**Weather and Climate Summary and Forecast**
**September 2018 Report**

Gregory V. Jones
Linfield College
**September 4, 2018**

Summary:

- Compared to July, August temperatures moderated some ending up 1-2°F above average across many wine regions in the west (a smoke effect? see below). Areas in and around the Bay Area and the Northern California to Oregon coast continued to see average to slightly cooler than average conditions from strong coastal upwelling and cooler SSTs. Dry conditions persisted in the western US in August, continuing long-term drought concerns, especially in the PNW.
- While some short-term warming this week will be seen for most, a drop to seasonal temperatures is likely through mid-month and there are a couple of frontal passages and, dare I say, rain in the offering! I do not expect much from these events, but they will likely be the first significant rains since late April. The PNW is more likely to get in on this rain with the probably decreasing as you head south.
- The seasonal forecast continues to indicate a relatively warm and dry western US through fall and early winter. While this does not mean that it will not rain, the overall pattern is tilting the odds to being drier than average through at least mid-November, adding to the ongoing drought conditions, especially in the PNW.

August 2018 moderated slightly from the very warm July across the western US. Temperatures were 1-4°F above average across many areas of the west (Figure 1), except the Bay Area north along the coast into Oregon where coastal SSTs continued cooler than average due to strong coastal upwelling that produced a strong marine layer (see North Pacific discussion below). The effect was even more dominant than seen in July, especially inland into the Central Valley. Also, there is some evidence that temperatures in many regions in the west were muted due mid to high-level smoke which lowered daytime temperatures. Warmer than average temperatures were experienced in the Sierra Nevadas and extended to the Four Corners. The northern Plains toward the southeastern US experienced cooler to near average conditions while the northeast was much warmer than average (not shown). Precipitation amounts throughout the west were less than 25% of normal except in some isolated areas that received slightly more than average for the month (Figure 1). The rest of the country largely saw above-average precipitation for the month, especially areas in the mid-Atlantic where flooding events occurred throughout the month (not shown).

