Weather and Climate Summary and Forecast
October 2017 Report

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Summary:

- Typical variability in September temperatures with the onset of fall conditions evident throughout the western US. Mixed rainfall amounts, with most of it welcomed at the end of a dry run of 45-90 days in the west.
- Current conditions favor cool to seasonal temperatures and drier than average conditions in October throughout the western US. Rains should stay mostly away till mid-month or later.
- The extended forecast calls for much of the same, with a typical fall transition but forecast now calls for a chance of La Niña development, which would tilt the odds to winter being cool/wet in the PNW and cool/dry in California.

September 2017 in the western US was fairly typical for the onset of fall. The month started warm, followed by the first mid-latitude system right on schedule on September 9-11, a short warm-up, then a series of cold fronts that brought rain (PNW) and temperatures below normal during September 16-24 across the west, then ended with warm and dry conditions. The map of September temperatures in Figure 1 shows a pattern that reflects a warmer than average month for most of the coastal zone of California, northward into the PNW with temperatures 1-4°F warmer than the 1981-2010 average. Cooler than average conditions, due to cloud cover and rain, were seen in an area from the southwest stretching NE through the southern Great Basin and into the northern Rockies. Harvest during the month was in a start, stop and wait mode up and down the west coast, with weather conditions not forcing the issue in any dramatic way. Nationwide the Midwest, Great Lakes and New England were all much warmer than average in September while the south was largely near average in terms of temperatures (not shown).

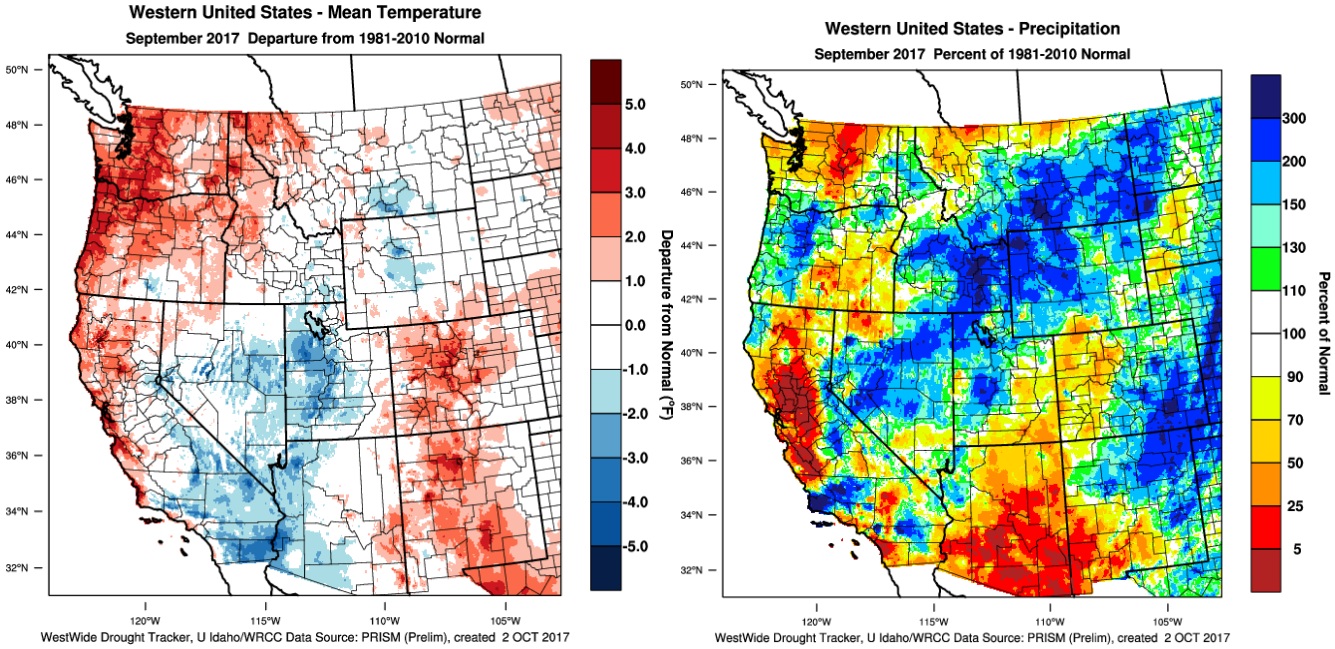

Figure 1 – Western US September 2017 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

The onset of fall rains was mixed along the west coast with western Oregon, coastal Northern California and areas of the south-central coast of California seeing measurable amounts while Washington and central California were dry

(Figure 1). Inland rainfall amounts in September were significant across portions of the Great Basin into the northern Rockies and came from cold fronts moving through the region later in the month. Precipitation amounts nationwide were dominated by Hurricane Irma in Florida and the southeastern US (not shown). The Plains were also wetter than average while the Mississippi River valley and New England were drier than normal.

