Nevada Drought Update

Drafted: June 2-7, 2021
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Current drought conditions in Nevada and across the West

Currently, all of Nevada is in drought (Fig. 1). Just over 40% of the state, mostly in the south and east, is in D4 or Exceptional Drought and another almost 35% of the state is in D3 or Extreme Drought. These are the deepest drought categories shown in the Drought Monitor, and the occurrence of either during the growing season can trigger a FastTrack drought emergency declaration by the US Department of Agriculture. Roughly 18% of the state is in D2 or Severe Drought. Eight or more weeks of D2 drought during the growing season can also drive the USDA to issue a FastTrack drought emergency declaration. All of Nevada's counties have received a USDA Secretarial Disaster Designation for drought. The remaining 6% of the state is in D1 or Moderate drought. The relatively mild drought conditions are limited to northern Humboldt and Elko counties. Drought in Nevada is part of a larger drought stretching across much of the western United States. The Southwest, the northern Great Plains, California, Utah and western Colorado are all experiencing significant drought.

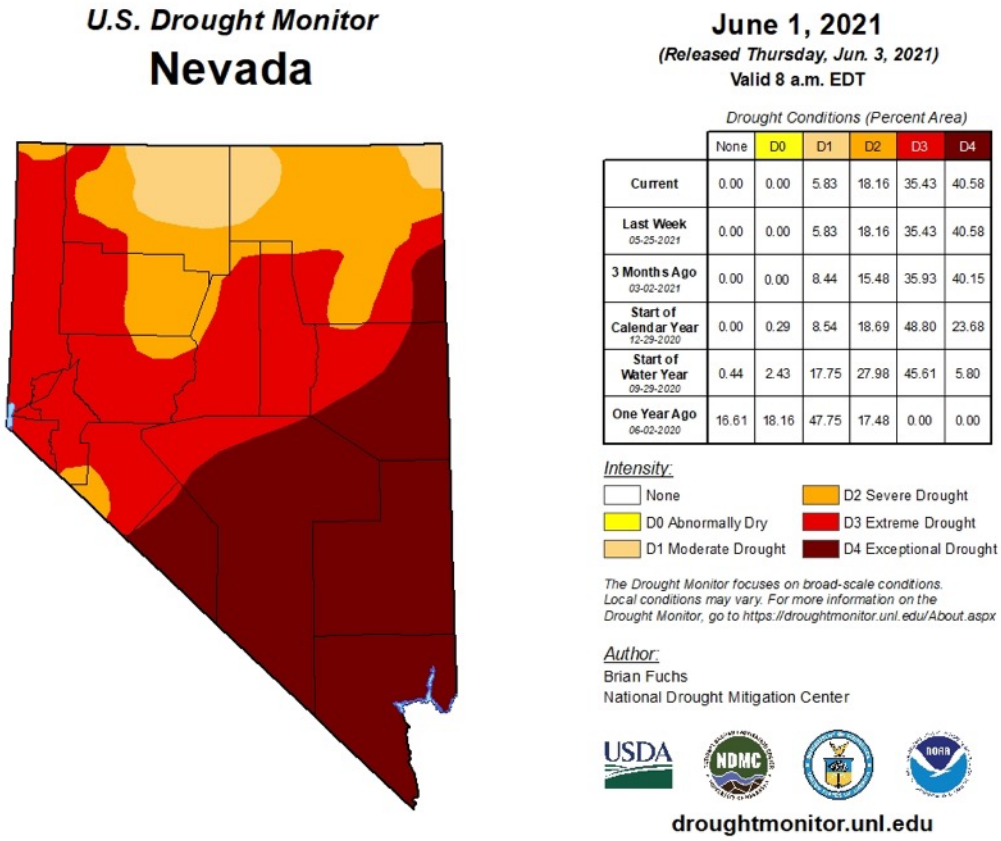

Figure 1. US Drought Monitor map released on June 3, 2021, reflecting conditions as of June 1, 2021.

