

Montana Water Supply Outlook Report – Spring 2022



Near Jordan Montana

This report was prepared by the Department of Natural Resources & Conservation on behalf of the Governor's Drought & Water Supply Advisory Committee



Water Supply Overview

Precipitation:

The 2021 Water Year (November 2020 – October 2021) closed with above average temperatures, and much below average precipitation in September. Unfortunately, this trend continued with drier and warmer than average conditions across much of Montana in October and November. Isolated precipitation events in the southeast and northwest improved conditions locally, but state averages trended lower and warmer throughout the fall of 2021. Apart from some marginal improvements in the northwest, drought conditions continued to deteriorate through early December 2021. Drought conditions typically improve in the fall. This late date represents the latest point in the year that drought conditions have continued to worsen since the start of the US Drought Monitor in January of 2000. As of December 7, 2021, 33% of the state was in D4 (exceptional drought) which is also the highest percentage of the state ever represented in this category in the 22 year history of the U.S. Drought Monitor.

U.S. Drought Monitor Montana

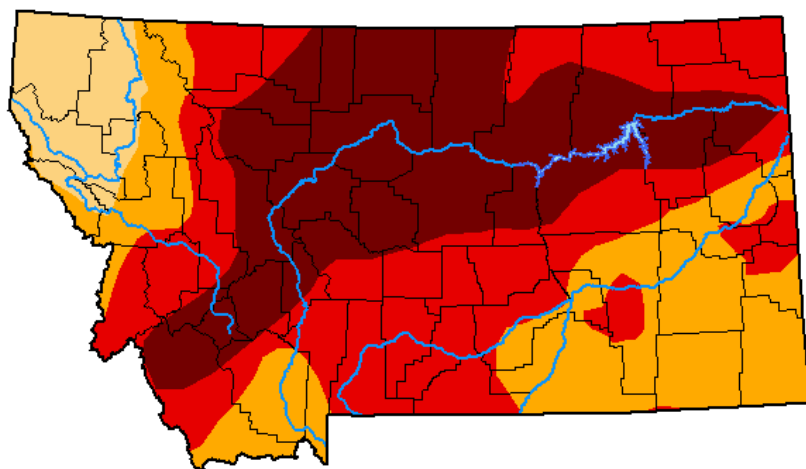
December 7, 2021

(Released Thursday, Dec. 9, 2021)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	92.82	68.16	33.10
Last Week <i>11-30-2021</i>	0.00	100.00	100.00	92.82	66.82	33.10
3 Months Ago <i>09-07-2021</i>	0.00	100.00	100.00	98.70	68.34	20.32
Start of Calendar Year <i>12-29-2020</i>	36.37	63.63	34.41	8.27	0.36	0.00
Start of Water Year <i>09-28-2021</i>	0.00	100.00	100.00	100.00	65.68	21.91
One Year Ago <i>12-08-2020</i>	36.37	63.63	32.02	8.25	0.36	0.00



Intensity:

None	D2 Severe Drought
D0 Abnormally Dry	D3 Extreme Drought
D1 Moderate Drought	D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

