Monthly Climate Report

NWS Reno

Issued: 01/08/2024

Includes previous Drought update (DGT) and Hydro Report (E5)

Synopsis:

December 2022 was generally a mild month with temperatures about 3-4 degrees above average (Figure 1). Precipitation was below average across the region, with only a few weaker weather systems scattered through the month (Figure 2). The bulk of December's precipitation and high elevation snowfall occurred with two storm systems on the 6th-7th and 18th-19th. While the majority of the lower elevations did not see a white Christmas, a weak upper disturbance brought between ½" and 2" of snow overnight into early Christmas morning to portions of Lassen County including Susanville, and west central NV including Fallon.

At month's end, the basin average Sierra snowpack was only 40-45% of average--a stark contrast to the same date a year ago, when Sierra snowpack basin averages were around 200% of average. No snow cover was reported at any Snotel measuring sites below 6500 feet in the Truckee, Tahoe, and Carson basins and below 8000 feet in the Walker basin as of December 31, while the Reno Airport has not observed any snow (not even a trace) so far in this winter season.

Weather Events:

The first weather system to start the month was relatively weak in terms of precipitation with only 1-4" snow for the Sierra and Tahoe basin, but it did produce peak wind gusts around 60 mph in the Surprise Valley, and 54 mph at the Reno Airport on the 2nd.

The December 6-7 storm was the biggest snow producer of the month, but even this system was not very strong by Sierra standards (Photos 1-3). Storm totals were generally between 9-18" above 7000 feet around the Tahoe basin, with 2-6" in the lower elevations and also southward into Mono County. Most areas also saw their peak winds of the month with this storm, with gusts of 50-65 mph across several locations in western NV and eastern CA, with 75-100 mph gusts in the Sierra ridges.

The December 18-19 storm arrived with higher snow levels, but the prevailing inversion lingered into the morning of the 18th, producing patchy light freezing rain in parts of northeast CA and far northwest NV. Warmer air arrived during the day, and two rounds of precipitation with this storm produced liquid amounts of 0.40-0.70" across the main urban areas of far western NV, with 1" or more for the Sierra and parts of northeast CA. Snowfall in the Sierra was generally between 4-8" above 7000 feet with a few sites receiving over 1 foot, while less than 2" fell below 7000 feet.

In between these storms, valley inversions were common with light winds and areas of fog/freezing fog. Some of the fog was dense even in western NV valleys in the days after the December 18-19 storm, halting flight operations at the Reno Airport for several hours on the morning of the 22nd (Photo 4).

A few weak disturbances closed out the month, including areas of light snow (½" to 2") across parts of northeast CA-west central NV on Christmas Eve, and additional rounds of minimal precipitation on the 27th and 30th. This more progressive pattern weakened the valley inversions, allowing for temperatures to warm up into the lower 60s in some valley sites on the 27th and 29th.

Hydrology:

December was a relatively benign month for hydrology, with no flooding and limited precipitation. Streamflows in the area are still near to above normal thanks largely to the wet 2023 water year (Figure 3). Water year-to-date flows are still above average on most of the Carson, Walker, and Humboldt. Even the lower Humboldt near Imlay has continued to see above-average streamflow, a nice contrast to the zero flow experienced much of last fall and winter. The observed water year flow to date on the Humboldt near Imlay exceeded the combined 2021 and 2022 water year total volumes by late December! Soil moisture as measured by the NRCS SNOTEL remains slightly above normal in the Tahoe, Truckee, Carson, and Walker combined basins (Figure 4), and near the 70th percentile in the Humboldt Basin. The generally warm and dry conditions so far this water year have resulted in well below normal snowpack throughout the region, most notably in the watershed draining the Sierra into Nevada (Figure 5). As of early January the combined Tahoe, Truckee, Carson, and Walker basins reported below the 15th percentile by the NRCS SNOTEL network. (Figure 6). Only a couple of past years with similarly low early-season snowpacks met or exceeded the seasonal median SWE (Figure 7). Figure 7 paints a slightly more optimistic picture by projecting past year changes in snow water equivalent (SWE) from early January onto the current conditions resulting in a ~30% chance of meeting or exceeding the median water year peak for SWE. Fortunately, more active weather is anticipated through mid-January, which is likely to improve the snowpack and water supply conditions. End of December reservoir storage is still well above normal in major reservoirs throughout the area (Figure 8).

Drought Update:

The current 2023-24' water year is off to a dry, warm start across the region (Figure 9). As of the end of December, much of western NV has only received 25-50% of average precipitation while northern Washoe County and northeast CA currently stand at 50-70% of normal precipitation. These precipitation deficits are similarly pronounced across the HSA since September, owing to a dry 2023 Fall. Additionally, the current water year temperatures range from near normal to around 2-3 degrees above normal for western NV, while the eastern Sierra and northeast CA have experienced temperatures between 3-4 degrees above average. The combination of above average temperatures and below average precipitation has led to a "snow drought" in the Sierra explained in the hydrology section above. Despite the dry water year, other long-term drought indicators such as water storage, soil moisture, and stream flows are still in good shape. The drought monitor (Figure 10) still shows no drought currently across the region.

