

2022 Water-Year in Review

Drought conditions improved this water year courtesy of autumn and summer storms. Summer rains caused flooding in southern Nevada and brought the area out of exceptional drought status, but the entire state remained in severe to extreme drought status at the end of the water year.

Key Points

- WY 2022 was the second full water-year of drought in Nevada. Over 99% of the state has been in drought (D1 - Moderate Drought or worse) since early October 2020. Over half of the state has been in drought since May of 2020.
- Overall, drought improved this year. As of the August 16 US Drought Monitor map, there was no D4 - Exceptional Drought in Nevada. This is the first time since September 2020 that the state was free of D4 drought.
- Drought remained widespread across the western US, especially in California and Utah, but there were substantial improvements in the Pacific Northwest, Arizona, and New Mexico.
- It was a year of wild swings in precipitation! Generally speaking, fall (October - December) was wet, winter and spring were dry, and summer was very wet. The end result is that most of the state received near normal precipitation, with only far southern Nevada much drier than normal.
- The start of the water year was moderately warmer and only in parts of the state. Spring was cooler than normal over much of the state, but summer was quite warm.
- On April 1, the snowpack was not in great shape, at less than 65% of normal over most of the Great Basin and the Sierra and in somewhat better shape in the Upper Colorado. Mid-April storms provided a reprieve, especially in the Truckee basin.
- Significant summer flooding in and around Las Vegas were damaging and associated with two fatalities, but the rain did relieve drought conditions, bringing the southern part of the state from D4 (Exceptional Drought) into D2 (Severe Drought).
- Lake Mead's surface elevation has remained low since the 2021 water year (we all heard the news stories) and, despite modest rises this summer, is projected to stay below 1,075 feet through 2024 under even the most optimistic scenario.
- Lahontan and Rye Patch Reservoirs and the reservoir portion of Lake Tahoe fell to 5% or less of their capacity.
- Drought had major impacts on water recreation. Boat ramps at Lake Tahoe and Lake Mead closed early in the season because low water levels made using the ramps unsafe or impossible.
- La Niña is back for a third consecutive winter, which is likely to drive warmer and drier than normal conditions across the Southwest US, including southern Nevada.

US Drought Monitor Status

At the start of the 2022 water year, all of Nevada was experiencing some level of drought (Fig. 1-2, Table 1). Drought conditions have persisted since mid-2020. D4 Exceptional Drought developed in September 2020. Drought conditions improved, and by July, D4 was limited to southern and central Nevada. Continued improvements led to the removal of all D4 drought by the end of the water year.

Drought improved in areas that experienced above average precipitation in autumn and early winter—mostly northwestern Nevada—or during the summer—primarily in southern and central Nevada (Fig. 3-5). Normal to unseasonably cool spring temperatures kept drought from worsening, and early spring rain and snow relieved some ecosystem drought impacts in the north. However, without consistent wet conditions, drought impacts to water resources and some ecosystems remained.

Drought was widespread across much of the western US (Fig. 2), especially in the first half of the water year. Drought conditions remained extreme to exceptional throughout central California for the entire year and were persistent across Utah, as well. Winter and spring storms led to improvements in and removal of drought in the Pacific Northwest. The summer monsoon led to major reductions in drought over Arizona and New Mexico.

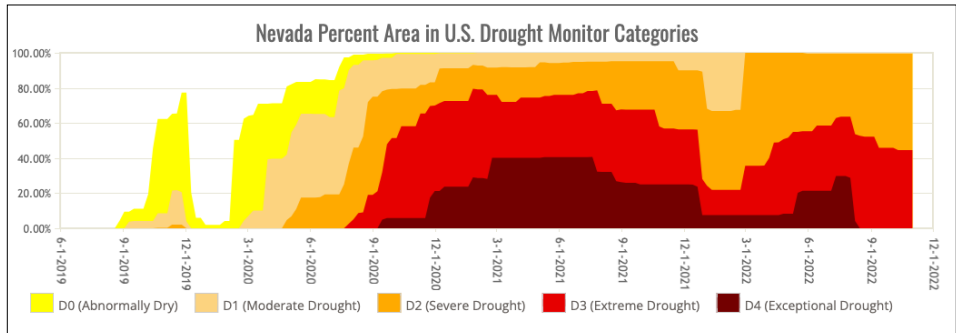


Fig. 1. Time series of drought in Nevada from mid-2019 through 2022 from the [US Drought Monitor](#).

