Weather and Climate Summary and Forecast
October 2024 Report

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October 3, 2024

Summary:

- September was a roller coaster for temperatures with recording breaking heat early and late in the month, sandwiching a very cool period in between. Overall, the month ended up warmer than average[1] in the west.
- Overall, a dry month over the west, although rains from the mid-month system dipping southward into California and some monsoon moisture in the Great Basin was evident but "barely enough to settle the dust." Heat and dry conditions elevated fire activity, most notably in Southern California.
- Growing degree-day accumulations for the vintage are now higher than average over most of the west, except along some coastal zones and within some mountain-valley areas.
- The run of warm and dry days to end last month looks to continue into October with ridging dominating the west. Extreme heat all the way to the coast to start the month, then likely record breaking warmth for many. Dry conditions are likely to persist for most of the west, although the potential for a push of fall-like moisture may make its way into the PNW. But don't expect much rain until later in the month. Elevated fire risk for now.
- Moving into the first half of winter, the long-term forecast has the majority of the country warm and dry with average precipitation. The PNW has the greatest chance of a normal start to winter rains, but amounts are iffy.
- The Tropical Pacific appears to be slowly heading to La Niña conditions, with the forecast calling for a weak event with a short duration. A weak La Niña often indicates that it would be less likely to result in conventional winter impacts over the western US and throughout the Pacific region, though predictable signals could still influence forecast guidance over the short term.

Past Month and Year to Date:

Talking about averages just doesn't seem to do September 2024 justice. The month whiplashed from record breaking heat early in the month, to an unseasonably strong and deep low pressure area that brought a week of cold and unsettled weather far south into California, to record breaking heat to end the month. Taken together, the result was that September 2024 was largely warmer than normal over the western US (Figure 1). The west coast and western

