

Weather and Climate Summary and Forecast

May 2020 Report

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Summary:

- April brought relatively mild temperatures across most of the western US, albeit with some frost/freeze pressure early in the month.
- Dry conditions continued over most of the western US, with northern California to the PNW seeing below normal precipitation for the month of April. Mountain snowpack at the end of the winter left many regions lacking with snow water equivalents running 20-60% of normal except in the northern Cascades and Rockies where most basins are running above normal for this time of year.
- Short to long term drought conditions are forecast to remain in place or develop for much of the west.
- The short-term forecast is pointing to a cool/wet period over the next few days giving way to warm and dry conditions through mid-month and beyond.
- The May through July seasonal forecast for the western US is pointing to the likelihood of warmer than average conditions into the summer. The overall precipitation outlook continues the drier than average conditions for much of the PNW and northern California, and near average elsewhere in the west.

The April forecast flipped from a cool west and warm east to an average to warmer than average west and quite cold east. This was the result of a shift in the jet stream bringing more ridging to the west and troughing in the east. For the western US, temperatures in April were near average to warmer than average, especially in Northern California, western Oregon, and the Four Corners region (Figure 1). The inland PNW was slightly below average while the northern Rockies and Great Plains saw temperatures of 3-7°F below normal. From the Rockies eastward, the rest of the country was much cooler than normal for the month, except right along the coastal regions from the Gulf to New England (not shown). The precipitation pattern for April showed largely dry conditions, except in central to southern California where cut-off lows dipped south into that region during the month, largely missing the northern portion of the state. Percent of normal amounts ranged from 5-75% over most of the west, but 200-300% of normal southward in California (Figure 1). For the rest of the country, New Mexico and western Texas experienced a very dry month as did much of the Plains, Midwest, and Great Lakes, while the Ohio Valley, the mid-Atlantic, southern Texas, the Gulf Coast, and Florida experienced a moderately wet month (not shown).

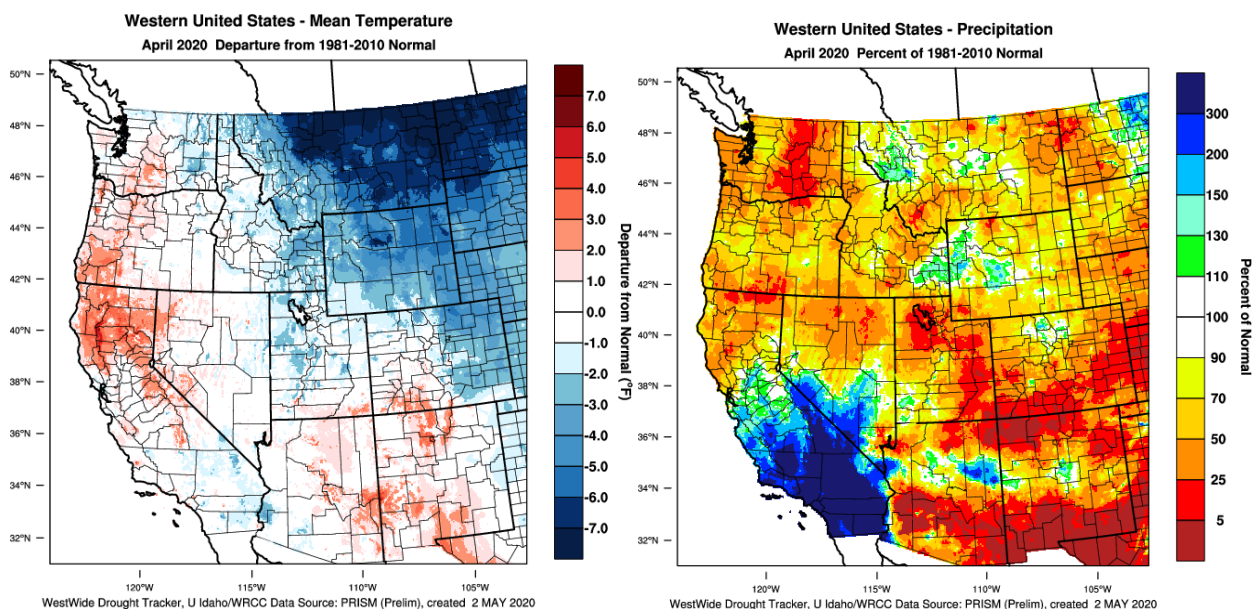


Figure 1 – Western US April 2020 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

