

Weather and Climate Summary and Forecast

April 2022 Report

Gregory V. Jones
April 3, 2022

Summary:

- Much of the west saw warmer than average¹ temperatures in March, except for the Rockies which were largely cooler than average. Overall dry conditions continued during March with only a few locations across the west seeing much precipitation.
- The warm and relatively dry month accelerated snowmelt, reducing many western basin snowpacks to 70% or less. As such, drought concerns continue with over 90% of the west in some level of drought, with the most severe to exceptional drought conditions rising to over 30% of the west. Chances for much or any drought improvement are not likely from here on into the summer.
- For the short term, cool conditions will give way to a very warm mid-week followed by cool conditions again by next weekend. Precipitation is likely from northern California into the PNW, but dry elsewhere until mid-month.
- The forecast for mid-month is hinting at cold air dropping down out of Alaska, as such, quite cool conditions are forecast for most of the west. Given that budbreak has occurred or starting for many, the concern during this time is of course frost, which could be widespread with clearing skies after frontal passes during mid-month.
- The 90-day forecast continues to show the continued La Niña and PDO influence, pointing to likely cool and near average precipitation for the PNW and near-average temperatures and dry south in California.

Past Month and 2021-22 Water Year to Date

After a generally cooler than average February for most of the west, March was warm with temperatures 1-4°F above average over most of California, Oregon, Washington, Nevada, and Idaho (Figure 1). The warm conditions transitioned to colder than average temperatures across much of the Rockies, the desert southwest, Plains, and northern Great Lakes, then back to a substantially warmer than average east coast from Florida to New England (1 to 5°F; not shown). Precipitation for the month of March over the west largely continued the ongoing dry conditions since early January with anywhere from 5 to 75% of normal for most areas except the NW portions of Oregon and Washington, along with scattered portions of the Rockies (Figure 1). The high-pressure ridge that has been out over the Pacific continues limiting storms off the Pacific from bringing much moisture to anywhere but the extreme NW. A dry month was seen across

