Weather and Climate Summary and Forecast
September 2022 Report

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September 3, 2022

Summary:

- August was warmer than average over the west, with most areas 2-7°F above normal[1] while the Four Corners region was closer to average. Higher humidity and higher nighttime temperatures continued from July.
- Rainfall in August was mostly due to monsoon moisture in eastern California across the Great Basin, and southwest, while the west coast zone into the inland PNW remained dry with continuing drought concerns.
- Exceptionally warm start to September in California. Most of the west will see warmer than average conditions in the short term. Continued monsoon moisture is likely for the southwest, otherwise dry elsewhere.
- September is expected to continue the warmer than average temperatures over most of the west through mid-month or later. Slight chance of showers or drizzle in the Puget Sound over the next couple of weeks and continued monsoon moisture and the potential for precipitation in the southwest across to Texas.
- Harvest has started in California but lagging in Oregon, Washington, and Idaho. The 90-day forecast is holding to warmer and drier than normal for September, potentially wet and cool in October, and dry with a near normal to warm November over most of the west.

Past Month and 2022 Year to Date

The forecast for August held to warmer and drier for much of the west and the continued monsoon precipitation in the southwest and Great Basin (Figure 1). The PNW, Northern Rockies, and most of California experienced August temperatures 2-7 degrees above average, while much of the desert southwest was closer to average due to increased cloud cover, higher humidity levels, and precipitation from the monsoon flow. Slightly cooler than normal to average temperatures were seen in and around the Bay Area and southern California. Much of the country east of the Plains experienced average temperatures in August, except New England which was 4-6 degrees above average (not shown). August precipitation was less than 20% of normal up and down the west coast, shifting to 150-300% of normal in portions of eastern California, most of Nevada, and areas throughout the southwest (Figure 1). The monsoon also brought record-breaking rainfall across Texas and the mid-south, while the eastern seaboard and especially southern New England experienced a drier than normal August (not shown).

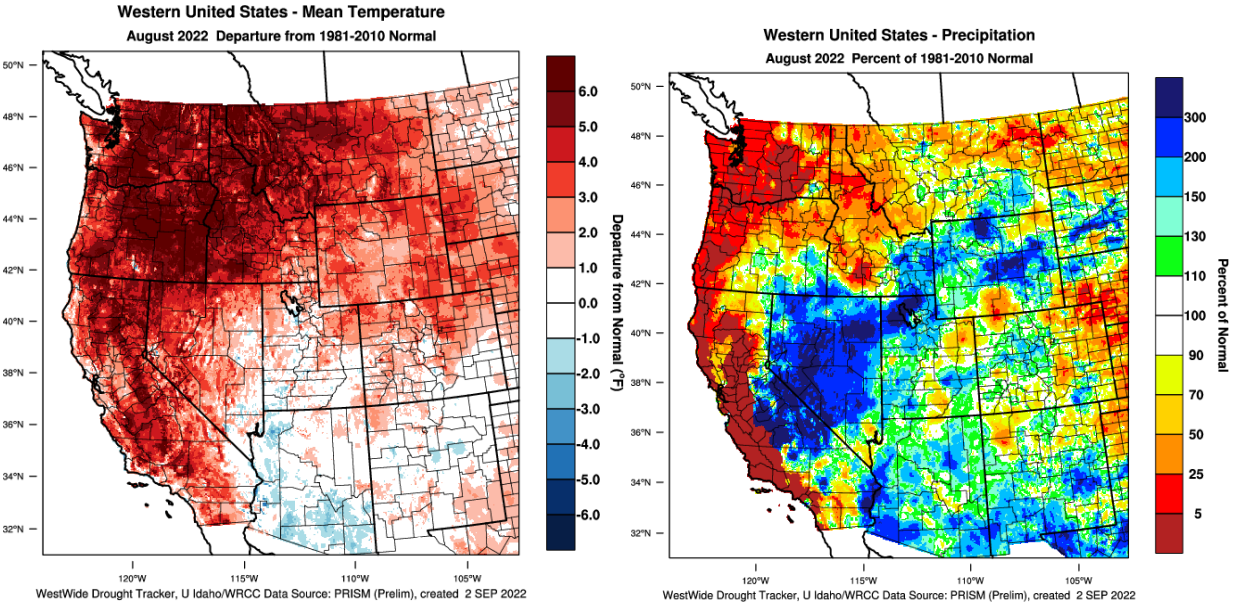

Figure 1 – Western US August 2022 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

[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. Also, note that the 1991-2020 climate normals are starting to become available across reporting agencies and will be used in this report when possible.

