Weather and Climate Summary and Forecast
November 2020 Report

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Summary:

- October was warmer than average[1] across the vast majority of the western US, especially in California and the Great Basin but closer to average in the PNW and across the northern Rockies.
- October was also dry for the bulk of the western US, except in portions of eastern Washington and northern Idaho and Montana.
- With a slow start to the fall rainy season, on top of a weak monsoon season and record high temperatures for many, the western US drought footprint is now above 90%, with nearly 60% in severe to exceptional drought. The forecast through the first half of winter is for much of the west to remain dry, with the exception of the PNW which is forecast to see a reasonable start to early winter rains.
- The ridge of high pressure that has brought a warm and dry end to October and start to November is expected to give way to a few weak cold fronts out of the North Pacific, but also the chance for a couple of Arctic air mass incursions during early November. The result will likely be a relatively cold second week to mid-month period. Precipitation amounts will be light for most, but relatively heavy for the PNW and into British Columbia.
- The forecast for November through January is largely based on the La Niña conditions in the Tropical Pacific and a relatively warm North Pacific. As such, the PNW is anticipated to see near average to slightly cooler and wetter first half of winter, while California is expected to be warmer than average and near average to drier than average through December.

The month of October was much warmer than average over California and the southwest (2-6°F) while less so in the PNW. There was a stark contrast between the west and the east side of the Rockies where a colder than average month played out in the central US (Figure 1) while warmer conditions were seen in the southeast and eastern seaboard (not shown). October was very dry over most of the western US, except for portions of Washington east into the Northern Rockies (Figure 1). Much of the rest of the country was also dry, except portions of the southeast which experienced a wetter than average month largely due to tropical systems during the month (not shown).

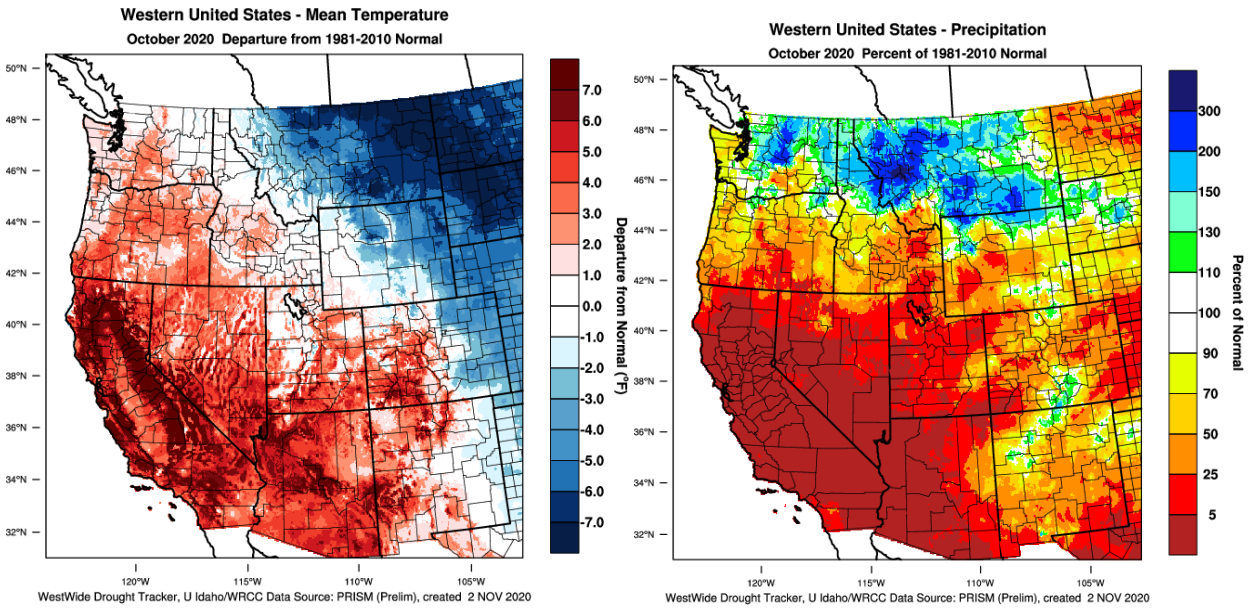

Figure 1 – Western US October 2020 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

[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.