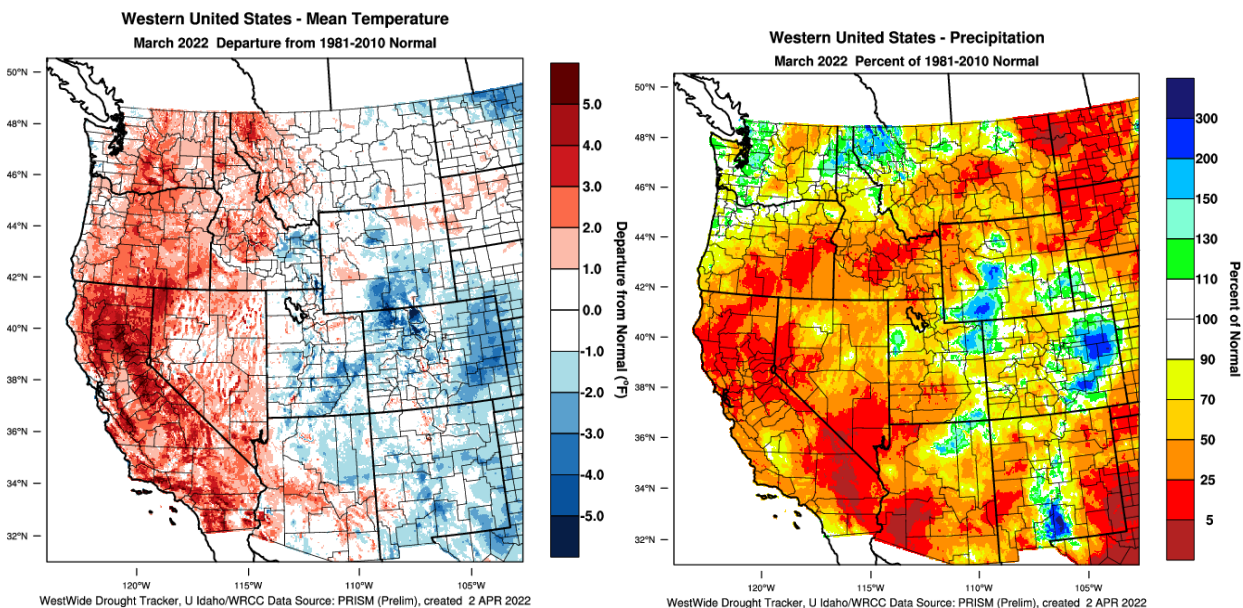


Figure 1 – Western US March 2022 temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

¹ 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.

most of the country with less than 25% of average over the northern Plains and throughout Texas then around 70% of average along the east coast (not shown). Portions of the Great Lakes, mid-south, and Florida were the only areas of the country experiencing a wetter than average month.

The October through March water year-to-date in the western US has seen temperatures mostly above average (1-3°F), although some coastal zones, interior valleys, and scattered isolated areas are closer to average (Figure 2). The majority of the rest of the country has been warmer than average for the water year-to-date, with only the northern Plains experiencing closer to average to cooler than average temperatures for the year (not shown). Precipitation amounts for the water year continue to fall, now mostly at 75% or less for a large area of the western US. Areas such as the Sierra Nevada mountains, portions of the Great Basin, areas in the Rockies, and the northern Cascades are still holding to 100% of normal or higher (Figure 2). However, snow water equivalent (SWE) amounts have declined precipitously due to the warm March and dry pattern that has been dominant since the first of the year with SWE falling to 70% of normal for much of the southern Cascades, Sierra Nevada Mountains, and Great Basin. Moving out of the Rockies, the northern Plains and portions of the Great Lakes and Ohio River valley are continuing to see a wet water year-to-date, while the southwest across to Texas, the Gulf Coast, and southeast up to the mid-Atlantic has seen a dry period so far (not shown).