Year-to-date the western US is close to average to above average (Figure 2). The warmest areas so far have been throughout most of California, while the coolest conditions year-to-date have been seen in the inland PNW with eastern Washington, eastern Oregon, the Snake River Valley, and most of Idaho, with 1-4 degrees below average for the year. The cooler conditions year-to-date also extend into the northern Rockies, the northern Plains, and Great Lakes southward to the central Plains, while Texas, the southeast, and eastern seaboard have been warmer than average (not shown). Year-to-date precipitation amounts remain substantially below average for most areas of the western US, with precipitation substantially below average for nearly all of California and Nevada with most areas seeing 40% or less for the year and with many regions dropping to 10% or less. Areas from northern Oregon, into Washington, and Idaho are running slightly ahead for the year (Figure 2), while portions of eastern Arizona and most of western New Mexico have seen monsoon rainfall that has brought year-to-date totals above average for the first time in a long time. For the rest of the country, year-to-date precipitation is running below average across Texas and in the southern and central Plains, and in southern New England, while portions of the southeast, the Great Lakes, the northern Plains, and the central Ohio River valley is above normal (not shown).

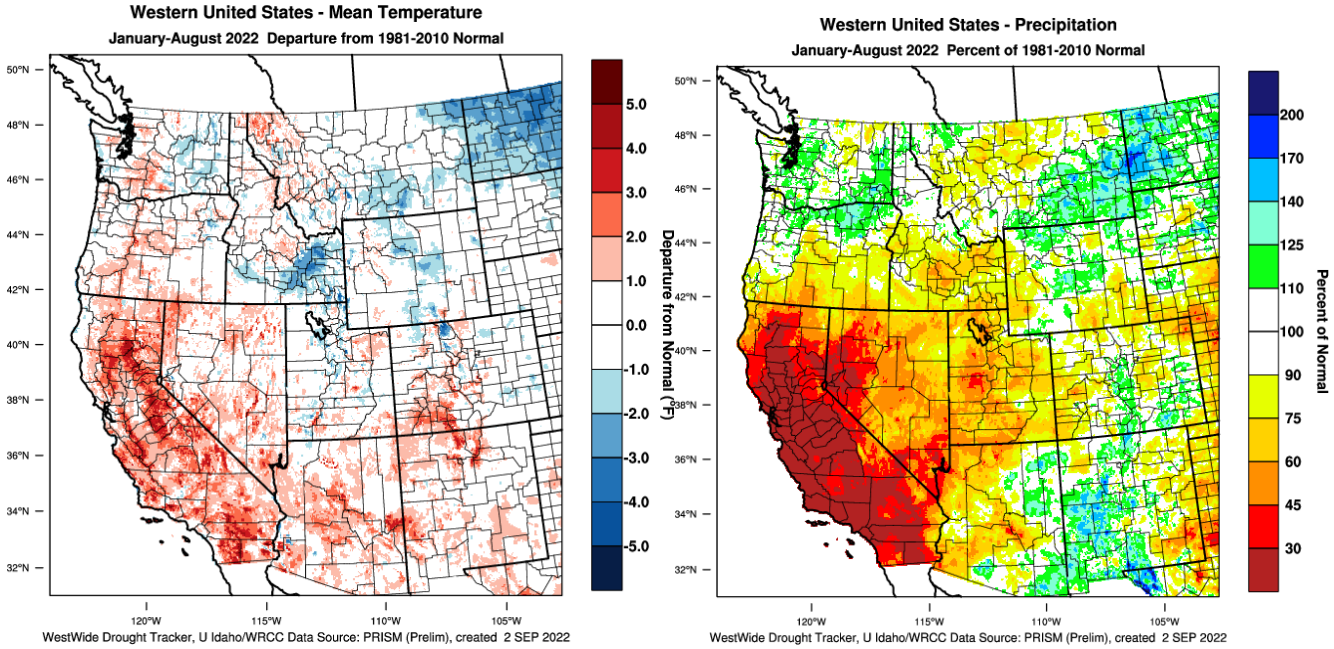

Figure 2 – Western US year to date (January-August 2022) temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

