

Weather and Climate Summary and Forecast

December 2024 Report

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December 8, 2024

Summary:

- Much of the west experienced a cooler than average¹ November, although portions of the PNW saw slightly warmer than average temperatures for the month.
- November brought substantial precipitation to portions of northern California and into the PNW, while southern California and the southeast remained very dry.
- November precipitation lowered drought conditions for northern California, Oregon, and Washington, but dry conditions continued in the northern Rockies and southwest. Seasonal outlooks point to continued improvement in the north but ongoing dry conditions in the southwest.
- Mix of ridging bringing dry but cool conditions along with off and on frontal passages and rain chances through mid-month. Santa Ana winds will likely kick up in southern California over the next 10 days.
- The overall December forecast favors a near average to warmer than average month over the western US. Precipitation amounts appear headed to an overall wet month for the PNW and near average to drier than average in California and southwest.
- La Niña conditions have been slow to develop with probabilities dropping to below 60% by the end of the year. This La Niña continues to be seen as a likely weak, short duration event. But a strong negative phase of the PDO and a weak La Niña continue to tilt the odds to a cooler and wetter winter from northern California into the PNW and cool to near average and dry into southern California and the southwest.

Past Month and Year to Date:

November 2024 brought generally cooler conditions for much of the west, especially in California, Nevada, and the southwest (Figure 1). Temperatures were closer to average or warmer than average in Oregon, Washington, Idaho, and Montana for the month. The month also saw significant rainfall over portions of northern California while most of southern California saw no rain at all. Records were broken across areas of northern California over a 3-day storm that brought nearly a winter's worth of precipitation (Figure 1). While the west was generally cooler than average in November, from the Plains eastward the rest of the country was moderately to substantially warmer than average with the mid-south experiencing the warmest conditions with 6-10°F above average for the month (not shown). In terms of precipitation, the rest of the country saw quite varied amounts with the central Plains, northern Texas, the Great Lakes,

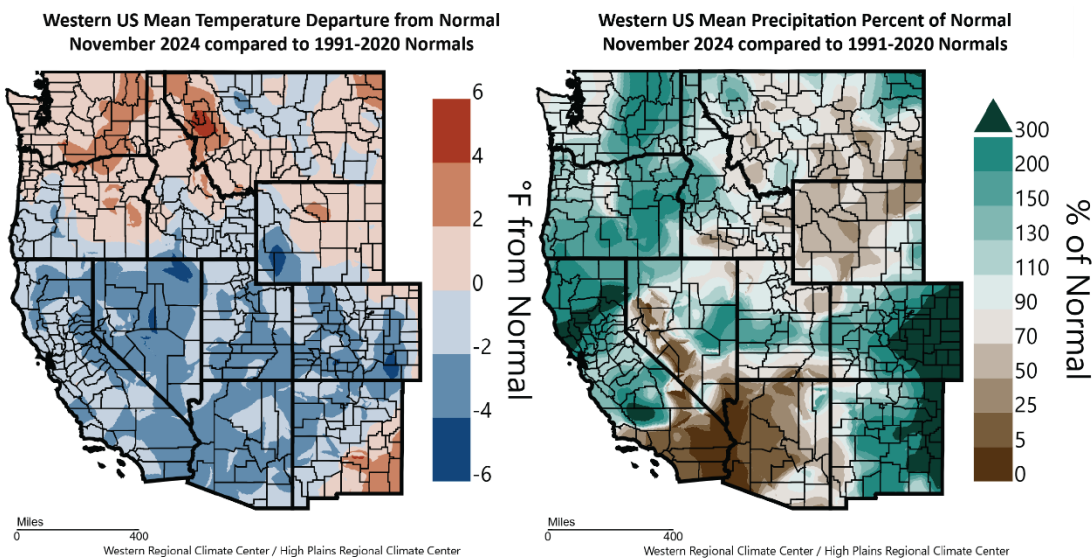


Figure 1 – Western US November 2024 temperature departure from normal (left) and percent of normal precipitation (right; images from Western Region Climate Center and High Plains Regional Climate Center).

¹ Note that unless stated otherwise, all references to normal or averages in this report are to the 1991-2020 climate normal for each weather/climate parameter. See this [website](#) for more information on climate normals.

and portions of the south seeing 200-800% of average, while southern Texas, Florida, and the mid-Atlantic experienced below average to no rainfall at all during the month (not shown).