Date	Oct 5 2021	Jul 5 2022	Sep 27 2022
None	0.0	0.0	0.0
Abornmally Dry-D0	0.0	0.0	0.0
Moderate Drought-D1	4.8	0.5	0.5
Severe Drought-D2	27.6	41.0	53.7
Extreme Drought-D3	42.6	37.2	45.9
Exceptional Drought-D4	25.0	21.3	0.0

Table 1. Percent of Nevada in each drought class. [US Drought Monitor](#).

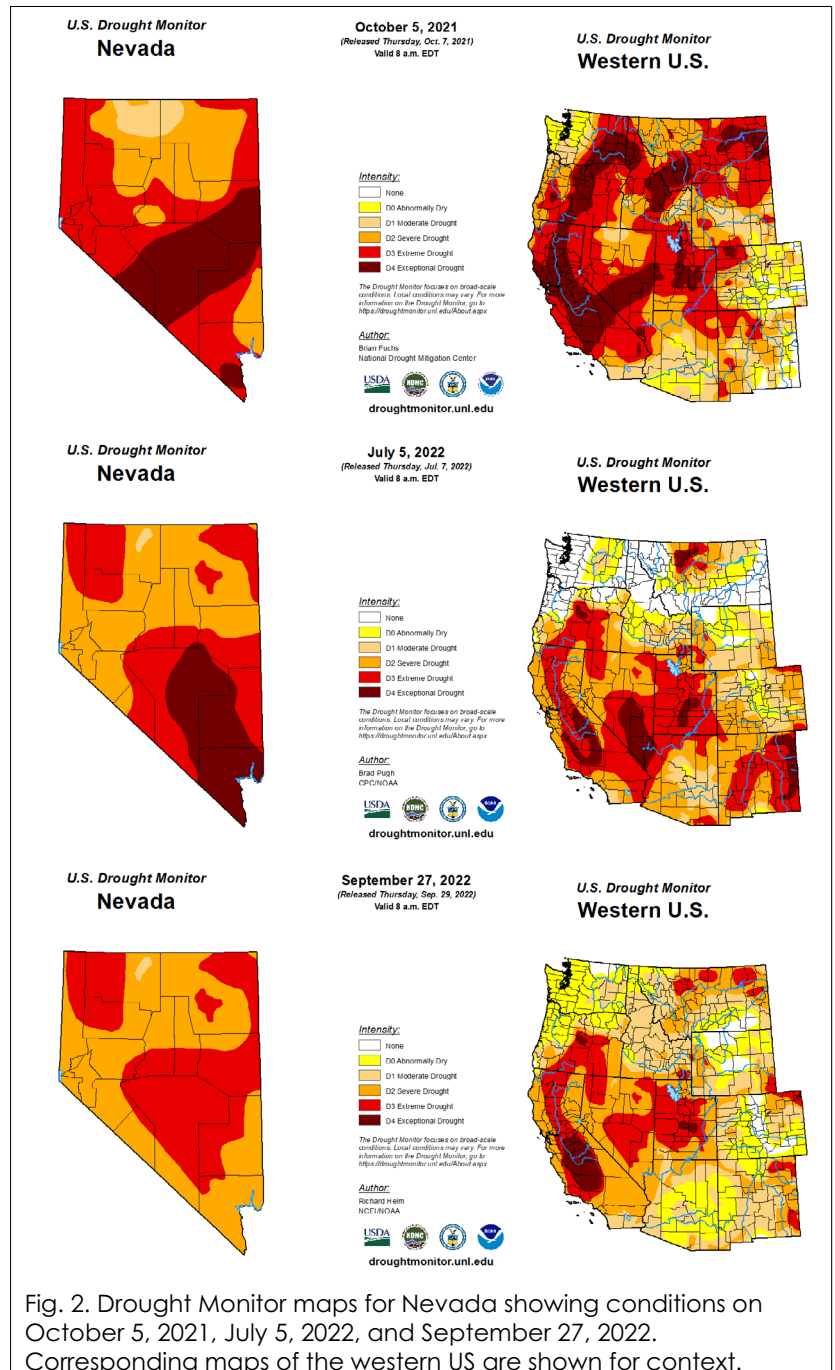


Fig. 2. Drought Monitor maps for Nevada showing conditions on October 5, 2021, July 5, 2022, and September 27, 2022. Corresponding maps of the western US are shown for context.

Temperature & Precipitation

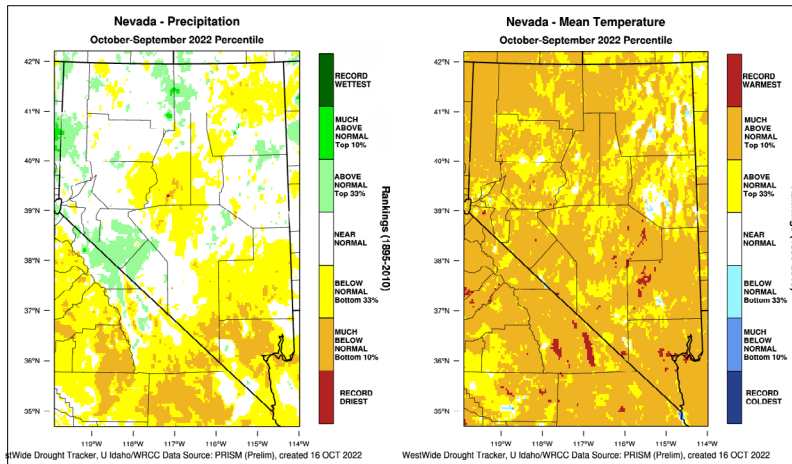


Fig. 3. Water-year total precipitation (left) and average temperature (right) relative to the historical record. Record driest areas are the driest since the 1896 water year. Record warmest areas are the warmest since the 1896 water year. Top and bottom 10% and 33% refer to the range between 1896 and 2010. From the [WestWide Drought Tracker](#).

The 2022 water year delivered near-normal precipitation levels across large parts of the state (Fig. 3). Precipitation was somewhat above normal in parts of western Nevada and along the Humboldt/Elko border. Despite the very wet summer, far southern Nevada did end the water year with much-below normal precipitation.

The start of the water year (October and December, particularly) was exceptionally wet in parts of the state (Fig. 4). Beginning in January, conditions changed. Most of the state received less than 40% of normal precipitation. Spring precipitation was near normal in northern-most Nevada. Summer was quite wet across most of the state

Temperatures were normal to above normal over the first half of the water year

(Fig. 5). Spring brought cooler temperatures to many areas of the state and especially to the north. Temperatures were notably hot over the summer with many parts of the state 3°F to more than 5°F above normal. Owing in part to the very warm summer, water-year average temperatures were above normal to much above normal across most of the state. (Fig. 3).