With the majority of the growing season now behind us, the western US growing degree-days (GDDs) from March through the end of August is now mostly above average (Figure 3). A warm August allowed much of the PNW to catch up, although eastern Washington and eastern Oregon continue slightly below average. Except for the northern portion of California, the state is running 200-600 GDD ahead of normal for the period. Western Oregon is now running mostly near average to 100-200 GDD above average, while eastern portions of the inland PNW are near average to 50-150 GDD below average. While much of Idaho is now ahead of average GDD, portions of the western Snake River Valley are slightly below average for this time of year. In terms of days ahead or behind, the GDD data mapped in Figure 3 results in the warmer areas in California being 10-20 days ahead of normal accumulation amounts. Wine regions in western Oregon are now running 6 days ahead to 2 days behind, while eastern Oregon and Washington, along with the Snake River Valley are 2-10 days behind the normal accumulation by the end of August (not shown).

For the four main Oregon wine regions, individual NWS weather stations show heat accumulation (GDD) amounts for April through the end of August that are right at or slightly above the 1991-2020 climate normals for McMinnville, Roseburg, and Medford, while Milton-Freewater has moved close to the 1981-2010 climate normals (Figure 4). These locations are close to 15% below the 2021 vintage but are 10-30% GDD above the cool 2010 and 2011 vintages.

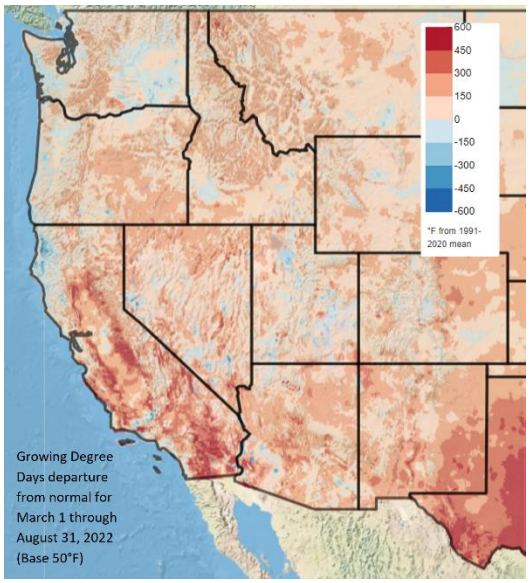

Figure 3 – Western US March through August 2022 growing degree-days (image from Applied Climate Science Lab, University of California Merced).