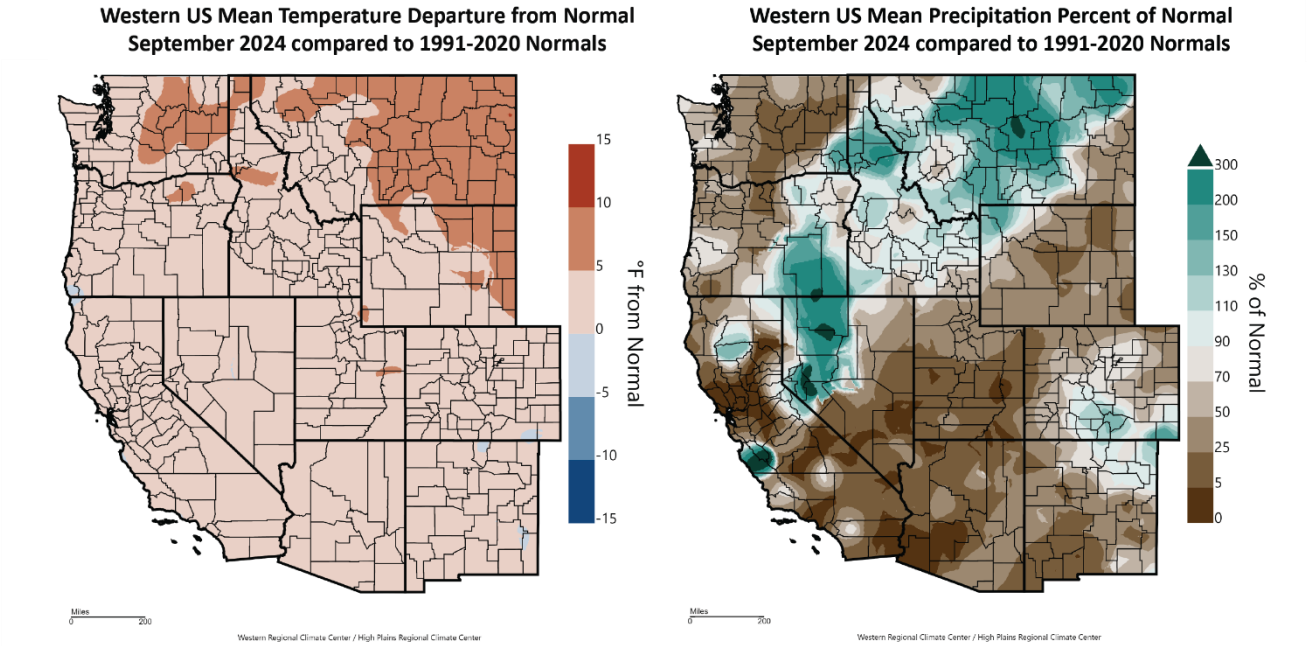

Figure 1 – Western US September 2024 temperature departure from normal (left) and percent of normal precipitation (right; images from Western Regional Climate Center, 2024: ACIS Climate Maps)

[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.

valleys experienced a month that was between 1-3 degrees warmer than normal, while inland areas of the PNW and southwest saw temperatures 3-6 degrees above average. The northern Plains and western Great Lakes region experienced the warmest conditions in the country during September with temperatures 6-10 degrees above average. The rest of the eastern US saw temperatures largely warmer than average, except across portions of the south where increased cloud cover and rain lowered maximum temperatures some (not shown).

September 2024 was largely dry over the western US with much of the region seeing less than 90% of normal and a significant area 5% or less of average (Figure 1). The green zones in Figure 1 reflect 1-2 day events that occurred mid-month with isolated amounts of rain 200-300% of normal, but most of these regions get less than one inch during the month, therefore these totals did not amount to much. Some monsoon flow also brought moisture into the northern Rockies and Plains, albeit amounts were generally less than an inch for the month. Precipitation across the rest of the country was dominated by amounts in the southeast and especially from Hurricane Helene where some areas saw 400 to 900% of normal amounts, while the Great Lakes across to New England were substantially drier than average (not shown).

Year-to-date temperatures for the western US continue to be warmer than normal across most of the region (Figure 2), averaging 0.5-4.5 degrees above average. Some areas continue to run cooler than average, including small areas in the southwest, the south coast of California, north-central Oregon, and portions of Montana 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 remain 2-6 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 is largely near average to above average with values ranging from 90-200% (Figure 2). The areas that have seen 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. Most 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 largely wetter than average year-to-date, with eastern Texas, the Gulf States, the southeast, and northward into the Great Lakes and into New England seeing the greatest departures, while the driest area of the country remains southern New Mexico, west Texas, and portions of the central and northern Plains (not shown).