Additional Information on Drought and Climate:

[Report Drought conditions here]
[Nevada statewide Drought update]
[NV Living with Drought]
[Drought Monitor]
[New Drought.gov]
[California Nevada Drought Early Warning System]
[NOAA CPC Drought page]
[CNAP Drought tracker]
[California Nevada River Forecast Center]
[WRCC Drought Tracker]
[WRCC Enso page]
[WRCC Monthly Climate Summaries]
[Evaporative Demand Drought Index]
[US Seasonal Drought Outlook]

Contact NWS Reno Climate Team
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https://www.weather.gov/rev/

Photos:

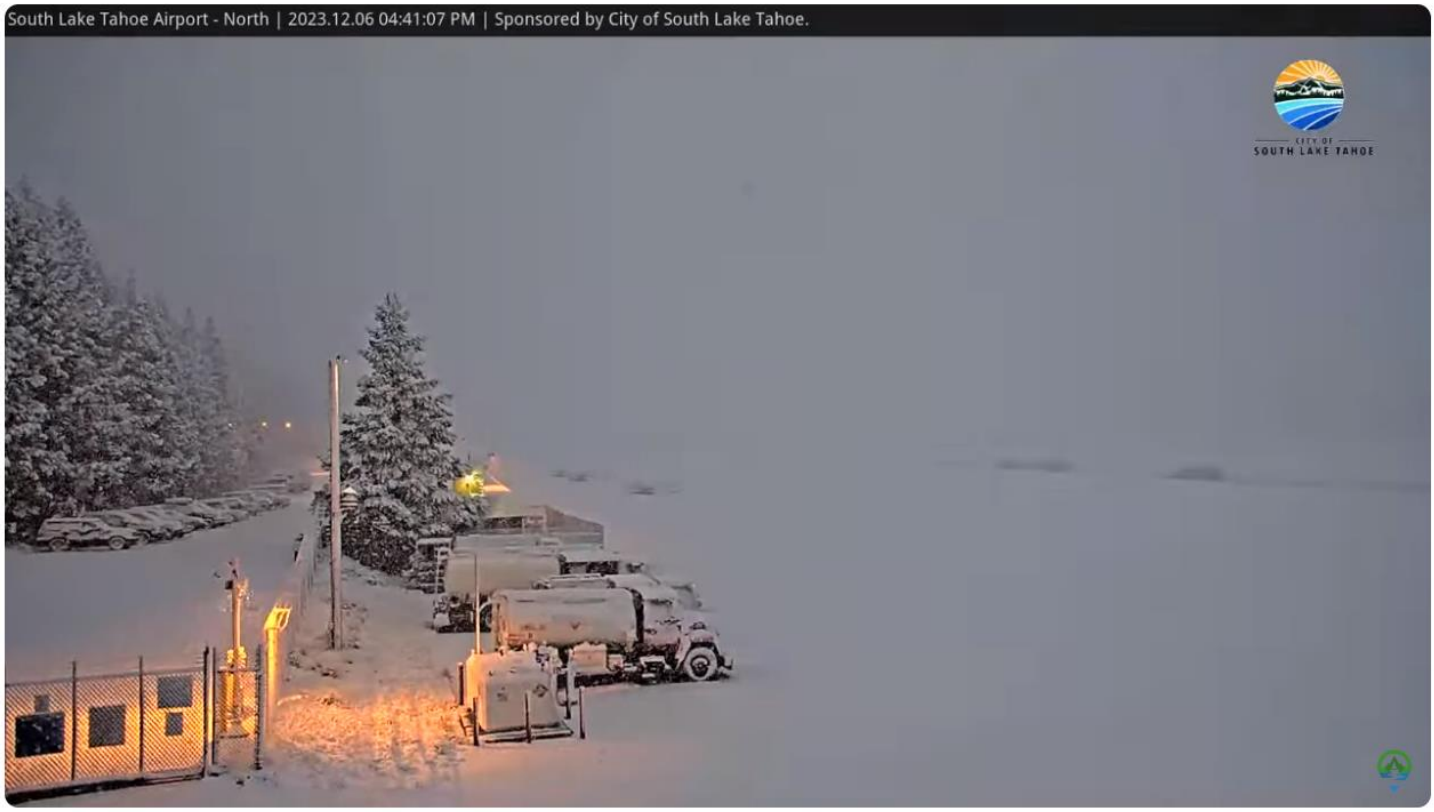

Photo 1: South Lake Tahoe airport snowfall on 12/6. Courtesy City of South Lake Tahoe.

Photo 2:: Snowfall on 12/6 along Mount Rose Highway. Image courtesy of NV Department of Transportation.

Photo 3: Snowfall on 12/6 along US-50. Image courtesy of NV Department of Transportation.

Photo 4: Dense fog in Truckee Meadows on the 22nd. Image courtesy of NWS Reno.

Figures:

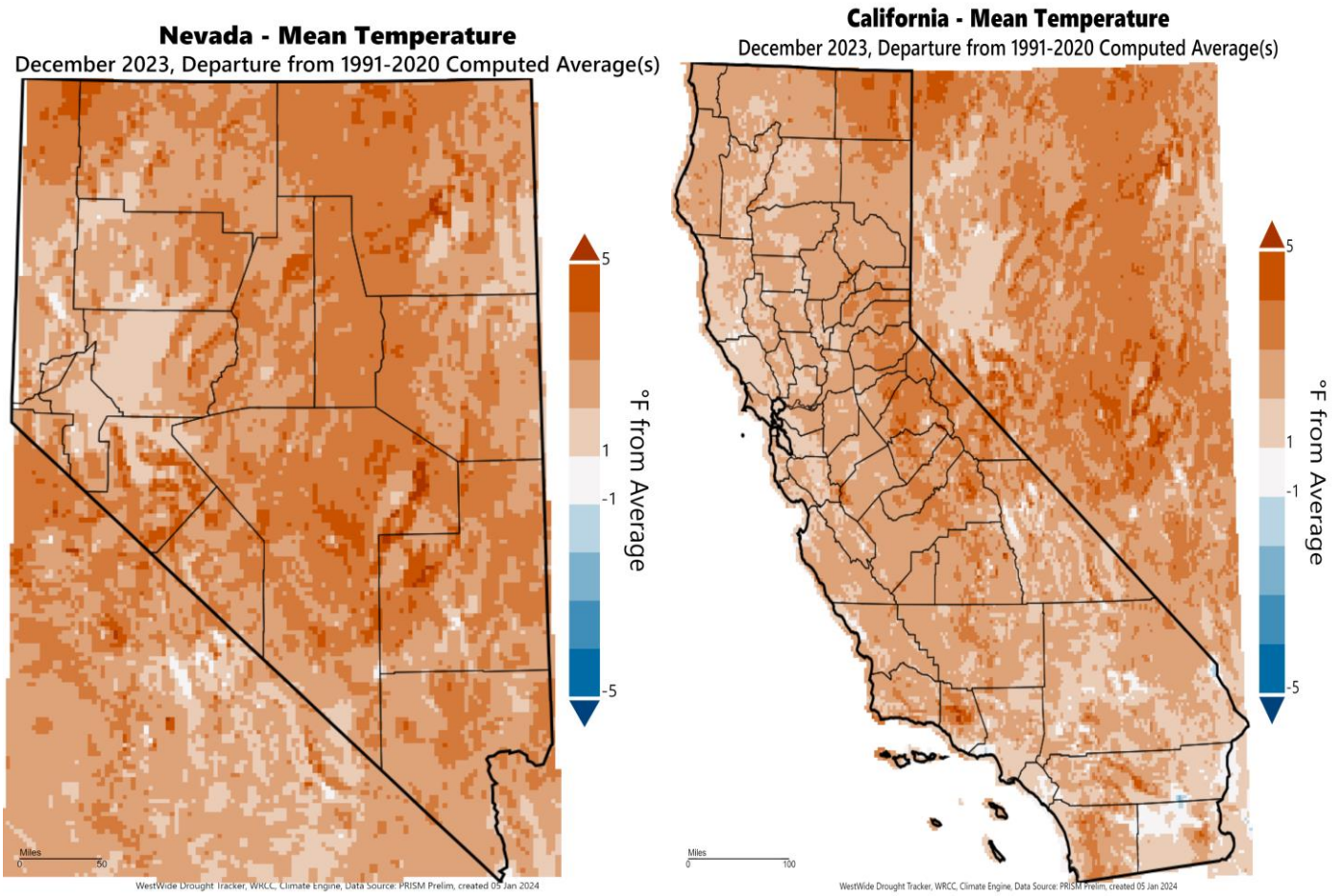

Figure 1: Nevada (left) and California (right) departure from normal temperatures for December 2023. Data courtesy of WestWide Drought Tracker. (WWDT)

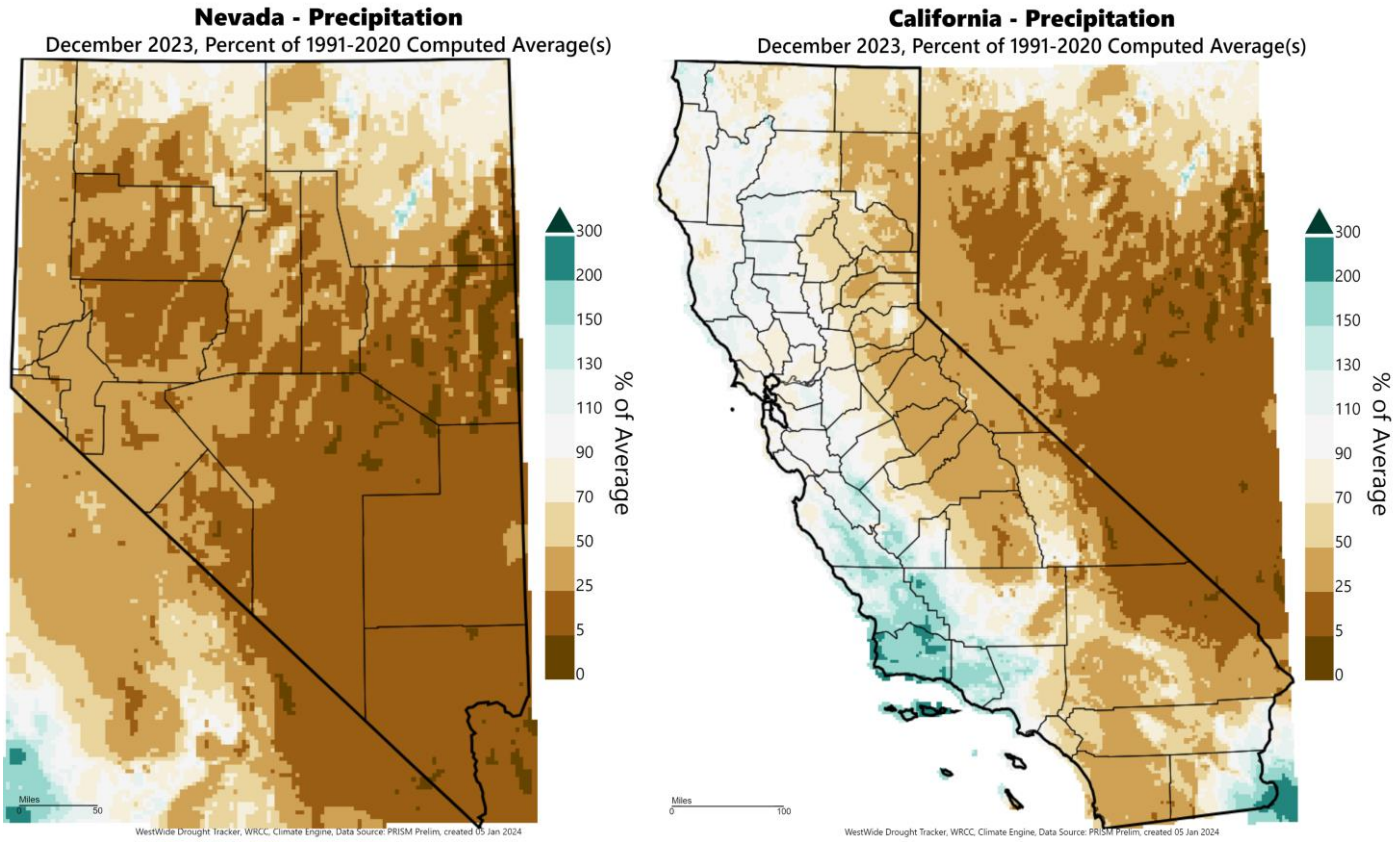

Figure 2: Nevada (left) and California (right) percent of normal precipitation for December 2023. Data courtesy of WestWide Drought Tracker. (WWDT)

