

Weather and Climate Summary and Forecast

July 2022 Report

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July 7, 2022

Summary:

- Strong north-south contrast in temperatures continued in June with the northern areas near average to slightly below average¹ while southern regions are moderate to substantially above average.
- Early June precipitation from northern California to the PNW left the month above average, while central to southern California remained dry. Drought concerns have lessened across much of the PNW, although eastern Oregon south into California drought conditions has risen to over 60% in the highest categories of drought.
- After a coolish start to the month, most of the west will see a warmup in the short-term, with a few wet days for only the extreme NW, otherwise dry everywhere else.
- Mid-month is expected to bring warm temperatures over most of the west. The coastal zones are likely to stay closer to average temperatures for the month of July, especially from northern California to the Canadian border.
- JAS is forecast for warmer than average conditions over the west and the country, with cool SSTs offshore likely to keep the PNW closer to average temperatures. Seasonally dry conditions are likely for much of the west.

Past Month and 2022 Year to Date

While the bulk of the country was warmer than normal in June, the west was divided into continued cool in the north and warm in the south (Figure 1). From northern California through the PNW and into the northern Rockies, temperatures were slightly warmer than average to as much as 1-3 degrees below average in the inland PNW. In contrast, from central California southward and eastward across the Great Basin, southern Rockies, and southwest saw temperatures 1-5 degrees above average (Figure 1). The PNW, northern Rockies and Plains along with New England were the coolest portions of the country in June with the rest seeing temperatures above normal with Texas experiencing 4-6 degrees above average (not shown). Early June saw continued rainfall from an active jet stream, bringing close to 200% of normal to northern California and the PNW (Figure 1). The desert southwest also got precipitation with an active early monsoon season. A dry month was also seen across much of the rest of the country, although scattered areas in the eastern US did receive closer to average precipitation for the month (not shown).

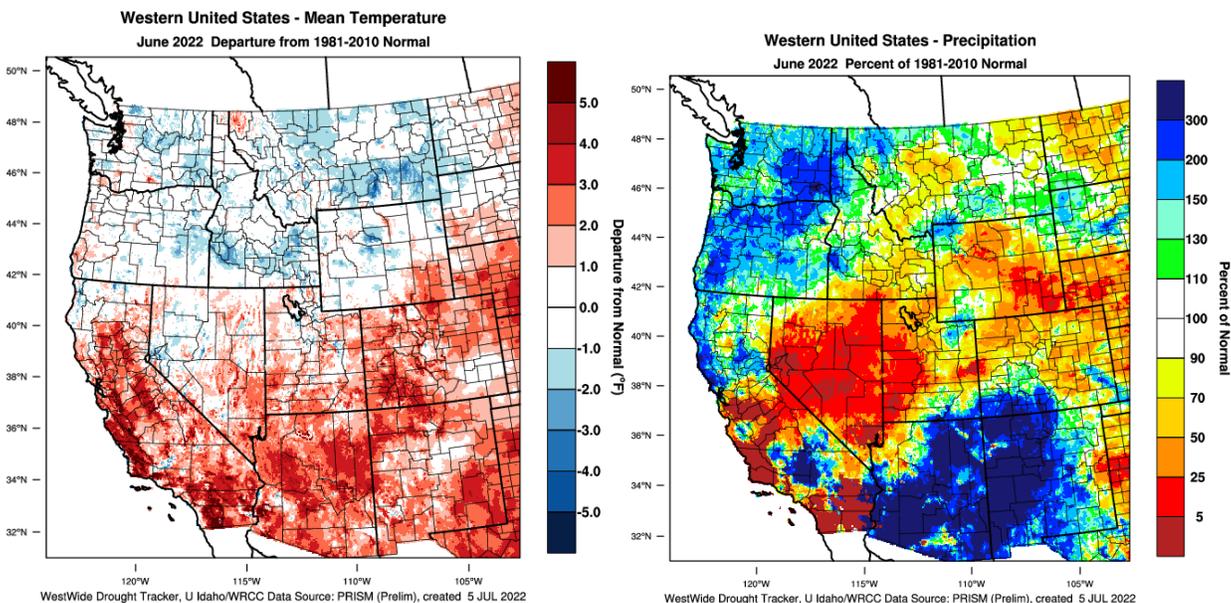


Figure 1 – Western US June 2022 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

