Weather and Climate Summary and Forecast
July 2020 Report

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Summary:

- June held true to forecast with relatively mild temperatures over most of the west, with portions of California warmer than average and portions of Washington and extreme southern California cooler than average.
- Precipitation over the western US during June produced a slightly wetter than average north and much drier than average south.
- Short to long term drought concerns are forecast to remain in place or develop further for much of the west.
- The short-term forecast is pointing to seasonal conditions with onshore flow and marine layers in the western valleys and a generally cool month for all. No rain to speak of for all except maybe the extreme NW of Washington. Warmer second half of month likely over the west, but extreme heat does not look likely.
- The July through September seasonal forecast continues to point to the likelihood of a warmer than average period for much of the western US. The overall precipitation outlook is pointing to average conditions, which in the summer is dry overall. However, a precipitation event or two due to thunderstorms is highly likely later in the summer.

The June forecast for an equal chance of being slightly above to slightly below average month held largely due to continued unsettled flow out of the Gulf of Alaska. Overall, areas of central California saw a warmer than average June, while portions of Oregon and Washington were near average (Figure 1). However, scattered areas in eastern Washington and Oregon, Idaho, and Southern California had a cooler than average month. The forecast for a warmer month from the Plains into the Great Lakes held true, with many areas seeing temperatures 3-5°F warmer than normal for the month, however, the southeast and mid-Atlantic experienced a near average to slightly below average month (not shown). The precipitation pattern for June in the western US reflected the forecast with near average to above average amounts in the PNW and northern Rockies, but dry in California and the desert southwest. An interesting pattern can also be seen in Oregon and Washington where the rainshadow effect along the eastern side of the Cascades is quite evident (Figure 1). For the rest of the country, New Mexico and western Texas and the southern Plains experienced a very dry month as did Northern New England, while the Gulf Coast, Florida and the mid-Atlantic experienced a moderately wet month (not shown).

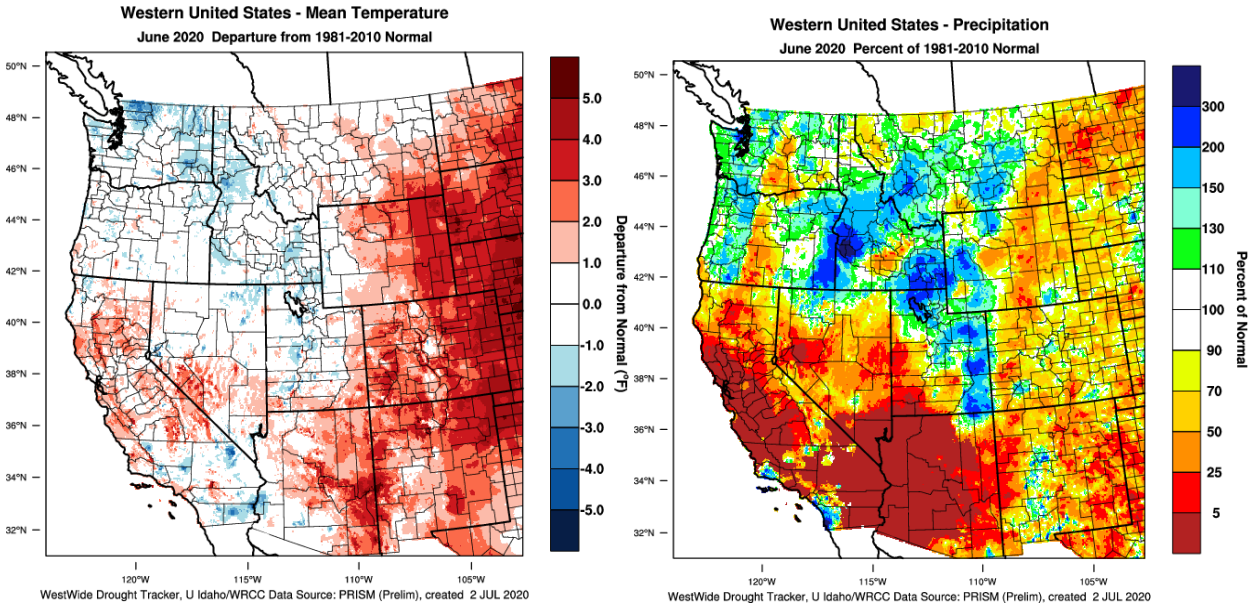

Figure 1 – Western US June 2020 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

