# Weather and Climate Summary and Forecast
# September 2023 Report

Gregory V. Jones
**September 4, 2023**

**Summary:**

- August brought a wild mix of weather that was not welcomed by many! However, the month ended largely warmer than average[1] over much of the western US, especially in the PNW and southwest.
- Precipitation in August was dominated by tropical storm Hilary bringing large amounts across much of the west along with the onset of monsoon rains. Dry thunderstorms crossed over the mountains into the west side setting off fires in many regions.
- Drought extent expanded in the PNW while Hilary and the onset of monsoon flow lowered drought most everywhere else.
- Cool start to September north, closer to seasonal south. Temperatures are forecast to warm into mid-month and precipitation is forecast to be lower than average due to what looks like a pause in the monsoon flow.
- The September forecast currently has the month likely ending up pretty much average for temperatures over most of the west coast. For precipitation, the PNW is expected to end the month above average due to early month rain events and the seasonal start of frontal passages (PNW) while the Four Corners region is expected to see a wet month due to early month monsoon rains.
- Heading into the harvest season and fall the forecast is tilting the odds to near average to warmer than average conditions over the majority of the western US. For precipitation, the forecast displays equal chances for a slightly above to slightly below 90 day window for most, except the PNW where, even with the onset of fall frontal passages, amounts are forecast to be below average. The wild card right now rests with El Niño. A strengthening El Niño would mean a greater likelihood of wetter conditions for California and the southwest while the PNW is more likely to be drier.

**Past Month and Year to Date:**

What an August … coolish for some, recording breaking heatwave for others, westside fire starting dry lightning events, a very rare tropical system bringing flooding to many, the onset of monsoon rains, higher humidity levels most everywhere, and October-like temperatures to end the month in the north. While temperatures were mostly warmer than average for August, tropical storm Hilary kept portions of the west cooler than average and pushed large amounts of moisture northward from California into the Great Basin, Idaho, and northern Rockies (Figure 1). All the while, the Bay Area, North Coast, and western Oregon and Washington were extremely dry.

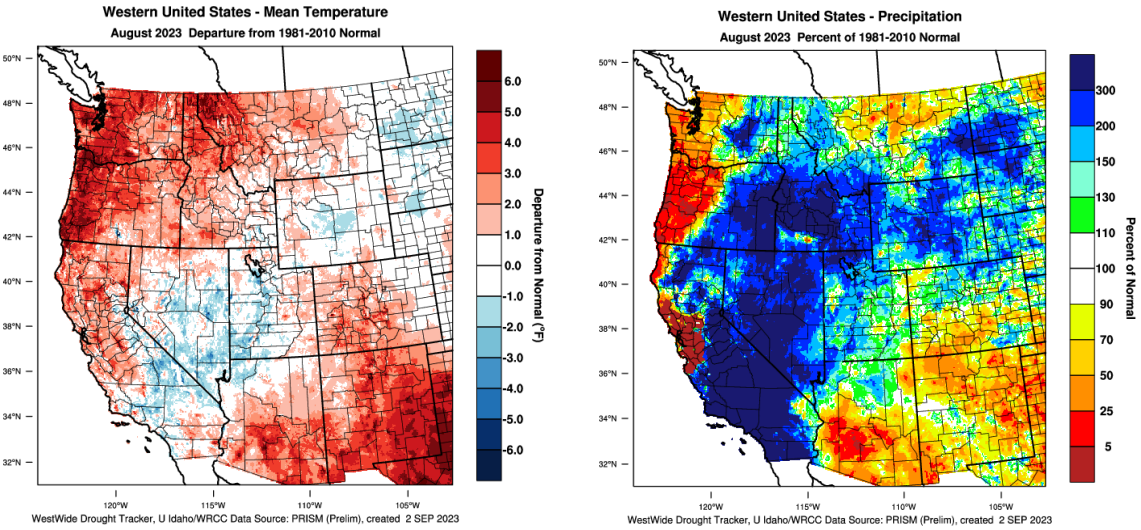


**Figure 1** – Western US August 2023 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

[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.

