

Weather and Climate Summary and Forecast

November 2022 Report

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November 4, 2022

Summary:

- Record-breaking October with more days over 80 degrees for the month in many locations across the west leading to temperatures mostly 2-8 degrees above normal¹.
- No rain to speak of until the 21st of the month, resulting in a very dry October for most of the west, except for continued late-season monsoon flow in the southwest, portions of the Rockies, and much of Montana.
- Growing degree-days ended up near average to above average (1991-2020) for wine regions in the west.
- November has turned the page with cold and wet conditions over the western US thanks to the jet stream breaking down the ridge allowing our typical every-other-day systems to dip southward. Temperatures will likely be substantially below average over the next few weeks with early-season snow even down to lower elevations.
- The 90-day forecast is dominated by the influence of the triple-dip La Niña and colder SSTs in the North Pacific. As such forecasts are hinting at the PNW likely to see a cool and wet start to the winter while California and the southern tier of states have an increased probability of warmer than average temperatures and a near average to drier than average first half of winter.

Past Month and 2022 Year to Date

October continued the warm and dry end of the growing season across most of the west (Figure 1). Temperatures for the month were 2-8 degrees above average for most areas, with record-breaking warmth throughout the PNW. Some locations along the coast in California saw closer to average temperatures while the Four Corners region was near average to slightly below average due to cloud cover associated with late-season monsoon flow. The warmth in the west extended across the northern Plains and Great Lakes to New England while the southeast was cooler than average for the month (not shown). A very dry October was experienced by most of the west with 5% or less of normal across much of California and 75% or less of normal elsewhere. Wetter than average conditions were seen in southern California, the desert southwest, across much of Montana, and isolated areas in the Rockies and inland PNW (Figure 1). The rest of the country saw a mostly dry October (not shown), leading to increasing drought conditions described below.

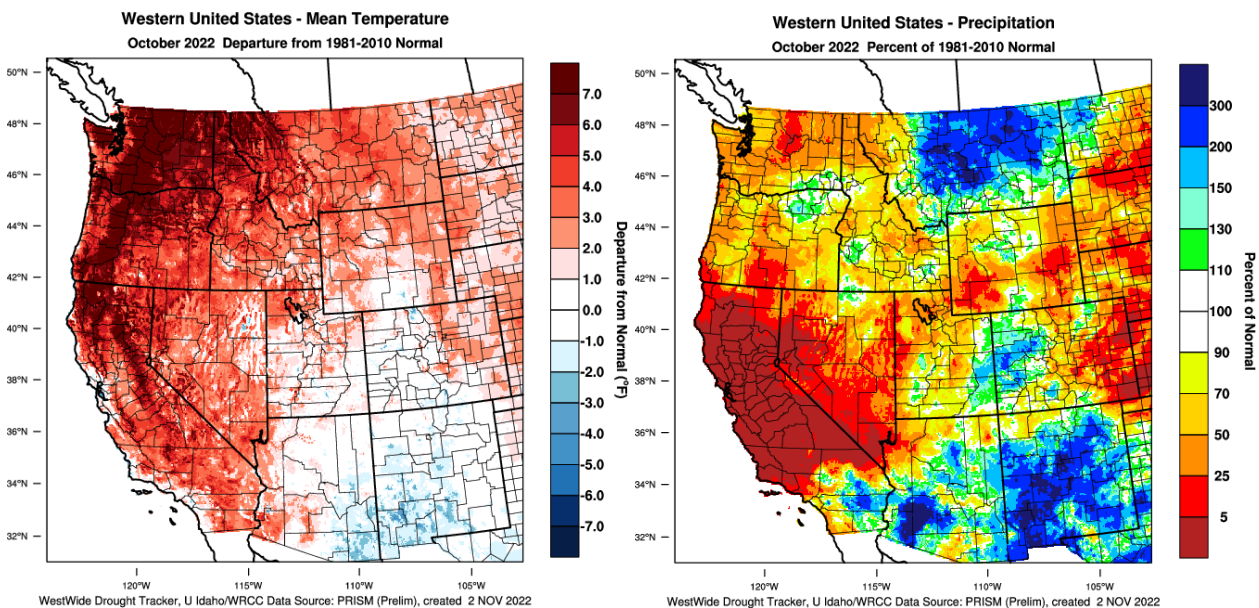


Figure 1 – Western US October 2022 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

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.