For the first nine months of 2017 temperatures continue to trend above average globally and for the US as a whole, with the US currently on track to have its 2nd warmest year on record. The only cooler than average zones in the contiguous US states are in eastern Washington and Oregon and portions of Montana and Wyoming which are running up to 2°F below average. California year to date is +2.9°F warmer than average, Oregon is +1.9°F, and Idaho is +2.1°F. The remainder of the western US continues to be on the pace to end up 1-3°F above average. Cumulative precipitation patterns for the first nine months of 2017 continues to show overall wetter than average conditions in the western US, which was largely driven by late winter and spring rains (Figure 2). Some isolated regions are showing drier than normal conditions year to date, including southern Nevada, southern Arizona, and eastern Montana. The continued dry conditions in the northern Great Plains remains one of the driest areas in the US, while the bulk of the rest of the eastern US has experienced average to wetter than average conditions year to date, especially along the Gulf states (not shown).

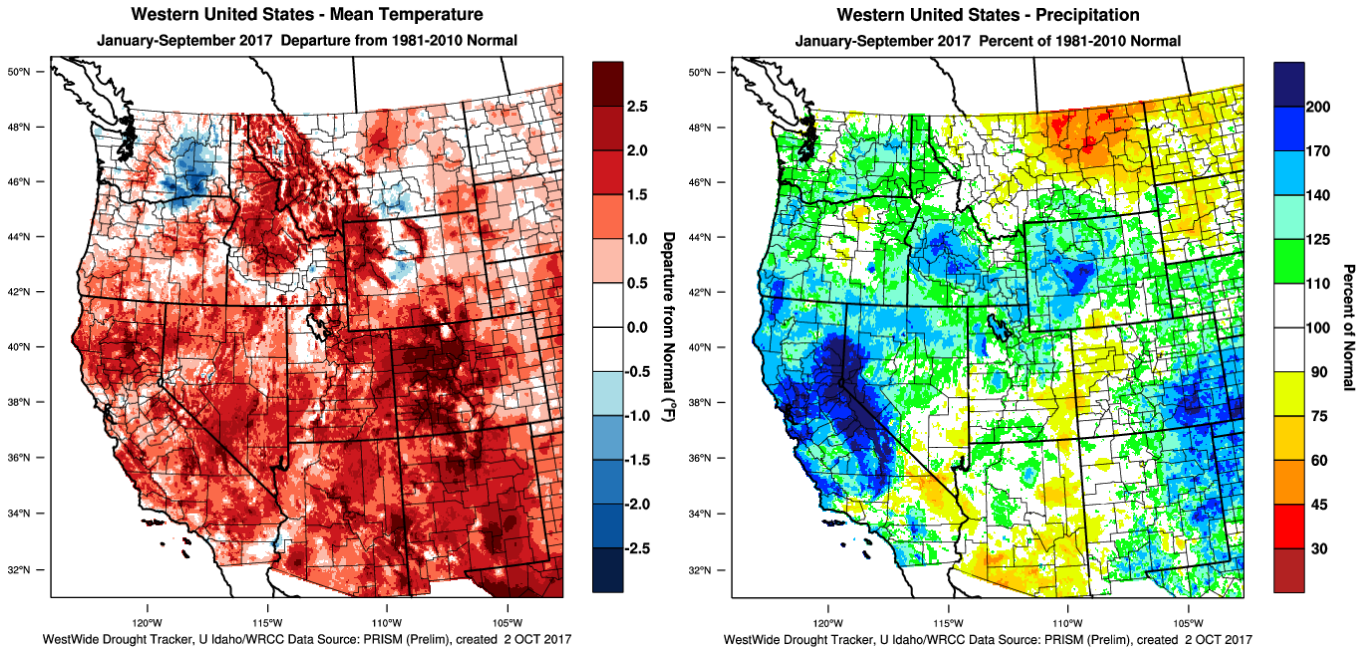

Figure 2 – Western US January-September 2017 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

