

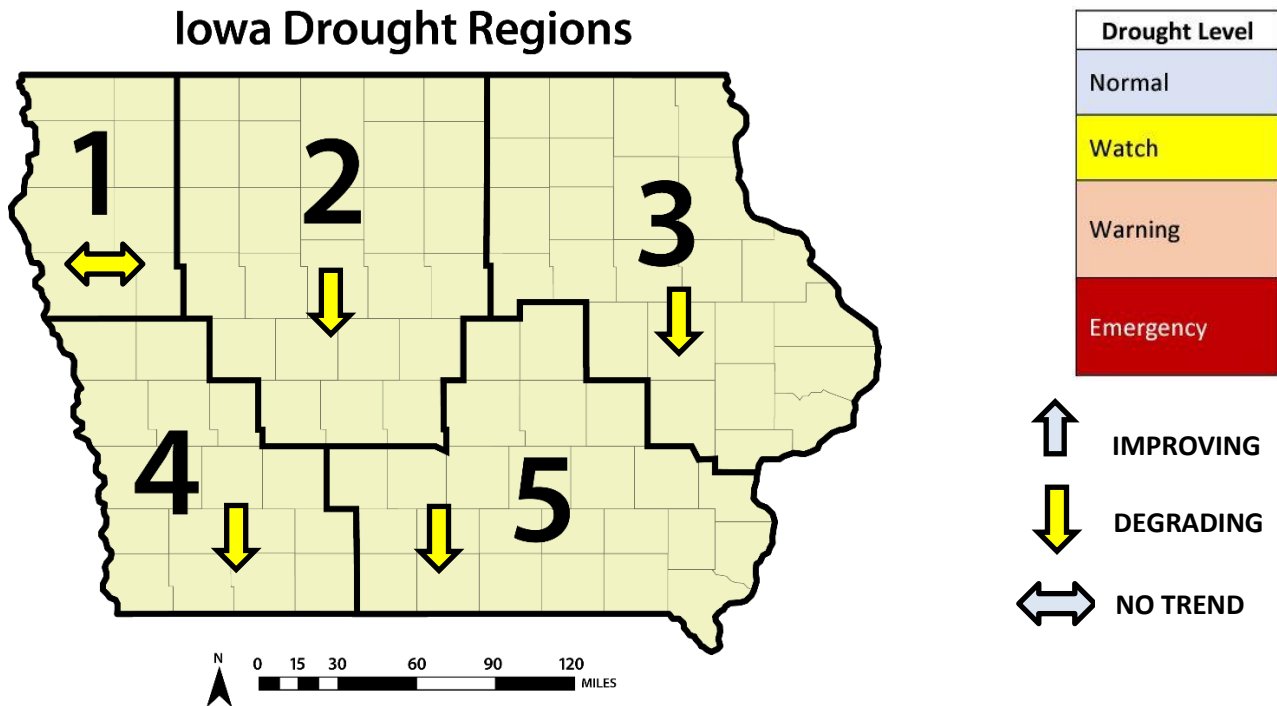


WATER SUMMARY UPDATE

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A snapshot of water resource trends for May 2023

IOWA DROUGHT CONDITIONS



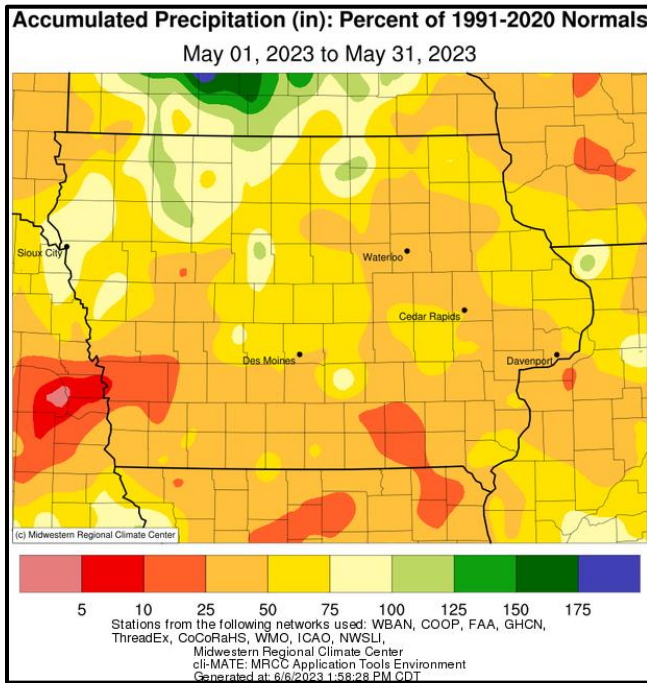
INTRODUCTION: This edition of the Water Summary Update continues to reflect use of the 2023 Iowa Drought Plan (IDP), which was developed as a collaborative effort between the Department of Natural Resources, the Department of Agriculture and Land Stewardship, and the Department of Homeland Security and Emergency Management. The IDP can be seen in its entirety on the DNR’s website: [The Iowa Drought Plan](#). The IDP uses precipitation, the Standardized Precipitation Index (SPI), a standardized streamflow index (SSI) and the US Drought Monitor to establish drought levels for the state. Three out of four of these indicators can trigger a drought determination under the IDP.