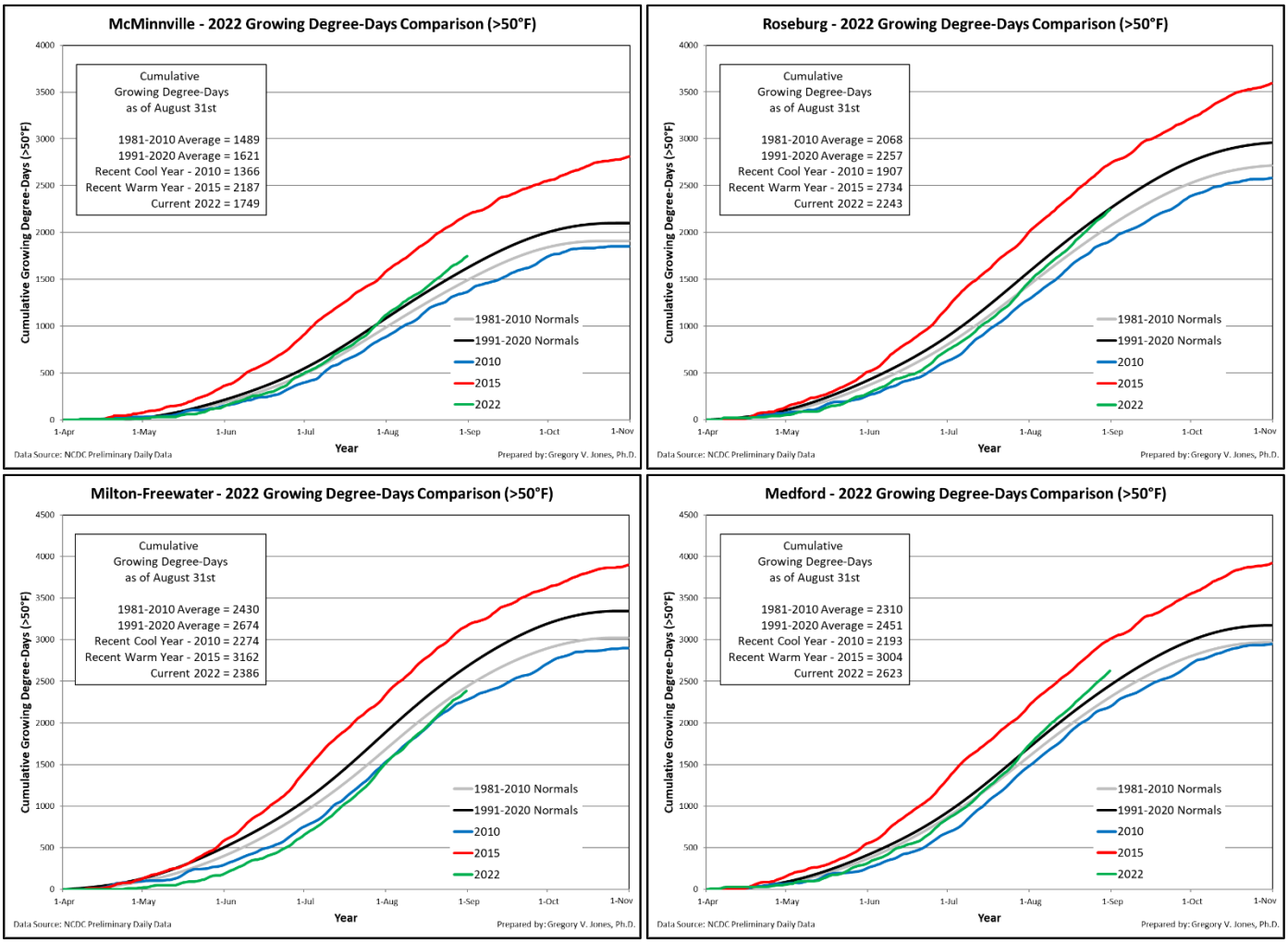

Figure 4 – Cumulative growing degree-days (base 50°F, no upper cut-off) for McMinnville, Roseburg, Milton-Freewater, and Medford, Oregon. Comparisons between the current year (2022) and a recent cool year (2010), a recent warm year (2015), and both the 1981-2010 and 1991-2020 climate normals are shown (NCDC preliminary daily data).

Drought Watch – Two areas of the country have seen broad drought improvements; the southwest and south (Figure 5). Record-setting rainfall across the south has lowered drought concerns there while the North American monsoon has

brought significant rains to the southwest (Figure 1). Many areas in the Four Corners region only receive about five inches of rain annually, but many locations in the region have received this much over the last few weeks alone. However, drought expanded in the Northwest as warmer and drier than average conditions continued across the region. While the overall drought footprint in the west region is close to 88%, the most extreme categories of drought (extreme and exceptional) have dropped to under 20% due to the monsoon rains in the southwest. Roughly 30% of Washington is in some level of drought, but no areas in the state are in the most extreme drought categories. Oregon continues at roughly 75% of the state in some level of drought with the eastern and southern portions of the state still in extreme categories (>30%). California continues to have 100% of the state currently in some level of drought but has seen a slight decline of the most extreme drought conditions to 40%. Drought zones also continue to extend across the Rockies, portions of the Plains, and most of Texas. The seasonal drought outlook (Figure 5, right panel) continues to show both short and long-term drought issues for much of the west. Over the last month or so the southwest and Four Corners region across to Texas has seen monsoon rains that are anticipated to continue to lower drought levels and even remove some areas completely (Figure 5 and see forecast section below). The eastern half of the country has remained largely free from drought, although the coastal areas of New England will likely see dry conditions persist into fall.