2020 so far has seen temperatures in the western US running largely near average to above-average (Figure 2). Portions of western Washington and Oregon, eastern Washington, and Idaho continue to run slightly cooler than average or average for the year. The northern Rockies, the northern Cascades in Washington, and northern to central Plains have seen a year to date that is near average to colder than average (0-2°F below normal) while Texas, the Gulf Coast states, and the eastern third of the US have been seeing temperatures 1-3°F above normal (not shown). Dry conditions remain over much of the western US with precipitation amounts in most of California, the eastside of the Cascades, and the bulk of the Great Basin and Four Corners region continuing to run 20-70% of average rainfall (Figure 2). Portions of western Oregon are closer to average year to date, while western and eastern Washington, the Blue Mountains of Oregon, much of Idaho, and the California-Arizona border have seen 90-180% of average rainfall. The relatively dry year to date for 2020 continues to add to longer-term drought concerns for much of this area (see Drought section below). On the other hand, the majority of the eastern third of the country has seen wetter than average conditions since the first of the year, while dry conditions continue from the Panhandle region into the Plains and in northern New England (not shown).

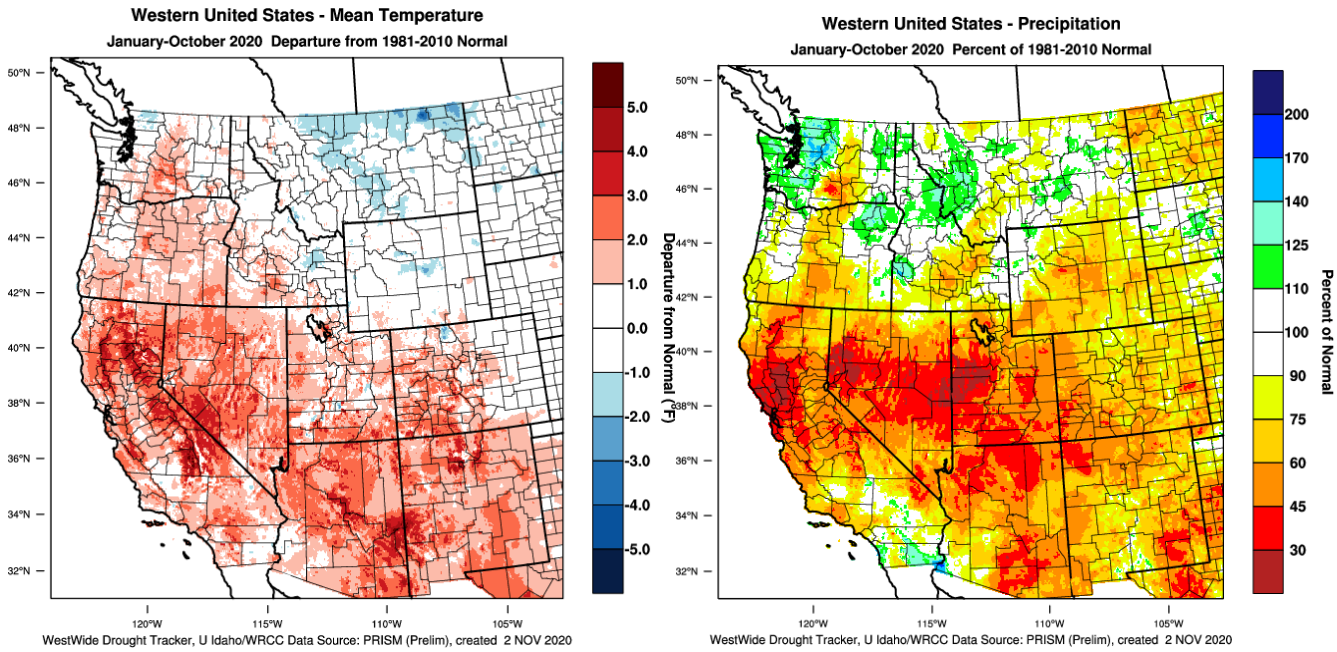

Figure 2 – Western US year to date (January-October) temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

With the end of October, we can close the calendar on the 2020 vintage and finalize growing degree-days for the western US. Heat accumulation (GDD) for the western US from March through October shows the vintage ending up largely above normal (Figure 3). Vintage GDD amounts over most of California, Oregon, and Washington ended up 5-20% above the 1981-2010 normals. Isolated areas in eastern Washington, eastern Oregon, and Idaho were closer to normal or as much as 5-10% down from average. In California, the vast majority of the state shows above-average heat accumulation while isolated inland areas of Southern California ended up below average.