CONDITION SUMMARY:

The month of May followed the drier than normal and warmer than normal trends of both March and April. The May monthly statewide precipitation was 2.54 inches, 52 percent of normal rainfall. All areas of Iowa had below normal rainfall, with southwestern Iowa the driest at only 35 percent of normal precipitation. The spring months of March, April, and May had a statewide average of 6.09 inches of rainfall, 63 percent of normal. As a result of these moisture deficits, streamflow is down, and soil moistures are lower as well. The Iowa Drought Plan now

shows the entire state in a “Drought Watch” condition, a worsening from last month. Iowa is below normal for rainfall for 2023, as well as for the water year that began on October 1, 2022.

May Precipitation



The month of May followed the drier than normal trend of both March and April. The May monthly statewide precipitation was 2.54 inches, 52 percent of normal. Most areas of Iowa had below normal rainfall, with southwestern Iowa having the 12th driest May on record. The statewide average temperature was 62.8 degrees, 2.9 degrees warmer than normal.

The spring months of March, April, and May had a statewide average of 6.09 inches of rainfall, 63 percent of normal. As a result of these moisture deficits, streamflow is down, and soil moistures are lower as well. The Iowa Drought Plan now shows the entire state in a “Drought Watch” condition, a worsening from last month. Iowa is below normal for rainfall for 2023, as well as for the water year that began on October 1, 2022.

A vast majority of Iowa’s National Weather Service co-op stations reported below-average totals in May, especially in southern Iowa where swaths of three to four-inch deficits were observed. Only small sections of northern and central Iowa measured above-average totals, though amounts were up to four inches above normal. Monthly precipitation totals ranged from 0.45 inches in Council Bluffs to 8.39 inches in Fort Dodge.

Statewide temperatures were above-normal in May with the warmest conditions found in northwestern Iowa, where positive departures of up to six degrees were found. Average temperatures decreased to the southeast, though were still unseasonably warm. The Lock and Dam in Dubuque, Lowden, and the Spencer Municipal Airport reported the month’s high temperature of 93 degrees on the 30th, and the Waterloo Municipal Airport observed 93 degrees on the 31st. Chariton and Vinton reported the month’s low temperature of 25 degrees on the 3rd.

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 for the month of May (comparing March, April, and May precipitation) range from -0.9 to -1.1. These negative SPI values found across nearly all of Iowa show a deterioration from last month, with the wetter than normal winter months now more than 90 days in the past.

Standardized Streamflow Index (SSI)

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. For this WSU daily streamflow yields from approximately six to 12 rivers in each region are averaged to create the region's mean daily flow, which is then compared to historical streamflow since 1960 to determine how current streamflow fits into historical context. 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.

For May, the SSI for each drought region are:

Drought Region	30-Day SSI	365-Day SSI	IDP Classification ↑ = improving ↓ = degrading ↔ = no trend
1	-0.26	-0.74	Normal ↓
2	-0.01	-0.53	Normal ↓
3	-0.05	+0.43	Normal ↔
4	-0.96	-0.77	Drought Watch ↓
5	-0.69	-0.93	Drought Watch ↓

