

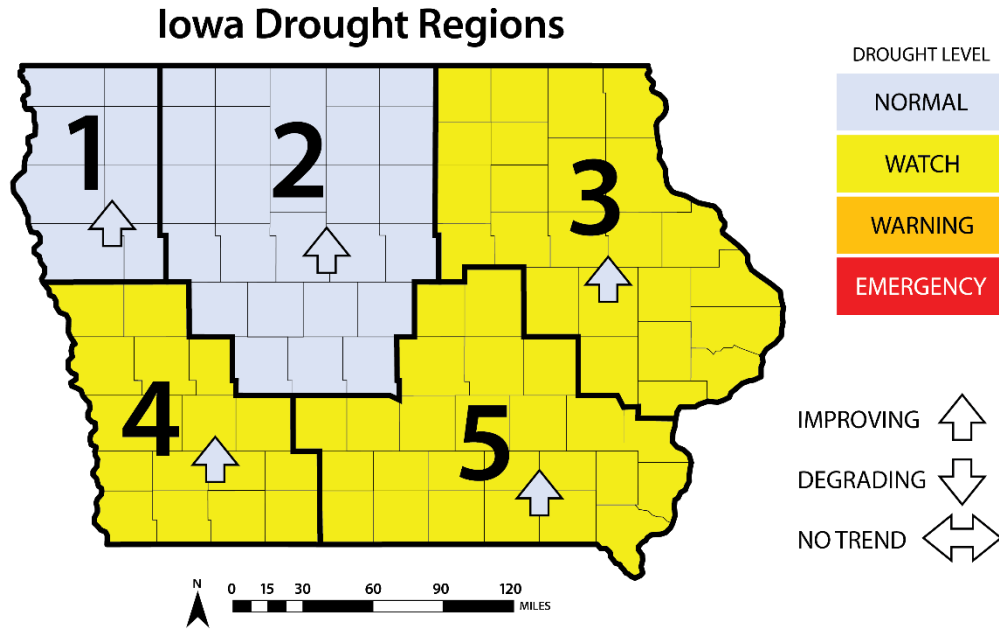


WATER SUMMARY UPDATE

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A snapshot of water resource trends for March 2024

IOWA DROUGHT CONDITIONS



CONDITION SUMMARY

After the second driest February in 152 years, March rebounded with above normal rainfall that helped to alleviate some of the drought conditions across Iowa. While recent rains have improved conditions, it will take a much longer period of above-normal precipitation to eliminate drought conditions across Iowa. For the month of March, preliminary statewide temperatures averaged 41.0 degrees or 4.6 degrees above normal while precipitation totaled 2.50 inches, 0.51 inch above normal.

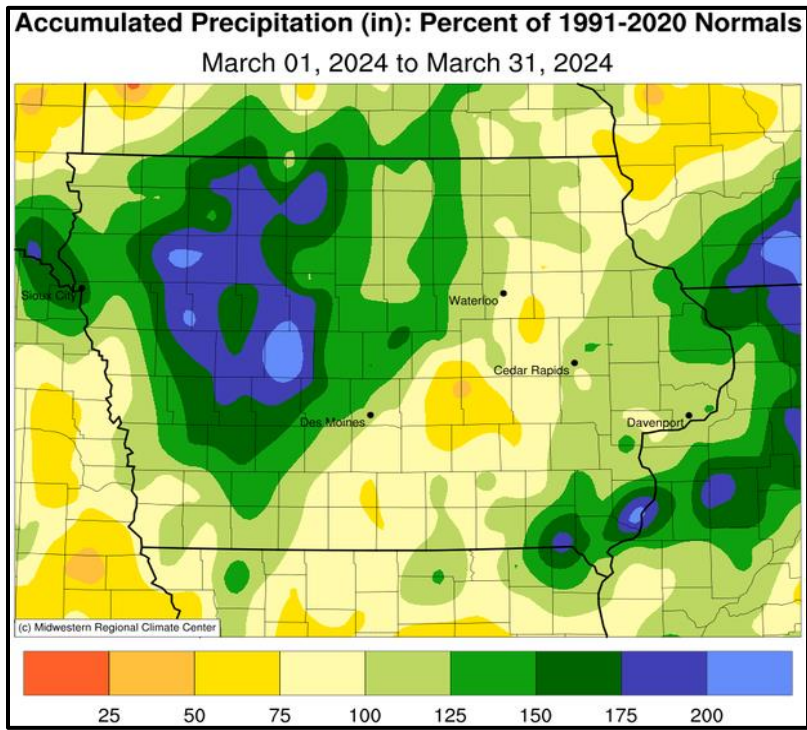
The US Geological Survey reports that streamflow deteriorated across the state in March, but have rebounded in the later March and early April. The US Drought Monitor, one measure reflected in the Iowa Drought Plan (IDP), shows improvement in some areas of the state, with significant reductions in the area designated as D3 - Extreme Drought.