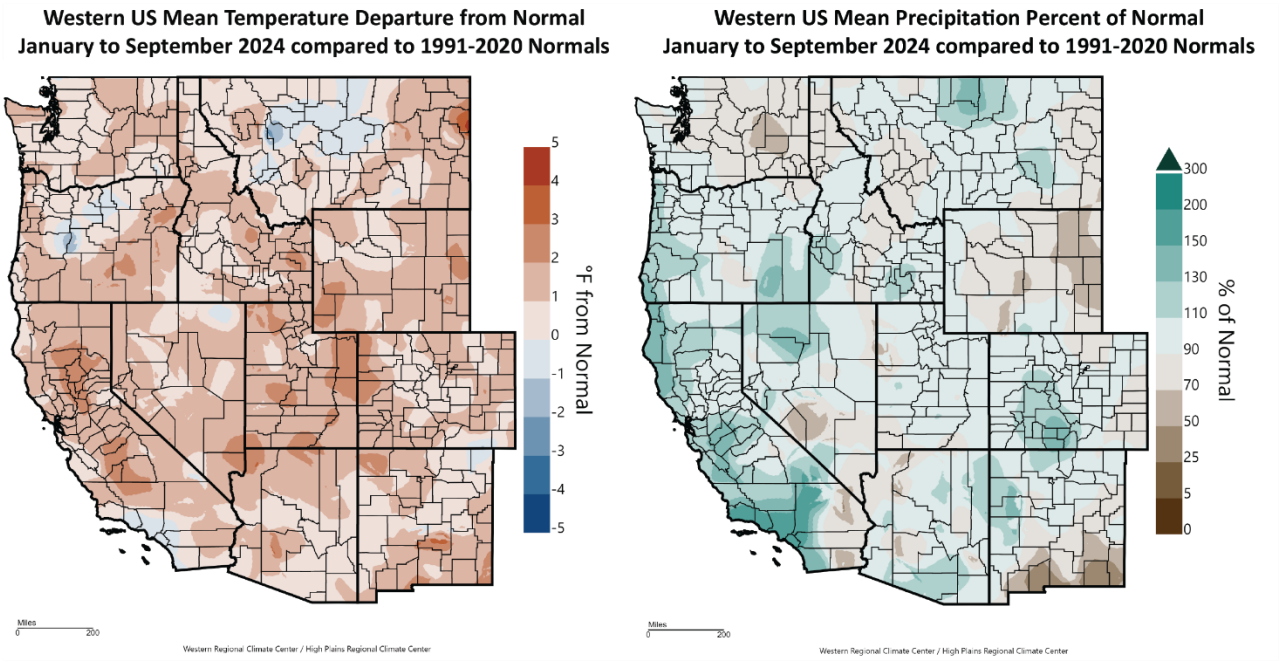

Figure 2 – Western US year-to-date (January 1 through September 30, 2024) temperature departure from normal (left) and percent of normal precipitation (right; images from Western Regional Climate Center, 2024: ACIS Climate Maps).

Heat Accumulation:
March through September heat accumulation totals show much of the western US above the 1991-2020 climate normals (Figure 3). Averaged over the entire western US, growing degree-days are roughly 10-15% above average. However, coastal zones in California, Oregon, southeastern Washington, and scattered valleys and mountainous areas ended 5-10% lower than average for the growing season. Lower accumulation amounts are especially evident along the southern California coastline where cool offshore SSTs have kept temperatures lower than normal this year (Figure 2). Some inland wine regions in Oregon, Washington, and Idaho along with portions of southern Arizona and New Mexico after a warm September brought them to slightly above average to average.

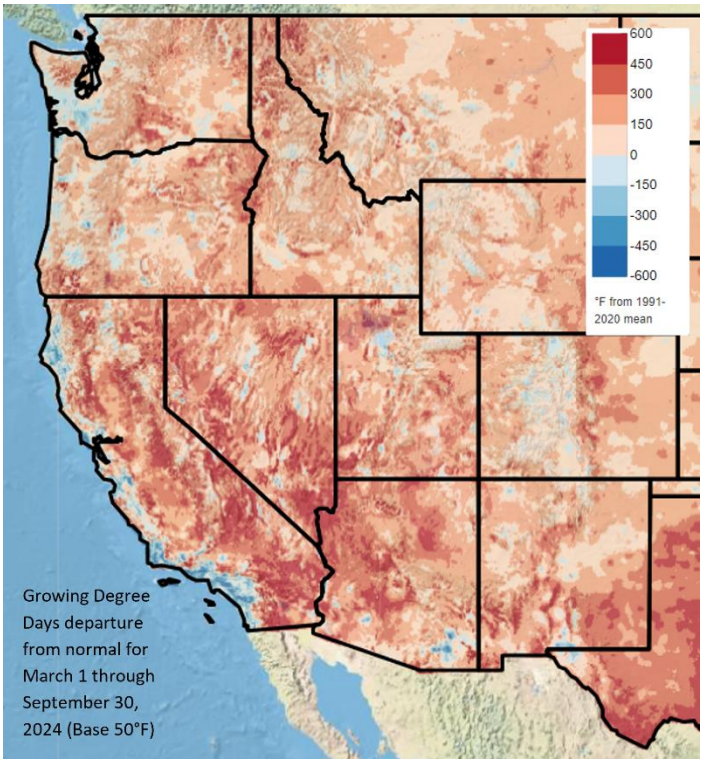

Figure 3 – Western US March through September 2024 growing degree-days (image from Climate Impacts Research Consortium, University of Idaho).

