

Weather and Climate Summary and Forecast

August 2024 Report

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August 3, 2024

Summary:

- Likely the warmest July on record for most of the western US. Temperatures 2-8 degrees warmer than average¹ with the warmest conditions in California. Cooler along the coast, but still warmer than average.
- A dry July for most of the western US, except for inland thunderstorm activity from monsoon moisture streaming northward. However, less rain and more wildfire starts were the result of most of these storms.
- Growing degree-day accumulations ramped up in July with most western US wine regions now above average. Coastal zones and some inland areas of the PNW remain closer to average.
- After more seasonal temperatures to end July, another ridge of high pressure is setting in bringing warm and dry conditions over most of the west. It doesn't appear that this event will have either the magnitude of the record highs or the duration of those seen in July. Coastal zones will see onshore marine layers and fog that will likely tamp down temperatures.
- No widespread precipitation in the forecast through mid-month or further, although a slight chance exists in the far northwestern areas of Washington later in the month. Monsoon moisture will elevate inland thunderstorm potential for some but no real help in dampening the fires across the west.
- The 90-day forecast heading into fall has the western US with mostly above normal temperatures except along the coastal zones where onshore flow should keep conditions closer to normal. No clear precipitation outlook, with some indication of drier in the Rockies and southeast, and wetter than normal in the extreme PNW.
- The Tropical Pacific is now ENSO-neutral and La Niña conditions are expected by early fall. North Pacific coastal waters have warmed. Both would indicate a warmer than average end to the summer. The timing of the La Niña onset will likely determine the start of fall precipitation over the west.

Past Month and Year to Date:

While NOAA hasn't released the final data yet for July 2024, the month will likely be the warmest July on record or at least a top three for most western states. Exceptional heat with many records for both maximum and minimum