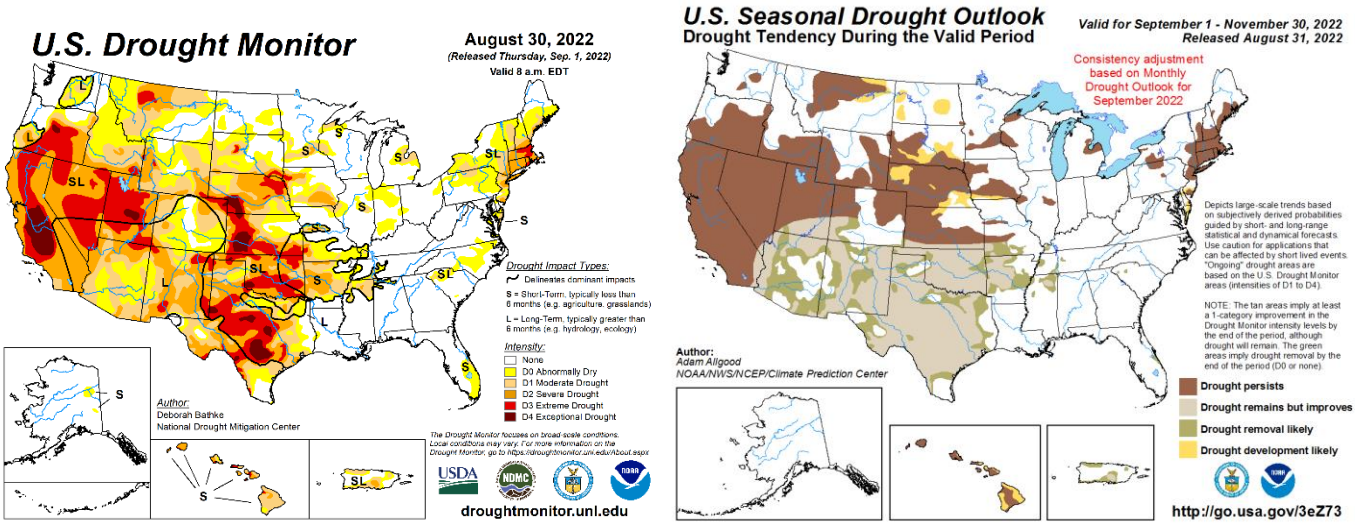

Figure 5 – Current US Drought Monitor and seasonal drought outlook.

ENSO Watch – La Niña conditions in the Tropical Pacific continued through the most recent forecast period (Figure 6). The Climate Prediction Center (CPC) maintains the La Niña Advisory and will likely continue to do so through the end of summer and into the start of fall. Most other oceanic and atmospheric variables are consistent with the observed La Niña conditions and ocean-climate models continue to predict SSTs remaining below average in a moderate La Niña. The official outlook from numerous agencies confirms this forecast with the outlook calling for a moderate to weak La Niña to continue and has pushed out the window to at least December 2022 to February 2023. The CPC model-based outlook forecasts have increased the probability of La Niña continuing through November at 86% and then decreasing to 60% by the end of the year or the start of 2023. As such La Niña is almost certain to have its third year in a row, which has happened only twice since 1950. The current 90-day forecast (see below) continues to show the anticipated influence of the La Niña conditions with a wetter southern tier of states and a drier central to northern states.

North Pacific Watch – The North Pacific has continued its warming trend with most of the basin from Japan to the North American border (Figure 6) running from 0.5 to 5°C (1-10°F) above the CSFR 1981-2020 climatology. The North Pacific also continues to exhibit strong negative values in the Pacific Decadal Oscillation (PDO). The warmer conditions now extend all along the coast of western North America south to Baja California (Figure 6). With the warmer waters in the North Pacific, broader warmer than average conditions were seen across most of the west in August and especially in the PNW (Figure 1). This pattern will also likely help drive a more active monsoon season in Mexico and the southwest, which continues to be apparent in the 90-day forecast for the end of summer and the start of fall (see below).