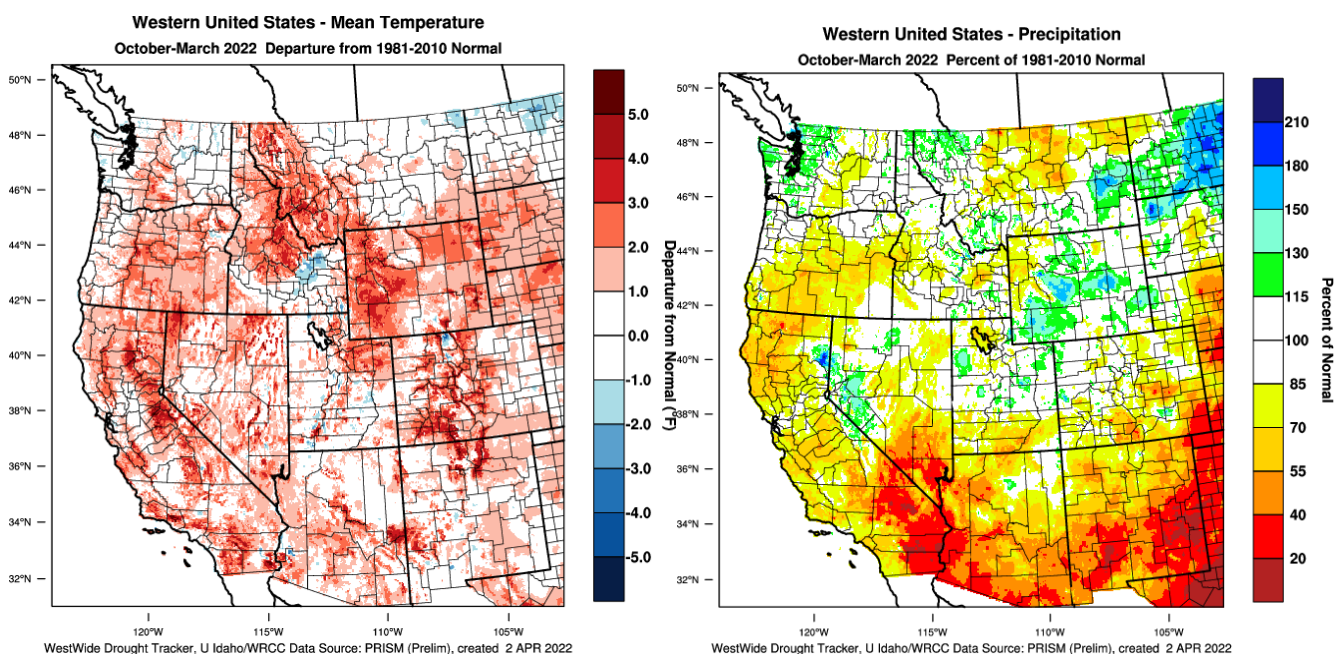


Figure 2 – Western US water year to date (October 2021 through March 2022) temperature departure from normal (left) and percent of normal precipitation (right; images from WestWide Drought Tracker, Western Region Climate Center; University of Idaho).

Drought Watch – While parts of the west saw much needed precipitation over the last 30 days or so, in most areas it was not enough to bring drought relief to the conditions that have persisted for many months (Figure 1). There were some improvements in western Oregon and Washington, but the very warm temperatures in California and the Basin accelerated snowmelt with snowpacks dropping to very low levels across the region. Water year-to-date precipitation is 85% or lower for most of the west and snow water equivalents have dropped to 70% or less for most watersheds in California, Oregon, Idaho, western Utah, and south-central Washington. The current Drought Monitor continues to depict over 90% of the west continuing in some level of drought (Figure 3) while the most extreme drought conditions (extreme and exceptional) have risen to 33% of the west today. Drought zones also continue to extend across the Rockies, much of the Plains, most of Texas, the western Great Lakes, and even across the Gulf into the southeast. Short- and long-term drought indicators from the seasonal outlook (Figure 3, right panel) point to those regions in the west in drought currently being likely to stay there for the foreseeable future. Even those areas that showed some potential for improving conditions have now shifted into an increased probability of drought further developing (Figure 3).