Heat accumulation departures from normal for January-September remain above normal for most regions in the west (Figure 3). Portions of eastern Washington and Oregon are near or just slightly below normal, while the rest of Oregon is 15-20% above average, California is 5-25% above average, and Idaho is 10-15% above average. While the coolish September slowed heat accumulation somewhat, wine regions continue 5-20 days ahead of average, except the cool portion of eastern Oregon/Washington which is still 2-6 days behind. Heat accumulation (GDD) amounts for four locations in Oregon continue to track above the 1981-2010 normals for this period, but remain below the values seen at this point in 2015 (see the Appendix Figure 1 for four locations in Oregon). The 2017 heat accumulation to date in the western US wine regions is now intermediate to the values seen in 2013 and 2014 and almost identical to what was experienced in 2016.

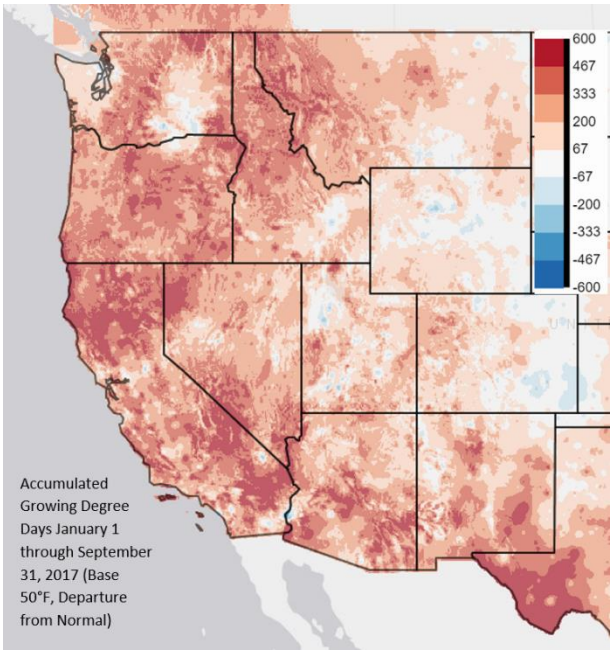

Figure 3 – Western US January through September 2017 growing degree-days departure from the 1981-2010 normals (image from Climate Impacts Research Consortium, University of Idaho).

Drought Watch – The same general drought pattern continues from the last few months (Figure 4; left panel). The inland PNW, Montana and the northern Great Plains continue to show the most moderate to severe drought conditions nationwide. The abnormally dry conditions in the PNW reflect the delay in the normal onset of rains in the region which tends to occur during the second half of September and the first half of October. Coastal Central to Southern California across into Southern Arizona continue to exhibit long-term moderate drought. Scattered short-term drought exists across many areas of the rest of the country (areas in yellow in Figure 4, left panel). The seasonal drought outlook for the United States through December (Figure 4, right panel) predicts drought to persistent in the two main regions of Montana/Northern Great Plains and California/Arizona. Additional drought development and persistence is likely in scattered regions across the US with portions of the Mississippi River valley seeing the most development. Onset of winter rains are expected to ease the minor seasonal drought in the PNW (see forecast periods).

