

Nevada Drought Update - February 2023

Drafted February 2, 2023

Prepared by K. Rhodes, Nevada State Climate Office

Drought conditions have improved in Nevada where many counties are no longer in D2-Severe Drought Status. As a result, many Nevada counties are now under "Drought Watch" instead of "Drought Alert" status.

Current drought conditions in Nevada and across the West

Drought improvement continued throughout January. Roughly 19% of the state remains in D3-Extreme drought, and we are closing in on six months with no D4-Exceptional Drought in Nevada (Fig. 1, Table 1). That is an improvement upon this time last year, when 7.5% of the state was experiencing D4-Exceptional Drought. Since December 27, 2022, D3-Extreme Drought has improved in areas of 14 Nevada counties. Several counties are now entirely in D1-Moderate Drought.

Across the western U.S., D1-Moderate Drought and D2-Severe Drought now dominate most areas of Nevada, California, and Utah. Patches of D3-Extreme Drought persist in some parts of Nevada, Utah, eastern Oregon, and northern Montana. The Pacific Northwest, the Rocky Mountains, and most of Arizona and New Mexico are drought-free or D0-Abnormally Dry.

Over the last month, drought conditions have mostly improved or remained unchanged across the West, with one-class improvements in almost all areas (Fig. 2). Worsening conditions in eastern Colorado that were mentioned in last month's report seem to have reversed course. Parts of California saw up to 3-class improvements, and 1 - 2 class improvements were widespread.

Date	2/2/22	9/27/22	1/3/23	1/31/23
None	0.0	0.0	0.0	0.0
Abnormally Dry-D0	0.0	0.0	0.0	0.0
Moderate Drought-D1	33.2	0.48	21.5	37.5
Severe Drought-D2	44.9	53.6	54	43.9
Extreme Drought-D3	14.3	45.8	24.5	18.5
Exceptional Drought-D4	7.5	0.0	0.0	0.0

Table 1. Percent of Nevada in each drought class from the [US Drought Monitor](https://droughtmonitor.unl.edu).

U.S. Drought Monitor Western U.S.

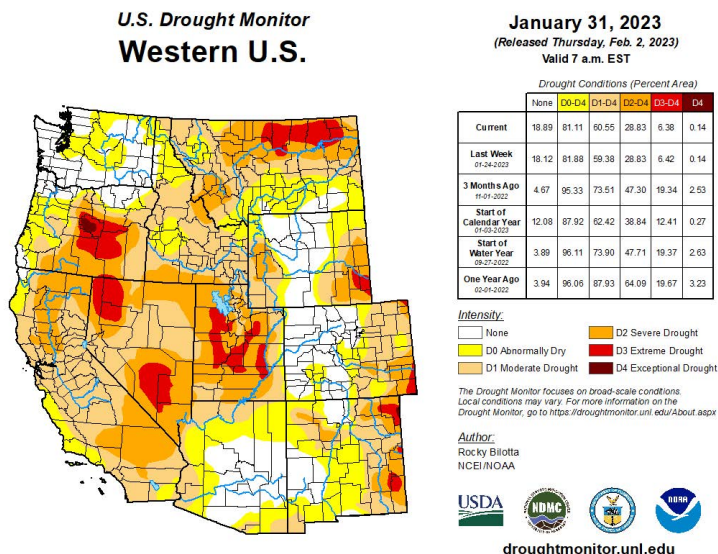


Fig. 1. Drought Monitor map for the western US, released on February 2, 2023, reflecting conditions as of January 31, 2023.