The April through September growing degree days for stations in the four main wine regions in Oregon continue to show a relatively warm growing season with the Willamette, Umpqua, and Rogue valleys moderately above both the 1981-2010 and 1991-2020 climate normals, while eastern Oregon continues to run slightly behind the 1991-2020 climate normals. For the six-month period, Roseburg, McMinnville, and Medford are now 10%, 13%, and 14% above the 1991-2020 climate normals while Milton-Freewater is 3% below (Figure 4). Compared to the last 15 years, the three western Oregon regions are 1-7% above average while Milton-Freewater is 1% lower than average. Compared to the same period in 2023, the 2024 vintage GDD is now running 2-8% below last year.

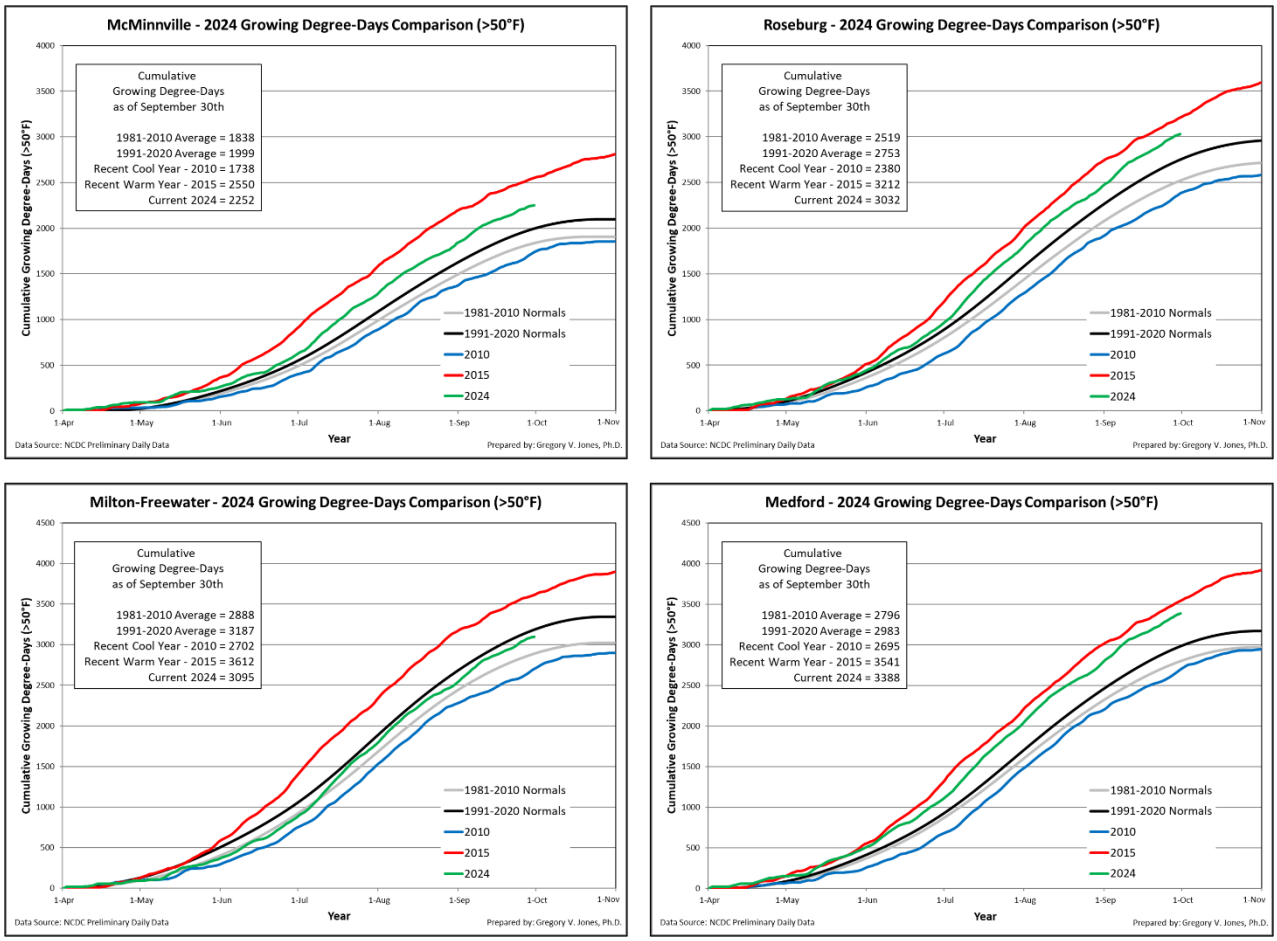

Figure 4 – Cumulative growing degree-days (base 50°F, no upper cut-off) for McMinnville, Roseburg, Milton-Freewater, and Medford, Oregon. Comparisons between the current year (2024) and a recent cool year (2010), a recent warm year (2015), and both the 1981-2010 and 1991-2020 climate normals are shown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

Drought Watch – It is a challenge to talk about drought when a portion of the US just experienced a deluge of unbelievable portions. Hurricane Helene brought significant amounts of rain across the southeast, with some locations receiving 20-30" over a few days. The outline of the affected area can be seen in the October drought map in Figure 5. Apart from the southeast, the rest of the country experienced a mostly dry September adding to ongoing drought concerns in many areas. Across the US dominant drought related impacts now extend over portions of the PNW across into the northern Rockies, in the northwestern Great Lakes, and in the mid-south up into the Ohio River valley and western Appalachian mountains. The overall drought footprint for the continental US increased slightly in September to nearly 