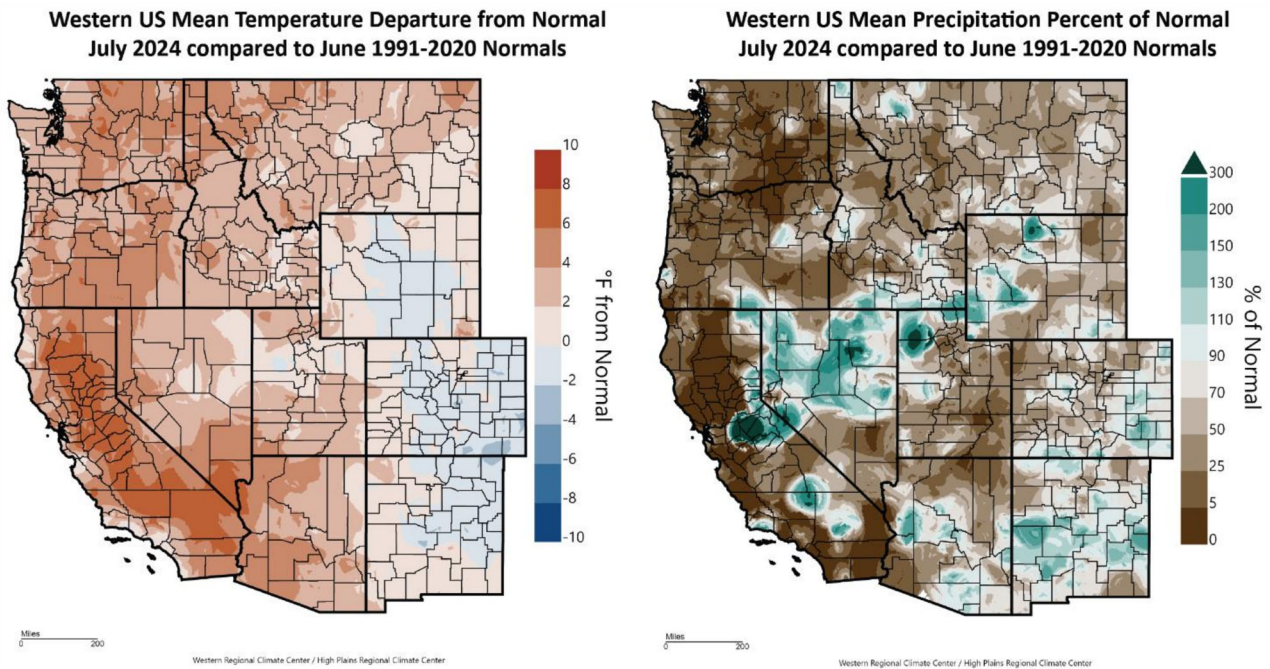


Figure 1 – Western US July 2024 temperature departure from normal (left) and percent of normal precipitation (right; images from Western Regional Climate Center, 2024: ACIS Climate Maps)

¹ Note that all references to normal or averages in this report are to the 1991-2020 climate normal for each weather/climate parameter unless stated otherwise. See this website (<https://www.climateofwine.com/climate-normals>) for more information on climate normal.

temperatures along with the length of the heat was experienced by most of the west. Departures from normal were +2-8 degrees for the majority of the west, while areas from central Wyoming to Colorado and eastern New Mexico were slightly below average for the month (Figure 1). Cooler than average conditions were also seen in eastern Texas northward into the Mississippi River valley due to Tropical storm activity, while a warmer than average month was experienced in the rest of the eastern US (not shown).

July 2024 was mostly dry across the western US (Figure 1) although thunderstorm activity brought some precipitation to areas in California, the Basin, and the southwest. However, remember that July receives very little rainfall almost everywhere, so a 300% increase from nearly nothing is not much. While this moisture was needed, the lightning that came with these storms started wildfires that are still burning. The majority of the western US received 50% of normal precipitation while many areas received nothing at all. Monsoon moisture brought some moisture to the southwest (Figure 1) and looks to continue in August (see Forecast section). July precipitation across the rest of the country was dominated by higher than normal amounts from Tropical systems and Gulf moisture generating many severe thunderstorms and tornadoes in the heartland, the southeast, and even into New England (not shown).

January through July temperatures have been warmer than normal across the western US (Figure 2), averaging 0.5-4.5 degrees above average after the very warm July. Areas still running cooler than average include zones in the southwest and the inland PNW and northern Rockies where temperatures 0.5-2.0 degrees below average have been experienced (Figure 2). These cooler areas in the west are the exception to the pattern across the rest of the continental US where temperatures have been 2-7 degrees warmer than average year-to-date (not shown). The warmest conditions continue to be seen across the northern Plains, the Great Lakes, the upper Midwest, and New England.

Year-to-date precipitation for the western US continues to run largely near to above normal with values ranging from 90-200% (Figure 2). The wettest conditions have been over much of coastal to inland California and especially the south coast, along with much of Arizona and New Mexico. Portions of Oregon and the Great Basin have seen 90-130% of average precipitation so far this year. The driest regions have been across much of eastern Washington and the northern Rockies of Montana and Idaho, which have experienced 50-90% of normal precipitation (Figure 2). The rest of the country has seen a mixed year-to-date precipitation pattern with extremely dry conditions in west Texas, the central Plains, and portions of the mid-Atlantic and Florida, while wetter than average year-to-date conditions have been seen in eastern Texas, the Gulf States, northward into the Great Lakes and into New England (not shown).

