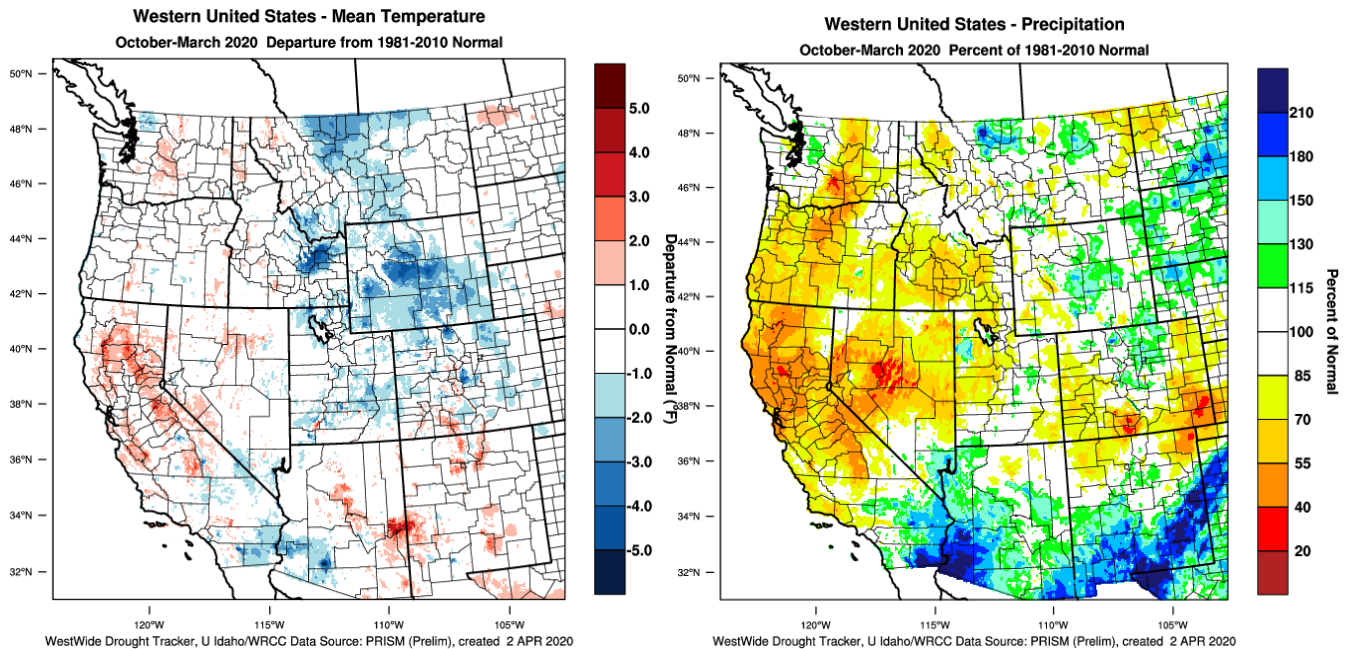


Figure 2 – Western US water year to date (October-March) temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

Drought Watch – Even with some March precipitation in the west, there was little overall improvement in drought conditions, except in the Four Corners region where one-category improvements were seen (Figure 3, left panel).