About the US Drought Monitor

The US Drought Monitor tracks the extent and severity of drought in the United States. Experts across the country use weather and climate data, lake, stream, and reservoir levels, and information about the health of natural vegetation and crops to evaluate drought conditions and report on them weekly. It is the most comprehensive assessment of drought available in the United States. Despite its many strengths, the Drought Monitor does have one key drawback. It presents drought information as a single map each week, but not everyone experiences the same drought. For example, after a dry winter, streams and reservoirs will often be low, but if it rains in the spring, some vegetation can still grow well. S and L indicators on the Drought Monitor map show when there are differences between short- and long-term drought conditions, and the written narrative provides more information about drought characteristics, but there may still be situations where some sectors or individuals experience drought more or less intensely than the Drought Monitor shows.

Water Resource Conditions

Reservoirs

Currently most reservoirs in Nevada are near or below their usual capacity for this time of year (Fig. 2). Reservoir levels reflect both climatic conditions and management choices. The biggest news is that, by the end of May, Lake Mead had fallen to 1,073.5 feet, below the 1,075 foot elevation that triggers the implementation of shortage rules. The Natural Resources Conservation Service expects that more water will evaporate from Lake Tahoe than will flow into the lake during the coming months, so water levels might drop below the rim.

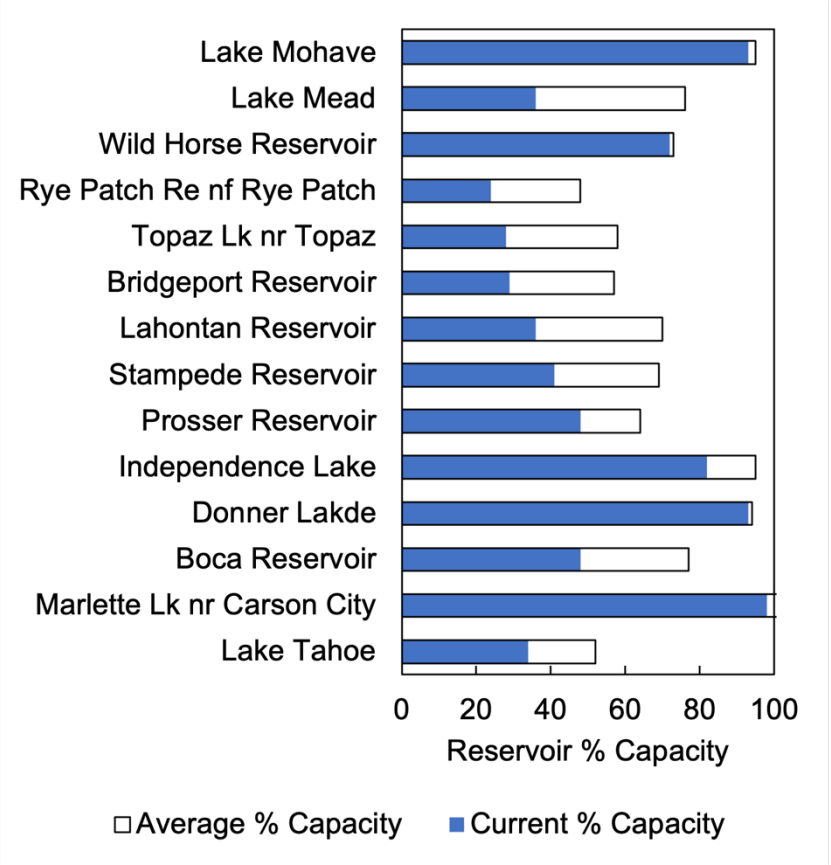

Figure 2. Reservoir data are current as of June 1, 2021. Average refers to 1981 - 2010. Source: https://www.wcc.nrcs.usda.gov/basin.html