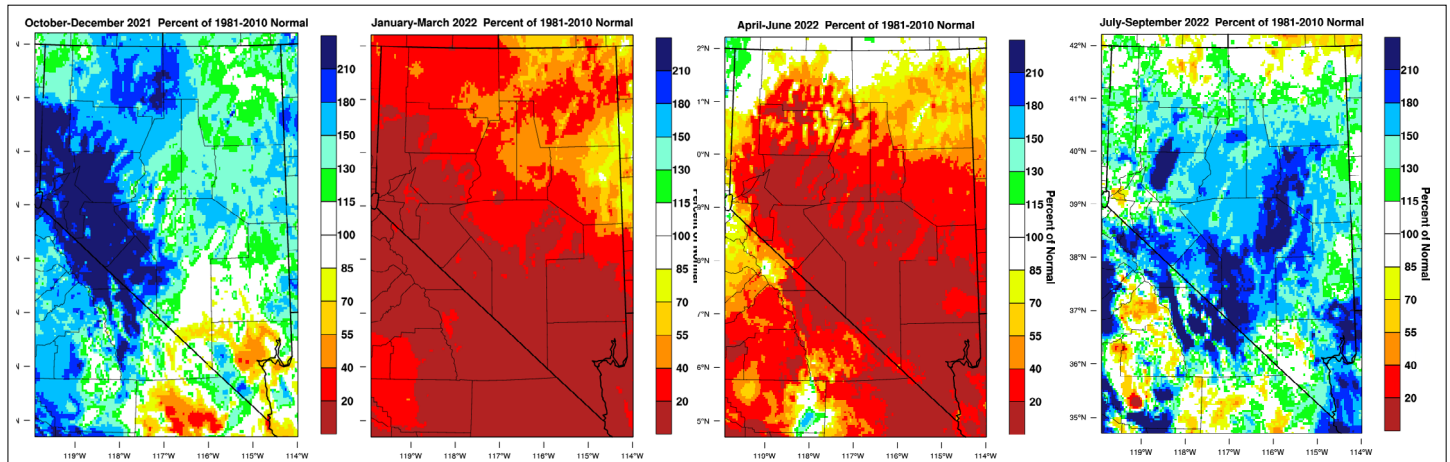


Fig. 4. Percent of seasonal average precipitation. From the [WestWide Drought Tracker](#).

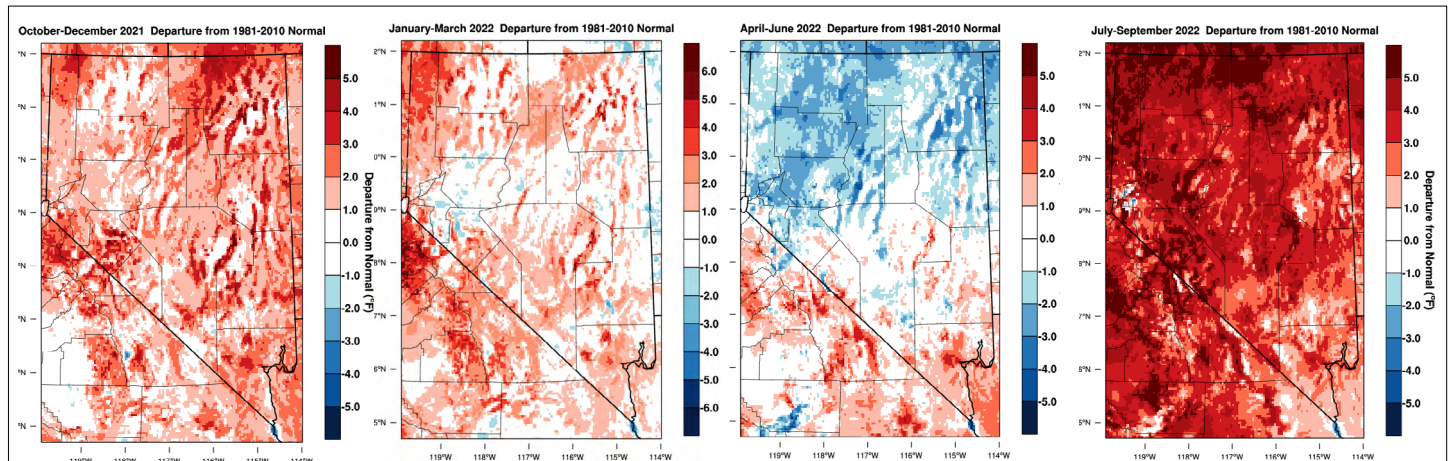


Fig. 5. Difference from seasonal average temperatures (°F). From the [WestWide Drought Tracker](#).