Drought conditions have improved overall, with Drought Regions 3, 4 and 5 (northeastern and southern Iowa) remaining in Drought Watch. Late March and early April rains indicate that conditions may continue to improve throughout the spring.

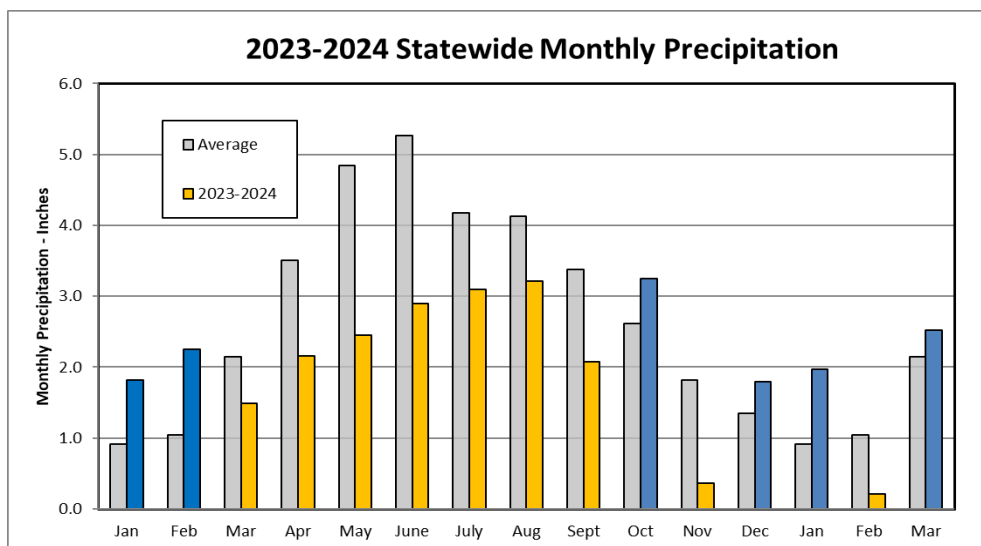
March Precipitation and Temperature

During the month of March most weather stations in western Iowa, and in the eastern one-quarter of Iowa reported between 150-200 percent of normal precipitation, much of which fell during the final half of March. Only stations in south-central and northeastern Iowa experienced below normal precipitation. Monthly precipitation totals ranged from 0.54 inch near Grinnell to 6.27 inches in Augusta. Statewide snowfall was below normal with an average of 1.9 inches, 2.8 inches below normal.

Warmer than average temperatures blanketed Iowa through March, as a continuation of consecutive unseasonably warm months that began in August 2023. Stations in eastern Iowa reported the warmest monthly temperatures with positive departures approaching six degrees. Donnellson, Mount Pleasant and Muscatine reported the month's high temperature of 81 degrees on the 3rd, on average 37 degrees above average. Several stations reported the month's low temperature of nine degrees on multiple dates, on average 14 degrees below normal.



The graph below shows monthly precipitation in Iowa compared to normal (gray bars), and indicates that Iowa received above normal during four of the last six months. Over this six-month period the State has received 10.1 inches of precipitation, slightly more than the normal of 9.9. This is an encouraging pattern as we move from winter into the growing season. Over the past year, however, statewide average precipitation has been only 26 inches - 77 percent of normal, or 7.6 inches short for the 12-month period.



Standardized Precipitation Index (SPI)

The SPI is an index based on accumulated precipitation for various time scales. SPI is the most commonly used indicator worldwide for detecting and characterizing meteorological droughts. The SPI indicator measures precipitation differences based on a comparison of observed total precipitation amounts over the period of interest with the long-

term historical precipitation record for that period. Droughts are characterized by negative SPI values, while positive SPI values indicate wet periods. The range of SPI values is between -2 and +2.