As we head into the last month of 2024, temperatures are holding above average year-to-date for the western US (Figure 2). The region is averaging 0.5-4.5 degrees above normal with some small areas continuing to run slightly cooler than average, including portions of the south coast of California, north-central Oregon, and a small area of Montana where temperatures 0.5-1.5 degrees below average have been experienced. 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 amounts in the western US are largely remaining 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, especially the south coast, along with portions of the Four Corners region. 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 mixed year-to-date, with eastern Texas, the Gulf States, the southeast, and northward into the Great Lakes and New England seeing the greatest departures, while the driest area of the country remains southern New Mexico, west Texas, portions of New England, and portions of the central and northern Plains (not shown).

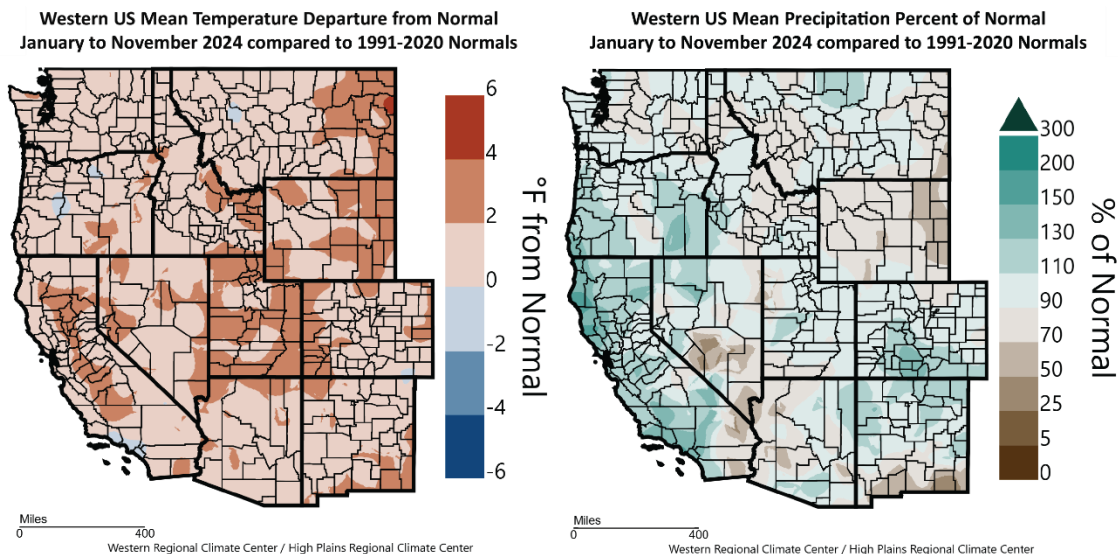


Figure 2 – Western US year to date (January-November 2024) temperature departure from normal (left) and percent of normal precipitation (right; images from Western Region Climate Center and High Plains Regional Climate Center).

Drought Watch – Moderate to substantial precipitation amounts during November over the west (Figure 1) resulted in a lessening of drought in the region while other areas of the country received enough precipitation to lower concerns (Figure 3). The overall drought pattern in the west continues to show the inland PNW, Northern Rockies, and southwest regions remaining moderately to significantly dry. For the continental US, the overall drought footprint depicted in Figure 3 declined from 87% to just under 72% with the most extreme drought categories dropping from 28% to just over 16%. The overall footprint in the western US has dropped slightly to just under 68% but the most extreme categories have remained close to 19%. November brought enough precipitation to lower Washington’s drought area to just above 32% of the state with the most extreme categories dropping off the map. A relatively wet November for much of Oregon (Figure 1) dropped the state’s drought footprint from 90% to just over 37% and the extreme drought categories (severe, extreme, and exceptional) off the map. Montana increased to just below 95% of the state in some level of drought with the extreme categories dropping slightly to nearly 31% of the state. Idaho has remained at close to 92% of the state now in some level of drought but has seen the more extreme categories of drought drop to just below 7. A wet November in northern California and dry month in Southern California both helped and hurt the current drought conditions. Overall,

the drought footprint dropped from 75% to close to 43% (mostly in the north) while the more extreme drought categories rose to nearly 6% (mostly in the south; Figure 3 left panel).

As given in last month’s outlook, the start of the wet season has lowered the area under drought concern across much of the PNW while continuing to show long-term drought in the southwest (Figure 3; right panel). Dry conditions are expected to continue or develop further across much of the northern Plains, portions of the Rockies, across Texas, the southeast and into New England, while conditions around the Great Lakes are likely to improve.