For the rest of the country, August brought extreme heat to the south from Arizona, across Texas and the Gulf Coast to Florida and the southeast (not shown). Cooler than average temperatures were seen across the Midwest and into the Great Lakes and portions of New England. In terms of precipitation, the southern portion of the country from Arizona to the southeast was dry, especially Texas and Louisiana, adding to drought concerns in these regions (see drought section), while the Midwest up into the eastern Great Lakes and New England experienced a relatively wet August.

The relatively warm August continued to shift the western US closer to average year-to-date temperatures for many areas (Figure 2). Although, the Basin and Rockies have year-to-date temperatures 1-4°F below average, while the southern Sierra Nevada mountains and south coast of California have seen temperatures 2-3°F below average. Washington, northern and western Oregon, northern Idaho, and western Montana remain near average to slightly above average for the year (Figure 2). Precipitation amounts for 2023 continue to show the extreme winter that brought California largely out of drought, which was added to by tropical storm Hilary. Except for dry conditions in extreme southeastern and extreme northern California, most of the state has seen 110 to over 200% of normal precipitation since the start of the year (Figure 2). The Great Basin and much of the Rockies have also had a wetter than average year-to-date helping to reduce drought conditions in those regions as well. August continued the drier than average conditions in the PNW, although some areas of southeastern Oregon and southern Idaho received enough tropical moisture to stay just above average. Strong east-west temperature differences continue year-to-date with the eastern US running substantially above average (2 to 6°F; not shown) while the west has been cooler or near average. Year-to-date precipitation amounts are quite variable across the eastern half of the country with moderately drier than normal conditions experienced in the Plains, much of Texas, the Midwest, Florida, and the mid-Atlantic, while the Front Range of the Rockies, mid-south, southeast, Great Lakes, and portions of the eastern seaboard have been closer to average or slightly wetter than average (not shown).

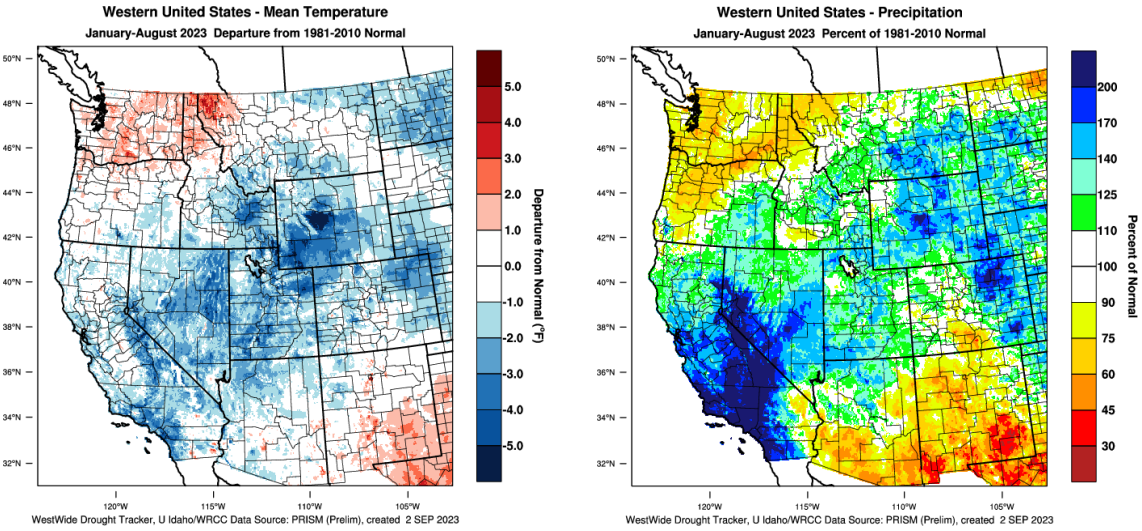


**Figure 2** – Western US 2023 year to date (January 1, 2023, to August 31, 2023) temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

**Heat Accumulation:**

March through August 2023 growing degree-day (GDD) departures for the western US continues the broad pattern seen so far this year. Generally higher than average amounts in the PNW and northern states and lower than average amounts in California and central to southern states (Figure 3). Southern California into Nevada and portions of the Great Basin have remained much lower than average, especially with cloud cover and precipitation from tropical storm Hilary lowering temperatures from normal. Central California northward to the Oregon border experienced a warmer than average month (Figure 1), which brought the area closer to near average GDD for the year. The PNW saw continued warmer than average conditions in August with GDD amounts continuing mostly above average. In terms of days ahead or days behind normal, inland California remains near average to 7 days behind normal while the central to southern California coastal areas are 14-18 days behind at this point. The PNW continues at roughly 7-24 days ahead of normal accumulation amounts at the end of August (not shown).