71% in drought with the most extreme drought categories remaining at roughly 9%. For the western US, the overall drought footprint remained at close to 80% and close to 10% in the most extreme categories. September was mostly dry in the PNW, with some rain inland but very little on the west side of the mountains. Washington saw a slight drop in its drought footprint to close to 77% of the state in some level of drought and a modest drop to 10% of the state in moderate to extreme drought. Oregon also experienced a slight reduction in the overall drought footprint, from nearly 97% of the state to 90% now, while the more extreme drought categories have dropped to just less than 2%. The mountains of northern Idaho and western Montana remain the driest region in the west. While Montana dropped to 85% of the state in some level of drought, the extreme categories have increased to 10%. Idaho has increased to nearly 89% of the state in some level of drought and risen to nearly 14% in moderate to extreme drought. California continues to see its drought footprint increase, with nearly 72% of the state in some level of drought, but still seeing none of the state in any of the more extreme categories (Figure 5).

The seasonal drought outlook over the next 90 days continues to point to the same areas as it has the past few months. Namely, the Climate Predication Center is forecasting that drought conditions are anticipated to expand over the Central US from Texas north into the central to northern Plains (Figure 5; right panel). Areas of the PNW are now forecast to see conditions improve or be completely removed from drought as the start of the rainy season gets closer. Portions of the

Rockies and southwest are forecast to see drought persist into the start of winter. Areas of the mid-south, which had been in moderate drought, are forecast to see continued improvement, although hopefully not at the expense of severe tropical systems like Helene.

