

Weather and Climate Summary and Forecast

April 2024 Report

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Summary:

- March brought widespread cooler than average¹ temperatures for most of the western US, except for northern Oregon and most of Washington which were warmer than average.
- A more southerly storm track resulted in wetter than normal conditions from southern Oregon into Northern California and across the Great Basin and desert southwest, but a drier than normal PNW.
- Snow water equivalents (SWE) over the central to southern portion of the western US were bolstered by March storms, bringing many basins to average or as much as 300% above average. Lower SWE continues across the northern areas of the PNW and Rockies.
- After a warm start to April, with temperatures more like June, frontal passages with significantly colder air that is much more like February will set in across the west. Coldest northward, with snow likely down to low elevations for this time of year.
- Clearing skies on any given night over the next few days to a week will bring frost issues for most western valleys. Moderate warm-up afterward but continued off and on again spring weather over the next few weeks.
- The April and 90-day seasonal forecast are pointing to normal to warmer than average for the western US, however, I am still holding to what I have been seeing for months now, a little cooler than what is expected. The forecasts also depict near average precipitation to drier than average, especially in the PNW.
- All indicators are showing a continued weakening of El Niño with a La Niña watch for the fall.

Past Month and Water Year:

After a broadly warmer than average first few months of the year, March turned mostly cooler for the western US (Figure 1). Temperatures for the month were largely cooler than average over California, the Great Basin, the Rockies, and the southwest with the spatial pattern mostly following that of cloud cover and precipitation amounts. Northern Oregon, all of Washington, northern Idaho, and northwest Montana saw warmer than average temperatures for the month. The generally cooler conditions in the west transitioned to much warmer than average conditions from the Plains eastward where temperatures 2-8 degrees above average (not shown). March 2024 was wetter than average for most northern California and southern Oregon, into the Great Basin, the Rockies, and the southwest (Figure 1). Areas of the PNW into the northern Rockies, along with the southern Sierra Nevada mountains and southern Nevada saw below

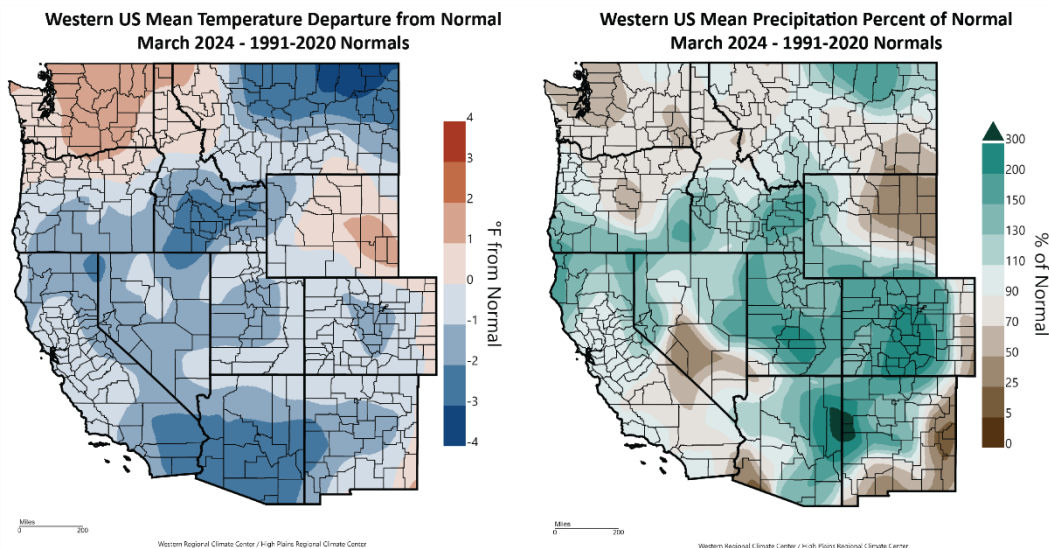


Figure 1 – Western US March 2024 temperature departure from normal (left) and percent of normal precipitation (right; images from Western Regional Climate Center, 2024: ACIS Climate Maps)

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.

average precipitation. Across the rest of the country, higher than normal precipitation amounts were experienced in the Great Lakes, across the south, and up along the eastern seaboard into New England (not shown). Dry conditions continued in eastern New Mexico, Texas, and the southern to northern Plains adding to ongoing drought concerns in those areas (see Drought section below).

