

# Weather and Climate Summary and Forecast

## January 2022 Report

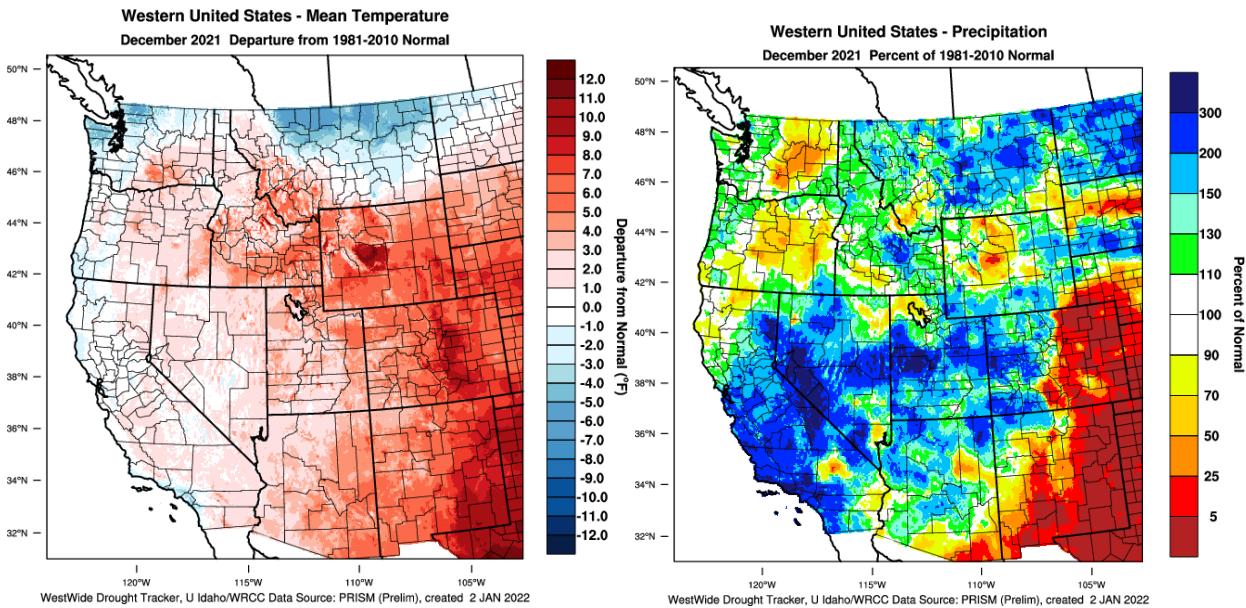
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January 5, 2021

### Summary:

- A westward shift in the North Pacific high-pressure area in early December allowed the storm path to dip southward and mix with modified Arctic air. The result was some very welcomed rain and snow, even into many of the most drought-impacted areas in the west.
- December was warmer than average<sup>1</sup> over most of the west. Near-average to slightly cooler than average along the coast and into the Olympics and northern Cascades.
- Drought concerns have lowered but are not gone. Over 95% of the west is still in some level of drought, but the areas in severe to exceptional drought have dropped to below 35%. Continued improvement in drought conditions is likely through the second half of the winter.
- The storm path continues to bring systems south along the west coast with more precipitation through the first ten days of the month. The second week of January is likely to start a drying out period with temperatures remaining seasonal to cooler than average over the west.
- The second half of winter continues to be strongly influenced by cool SSTs in both the northern and tropical Pacific with cool and wet conditions north transitioning to cool and near average to dry south and east.

### Past Month and 2021 Annual Overview

The month of December saw temperatures that were near average to cooler than average along the coastal zones, into the northern Cascades, and eastern Montana, to warmer than average inland and across to the Rockies (Figure 1). The rest of the country saw temperatures that were well above average with portions of Texas and the Mississippi River valley seeing temperatures 10-12°F above average for the month (not shown). The big story for the west was precipitation. For the first half of winter, we had been under a classic La Niña pattern, characterized by a strong, persistent ridge of high pressure over the northeastern Pacific that had been well-predicted by the seasonal models. However, the ridge shifted westward during December which opened the door for strong meridional flow to develop over the eastern Pacific. The result, many low-pressure areas combined with modified Arctic air were allowed to move