Snowpack

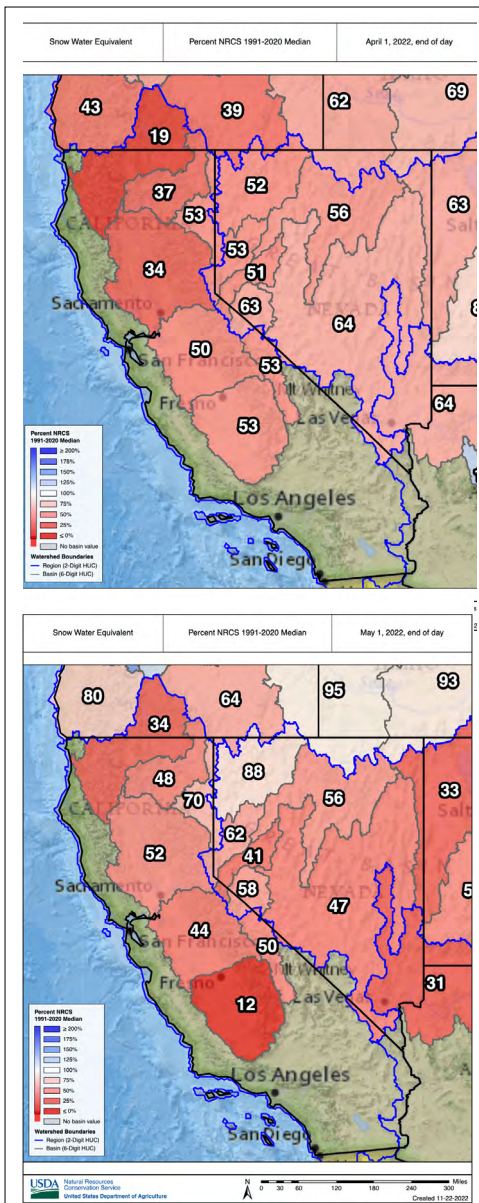


Fig. 6. Percent of normal snowpack in early April (top) and early May (bottom) 2022. From the [Natural Resources Conservation Service](#).

Despite a great start to the season, the dearth of precipitation from January - March meant snowpack peaked early (in some places peak snow was around New Year's), and April 1 snowpack was half of normal. Spring storms did bring snowpack levels up a bit in northern Nevada and northeastern California (Fig. 6).

Water Resources

Many Nevada reservoirs have had lower than average water at the beginning of the 2022 water year, and many reservoirs are still low. Water levels in Lake Tahoe, Lahontan Reservoir, and Rye Patch Reservoir were at less than 10% of capacity in late September 2022—still an improvement from the beginning of the water year (Table 2). Donner, Independence, and Topaz Lakes and Lake Mohave were at or above their average September levels. Lake Mead has been in shortage conditions for most of the water year, falling below 1,050 ft in April (Fig. 7). Lake elevations are projected to remain low throughout 2023 with some chance of water levels falling below 1,000 ft.

Reservoir	Average % Capacity	Sep 2021 % Capacity	Sep 2022 % Capacity
Lake Tahoe	25	4	5
Marlette Lake	96	87	90
Boca Reservoir	50	52	43
Donner Lake	56	35	85
Independence Lake	87	73	90
Prosser Reservoir	45	35	38
Stampede Reservoir	68	35	49
Lahontan Reservoir	28	2	6
Bridgeport Reservoir	24	10	19
Topaz Lake	21	8	22
Rye Patch Reservoir	15	3	4
Wild Horse Reservoir	43	49	41
Lake Mead	53	34	28
Lake Mohave	88	87	88

Table 2. Reservoir storage in Nevada at the end of September 2021 and 2022. Data from the [Natural Resources Conservation Service](#).