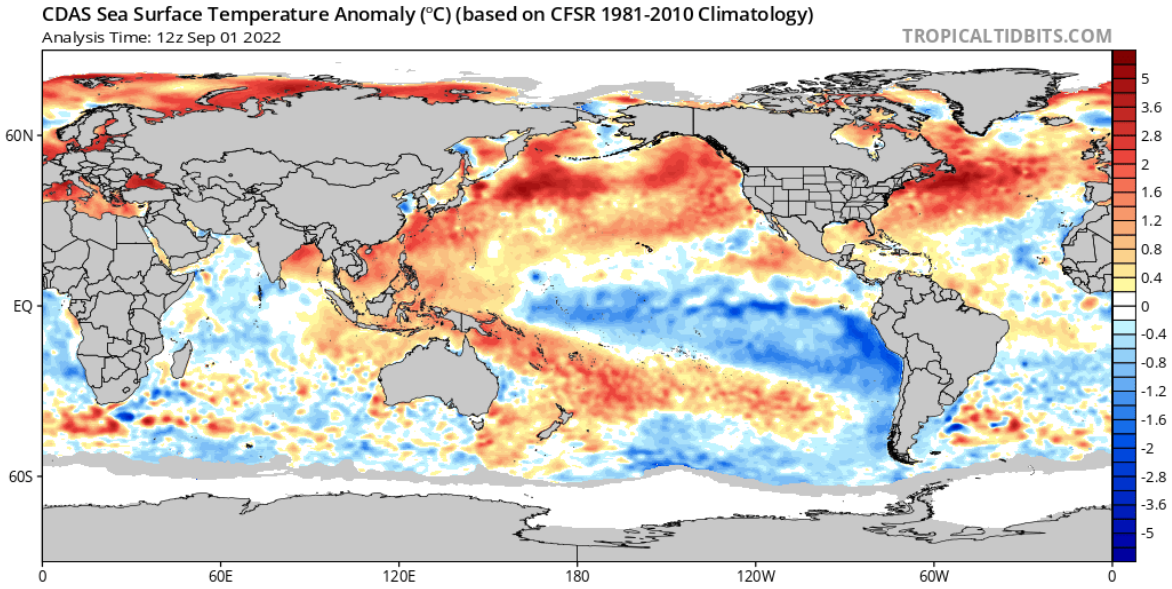

Figure 6– Global sea surface temperatures (°C) for the period ending September 1, 2022 (image from Tropicaltibits.com).

Forecast Periods:

Next 5 Days: Hot to warm to seasonal start to September. Strong ridge setting up with likely very high temperatures over the next 5-10 days in California, while still warm in the PNW more seasonal than points south and inland. Some onshore flow from the west will tamp down temperatures for Oregon and Washington with a possible drizzle or shower further north into the Puget Sound.

6-10 Day (valid September 7-11): The ridge setting up in the first week of September will continue to bring very warm, and likely record-breaking, temperatures to California and the Great Basin. Warmer than average conditions are likely across the PNW and central to northern states across to the east coast. Monsoon flow with cloud cover, high humidity, and rains will continue to stream across northern Mexico and Texas. Temperatures will likely be below average across this region. Below average precipitation is likely across the northern tier of states with above average precipitation across the south and into the mid-Atlantic region.

8-14 Day (valid September 9-15): The overall pattern from earlier in the month is likely to continue into this forecast period with the majority of the west warmer than average, except for the southern border across Texas and to the Gulf Coast region which is likely to stay cooler than average. New England is forecast to experience a very warm mid-month with portions of the northern Rockies and Plains likely closer to average for this time of year. The precipitation forecast for mid-month reflects the continued monsoon flow from the Pacific into the southwest, Texas, southern Plains, and southeast. California and the PNW are forecast to be near normal, which still means very little if any rain for this time of year. The northern Plains are forecast to see below-average precipitation for this time of the month.

30 Day (valid September 1-30): The second half of the month of September appears to be likely to continue the first half with above-average temperatures over the west, across the northern states to New England and the eastern seaboard (Figure 7). The area most likely to see above-average temperatures runs from California, northeast into the inland PNW, northern Rockies, and northern Plains. Below average temperatures for the month are likely across central Texas while the rest of the state, western Gulf states, and Mississippi River valley will likely see close to average temperatures for the month. The precipitation forecast is currently pointing to the month ending up with below-average amounts from the PNW to the Great Lakes and northern New England, while from the southwest across to Florida is forecast to see above normal rainfall (Figure 7).

90 Day (valid September-October-November): Most of the country is forecast to see a warmer than average end of summer and start of fall. However, month-to-month variation is likely with October currently the wild card with likely

cooler than average conditions. Overall, the country is likely to see above-average temperatures with the southwest and Rockies along with New England with the greatest probability (Figure 7). The area along the Canadian border from Washington to the northern Plains is forecast to have equal chances of slightly above to slightly below temperatures for the 90-day period. As we transition into the rainy season in the west, the current forecast (Figure 7) is depicting western Washington to possibly see above average precipitation while Oregon, California, and the inland PNW have equal chances of above to below normal amounts for the period. The middle of the country from the Great Basin, across the Rockies, Plains, and into the Mississippi and Ohio river valleys are forecast to likely see below-normal precipitation during this period. Given that this period is often an active tropical storm period, it is of interest that this forecast is not indicating much precipitation along the Gulf Coast and southeast.