For four of Oregon's main wine producing regions, the main weather stations in each location I have monitored for many years are moderately to substantially above both the 1981-2010 (+14-38%) and 1991-2020 (3-27%) climate normal for the March to August period. Compared to the average of the last 15 years these locations have seen 4-12% more GDD to date and 14-18% over what they accumulated in the same period in the 2022 vintage.

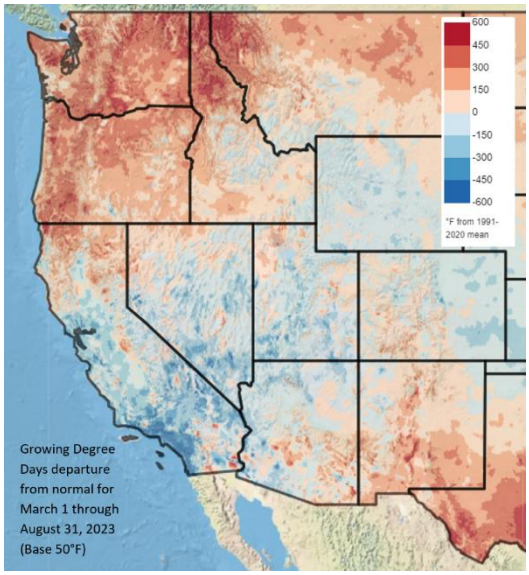


**Figure 3** – Western US March through August 2023 growing degree-days (image from Climate Impacts Research Consortium, University of Idaho).