Year to date temperatures in the western US have been mixed with many areas warmer than average and others average to cooler than average. Temperatures have been warm in central to northern California, Nevada, and the southwest while areas in southern California are near average to cooler than average (Figure 2). For Oregon, the western portion of the state is near average to warmer than average while the eastern portion of the state is mostly warmer than average. For Washington, only the central portion of the state is warmer than average with most other areas average or cooler than average. For the Rockies and southwest, they have seen cool conditions north and into the Plains and warm conditions in the Four Corners region. The northern Rockies and northern to central Plains are the only areas of the country running colder than average (1-2°F below normal) while the Texas, Gulf Coast states and the eastern third of the US has been seeing temperatures 1-3°F above normal (not shown). January through June precipitation amounts has also been mixed across the western US with most of California, the eastside of the Cascades, and the bulk of the Great Basin and Four Corners region running 20-70% of average rainfall (Figure 2). Portions of western Oregon are closer to average year to date, while western and eastern Washington, much of Idaho, and the California-Arizona border have seen 115-250% of average rainfall. The relatively dry first half of winter, spring and into early summer continues to add to longer-term drought concerns for much of this area (see Drought section below). The majority of the eastern third of the country has seen wetter than average conditions since the first of the year, while dry conditions have been seen from the Panhandle region into the Plains (not shown).

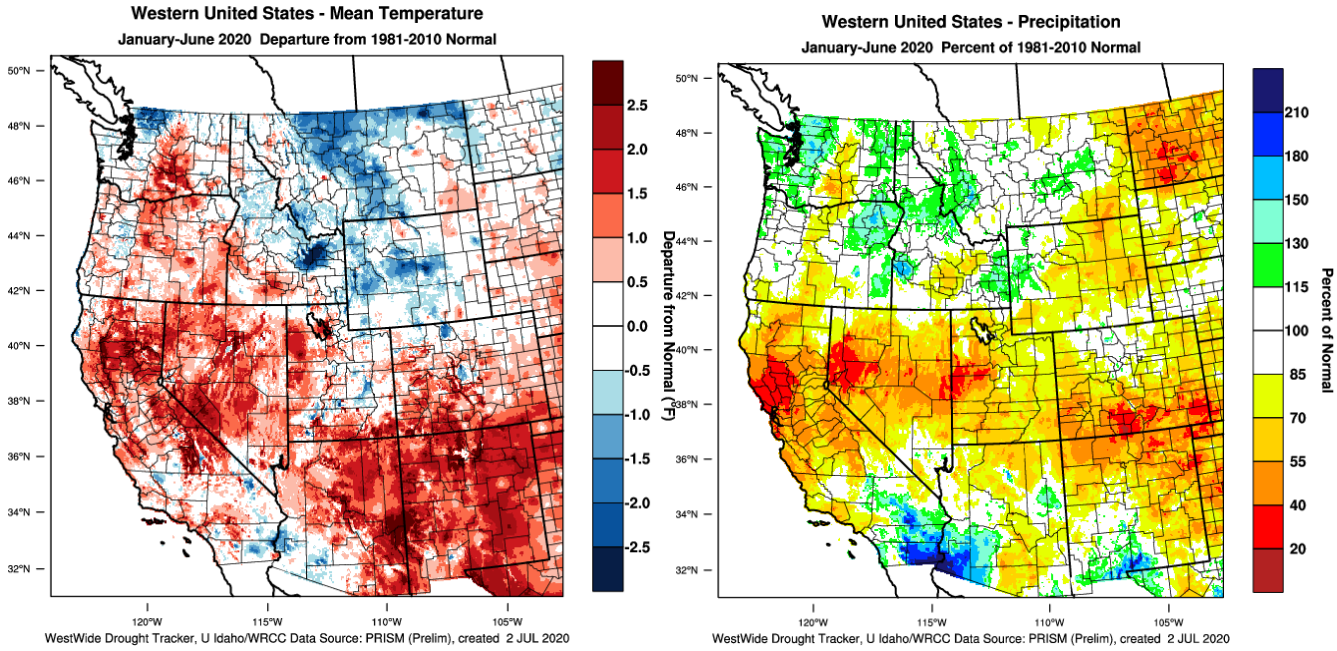

Figure 2 – Western US year to date (January-June) temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