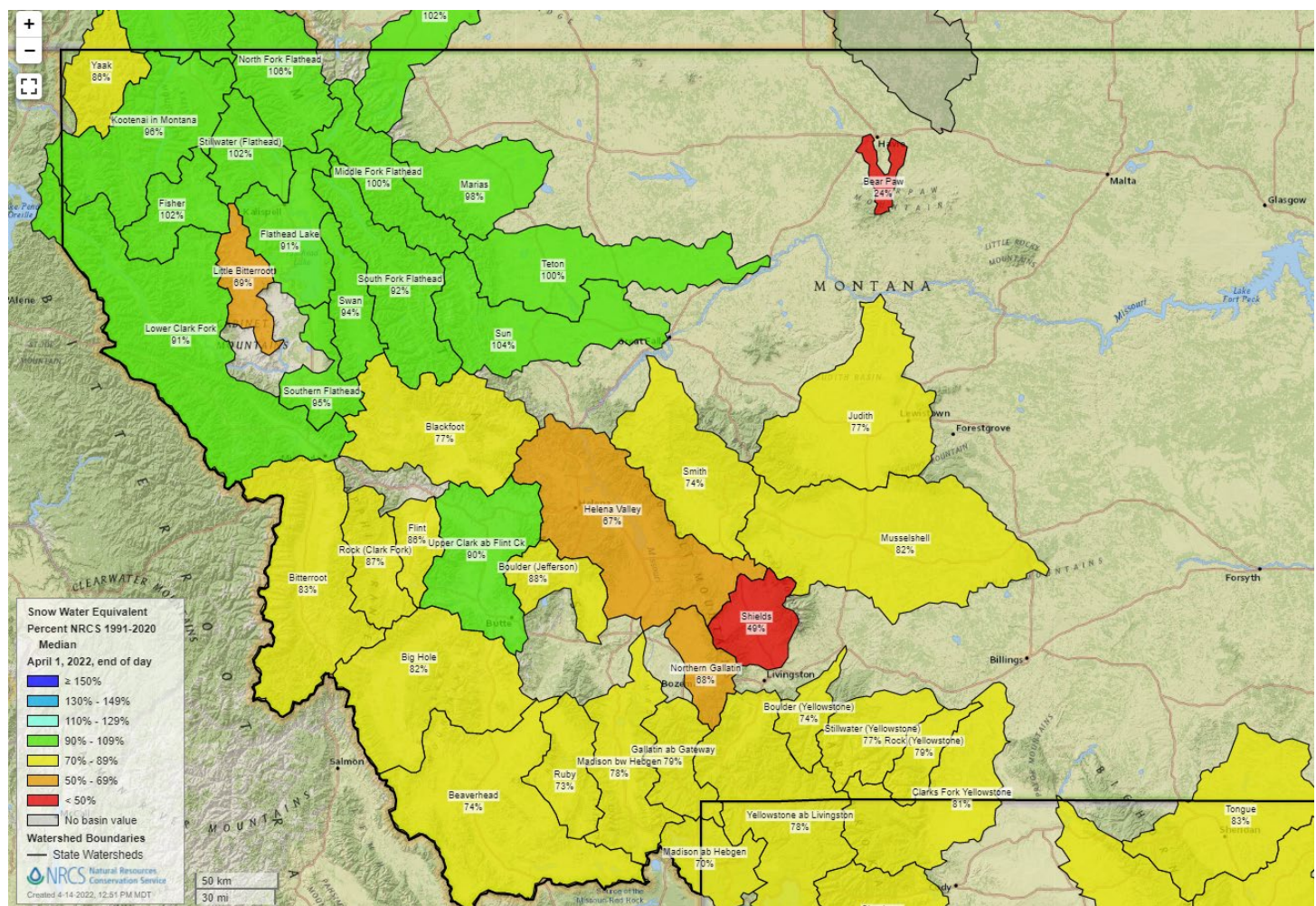
David Simeral
Western Regional Climate Center

Snowpack:

Snowpack across all basins was below to much below average on December 1. However, above average precipitation in December along with colder temperatures across much of the state brought an end to the calendar year with snowpack approaching the normal range in the northwest and southwest. The central part of the state remained stubbornly below average despite the December snowfall. Below average precipitation persisted across most of Montana in January,

February and March of 2022. Exceptions were northwest Montana and the northern Rocky Mountain Front, which received near to above average precipitation in March. Most of that region's precipitation occurred during the first week of March. Unfortunately, minimum daily temperatures at this time were also above freezing, and it rained at all but the highest elevations.

The extreme fluctuations in temperature in January, February, March and April greatly confuse attempts to sum up conditions this last winter and early spring. Much below average temperatures were recorded in both February and March. A week of extreme cold in February was followed by record highs and a rain on snow event in the first week of March followed by sub-zero temperatures the following week. Record highs for the day were set in multiple locations in both March and again in April followed by record lows in mid-April. These radical fluctuations in temperatures including the rain on snow events in March and April severely impacted the low and mid-elevation snowpack across the state. By the end of March, mid and low-elevation snowpack was virtually non-existent across Montana except for the northwest where snowpack approached average. Peak snowpack in most mountain locations typically occurs sometime during April. The current forecast for Montana predicts below normal temperatures and above normal