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 continues to see a relatively cool year north of California, while southward conditions are closer to average or warmer than average for the year (Figure 2). The coldest conditions year-to-date have been seen in the inland PNW with eastern Washington, eastern Oregon, the Snake River Valley and most of Idaho, seeing 2-6 degrees below average for the year. The colder conditions year-to-date also extend into the Rockies, the 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 a dividing line in northern Oregon and Idaho showing the wetter conditions northward (Figure 2). Precipitation year-to-date remains 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. Extreme eastern Arizona and most of western New Mexico have seen some monsoon rainfall in the last 60 days, bringing these regions 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 the south from Texas and the western Gulf, over portions of the southeast, and the Great Lakes, while the northern Plains and central Ohio and Mississippi river valleys up into New England are mostly wetter than average year-to-date (not shown).

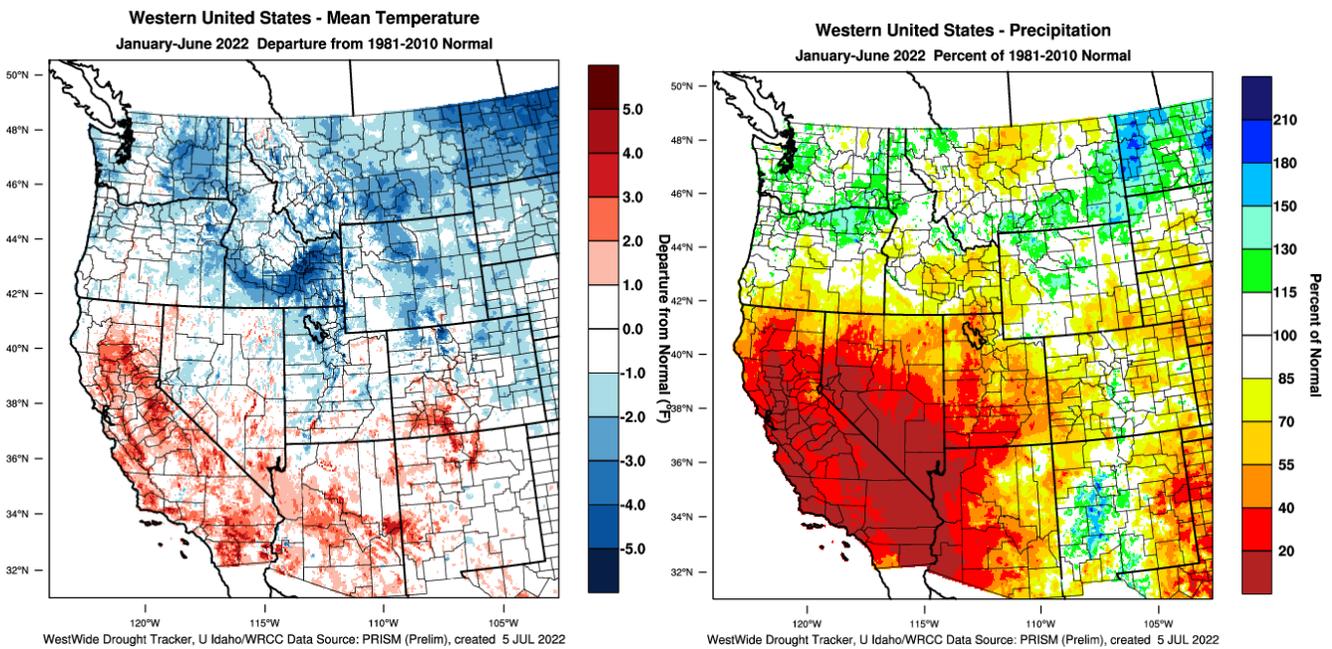


Figure 2 – Western US year to date (January-June 2022) temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

March through June growing degree-days (GDDs) over the western US (Figure 3) continue to show the broad pattern of a cooler first half of the summer in northern areas, even extending into the Great Basin and Rockies, and the warm first half of the summer in central to southern California and across to Texas. Areas in the North Coast and north-central valley southward in California are running near average to 150-300 GDD ahead of normal for the period. However, from northern California to every region in the PNW, GDDs are significantly below what is normal for this time of year (50-300 GDD). In temporal terms, the GDD data mapped in Figure 3 finds that the warmer areas in California by the end of June were running 6-18 days ahead of normal accumulation amounts while wine regions in western Oregon and the Snake River Valley are 2-8 days behind and eastern Washington and Oregon are 8-18 days behind the normal accumulation by the end of June (not shown).

