Weather and Climate Summary and Forecast
October 2022 Report

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October 2, 2022

Summary:

- Warmer than average during September with western US temperatures 3-7°F above normal[1].
- A stubborn upper-level cut-off low that moved slowly across the region brought significant rainfall to northern California and even some to southern Oregon. The remnants of a tropical storm brought rain to southern California while monsoon moisture continued in the southwest, while the rest of the west was dry.
- Warm/dry start to October over the western US. Temperatures over the short-term will be quite warm, although cool nights hint at the fall to come. Continued monsoon moisture for the southwest, dry elsewhere.
- Glorious weather is helping the PNW catch up and finish out the vintage. The first half of October is expected to continue the warmer than average temperatures, while the second half appears to cool to more seasonal temperatures. No rain in sight till mid-month, with models hinting at typical fall rain patterns in the second half of the month.
- The 90-day forecast is hinting at an average to warm first half of the winter in the west, with the PNW likely to see a wet start to the winter while California and the southern tier of states are likely to remain dry.

Past Month and 2022 Year to Date

A warm and dry September was had by many across the western US (Figure 1). Temperatures ranged from near average in some isolated areas along the coast, to mostly 2-7 degrees above average. Portions of the desert southwest were also closer to average due to increased cloud cover, higher humidity levels, and precipitation from the welcomed monsoon flow. The extreme warmth in the west extended to the Mississippi River valley while the eastern third of the country was near average to between 1-2 degrees above average (not shown). Precipitation in the western US in September was tied to a cut-off low bringing rain to northern California (>200% of normal) and southern Oregon and a push northward into southern California from the remnants of a tropical system (>200% of normal). The PNW experienced a wonderfully dry month with 20-60% of normal (Figure 1). The continued monsoon flow in the southwest brought welcomed rainfall around the Four Corners region, while the middle of the country was dry (not shown). The influence of Hurricane Ian left a path of much higher-than-normal precipitation from Florida to New England.

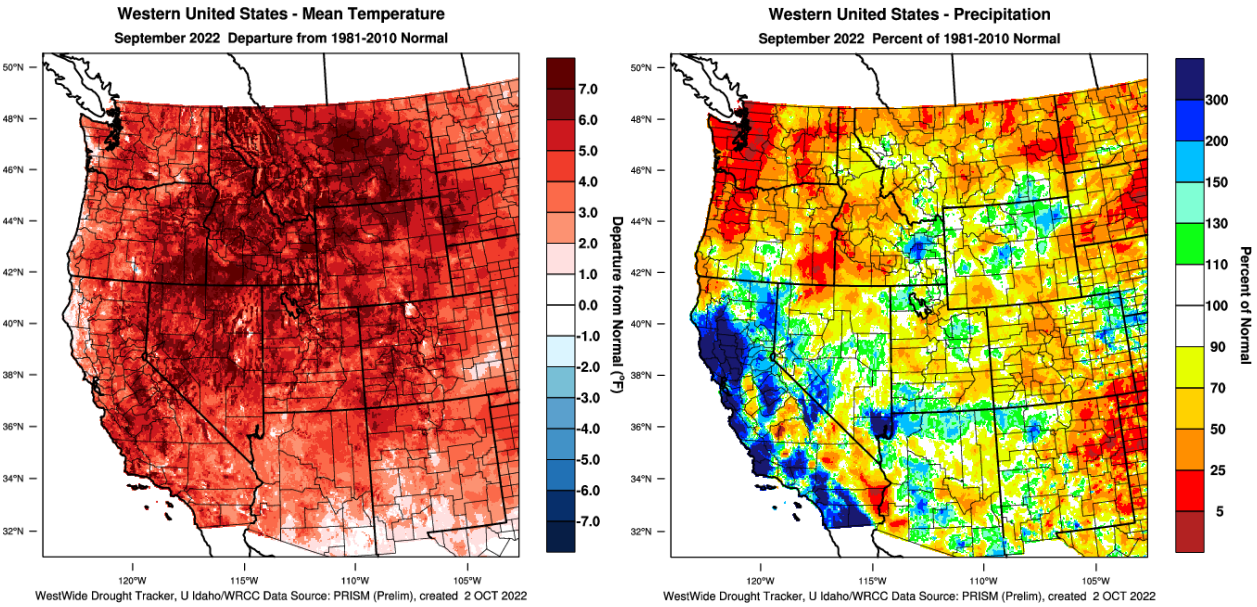

Figure 1 – Western US September 2022 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

[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.