The dormant period has ended with temperatures over the entire western US warmer than average (Figure 2). Since the first of October temperatures have been averaging roughly 1-4 degrees above average with the warmest areas being the northern and central Basin along with the northern Rockies and Plains. Closer to average temperatures have been seen in portions of eastern Oregon and the southwest. The bulk of the continental US has also been warmer than average for the water year so far (not shown). The northern Plains across the Great Lakes and into New England continue to exhibit the warmest conditions, 4-8 degrees above average, while small areas along the Gulf Coast are the only areas that have seen below average temperatures (0-1 degree). For the water year to date, precipitation amounts in the western US have been mixed but some areas have made up for their early winter deficits. The driest regions are much of the northern Rockies of Montana and Idaho, which have experienced 30-90% of normal precipitation and have 80% or less of snow water equivalents (SWE) in mountain basins (Figure 2). Portions of inland California, the Great Basin, and the southwest have been dry until late with February and March precipitation above average and SWE in mountain basins now above average. For the rest of the country, the water year to date has been drier than average in the northern Plains, Ohio River Valley, mid-south, and west Texas, while wetter than average conditions have been experienced in the central to southern Plains, Florida, and the central Atlantic states into New England (not shown).

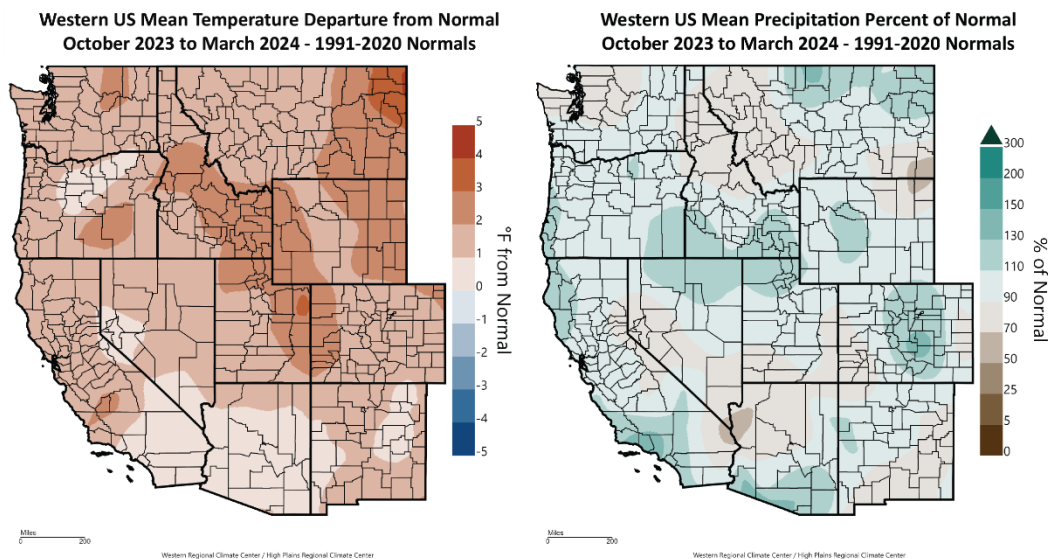


Figure 2 – Western US Water Year (October 1, 2023, through March 31, 2024) temperature departure from normal (left) and percent of normal precipitation (right; images from Western Regional Climate Center, 2024: ACIS Climate Maps).

Drought Watch – Minor changes to the country’s drought situation. Two storms moving across the central Plains and upper Midwest brought some much needed snowfall, accounting for nearly 50% of this winter’s meager total. Coastal nor’easter storms brought significant precipitation to the eastern US with the wettest day on record for many mid-Atlantic locations. The western US received widespread precipitation, but more on the lighter side compared to earlier in the winter. Even with decent precipitation amounts over much of the country, the extremely warm winter has paced the drought development for those areas of the country still in drought (Figure 3). The overall drought footprint for the continental US has decreased slightly from last month with roughly 42% in drought with the most extreme drought categories dropping to slightly less than 6%. The drought area in the western US stayed close to the same as last month (~49%) with the most extreme drought categories decreasing to close to 8%. March was moderately dry in the PNW, but did not affect Washington’s drought much with the area dropping to just below 36% of the state with no areas now in the most extreme categories. Portions of northern Oregon were also dry while southern Oregon was wetter in March (Figure 1), this resulted in the drought footprint dropping to just under 31% with no areas in the extreme drought categories (severe, extreme, and exceptional). Only slight changes occurred in Idaho where drought coverage remains just under 50% but with the most extreme drought categories (mostly in the northern portion of the state) dropping to roughly 9%. March brought enough precipitation in northern and central California to keep the state mostly drought free (Figure 1).

The drought level in the state is now below 5% in some level of drought, with no areas with the more extreme drought categories (Figure 3).