For four locations in Oregon that I have tracked for many years, heat accumulation (GDD) amounts are running close to the 1981-2010 and 1991-2020 climate normals for the months of April through June for Medford, Roseburg, and McMinnville, while being substantially below for Milton-Freewater, which is also tracking below the 2010 vintage, the coolest year since 2000 (Figure 4).

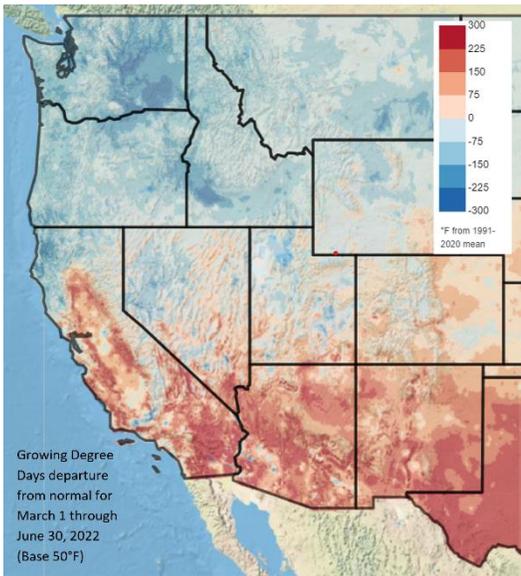


Figure 3 – Western US March through June 2022 growing degree-days (image from Applied Climate Science Lab, University of California Merced).