A warm summer and start to fall has brought western US temperatures to close to average to above average year-to-date (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 1-3 degrees below average for the year. The cooler conditions year-to-date also extend into areas of 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). The 2022 year-to-date precipitation amounts remain below average for most areas of the western US, with precipitation substantially below average for nearly all of California, Nevada, and Utah with most areas seeing 80% or less for the year and with much of California 20% or less. Areas from northern Oregon, into Washington, and northern 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 along the eastern seaboard, while portions of the southeast, the Great Lakes, the northern Plains, and the central Ohio River valley is above normal (not shown).

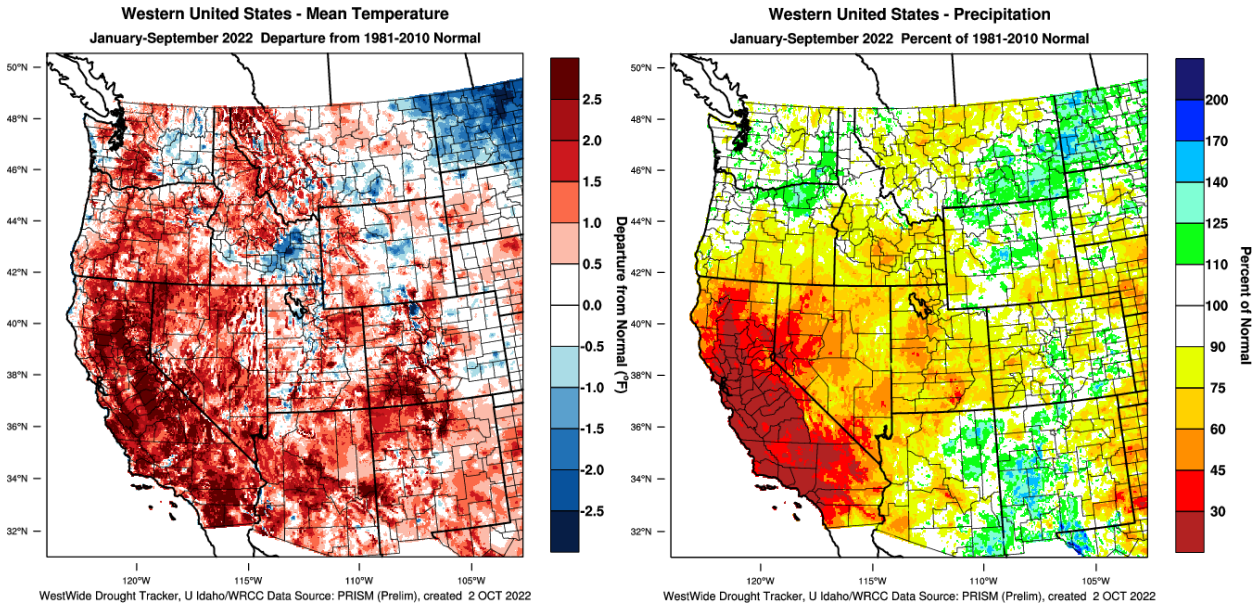

Figure 2 – Western US year to date (January-September 2022) temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

Western US growing degree-days (GDDs) from March through the end of September can be seen in Figure 3. A warm summer that continued through September has brought the majority of the west to above-average GDD. Portions of the North Coast, the western valleys of Oregon, and especially eastern Washington and eastern Oregon have accumulated near average to below average GDDs for the vintage. Overall California has seen GDD amounts 200-600 GDD ahead of normal for the year, while western Oregon has experienced near average to 100-300 GDD above average. Eastern portions of the inland PNW are near average to 50-150 GDD below average while much of Idaho has moved ahead of average GDD.