The broader pattern for the seasonal drought outlook continues from last month (Figure 3; right panel), although some improvements have been seen over the last 30 days. The outlook continues to point to some improvements in the overall drought footprint in the middle to lower Mississippi River valley, but also shows improving conditions in the southwest and along the northern tier of states. The PNW is forecast to see drought conditions wane, in spite of the dry forecast over the next three months (see forecast section below). From central Idaho north into the Sawtooth mountains and across the northern Rockies, drought is forecast to persist although the spatial extent is forecast to decline during the next three months. Continuing drought is likely over much of Arizona, New Mexico, and Texas but late March precipitation and cooler observed and forecasted temperatures result in a smaller spatial extent.

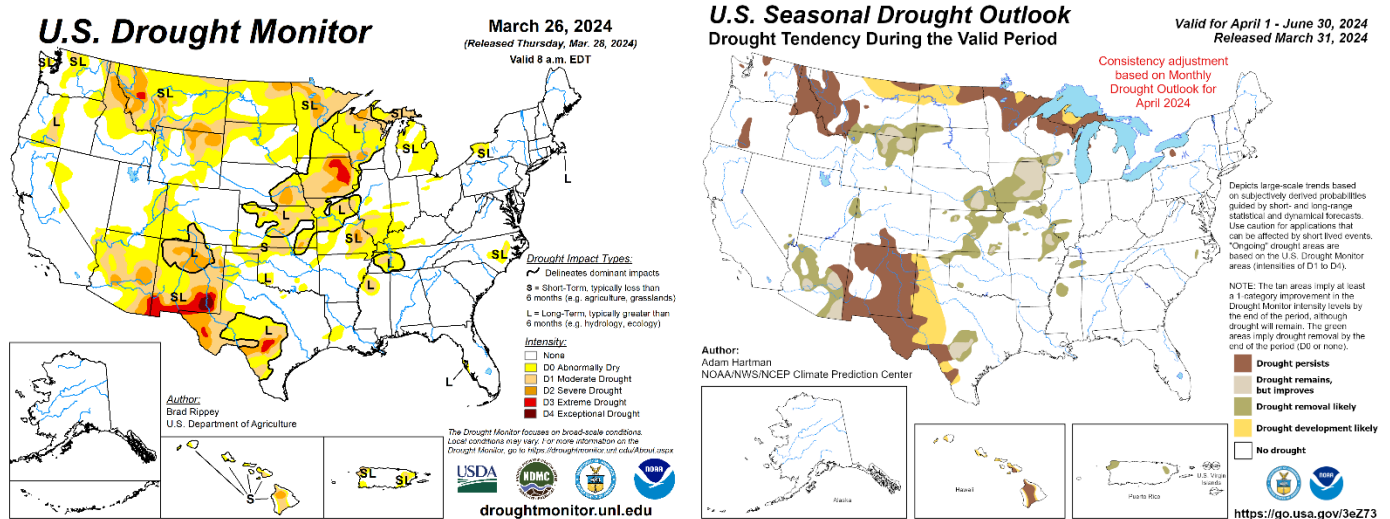


Figure 3 – Current US Drought Monitor and seasonal drought outlook.

ENSO Watch – Sea surface temperature (SST) anomalies across the Tropical Pacific have continued to weaken indicating that the current El Niño is waning. There has even been a small area of below average SSTs showing up west of Ecuador, showing the first signs of the forecasted La Niña (Figure 4). Other key variables in the atmosphere and ocean are also showing signs of a shift to more neutral conditions. While the Climate Prediction Center (CPC) and numerous other agencies are forecasting that the current El Niño will likely continue for a month or so, the weakening is likely to cause most indices to flip to ENSO-neutral by June 2024 (83% chance). Moving into summer there are increasing odds of La Niña developing by August 2024 (62% chance). Currently an El Niño Advisory is still in place, but a La Niña watch is evident for the longer term. The second half of winter continued some much needed El Niño like precipitation patterns over the western US (Figure 1) albeit a little more widespread across the west than normal. Late March and early April storms have added to California, the Great Basin, and the southwest’s winter precipitation total, leaving mountain basins with generally above average snow water equivalents (not shown). However, it appears that we may be near the end of this season’s precipitation inputs (see forecast section below).