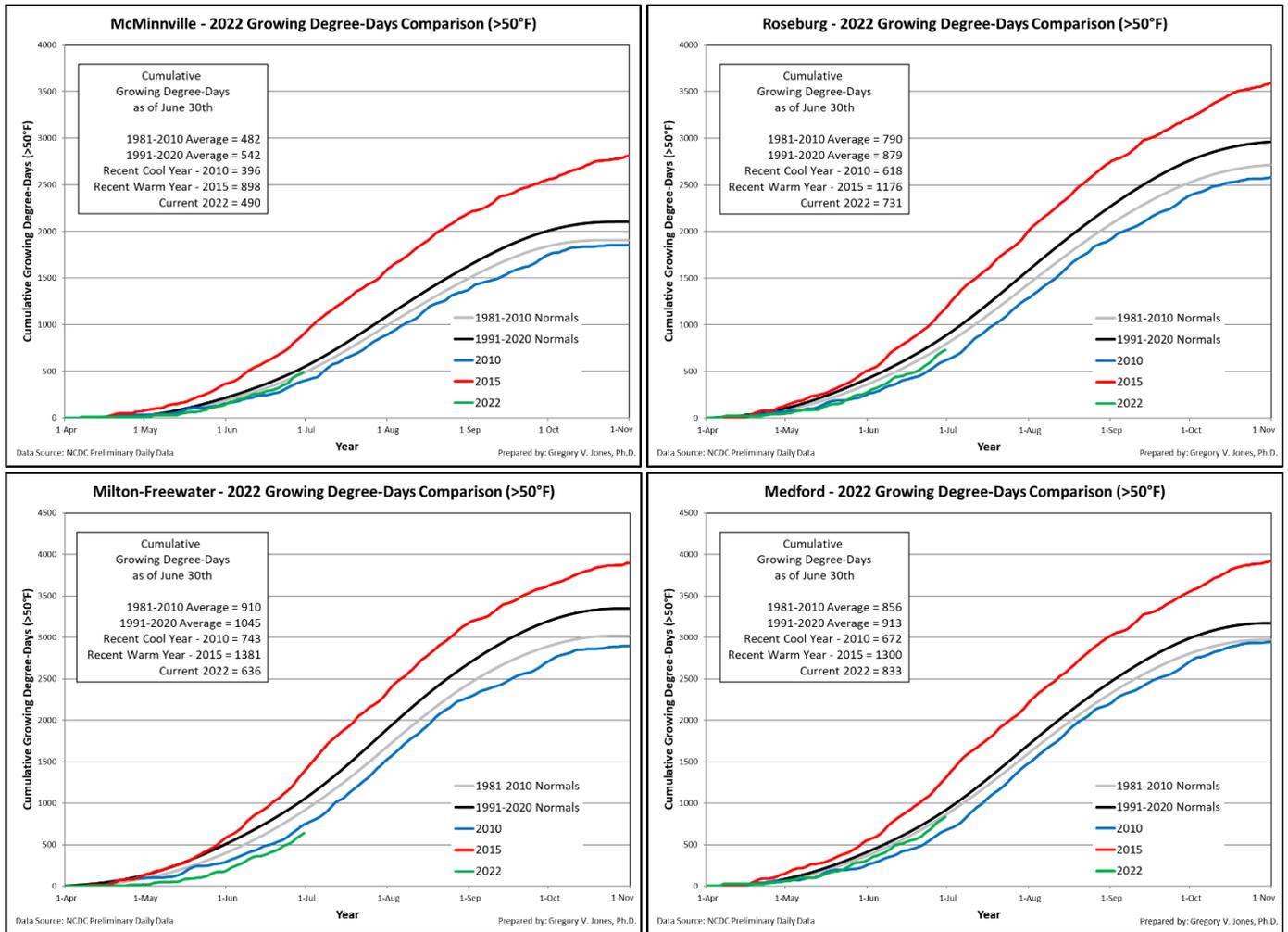


Figure 4 – Cumulative growing degree-days (base 50°F, no upper cut-off) for McMinnville, Roseburg, Milton-Freewater, and Medford, Oregon. Comparisons between the current year (2022) and a recent cool year (2010), a recent warm year (2015), and both the 1981-2010 and 1991-2020 climate normals are shown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

Drought Watch – The broad pattern of drought in the western US continues (Figure 5) although there have been some adjustments as we have moved out of an active spring and into summer. The overall drought footprint has declined from

over 93% three months ago, to 83% today. Most of the changes have come from the continued cool and wet conditions in the PNW which have lowered drought concerns in the region (Figure 2). Roughly 40% of Washington is in some level of drought, but no areas in the state remain in the most extreme drought categories. For Oregon, there have been some improvements in the northwest and northern portions of the state, but over 75% of the state is still in some level of drought and much of the eastern and southern portions of the state are still in extreme categories (>30%). California has not seen any long-term improvement with 100% of the state currently in some level of drought and nearly 60% continuing in the most extreme drought conditions (extreme and exceptional). Drought zones also continue to extend across the Rockies, portions of the Plains, and most of Texas, although some improvement has been seen in the southwest from monsoon flow bringing some much-needed precipitation. The seasonal drought outlook (Figure 5, right panel) continues to show both short and long-term drought issues for much of the west. However, the outlook points to drought improvement and or removal for areas of the desert southwest where monsoon rains are anticipated in the summer forecast (Figure 5 and see forecast section below). The eastern half of the country appears to be moving into summer with the Mississippi river valley anticipating drought development but other areas staying largely free from drought, especially in the southeast and mid-Atlantic with an active tropical storm season forecast.