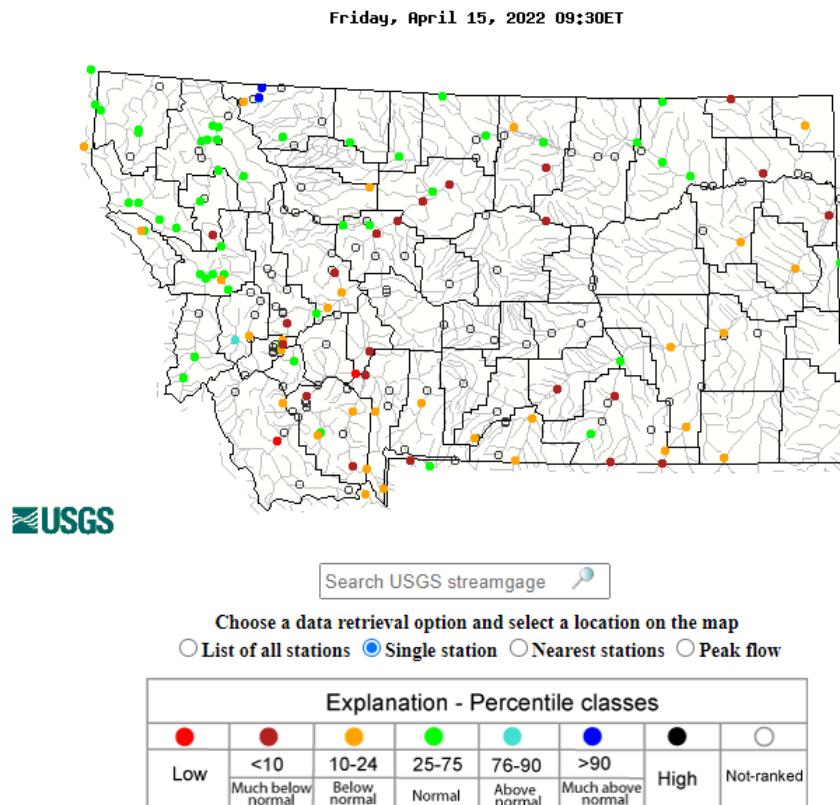
precipitation for the next few weeks so there is potential to extend snow accumulations into May this year, particularly at higher elevations.

Streamflow: ([DNRC/USGS/Gaging Stations](#), [USGS WaterWatch](#), [Missouri Basin River Forecast Center](#))

Statewide, the snowpack currently varies from near average to much below average. As a result, the translation of current snowpack into summer stream forecasts remains uncertain and will depend upon temperatures and the effect that has on the rate of snowmelt. Warmer temperatures will accelerate runoff, while cooler than average temperatures could suppress runoff, effectively extending the season. Snowpack is a critical component of early season streamflow across the state, but not the only component. Total water year precipitation, peak snowpack accumulation, spring and summer precipitation and the departure from seasonal average temperatures all contribute to the overall water volume available during the growing season.

With the opportunity to add snow to the mountain snowpack diminishing, the outlook for spring and summer runoff in some areas of the state is somewhat grim. The current forecasts for southwest Montana and the mainstem of the Missouri are all well below normal. Of particular concern is that the forecasts for the Beaverhead River and downstream on the Jefferson are calling for less than 50% of normal flows for April to July. This region experienced very low streamflow last season and it appears there may be a repeat of those conditions this year. It's a similar story for the Smith and Musselshell rivers, with streamflow last season being well below normal and current forecasts at around 50% of normal for this season.

The picture is somewhat better for streams along the Rocky Mountain Front and in the river basins west of the Continental Divide. These areas have near normal snowpacks and, as a result, streamflow forecasts are near average in these basins. The exception is the forecast for the Upper Clark Fork basin. Forecasts for those gages are 70-85% of normal. This area missed out on the above normal precipitation that benefitted the other western Montana basins. At this point in the spring, the best chance for improved streamflow will be if cool weather helps maintain high elevation snowpack and whether above average spring and summer precipitation occurs.