Heading into the last couple of months of 2022 the western US has seen temperatures that are a top five warmest on record and are comparable to those experienced in 2015 and 2021 (Figure 2). The warmest areas so far have been throughout most of California with 1-3 degrees above average temperatures, 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 Ohio river valley, while Texas, the southeast, and eastern seaboard have been warmer than average (not shown). Year-to-date precipitation amounts in the western US remain below average for most areas, 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 Arizona and New Mexico have had significant monsoon season that 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 portions of the eastern seaboard, while areas of the southeast, the Great Lakes, the northern Plains, and the central Ohio river valley have seen above normal precipitation amounts for the year so far (not shown).

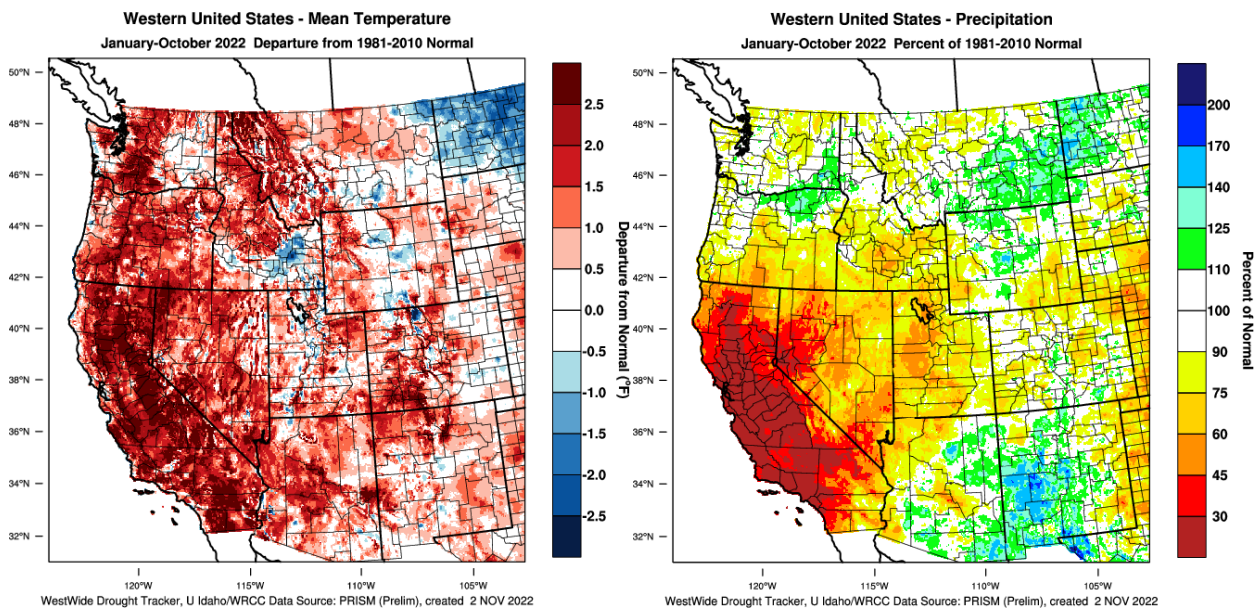


Figure 2 – Western US year to date (January-October 2022) temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

Coming to the end of the growing season, the final tally of western US growing degree-days (GDDs) from March through October can be seen in Figure 3. Overall, a cool spring transitioned into a warm summer and then a much warmer than average fall resulting in GDD largely above the 1991-2020 average over the western US. While portions of the North Coast, the western valleys of Oregon, and especially eastern Washington and eastern Oregon accumulated near-average to slightly below-average GDDs for the vintage, the majority of the west ended up above average. Overall California saw 200-600 GDD more than normal for the vintage, while western Oregon saw near average to 100-300 GDD above average. Eastern portions of the inland PNW ended up closer to average (+ 100-150 GDD) or slightly below the average during the 1991-2020 period.