In Oregon's main wine regions, growing season temperatures were 0.2°F above average in Milton-Freewater, to 1.9°F above average in McMinnville, to 2.7 and 2.9°F above average for Medford and Roseburg, respectively. Growing degree-day amounts for these four locations reflect the broader regional patterns seen in Figure 3 with higher heat accumulation in the more southerly locations and close to average for northern Oregon and eastern Washington and eastern Oregon. All four locations ended the April through October calendar period above the 1981-2010 normals for 2020 (6 to 25%), with eastern Oregon (Milton-Freewater and the Walla Walla region) continuing to be closer to the long-term average (see Appendix Figure 1). Compared to the average of the last 15 years for the sites, Medford ended 10% up, Roseburg 11% up, and McMinnville 3% above average, while Milton-Freewater ended 3% down. Compared to 2019, Medford ended 2020 12% higher, Roseburg 9% higher, McMinnville 6% higher, and Milton-Freewater ended right at the 15 year average (see Appendix Figure 1 for four locations in Oregon).

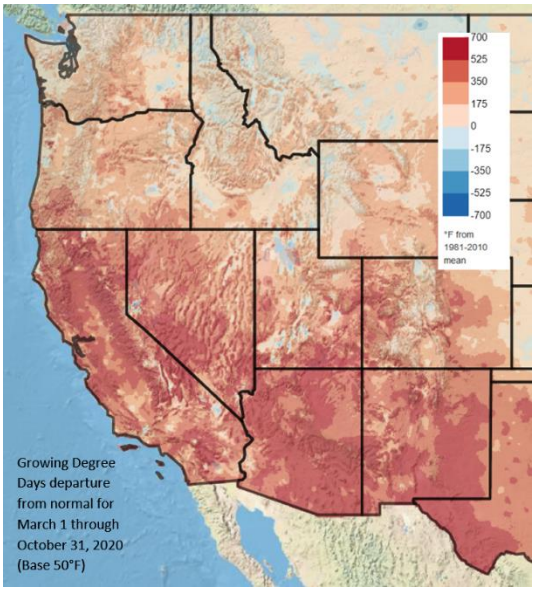

Figure 3 – Western US March through October 2020 growing degree-days (image from Climate Impacts Research Consortium, University of Idaho).

Drought Watch – The long-term patterns for dry conditions continued during the month of October over the western US with a slow start to the fall rainy season (Figure 1) and drought continuing to intensify across much of the region (Figure 4). Over 90% of the western US is in some category of drought with nearly 60% in severe to exceptional drought conditions. The only areas not exhibiting drought are western Washington, coastal Southern California, and scattered small areas in the northern Rockies. During October, drought concerns further developed in many areas of the west and into the Great Lakes and New England. The longer-term outlook for the US through January continues to show the forecasted dry conditions for much of the west with further development expected in Southern California, the southern Plains, and Texas. The PNW is expected to see some improvement in drought conditions with fall rains as detailed in the forecast below. The Four Corners region continues to be the bullseye for the western drought, with the conditions being the result of a weak monsoon season and record-high temperatures. Additional areas in the Rockies, Plains, and the panhandle region likely to see drought conditions develop further (Figure 4, right panel).