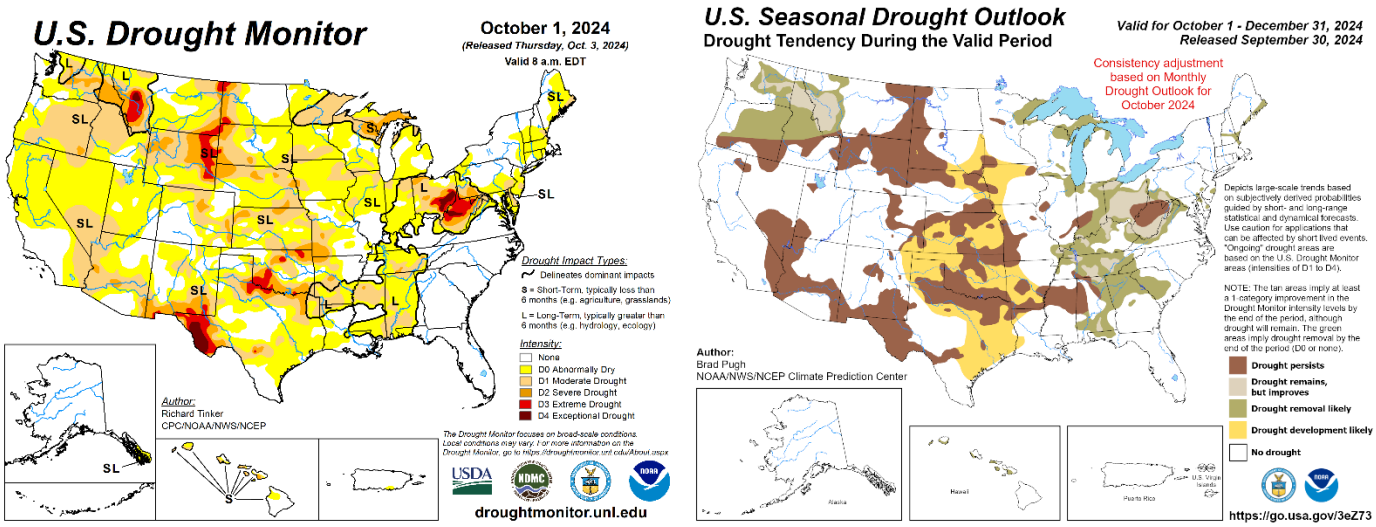

Figure 5 – Current US Drought Monitor and seasonal drought outlook.

ENSO Watch – As of the mid-September updates, ENSO neutral conditions persist in the western equatorial Pacific (Figure 6). Cold upwelling continues off South America and extends across the Pacific driven by strengthening trade winds. Both oceanic and atmospheric drivers are all showing signs of La Niña development. As such the current predictions from NOAA and the Climate Prediction Center (CPC) have La Niña conditions favored for the September-November 2024 period (71% chance) and are expecting it to persist through January to March 2025. The models continue to indicate that this La Niña will likely be a weak event with a short duration. A weak La Niña often indicates that it would be less likely to result in conventional winter impacts over the western US and throughout the Pacific region, though predictable signals could still influence forecast guidance over the short term. The slow start to this La Niña appears to have resulted in a relatively quiet hurricane season in the Atlantic through mid-September, which has now erupted with Helene developing into a record breaking storm severely impacting Florida and the southeast. Forecasts are still calling for more Atlantic storm activity over the next couple of months.

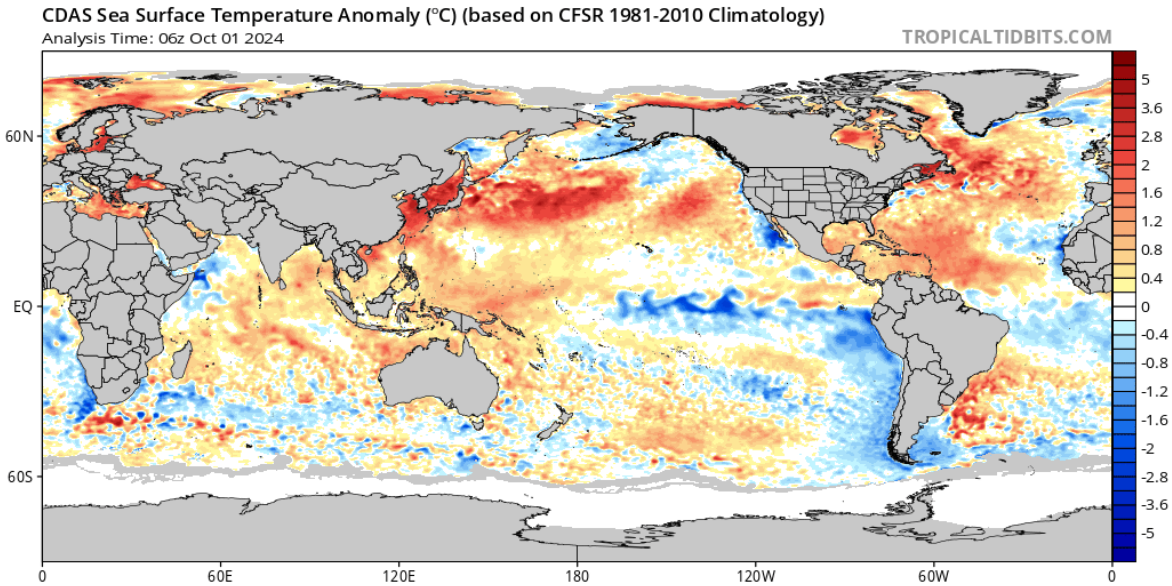

Figure 6 – Global sea surface temperatures (°C) for the period ending October 1, 2024 (image from Tropicaltibits.com).