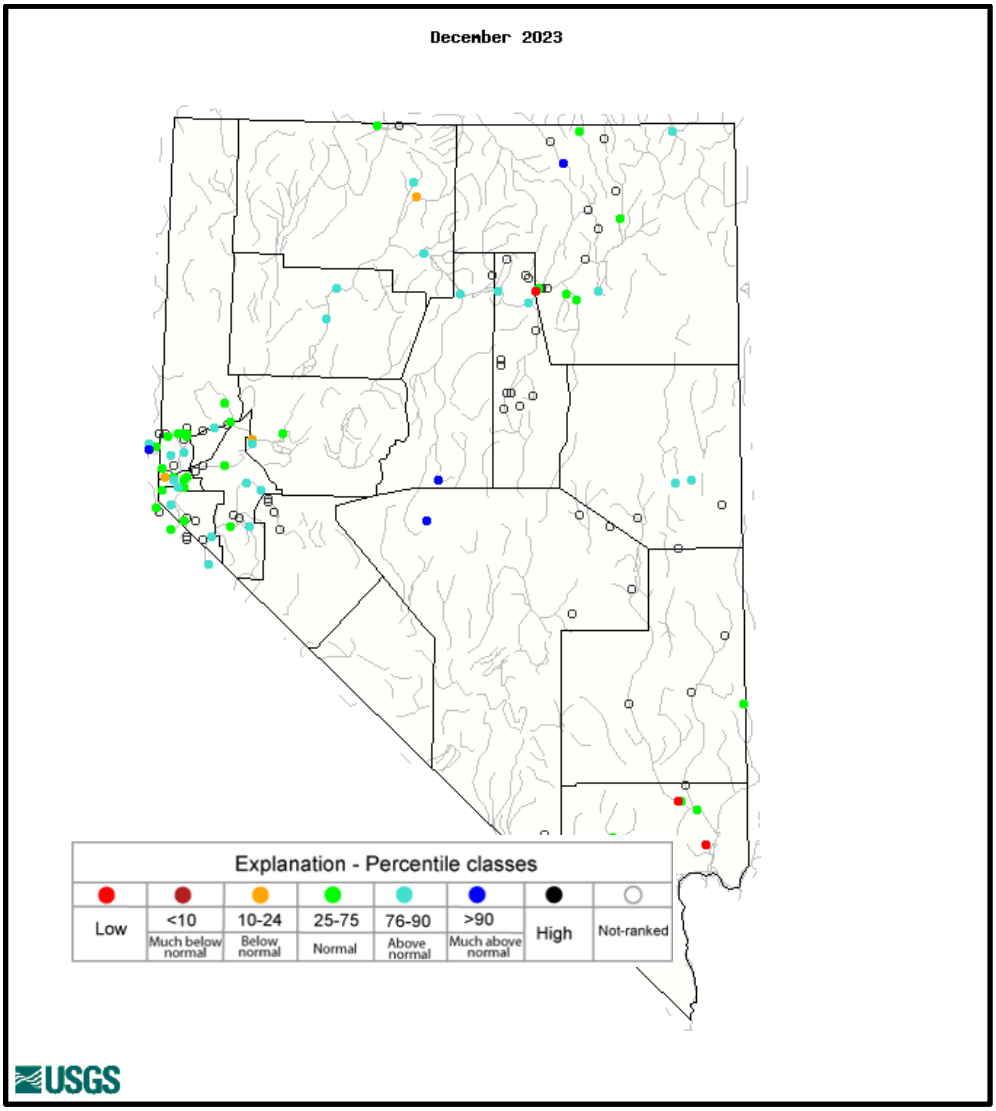

Figure 3: December Monthly USGS streamflow Note, the only red dot in western NV is the Truckee Canal which is closed for construction.