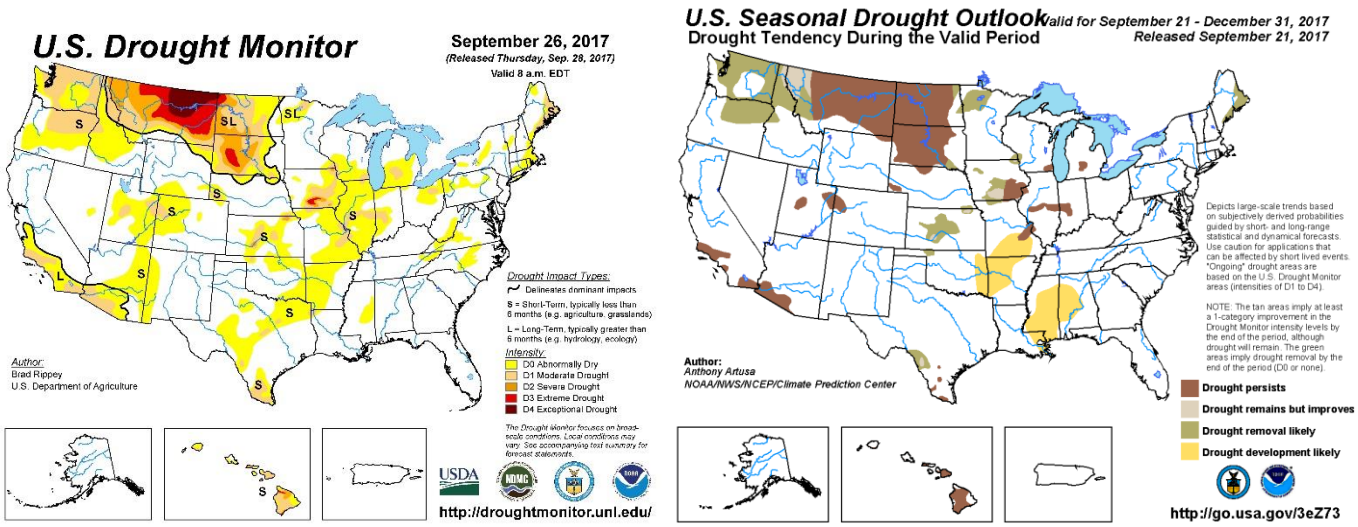

Figure 4 – Current US Drought Monitor and seasonal drought outlook.

ENSO Watch – Mixed signals coming out of the tropics. The tropical Pacific has remained in an ENSO-neutral state, although sea surface temperatures (SSTs) in the east-central tropical Pacific have cooled to the threshold for La Niña

while the atmosphere continues to maintain largely ENSO-neutral patterns. The collection of latest ENSO prediction models indicates coolish ENSO-neutral or weak La Niña as two possible scenarios during Northern Hemisphere fall and winter. Multiple governmental and research agencies are currently indicating that the outlook slightly favors La Niña development, and carries a La Niña watch. Neutral conditions tend to mean that there is little tropical influence in mid-latitude weather and statistically tilts the odds to favoring the next few months to be warm and dry across the southern half of the US; wet and cool the further north one goes into Canada (see forecast periods below). A weak La Niña would statistically favor a wetter and cooler winter in the PNW and a cool, but dry California.

North Pacific Watch – The North Pacific Ocean continues to display warmer than average SSTs over the majority of the basin (Figure 5). Surface waters are running 1-4°F warmer than average, with some isolated areas in the Gulf of Alaska and off of California currently ~1°F below normal (note figure is in °C). The latest October-November-December (OND) ensemble forecast for SST continues the same basic spatial pattern and either maintaining the current conditions or a slight cool down. The continued warm conditions in SST in the North Pacific would enhance the likelihood that the western US would see a warmer than average OND (see 90-day forecast below). But if La Niña does set in the tropics, the PNW would tend toward cooler and wetter for the winter, while California would tend to be cooler and drier through the 90-day forecast window (below and in Appendix Figure 2).