The conditions in April did not change the water year (starting in October) overall conditions, keeping temperatures near average and precipitation amounts mostly dry over the western US (Figure 2). Central to Northern 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 Gulf Coast states and the eastern third of the US has been seeing temperatures 1-4°F above normal (not shown). The water year precipitation for the western US is running 20-85% of average 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 cut-off lows in March and April brought rains south into those regions (Figure 2). The relatively dry first half of winter and now spring continues to add 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 through Florida, which continues to be much drier than average (not shown).

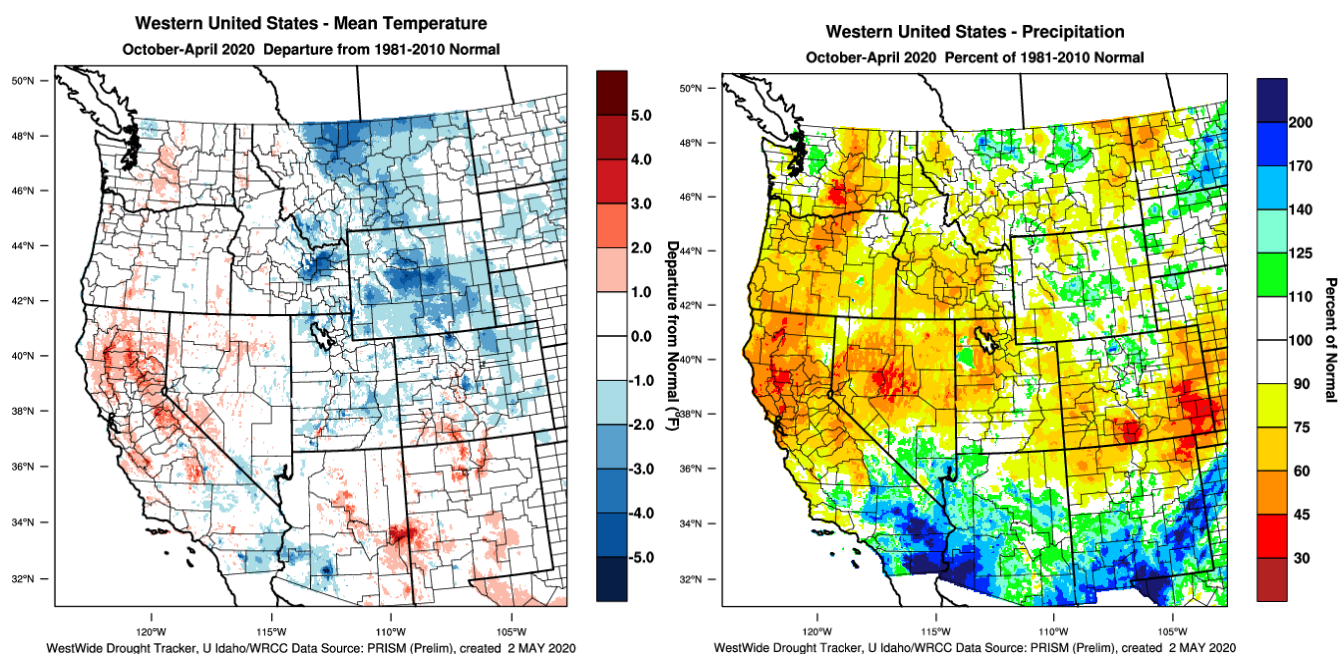


Figure 2 – Western US water year to date (October-April) temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

The first run at growing degree-days mapped over the western US shows a March through April that was above normal in a large area of California and moderately to slightly above normal in western Oregon (Figure 3). In eastern Oregon and Washington wine regions, the period brought slightly above average to slightly below average heat accumulation depending on the location. In California, the Bay Area was near average to slightly below average while much of Southern California was moderately below average. Reports of bud break across the west point to an early timing in most of California, albeit slightly slowed of late, to near average to slightly early in Oregon and early in Washington.