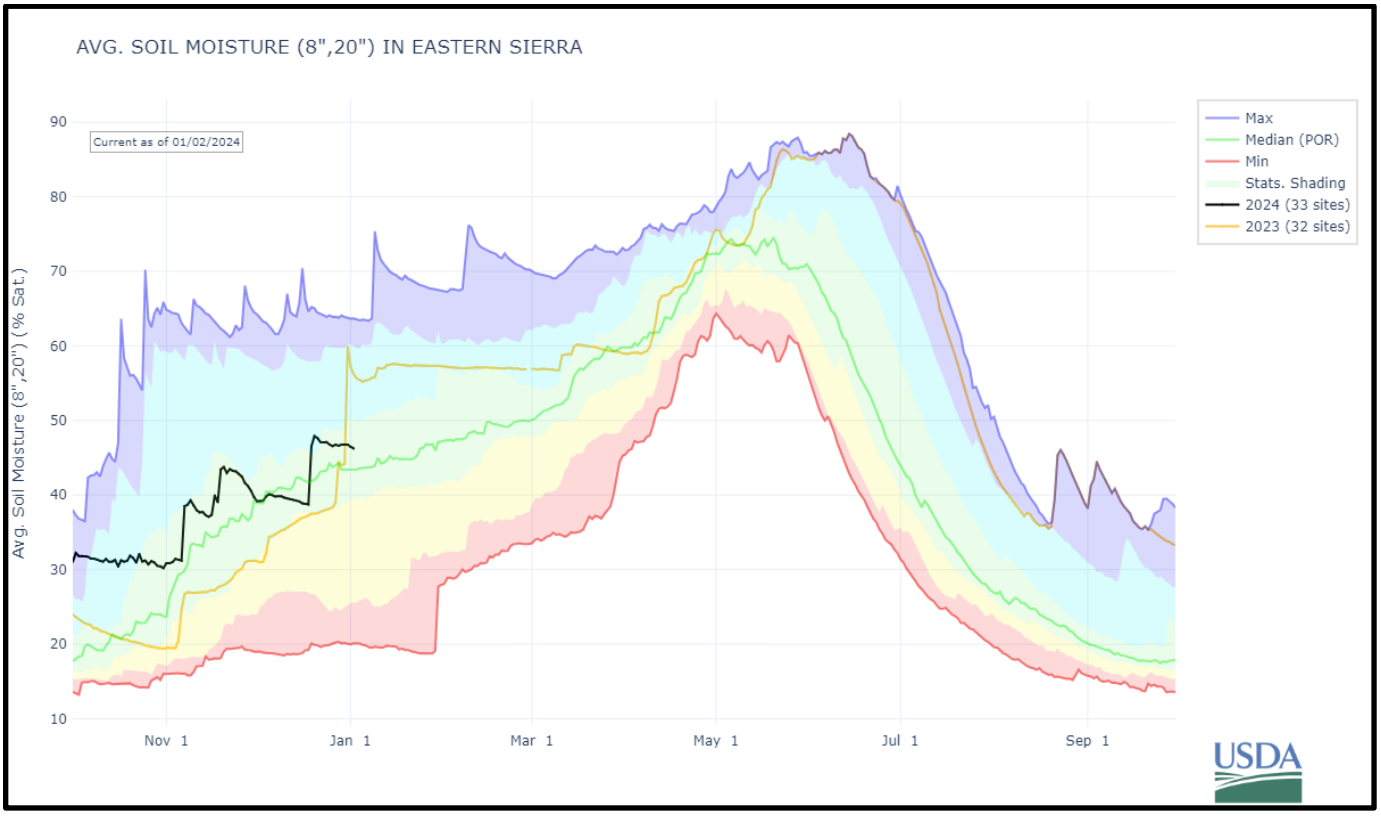

Figure 4: NRCS SNOTEL soil moisture for the combined Tahoe, Truckee, Carson and Walker basins indicated in dark black for water year 2024. Water years 2023 and 2017 are plotted in orange and purple for additional perspective.

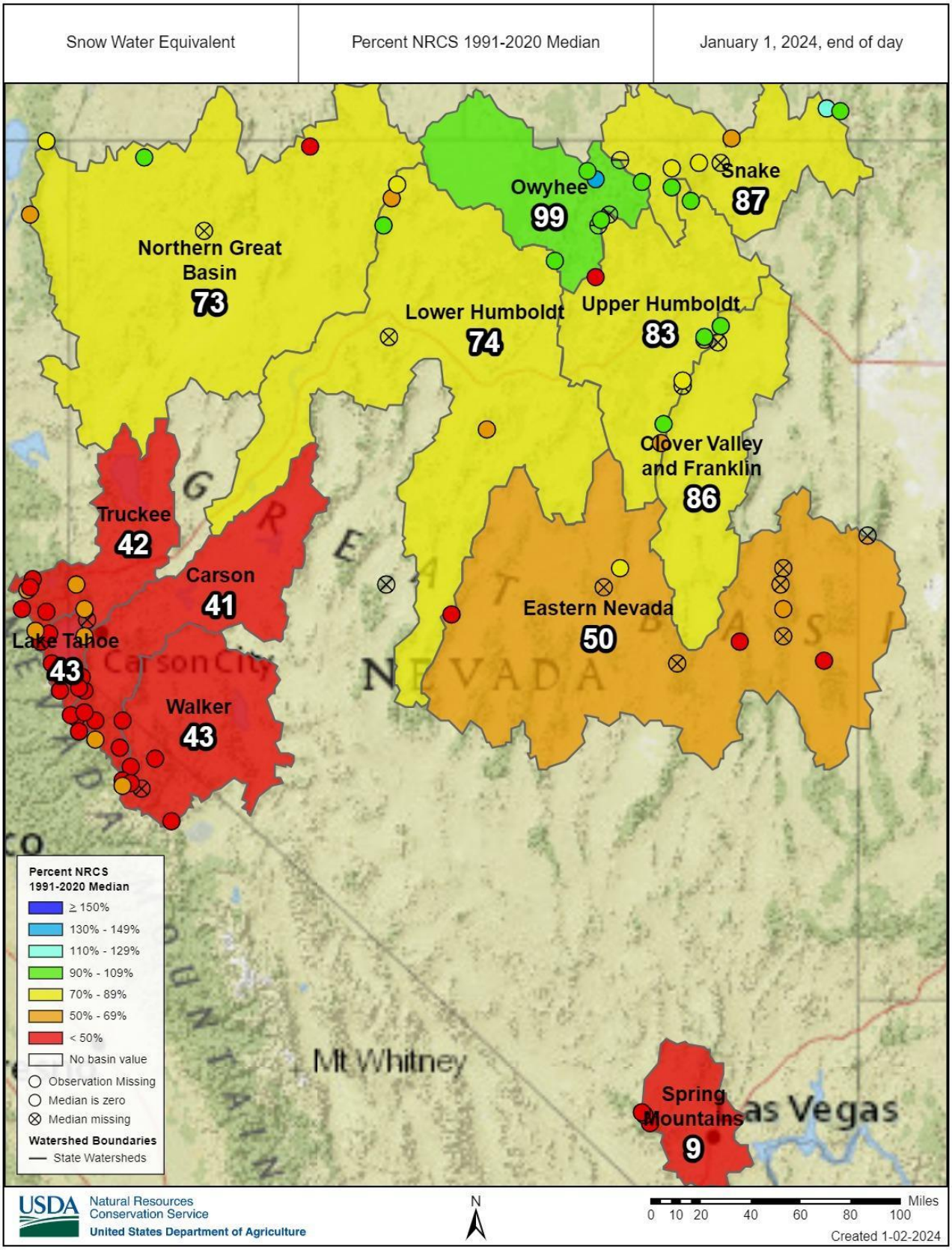

Figure 5: NRCS SNOTEL basin snow water equivalent as percent of median for 01/02/24.