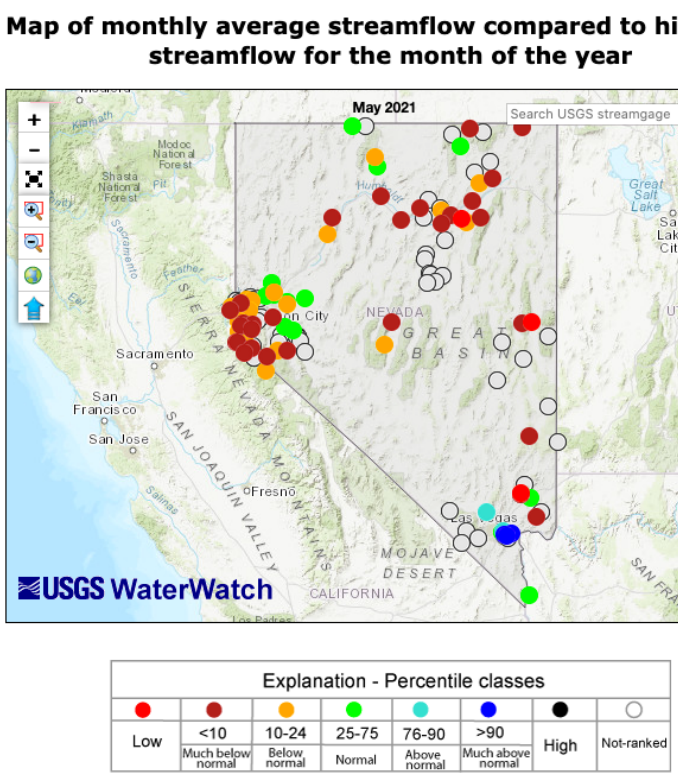

Figure 3. Average May stream flow relative to normal seasonal conditions.
Source: https://waterwatch.usgs.gov/index.php?id=mv01d&sid=w__gmap&r=nv

River and Streamflow

May streamflow was lower than normal at most gaged stations (Fig. 3). As reported by NWS Reno, stream gages below dams can report near-normal flow in dry years because of reservoir management.

Snowpack

By late May or early June, even high-elevation snowpack is usually low and waning. This year's snowpack, tracked by snow water equivalent (SWE), the amount of water stored in snow, is much lower than normal, about 10 % of the median (Fig. 4).

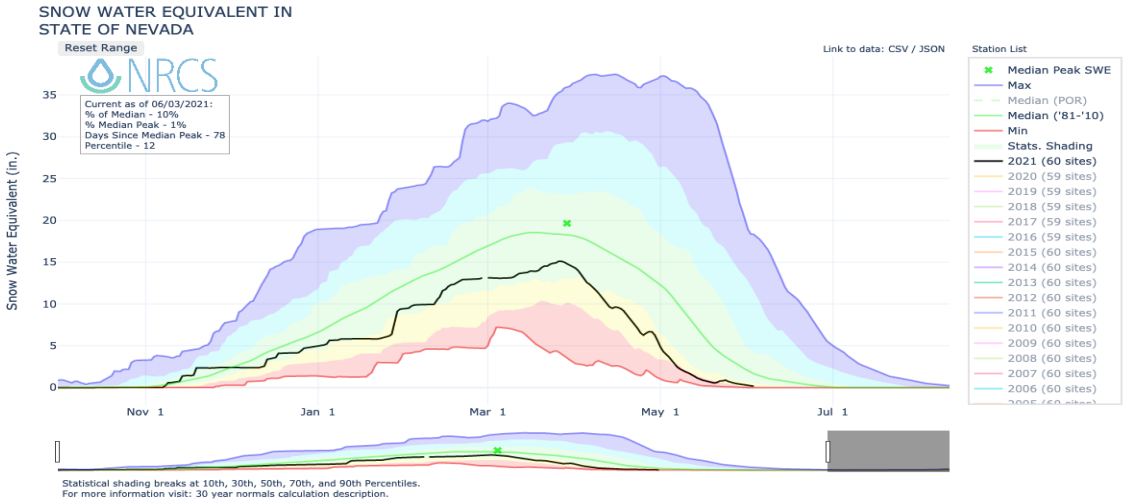

Figure 4. Snow water equivalent at SNOTEL stations in Nevada and the eastern Sierra Nevada as of June 3, 2021. Source: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/nv/snow/products/?cid=nrcseprd1685435