Reservoirs: ([Bureau of Reclamation Reservoirs](#), [State Reservoirs](#))

April is generally the time of the year when water managers across Montana start to fill the local, state and federally managed reservoirs across Montana. It is also a time that leaves most water managers and dam tenders feeling uneasy as they consider changing conditions while attempting to anticipate spring runoff and water demand moving into the summer months. It is important to remember that water management in Montana isn't only about water supplies here in Montana. This year, the warm and dry winter combined with extreme drought across much of the Northern Great Plains have greatly reduced the threat of flooding farther down the Missouri River. According to the Army Corp of Engineers, reservoir inflows in the Missouri River basin above Sioux City, Iowa (upper Basin) were well-below average in March. The updated 2022 upper Missouri River Basin runoff forecast is 17.8 million acre-feet (MAF), or 69% of average. As a result, river managers may consider reducing reservoir releases this spring and hold back more water at federal water projects along the Missouri Mainstem. There is also some concern about potentially reduced inflows into Clark Canyon reservoir in southwest Montana due to the dry conditions that have carried over since 2020. The current reservoir elevation at Clark Canyon is below average for this date at 56%. The average storage level at the end of March is typically about 123,844-acre feet. This year the storage level at the end of March indicated 95,415-acre feet of storage.

Water elevations at state water projects across Montana are mostly below average. Below average snowpack and diminished carry-over storage due to last year's drought suggests that some of Montana's reservoirs may not fill to full capacity this spring. Precipitation and temperature over the next 90 days will likely determine storage levels. Given expectations for reduced runoff, early season irrigation demands will play an out-sized role in determining stored water availability for this summer. Conditions for the smaller irrigator-controlled reservoirs across the state are generally poor. Overall, reservoir storage is below average in the larger federal, state and local facilities used for both irrigation and recreation as of April 1.

Storage in small reservoirs and stock water ponds in the eastern two-thirds of the state is low to very low at the time of this writing. April, May and June are typically the wettest months of the year east of the continental divide so there is still time to fill the many dug-outs, potholes, and small reservoirs that so many producers rely on for stockwater. Absent at least average precipitation this spring, many producers are likely to have difficulty ensuring adequate drinking water supplies for livestock this summer. Some producers in eastern Montana have already started hauling stockwater.

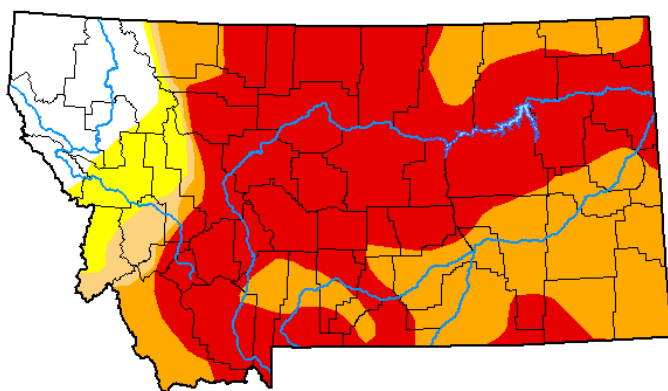
Drought Outlook:

The current drought conditions (abnormally dry to extremely dry) across Montana are the result of the combination of last year's hot and dry summer; overly warm and dry conditions prevalent last fall; and the warmer and drier than average winter. Parts of the state, particularly southwest Montana, are entering the third year of the drought. While the drought in the early 2000's lasted longer, the current drought is the most severe that Montana has experienced in over 20 years. While there is still time for conditions to improve, persistent dryness east of the Continental Divide will likely result in further degradation of both stream and surface water availability and soil moisture.

As of mid-April, drought conditions across Montana, except for the northwest, are especially bad for this time of year with 82% of the state in severe (D2) to extreme (D3) drought. The last time conditions were this dire in early spring was in 2003 and 2005. However, April, May and June are typically the wettest months on the east side of the continental divide in Montana, so there is still time for conditions to improve. Even with above average precipitation in the next 90 days, much of the state will likely remain in some level of drought through the summer and likely well into the fall.