U.S. Drought Monitor Class Change - West 4 Week

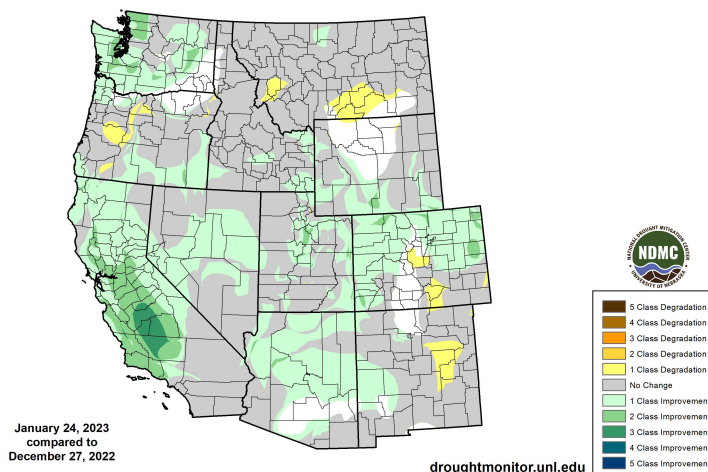
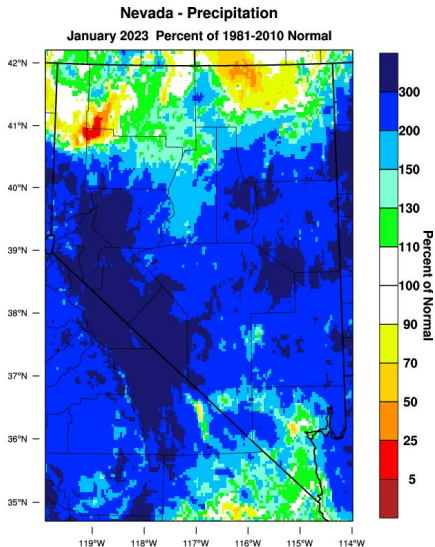


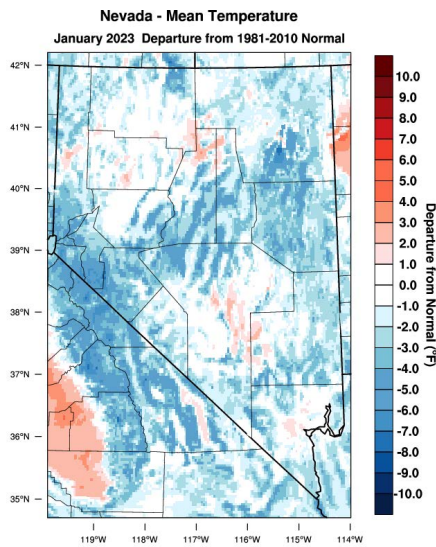
Fig. 2. Drought Monitor change map showing places where drought conditions improved (green) or worsened (yellow to brown) between late December 2022 and late January 2023.

January Temperature, Precipitation & Snowpack



WestWide Drought Tracker, U Idaho/WRCR Data Source: PRISM (Prelim), created 2 FEB 2023

Fig. 3. Percent of average (1981-2010) January precipitation in 2023. PRISM from [Westwide Drought Tracker](#).



WestWide Drought Tracker, U Idaho/WRCR Data Source: PRISM (Prelim), created 2 FEB 2023

Fig. 4. Difference from average (1981-2010) January temperature (°F) in 2023. PRISM from [Westwide Drought Tracker](#).

The start of the new year brought cold, wet weather to most of the state (Fig. 3, Fig. 4). The series of storms we saw in December continued into January and brought some areas of central and western Nevada up to more than 300% of normal precipitation. Small areas of northern Nevada appeared drier than normal, but sparse data has raised questions about precipitation amounts. January brought cooler than normal days and nights to most of the state, especially in Reno and the Carson City area (Fig. 4) where temperatures were several degrees below normal.

Snowpack across the western U.S. is looking good. Most areas have normal to above normal snow. Snowpack in the Upper Colorado River basin is reasonable, at 90 - 155% or normal. The snowpack that developed in southern Nevada in December remains, as most of the area is above 200% of normal (Fig. 5). While there is some variability in snowpack across parts of the West, Nevada's snowpack is generally well above normal, as is reflected in the state's modest improvement in drought conditions. In the Upper Humboldt River, Clover Valley and Franklin River, and the Eastern Nevada Basins, the snowpack is well over 200% of the February 2, 2022 snowpack.

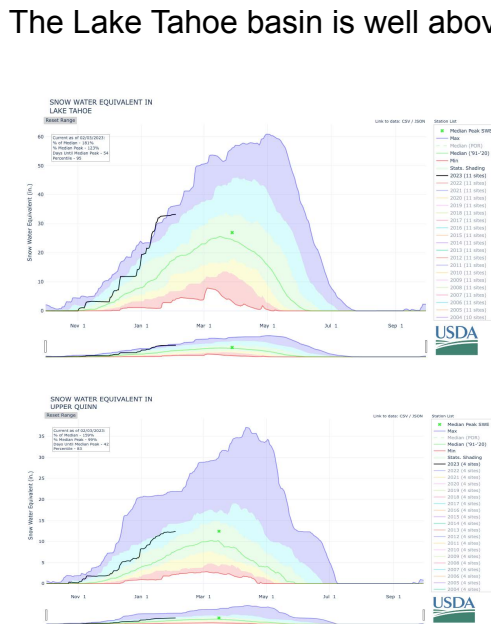


Fig. 6. Snowpack in Lake Tahoe and Upper Quinn basins. Black line represents current levels, green is the median from 1991 - 2020, and red line is the minimum. [Natural Resources Conservation Service](#).

