## Weather and Climate Summary and Forecast August 2022 Report

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Summary:

- A warm July occurred over most of the west, with most areas 2-6°F above average<sup>1</sup> while coastal zones were closer to average. Very muggy conditions along with a heat wave made the end of July miserable for many.
- Precipitation in July was sparse, with most coming from enhanced monsoon flow in the southwest and into the Great Basin. Drought concerns continue for most of the west, although the Four Corners has seen some relief from the monsoon.
- Seasonal start to August, but most of the west will see much warmer than average conditions in the short-term, Most precipitation in the west will likely be from monsoon flow and thunderstorms, otherwise dry elsewhere.
- Mid-month is expected to continue warmer than average over most of the west. Coastal zones in California are
  likely to stay closer to average temperatures for the month of August. Monsoon flow will likely continue to
  elevate absolute humidity levels over much of the west.
- Heading into the homestretch for harvest, ASO is forecast for warmer than average conditions over the west and much of the country. No clear indication on precipitation yet, likely near normal in the western US.

## Past Month and 2022 Year to Date

July brought warmer than average temperatures for much of the western US (Figure 1). The warmest area was centered in the northern Great Basin and PNW where 2-6 degrees above average temperatures where seen. Portions of the desert southwest were closer to average due to increased cloud cover, higher humidity levels, and precipitation from monsoon flow. Slightly cooler than normal to average temperatures were seen in coastal zones from southern Oregon, into northern California, the Bay Area, and southern California. The bulk of the country experienced warmer than average temperatures in July with Texas experiencing 4-6 degrees above average (not shown). Precipitation during July was limited, with some rainfall in coastal northern California and eastern Washington. The most evident precipitation difference is the monsoon flow during July bringing widespread rain and even flooding to the Four Corners region (Figure 1). A dry month was also seen across Texas and the mid-south along with the Great Lakes and southern New England, while elsewhere saw closer to average or more than average precipitation for the month (not shown).



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

<sup>&</sup>lt;sup>1</sup> 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 first seven months of the year, the western US continues to see a slightly cool year north of California, while southward conditions are closer to average or warmer than average for the year (Figure 2). 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, seeing 2-6 degrees below average for the year. The cooler conditions year-to-date also extend into 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). Year-to-date precipitation amounts remain substantially below average for most areas of the western US, but especially from northern Oregon, into Washington, and Idaho where wetter conditions have been observed (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. Far eastern Arizona and most of western New Mexico have seen some monsoon rainfall in the last 30 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-July 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 July (Figure 3) continue to show the broad pattern of a cooler first half of the summer in northern areas, but also some catch-up occurring with the warm July shown in Figure 1. Southern areas have accumulated substantially more heat, especially across Texas. Except for the northern portion of California, the state is running 150-400 GDD ahead of normal for the period. From northern California through most areas in the PNW, GDDs have recovered slightly but are still close to average or below what is normal for this time of year (50-300 GDD). In terms of days ahead or behind, the GDD data mapped in Figure 3 finds that the warmer areas in California by the end of July were running 6-20 days ahead of normal accumulation amounts. Wine regions in western Oregon are now running 6 days ahead to 6 days behind, while eastern Oregon and Washington, along with the Snake River Valley are 8-12 days behind the normal accumulation by the end of July (not shown).

For single NWS weather stations in four Oregon wine regions, heat accumulation (GDD) amounts for April through the end of July are running right at or slightly above the 1991-2020 climate normals for McMinnville and Medford, close to the 1981-2010 climate normals for the Roseburg, but substantially below average for Milton-Freewater, which is now tracking at values seen in the 2010 vintage, the coolest year since 2000 (Figure 4).



**Figure 3** – Western US March through July 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** – Precipitation from the North American Monsoon over the last few weeks led to some improvements in the drought situation across Arizona and New Mexico (Figure 1), where precipitation deficits lessened in many locations.