Soil moisture

Higher elevation soil moisture (measured at SNOTEL stations) is lower than normal and was at record lows for much of the winter (Fig. 5), but the record is relatively short. Soil moisture has been measured at Nevada SNOTEL stations only since 2006. New stations have been added regularly, so we now have information from almost twice as many stations as in 2006. Low soil moisture stresses vegetation. It also tends to limit the amount of streamflow generated when snow melts or during smaller rain events, as that water moistens soils before reaching streams and rivers.

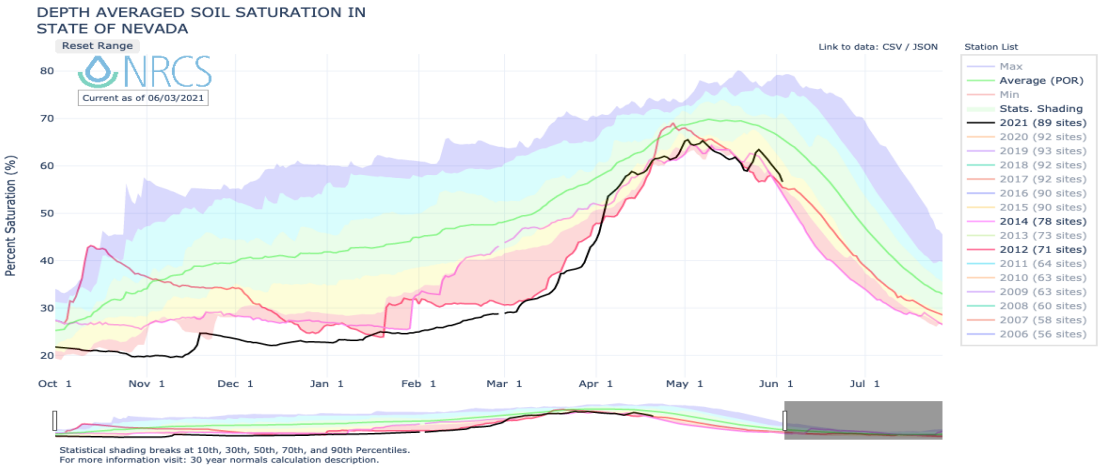

Figure 5. Soil moisture at SNOTEL stations in Nevada and the eastern Sierra Nevada as of June 3, 2021. Source: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/nv/snow/products/?cid=nrcseprd1685435

Broad-scale soil moisture estimates are made using models or remotely sensed information and they don't always agree perfectly. Nonetheless, many of the currently available products demonstrate drier than normal soil conditions over much of Nevada and particularly southern Nevada (Fig. 6), which is consistent with the very low precipitation that area has received.