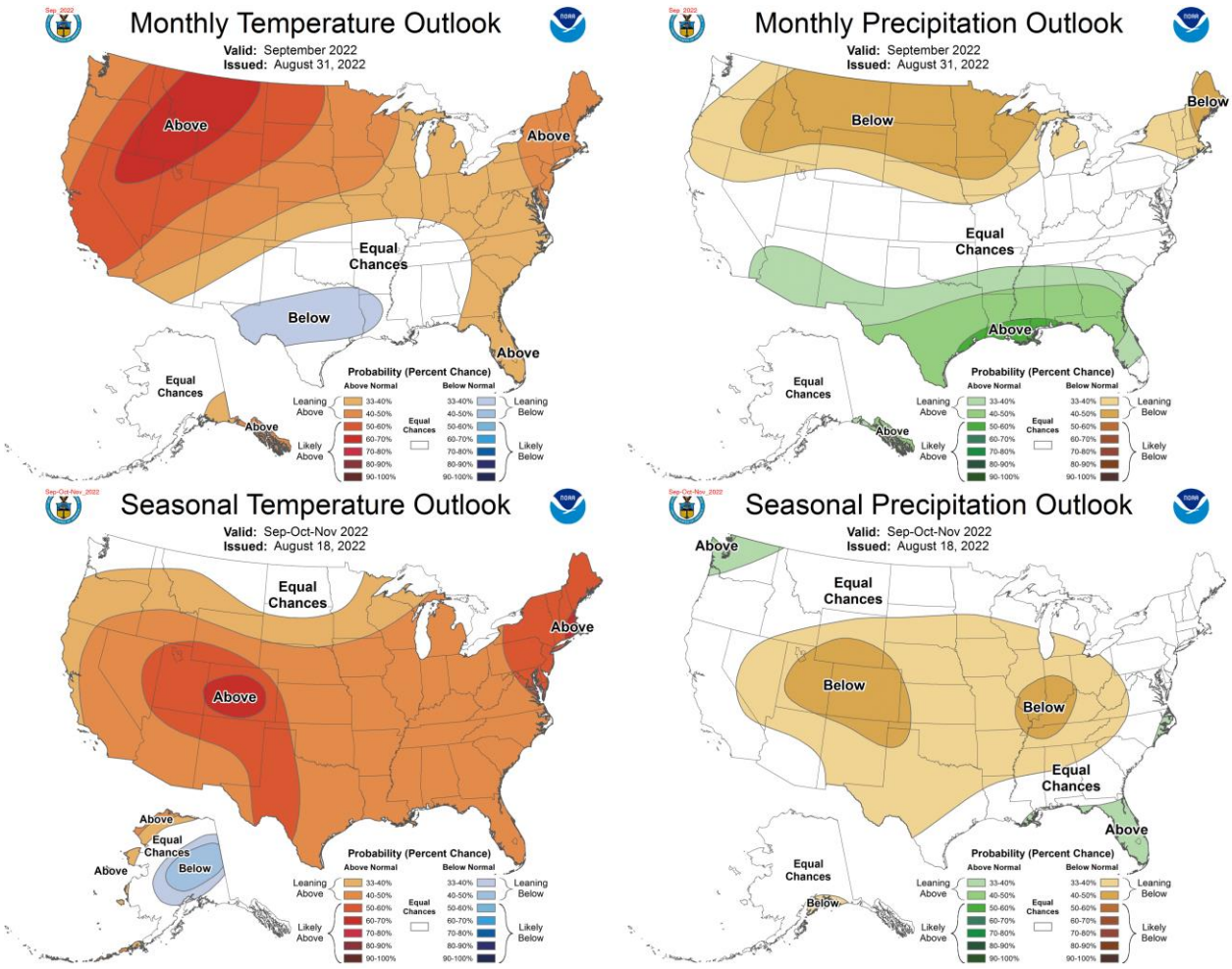

Figure 7 – Temperature (left panel) and precipitation (right panel) outlooks for the month of September (top panel) and September, October, and November (bottom panel) (Climate Prediction Center, climate.gov).

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