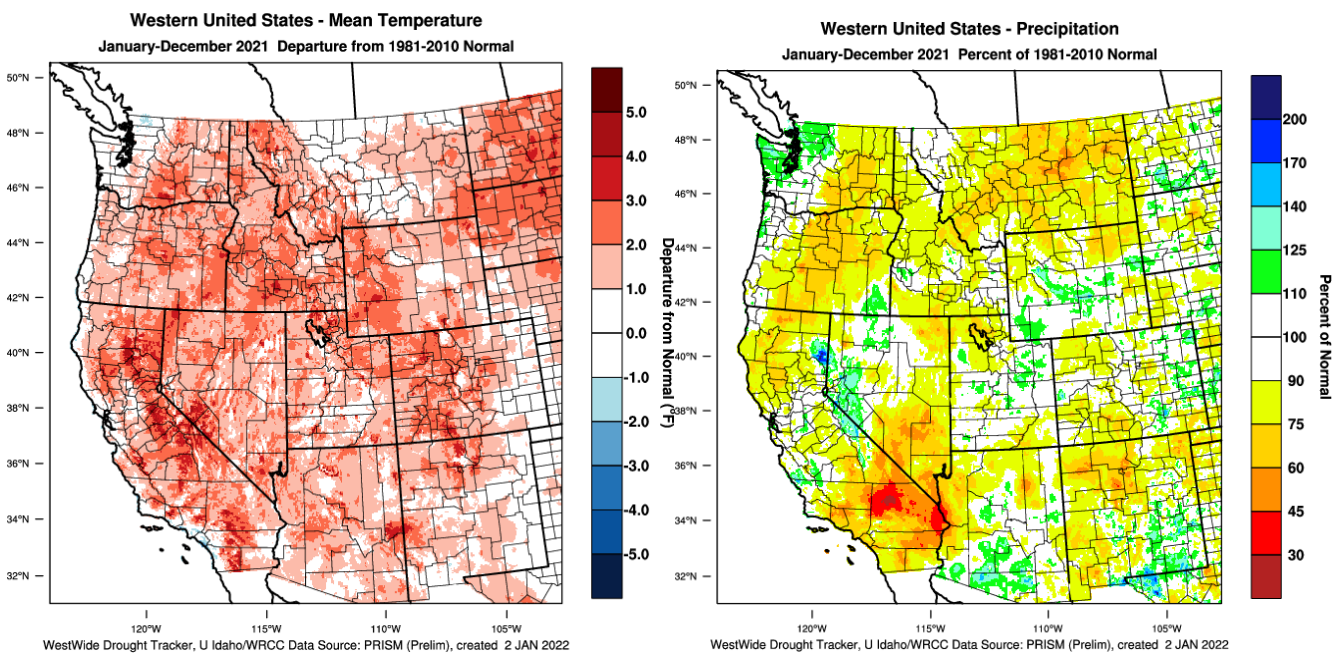


**Figure 1** – Western US December 2021 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

<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.

southward off the west coast all the way into southern California bringing some much-needed precipitation for most (Figure 1). The rest of the country was mixed, with very dry conditions in Texas and northward along the Front Range and across to the mid-Atlantic, while the northern Plains experienced a wetter than average month (not shown).

The preliminary tally of the calendar year climate characteristics for the western US resulted in temperatures mostly above average, although coastal zones and scattered isolated areas were closer to average (Figure 2). Once the preliminary data is finalized, we will likely see the western US close to 3°F above average, with California and the desert southwest leading the way, and 2021 will likely be a top 3 warmest year on record for the west. Maximum temperatures saw a greater deviation from average compared to minimum temperatures in 2021 over the western US. Most of the rest of the country also ended up warmer than average, except areas in Texas, the southern Plains, and the southeast which were closer to the average for the year (not shown). Even with the December inputs, precipitation amounts for the calendar year show that the western US was quite dry with most regions seeing between 30-90% of normal (Figure 2), with portions of California and the desert southwest likely ending up with a top ten driest year on record. The inland PNW also saw a very dry year, while the northern Cascades and Olympics were above average. Even portions of the Sierra Nevada mountains went above average for the year with the record-breaking snow in December. While current and projected drought concerns in the west continue (see Drought section below), the first half of winter brought some relief. The dry conditions in the west extend across the Rockies and into the northern Plains south into Texas while the bulk of the eastern third of the country ended up with a wetter than average year (not shown).