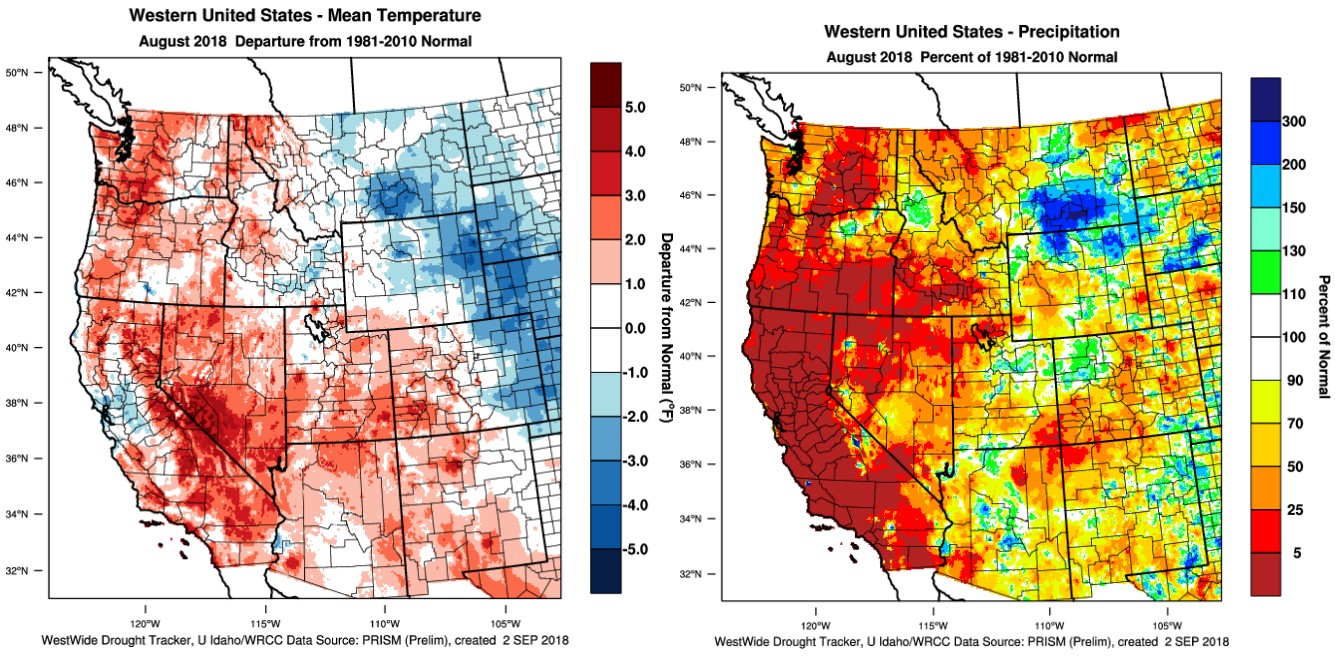



**Figure 1** – Western US August 2018 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

The water year from October through August continues to run warmer than average in the western US with portions of California, Oregon and Washington seeing 0.5-1.5°F above normal temperatures (Figure 2). The Four Corners continues to be the warmest, with conditions 2-5°F warmer than average. The Bay Area and the Central Valley of California continue to show the effect of coastal upwelling and stronger than average marine layers holding down temperatures. The pattern for the rest of the country is holding from last month with average to warmer than average for the eastern third of the country while eastern Montana across the Plains eastward to the northern Great Lakes continue to run cooler than normal. The current water year deficit throughout much of the west continued in August (Figure 2). Southern California across into the desert southwest and Four Corners region continue running 15-45% of normal, while central to northern California and much of Oregon and some of southern Idaho and Washington have been 60-90% of normal. Northern Washington and Idaho, Montana and a small area of the northern Sierra Nevada's continue to show 110-200% greater than average precipitation for the water year (Figure 2). For the rest of the country, Texas and the southern Plains continue mostly dry, while the Great Lakes region, northern New England and the Ohio River valley have been slightly wetter than average and the southeast has been near normal (not shown).