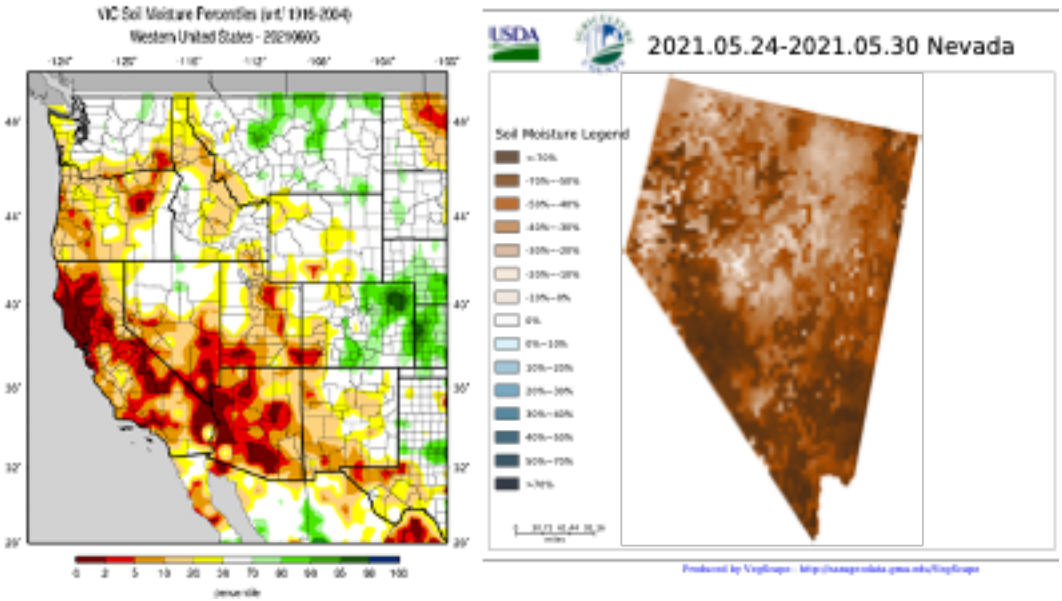

Figure 6. Soil moisture anomalies from the (left) Surface Water Hydrology at UCLA and (right) NASA SMAP data. Sources: http://www.hydro.ucla.edu/SurfaceWaterGroup/forecast/monitor/index.shtml, https://nassgeo.csiss.gmu.edu/CropCASMA/.

Vegetation Conditions

Vegetation

As with soil moisture, vegetation conditions are often monitored using remotely sensed products. The Mean Vegetation Condition Index, one of many indices, compares current vegetation conditions as measured by the Normalized Difference Vegetation Index (NDVI) to the usual NDVI for that time of year. Low values across much of the state show that vegetation in parts of Nevada is stressed (brown colors), but there are areas where vegetation appears to be in normal conditions for the time of year (Fig. 7).

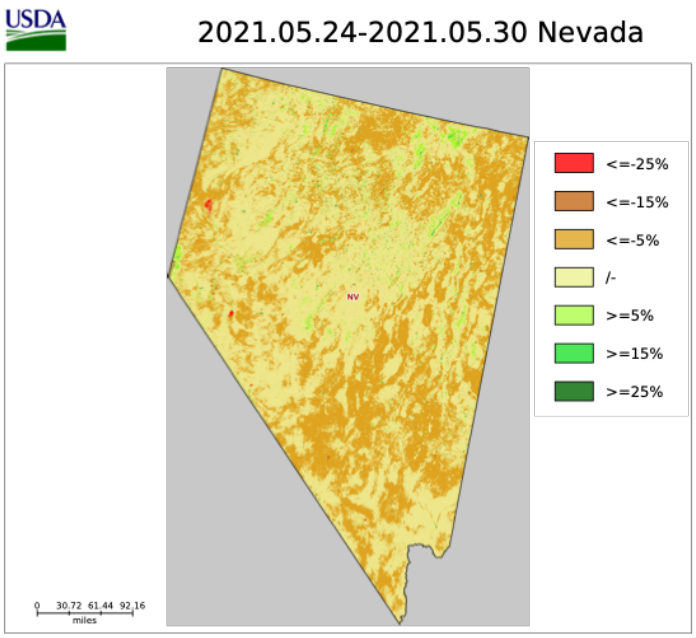

Figure 7. Mean Vegetation Condition Index for late May. Negative values in brown indicate places where vegetation is less robust than usual. Positive values in green where vegetation is doing better than usual. Source: https://nassge.csis.gmu.edu/CropCASMA/