The Lake Tahoe basin is well above its median snowpack for this time of year, but other basins are slightly less dramatic and more closely following their median snowpack, like the Upper Quinn basin in the Humboldt (Fig. 6). Lots of early season snow doesn't always set us up for a snowy spring. Temperature and precipitation outlooks for the coming spring months (see page 4!) don't give us a confident prediction of either warm/dry or cool/wet conditions, but in many the basins

the current snowpack is already at or above the median peak snow water equivalent (the little green x's) which normally happens in late March or early April. That is a very promising sign for the coming season.

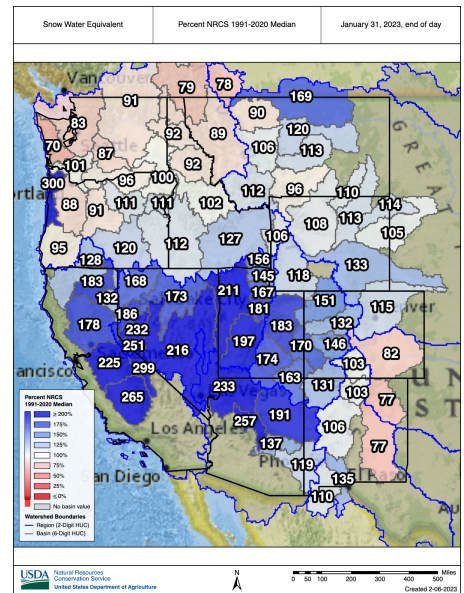


Fig. 5. January 31, 2023 snowpack in western U.S. [Natural Resources Conservation Service](#).

Soil Moisture

Wet storms in western Nevada left both top and subsoils wetter than normal by late January (Fig. 7). Unlike last month where wet surface soils overlaid drier subsoils in some areas, topsoil and subsoils are more uniform now, with some areas of dry topsoils overlying moister subsoils in parts of southern and northern Nevada (Fig. 7).

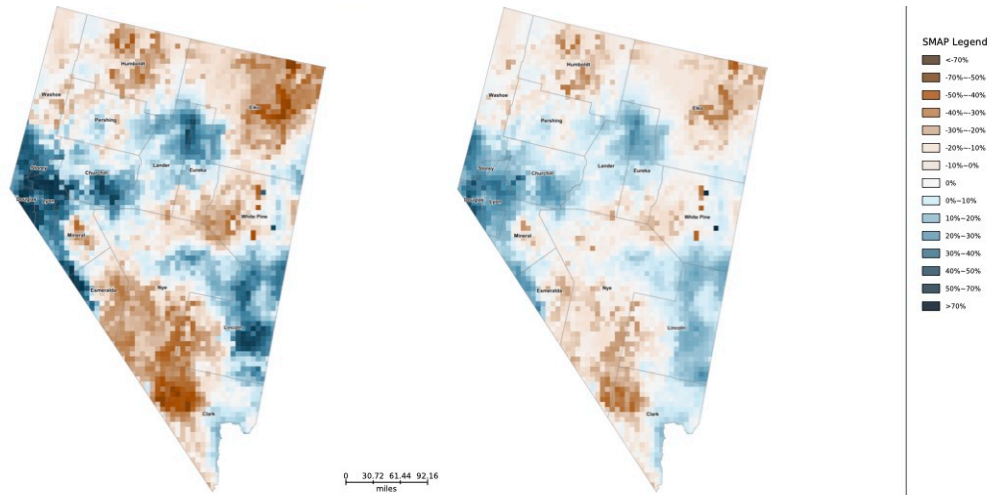


Fig. 7. Topsoil (left) and subsoil (right) moisture anomalies from 9km SMAP for January 29, 2023. Maps from [Crop-CASMA](#).