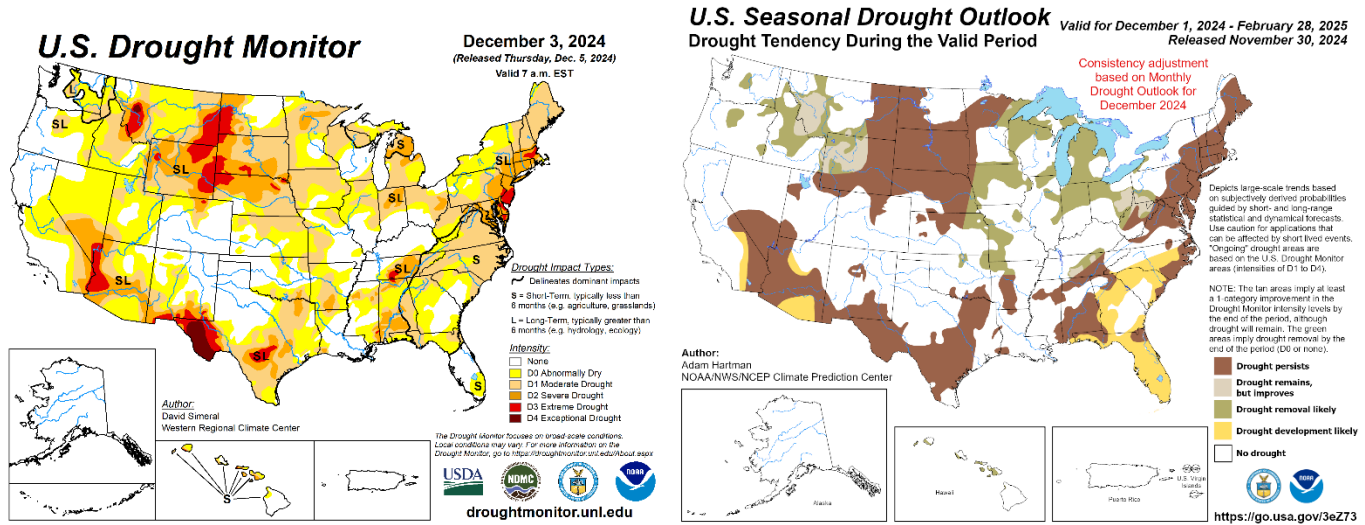


Figure 3 – Current US Drought Monitor and seasonal drought outlook.

ENSO Watch – The anticipated shift to La Niña conditions in the Tropical Pacific has been slow in coming. Currently the Climate Prediction Center has the ENSO alert system at a La Niña Watch level. SSTs in the central-eastern equatorial Pacific are mostly near average (Figure 4), indicating that the tropical Pacific is currently ENSO-neutral. The evolution of other key oceanic and atmospheric variables is consistent with the potential development of La Niña conditions, although the probability has declined over the last 30-60 days and is now at a 57% chance of developing into La Niña by the end of December. The Climate Prediction Center is forecasting for this event to likely be on the weaker side and not likely to last long with persistence only through the January to March 2025 period. Even with a likely weak La Niña on the horizon, the anticipated conditions are contributing to the model forecasts given below and applied research that both point to the PNW likely seeing a cooler/wetter winter, while California has higher odds to be drier during the winter and near average for temperatures (see the 90-day forecast below). Although conditions in the North Pacific could influence the magnitude of the effects of this La Niña.