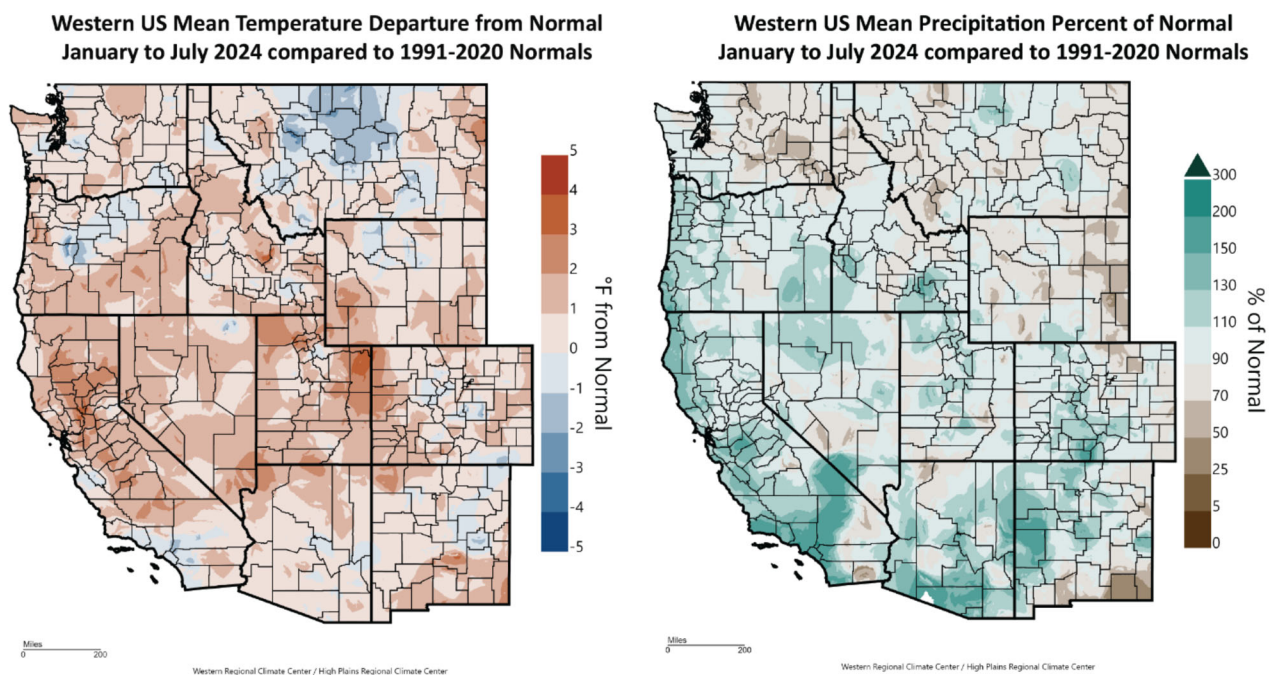


Figure 2 – Western US year-to-date (January 1 through July 31, 2024) temperature departure from normal (left) and percent of normal precipitation (right; images from Western Regional Climate Center, 2024: ACIS Climate Maps).

Heat Accumulation:

The recording breaking warmth of July boosted growing degree-days over the western US to mostly above the 1991-2020 average accumulation (Figure 3). Some coastal zones remain near average GDD as onshore flow has continued to moderate temperatures along the coast. Inland wine regions in Oregon, Washington, and Idaho along with portions of southern Arizona and New Mexico are close to average or below average after the warm July. In terms of seasonal timing, the majority of the western US is now running 2-20 days ahead of normal accumulation during the 1991-2020 period. The cooler coastal and inland areas are now mostly 2-10 days behind normal GDD for the March through July period (not shown).