90-day SPI values for the Drought Regions in March (comparing January, February, and March precipitation) range from +0.8 to -0.1, with nearly all values above zero. 180-day SPI values are mostly negative, but all are improving and all are in the IDP Normal range.

Drought Region	3-month SPI	6-month SPI	IDP Classification ↑ = improving ↓ = degrading ↔ = no trend
1	+0.6	+0.5	Normal ↑
2	-0.1	-0.3	Normal ↑
3	+0.1	-0.3	Normal ↑
4	+0.3	-0.6	Normal ↑
5	+0.8	-0.5	Normal ↑

Standardized Streamflow Index (SSI) and Streamflow

SSI is a metric that compares current streamflow against the historical record to determine how far away the current streamflow value is from the river’s historical mean observed on the same date. Drought index values typically range from 0 (streamflow is the same as the mean) to -3, which indicates the current streamflow is three standard deviations less than the historical mean for the period. Positive SSI values indicate wetter than normal or flood-level flows. Of particular note are the 30-Day SSI values for Drought Regions 3 and 5. Drought Emergency is the most severe category used in the Iowa Drought Plan, and this is the first month where any value has been lower than -2, the threshold for a drought warning emergency. For February, the SSI for each drought region is:

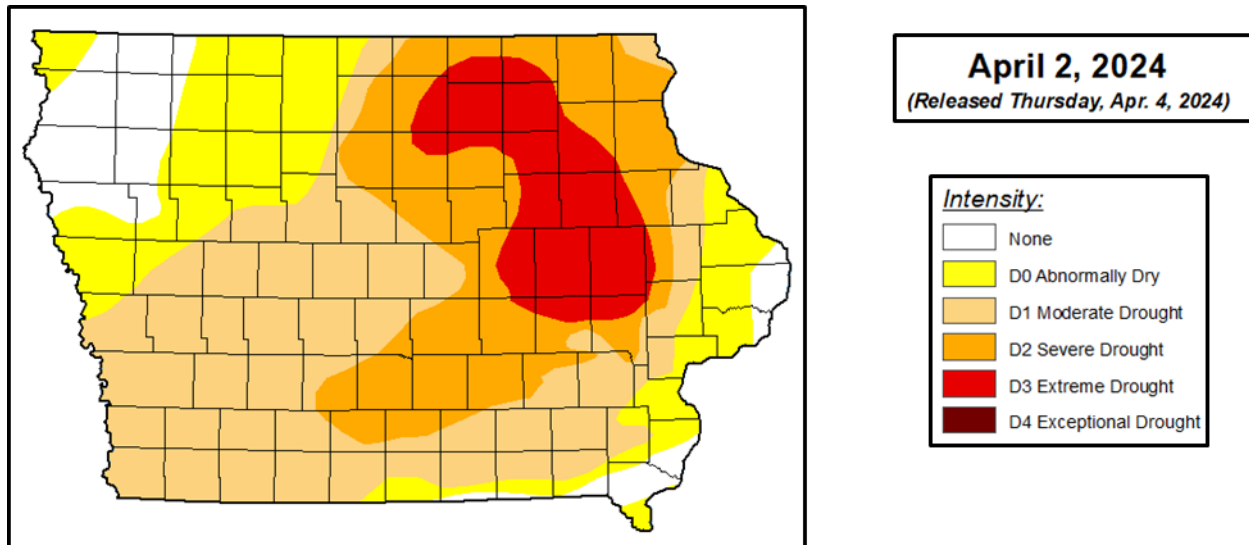
Drought Region	30-Day SSI	365-Day SSI	IDP Classification ↑ = improving ↓ = degrading ↔ = no trend
1	-0.62	-0.60	Normal ↓
2	-1.18	-1.11	Drought Watch ↓
3	-2.14	-0.84	Drought Emergency ↓
4	-1.34	-1.52	Drought Warning ↓
5	-1.91	-1.64	Drought Warning ↓

Much like the SSI shows, the US Geological Survey indicates that streamflow conditions in March worsened across most of the state to below-normal or lower levels. The Iowa, Wapsipinicon, Chariton, Upper Iowa, Maquoketa, Turkey, Yellow, Nishnabotna, and portions of the Skunk and Des Moines Rivers moved into much below-normal conditions. The North Raccoon, Floyd River, Little Sioux, Maple, Nodaway, and East Fork 102 Rivers remained in normal conditions, with the rest of the state in below-normal conditions. Rain events at the end of March improved overall streamflow conditions across the state, but approximately a third of the state is still in below-normal flow conditions as we begin April.