For four locations in the western and eastern growing regions in Oregon, individual NWS weather stations show heat accumulation (GDD) amounts for April through October ended up slightly below to moderately above the 1991-2020 climate normal: McMinnville (+18%), Roseburg (+7%), and Medford (+15%), while Milton-Freewater was 4% below the period average (Figure 4). All locations ended up above the 1981-2010 climate normals (+6 to +21%), while for the last 15 years the stations ended up from 3% below (Milton-Freewater) to 5-7% above. Each location was below the GDD experienced in 2021 (4-9%) but 11-34% GDD above the cool 2010 and 2011 vintages.

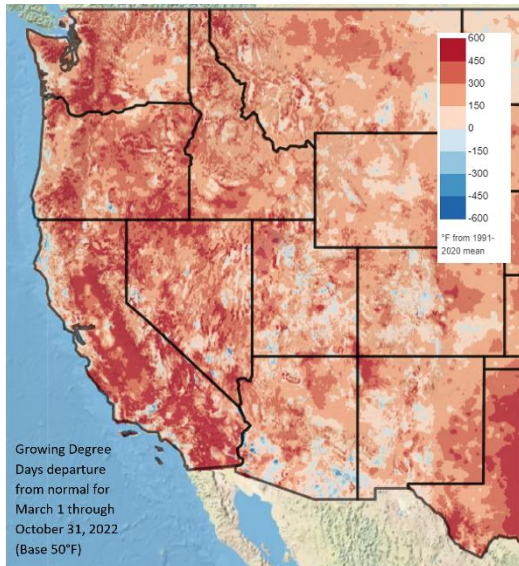


Figure 3 – Western US March through October 2022 growing degree-days (image from Applied Climate Science Lab, University of California Merced).