In the western and eastern growing regions in Oregon, individual NWS weather stations show heat accumulation (GDD) amounts for April through the end of September that are right at or slightly above the 1991-2020 climate normals for McMinnville (+11%), Roseburg (+3%), and Medford (+10%), while Milton-Freewater is 8% below the period average (Figure 4). All regions are above the 1981-2010 climate normals (+1 to +21%). These locations are 10-13% below the 2021 vintage but are now 15-35% GDD above the cool 2010 and 2011 vintages.

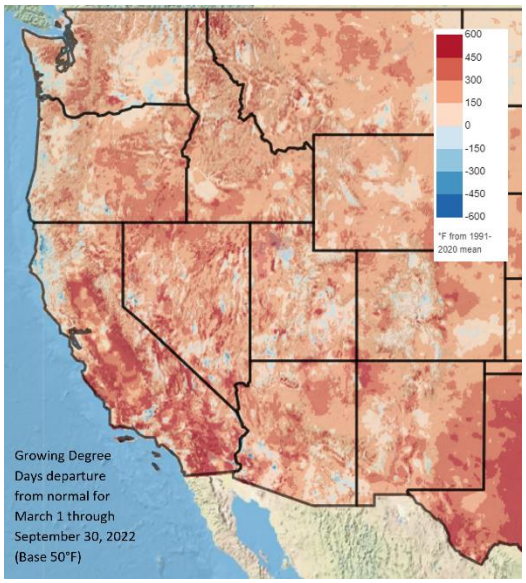

Figure 3 – Western US March through September 2022 growing degree-days (image from Applied Climate Science Lab, University of California Merced).