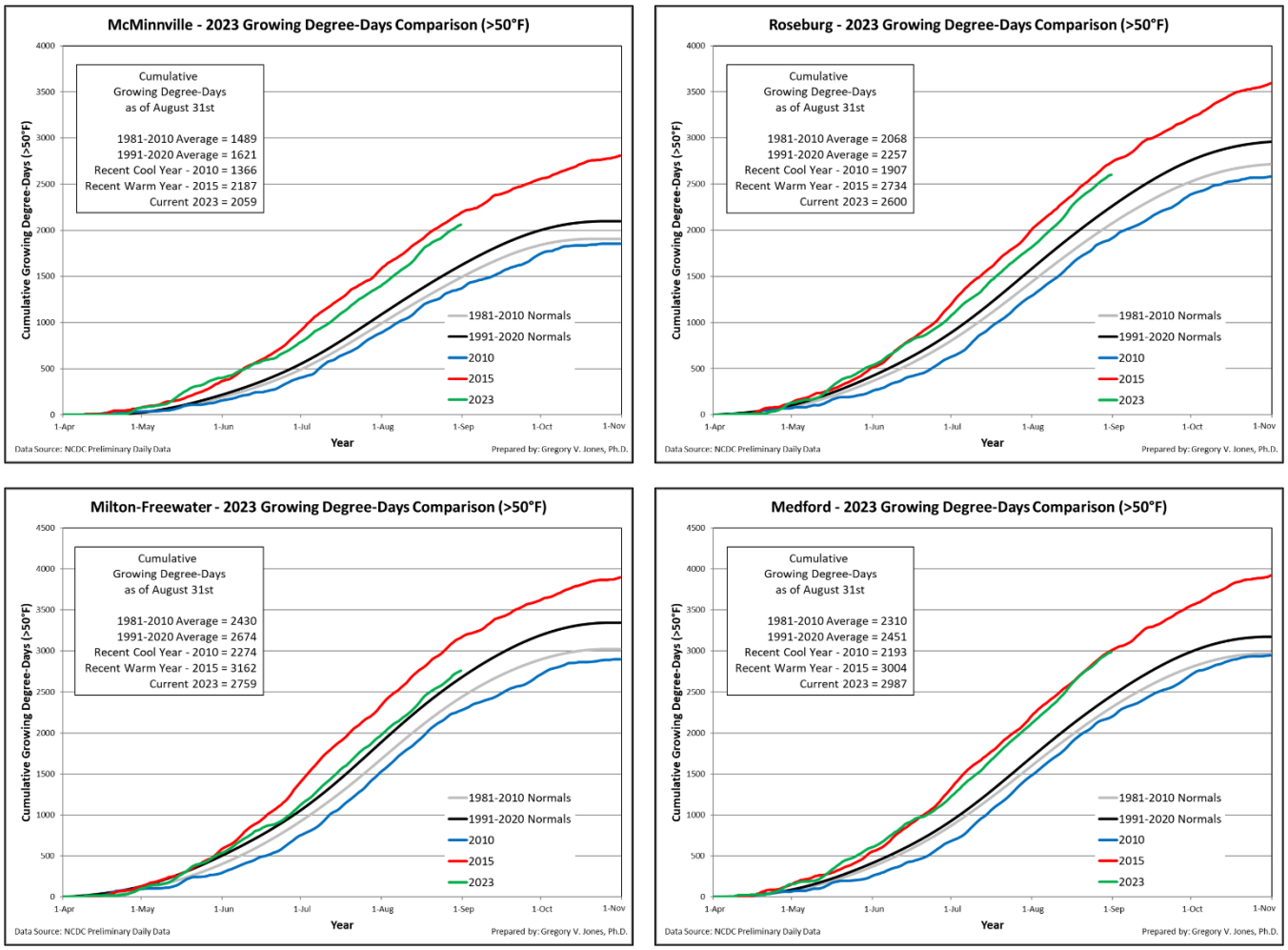


**Figure 4** – Cumulative growing degree-days (base 50°F, no upper cut-off) for McMinnville, Roseburg, Milton-Freewater, and Medford, Oregon. Comparisons between the current year (2023) and a recent cool year (2010), a recent warm year (2015), and both the 1981-2010 and 1991-2020 climate normals are shown (NCDC preliminary daily data).

**Drought Watch** – The overall pattern of drought in the US did not change much over the month of August with the core areas seeing drought continuing to be the PNW, central Plains, western Great Lakes, and Four Corners across through Texas and the western Gulf Coast states (Figure 5). Tropical system Hilary and additional monsoon flow during the month (Figure 1) keep a large portion of the west, including California, either out of drought or lowered the severity as in portions of Arizona, Utah, and Nevada. Across the continental US, the overall drought footprint dropped slightly to just over 50% but rose to nearly 8% in the most extreme drought categories. For the western US, the region increased to nearly 55% in drought but continues to show large differences between states and regions. Washington has seen increasing drought concerns, going from 70% in some level of drought in June to nearly 95% now with 5% in the more extreme categories. Not much change in Oregon month over month with just under 76% of the state in some level of drought but remaining with no areas in any of the extreme drought categories (severe, extreme, and exceptional). Idaho has dropped to just over 32% drought coverage, with a small area (<1%) in the more extreme categories. Tropical system Hilary helped lower California drought concerns to its lowest levels in years. Currently, the state is at just less than 7% in some level of drought with no areas with the more extreme drought categories (Figure 5).

The onset of monsoon flow in the southwest and tropical system Hilary altered the seasonal drought forecast over a large area of the west (Figure 5, right panel). The PNW has moved further into drought with the 90 day forecast indicating the likelihood of further development across the region. California and Nevada along with portions of Arizona and Utah are forecast to remain out of drought into the fall. Over the rest of the country, most of Texas, New Mexico, the Midwest, western Great Lakes, and western Gulf Coast states are forecast to see drought persist or develop further (Figure 5).