U.S. Drought Monitor Montana

April 12, 2022
(Released Thursday, Apr. 14, 2022)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	9.45	90.55	85.40	82.49	52.50	0.00
Last Week 04-05-2022	9.38	90.62	85.32	82.52	52.44	0.00
3 Months Ago 01-11-2022	7.51	92.49	89.22	85.89	53.93	8.97
Start of Calendar Year 01-04-2022	7.36	92.64	89.33	86.35	53.93	13.87
Start of Water Year 09-28-2021	0.00	100.00	100.00	100.00	65.68	21.91
One Year Ago 04-13-2021	13.53	86.47	44.64	18.74	8.46	0.00

Intensity:

None	D2 Severe Drought
D0 Abnormally Dry	D3 Extreme Drought
D1 Moderate Drought	D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Richard Tinker
CPC/NOAA/NWS/NCEP

The next 8 to 10 weeks is a critical period. Despite the current drought status across much of Montana, there is time for conditions to improve prior to the onset of summer. In early April over 21 of the last 22 years, at least some part of Montana has been in some state of drought. In 10 of those years, statewide drought conditions improved between early April and late June, but in 10 of them, conditions worsened. In one year, 2014, conditions remained about the same. In early April of 2005, 86% of the state was listed in a D2 to D4 drought category. Despite a drier than average April and May, an unusually wet June relieved drought conditions across the state and by September 1st drought conditions had improved dramatically. The chances of improving versus worsening drought conditions between early April and the end of June is about 50/50 and will likely vary across of the state.

Long Term Forecast:

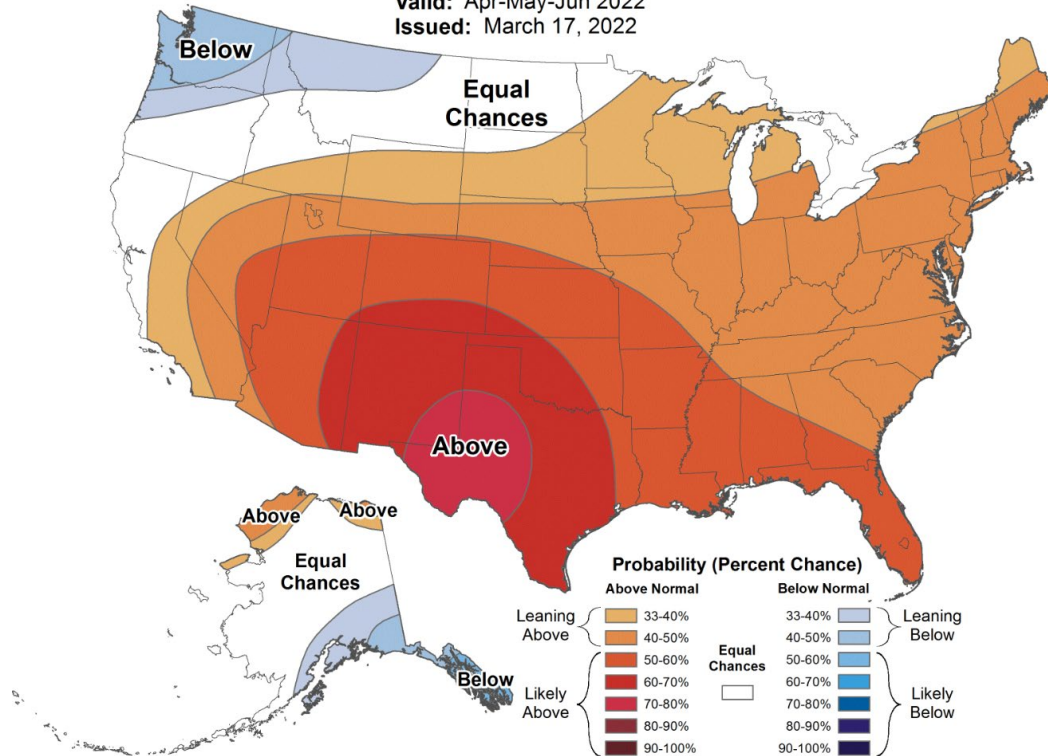
Given the extremely dry conditions as we enter the summer, temperature will likely determine the severity of the drought over the next four to six months. The long-term outlook (3 months) leans to below average temperatures in the northwest and north central parts of the state with the rest of the state leaning to average temperatures. The long-term precipitation forecast does not offer any specific direction for the northern two-thirds of the state but does indicate a 30 - 40% chance for below normal precipitation across the southern tier of Montana. This forecast is not predictive, but the outlook is substantially better for the Pacific Northwest and Northern Great Plains than for much of the rest of the country which is forecast for above to much-above normal temperatures and below normal precipitation.