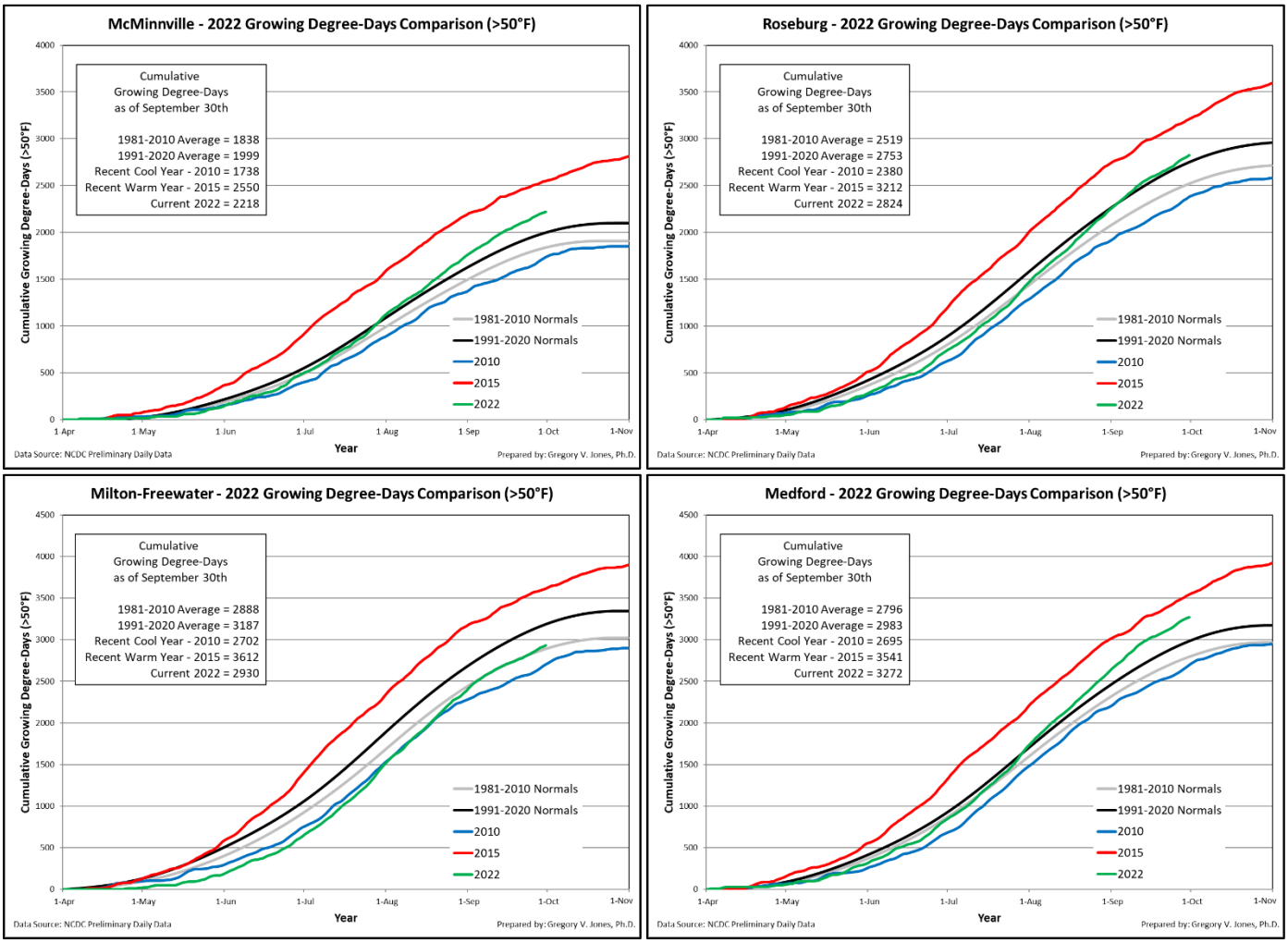

Figure 4 – Cumulative growing degree-days (base 50°F, no upper cut-off) for McMinnville, Roseburg, Milton-Freewater, and Medford, Oregon. Comparisons between the current year (2022) and a recent cool year (2010), a recent warm year (2015), and both the 1981-2010 and 1991-2020 climate normals are shown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

Drought Watch – Unfortunately drought conditions are still with us, but a couple of areas did see some improvements over the last month. Rains from the upper level, cut-off low described above brought some relief to northern California

(Figure 1) albeit causing some concerns of flooding in fire scar areas. Southern Oregon also saw some rain from the same event, helping to tamp down the lingering fires in the region. Monsoon showers also continued to bring rain to the desert southwest and Four Corners regions (Figure 5). However, even with these two rain occurrences, drought expanded across the western US (Figure 5) with the overall drought footprint in the west region to over 96% now. If there is any good news, it is that the most extreme categories of drought (extreme and exceptional) have stayed under 20%. Washington has moved to over 92% of the state in some level of drought, but still has no areas in the state in the most extreme drought categories. Oregon has moved to nearly 100% 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 the most extreme drought conditions have remained at 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. The anticipated start of fall rains has the outlook lowering or removing drought altogether in the PNW while monsoon rains will likely continue to lower drought levels in Arizona, even removing some areas completely (Figure 5 and see forecast section below). The eastern half of the country has remained largely free from drought, with the eastern seaboard likely to see drought removal, although the coastal zones in the western Gulf are expected to have drought develop during the next few months.