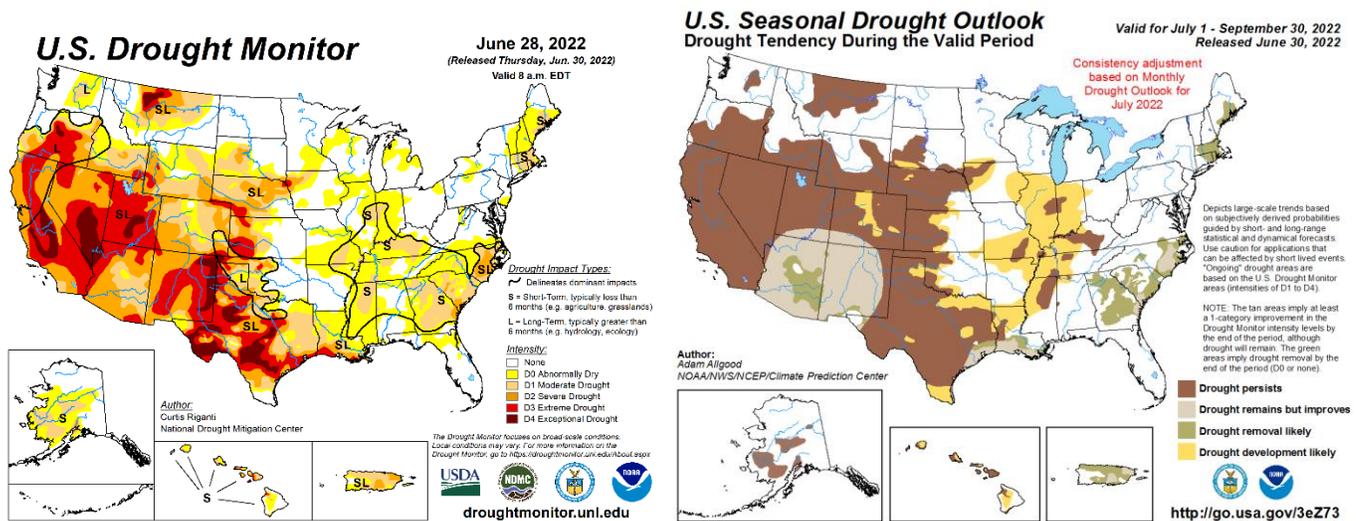


Figure 5 – Current US Drought Monitor and seasonal drought outlook.

ENSO Watch – La Niña conditions continue in the Tropical Pacific with SSTs remaining below average (Figure 6), although warming slightly over the last 30 days. With La Niña continuing, the Climate Prediction Center (CPC) maintains the La Niña Advisory for July and will likely continue to do so through the end of summer. Most other oceanic and atmospheric variables are consistent with the observed La Niña conditions and most ocean-climate models continue to predict SSTs to remain below average in a moderate to weak La Niña. The official outlook from numerous agencies confirms this forecast with the outlook calling for a moderate to weak La Niña to continue, although the probability through the summer has declined slightly to 52%, and the fall/winter likelihood is now 51-59%. If this continues, this will be one of the few times that three winters in a row will be in a La Niña pattern. The spring and now into summer conditions and the seasonal model forecasts have been, and look to continue to be, influenced by La Niña conditions, pointing to the PNW likely seeing a cool to average summer, while California is likely to see moderately warmer temperatures, and the desert southwest is forecast to have an active monsoon season (see the 90-day forecast below).

North Pacific Watch – Broad warming of the North Pacific across much of the basin has occurred over the last month (Figure 6). The North Pacific continues to exhibit strong negative values in the Pacific Decadal Oscillation (PDO), although the index has become less negative from its record values in the last few months. However, there remain moderately cool coastal zone waters off the west coast. This cooler water has had a strong influence on the cooler and wetter than average spring into June for the PNW and western Canada. Given that the Tropical Pacific remains cooler than average in a moderate La Niña, and combined with the cold PDO, a strong north-south variation in temperatures has been evident (Figure 1) and likely will continue through the rest of the summer (see the forecast below). This pattern will also likely help drive a more active monsoon season in the southwest, which is apparent in the 90-day forecast for the summer (see below).