North Pacific Watch – The overall pattern in SSTs over the North Pacific has continued from last month, although the magnitude in SSTs has changed some. The Bering Sea has warmed slightly over the last month, while the Gulf of Alaska has cooled some (Figure 6). Some cooling has also occurred right along the west coast while the plume of cooler waters has grown in size and magnitude in and around Baja California. Otherwise, the bulk of the North Pacific remains warmer than average at this time. The pattern in SSTs in the North Pacific continues the long run of the Pacific Decadal Oscillation (PDO) which has been in a strong negative phase since early 2020. During winter, the negative phase of the PDO typically brings warmer than normal conditions for much of the southern and eastern states, while the west coast and the PNW are normally colder than normal. Precipitation is normally mixed over the lower 48, with typically a wetter, snowier winter in the PNW and northern Rockies, and drier conditions across southern regions.

Forecast Periods:

Next 5 Days: Offshore ridging dominates the west with temperatures elevated above average, windy conditions along the coast and just inland, and unseasonably dry except with a slight chance of precipitation in the western PNW. Potential record breaking temperatures in many locations throughout the western states, including right at the coast. Elevated fire risk.

6-10 Day (valid October 8-12): The ridge of high pressure maintains its control over the western US with temperatures likely to be above normal everywhere west of the Great Lakes and southern Plains. If the ridge moves inland there is the potential for onshore flow that might keep coastal temperatures closer to normal and opens the possibility of shortwave troughs bringing showers to the western valleys from the North Coast to British Columbia. Cooler to near normal temperatures from the Mississippi Valley into New England. Likely dry over the middle of the country and wetter than average along the southeast coast and Florida.

8-14 Day (valid October 10-16): The ridge dominating the west continues to mid-month or later with unseasonably warm conditions likely over the western 2/3rd of the country. The warmest conditions are likely across the northern Rockies and into the Northern Plains. For precipitation, the west is forecast to see near normal amounts along the coastal zones due to shortwave troughs that could peak through the edge of the ridge. The inland PNW is forecast to stay dry during this period, while the southwest will likely see some late season monsoon flow. The eastern half of the country is forecast for a below average chance of precipitation, with the southeast and Florida the only areas with above average chances for precipitation into mid-month.

30 Day (valid October 1-31): The current October forecast is holding from previous seasonal forecasts to see greater chances of being warmer and drier for much of the western US and country (Figure 7). The greatest probability for seeing warmer conditions is centered over the Four Corners and interior west with coastal zones of the west having slightly lower chances. The southern portion of the eastern US has equal chances of above to below normal temperatures during October. The precipitation forecast is calling for a high likelihood for below average amounts centered over the central Plains and extending over much of the heartland. Equal chances are given along the west coast, northern states, New England, and mid-south, while the far southeast and Florida have a higher chance of seeing a wet month (Figure 7).

90 Day (October-November-December): Seasonal predictions have been showing a warm October followed by a cool and wet November for a while now and the indications have not changed in the current forecast. The overall three month forecast map (Figure 7) is weighing things a little more to the warmer start to the winter, especially across the southern states from California across to Florida and up into the eastern states. Equal chances of seeing slightly below to slightly above average temperatures are forecast from northern California, across the PNW, the northern Rockies, and western Great Lakes. The seasonal forecast for precipitation continues to point to elevated chances for above average amounts in the PNW, equal chances south into California, and dry across the south and southwest. The Great Lakes and New England have slightly elevated chances for a wetter start to winter, while the Ohio River valley and southeast have equal chances for above to below normal precipitation (Figure 7).