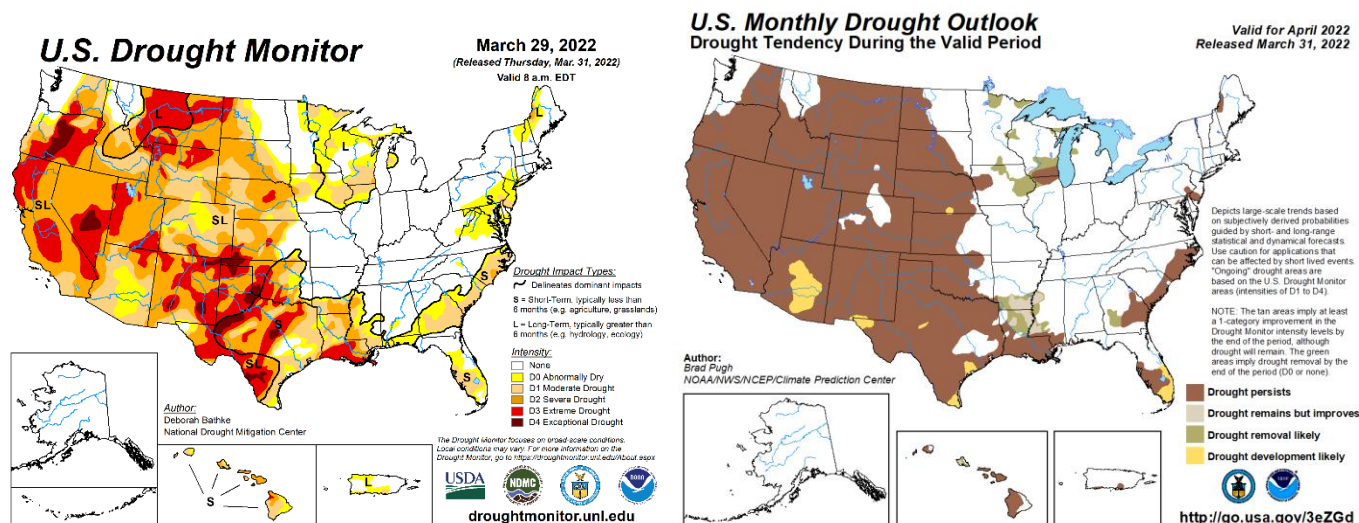


Figure 3 – Current US Drought Monitor and seasonal drought outlook.

ENSO Watch – Toward the end of March, tropical Pacific SSTs in the central-eastern equatorial Pacific were holding to below normal and even strengthening slightly. These conditions mean that La Niña is still with us (Figure 4) and the Climate Prediction Center (CPC) is continuing the La Niña Advisory. Numerous other oceanic and atmospheric variables are consistent with weak La Niña conditions at this time. A majority of models continue to predict SSTs remaining below average during the next month or so, then returning to ENSO-neutral levels during late spring to summer. The official outlook from numerous agencies confirms this forecast with the outlook calling for a weak La Niña to continue, although the forecast methods vary on the dissipation timing with the probability window anywhere from May to July or July to September. Seasonal model forecasts continue to be influenced by La Niña conditions, pointing to the PNW likely seeing a cooler/wetter move into spring and early summer, while California is likely to see near average to slightly below average precipitation and slightly warmer temperatures during the second half winter (see the 90-day forecast below).

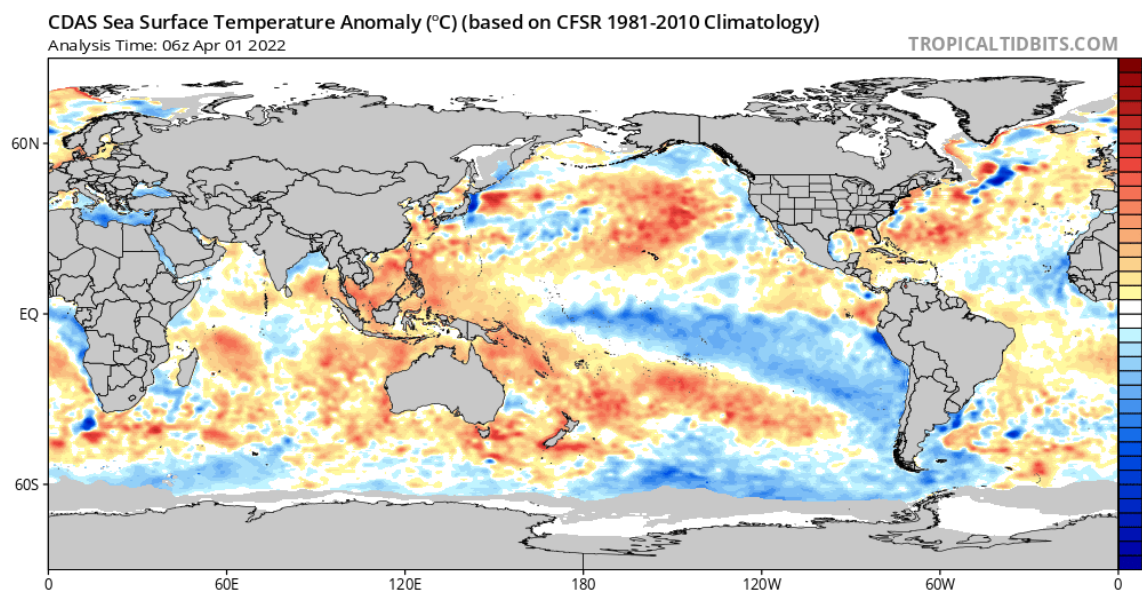


Figure 4 – Global sea surface temperatures (°C) for the period ending April 1, 2022 (image from Tropicaltidbits.com).