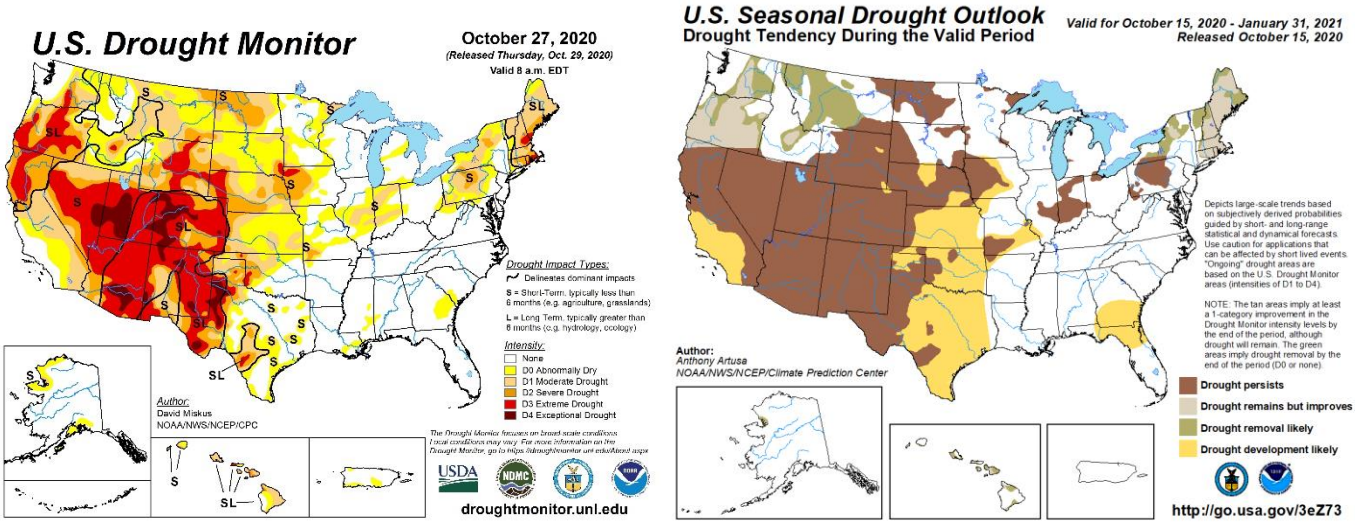

Figure 4 – Current US Drought Monitor and seasonal drought outlook.

ENSO Watch – The Tropical Pacific has clearly moved further into the forecasted La Niña (cold event) conditions as mentioned in previous months (Figure 5). In mid-October, the Climate Prediction Center (CPC) report indicated that SSTs in the east-central Pacific are now roughly 1°C below average, indicating La Niña conditions. In addition, patterns in all key atmospheric variables are consistent with La Niña conditions. Most model forecasts point to the

Tropics exceeding the threshold of La Niña SST conditions through winter and dissipating next spring. The official CPC/IRI outlook and other agencies outlooks are consistent with these model forecasts, calling for an 85% chance of La Niña for winter. From this, a La Niña advisory is in effect. Seeing more clarity in La Niña conditions and forecasts leads me to believe that we will likely head into a pattern that is shown in the November and three-month forecasts in Appendix Figure 2 where the PNW has a greater chance of being wetter than average (roughly 70%), while California and the southwest have a greater chance to remain dry. Contrary to average La Niña conditions, which are typically much cooler than average over the west, and especially the PNW, the current forecast is calling for warmer than average to average conditions, except for NW Washington, which could reflect more influence from the North Pacific (see below).