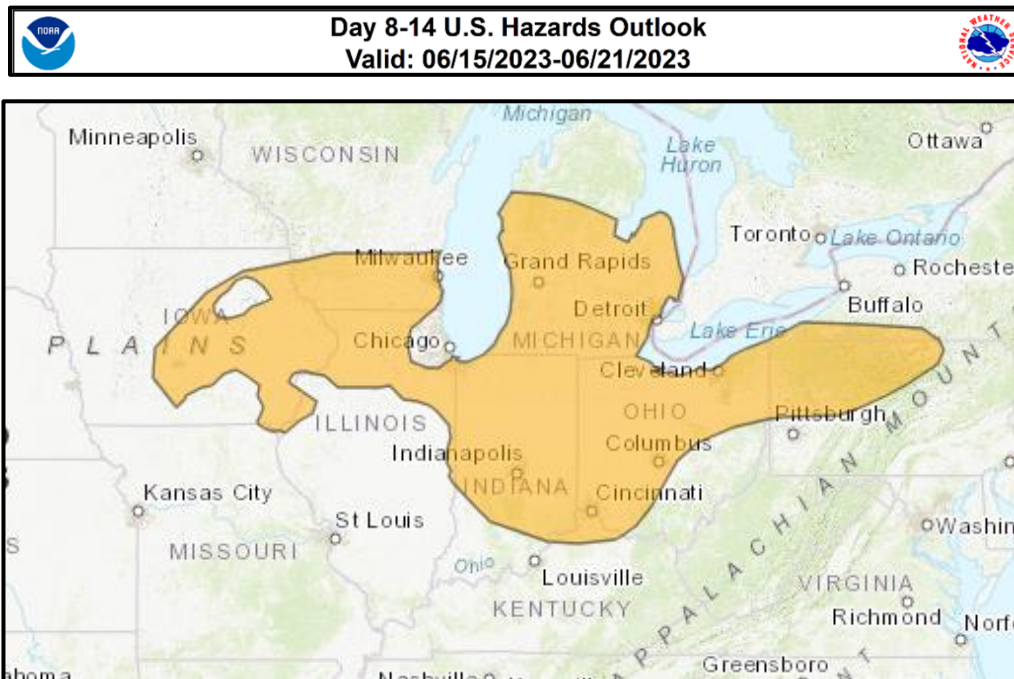
Below normal precipitation for three months in a row continues to show up in decreasing streamflows – especially at a time when normal increasing rainfall should be increasing flows in nearly all interior streams and rivers. At this time, only Drought Regions 4 and 5 are in the “drought watch” trigger for SSI.

During May, the US Geological Survey notes that streamflow conditions ranged from normal to below-normal conditions over a third of the state. The Raccoon River has moved into much below-normal conditions since last month, and portions of the Des Moines, Nishnabotna, Chariton, Thompson, and Boyer Rivers have moved or remained in below-normal conditions.

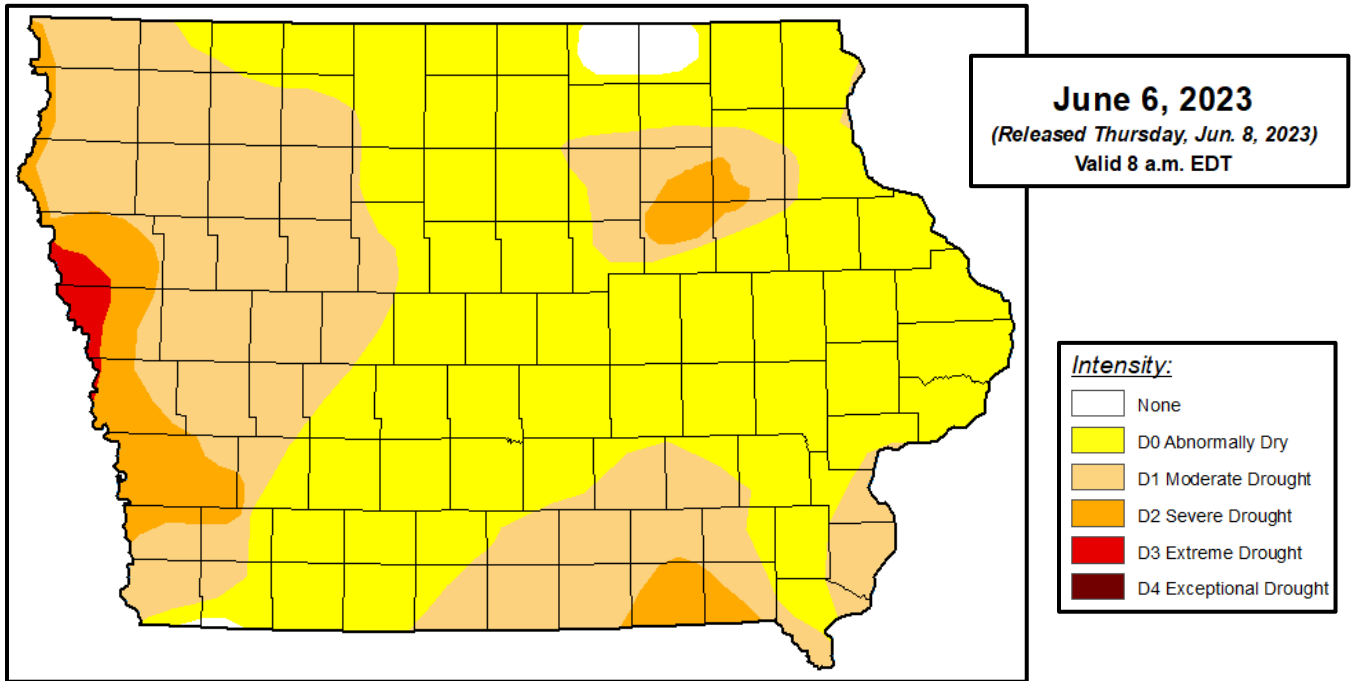
US DROUGHT MONITOR AND DROUGHT CONDITIONS