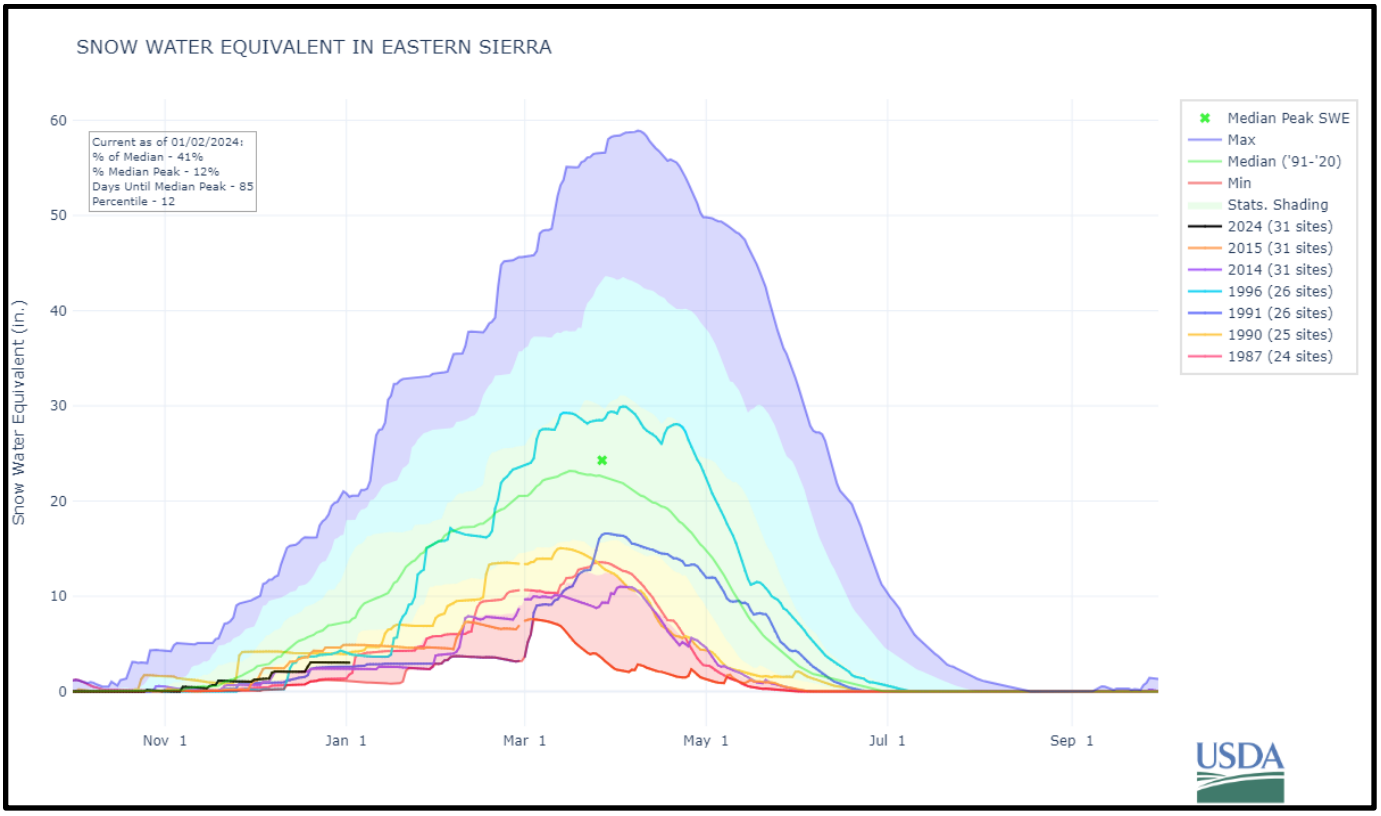

Figure 6: NRCS SNOTEL snow water equivalent (SWE) for the combined Tahoe, Truckee, Carson and Walker basins indicated in dark black for water year 2024. Previous water years with similar low early season snowpack are plotted for additional perspective.