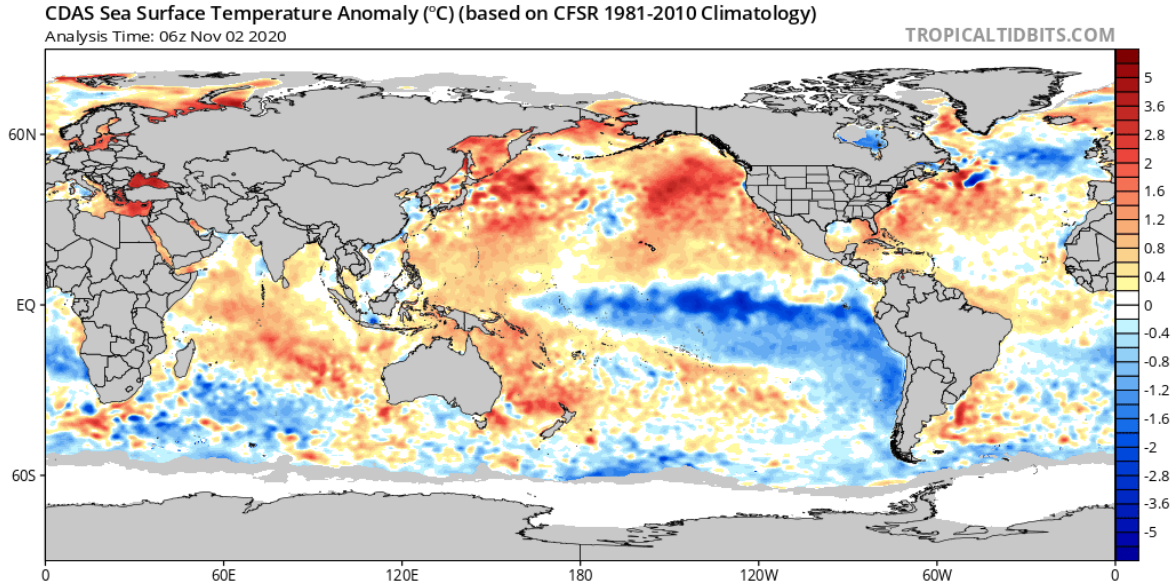

Figure 5 – Global sea surface temperatures (°C) for the period ending November 2, 2020 (image from Tropicaltibits.com).

North Pacific Watch – In contrast to the cooler surface waters in the Tropics and La Niña conditions, the North Pacific continues to show a large area of anomalously warm water running 2-5°F above average (Figure 5). Over the last month or so, near-shore temperatures have warmed slightly from the Gulf of Alaska, Oregon, and California while the slight cooling seen out over the central Pacific has waned. This confounds what appeared to be a strengthening of upwelling or a longer-term move to the cold phase of the Pacific Decadal Oscillation (PDO) in prior months. Currently the North Pacific is closer to the warm phase, which would put it out of phase with the Tropics (see above). The effect here is that the current warmth in the North Pacific will likely mute the La Niña effect, making the magnitude of the impact lowers. The result is that the PNW will likely be in for slightly warmer winter than expected with a La Niña but is likely to stay wet over the course of the winter, while California would likely be warm and dry.

Forecast Periods:

Next 5 Days: The ridge of high pressure that has brought clear skies, fog in the valleys, and warmer than average temperatures for this time of year will break down over the next few days. The result is that the jet stream will become more zonal and allow a cold front with some moisture to move in from the North Pacific. The front should bring rain to western Washington and northwest Oregon but weaken as it moves southward and inland with the remainder of the west seeing only a modest increase in clouds and a drop to seasonal temperatures.

6-10 Day (valid November 7-11): After a period of warmer than average temperatures and continued dry conditions the western US will turn colder during this forecast period. This scenario is less about cold fronts coming off the Pacific and more about a couple of chances for Arctic air pushing southward into the Rockies, Great Basin, and to the west coast. With the Arctic air there is less chance for precipitation in the forecast with PNW south into Northern California likely not seeing much precipitation. With the cold air flip in the west, comes a warm air pattern in the east

with a high likelihood of seeing much warmer than average conditions. Precipitation across the rest of the country is forecast to be near average to slightly above average.

8-14 Day (valid November 9-15): General pattern from the previous forecast period continues with a good chance for Arctic air incursions and cooler than average temperatures over the west while the eastern US will likely remain warmer than expected for mid-November. The western US is likely to see some precipitation during this period, but not enough to be anything other than average to below average for this time of year. The upper Midwest and New England are forecast to be wet during this period while the Gulf Coast is expected to be dry during mid-month.

30 Day (valid November 1-30): Even with the short-term forecast calling for Arctic air moving into the western US, the forecast for the month of November is holding for a warmer than average month over the vast majority of the country (see Appendix Figure 2). For precipitation, the bulk of the country is expected to see either average or drier than average conditions, while the PNW is forecast to see slightly above average precipitation for the month.

90 Day (valid November-December-January): The first half of winter forecast is largely following the expected pattern for temperature and precipitation given the current La Niña (see Appendix Figure 2). The main differences are that the typical cooler than average winter for the PNW and northern half of the country is forecast to be closer to average. My take on this is that the warmth of the North Pacific is tilting the odds to a less cold of a winter. However, the rest of west coast and southern half of the country is holding to what is anticipated from La Niña, which is a warmer and drier first half of winter.