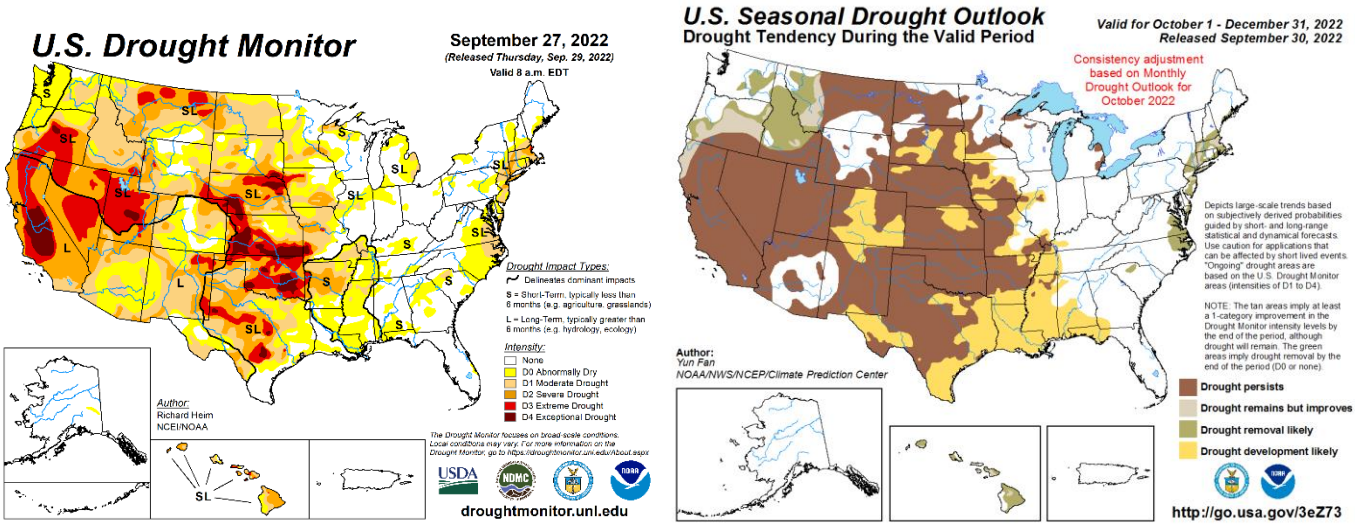

Figure 5 – Current US Drought Monitor and seasonal drought outlook.

ENSO Watch – At the end of September, sea surface temperatures in the central-eastern equatorial Pacific remained below average (Figure 6) and even strengthening the case for the La Niña triple-dip you have heard about in the media. The Climate Prediction Center (CPC) has continued the La Niña Advisory and will likely continue to do so through the fall and at least the first half of winter. 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 La Niña to continue and has pushed out the window to at least to March 2023. The CPC model-based outlook forecasts have increased the probability of La Niña continuing through November at 91% or a near certainty. As the winter proceeds, the likelihood that La Niña will continue from November to January drops to 80% then drops further to a 54% chance from January to March, then moving to ENSO-neutral next spring. The triple-dip La Niña is almost certain at this point, 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.

North Pacific Watch – Sea surface temperatures in the North Pacific have continued to warm, with a broad pattern from Japan to the North American coast and extending south to Baja California (Figure 6) running from 0.5 to 5°C (1-10°F) above the CSFR 1981-2020 climatology. The warm North Pacific contrasts strongly with the cooler La Niña conditions in the Tropical Pacific (Figure 6). With the warmer waters in the North Pacific, broader warmer than average conditions continue to be seen across most of the west in September and are now forecast into mid-October. This is especially

evident in the PNW and northern Rockies (Figure 1). This pattern may also continue to bring some late-season monsoon flow in Mexico and the southwest, which continues to be apparent in the 90-day (see below).