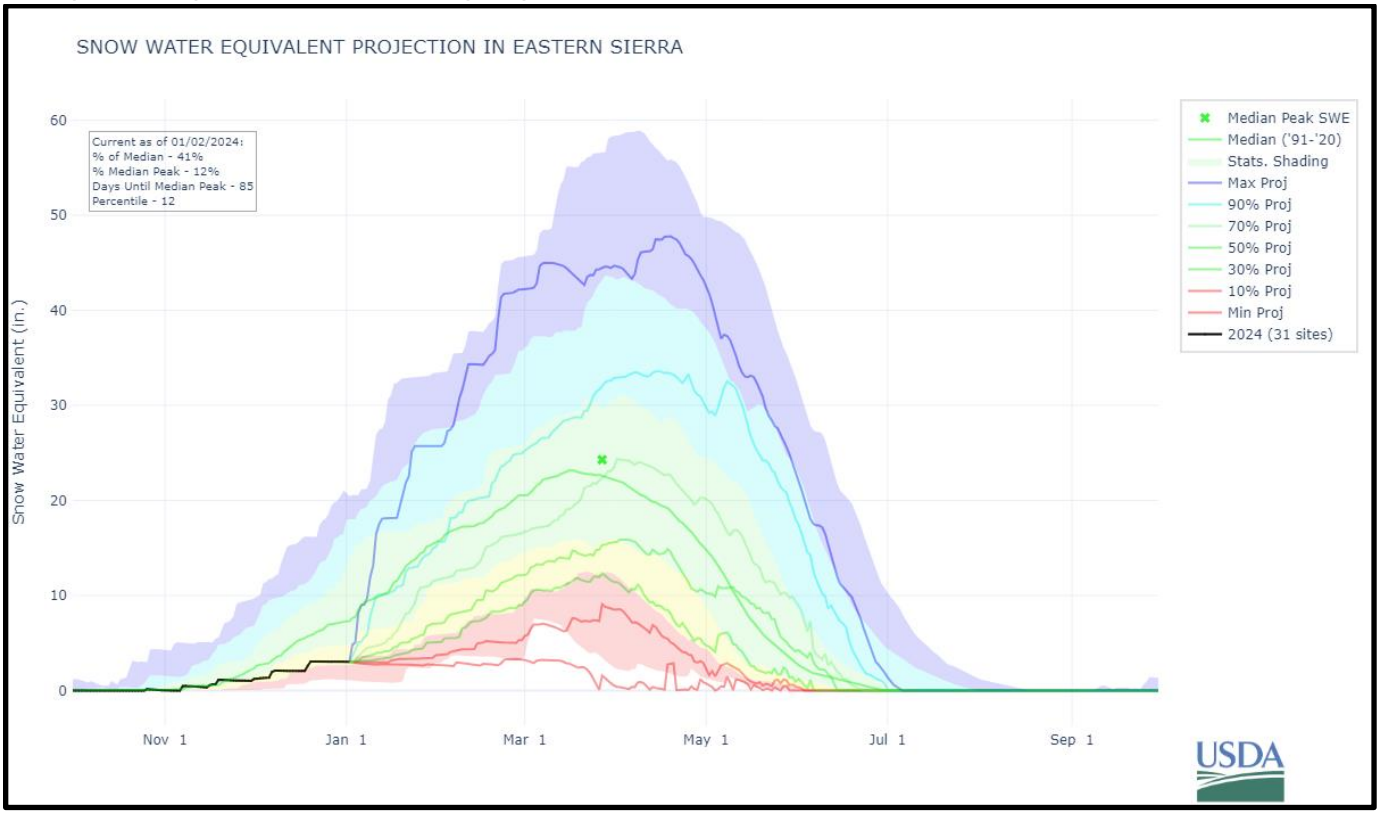

Figure 7. NRCS SNOTEL snow water equivalent (SWE) for the combined Tahoe, Truckee, Carson and Walker basins indicated in dark black for water year 2024, with the range of past observed SWE changes from early January on.

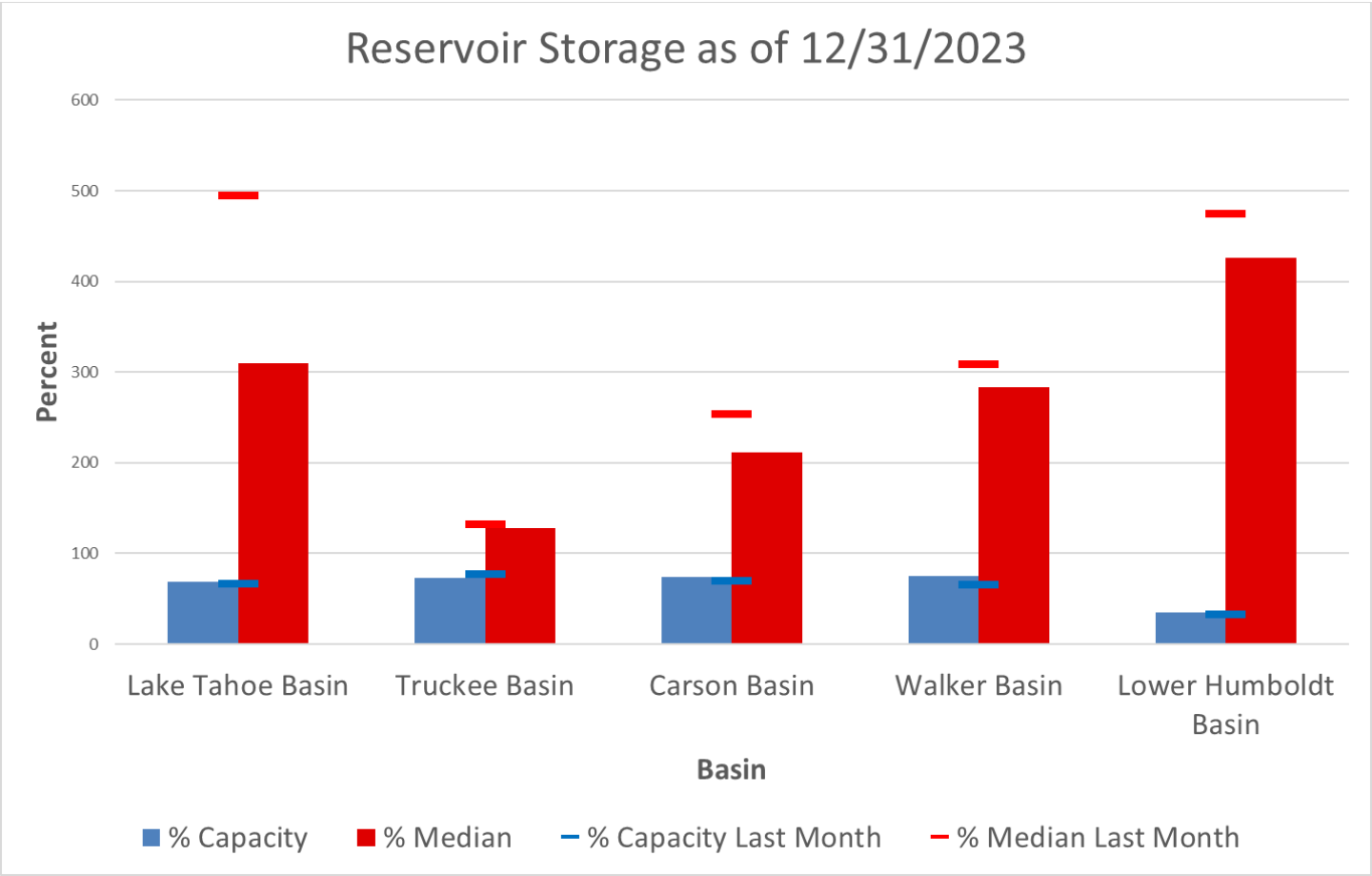

Figure 8: End of month reservoir storage relative to capacity and **median*** for this month and last month. (*note reference was recently update to NRCS 1991-2020 median values)