Heat accumulation (GDD) amounts for four locations that I have tracked for many years in Oregon are all substantially above the 1981-2010 normals for the month of April and above the average of the last 15 years for the sites. Compared to 2019, Roseburg and Medford are 10% up during the same period in 2020 while McMinnville and Milton-Freewater are running 2 and 15% below, respectively (see the Appendix Figure 1 for four locations in Oregon).

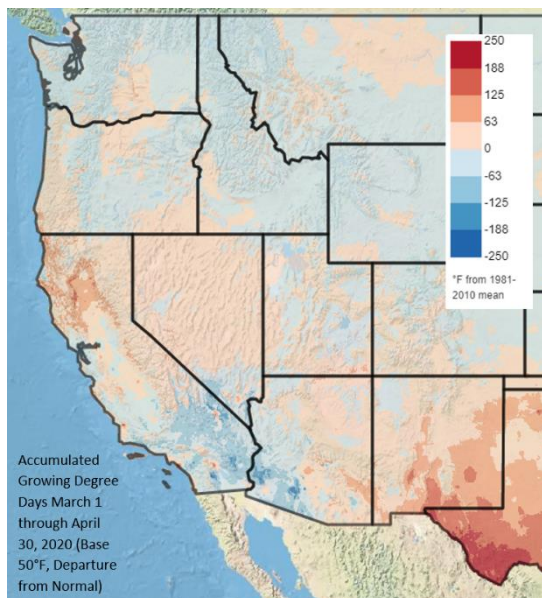


Figure 3 – Western US March through April 2020 growing degree-days (image from Climate Impacts Research Consortium, University of Idaho).

Drought Watch – The vast majority of the western U.S. received little to no precipitation during the month of April, except for small pockets of the Pacific Northwest and much of the Southwest (Figure 1). Temperatures were also generally above normal, with record-setting heat across parts of the Southwest with daily highs of 10 to 20 degrees above normal. The heat and dry weather led to deteriorating drought conditions across several states (Figure 4; left panel) with much of the west continuing to slip into short to long term drought conditions except for areas in the northern Rockies, Southern California, and the southern portions of southwest. During April, the Gulf Coast remained dry continuing to move into abnormally dry to extreme drought, while the rest of the US remains drought-free. Snowpack numbers for the end of April across the western US are showed these impacts with snow water equivalents are holding at 45-55% of normal in California, 20-45% of normal in southern and eastern Oregon, 50-60% of normal in the Oregon Cascades, and 70-115% of normal in Washington and the inland PNW (not shown). The longer-term outlook for the US through July continues to show the forecasted dry conditions for much of California, Oregon, and Washington with drought development and/or persistence through mid-summer. The Four Corners region will likely remain dry, while southern Texas, the Gulf Coast, and Florida will likely see drought conditions subside (Figure 4, right panel).