March through June growing degree-days for the western US shows the period is largely running near normal to above normal although the coolish June lower these values closer to average (Figure 3). Amounts are currently 5-10% above normal or running 4-18 days ahead of average for this time of the season. However, some areas are slightly behind in heat accumulation with eastern Washington 5-10% down or about one week behind. In California, the Bay Area has stayed near average to slightly above average while isolated inland areas of Southern California remain below average.

Heat accumulation (GDD) amounts for four locations in Oregon reflect the broader regional patterns driven by the relatively cool June (Figure 3). Three of the locations are above the 1981-2010 normals for the months April through June (6 to 31%), however eastern Oregon (Milton-Freewater and the Walla Walla region) has now dipped slightly below the long term average (2% below) (see Appendix Figure 1). Similarly, compared to the average of the last 15 years for the sites, Medford and Rosburg are 8-14% up while McMinnville is right at the average and Milton-Freewater is 10% down. Compared to 2019, Roseburg and Medford are 3-6% down during the same period in 2020

while McMinnville and Milton-Freewater are running 12 and 24% below values seen in 2019, respectively (see the Appendix Figure 1 for four locations in Oregon).

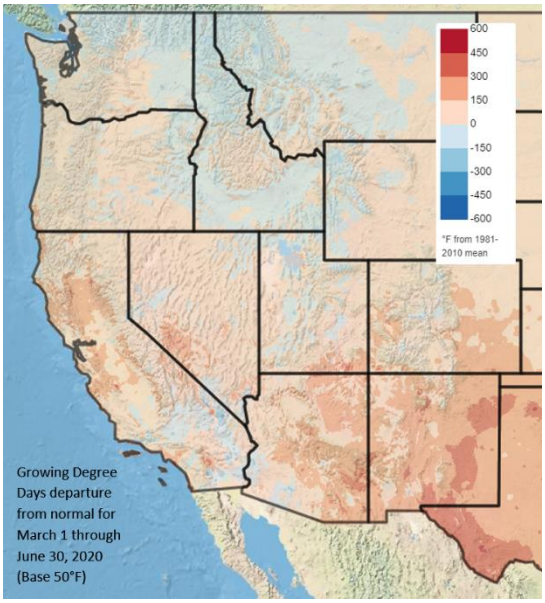

Figure 3 – Western US March through June 2020 growing degree-days (image from Climate Impacts Research Consortium, University of Idaho).

Drought Watch – Even with above-normal precipitation in parts of the Northwest during June (Figure 1), drought conditions remain over much of the region and the entire western US (Figure 4). The general pattern in drought continues from previous months, however, it has strengthened in many areas of the western US including northern California, Oregon, across the Great Basin into the Four Corners and the Panhandle regions. During June, much of the Gulf Coast region had enough precipitation to lower drought concerns while the rest of the eastern US remains drought-free. The longer-term outlook for the US through September continues to show the forecasted dry conditions for much of northern California, Oregon, and central Washington with drought development and/or persistence through mid-summer. The Four Corners region will also likely remain dry, while additional areas in the northern Rockies and Plains are likely to see drought develop and areas in Texas and New Mexico will likely continue to see drought conditions improve (Figure 4, right panel).