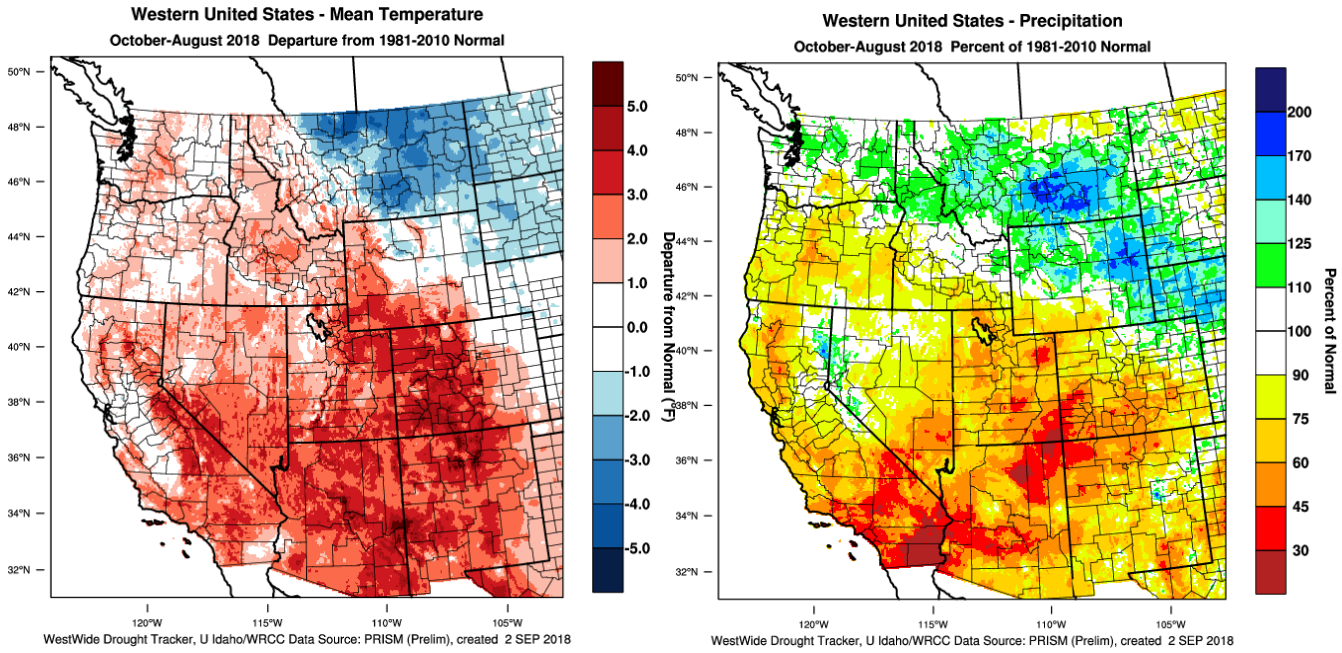



**Figure 2** – Western US Water Year October 2017 - August 2018 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

Degree-day accumulations for the month of August where near average to slightly above average in many regions with the exception of the Bay Area, coastal areas of Northern California and Oregon, and portions of eastern Washington which were slightly below normal. Year to date growing degree-days (GDD) over the western US are continuing to run largely above the 1981-2010 average (5-30%) (Figure 3). Wine regions in Idaho, Washington and Oregon continue running 100-300 GDD units above normal, or two to three weeks ahead of average. California continued to see mixed conditions with much of the state near normal to above normal except in the Bay Area corridor where near shore upwelling and lower SSTs (see North Pacific discussion below) contributed to a strong marine layer and cloud cover that has kept heat accumulation slightly below to normal for the season (continuing roughly 7-10 days behind average accumulation) (Figure 3). Temperatures for four locations that I have tracked for many years in Oregon were 1.3-2.5°F above average in August, contributing to a growing season to date GDD that is 1-5% below 2017, 5-12% above the 15-year average, and 15-25% above the 1981-2010 normals (see the Appendix Figure 1 for four locations in Oregon). If the forecast holds for September, then the 2018 GDD in western US wine regions will likely end up slightly lower than the average of the last five years in the North Coast to average in eastern Washington/Oregon, to above average in western Oregon and other regions in California.

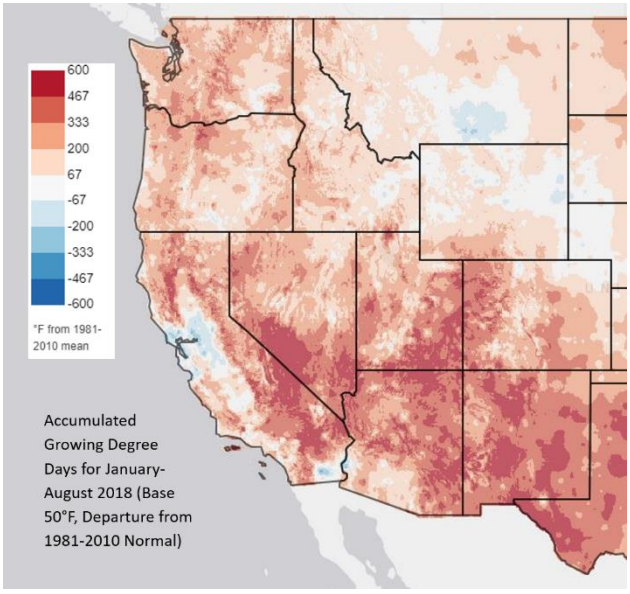



**Figure 3** – Western US January-August 2018 growing degree-days departure from the 1981-2010 normals (image from Climate Impacts Research Consortium, University of Idaho).

**Drought Watch** – Fast forward one month and the current state of drought in the US looks largely the same. Continuing dry conditions in the west added to the general trend toward short to long-term drought over the bulk of region. The driest area in the west remains the Four Corners, but severe to extreme drought conditions have increased in Oregon (Figure 4). Other dry areas include much of Texas and into Kansas, Missouri and southern Iowa. The US seasonal drought outlook did not change much from last month, continuing to show that the majority of the PNW will likely see drought persist or develop into early winter (Figure 4, right panel). The outlook does continue to indicate some improvements in drought severity in the Four Corners region due to forecasted monsoon rainfall (see 90-day forecast period below). Drought persistence is forecast to likely continue in much of Texas, while Kansas, Missouri and southern Iowa are likely to see wetter conditions and improving drought conditions.