**Figure 2** – Western US annual (January-December 2021) temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

**Drought Watch** – A westward shift of the North Pacific high-pressure area has maintained a prolonged period of frequent weather systems affecting much of the west coast. During the past two weeks, precipitation has averaged 150-300 percent of normal or more throughout the PNW and California. Combined with below normal temperatures, the result has been periods of very favorable snowpack development. As such drought conditions have lessened for many, although the current Drought Monitor shows over 95% of the west is still in some level of drought (Figure 3). The tremendous change has come from the areas with the most extreme drought conditions (extreme and exceptional) dropping from nearly 60% three months ago to less than 35% today. Drought zones continue to extend across the Rockies, much of the Plains, most of Texas, and the western Great Lakes, with even portions of the US east of the Mississippi River showing some short-term drought. Short- and long-term drought indicators from the seasonal outlook (Figure 3, right panel) point to the PNW across to portions of the northern Rockies and south into California seeing continued improvement or drought removal through the second half of the winter. However, the outlook continues to show the long-term drought in the southwest, Great Basin, and up into the Rockies, while also indicating the likelihood

of drought developing further in Texas and the southern Plains. From the Mississippi River eastward the Gulf Coast and coastal zones of the mid-Atlantic are forecast to see drought conditions develop (Figure 3).

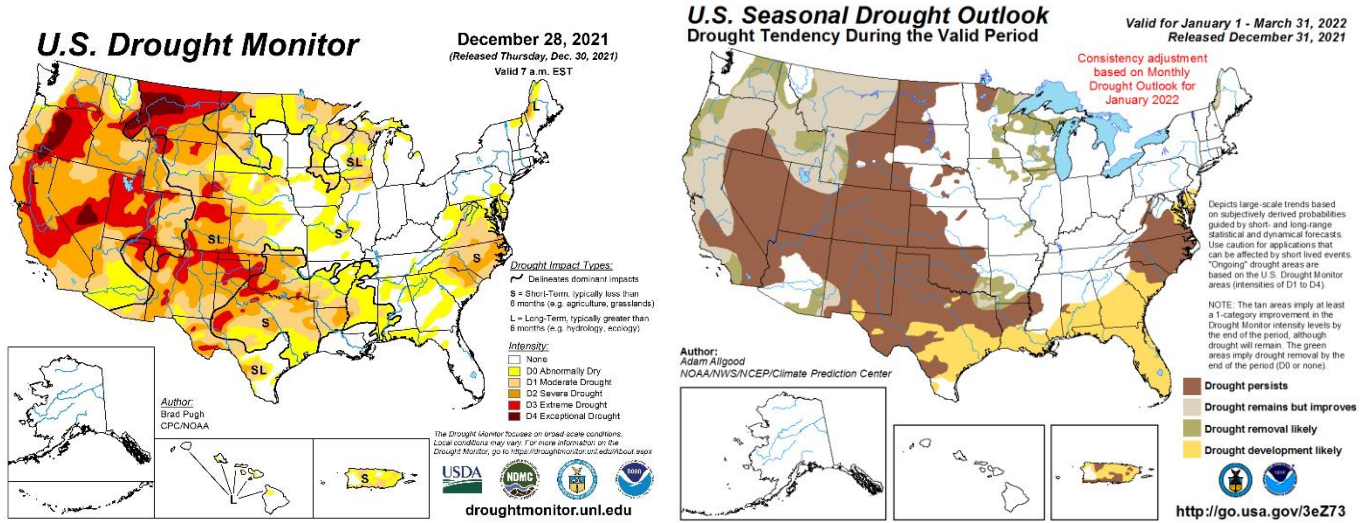


Figure 3 – Current US Drought Monitor and seasonal drought outlook.

**ENSO Watch** – La Niña conditions continue in the tropical Pacific with SSTs in the central-eastern equatorial Pacific well below average through early January (Figure 4). Following from these cool SSTs, the evolution of other key oceanic and atmospheric variables is consistent with weak to moderate La Niña conditions, and the Climate Prediction Center (CPC) is continuing the La Niña Advisory. Modeling efforts also continue to predict SSTs remaining below average during winter, and then returning to ENSO-neutral levels during late spring to early summer. The official outlook from numerous agencies confirms this forecast with the outlook calling for a weak La Niña continuing with high probability through April and dissipating by May. The La Niña conditions continue to inform seasonal model forecasts, pointing to the PNW likely seeing a cooler/wetter second half of winter, while California is likely to see near average to slightly below average precipitation and temperatures during the second half winter (see the 90-day forecast below).