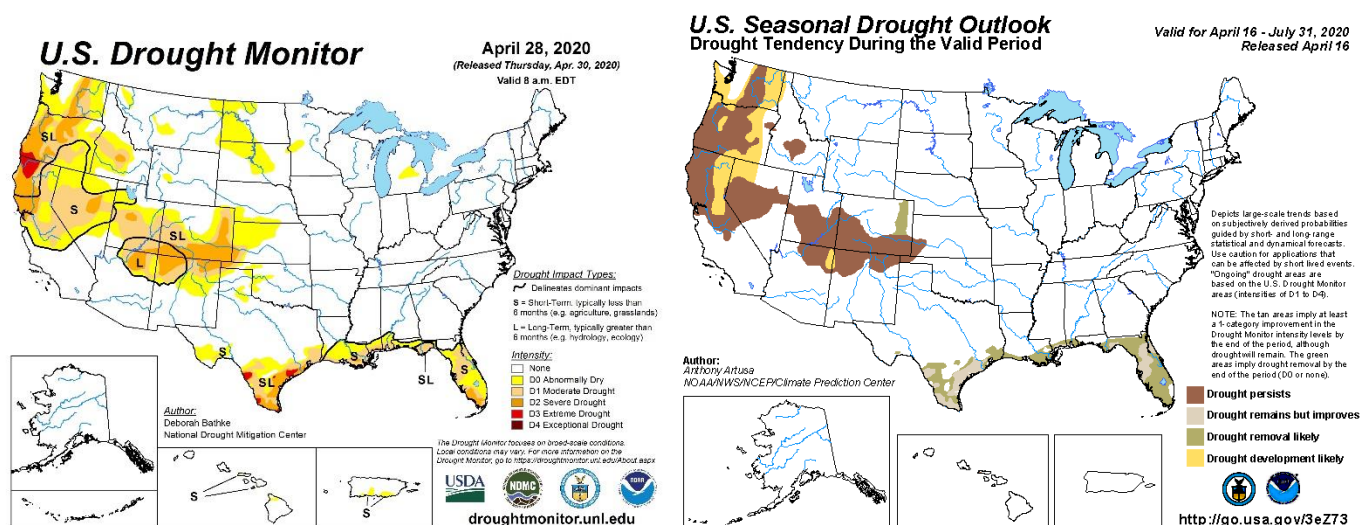


Figure 4 – Current US Drought Monitor and seasonal drought outlook.

ENSO Watch – Conditions in the tropical Pacific continue to move between weak El Niño (warm) and neutral conditions. In mid-April, the Climate Prediction Center (CPC) report indicated that SSTs in the east-central Pacific were near the borderline of weak El Niño, however the patterns in atmospheric variables are indicating mostly neutral 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 into early summers tend to be the least predictable. The current conditions along with the changes in the North Pacific (see below) are driving the longer-term forecast (see forecast periods below and Appendix Figure 2).