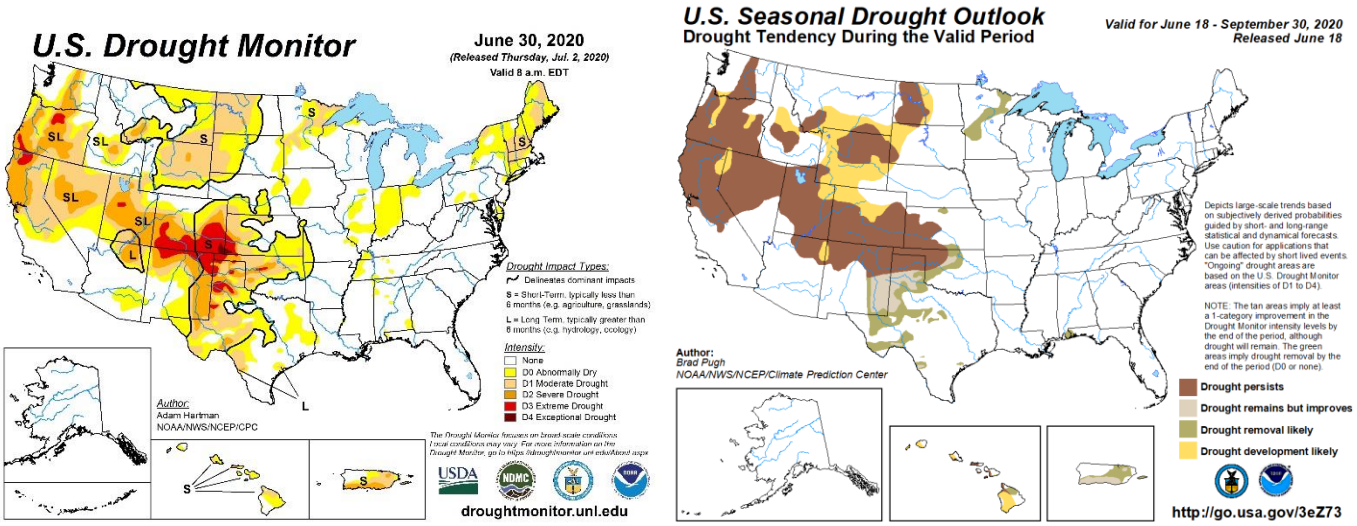

Figure 4 – Current US Drought Monitor and seasonal drought outlook.

ENSO Watch – The tropical Pacific continues to flip between weak El Niño (warm) and neutral conditions but is showing more cooling signs of late (Figure 5). In mid-June, the Climate Prediction Center (CPC) report indicated that SSTs in the east-central Pacific decreased to near the La Niña threshold in early June. Patterns in atmospheric

variables are also indicating mostly neutral to weak La Niña conditions. Most model forecasts hover near or just short of the borderline of weak La Niña SST conditions through fall, becoming slightly weaker beginning in early winter. The official CPC/IRI outlook and other agencies outlooks are consistent with these model forecasts, calling for a likely continuation of ENSO-neutral in summer, with approximately equal chances of ENSO-neutral or La Niña for fall and winter. The recent ENSO-neutral conditions will not likely play much of a role in our summer weather, however, the move into La Niña conditions in the fall might mean an early onset of precipitation from northern California north into the PNW. At least over the short term, the current conditions along with the changes in the North Pacific (see below) are keeping the cool to average conditions in place (see forecast periods below and Appendix Figure 2).