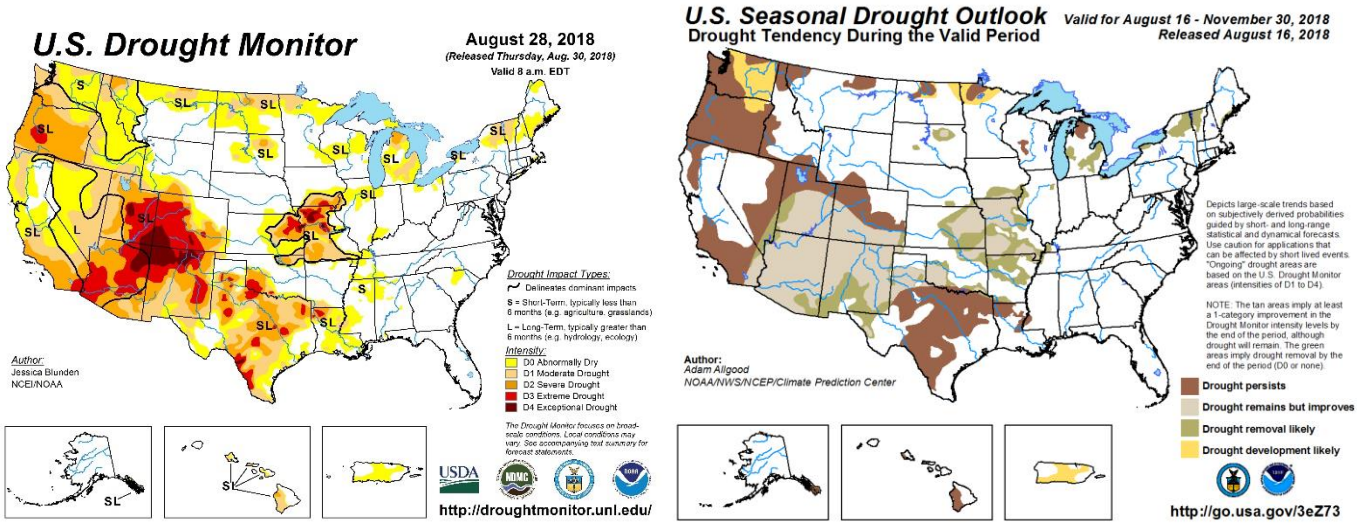



**Figure 4** – Current US Drought Monitor and seasonal drought outlook.

**ENSO Watch** – Some slight changes here as the tropical sea surface temperatures declined during the last month but the long-term forecast still holds. In mid-August 2018, the status of El Niño, La Niña, and the Southern Oscillation, or ENSO, shows that the east-central tropical Pacific waters continue to reflect ENSO-neutral conditions. Most of the key atmospheric variables, including winds, also continue to indicate neutral conditions at this time. The official Climate Prediction Center forecast calls for neutral conditions through the rest of northern summer, with a 60% chance of El Niño development during fall, rising to 70% for winter 2018-19. This leads to the CPC having an El Niño watch is in effect. The latest forecasts of statistical and dynamical models collectively favor weak El Niño

development by early fall, growing to weak or possibly moderate strength during late fall and winter; most forecasters agree with this scenario. If the conditions for neutral-ENSO continue to hold into the summer, the weather across the US will likely continue to follow the warmer and drier than average conditions in the 90-day forecast (see forecast periods below and Appendix Figure 2).