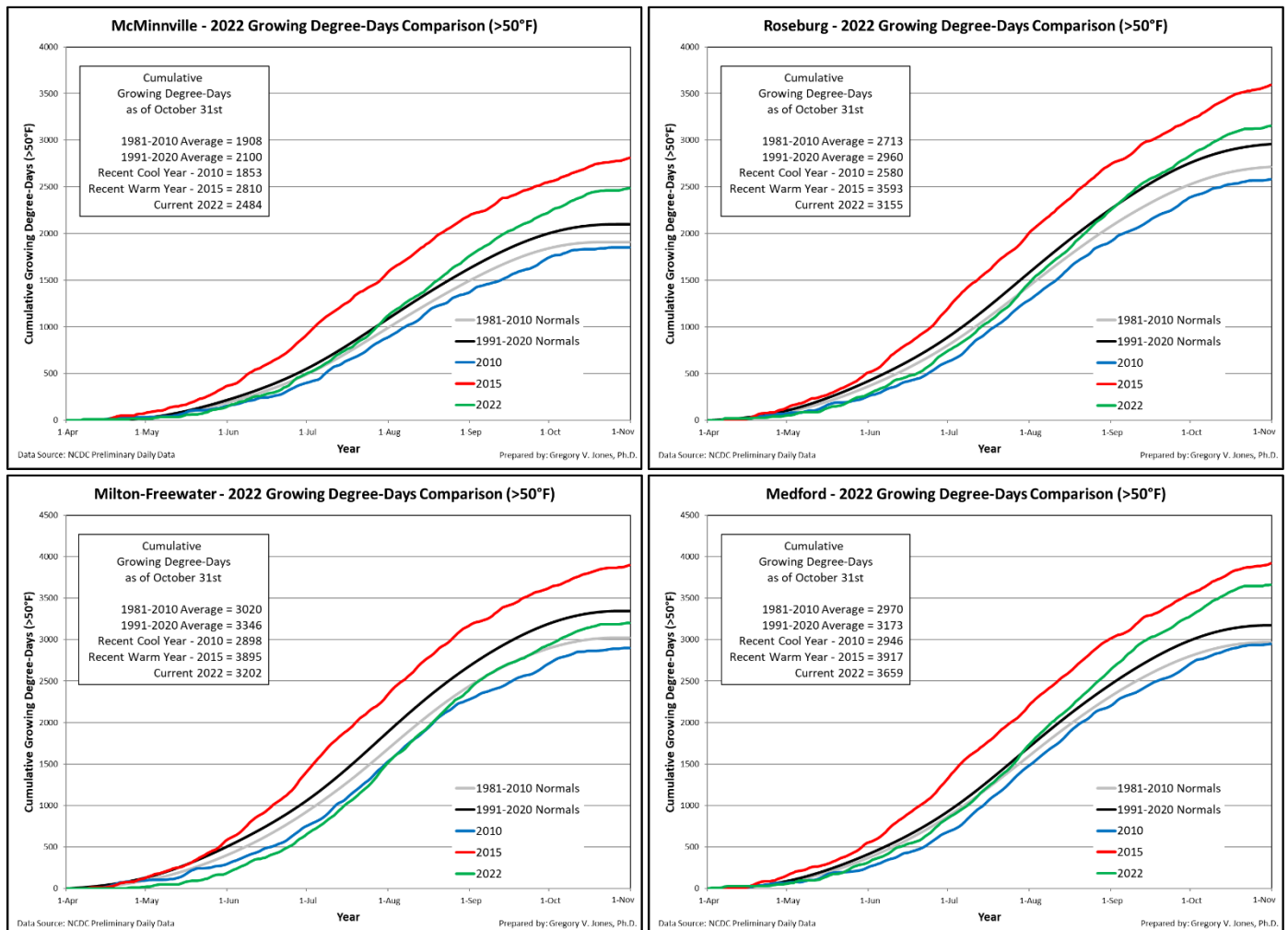


Figure 4 – Cumulative growing degree-days (base 50°F, no upper cut-off) for McMinnville, Roseburg, Milton-Freewater, and Medford, Oregon. Comparisons between the current year (2022) and a recent cool year (2010), a recent warm year (2015), and both the 1981-2010 and 1991-2020 climate normals are shown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

Drought Watch – The current drought map of the United States (Figure 5) depicts over 85% of the country in some level of drought with over 36% of the country in severe, extreme, or exceptional drought conditions. While the western US

has largely remained dry, drought conditions have expanded eastward covering nearly every state. At the end of October, the west finally saw the development of an active pattern with the jet stream delivering storms and much-needed precipitation. However, drought conditions are still holding to record area coverage with the overall drought footprint in the western region continuing to be over 95%. Fortunately, the most extreme categories of drought (extreme and exceptional) have remained under 20%. Washington has moved to 100% of the state in some level of drought, but still has no areas in the state in the most extreme drought categories. Oregon continues to be at nearly 100% of the state in some level of drought with the eastern and southern portions of the state remaining in extreme categories (>30%). California also continues to have 100% of the state currently in some level of drought with the most extreme drought conditions increasing to over 43% during the last 30 days. Drought levels have also worsened over much of the Great Basin of Nevada and Utah. The seasonal drought outlook for the first half of winter (Figure 5, right panel) shows some potentially good news but continues to show both short and long-term drought issues for significant areas of the west. A wet first half of winter forecast for the PNW (see forecasts below) has the outlook lowering the severity or removing drought altogether in the region. A wet monsoon period has lowered drought levels in the Four Corners region and the outlook calls for complete removal likely through the first half of winter (Figure 5 and see forecast section below). The Plains are forecast to see drought persist during this period while portions of the southeast are forecast to see drought develop.