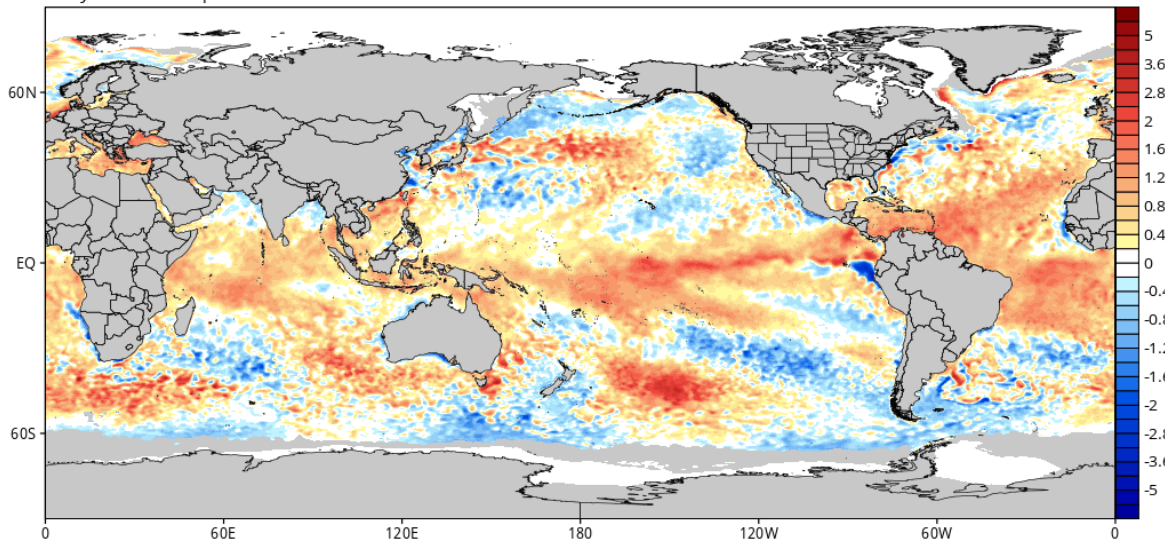


Figure 4 – Global sea surface temperatures (°C) for the period ending April 1, 2024 (image from Tropicaltidbits.com).

North Pacific Watch – The broader North Pacific SST pattern is much the same as it was one month ago. Cooler anomalies continue to cover much of the Gulf of Alaska and south of the Hawaiian Islands, while warm SSTs continue to occur out over the middle of the North Pacific and along the west coast of the US (Figure 4). As such, the Pacific Decadal Oscillation (PDO) remains in a negative phase, although lower than its peak in the middle of 2023. Moving into spring and early summer North Pacific SSTs remain more in phase with the tropical Pacific (warm) than they have been. This has added to the more typical El Niño pattern with precipitation south into California and across the southern tier of states.

Forecast Periods:

Next 5 Days: A lovely start to the month north with a building ridge of high pressure, temperatures will climb into the lower to upper 70s for many. Cool conditions remain in the southern portion of California and southwest as the low pressure area moves eastward. Cooler conditions come back later in the week and weekend with cold nights possible depending on cloud cover holding on overnight or clearing.

6-10 Day (valid April 7-11): Unsettled weather southward will keep much of the western US on the cool side, especially in the desert southwest. Milder into the PNW but continued cold nights and frost concerns. Precipitation will likely stay below average for much of the west into the forecast period with northern California and southern Oregon having the greatest chance for below average amounts. Cold in the west flips to warm in the east with a high likelihood of much warmer than average temperatures across the northern Plains, Great Lakes, south to the Gulf Coast, and northward into New England. In terms of precipitation, the middle of the country is expected to see above normal amounts while the eastern seaboard is expected to see below average amounts for this time of year.

8-14 Day (valid April 9-15): Overall mild and dry during the middle of the month. The bulk of the western US is likely to see above average temperatures during this period, although closer to normal conditions are likely in the western areas of Oregon and Washington along with slightly cooler conditions continuing in the southwest. The same general pattern of significantly warmer than average temperatures is likely for the entire eastern US. Overall precipitation amounts into mid-month are likely to continue below average over the vast majority of the western US. The rest of the country has a decent chance of seeing above average precipitation, except the eastern seaboard from Florida to New England which is forecast to see near normal amounts.

30 Day (valid April 1-30): As given here last month, March did come “In like a lion, out like a lamb” and April appears to be holding to a warmer than average month for much of the western US (Figure 5). The PNW is forecast to likely see a warmer than average month, while central California into the Great Basin and desert southwest has a forecast of equal chances for slightly above to slightly below temperatures for the month. The eastern US is forecast to see a much

warmer than average month, especially the northern Plains and Great Lakes regions. The April precipitation forecast continues to point to a relatively dry month for the PNW, while the desert southwest is forecast to see above average precipitation for the month (Figure 5). The bulk of the rest of the country is forecast to experience a wetter than average month of April, with the upper Ohio River valley having the greatest chance for a wet month.