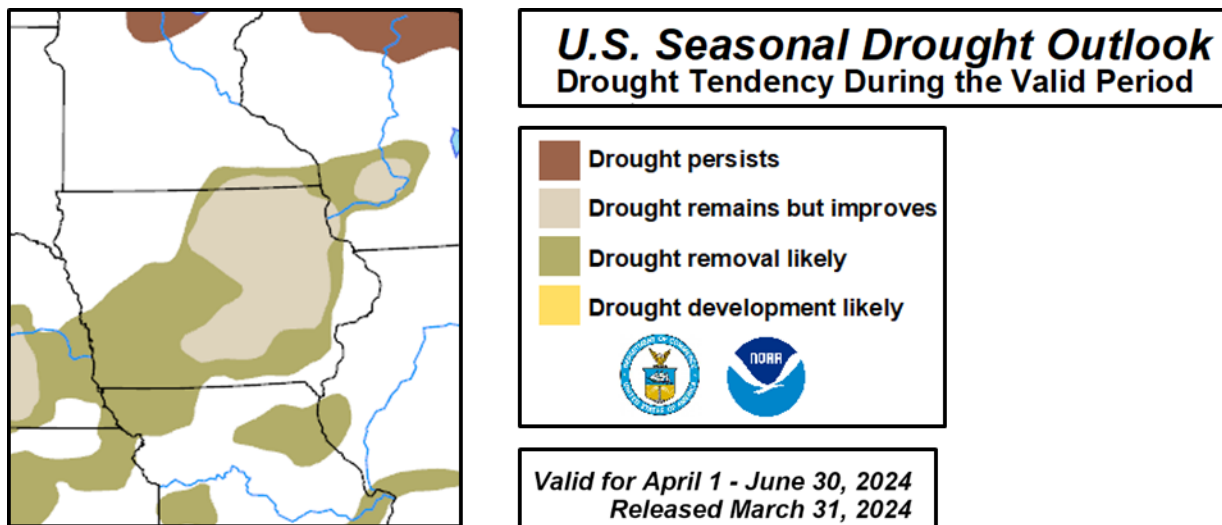
US DROUGHT MONITOR AND DROUGHT CONDITIONS

The current US Drought Monitor map indicates significant improvement in drought conditions across Iowa over the past month. The areas of the state classified in D3-Extreme Drought were reduced from nearly 19 percent to less than 12 percent, and the areas of D2-Severe Drought, were reduced from 38 percent to 22 percent. The area of the state that is free from any drought or dryness has increased from less than one percent to nearly 10 percent. This week marks 204 weeks with some classification of drought or dryness in Iowa, dating back to May 5, 2020. This is the longest period of drought since the start of the US Drought Monitor in 2000 and the longest drought since 1954-1959.

On a national scale, over 80 percent of the United States is free from drought or dryness. Over the past month drought conditions have improved in much of the country, with areas of degradation in southern Kansas and northern Oklahoma, along with parts of Wyoming and South Dakota.



The Seasonal Drought Outlook issued by the Climate Prediction Center (CPC), valid for April 1 through June 30, shows a predicted improvement of drought conditions in eastern Iowa, and a potential for removal of drought conditions across much of western and southwestern Iowa. These are more optimistic outlooks than those of one month ago.