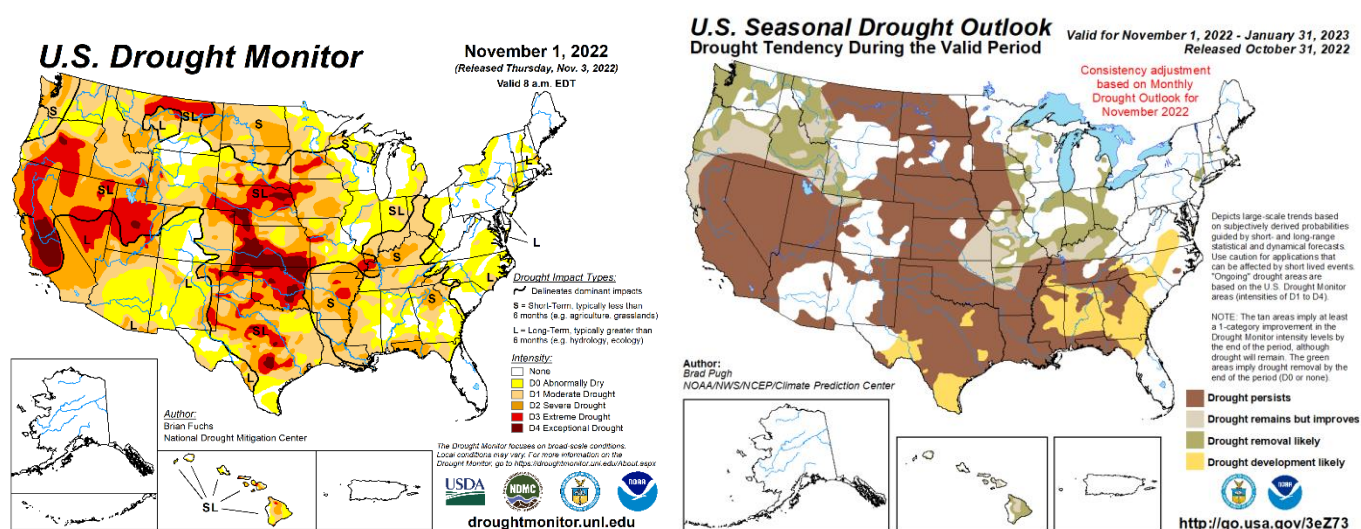


Figure 5 – Current US Drought Monitor and seasonal drought outlook.

ENSO Watch – Moving into the first half of winter the sea surface temperatures in the central-eastern equatorial Pacific remained below average most everywhere (Figure 6) ensuring a La Niña triple-dip. The Climate Prediction Center (CPC) has continued the La Niña Advisory and will likely continue to do so through the first half of winter. The tropical Pacific atmosphere also remains 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 at least through February. The CPC model-based outlook forecasts have the probability of La Niña continuing through February at 75%, afterward which there is a 54% chance for ENSO-neutral conditions in the second half of winter. The triple-dip La Niña has happened only twice since 1950 and the current 90-day forecast (see below) continues to show the anticipated influence of these conditions across the continental US.

North Pacific Watch – While sea surface temperatures in the North Pacific remain warmer than average, cooling over the last couple of weeks is evident. SSTs from Japan to the North American coast and extending south to Baja California (Figure 6) have been from 0.5 to 5°C (1-10°F) above the CSFR 1981-2020 climatology but cooling 1-2°C (1.8-3.6°F) of late. This development is likely the result of increased storminess from the Aleutian Low churning deeper and cooler water to the surface. The relative warmth in the North Pacific contrasts strongly with the cooler La Niña conditions in the Tropical Pacific (Figure 6). With the cooling of SSTs in the North Pacific, broader cooler and wetter than average conditions are likely to be seen across the PNW and northern tier of states (see forecast below).