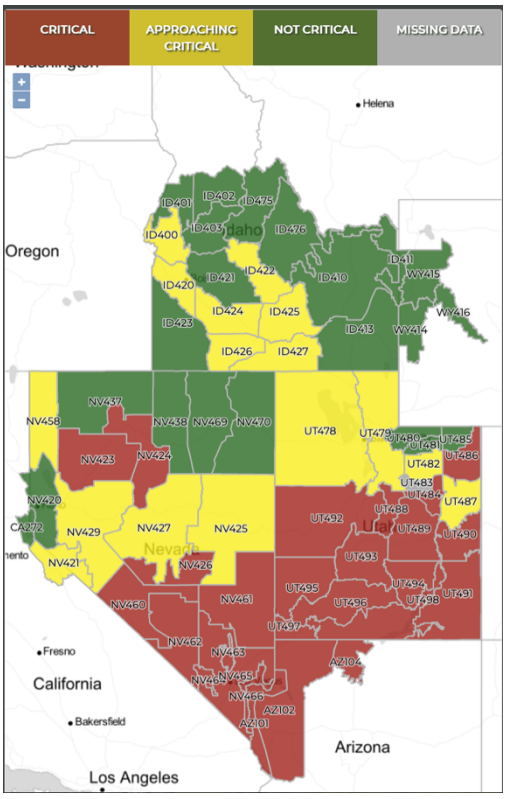

Figure 8. Fuel moisture status in and around Nevada as of June 6, 2021. Red and yellow indicate low fuel moisture. Source: https://gacc.nifc.gov/gbcc/predictive/cfs/#/

Fuel Moisture

In much of Nevada, fuel moisture levels are very low. The Great Basin Coordination Center indicates critical and near critical conditions across most of the state (Fig. 8). When fuel moistures are low, fires can burn hotter and faster, making them more difficult to control.

Impacts reported by Nevadans

Dry conditions have caused problems for Nevadans. By summer of 2020, ranchers were reporting needing to haul water and purchase supplemental feed. Nevadans in rural and urban areas reported impacts on their yards, recreational activities and local wildlife. If you want to see individual reports, you can visit the 2020 and 2021 Condition Monitoring Observer Reports (CMOR) maps. Your observations of drought impacts are important. They help ensure that the Drought Monitor is accurately describing drought and help us understand the impacts Nevadans are facing. You can (please do!) report your drought impacts at livingwithdrought.com.