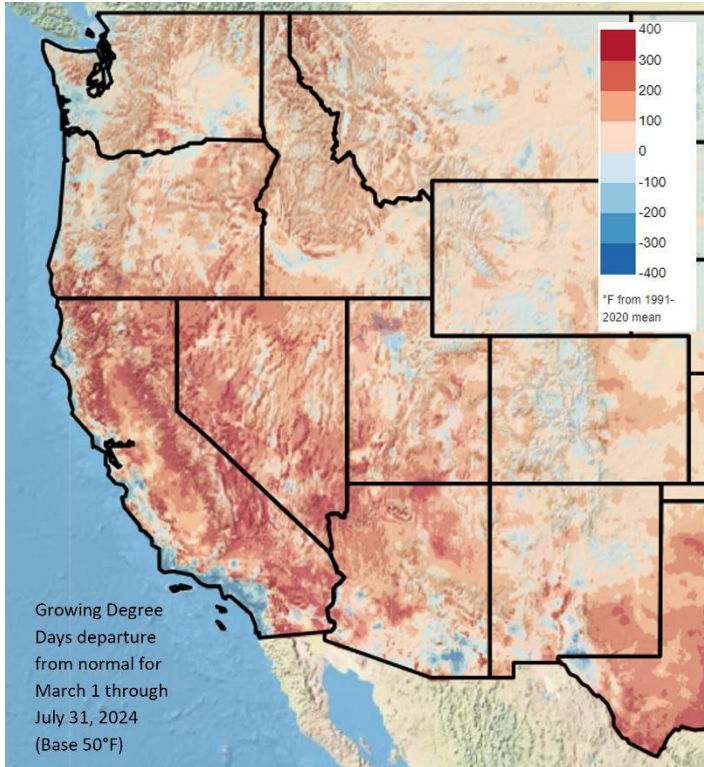


Figure 3 – Western US March through July 2024 growing degree-days (image from Climate Impacts Research Consortium, University of Idaho).

Growing degree-days over the four main wine regions in Oregon ramped up in July with the Willamette, Umpqua, and Rogue valleys now substantially above both the 1981-2010 and 1991-2020 climate normals for the March through July period (Figure 4). These regions are now running close to the accumulation of 2015, one of the warmest vintages in the state. Warmer conditions in July brought eastern Oregon wine regions close to the 1991-2020 climate normal but still substantially below the 2015 vintage GDD. Compared to the last 15 years, the three western Oregon regions are 2-9% above average while Milton-Freewater is 3% lower than average. Compared to the 2023 vintage at the end of July, the regions range 1-9% below last year at this time.