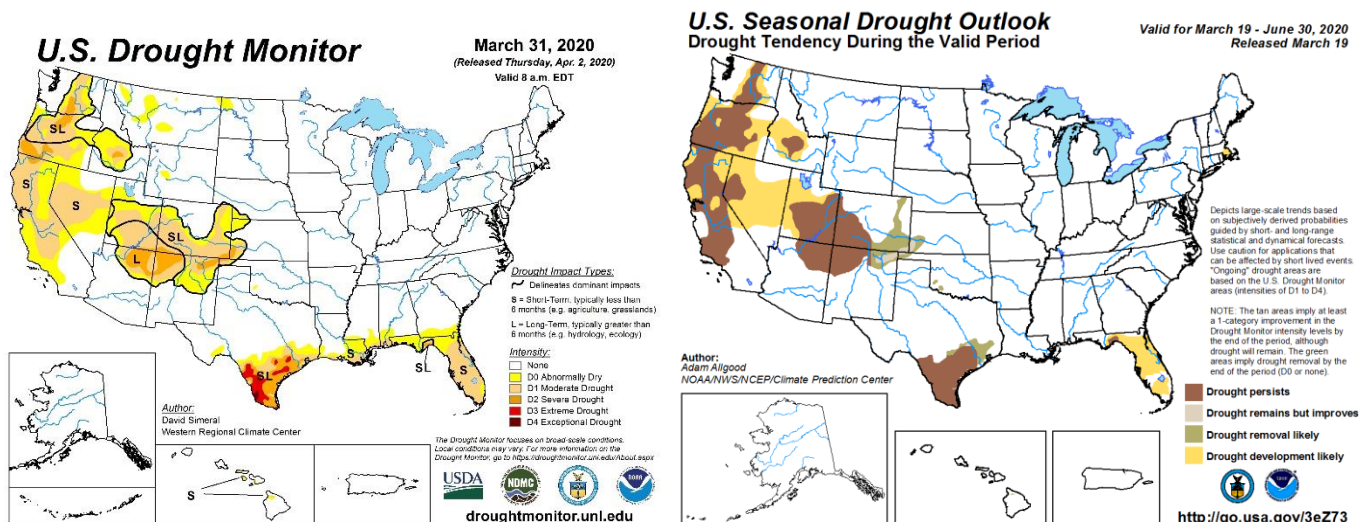


Figure 3 – Current US Drought Monitor and seasonal drought outlook.

Overall, the west continues to slip into short to long term drought conditions except for areas in western Washington, the northern Rockies, and the southwest. During the month of March, most of the Gulf Coast moved into abnormally dry to extreme drought, while the rest of the US remains drought-free. Snowpack numbers for late March across the western US are showing that snow water equivalents are holding at ~70% of normal in California, 80-105% of normal in western Oregon, while remaining 90-125% of normal in Washington and the inland PNW due to normal amounts in March (see above). The longer-term outlook for the US through June continues to show the forecasted dry conditions for much of California, Oregon, and Washington with drought development and/or persistence through spring and into early summer. The Four Corners region and much of southern Texas will likely remain dry, while portions of Florida will likely see drought conditions develop (Figure 3, right panel).

ENSO Watch – The tropical Pacific continues to wax and wane between weak El Niño (warm) and neutral conditions. The latest reports from the Climate Prediction Center (CPC) indicate SSTs in the east-central Pacific were neutral, but above average during mid-March. Patterns in atmospheric variables are split between neutral and borderline El Niño conditions. Most model forecasts favor warm-neutral SST conditions during spring, cooling to average by early summer. The official CPC/IRI outlook and other agencies outlooks are consistent with these model forecasts, calling for the continuation of ENSO-neutral. When ENSO is in a neutral phase, tropical Pacific SSTs are usually close to average. However, ENSO-neutral conditions do not mean that regional weather conditions will necessarily be average, but that these types of springs tend to be the least predictable. The current conditions along with the changes in the North Pacific (see below) are driving the cool/wet April forecast (see forecast periods below and Appendix Figure 1).