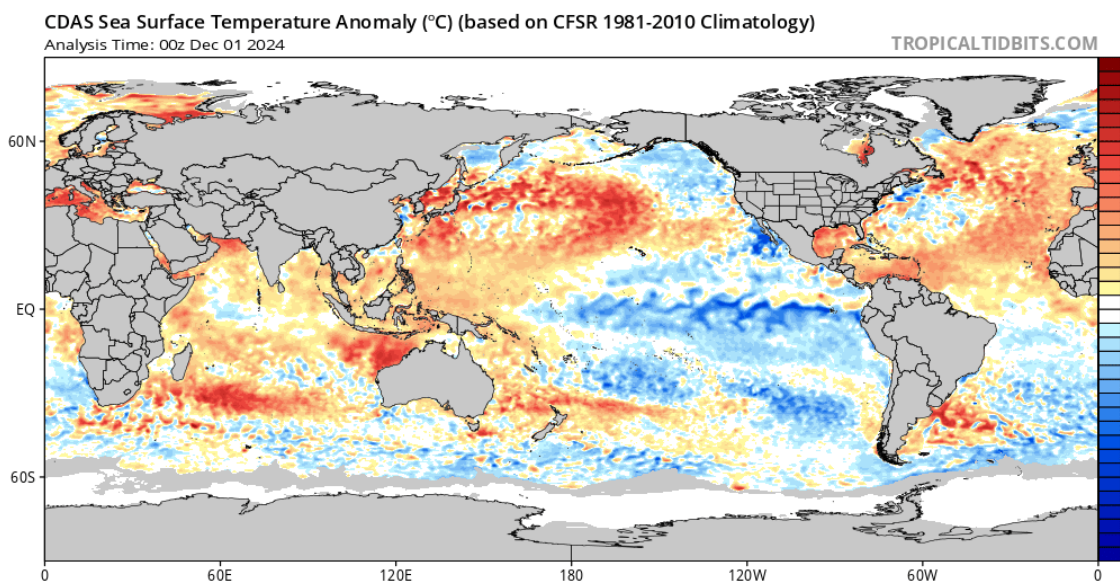


Figure 4 – Global sea surface temperatures (°C) for the period ending December 1, 2024 (image from TropicalTidbits.com).

North Pacific Watch – The pattern in North Pacific SSTs has remained spatially consistent over the last few months (Figure 4). The Gulf of Alaska and near-shore areas of western North America continue cooler than average with circulation over the region helping to mix cooler waters to the surface. Warm SSTs still exist over a large area in the central North Pacific and a cooler SST plume is found southwest of Baja California. These conditions keep the Pacific Decadal Oscillation in a strong negative phase, where it has been since early 2020. This type of pattern in North Pacific SSTs is largely in phase with the tropical Pacific, which is slightly cooler than average (see above). The combination of a cold PDO and weak La Niña winter has commonly brought cooler temperatures and higher precipitation amounts to the PNW and northern states, while California and southern states tend to be near normal to warmer than normal and drier than normal during the winter (see the 90-day forecast below).

Forecast Periods:

Next 5 Days: After a wet start to the weekend a ridge builds in bringing drier and slightly cooler temperatures. Fog is likely in most valleys across the west. Frontal conditions later in the week bring another shot of rain and snow with the greatest chances in the PNW but even a decent chance south into California.

6-10 Day (valid December 14-18): The temperature outlook into mid-month is calling for near average to slightly above average for the west. The middle of the country is forecast for a greater chance of above average temperatures while the eastern seaboard is forecast for closer to average temperatures mid-month. The precipitation outlook for the western US has the PNW with a decent chance of above average amounts while the desert southwest and southern Rockies have a greater chance of below average amounts. California is anticipated to be near normal. The Mississippi Valley up into the Great Lakes are expected to be wetter than average, while the eastern states are likely to be closer to normal.

8-14 Day (valid December 16-22): Widespread warmer than average temperatures are forecast for the entire western US during the period leading up to Christmas. Warmer conditions are also expected in the eastern US, but with a chance of some areas seeing closer to normal temperatures. It appears that the general pattern of a wetter than average northern California and PNW and drier southwest and Rockies is likely to continue into this forecast period. Southern Texas and Florida are forecast to see above average precipitation during this period with the rest of the eastern US likely closer to normal.

30 Day (valid December 1-31): The monthly outlook for December points to a largely warmer than average month for the west coast to the Plains (Figure 5). The greatest probability of a warmer than average month is in southern California into the southwest and Rockies. The middle of the country into the southeast is forecast to have equal chances of a slightly warmer to a slightly cooler month, while the northeast is more likely to see a cooler than average month. The precipitation forecast for December is pointing to the southwest and much of California is likely to see a drier than average month. The northern Rockies and Plains are forecast to see a wetter than average month, while the rest of the western US is forecast to have equal chances of above to below average precipitation, which also extends across much of the rest of the county (Figure 5).

90 Day (valid December-January-February): Even with a warmer start to this period in December, the 90-day forecast heading into the heart of winter hints at a cooler than average PNW across to the northern Plains (Figure 5). The area forecast to have the greatest probability of above average temperatures during the winter extends from southern California across the southern states, into the mid-Atlantic and New England. Areas of California, the Basin, central Rockies, central Plains, and the Great Lakes are forecast to be near normal or have equal chances. Similar to the temperature forecast, the 90-day precipitation forecast appears to be driven mostly by anticipated La Niña conditions bringing wetter than average conditions to the PNW and Great Lakes while the southern states are forecast to see below average winter precipitation amounts (Figure 5). The signal for winter precipitation is mixed for California with equal chances for below to above average precipitation.