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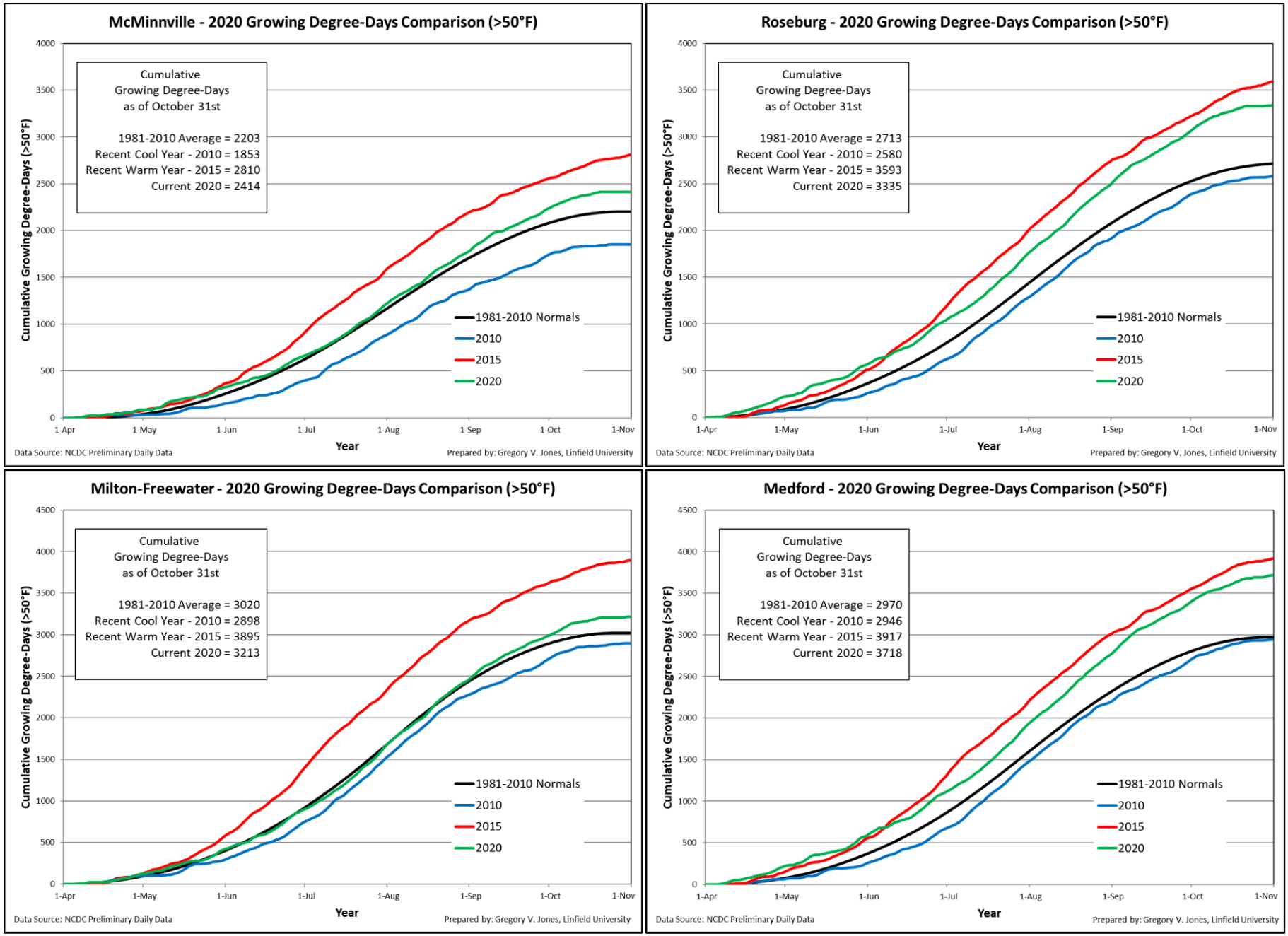
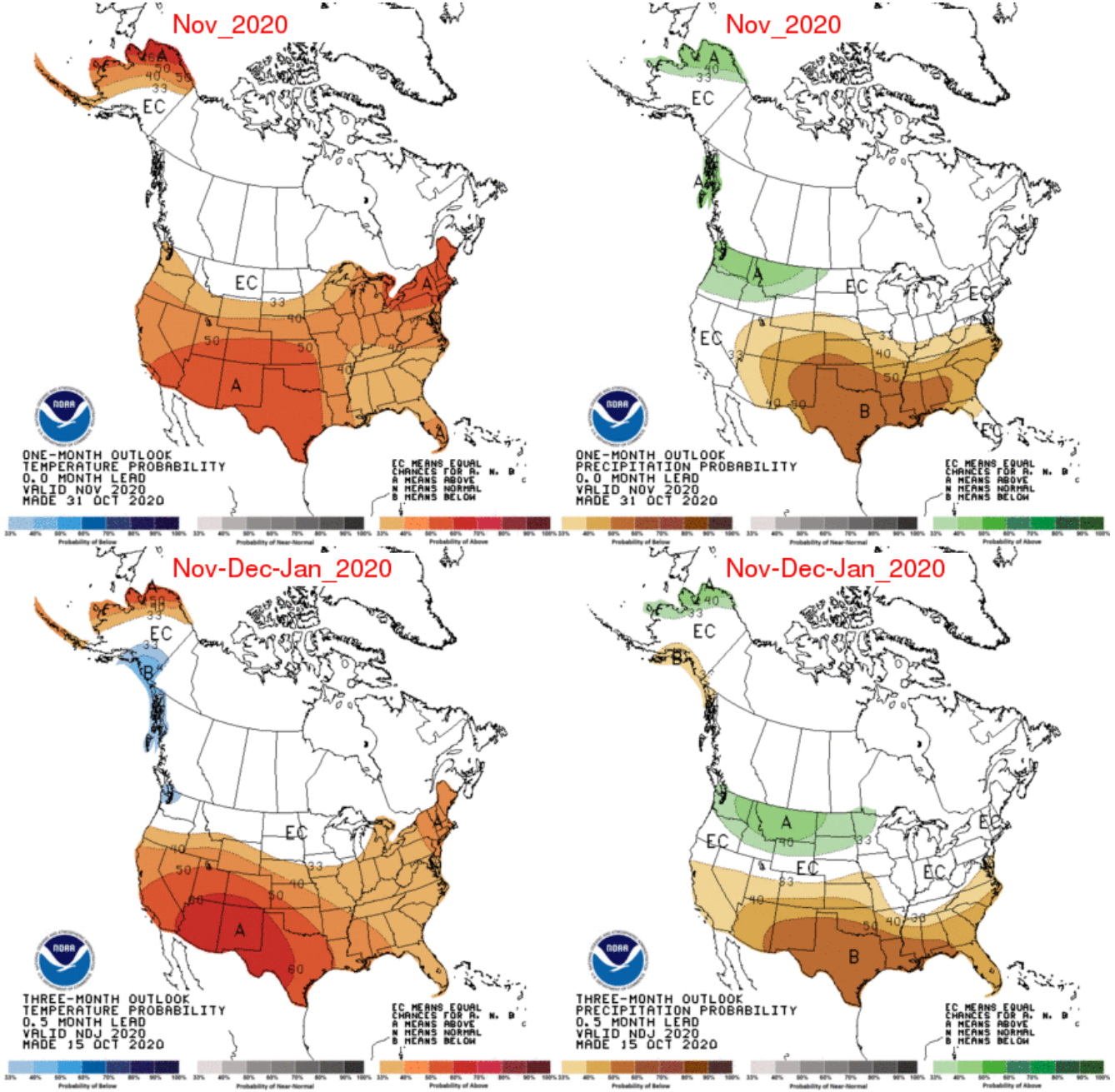


Appendix Figure 1 – Cumulative growing degree-days (base 50°F, no upper cut-off) for McMinnville, Roseburg, Milton-Freewater, and Medford, Oregon. Comparisons between the current year (2020) and a recent cool year (2010), a recent warm year (2015) and the 1981-2010 climate normals are shown (NCDC preliminary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



Appendix Figure 2 – Temperature (left panel) and precipitation (right panel) outlooks for the month of November (top panel) and November, December, and January (bottom panel) (Climate Prediction Center, climate.gov).