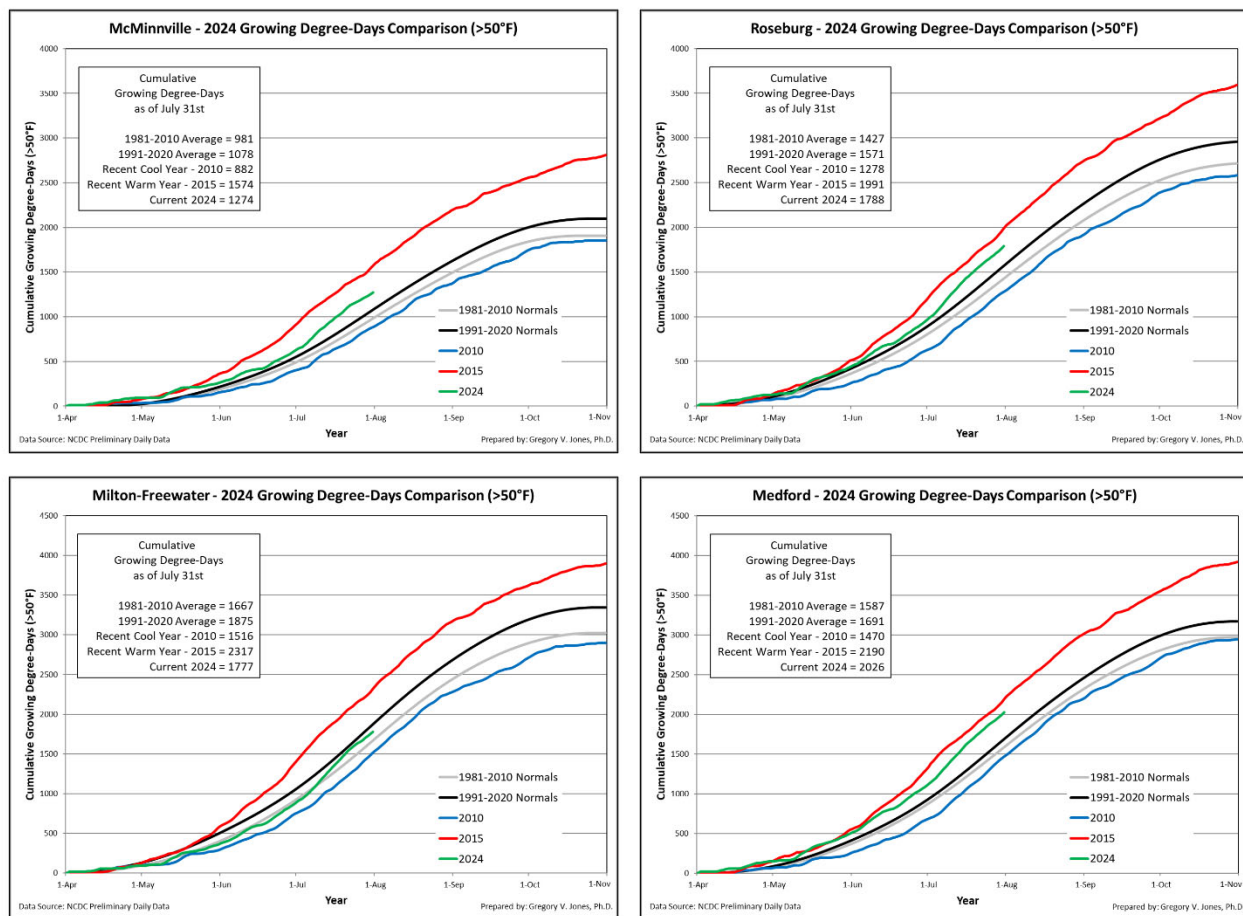


Figure 4 – Cumulative growing degree-days (base 50°F, no upper cut-off) for McMinnville, Roseburg, Milton-Freewater, and Medford, Oregon. Comparisons between the current year (2024) and a recent cool year (2010), a recent warm year (2015), and both the 1981-2010 and 1991-2020 climate normals are shown (NCDC preliminary daily data).

Drought Watch – Heat dominated the month of July, especially in the western US where conditions lead to very high evaporative demand drying out vegetation and contributing to widespread wildfires. In terms of drought, the general footprint across the US continued in July with the south and mid-Atlantic receiving some much needed precipitation in July but remaining in a moderate drought (Figure 5). Existing drought regions either stayed the same or expanded during the month. Moisture in Texas continued to be an east side occurrence leaving the western portions of Texas, along with the southern Plains and the Four Corners region very dry. This month’s heat and abnormal dryness continued to expand or intensify drought in portions of the northern Rockies and Pacific Northwest. At the end of July, the overall drought footprint for the continental US increased slightly to over 48% in drought with the most extreme drought categories rising to close to 6%. For the western US, the overall drought footprint rose to roughly 70% with the most extreme categories also increasing slightly to nearly 7%. The warm and dry month in the PNW added to drought concerns in Washington with an increase to close to 85% of the state in drought and nearly 7% of the state in moderate to extreme drought. Oregon also saw the drought footprint increase to nearly 95% of the state, but there were no developments into the more extreme drought categories in the state. The mountains of northern Idaho and western Montana remained very dry in July. Montana has drought covering 100% of the state, while Idaho has risen to nearly 80% of the state in some level of drought and over 10% in moderate to extreme drought. While California was exceptionally warm in July and mostly drier than average, drought coverage has increased mostly in the northern portion of the state. California has risen to just over 21% in some level of drought with no areas in the more extreme categories (Figure 5).

The broader pattern for the drought outlook for the western US has remained consistent from last month with expanding areas of potential drought (Figure 5; right panel). The areas with more prolonged drought are forecast to expand in both spatial extent and severity, these include the Four Corners, central to northern Plains, the northern Rockies, and the inland PNW. Areas of concern in the mid-south and mid-Atlantic region are forecast to see improvement, largely based on the forecast for an active tropical storm season (see Forecast section).