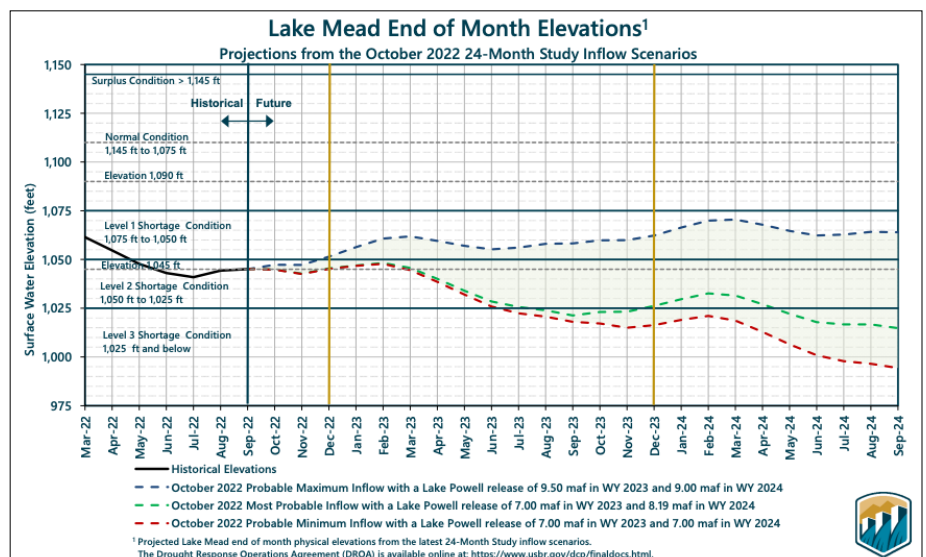
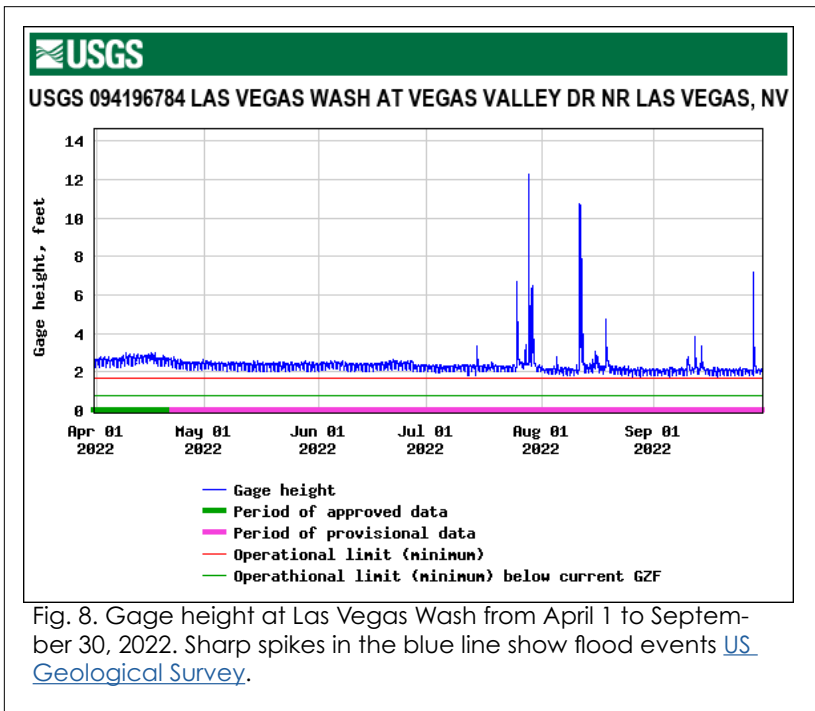


Fig. 7. End-of-month lake level elevations in Lake Mead through September 2022. Values are from the Bureau of Reclamation's 24-Month study and show reservoir levels for minimum, maximum and most probable inflow amounts. From the [Bureau of Reclamation](#).