North Pacific Watch – While the Pacific Decadal Oscillation has moved slightly more positive, it continues to be in one of its strongest negative or cool phases on record. As Figure 4 is showing, the negative phase is categorized by warm SSTs out over the central Pacific and cooler SSTs in the Gulf of Alaska and southward along the west coast to Baja California. This pattern and the negative PDO index values have been in place for a couple of years now and have been in phase with the last two winter's La Niña events which are represented by the cooler SSTs across the ENSO area from South America across the tropics (see above). This type of pattern in cooler North Pacific SSTs continues to inform the seasonal

forecast showing the tendency for a cooler/wetter PNW, transitioning to cool and near average precipitation in northern California and to near average to dry overall during the spring and early summer in most of California (see the 90-day forecast below).

Forecast Periods:

Next 5 Days: The current cool conditions will give way to warming through the week with the highest temperatures of the year so far for most locations up and down the west coast. A ridge building in from the southwest will bring very warm conditions to California (90s for many), then break down at the end of the week lowering temperatures to more seasonal conditions. Decent precipitation and wind event for northern California into the PNW over the next couple of days, giving way to a drier mid-week then a possible return to showers, even into California, by next weekend.

6-10 Day (valid April 8-12): The pattern during this forecast period is pointing to the PNW having decent chances to experience below-average temperatures and above-average precipitation. California is likely to see both temperatures and precipitation that are closer to normal for this time of year. Warm conditions are forecast for the southwest into the Rockies and the northern Plains, while the southeast has a high likelihood of being below average. The precipitation forecast is hinting at a high probability of wetter than average conditions across the northern states in the west and for a portion of the Rockies, while the rest of the eastern half of the country is likely going to be on the dry side.

8-14 Day (valid April 10-16): The likelihood of cooler than average temperatures expands over pretty much the entire western US due to cold air dropping south out of the Gulf of Alaska. This cool period has been on the mid to long-term forecast for a while now. The systems will also allow more moisture to come to the west with above-average precipitation more likely across the west and especially in the PNW. The concern during this time is of course frost, which could be widespread with clearing skies after frontal passes. The rest of the country, from the Front Range of the Rockies eastward is forecast to have a decent chance at seeing a warmer than average mid-month. In terms of precipitation, above average amounts are likely in the Great Lakes and Mississippi River valley, while the eastern seaboard will likely be dry.

30 Day (valid April 1-30): As has been on the long-term forecasts for a while now, the PNW has a high likelihood of seeing a cooler than average April, which transitions to closer to average in northern California then warmer southward. Across the US, the southern tier of states is forecast to see a warmer than average month with the greatest chance being across Texas and New Mexico (Figure 5). In terms of precipitation, the month of April looks to likely be above average in the PNW while greater chances for a dry month are found south into California. Across the country, the southwest across to Texas has the greatest likelihood of being dry for the month, while the Great Lakes into New England are much more likely to see a wet month (Figure 5).

90 Day (valid April-May-June): The seasonal outlook for the next 90 days has a similar pattern to the 30-day forecast for April. While previous forecasts had hinted at the entire western US warming up after a cool April, the current forecast (Figure 5) is holding the probability for a cool three-month period in the PNW with equal chances of slightly above to slightly below for most of California. The rest of the country is forecast to see warm conditions through June, with the highest probability being across Texas and New Mexico. In terms of precipitation, the 90-day forecast gives relatively high probabilities for the west to remain dry, especially over the Great Basin, across the Rockies, and into Texas. The only portion of the country expected to see wet conditions is the Great Lakes (Figure 5).