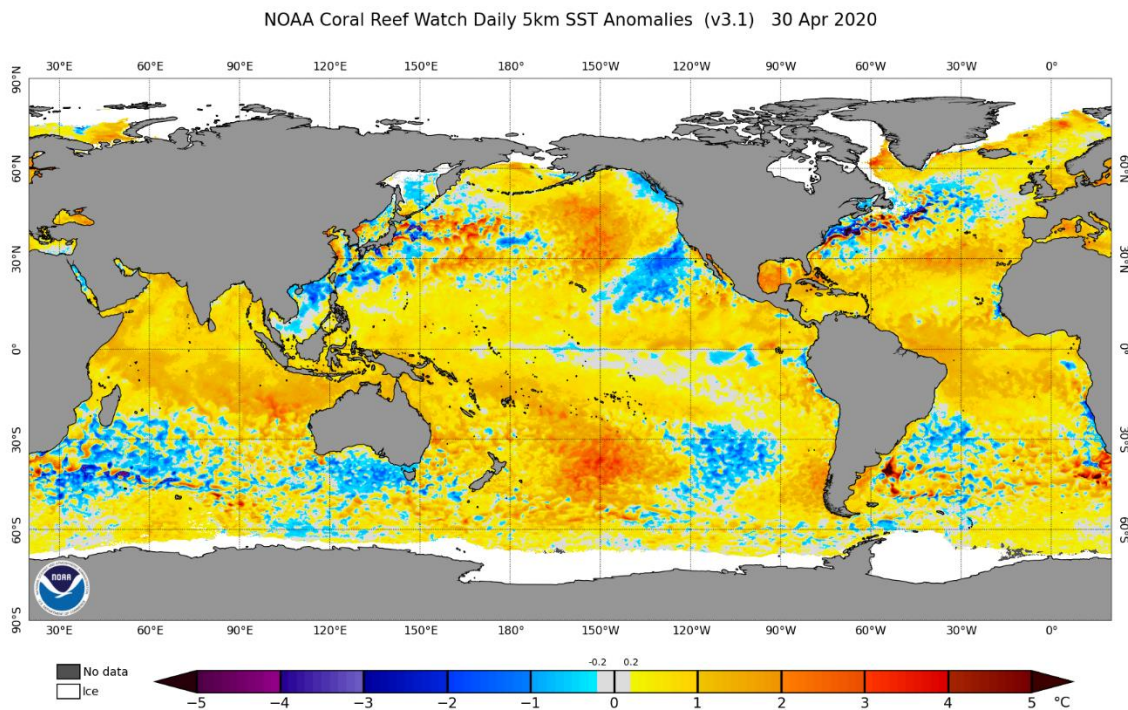


Figure 5 – Global sea surface temperatures (°C) for the period ending April 30, 2020 (image from NOAA/NESDIS).

North Pacific Watch – The overall pattern in the North Pacific SSTs has continued from last month; however, the spatial extent of the cooler surface temperatures has declined. Cooler than average conditions continue southwest of California, but the area is about half the size it was in March. In addition, the cooler coastal waters along the western North American coast, indicative of strong coastal upwelling, has warmed substantially over the last 30 days. The result is that the north Pacific has warmed over a relatively large part of the basin (Figure 4). The Pacific Decadal Oscillation (PDO) has remained 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 and now coastal regions, would likely provide more energy and moisture to the atmosphere (higher humidity).

Forecast Periods:

Next 5 Days: The end of April and start of May has brought with it a shift in circulation ushering in some much-needed precipitation over much of the west. These conditions will continue off and on over the next five days, with conditions wetter the further north one goes, then the cool and wet will give way to warmer conditions filling in from the intense heat currently in the southwest. Temperatures will rise to above seasonal for this time of year toward the end of the week.

6-10 Day (valid May 7-11): Split conditions over the US expected through the first ten days of the month with the Rockies westward forecast to be much warmer than average while the eastern US is expected to see much cooler than average temperatures. The Southwest is expected to continue to see quite warm temps during this period with the heat filling in up and down the west coast. The Great Lakes and New England, after seeing a warm start to the spring is likely headed for some very unseasonably cool conditions through the 11th of the month. After some welcome precipitation to start to the month, this period is forecast to be relatively dry in the PNW, Northern California, and the northern Rockies. Dry conditions will also likely continue across the Gulf Coast states and up into the Great Plains. Portions of New Mexico and Texas along with New England are forecast to see a wetter than average period.