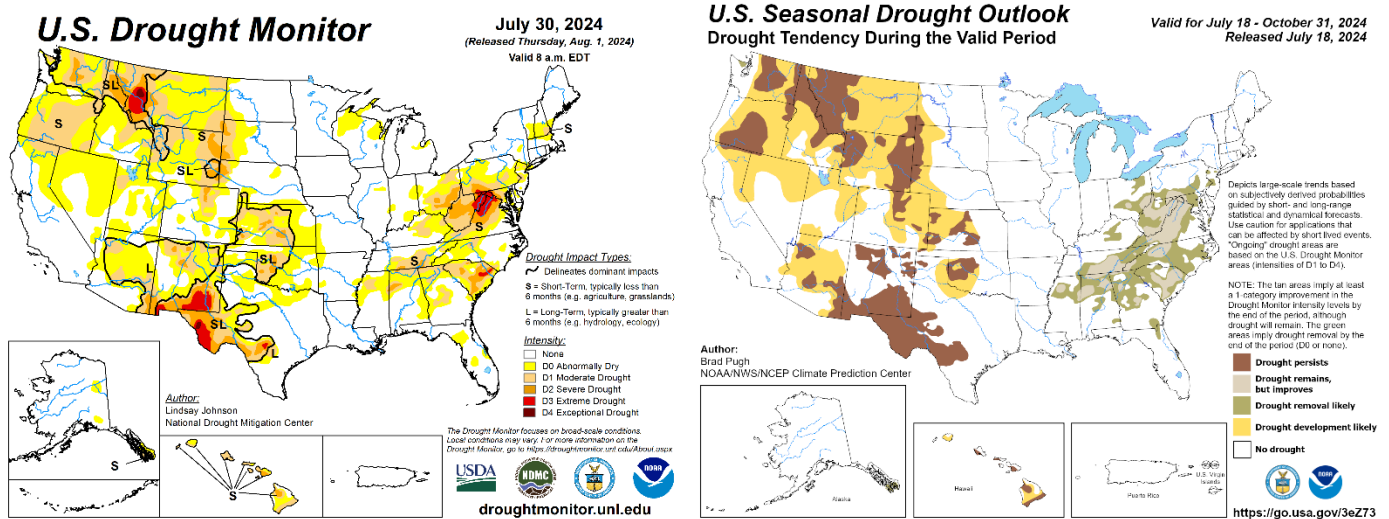


Figure 5 – Current US Drought Monitor and seasonal drought outlook.

ENSO Watch – Both sea surface temperatures (SSTs) and atmospheric indicators have the Tropical Pacific in ENSO-neutral conditions. Cold upwelling continues to ripple across the eastern Tropical Pacific off of South America and now extends close to the international dateline (Figure 6). Although not as warm as last month, northern Pacific SSTs still encompass most of the basin, except in the Gulf of Alaska, around Hawaii, and along the central California to Baja California coasts. NOAA and the Climate Prediction Center (CPC) forecast ENSO-neutral conditions to continue into fall. La Niña conditions are favored to develop sometime during the August through October period (70% chance) and are forecast to persist into the Northern Hemisphere winter (79% chance during November 2024 to January 2025). As I have summarized here previously, the current status in the Tropical Pacific continues to influence the following: 1) the forecast for the US over the next 90 days (Figure 7), 2) the Atlantic and Gulf of Mexico hurricane season, even though it has gone somewhat quiet lately, and 3) global temperatures which are anticipated to moderate in the second half of the year. However, I still maintain that it will be a top 3 record warm year globally, despite La Niña development.