Seasonal Temperature Outlook



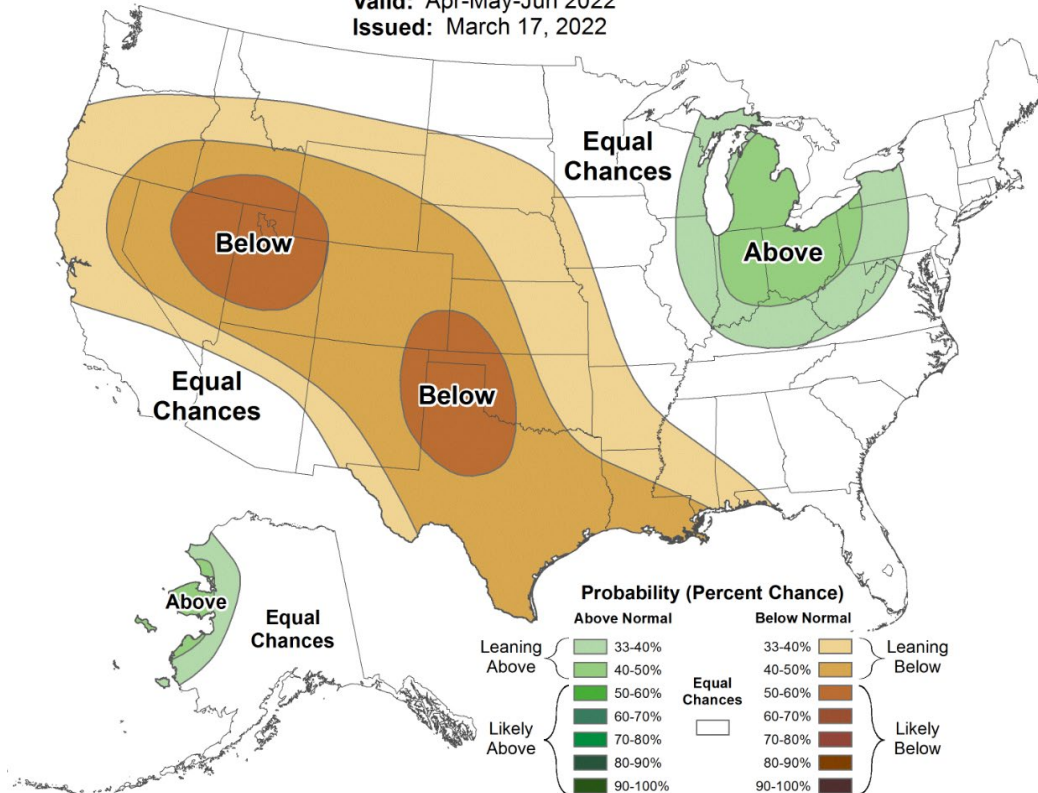
Valid: Apr-May-Jun 2022
Issued: March 17, 2022