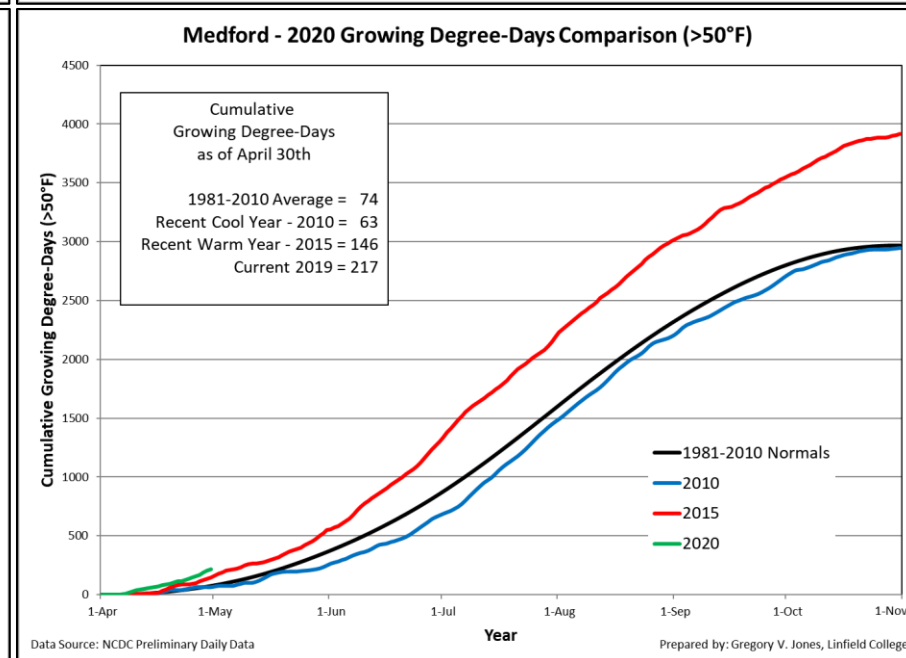
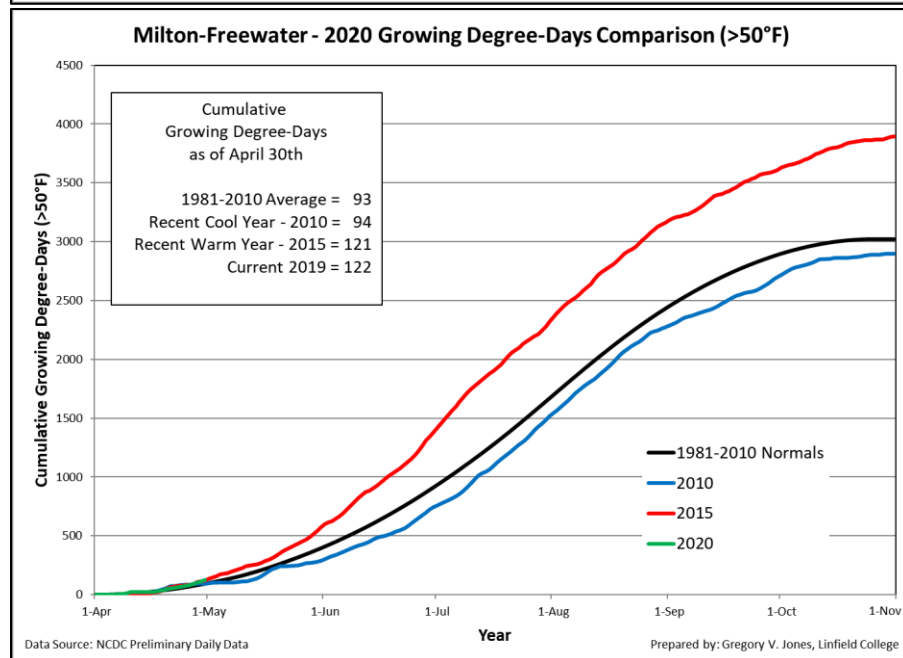
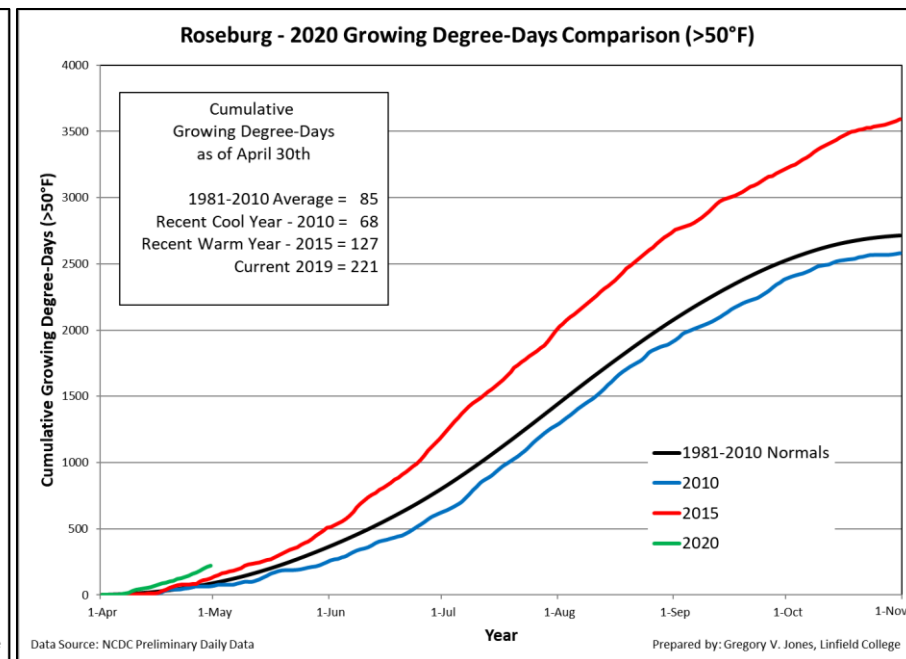
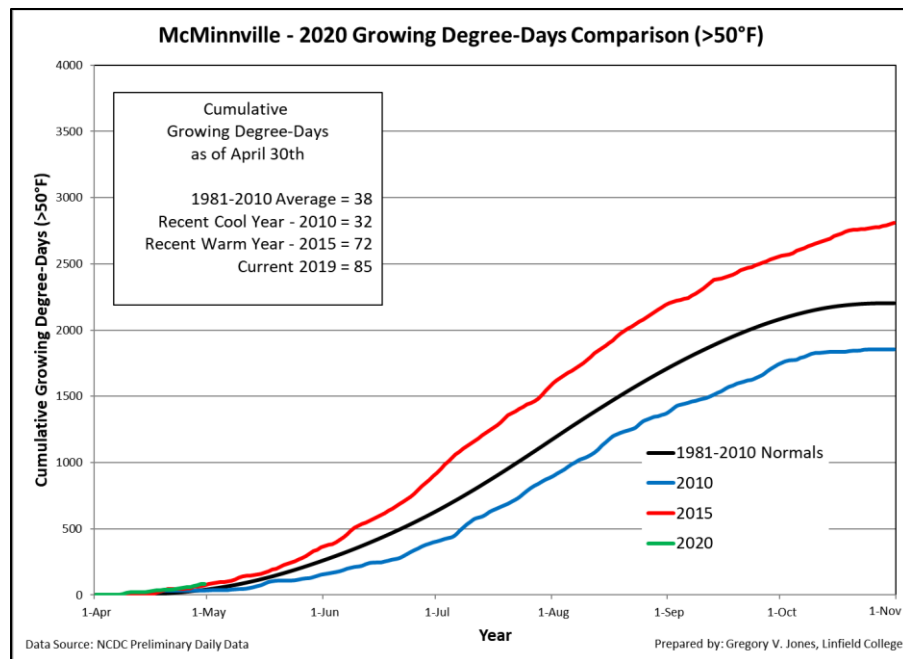
8-14 Day (valid May 9-15): Overall temperature and precipitation patterns are forecast to hold from the previous forecast period through the 15th of the month. Temperatures forecast above average west and below average east are due to a fairly strong north-south pattern in the jet stream. While there will likely be one or two rain events in the west during this period, they are not forecast to be much more than settling the dust. Dry conditions are forecast to remain over the west and central to Gulf Coast states, while the Desert Southwest and New England are forecast to see wetter than average conditions for this time of year.