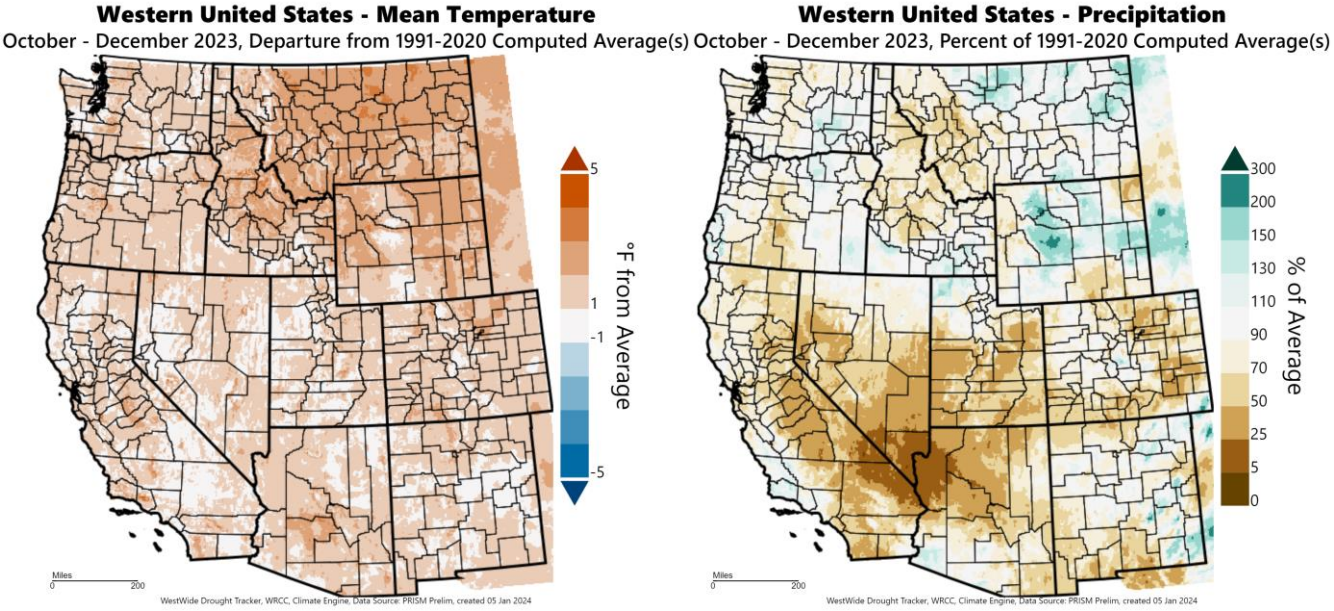

Figure 9: Current 2023-24' water year to date departure from normal temperature (left) and percent of normal precipitation (right). Data courtesy of WestWide Drought Tracker. (WWDT)

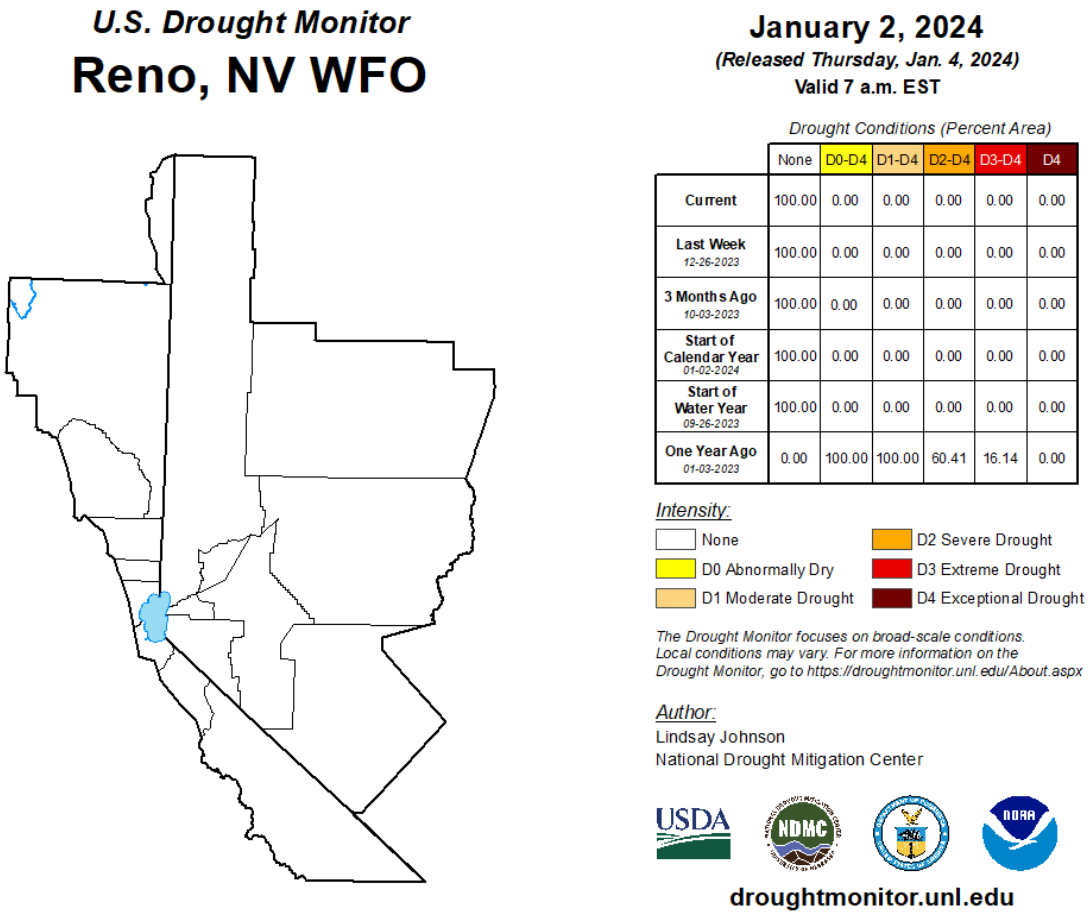

Figure 10: End of December Drought Monitor Status (no drought!) for NWS Reno Service area.(Drought Monitor).