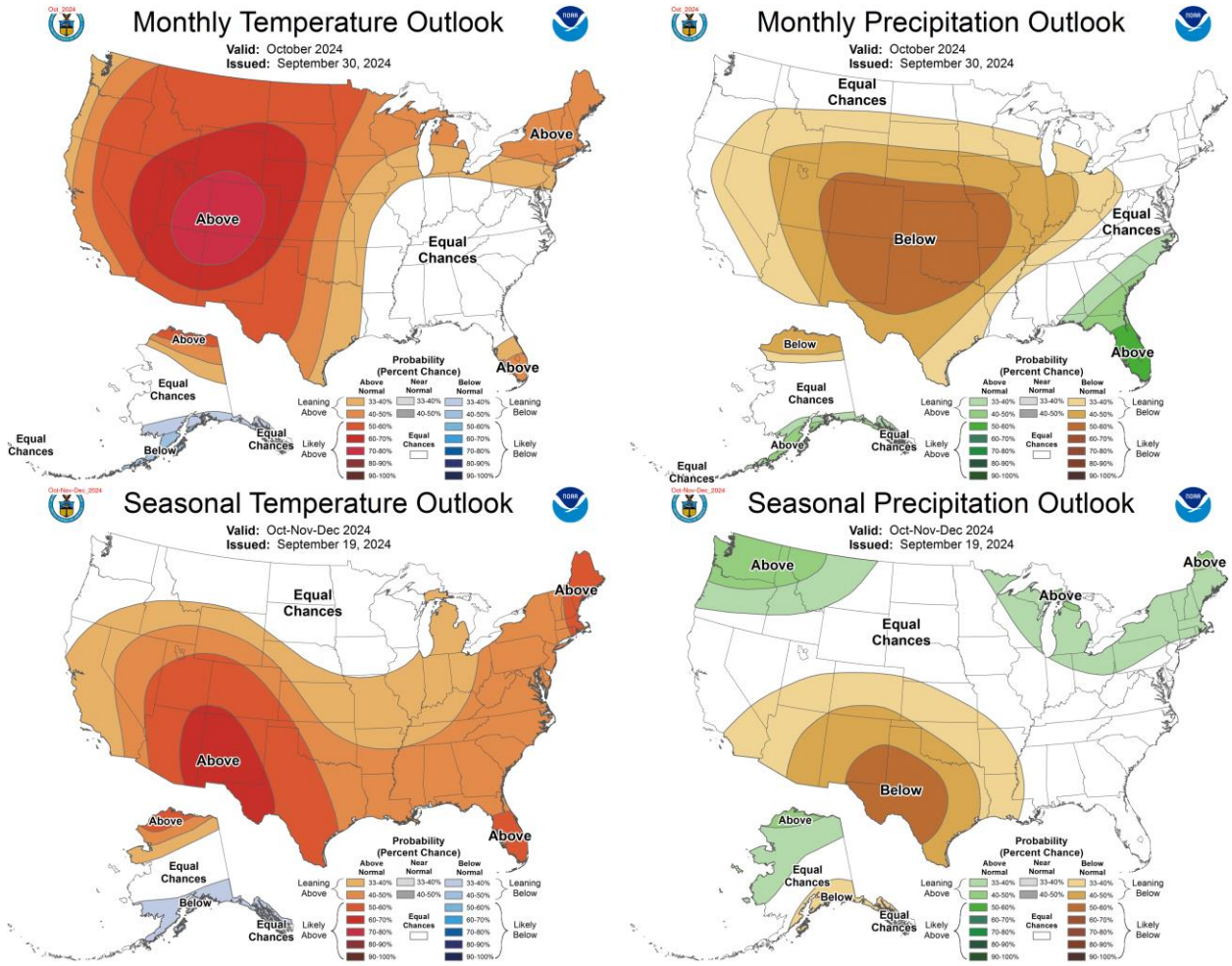

Figure 7 – Temperature (left panel) and precipitation (right panel) outlooks for the month of October (top panel) and October, November, and December (bottom panel) (Climate Prediction Center, climate.gov).

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