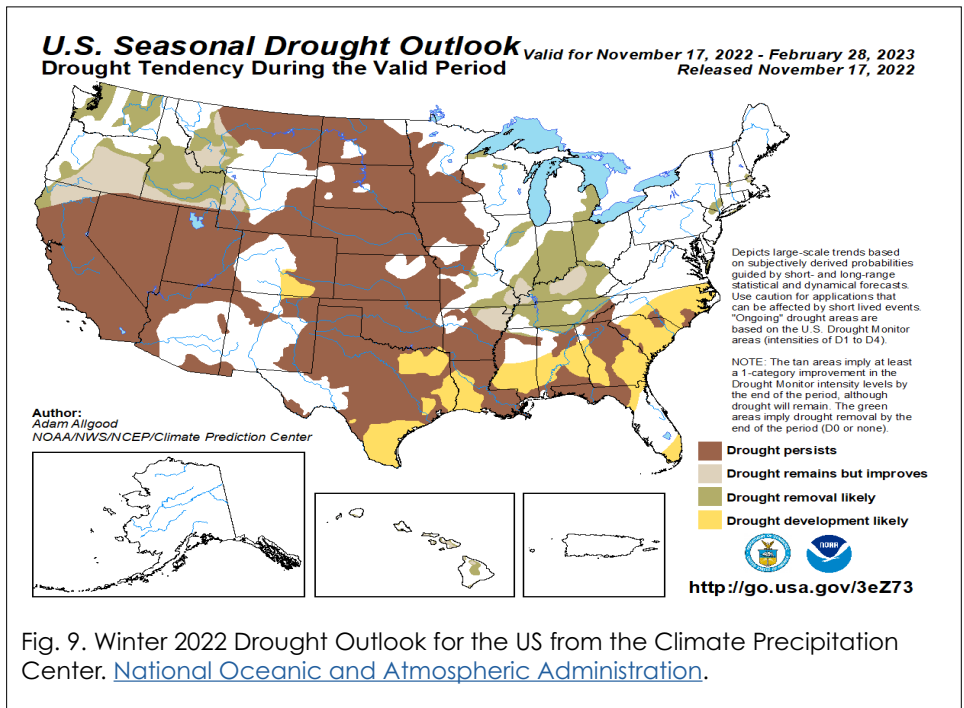
Floods during a drought ... again?

Summer rain is often welcome during the exceptionally warm and dry months, but it typically does little to alleviate longstanding drought conditions. This year, however, heavy rainfall in southern Nevada led to significant improvements in drought conditions, bringing the region from D4 (Exceptional Drought) into D2 (Severe Drought) by the end of the water year. Unfortunately, heavy rains also caused flooding (Fig. 8) that has been linked to tow weeks of periodic casino flooding and, sadly, to two fatalities in Las Vegas ([CNN](#)). Floods impacted other in other parts of Clark County, as well ([Moapa Valley Progress](#)).

Drought Outlook

The NOAA Climate Prediction Center's (CPC) winter outlook calls for continued drought conditions through this coming winter (Fig. 9). The entire state of Nevada is projected to see continued or worsening drought conditions, as are most of California and Utah. Conditions might improve and drought might even end in the Pacific Northwest, but drought could develop or worsen across the Midwest and South.

Experts at the CPC produce monthly and seasonal drought outlooks every month. They start with the US Drought Monitor map and then assess how the weather is likely to progress over the next one to three months on the basis of CPC temperature and precipitation outlooks and other analyses. And improvements are underway! Learn more about how these drought outlooks may change in the coming years by reading [Improving NOAA Climate Prediction Center Drought Outlook Products and Services](#).



Questions? Concerns? Corrections? We're always happy to hear from you.
Email climate@unr.edu or call 775-784-6999.