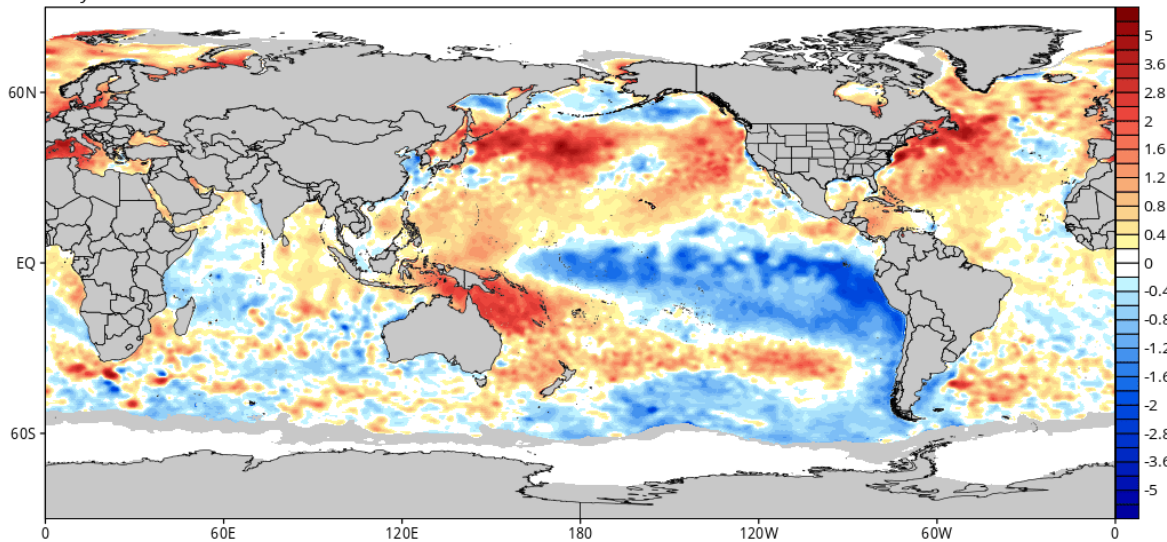


Figure 6– Global sea surface temperatures (°C) for the period ending November 1, 2022 (image from Tropicaltidbits.com).

Forecast Periods:

Next 5 Days: Frequent storms from an active jet stream will bring nearly daily rainfall to the western US. Higher amounts the further north one goes but California should get a reasonable amount of rain as well. The other big change is the shift to much colder air with temperatures likely to be 10-20 degrees below normal for this time of year. The result will be early-season snow for many, the question is how low it will go.

6-10 Day (valid November 7-11): Cold air will dominate the first ten days of November with the coldest region being the inland PNW, Northern Rockies, and Great Plains. The entire western US will likely see below-average temperatures, and as is common with westerly dips in the jet stream, the eastern half of the country will see a strong ridge of high pressure and likely substantially above average temperatures. Along with the colder air forecasted for the west comes an above-average precipitation forecast. Northern California into the PNW and the Northern Rockies is likely to see the greatest amounts during this forecast period. Dry conditions are favored in the desert southwest and Gulf Coast states while the eastern seaboard is forecast to be wetter than average.

8-14 Day (valid November 9-15): The general pattern of a colder-than-average western US and warmer than average eastern US continues into the next forecast period. Cold air will continue to flow into the Northern Rockies and Great Plains with a slight shift eastward likely. But the forecast points to highly likely colder than average temperatures across the west. The precipitation forecast is also holding into mid-month with above-average amounts in the west, especially the PNW, Northern Rockies, and Great Plains. Dry conditions are likely in the southern states and will likely extend into the Ohio river valley and into the eastern Great Lakes. Wetter than average conditions are forecast for Florida and the southeast.

30 Day (valid November 1-30): While the first part of November is forecast to see colder than average temperatures the outlook for the entire month of November is pointing to a greater chance of above-average temperatures for much of the country (Figure 7). The forecast shows a greater probability of warmer than average conditions from the desert southwest across to the Great Lakes and southeast with the highest likelihood being in northern New England. The PNW across to the northern Plains are forecast to likely see below-average temperatures for the month while California and the intermountain west is depicted as having equal chances of being slightly above to slightly below-average for the month. The November precipitation forecast has the PNW likely to see above-average amounts with much of California and portions of the intermountain west across to the Great Lakes are expected to be closer to average. From southern Texas across the Gulf states and into the mid-Atlantic and New England are forecast to likely see below-average precipitation for the month of November (Figure 7).

90 Day (valid November-December-January): The forecast for the first half of winter (Figure 7) continues to be largely predicated on the La Niña triple-dip and cooling SSTs in the North Pacific described above and in Figure 6. The PNW across the northern tier of states and south into the Ohio river valley and southeast have equal chances of seeing temperatures slightly below to slightly above-average while the southern states and up along the eastern seaboard into New England have a greater probability of seeing warmer than average temperatures (Figure 7). 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 much of the PNW, near average from California across the Rockies and the northern tier of states into the mid-Atlantic and New England, while the southern tier of states is expected to see below-average rainfall during this period (Figure 7).