30 Day (valid May 1-31): The temperature forecast for May reflects the previous two forecast periods with the majority of the west and south into Texas likely to see a warmer than average month while the Great Lakes and New England will likely remain cool (see Appendix Figure 2). The precipitation forecast points to much of the western US being closer to normal for the month of May, except the central Great Basin which forecast to see a dry month. The rest of the country is forecast to see mixed bag for precipitation in May, with areas of the Gulf Coast, Mississippi River Valley, and New England forecast to see a wetter than average month while the Great Lakes are forecast to be dry.

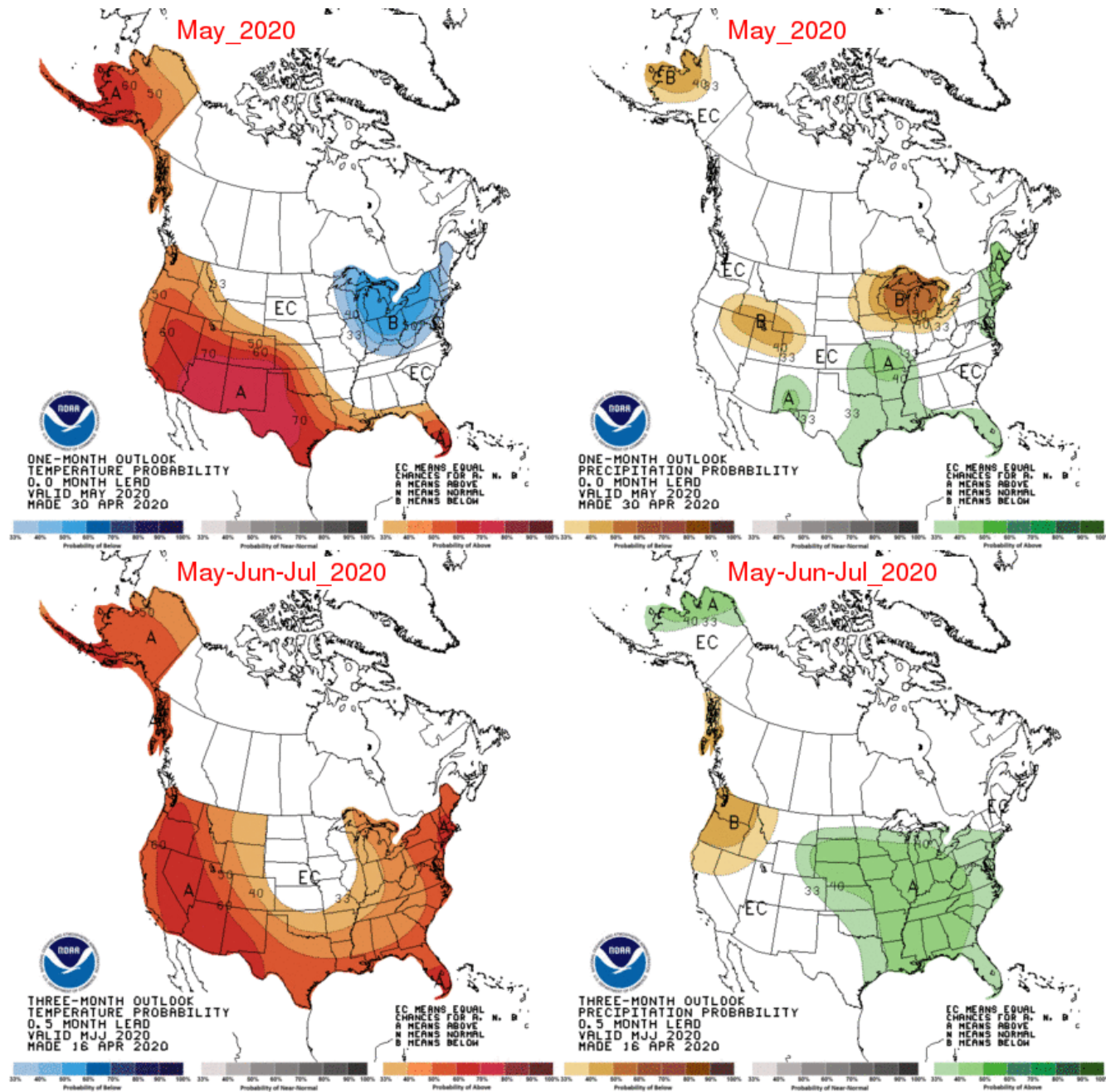
90 Day (valid May-June-July): The 90-day forecast pattern through July is indicating that most of the country will likely see a warmer than average period (see Appendix Figure 2). The only area of the country that will likely be closer to average is the northern Plains, which has seen this pattern for a few years now. The 90-day outlook for precipitation continues to indicate that the PNW and northern California are likely to remain dry, which is also reflected in the current US Drought Monitor and US Seasonal Drought Outlook in Figure 4 above. The southern portions of the western US and into the Rockies are forecast to be closer to normal for this period, while much of the eastern US is forecast to see wetter than average conditions through July.

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Appendix Figure 1 – Cumulative growing degree-days (base 50°F, no upper cut-off) for McMinnville, Roseburg, Milton-Freewater, and Medford, Oregon. Comparisons between the current year (2020) and a recent cool year (2010), a recent warm year (2015) and the 1981-2010 climate normals are shown (NCDC preliminary daily data).



Appendix Figure 2 – 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).