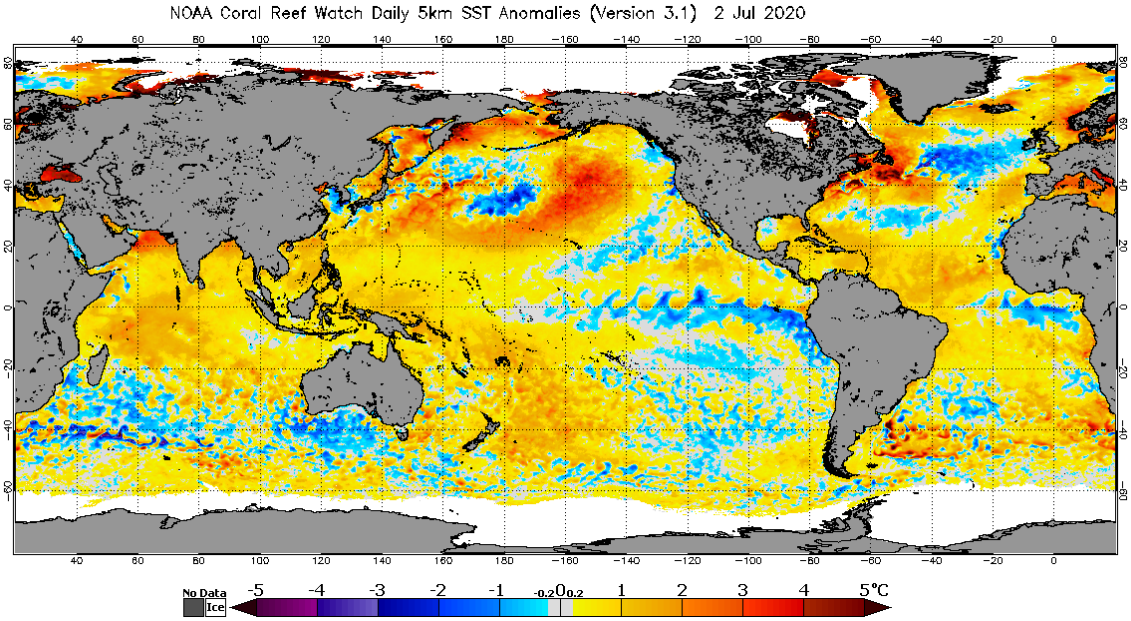

Figure 5 – Global sea surface temperatures (°C) for the period ending July 2, 2020 (image from NOAA/NESDIS).

North Pacific Watch – The overall pattern in the North Pacific for the last couple of months remains, however some changes are worth mentioning as they are likely playing a significant role in the current conditions and short-term forecast. An area in the central North Pacific has warmed even more from last month, approaching 4°F above average (Figure 5). However, to the west of this area is a significantly colder than average region which, in combination with the warmer zone is likely creating the flow pattern of troughing over the western US. This along with some cooling coastal zone waters from southern Alaska south to central California is likely tamping down temperatures over the short term. Elevated humidity and higher nighttime temperatures are still in play, but less so from previous months. The Pacific Decadal Oscillation (PDO) continues in a moderate negative phase which continues to approach conditions seen during 2008-2012. Current forecasts of how North Pacific SSTs might evolve over the next few months are mixed.

Forecast Periods:

Next 5 Days: Seasonal … after a period of frequent troughing over the last week that brought unseasonably cool and wetter than expected conditions to the PNW, conditions will turn to pretty close to average up and down the western US. Onshore flow will keep temperatures down and morning marine layers along the coast will be prevalent. If it rains at all during this period it will likely be confined to western Washington and British Columbia.

6-10 Day (valid July 8-12): The onshore flow will likely continue through this forecast period bringing seasonal temperatures from the central coast of California north into British Columbia and the inland PNW. Warmer than average temperatures will likely stay in Southern California, the desert southwest, and into the Rockies. The rest of the country is forecast to see warmer than average temperatures with a dominant heat wave in Texas and the southern Plains. The precipitation forecast for this period is average to drier than average over the entire western US.

The rest of the country is forecast to be near average as well, except for the northern Plains and western Great Lakes which is forecast to see a wet period.

8-14 Day (valid July 10-16): Heading into mid-month the overall zonal, onshore flow over the western US continues and will likely keep temperatures near average over most of the region to slightly below average in the PNW. Central to Southern California is likely to warm up from early month conditions, while the rest of the US continues to show a forecast to much warmer than average conditions for mid-July. In terms of precipitation, a similar pattern to the previous forecast period shows near-normal conditions for the western US, and average during mid-July is pretty much nothing. Drier than average conditions are forecast for much of the rest of the country, except for the northern Plains and western Great Lakes which is likely to stay wetter than average.

30 Day (valid July 1-31): Even with a strong likelihood of a warmer second half of July, the month will likely end up near average to slightly below average from the Bay Area into the PNW (see Appendix Figure 2). From the Bay Area south and spreading across the rest of the country is a forecast calling for July to have a good chance of being warmer than average. The precipitation forecast is called for an equal chance of slightly above to slightly below average rain for the west, but again average is pretty much nothing over much of the region in July. The driest area of the country in July is likely to be the Panhandle region and the Great Lakes into New England, while the southeast is forecast to have a wetter than average month.

90 Day (valid July-August-September): Even with the relative cool to average conditions forecast in July, the long term 90-day forecast through September continues to indicate 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 central Mississippi River valley. The 90-day outlook for precipitation continues to indicate that the western US is likely to remain dry, which is also reflected in the current US Drought Monitor and US Seasonal Drought Outlook in Figure 4 above. Much of the eastern US is forecast to see wetter than average conditions through September which is largely driven by an expected active tropical system season.