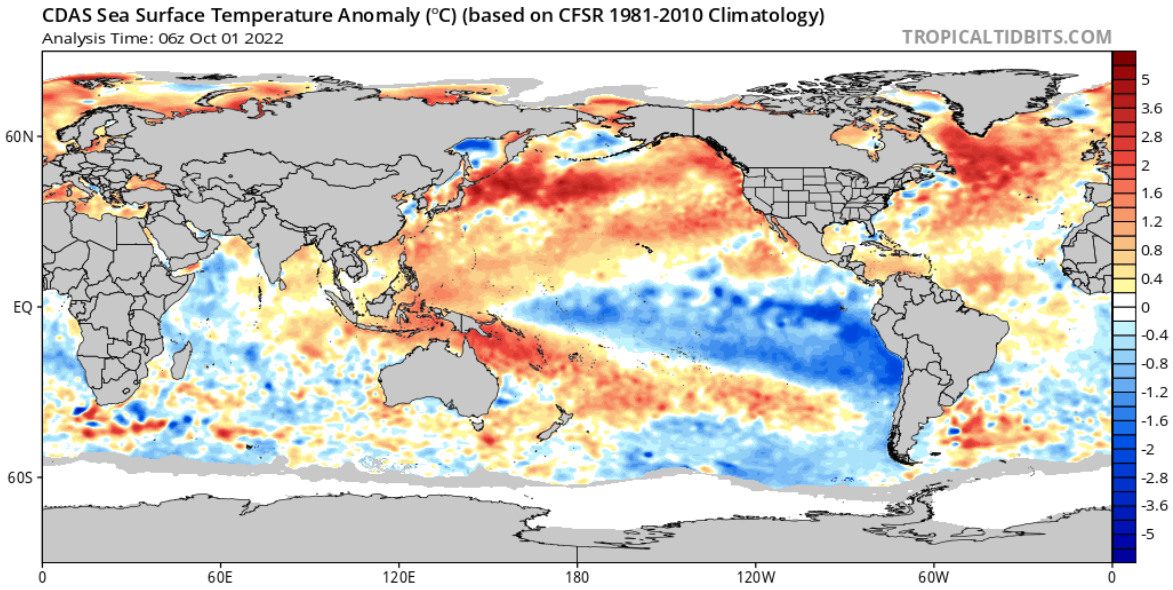

Figure 6– Global sea surface temperatures (°C) for the period ending October 1, 2022 (image from Tropicaltibits.com).

Forecast Periods:

Next 5 Days: Warm to hot for this time of year pretty much everywhere up and down the west coast. Temperatures will range from the mid-70s to mid-90s over the next ten days or so with nighttime temperatures hinting at the start of fall. No rain to speak of other than a drizzle in coastal zones that have a marine layer and fog prevalent.

6-10 Day (valid October 7-11): A ridge of high pressure remains in control over the west with temperatures staying above average for this time of year. The Rockies and Plains will likely see closer to average temperatures while much of the eastern US and especially New England will likely see below-average temperatures. The PNW is forecast to see below-average rainfall during this period, with likely very little if any precipitation in the forecast. The dry conditions are likely to extend across the northern tier of states and south and east across the US. The desert southwest is forecast to continue to experience some monsoon flow with above-average precipitation during the forecast period.

8-14 Day (valid October 9-15): The warmer than average temperatures from the end of September appear to be holding through the middle of October. The greatest likelihood for above-average temperatures is in the PNW but extends over the west and into the Northern Plains and south to Texas. The eastern US is forecast to see below-average temperatures through mid-month. The precipitation forecast for the middle of the month is holding to likely dry from northern California and the PNW, across the northern tier of states and much of the east. The desert southwest and Florida are the only areas forecast to see above-average precipitation.

30 Day (valid October 1-31): The temperature outlook for October is dominated by the much warmer than average first half of the month (Figure 7). The second half of the month looks like it will cool to average for this time of year, but overall, the month will very likely end up as one of the warmer Octobers we have seen in a long time. While the western two-thirds of the country is forecast to experience a warm October, the Great Lakes and Northeast will likely be closer to average or below average. The October precipitation forecast has the west likely to experience close to average amounts that are largely expected to start in the second half of the month. The Rockies are forecast to likely see a wetter than average month as is the mid-Atlantic region due to expected tropical storm activity. The Plains, Mississippi River valley, and the Great Lakes across to northern New England are forecast to see a drier than average month of October (Figure 7).

90 Day (valid October-November-December): Heading into the first half of winter, the US is forecast to see a warmer three-month stretch (Figure 7). The PNW across to the western Great Lakes has equal chances of seeing temperatures slightly below to slightly above average. This pattern is largely the result of the La Niña triple-dip and warmer than average North Pacific described above. The seasonal precipitation forecast is also largely driven by the expected patterns from the current Pacific SSTs with a wetter than average first half of winter for the PNW, near average across the northern tier of states and into the mid-Atlantic, while the southern tier of states is expected to see below average rainfall during this period (Figure 7).