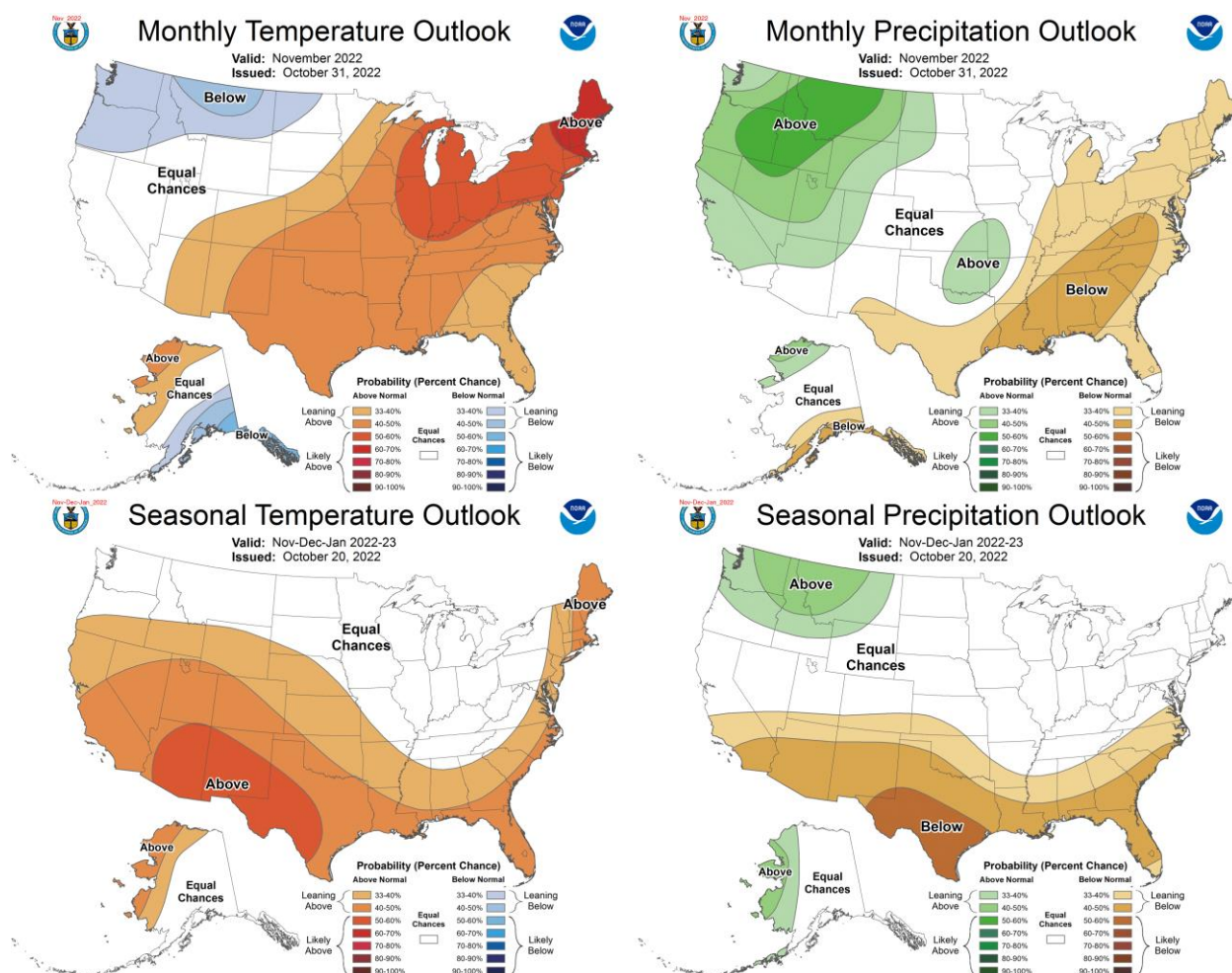


Figure 7 – Temperature (left panel) and precipitation (right panel) outlooks for the month of November (top panel) and November, December, and January (bottom panel) (Climate Prediction Center, climate.gov).

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