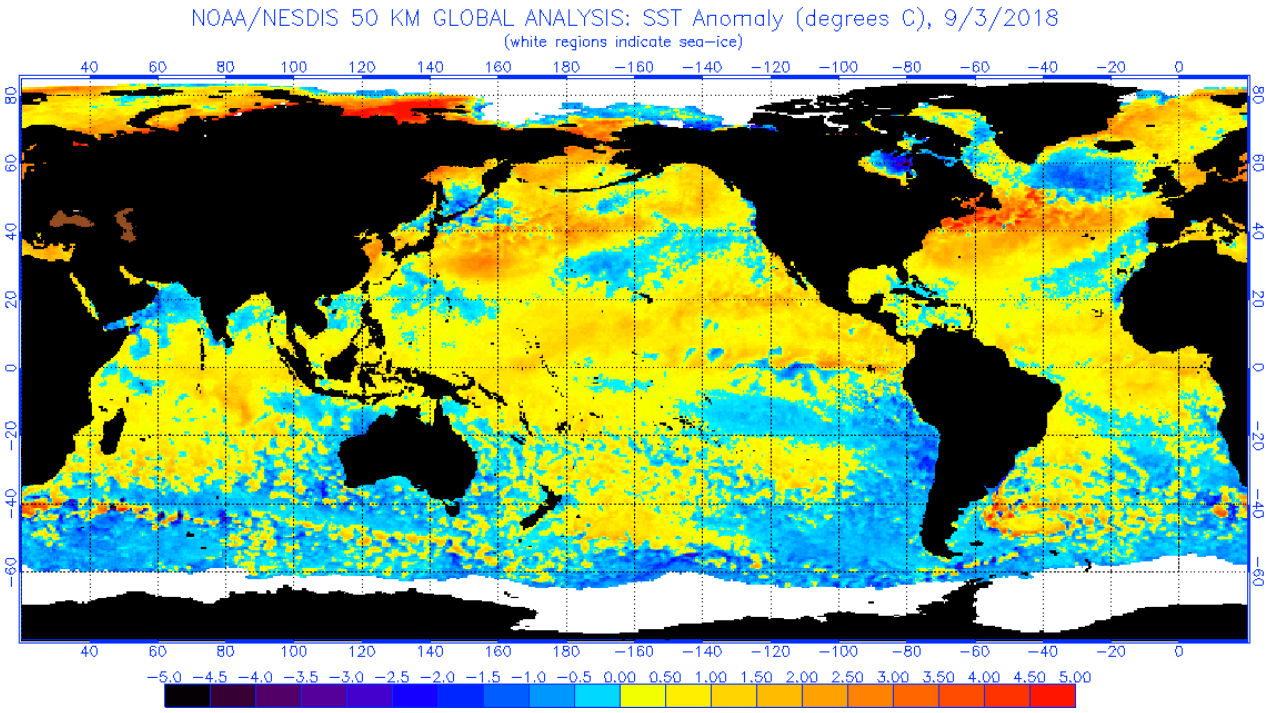



**Figure 5** – Global sea surface temperatures (°C) for the period ending September 3, 2018 (image from NOAA/NESDIS).

**North Pacific Watch** – Overall pattern of sea surface temperatures in the North Pacific remains the same. The Gulf of Alaska is largely running warmer than normal (1-2°F) and the upwelling along the west coast, especially centered on the Bay Area, continues with much cooler than average coastal waters. The near-shore upwelling has contributed to a robust marine layer, coastal cloudiness, and near normal to slightly cooler than normal temperatures in the region (Figure 5). Forecasts for how the North Pacific SST will evolve over the next 90 days are inconclusive with models diverging. If cooler than average nearshore conditions along the California coast remain, then coastal zones will likely stay near average to slightly cooler into harvest. If the SSTs increase slightly and the upwelling subsides, then warming will ramp up along with the broader forecast for the next 90 days (see below). For the PNW the warmer Gulf waters would tend to support the broader drier than normal fall into early winter mentioned above.

**Forecast Periods:**

**6-10 Day (valid September 8-12):** After a relatively warm first week of the month, conditions during the second week in the PNW will likely be near average to slightly cooler than average. Central California across the Great Basin and desert SW will likely continue to see warmer than average conditions during this period. Warmer than average temperatures are forecast for the majority of the rest of the country, except central Texas and Oklahoma and northern New England where near average conditions are forecast. In terms of precipitation, the majority of California and the PNW is forecast to be near normal rainfall during this period, while the interior Great Basin and the Rockies are forecast to be drier than normal. The bulk of the rest of the US is forecast to be wetter than normal largely based on some tropical storms developments in the Gulf of Mexico.

**8-14 Day (valid September 11-17):** Near average to slightly cooler than average temperatures are forecast for Northern California northward through the PNW during mid-month. The rest of the country, except a small section of south Texas, is forecast to see above normal temperatures during this period. At least one precipitation event is forecast to drop south into western Washington and Oregon during this period, the magnitude and exact timing of