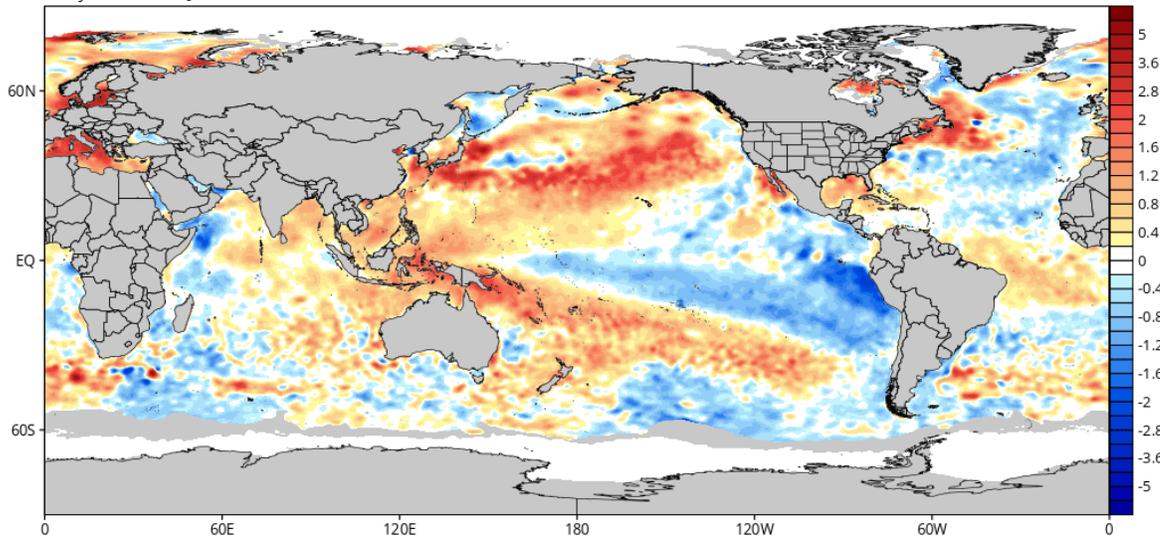


Figure 6– Global sea surface temperatures (°C) for the period ending July 1, 2022 (image from Tropicaltidbits.com).

Forecast Periods:

Next 5 Days: Onshore flow bringing seasonally cool conditions and clouds will slowly give way to warmer conditions over the next few days. Some rain in the far northwest of Washington, Puget Sound, and the northern Cascades but elsewhere likely to stay dry.

6-10 Day (valid July 11-15): The warm-up continues through the second week of the month with temperatures likely rising above average over most of the western US. Dry conditions are forecast for pretty much everywhere across the PNW, Great Basin, and the northern Rockies, while the southwest has a continued chance for some precipitation from monsoon flow. Warmer than average conditions are forecast across the south to Texas and the western Gulf, while the Great Lakes, Midwest, and eastern seaboard are forecast to be closer to normal or even slightly below normal. A broad area from Colorado and New Mexico, across northern Texas, the south, and up and down the eastern states is forecast to see a wetter than average period, while southern Texas is likely to stay dry during this forecast period.

8-14 Day (valid July 13-19): Continued warmer than average conditions likely for most of the western US, across to Texas and the Gulf Coast. The rest of the country has equal chances to be slightly warmer to cooler than average during mid-month. Much of the western US is forecast to either be drier than normal or near-normal during this period, which means dry given the time of the year. The southwest is still within a broader monsoon flow pattern and is forecast to have a decent chance of precipitation. The southern tier of states and up into the eastern seaboard is forecast to be wetter than average, while the northern tier of states is forecast to see a dry mid-month.

30 Day (valid July 1-31): Even with the warm mid-month forecast for the west, the monthly temperature outlook for July (Figure 7) is holding to near average to slightly below average temperatures overall. This is largely driven by the cool ocean temperatures off the west coast (see Pacific discussion above) and general onshore flow patterns early and late in the month. Most of the rest of the country, from the Rockies eastward, is forecast to have a warmer than average month with Texas and the southern Plains likely to see the warmest conditions. Not much in the July precipitation forecast with the most likely situation being precipitation from monsoon flow in the southwest and subtropical onshore flow in the southeast and mid-Atlantic, otherwise near average for the rest of the country.

90 Day (valid July-August-September): The forecast for the middle of the summer continues to tilt the odds to a warmer than average period for much of the country (Figure 7). The areas with the greatest likelihood of warmer than average conditions are the Great Basin, Rockies, and southwest along with New England. The PNW and northern Plains continue

to be forecast to be closer to normal for the 90-day period. For precipitation across the summer, the forecast shows that much of the western US have equal chances of seeing slightly above to slightly below average precipitation (Figure 7), but the season is already so dry on average that this forecast is mostly saying seasonally dry. The southwest continues to be forecast for an active monsoon season with likely higher than normal precipitation during this period. The other regions anticipated to see higher than average precipitation is the southeast and mid-Atlantic with subtropical activity. The northern Rockies across to the Great Lakes and south to Texas is forecast to experience a drier than average three-month period.