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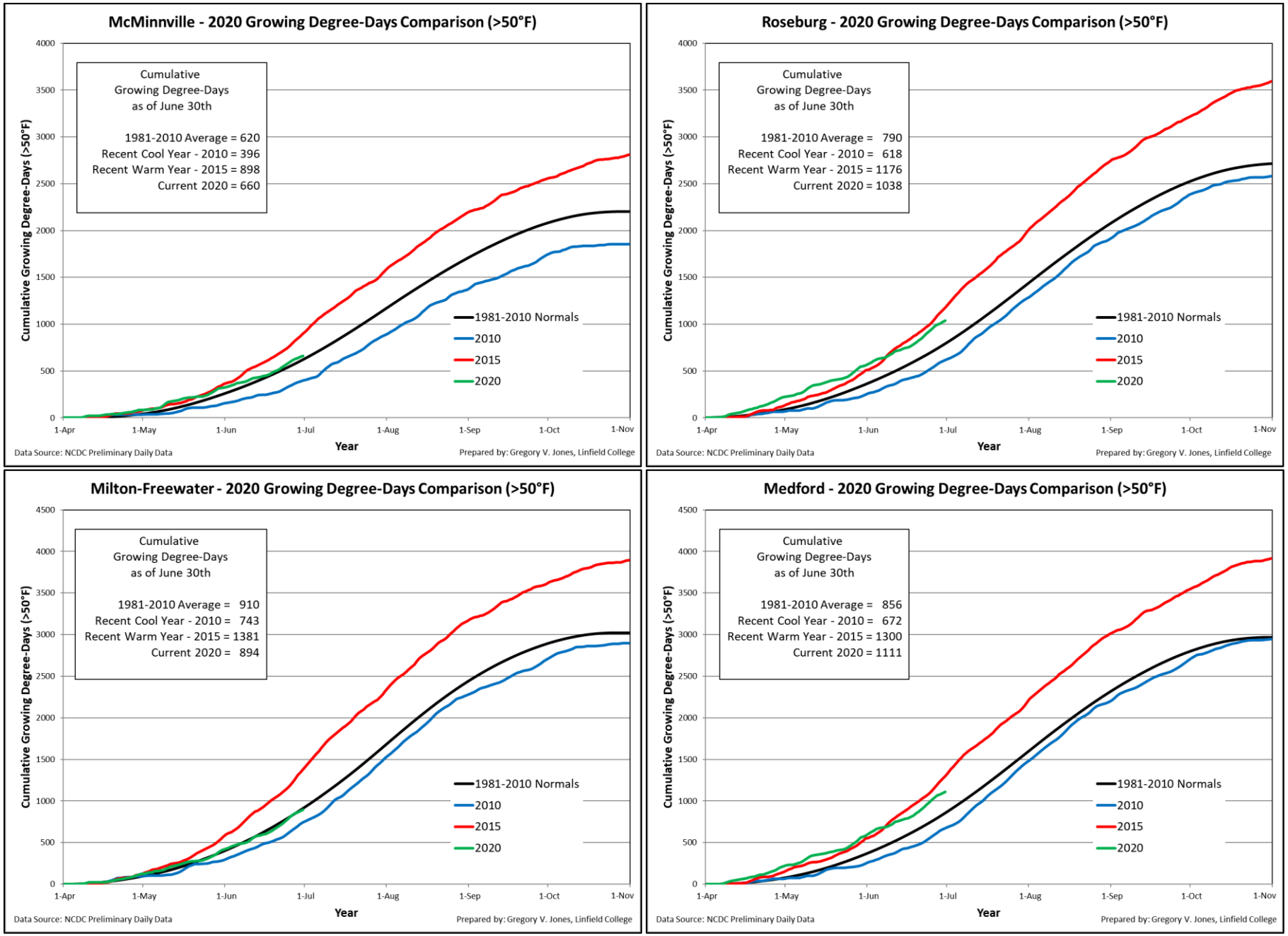
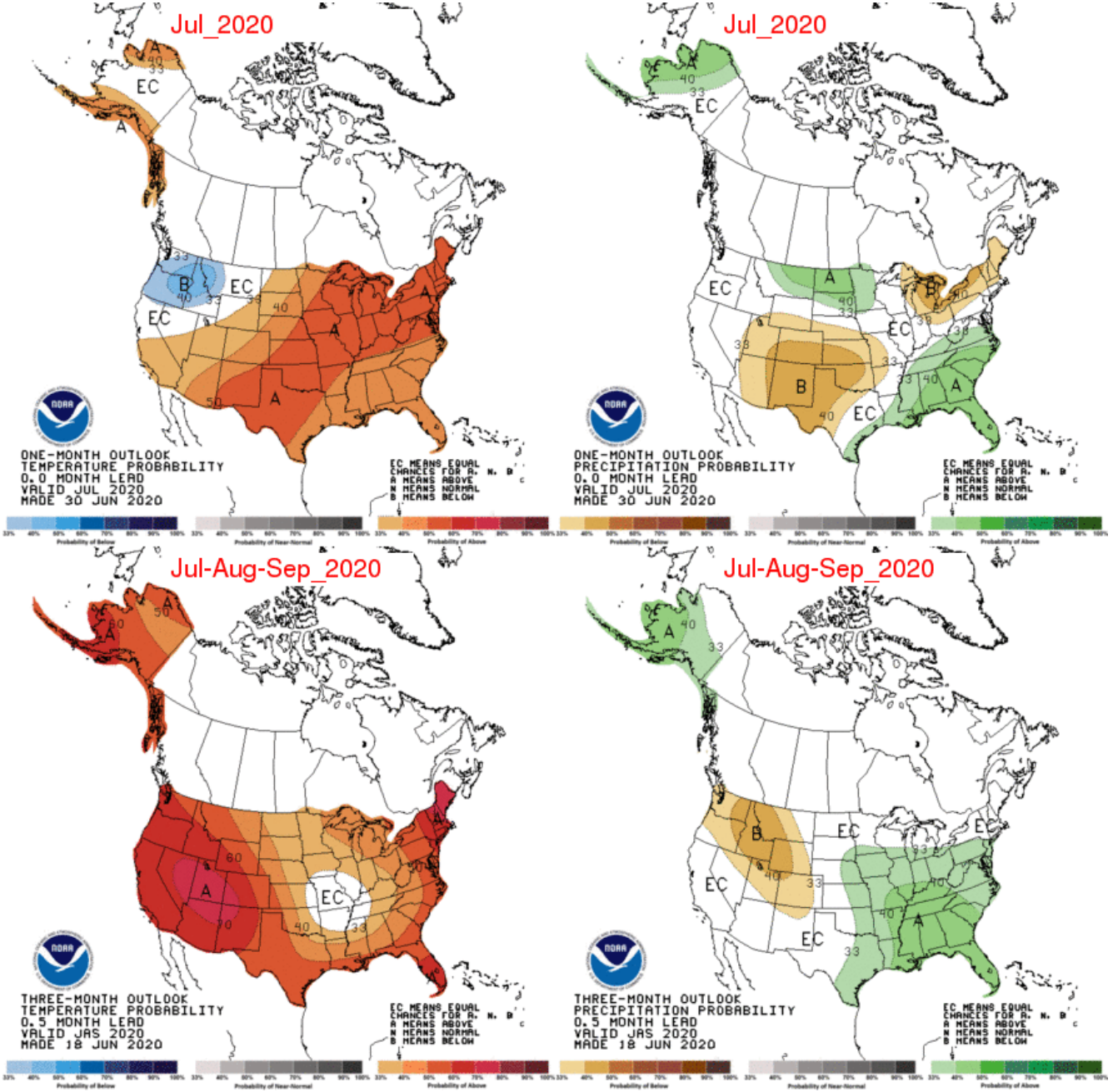


Appendix Figure 1 – Cumulative growing degree-days (base 50°F, no upper cut-off) for McMinnville, Roseburg, Milton-Freewater, and Medford, Oregon. Comparisons between the current year (2020) and a recent cool year (2010), a recent warm year (2015) and the 1981-2010 climate normals are shown (NCDC preliminary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



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