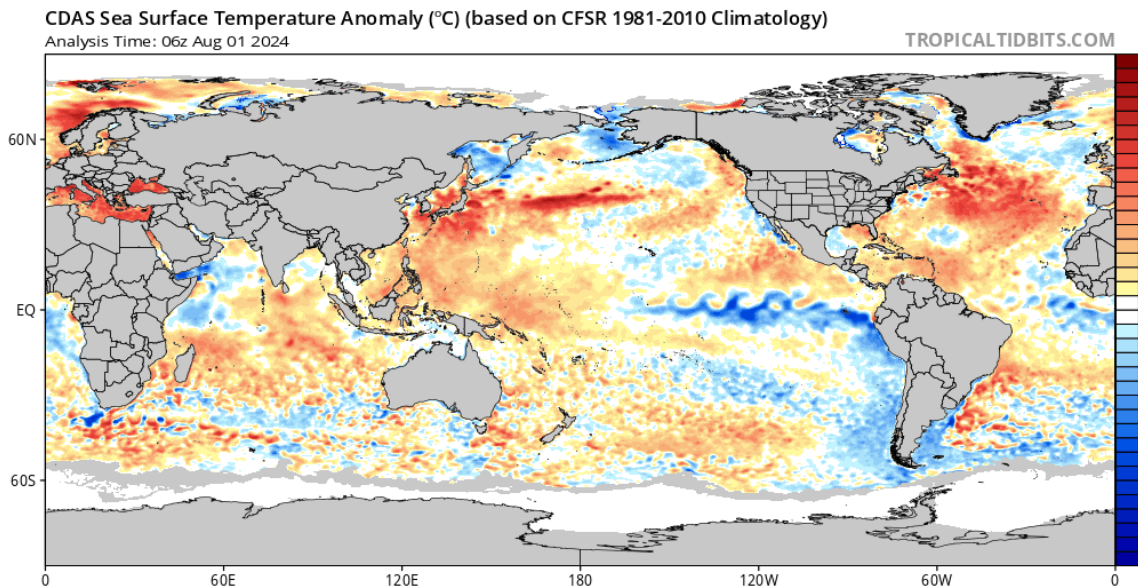


Figure 6 – Global sea surface temperatures (°C) for the period ending August 1, 2024 (image from Tropicalt Tibbits.com).

North Pacific Watch – Some changes in the pattern of SSTs in the North Pacific over the last month. These include slight cooling and a smaller footprint of the warm surface temperatures over the central North Pacific extending from Japan to the west coast (Figure 6). Other changes include a warming of coastal waters from southern Alaska to northern California and less cooling from central California to Baja California. The current state of the North Pacific ocean has the

Pacific Decadal Oscillation (PDO) remaining in a negative phase due to anomalously warm SSTs in the interior North Pacific and sea level pressures above average over the North Pacific. The warming coastal zones and above average sea level pressures support the current forecast of warmer than average temperatures heading into the end of summer and the first hint at fall (see Forecast below).

Forecast Periods:

Next 5 Days: Typical weather to start off August, with the western US largely warm and dry. Coastal zones will see moderate occurrences of marine layer and fog with temperatures closer to normal. Inland areas will warm back to above average temperatures with a chance of thunderstorm activity from monsoon moistened air. Otherwise, no precipitation westwide over the next few days.

6-10 Day (valid August 7-11): Continued warm and dry into this forecast period for the western US. Record warmth is likely to continue across the southern tier of states while the Plains across the Great Lakes to New England are forecast to see slightly cooler than average temperatures. Monsoon moisture appears to be picking up with thunderstorm activity likely for inland areas of the west. Near normal to slightly above normal precipitation is forecast for the rest of the country.

8-14 Day (valid August 10-16): Continued warmer than normal conditions over the western US with a ridge of high pressure in control. Warmest conditions from average are likely in the PNW, but extend south to California, the southwest, and across Texas and the Gulf Coast states. Cooler than average temperatures are likely to continue across the Plains, Great Lakes, and into New England. Rain chances in the west are elevated mostly due to northward streams of monsoon moisture on top of the heating, bringing greater thunderstorm potential, especially to inland areas.

30 Day (valid August 1-31): August is forecast to see above normal temperatures over the entire US with the greatest chances being seen in the central Rockies, Four Corners region, south into Texas, across the southeast and mid-Atlantic regions (Figure 7). Coastal zones in California, Oregon, and Washington are forecast for closer to average temperatures due to onshore flow generated by inland heat. The precipitation forecast for August across the western US is for a seasonally dry month along the west coast states with the interior PNW likely to see below normal amounts. The precipitation forecast for August across the rest of the country is pointing to a likely wetter than average southeast where tropical systems are forecast to bring rain during the month (Figure 7).

90 Day (August-September-October): Heading into the three month period that starts the transition to fall, the US is likely to see largely above normal temperatures (Figure 7). Near normal to cooler than normal temperatures are possible along coastal zones in the west from moderate onshore flow potential. The warmest conditions are likely across the Rockies and Four Corners region, across the south and into New England. The 90-day precipitation forecast has the western US with mostly equal chances of above to below average rainfall, although portions of the Rockies and southwest are forecast to see below normal amounts while the extreme PNW is forecast to see above normal amounts. Given that September and October bring the first fall frontal events, this scenario is likely. The anticipated increased tropical storm activity in the Gulf of Mexico and Atlantic has the three month forecast leaning toward above average precipitation likely across the southeast (Figure 7).