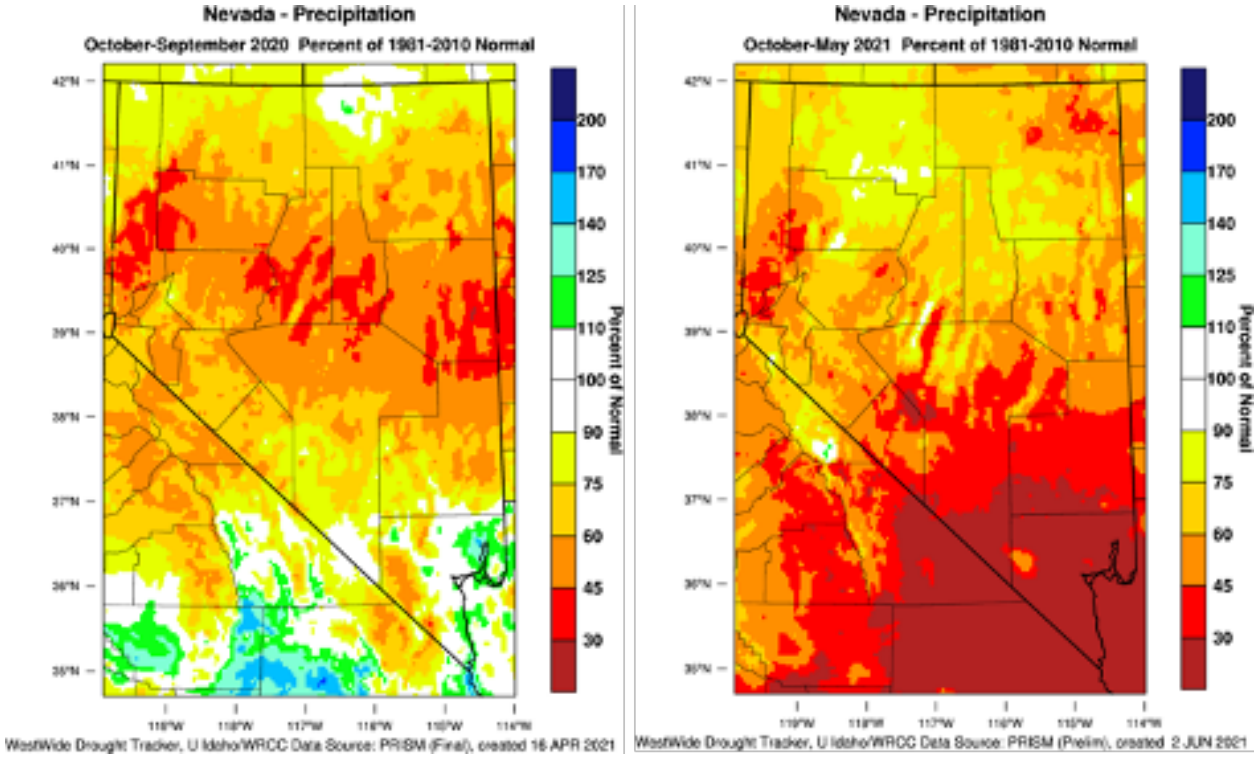

Figure 9. Percent of normal precipitation for the 2020 water year (left) and for the 2021 water year to-date (Oct - May). Source: https://wrcc.dri.edu/wwdt/

How did this drought develop?

For most of the state, this is the second year of below normal precipitation. During the 2020 water year (Oct 1 2019 – Sep 30 2020), precipitation was 30 – 70% of normal across most of the state (Fig. 9). The abnormally wet spring over Clark county was followed by extremely dry conditions that began in April 2020 and continue to present. The winter of 2020 – 2021 was also dry. While spring rains have improved conditions in north-central Nevada, the rest of the state has remained dry. Southernmost Nevada has received less than a third of the expected precipitation between October 1 2020 and the end of May 2021.

High temperatures made dry conditions worse. Average temperatures last summer and early fall (May – Oct 2020) were above normal over essentially all of the state (Fig. 10). In some places, temperatures were 3-4 °F degrees above average for that time of year. High summer and fall temperatures increased evaporation, drying soils and drawing down reservoirs already impacted by lower than usual rain and snow amounts.

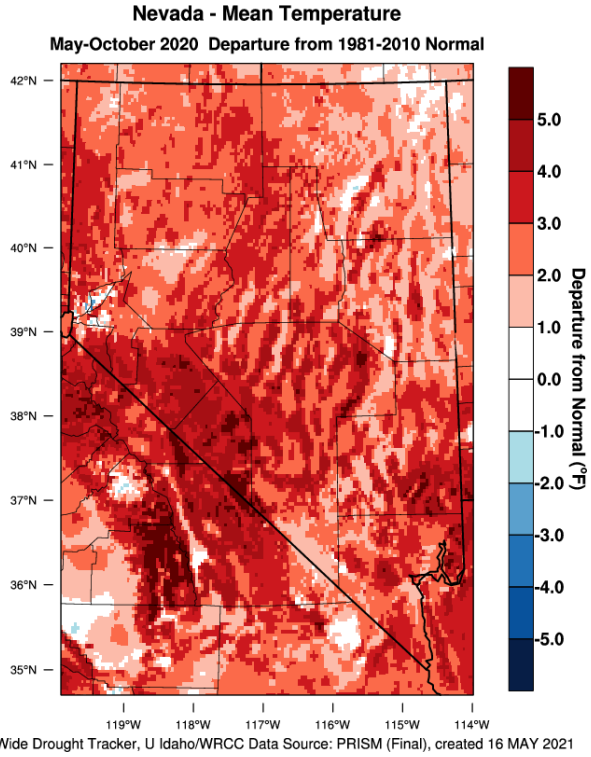

Figure 10. Difference from normal temperature for May - Oct 2020. Source: https://wrcc.dri.edu/wwdt/