90 Day (valid April-May-June): Moving out of winter, into spring and early summer the seasonal forecast is calling for a largely warmer than average period over most of the country (Figure 5). The PNW and Great Lakes region have the greatest probability of seeing a warmer than average three-month period, with only the desert southwest, the northern Plains, and Rockies likely to be closer to average. The three month precipitation forecast is pointing to the PNW likely continuing with dry conditions while California and the bulk of the interior western US and the Rockies have equal chances of slightly dry to slightly wet conditions. South Texas and New Mexico continue to be forecast to have a greater chance of below average precipitation into early summer, while the south and southeast have a greater chance of seeing above average precipitation (Figure 5).

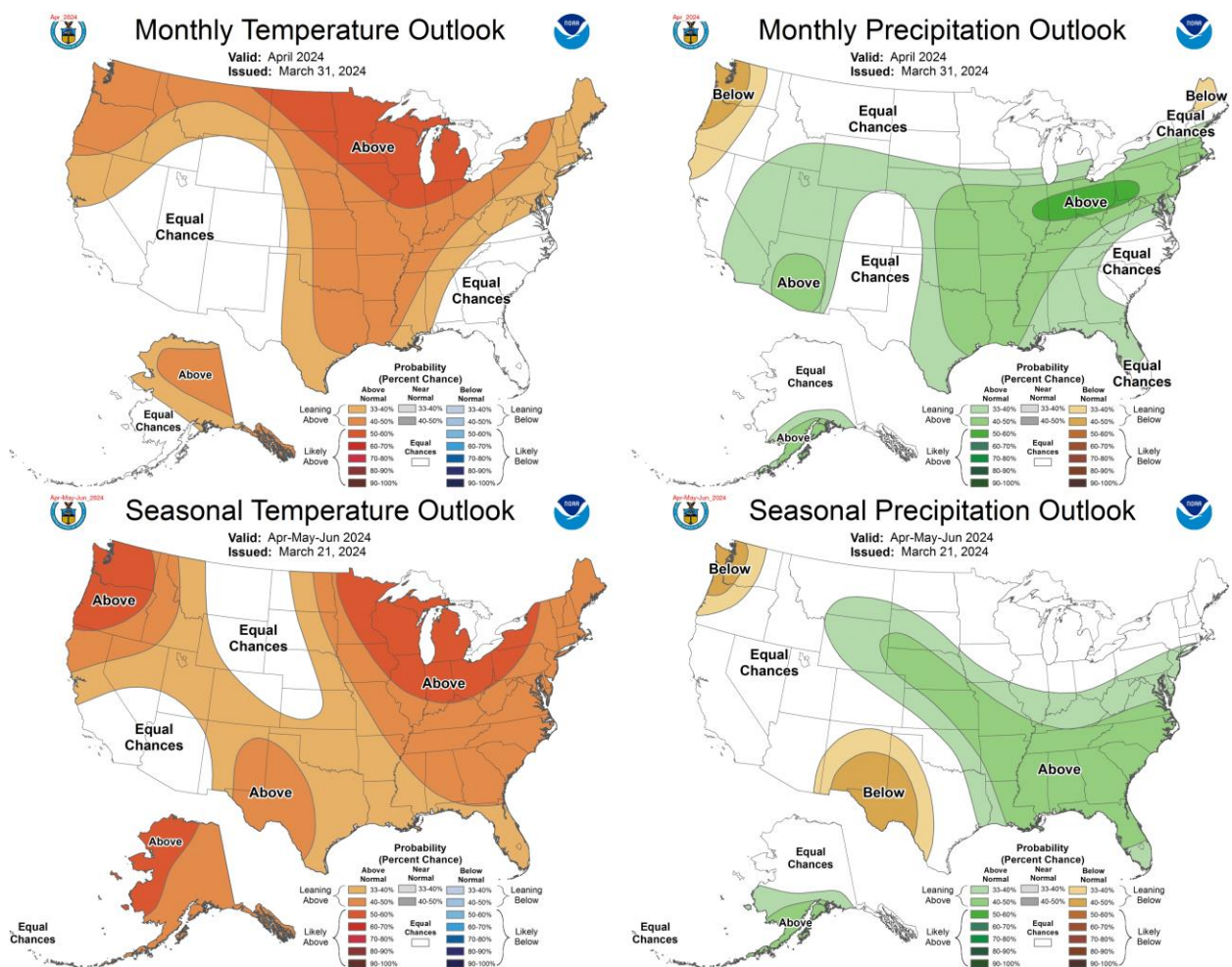


Figure 5 – Temperature (left panel) and precipitation (right panel) outlooks for the month of April (top panel) and April, May, and June (bottom panel) (Climate Prediction Center, climate.gov).

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