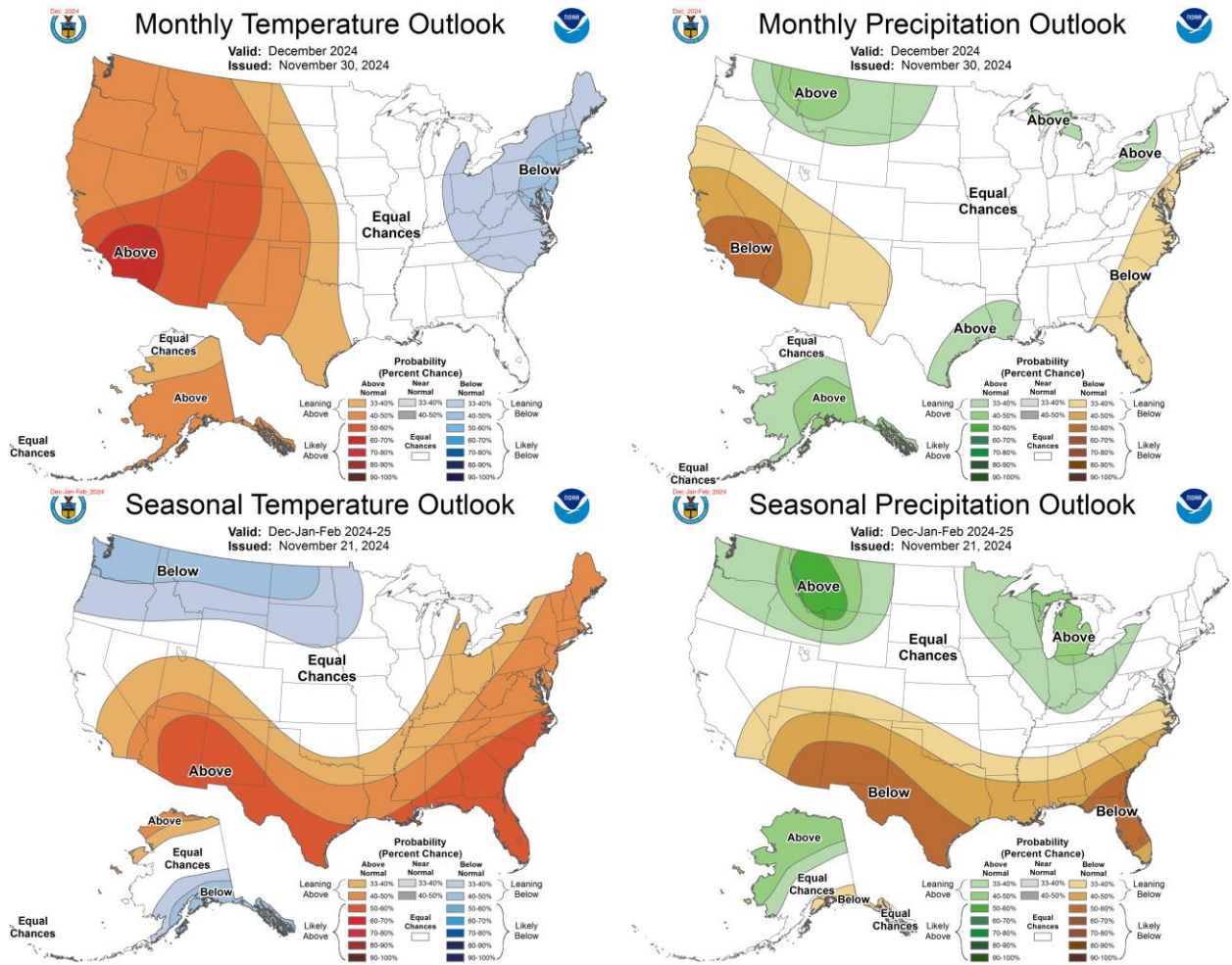


Figure 5 – Temperature (left panel) and precipitation (right panel) outlooks for the month of December (top panel) and December, January, and February (bottom panel) (Climate Prediction Center, climate.gov).

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