OTHER WATER RESOURCE INFORMATION

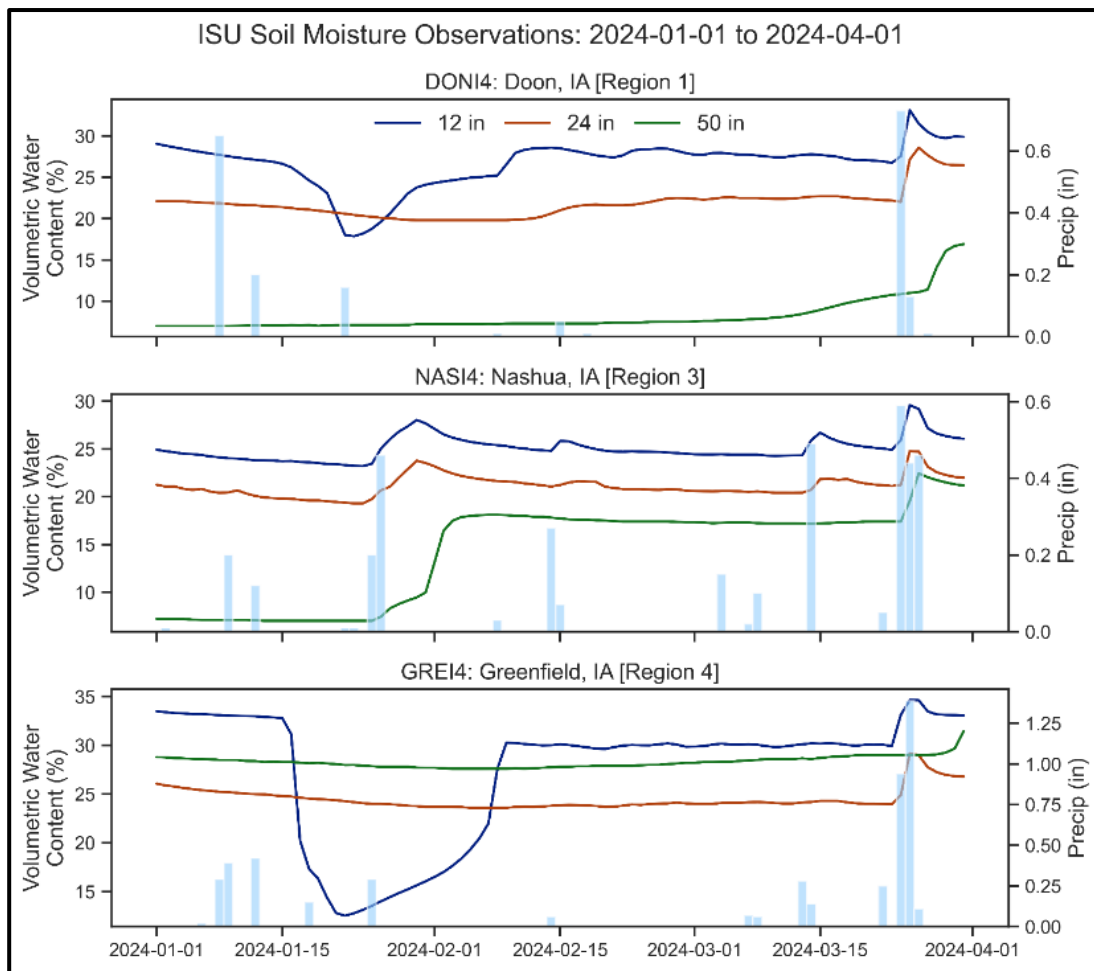
Border River Conditions

In their weekly update of Missouri River conditions dated April 2, 2024, the Army Corps of Engineers (USACE) indicates that the volume of water stored in the system of reservoirs is 54 Million Acre-Feet (MAF), slightly below normal for this time of year, and about the same volume as last month. Runoff for the month of March was 59 percent of average. The forecast for the calendar year for runoff above Sioux City is 17.5 MAF, or just 68 percent of average. Mountain snowpack has recovered over the last month, and stands at about 80 percent of normal for this time of year.

March Soil Moisture

The graphs below show measured soil moisture values for three locations for the last three months and at three depths. At each of these locations soil moisture increases in response to rainfall events (light blue vertical bars) - particularly with the rainfall events of late March. Shallow soils (dark blue line) respond more quickly to rainfall, while deeper soils (orange and green lines) tend to exhibit more steady moisture values. Soil moisture is dependent on soil type and are

specific to location, but these graphs from three different regions of Iowa show some overall improvement in soil moisture over the winter months. The April 1 USDA’s National Agricultural Statistics Service (NASS) report rates topsoil moisture at 59 percent very short or short, 37 percent adequate and 4 percent surplus. Subsoil moisture condition is rated at 76 percent very short or short, 22 percent adequate and just 2 percent surplus.



ADDITIONAL INFORMATION

This edition of the Water Summary Update continues to reflect use of the 2023 Iowa Drought Plan (IDP), which was developed as a collaborative effort between the Department of Natural Resources, the Department of Agriculture and Land Stewardship, and the Department of Homeland Security and Emergency Management. The IDP can be seen in its entirety on the DNR’s website: [The Iowa Drought Plan](#).

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