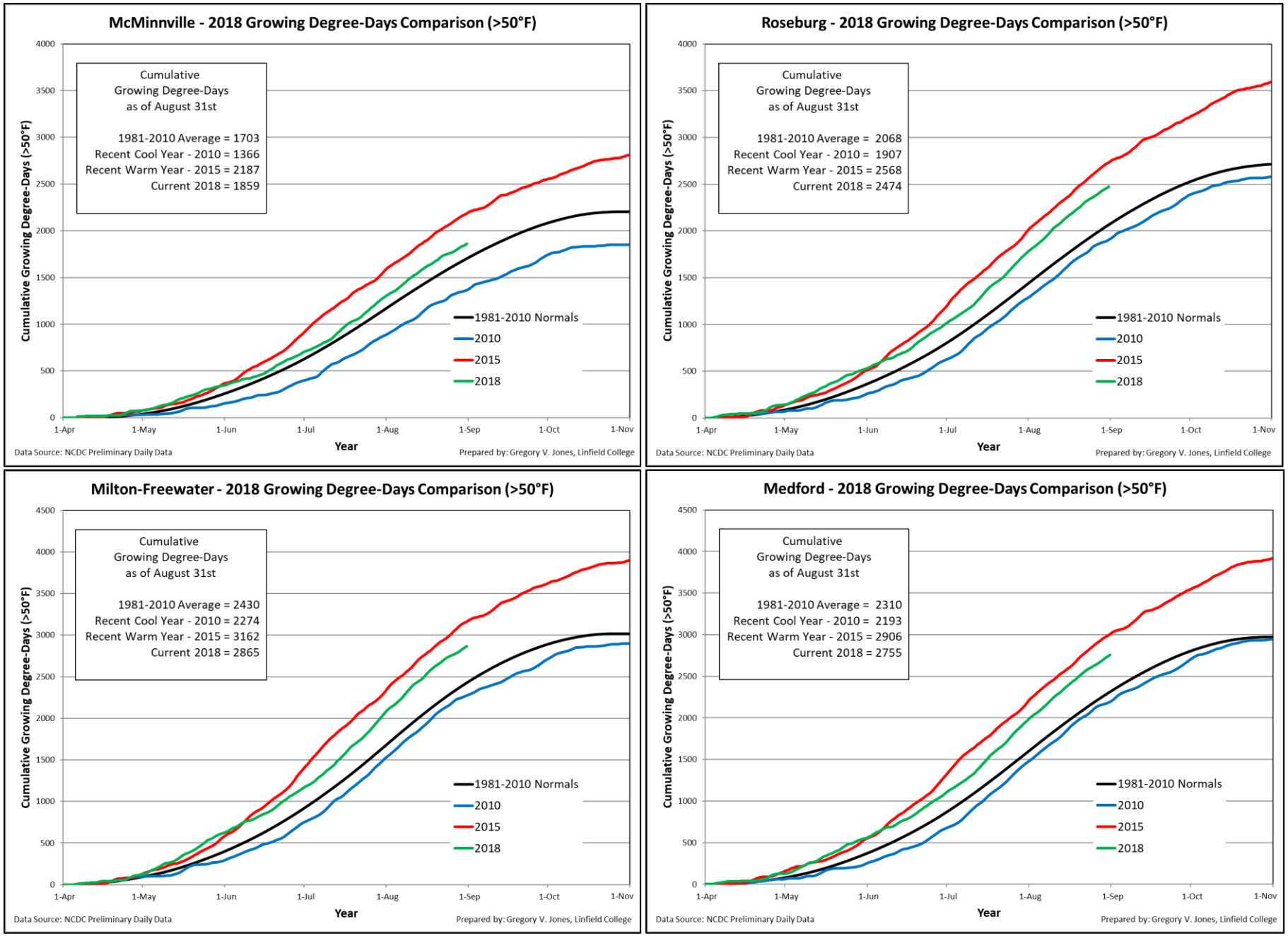
the event(s) is unknown at this time. The majority of the rest of the western US and into the Plains is forecast to be relatively dry during this period, while the Gulf Coast and southeast will likely be wetter than normal.

**30 Day (valid September 1-30):** The 30 day outlook is calling for the PNW across into the northern Rockies and Great Plains to have an equal chance of seeing slightly above to slightly below normal temperatures (see Appendix Figure 2) The rest of the country is forecasted to have a warmer than average month of September, especially the Great Lakes and into New England. Even with the potential for a rain event or two pushing into the PNW mid-month, the forecast is calling for the month to likely end up below normal in terms of precipitation (see Appendix Figure 2). The forecast for the rest of the west is calling for near normal rainfall amounts for the month which is still relatively dry this time of year. A broad swath from west Texas to the western Great Lakes is forecast to see a wetter than average month, as is this Gulf Coast and southeast, while the Ohio River valley and into New England should end up near average precipitation for the month.