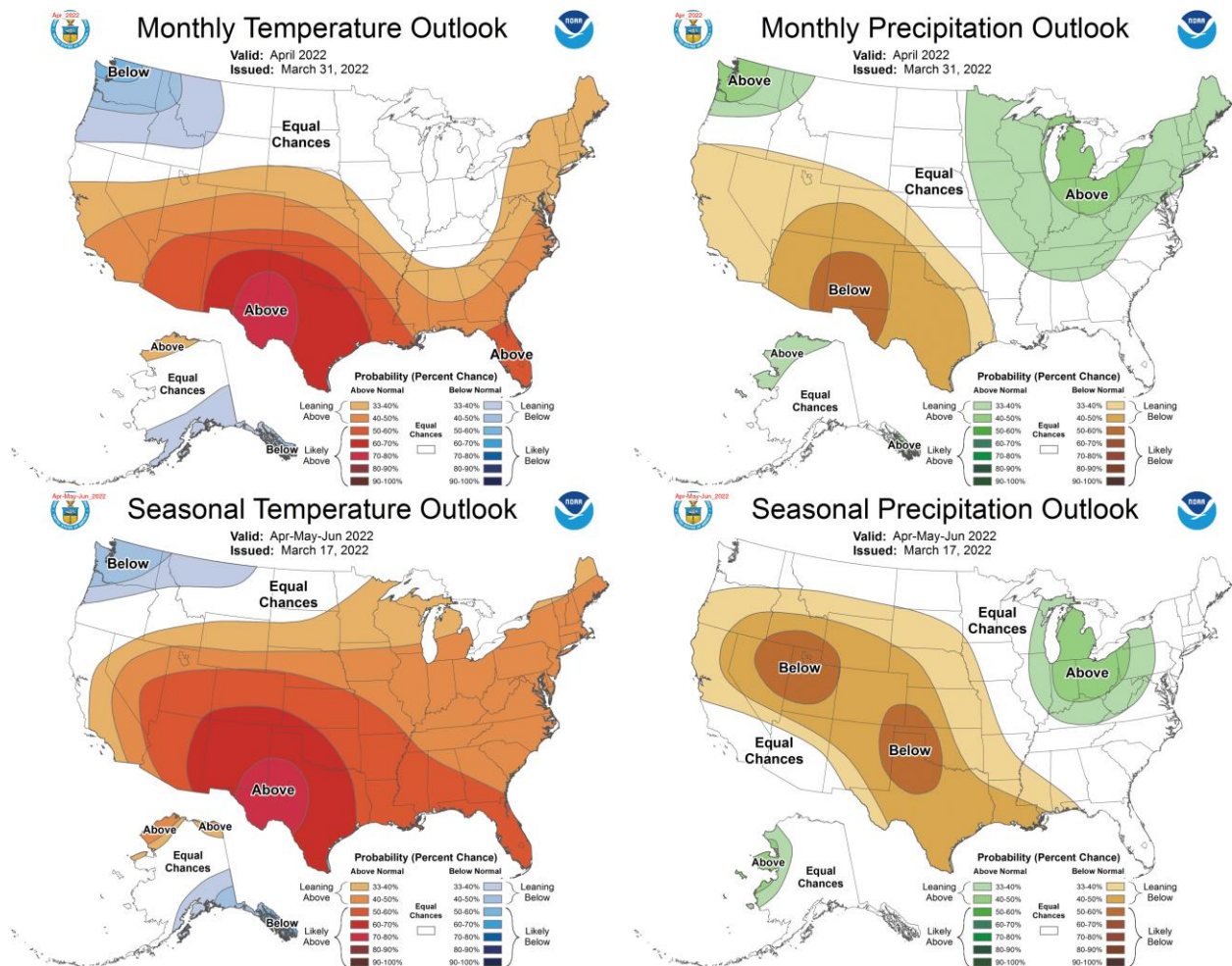


Figure 5 – Temperature (left panel) and precipitation (right panel) outlooks for the month of April (top panel) and April, May, and June (bottom panel) (Climate Prediction Center, climate.gov).

Gregory V. Jones, Ph.D.
CEO, Abacela Vineyards and Winery
TEL: 541-324-9269
EMAIL: greg@abacela.com

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