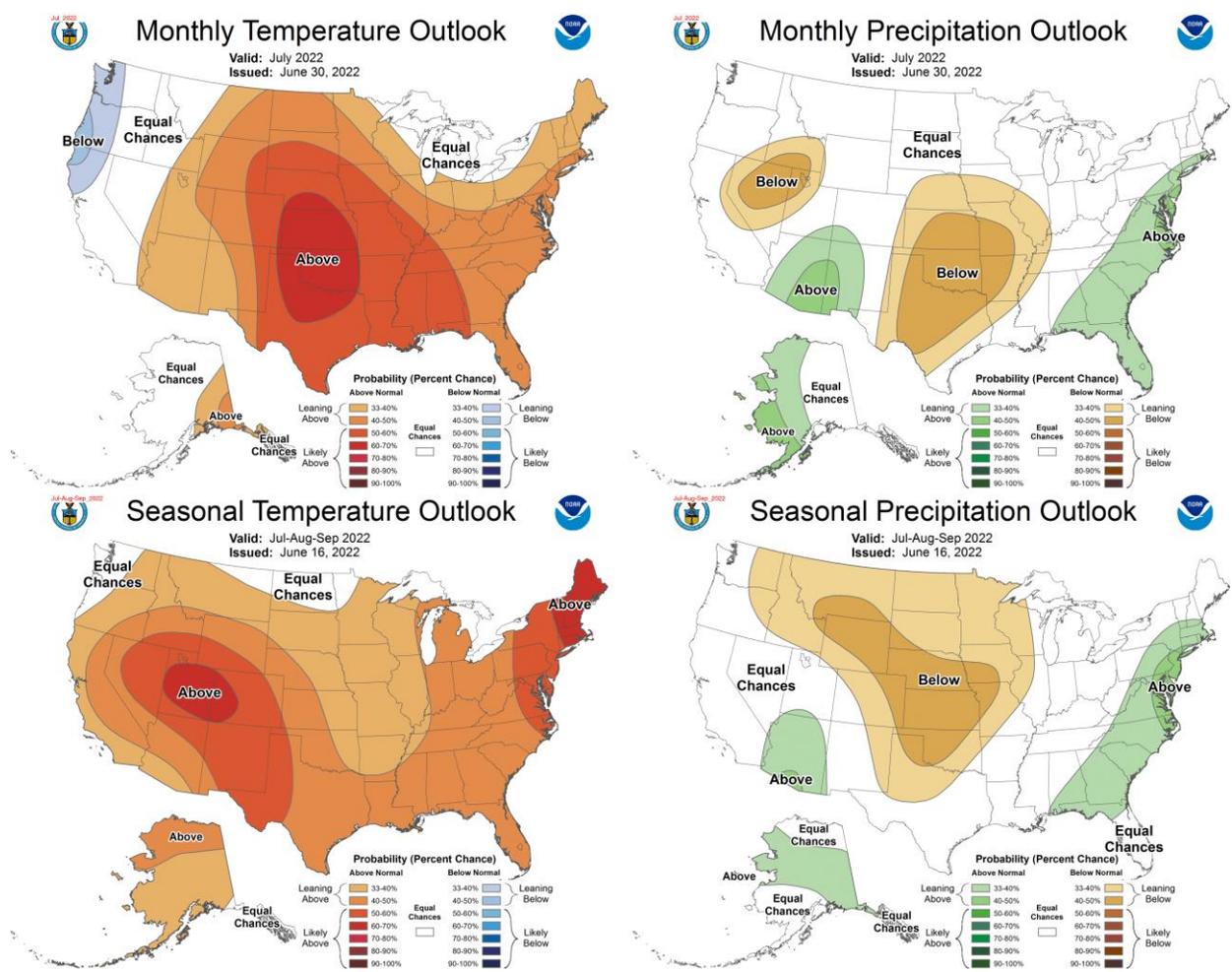


Figure 7 – Temperature (left panel) and precipitation (right panel) outlooks for the month of July (top panel) and July, August, and September (bottom panel) (Climate Prediction Center, climate.gov).

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