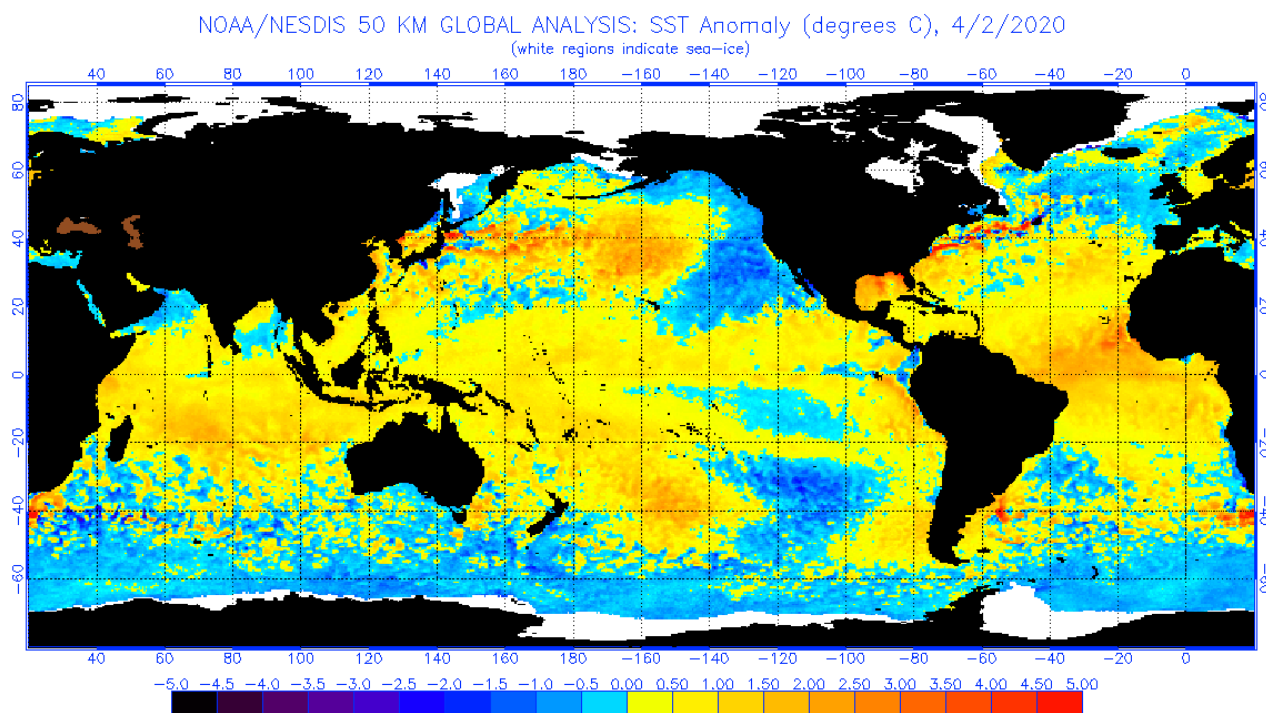


Figure 4 – Global sea surface temperatures (°C) for the period ending April 2, 2020 (image from NOAA/NESDIS).

North Pacific Watch – The pattern of North Pacific SSTs has strengthened from last month with both the warm pool in the central ocean warming and the coastal waters and extension from California to Hawaii cooling. The coastal cooling continues to indicate strong coastal upwelling driven by the wind field over the North Pacific and the cool water extending southwest to Hawaii is likely driven by the cut-off low patterns of the last month or so (Figure 4). The Pacific Decadal Oscillation (PDO) is now in a moderate negative phase which is approaching conditions seen during 2008-2012. I cannot find any indications of how North Pacific SSTs might evolve over the next few months, but the warmer waters in the open Pacific would likely provide more energy and moisture to the atmosphere while the cooler waters just to the west coast would likely lower temperatures slightly.

Forecast Periods:

Next 5 Days: The cool and moderately wet conditions ending the month of March will linger for the next five days or so. Circulation patterns will bring low-pressure areas out of the Gulf of Alaska southward into Oregon and California. Off and on-again precipitation is likely and continued cool temperatures for the next five days or so, then turning to more seasonal temperatures. Frost risk will vary based upon the timing of clearing skies at night.

6-10 Day (valid April 7-11): For the Rockies westward this forecast window will be dominated by the cooler than average conditions of the start of the month with Southern California and southwest likely being the coldest from average. From the Rockies eastward the rest of the country is forecast to see above-average temperatures during this forecast period with the Gulf Coast states the warmest from average. After a moderately wet start to the month, this period is forecast to be relatively dry in the PNW, but wetter than average south into California and especially the southwest. The remainder of the country is forecast to see near average to above-average precipitation during this period except for south Florida which is forecast to be dry.