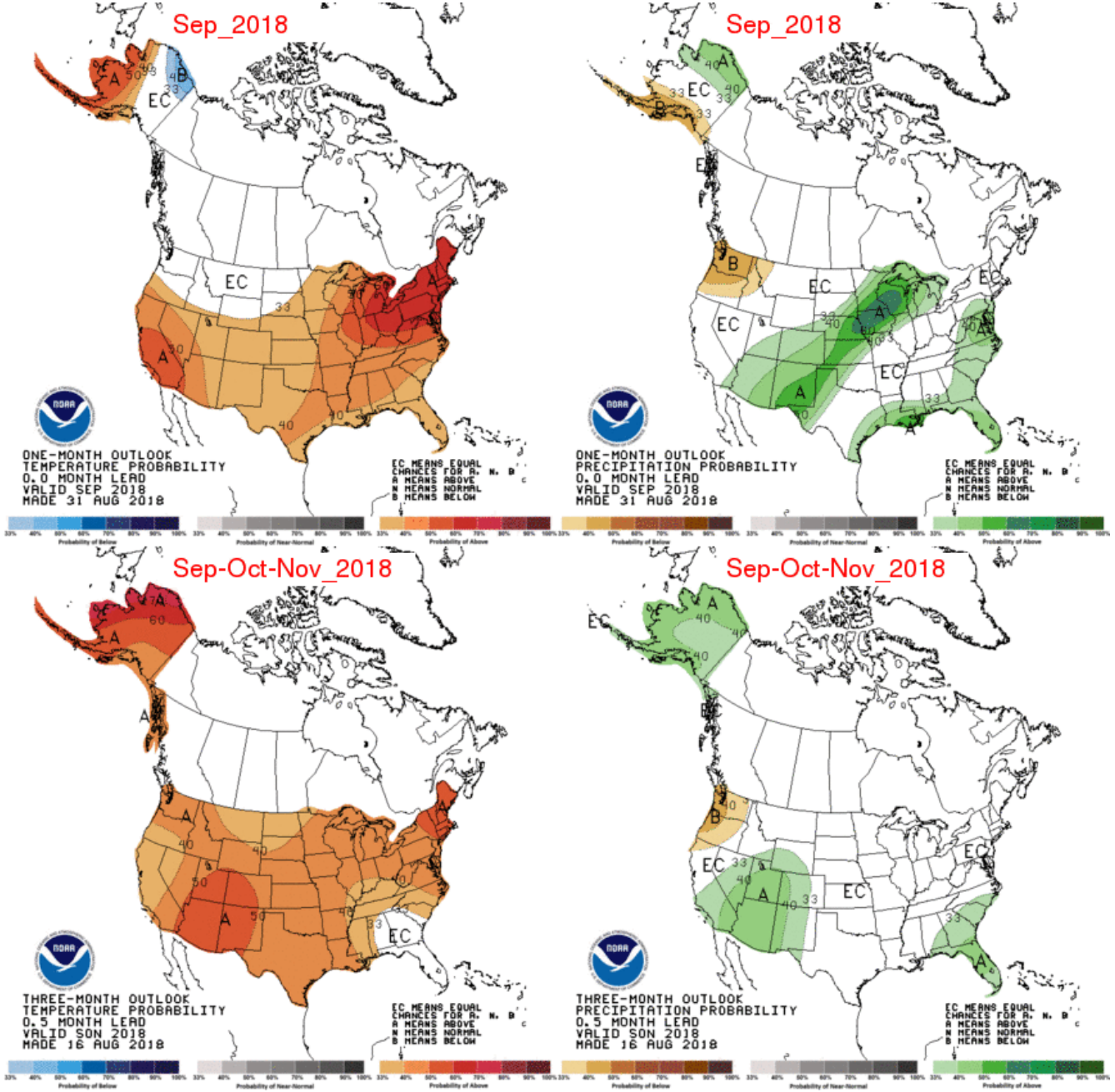
**90 Day (valid September-October-November):** The forecast over the next 90 days is continuing to hold to a warmer than average period for nearly the entire country (see Appendix Figure 2). The only exception is Florida and portions of the southeast which are forecast to be near the average of the three-month period. With no clear mechanisms at play, the nation's three-month precipitation forecast is largely calling for near average rainfall over the majority of the country. The exceptions are the continued forecast for a dry fall and start to the winter for the PNW (the US Drought Monitor is in agreement with this forecast), the potential for some late-season monsoon rains in the Four Corners region, and higher than average rainfall in Florida and the southeast (see Appendix Figure 2).

Gregory V. Jones, Director
Evenstad Center for Wine Education
Evenstad Chair in Wine Studies
Linfield College
900 SE Baker Street
McMinnville, OR 97128-6894
503-883-2218
gjones@linfield.edu

Linfield College




**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 (2018) 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 September (top panel) and September, October, and November (bottom panel) (Climate Prediction Center, climate.gov).