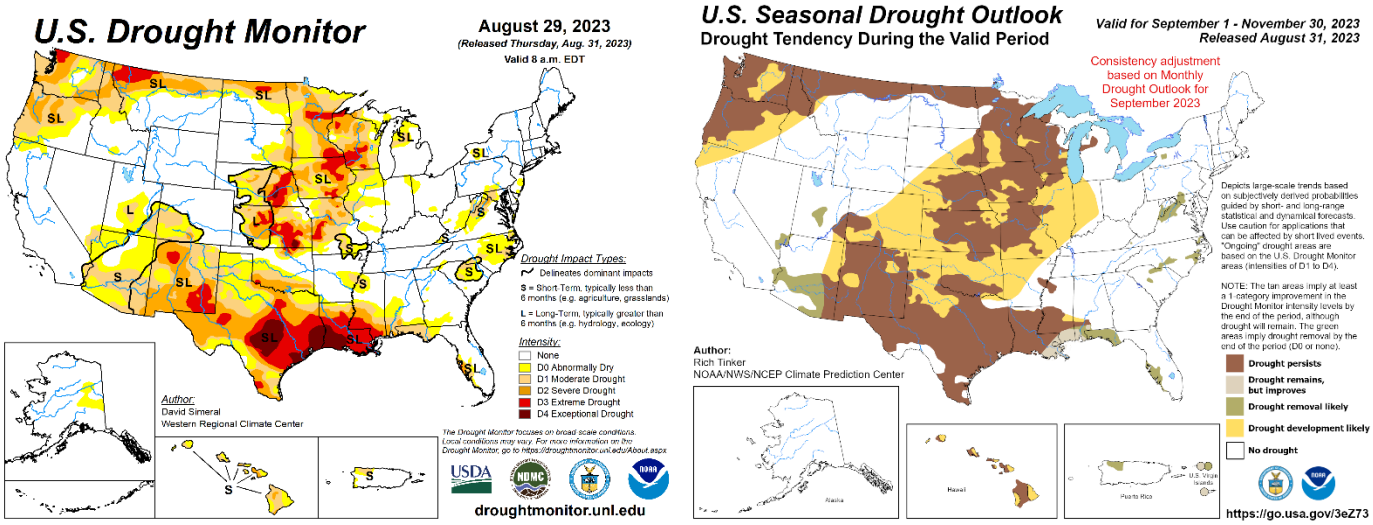


**Figure 5** – Current US Drought Monitor and Seasonal Drought Outlook.

**ENSO Watch** – Moderate El Niño conditions in the central-eastern Pacific have strengthened as sea surface temperatures (SSTs) have continued warming over the last month (Figure 6). While the majority of the key ocean and atmosphere variables across the tropics are now consistent with full-fledged El Niño conditions, some of the atmospheric factors are not yet fully in sync with the warmer SSTs. At this time the Climate Prediction Center maintains an El Niño advisory, signaling the continuation of the warm phase of the ENSO. The vast majority of the models in the ENSO prediction plume continue to forecast that the El Niño event will persist into the North Hemisphere fall and that it is highly likely (>90%) to continue into the winter and spring of 2023-24.

**North Pacific Watch** – The broad pattern in North Pacific sea surface temperatures (SSTs) has remained fairly consistent over the last month but continues to be in a strong negative Pacific Decadal Oscillation situation (Figure 6). The expansion of warmer SSTs throughout most of the Gulf of Alaska and further south along the coast to California has continued into September while the cooler coastal SSTs are now limited to extending from Baja California coast west toward Hawaii. The slight cooling in the SSTs in the Gulf of Alaska and a dip in the jet stream have brought some of the first low pressure and frontal passages southward into the PNW. The onset of this type of flow is about 10-15 days early,

just not sure how it will play out for the rest of the month of September as the forecast is calling for near average temperatures for most of the west and above average precipitation for the PNW (see Forecast section below).