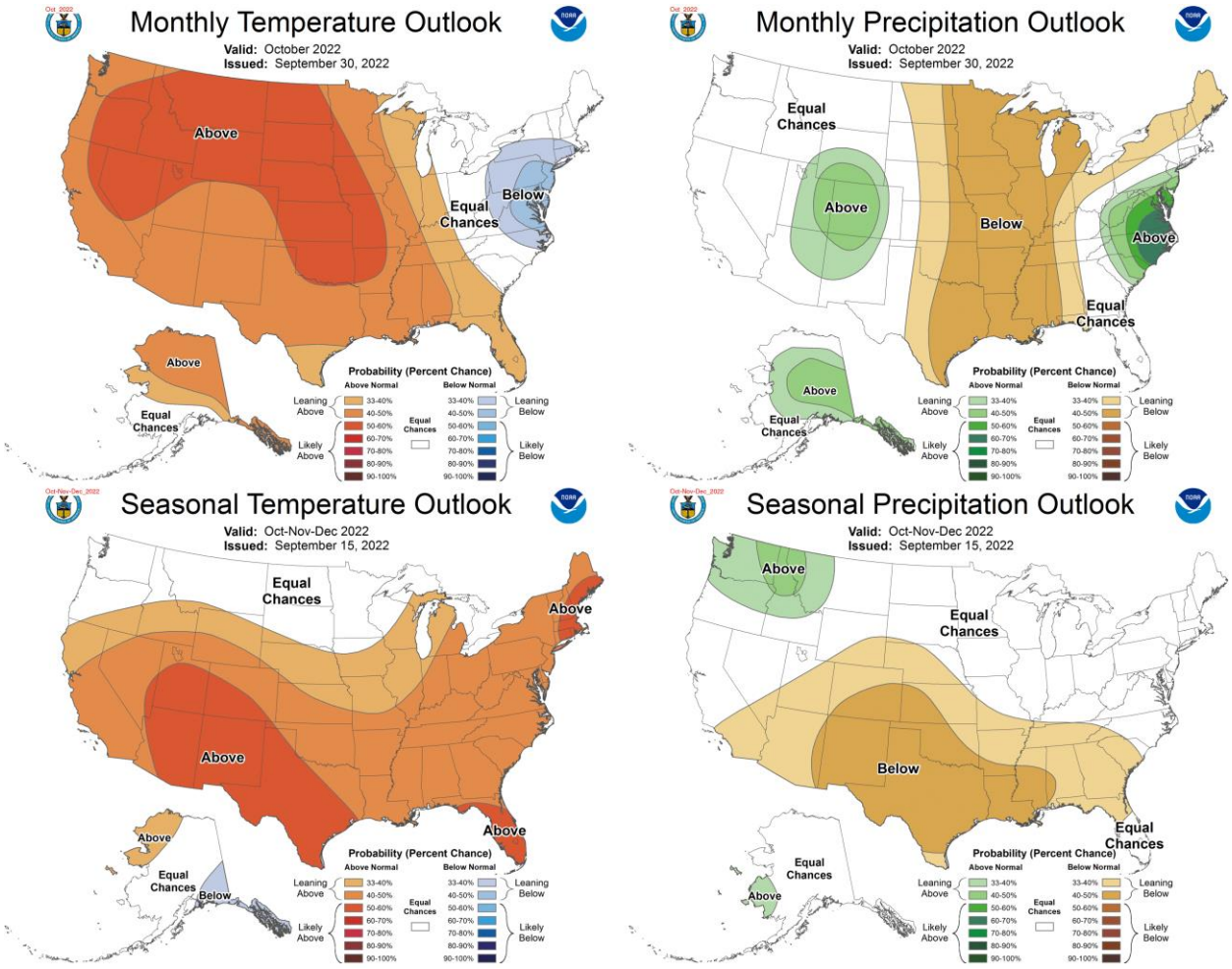

Figure 7 – Temperature (left panel) and precipitation (right panel) outlooks for the month of October (top panel) and October, November, and December (bottom panel) (Climate Prediction Center, climate.gov).

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