Water Resources

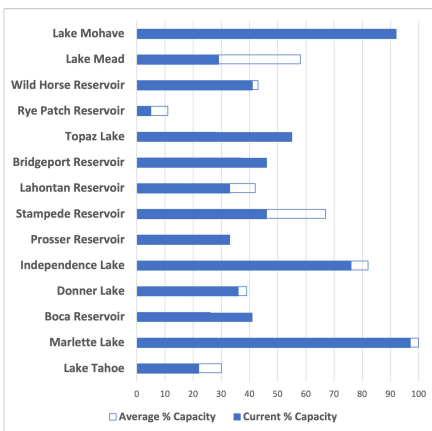


Fig. 8. Current and average percent capacity in Nevada's reservoirs at the end of January 2023. No data available for current % capacity of Lahontan Reservoir. Data from the [Natural Resources Conservation Service](#).

Wet winter conditions seem to have brought most Nevada reservoirs close to or above their average percent capacity (Fig. 8). Some notable exceptions include Stampede Reservoir where water levels have some catching up to do. Despite lots of stormy weather in the area, Lake Tahoe still sits a bit shy of normal water levels. Then, of course, there's Lake Mead.

Across Nevada, January streamflow was still somewhat variable but many sites experienced normal to much above normal streamflow (Fig. 9). The Sloan Channel gage near Las Vegas was the only site to record exceptionally high streamflow (block dot, Fig. 9).

The 24-month Lake Mead study continues to suggest that returning lake levels to normal conditions any time soon is highly unlikely. Under the most likely scenario, water levels will fall just to 1,025' by this summer, but we can hold on to some hope that perhaps levels will follow the Maximum Probable inflow scenario and stay near its current elevation of 1,045 feet (Fig. 10).

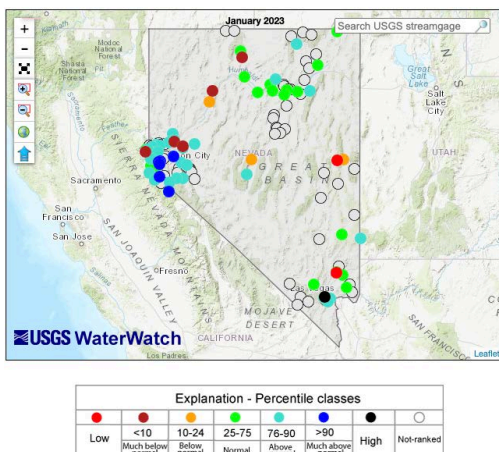


Fig. 9. January average stream flow relative to usual conditions. From [USGS Water Watch](#). More information on [percentile classes from the USGS](#).

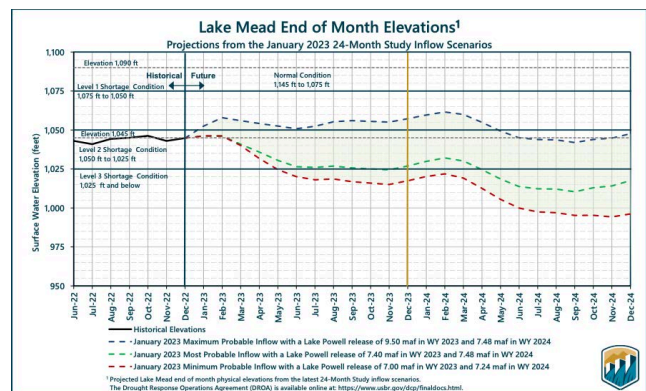


Fig. 10. Projected Lake Mead elevations from the [Bureau of Reclamation's](#) December 24-month study.

Looking forward

Wet weather across most of Nevada over the last month has brought many parts of the state to above normal precipitation levels for the 2023 water-year-to-date. Clark county remains the exception, however, as the area mostly remains normal or drier than normal (Fig. 11).

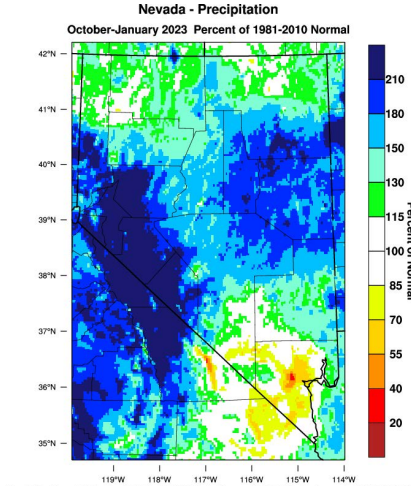


Fig. 11. Percent of average (1981-2010) October 2022 - January 2023 precipitation. PRISM from [Westwide Drought Tracker](#).