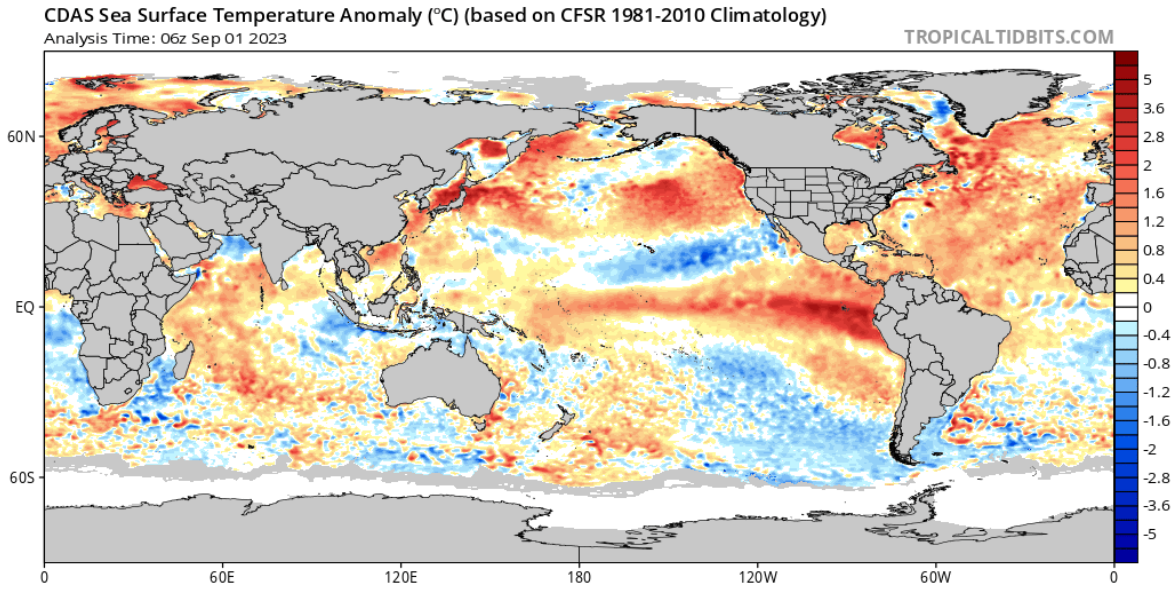


**Figure 6** – Global sea surface temperatures (°C) for the period ending September 1, 2023 (image from Tropicaltibits.com).

**Forecast Periods:**

**Next 5 Days:** A cool and slightly wet start to the month north, warmer south into California. Rain chances drop over the next five days, although humidity remains elevated due to lingering monsoon air flowing northward. Seasonal temperatures in the PNW and warmer than average temperatures from Northern California into the desert southwest.

**6-10 Day (valid September 9-13):** Temperatures are expected to rebound to normal or above normal in the PNW into the second week of September, while California and the rest of the western US are forecast to remain warmer than average. The Four Corners region across to the western Gulf will likely be much warmer than normal, while the Great Lakes are likely to be cooler than average. Normal to below average precipitation is forecast for the west as the monsoon push slows some. Slight chance of precipitation in the far northwest into Canada. The middle of the country and east coast are forecast to see above average precipitation, and other areas are forecasted to be closer to average or below average.

**8-14 Day (valid September 11-17):** Moving into mid-month, the forecast continues to tilt toward above average temperatures for most of the west, except southern California where onshore flow and clouds will likely tamp down temperatures. Very warm conditions are likely to continue across the south from the Four Corners to Florida, while the Great Lakes to New England are forecast to see near normal to below normal temperatures. The PNW forecast is leaning to below normal precipitation into mid-month, while California and portions of the southwest are expected to be closer to normal. The center of the country is forecast to likely see above average precipitation, while the rest of the country will likely be near normal or below normal rainfall for this time of year.

**30 Day (valid September 1-30):** The overall forecast for temperatures in September is calling for the west coast states to have equal chances of ending up slightly cooler to slightly warmer than average. The best bet is for an average month in most of the region (Figure 7). The middle of the country from the Great Plains south into Texas and the Gulf Coast has an above average chance of seeing a warmer than average month. The precipitation forecast for the western US for September is mixed with the PNW forecast to have an above average chance for a wet month, while California and most other states are expected to be close to normal. Monsoon flow is forecast to leave portions of the southwest with greater than normal precipitation for the month (Figure 7). A large area from Texas northeast into the Great Lakes has a September forecast for below normal precipitation while the eastern portion of the country has equal chances to be slightly above to slightly below for the month.

**90 Day (valid September-October-November):** The three month forecast heading into fall gives a seasonal outlook for an above average probability for the western US to see warmer than average temperatures (Figure 7). The greatest probability for warmer conditions is likely in the southwest, while the typical push of fronts along the west coast will likely keep temperatures there a little closer to average. Warmer than average temperatures are also forecast along the Gulf Coast, into the southeast, and up into New England while the upper Midwest and Plains have equal chances of slightly above to slightly below temperatures. The 90 day precipitation outlook is largely showing equal chances for slightly above to slightly below (seasonal) for most of the country (Figure 7). The exceptions are the PNW, portions of the southwest, and western Great Lakes having a greater chance of below average precipitation and the southeast and Florida having a greater chance of above average precipitation.