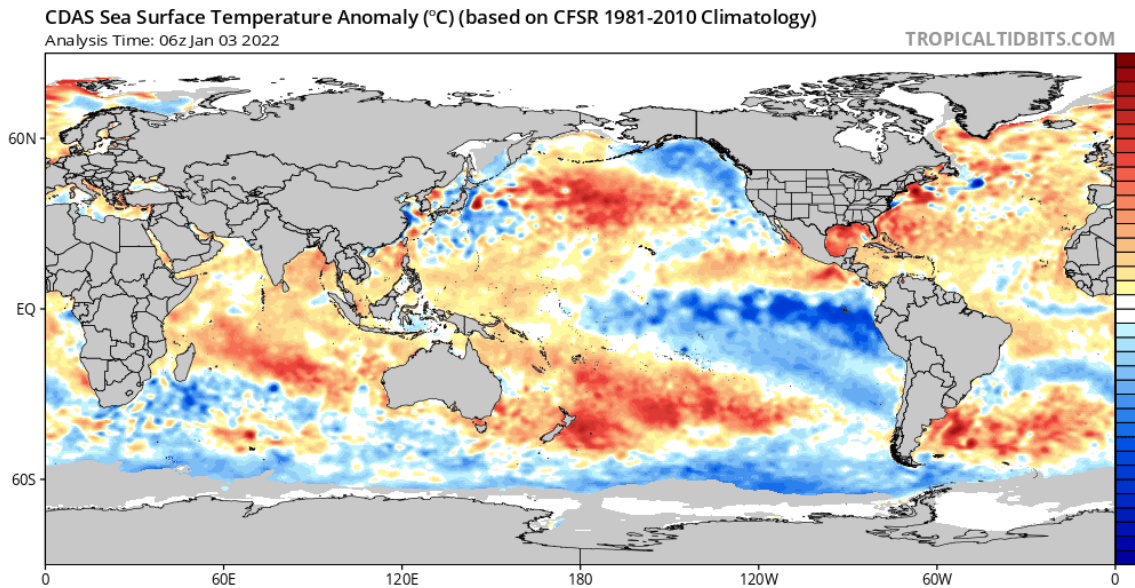


Figure 4 – Global sea surface temperatures (°C) for the period ending January 3, 2022 (image from TropicalTidbits.com).

**North Pacific Watch** – Similar to last month, the current SST pattern in North Pacific shows a large area in the Gulf of Alaska that continues cooler than average with circulation over the region helping to mix cooler waters to the surface (Figure 4). Warm SSTs still exist over a large area in the central North Pacific, with cooler SSTs occurring southwest from California, and cooler SSTs across the ENSO zone showing a classic La Niña pattern (see above). The Pacific Decadal

Oscillation is currently in one of its strongest negative or cool phases on record. This type of pattern in cooler North Pacific SSTs supports the seasonal forecast showing the tendency for a cooler/wetter PNW, transitioning to cool and near average precipitation in northern California and to slightly cool and near average to dry overall during the winter in most of California.