Despite what has been a wet winter so far, precipitation in Nevada is expected to be below normal later this week (February 8-12), but has a 33-50% chance of leaning above normal the following week (February 10-16, Fig. 13).

The Climate Prediction Center expects a [transition from La Niña conditions to ENSO-neutral conditions](#) over the next three months. By late spring, they expect a 82% chance of neutral conditions, meaning near-normal conditions are more likely.

The three-month outlook for Nevada suggests mostly equal chances of normal, wet or dry conditions over most of the state February - April (Fig. 14). Regionally speaking, Arizona and New Mexico have higher probability of leaning above normal temperatures, while the Pacific Northwest as well as Montana and Idaho have higher probability of leaning below normal temperatures.

The seasonal drought outlook for February - April looks slightly less optimistic compared to last month's prediction. The precipitation outlook is pointing towards equal chances of wet or dry conditions, so it will be a roll of the dice to see how spring conditions shape up. While drought isn't expected to improve in Nevada, conditions in other parts of the West, notably central and northern California, could improve.

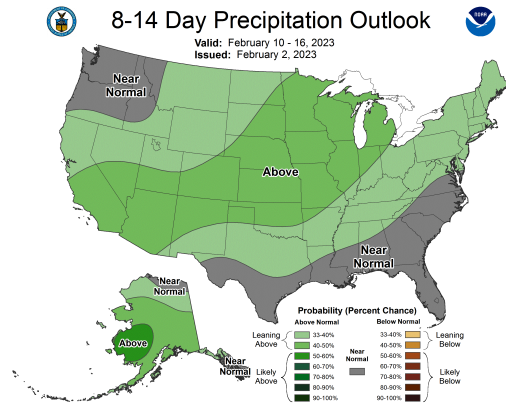


Fig. 13. Early to mid-February precipitation outlook. From the [Climate Prediction Center](#).

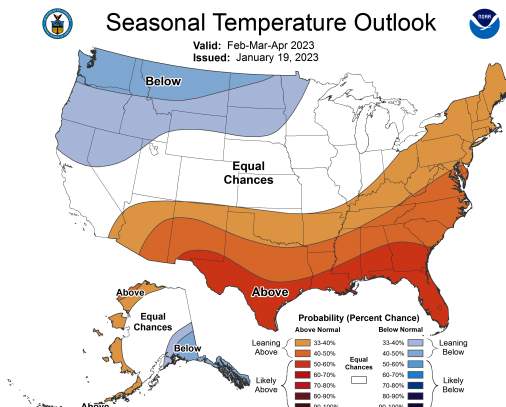
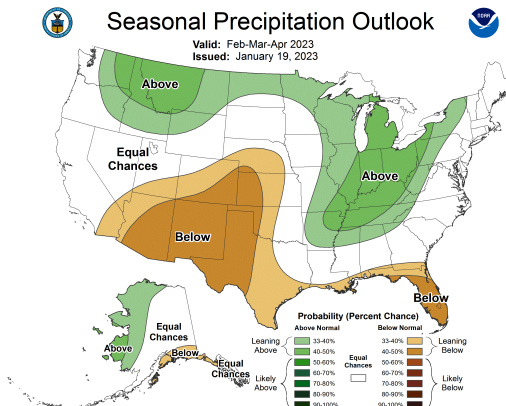


Fig. 14. Precipitation (top) and temperature (bottom) outlooks for February - April. From the [Climate Prediction Center](#).

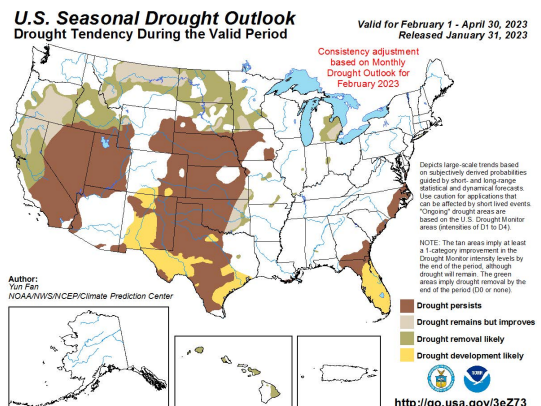


Fig. 15. February - April Drought Outlook. From the [Climate Prediction Center](#).