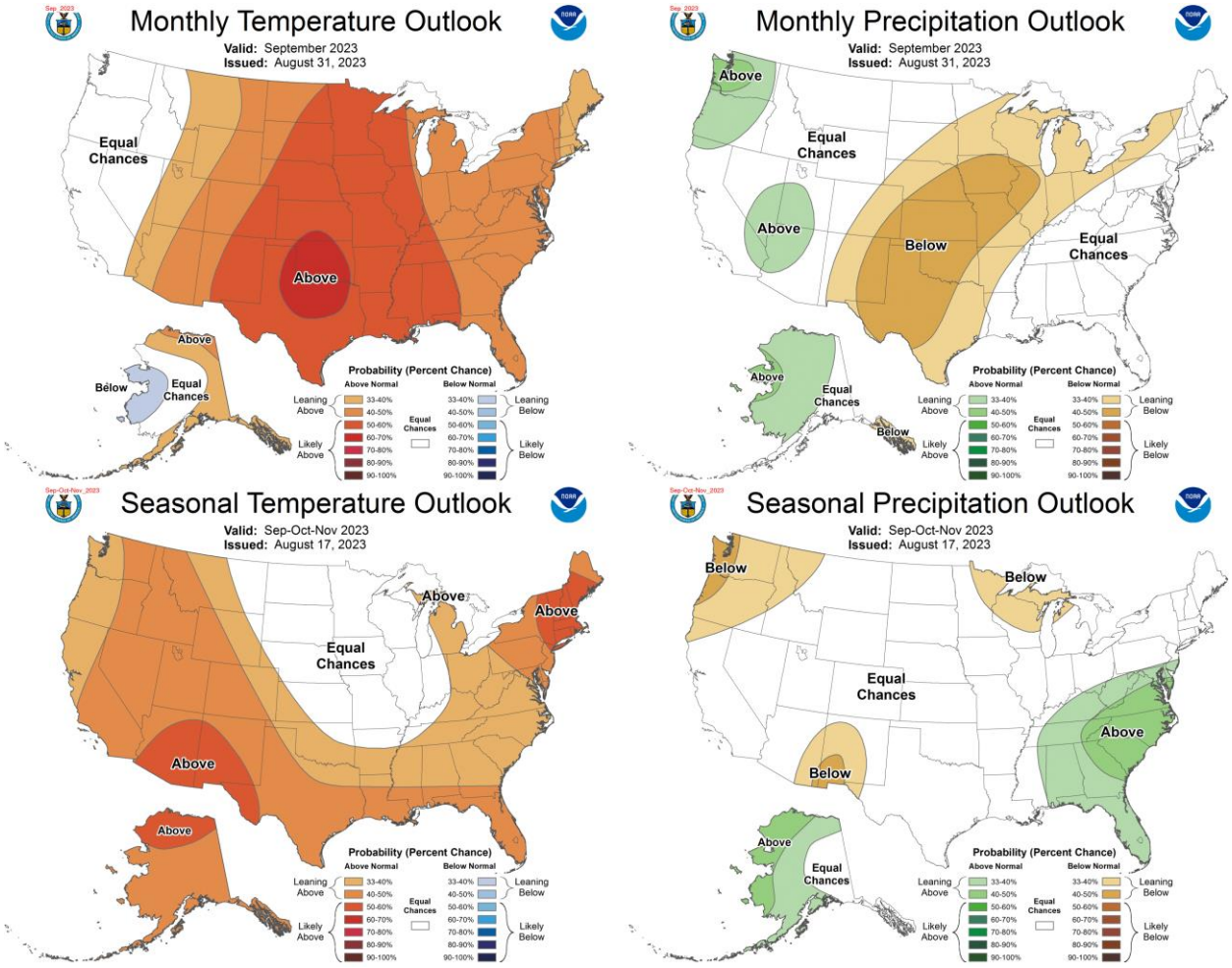


**Figure 7** – Temperature (left panel) and precipitation (right panel) outlooks for the month of September (top panel) and September, October, and November (bottom panel) (Climate Prediction Center, climate.gov).

Gregory V. Jones, Ph.D.
CEO, Abacela Vineyards and Winery
TEL: 541-324-9269
EMAIL: greg@abacela.com

Abacela®
AN ICON OF INNOVATION EST. 1995