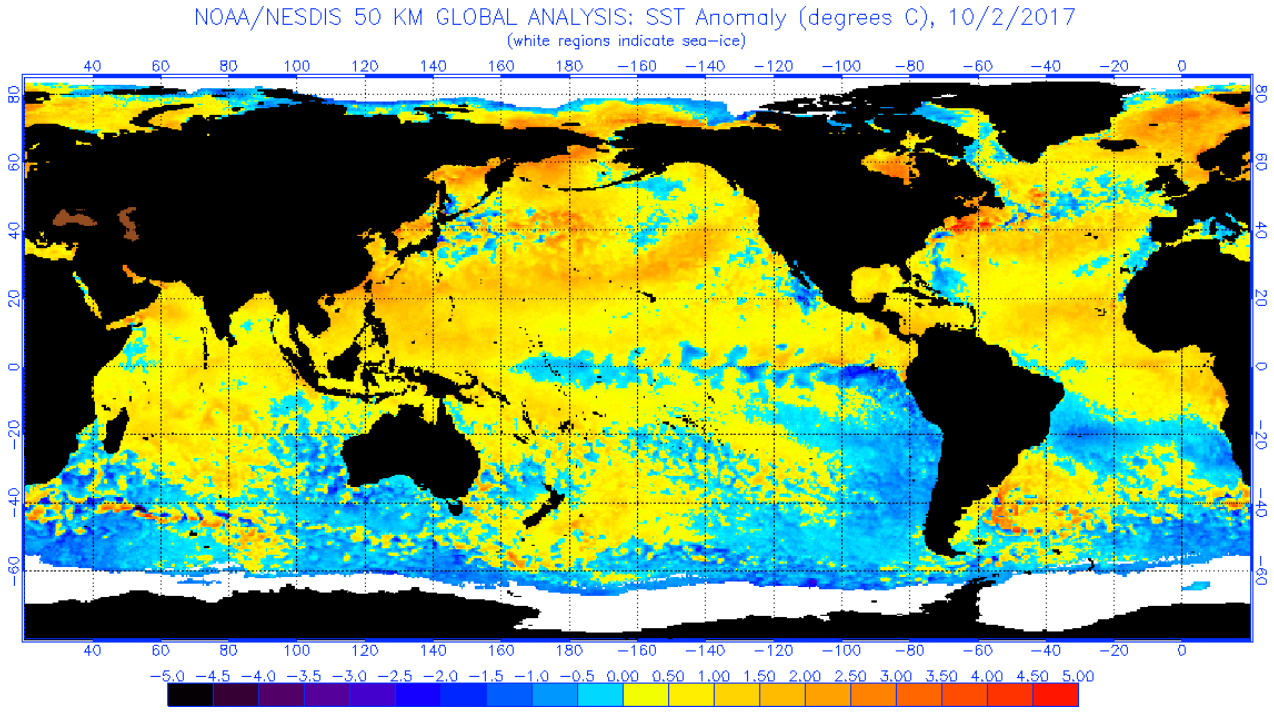

Figure 5 – Global sea surface temperatures (°C) for the period ending October 2, 2017 (image from NOAA/NESDIS).

Forecast Periods:

6-10 Day (valid October 9-13): Cool to seasonal and dry during this forecast period. While it is clear that fall is here with shortening day lengths and cooler temperatures, our high pressure ridge is holding on and bringing generally dry conditions over the western US. There is the chance for some light rain from northern Oregon into Washington and British Columbia October 6-7, but otherwise dry south over the rest of the west coast through this forecast period. The cooler and drier than average conditions should prevail throughout the Rockies and into the Plains, while the East Coast is forecast to be substantially warmer than average and likely to see above average precipitation.

8-14 Day (valid October 11-17): Overall pattern of cool and dry should continue through this forecast period. There are some models indicating that a shift in the ridge and jet stream are likely to bring a greater chance of precipitation during October 13-16. However, there is currently no indication that the rain will be heavy or widespread at this

point. The bulk of the rest of the US is projected dry through this forecast period, with only Florida and a small area of the southeast likely to see above average precipitation. The central portion of the US is forecast to stay relatively cool while the eastern US is forecast to remain warmer.

30 Day (valid October 1-31): While the first half of October is forecasted to be cool and dry in the west, long-lead models are showing increasing chances for a wetter second half of the month. The overall 30-day forecast reflects this dry/wet split with temperatures running near average over the majority of the west coast, cooler than average in inland PNW and northern Rockies and warmer than normal in Southern California and Arizona (see Appendix Figure 2). Similarly, the precipitation forecast for October is calling for average conditions with an equal chance of ending up slightly above to slightly below for the month. The eastern US is forecast to be warmer than normal for the month, with New England likely to see the greatest deviation to warm conditions. Nationwide the precipitation forecast tilts the odds to a wetter than average northern Plains, western Great Lakes, and Florida with dry conditions likely in the Ohio River valley into the mid-Atlantic states.

90 Day (valid October-November-December): The first look at the winter forecast for OND points to continued warmer than normal conditions likely across the US. The desert SW and Four Corners region has the highest likelihood of being warmer than normal during the three-month period (NOAA's Climate Prediction Center, see Appendix Figure 2). While this forecast is partially due to the warming of the North Pacific, hints at La Niña development (see above) could change the dynamics at play. The precipitation forecast over the OND period is mixed nationwide with the PNW and northern Rockies forecast to see wetter than average conditions, while the Gulf Coast and southeast are forecast to be drier than average and everything else in between near average (see Appendix Figure 2). For the western US, I would lean to a transition to a cooler OND if La Niña continues to develop. This would also point to a wetter (snowier) winter in the western US, especially in the PNW.