#### **Forecast Periods:**

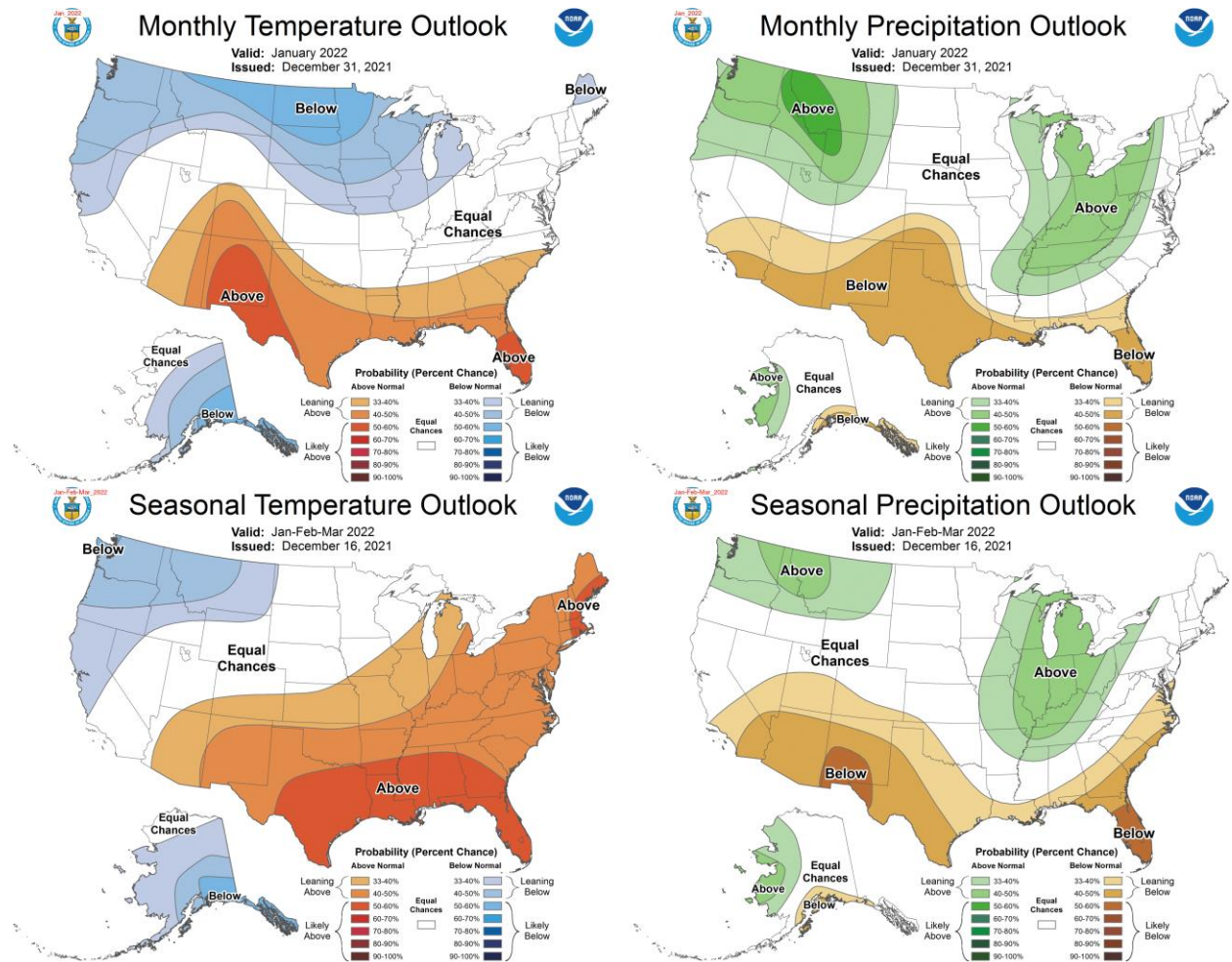
**Next 5 Days:** Vigorous flow out of the North Pacific will bring fronts south with moderately heavy rain and snow forecast for many. Highest amounts from northern California northward over the entire PNW. Temperatures will likely remain seasonal to slightly below average. Drying out some at the end of the period.

**6-10 Day (valid January 8-12):** Dry down looks to continue through this forecast period, except for extreme NW Washington. Temperatures should remain near normal to slightly below normal, except for warmer conditions along the coastal zones from extreme northern California, through Oregon, and to western Washington. The northern tier of states across to New England is forecast to be cooler than average for this time of year, while warmer than average conditions are likely along the front range of the Rockies, across Texas, the Gulf Coast, and Florida. Except for wetter than average conditions forecast for the Gulf Coast, southeast, and Florida, the bulk of the country is forecast to see a drier than average to average period.

**8-14 Day (valid January 10-16):** If the forecasted pattern for the Pacific high-pressure area holds, then a dry mid-January is likely for the entire western US. A slight shift west in the high-pressure area could allow more storms southward into the western US but models are consistent at this point for a dry mid-month. Temperatures are also likely to stay warmer than average over most of the west, while the eastern US is forecast to see below-average temperatures. The precipitation outlook for the rest of the US is overall pointing to a likely dry mid-month, with only south Texas, Florida, and Maine seeing near-normal amounts.

**30 Day (valid January 1-31):** Even with a drier and warmer mid-month forecasted, the overall month of January is forecast to be cooler than average in the PNW, south into central California, then near average into southern California and the Great Basin (Figure 5). Precipitation for the month is forecast to be above average from northern California into the PNW and across the northern Rockies, while near average to below-average further south into California and the southwest. For the rest of the country, the precipitation forecast calls for the southern tier of states to see below average amounts while the Plains across the Great Lakes is forecast to be closer to average to slightly above average. Temperatures are also forecast to remain warmer than average across the south, below-average over the northern Plains, and near average elsewhere (Figure 5).

**90 Day (valid January-February-March):** The seasonal forecast for the second half of winter continues to show a similar pattern from previous forecasts and reflects the expected influences of La Niña on precipitation and temperatures (Figure 5). Northern California and the PNW across to the northern Plains are expected to see below-average temperatures, while just southward of these areas near average temperatures are forecast, which then gives way to the rest of the country likely experiencing a warmer than average JFM period (Figure 5). For precipitation, the pattern of a drier southern tier of states, then equal chances of slightly above to slightly below for the central zone of the country, then above average for the PNW and Great Lakes holds from January through to March (Figure 5).



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

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