Precipitation also fell in parts of Nevada, Utah, and eastern California the last week of the month with muggy conditions all the way up into Canada. With temperatures mostly 2-6 degrees above normal in the West region (Figure 1) drought pressure continued for many in the west (Figure 5). The overall drought footprint in the west region has remained close to 83% over the last 60 days, although the most extreme categories of drought (extreme and exceptional) have dropped slightly due to the monsoon rains. Roughly 35% 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 continues to have 100% of the state currently in some level of drought and nearly 60% remaining in the most extreme drought conditions. 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, but the major change continues to be the southwest and Four Corners region where monsoon rains are anticipated during the remainder of the summer forecast (Figure 5 and see forecast section below). The eastern half of the country follows the 90-day forecast (see below) 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** – Although La Niña conditions in the Tropical Pacific have weakened slightly over the last month, SSTs remain below average (Figure 6). As such, the Climate Prediction Center (CPC) maintains the La Niña Advisory for August 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 remaining 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 until at least Sep-Nov 2022. The CPC model-based outlook forecasts that the probability of La Niña continuing through fall is now 68% and into early winter at 70%, but that ENSO-neutral will likely become the most likely category early in 2023. 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 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** – Continued warming of the North Pacific over the last 30 days. The warming is covering much of the basin from Japan to the North American border (Figure 6) with the central zones running as much as 4-5°C (7-9°F) above the CSFR 1981-2020 climatology. While the North Pacific continues to exhibit strong negative values in the Pacific Decadal Oscillation (PDO), the index has become less negative from its record values in the last few months. One aspect that is evident is that coastal waters are variable with some cooler water remaining off central California but much warmer water now in place from British Columbia south to northern California (Figure 6). With the warmer waters in the North Pacific broader warm than average conditions were seen across most of the west in July (Figure 1), except the Bay

Area and other coastal zones in California where cooler temperatures were seen in July (Figure 1). 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 August 1, 2022 (image from Tropicaltibits.com).

## **Forecast Periods:**

**Next 5 Days:** After a very warm and muggy end to July and start of August, onshore flow from the west will tamp down temperatures and move much of the smoke to the east. Temperatures will be seasonal for the first few days of the month then start to ramp up again. Chances for precipitation are limited to coastal zones around the Puget Sound and within thunderstorms on the eastside of the mountains that could develop from continued monsoon flow (see below).

**6-10 Day (valid August 9-13):** Another shot of very warm conditions likely over much of the western US. Warmest areas likely in the inland PNW, northern Rockies, and northern Plains. Monsoon flow will likely dominate mid-month bringing higher humidity, more cloud cover, and lower temperatures than normal for much of the southwest. The Four Corners high pressure area will continue to pump monsoon moisture into the Great Basin north to the PNW, so expect humidity levels to be higher in most regions. The eastern US is forecast to be near average to warmer than average through midmonth. The Plains into the Great Lakes and northern Mississippi river valley is forecast to be drier than normal, while the flood zones in eastern Kentucky and the Appalachian mountains are forecast to remain wetter than normal.

**8-14 Day (valid August 11-17):** The overall pattern continues into this forecast period with much of the west warmer than average, except for the desert southwest which is forecast to continue to be below normal due to monsoon flow and cloud cover. The core of the warmest temperatures is forecast to move slightly eastward dominating the Plains, Mississippi river valley and the western Great Lakes. The mid-Atlantic up into New England is forecast to see below normal to near average temperatures during this period. For precipitation the two dominant forecast zones are continued monsoon flow and wetter than average conditions in the southwest and Great Basin and a drier than average zone across the heartland. Elsewhere is forecast to see near normal precipitation amounts for the middle of the month.

**30 Day (valid August 1-31):** The monthly temperature outlook for August (Figure 7) shows a good chance of most of the country seeing warmer than average conditions. The main deviation is from the continued monsoon flow into the southwest where the forecast is pointing to the month seeing near average to below average temperatures. Precipitation for the month of August is forecast to be above average for the southwest and into the Great Basin as monsoon flow will bring elevated chances of thunderstorms. The west coast states are forecast to see a near average month, or in other words continued seasonally dry. The middle of the country across the Great Lakes and into New

England is forecast to see a drier than average month while the mid-Atlantic has a greater chance of being wetter than average.

**90 Day (valid August-September-October):** The forecast for the end of summer and start of fall is tricky as August typically has conditions very different than October. But on balance over the next 90 days the US is forecast to see above average temperatures except for the northern Plains which is forecast to be closer to average (Figure 7). The areas with the greatest likelihood of warmer than average conditions are the Great Basin, Rockies, southwest, and Texas along with New England. Heading into the harvest, precipitation amounts for the period are forecast to be near average for the west coast states and southwest, and below average in the northern areas of the Great Basin and Rockies. The drier conditions are also forecast to be seen across the Plains and into the western Great Lakes. Near average precipitation is forecast for portions of the south and into the Ohio river valley which gives ways to above average 90-day precipitation amounts along the Atlantic coast (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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