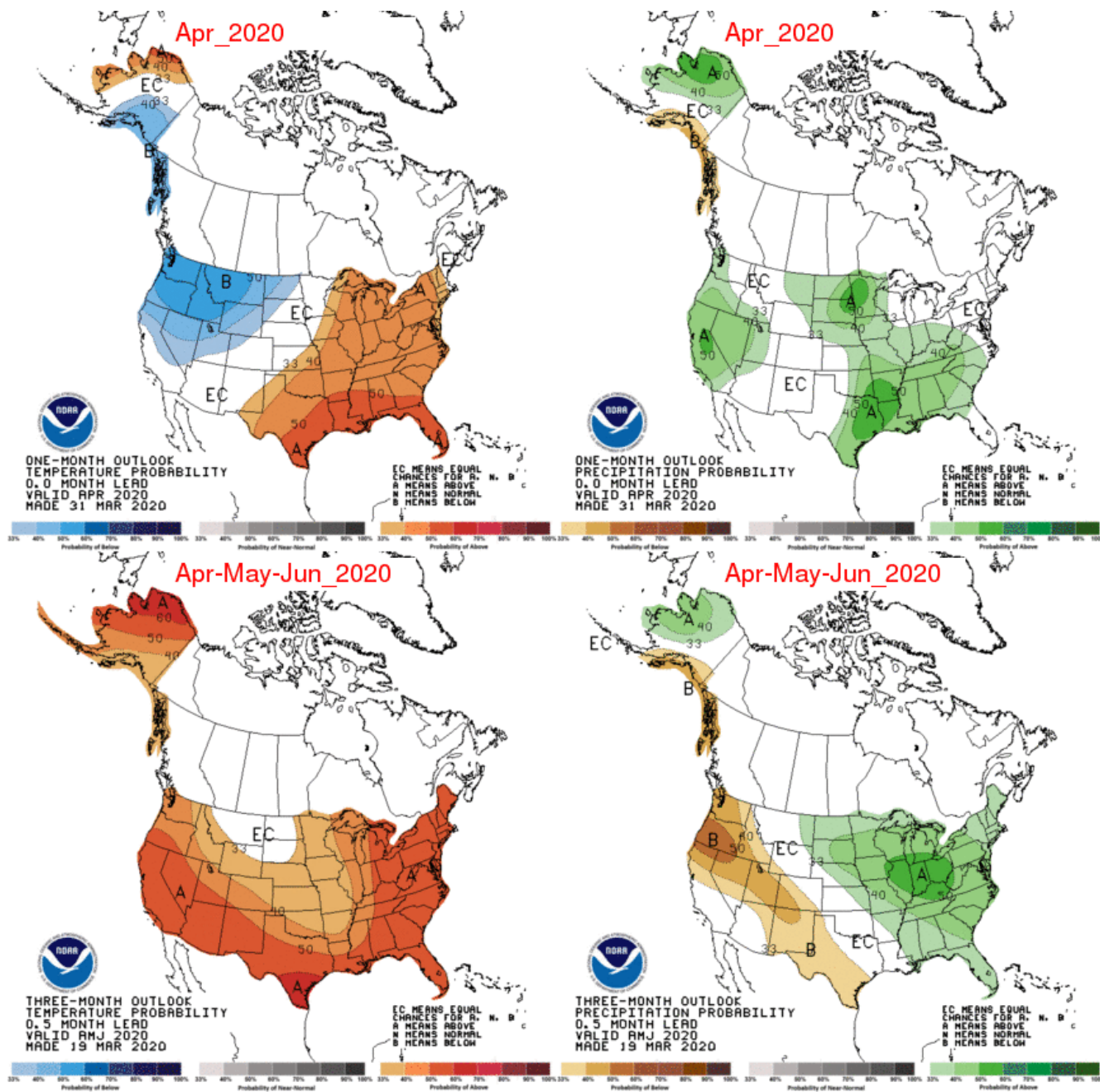
8-14 Day (valid April 9-15): The temperature forecast through mid-month continues to indicate that the western US from the Rockies west will remain cooler than average for this time of year. The rest of the US is forecast to continue to see warmer than average temperatures during this forecast period, except northern New England which is forecast to be near average. Precipitation amounts are forecast to be near-average for northern California into the Cascades and western valleys of Oregon and Washington. The rest of California eastward across the country is forecast to see wet conditions through mid-month.

30 Day (valid April 1-30): As mentioned back in January, the current forecast for April continues to show cooler than average conditions for much of the western US (see Appendix Figure 1). The PNW and the northern Rockies are forecast to have the coolest month, while central to southern California across the southwest and into the Plains are likely to be closer to average. The remainder of the country is forecast to see warm conditions during the month of April. The precipitation forecast points to much of the western US seeing a wet April, while portions of the southwest and Rockies will likely see a near average month. The eastern US is forecast to see a mostly wet month of April, except Florida and portions of the eastern Great Lakes and New England which are more likely to see near average precipitation for the month.

90 Day (valid April-May-June): The 90-day forecast through early summer is indicating that the vast majority of the country will likely see a warmer than average period (see Appendix Figure 1). This includes portions of the western US that will likely start off the period with a cool April. In a similar framework, while the western US will likely see a wet April, the 90-day outlook has the PNW, northern California, and much of the Rockies likely seeing drier conditions through June. This is also reflected in the Seasonal Drought Outlook above. The eastern US is forecast during this period to likely see a wet period with the greatest chance in the Ohio River Valley and the Great Lakes.

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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).