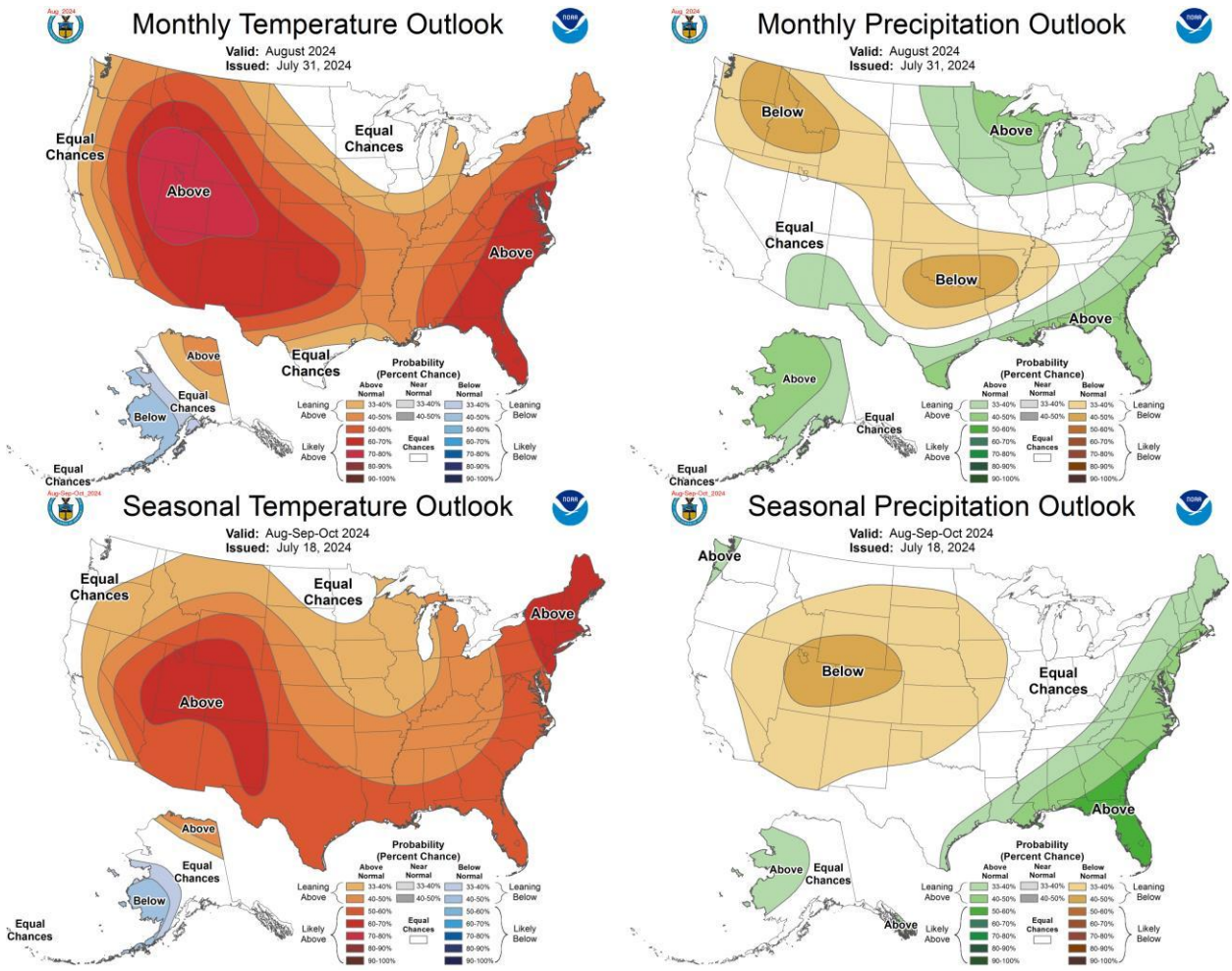


Figure 7 – Temperature (left panel) and precipitation (right panel) outlooks for the month of August (top panel) and August, September, and October (bottom panel) (Climate Prediction Center, climate.gov).

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