Seasonal Precipitation Outlook

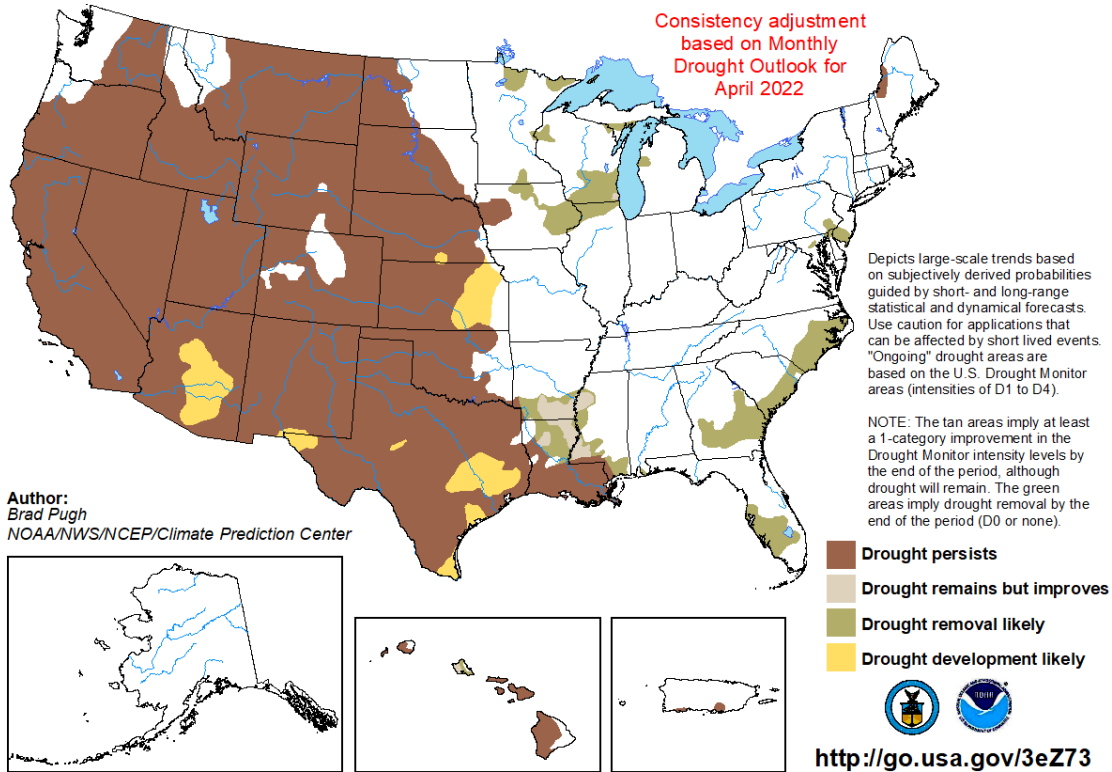


Valid: Apr-May-Jun 2022
Issued: March 17, 2022



U.S. Seasonal Drought Outlook Drought Tendency During the Valid Period

Valid for April 1 - June 30, 2022
Released March 31, 2022



Key Take-Aways:

- Parts of the state, particularly southwest Montana, are entering the third year of the drought. While the drought in the early 2000's lasted longer, the current drought is the most severe that Montana has experienced in over 20 years.
- Statewide, the snowpack currently varies from near average to much below average.
- With the opportunity to add snow to the mountain snowpack diminishing, the outlook for spring and summer runoff is poor across much of Montana.
- Below average snowpack and diminished carry-over storage due to last year's drought suggests that some of Montana's reservoirs may not fill to full capacity this spring.
- Even with above average precipitation in the next 90 days, much of the state will likely remain in some level of drought through the summer and likely well into the fall.
- The next 8 to 10 weeks is a critical period. Despite the current drought status across much of Montana, there is time for conditions to improve prior to the onset of summer.

Drought Evaluation Tools and Resources – The following resources provide useful tools that the Department of Natural Resources & Conservation (DNRC) and their partners use to evaluate drought and water supply conditions on a weekly basis across Montana.

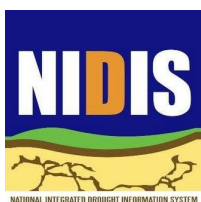
[Upper Missouri River Drought Indicators Dashboard](#)
[Montana Drought Impacts Reporter](#)
[NRCS Interactive Precip Portal](#)

[USGS Water Watch Dashboard](#)
[Montana Mesonet Data Downloader](#)

Working on behalf of the Governor's Drought and Water Supply Advisory Committee, DNRC has compiled this Spring Water Supply and Drought Outlook. This report provides a synopsis of statewide conditions gleaned from multiple sources and offers links to additional resources with more in-depth information.

In partnership with other state and federal agencies and Tribes, experts in climate science, snowpack, streamflow and weather information collect and evaluate drought and water supply data on a weekly basis year-round. This information is distilled into weekly recommendations to the U.S. Drought Monitor which tracks drought conditions nationally. Much of the information contained in this report comes from the [Montana Climate Office](#), [NRCS Water Supply Outlook Report](#), [U.S. Drought Monitor](#), [Climate Prediction Center](#), [National Integrated Drought Information System](#) and others. Please contact [Michael Downey](#), at DNRC (mdowney2@mt.gov) if you have any questions or feedback about any of the information contained in this report. Keep an eye out for the next drought update in late June.

This report would not be possible without the ongoing participation and contributions of our local, university, state, tribal and federal partners, some of which are listed below:



This report was developed by DNRC on behalf of the Governor's Drought & Water Supply Advisory Committee pursuant to MCA 2-15-3308(5).