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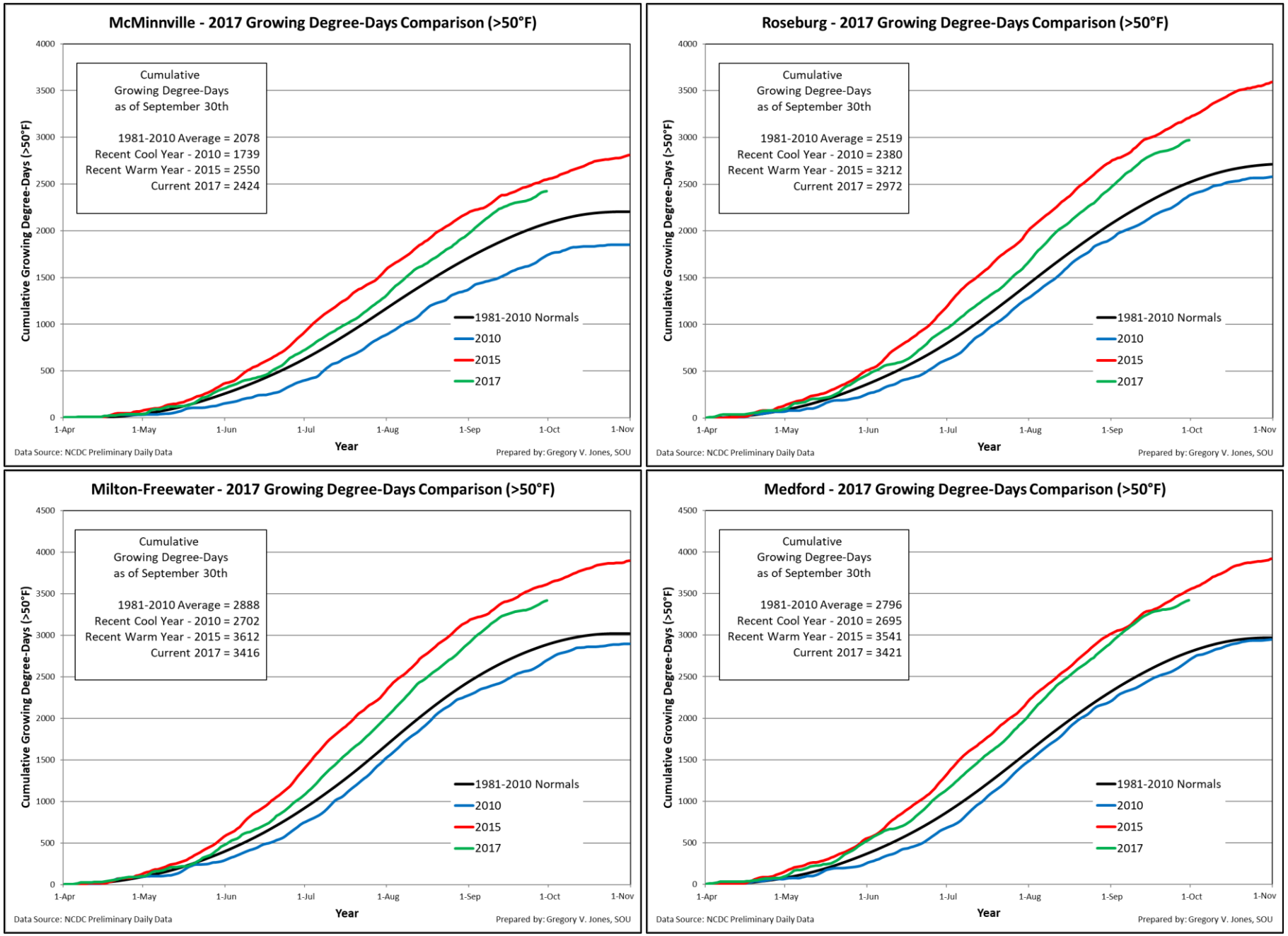
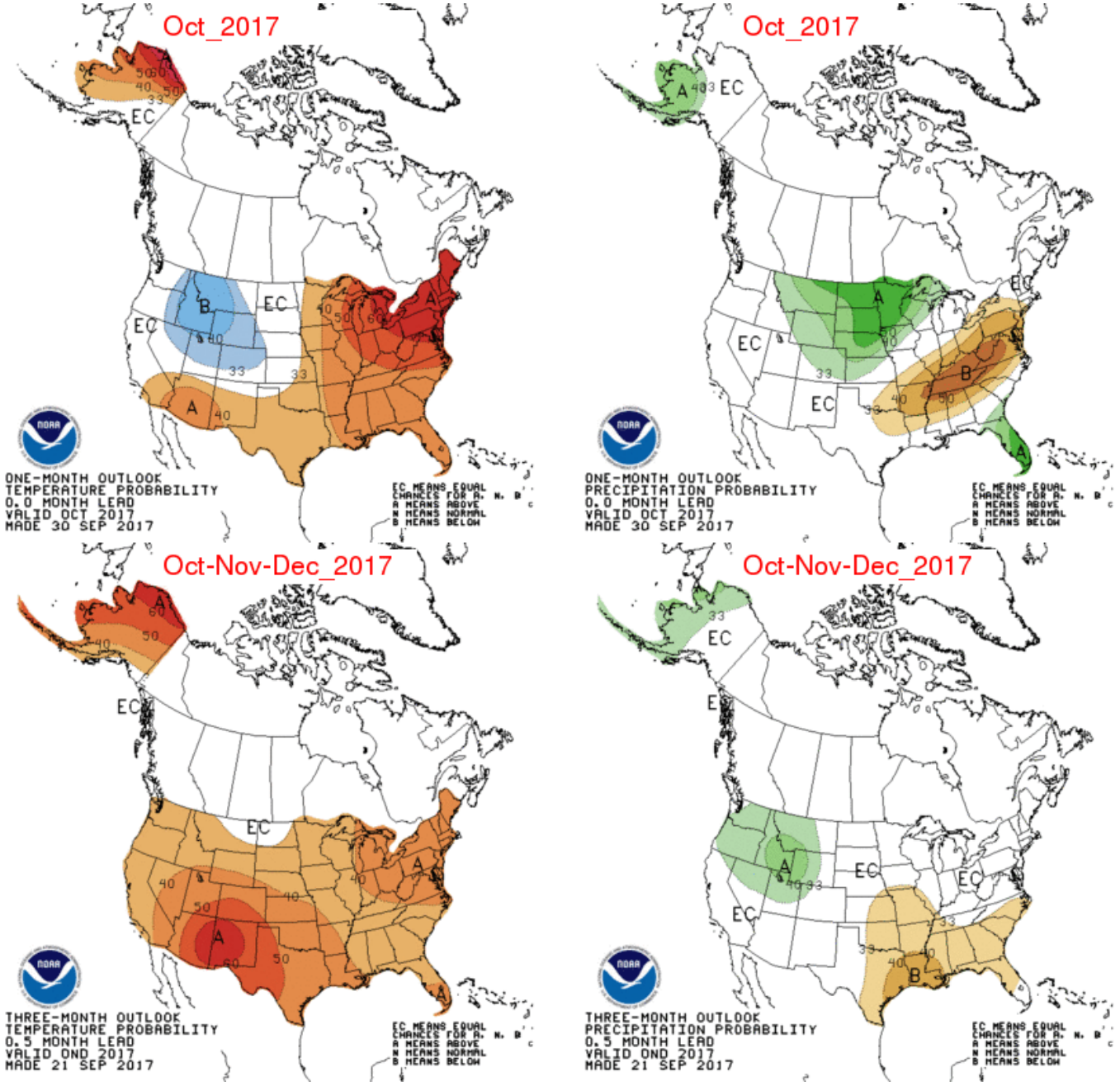


Appendix Figure 1 – Cumulative growing degree-days (base 50°F, no upper cut-off) for McMinnville, Roseburg, Milton-Freewater, and Medford, Oregon. Comparisons between the current year (2017) and a recent cool year (2010), a recent warm year (2015) and the 1981-2010 climate normals are shown (NCDC preliminary daily data).



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