During the month of May, the State of Iowa saw rapid and widespread expansion of drought conditions. Conditions are consistent with “Rapid Onset Drought” or flash drought, which generally refers to a rapid

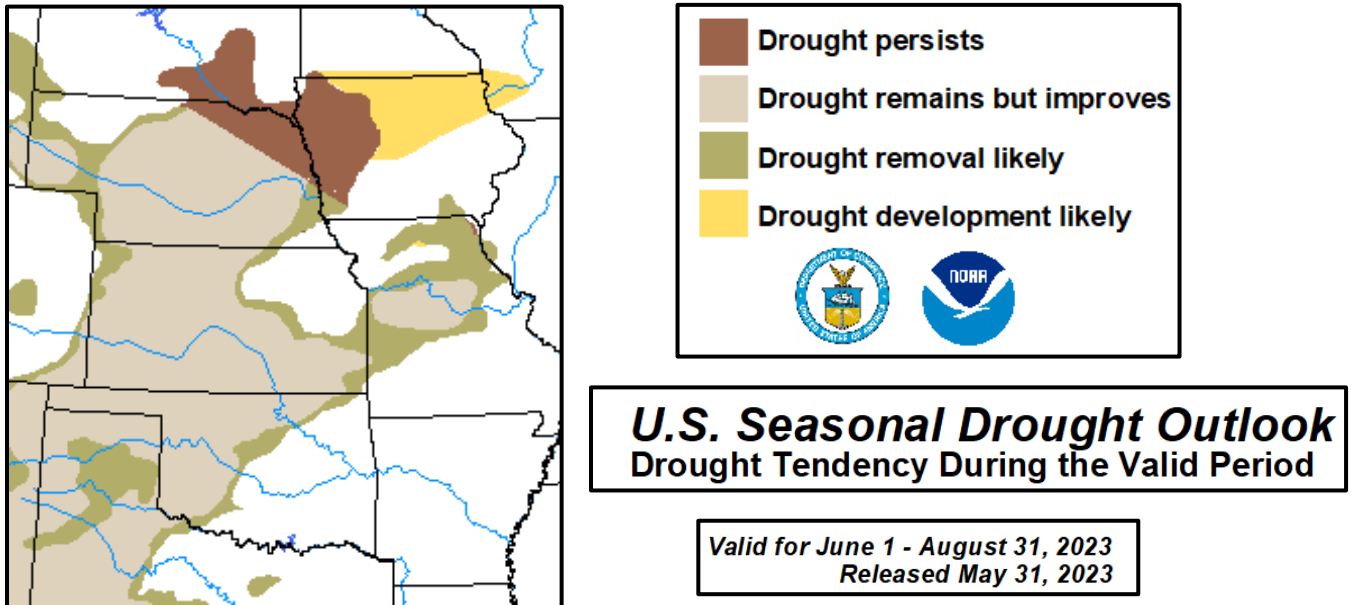
intensification of existing drought due to a combination of below normal precipitation, unseasonably hot temperatures, low relative humidity and higher winds. Current conditions across the Corn Belt, including Iowa, have reached flash drought potential, particularly in the presence of warmth and a dry airmass. Surface and low-level evaporation is made worse by these conditions and can further dry out topsoil and shallow soil moisture, intensifying drought over a period of several weeks. The Climate Prediction Center's (CPC's) 8-14 day US Hazards Outlooks shows the potential for rapid onset drought (flash drought) from central Iowa through the eastern Corn Belt and southern Michigan into the third week of June.



Over the last month, the US Drought Monitor continued to show an expansion of dryness and drought in Iowa, with nearly all of the state in some form of designation. At the start of May 75 percent of Iowa was rated at some level of dryness or drought. By the end of May, that area had grown to 92 percent of the state. The driest parts of Iowa continued to be the western and southeastern regions, although D4 Exceptional Drought was removed from Iowa in late May. The area of the state rated as D3 – Extreme Drought is less than 1 percent, in Woodbury and Monona Counties in western Iowa. The area of D2 – Severe Drought covers just over 7 percent of Iowa, while D1 – Moderate Drought covers about 35 percent of the state. D0 – Abnormally Dry covers more than half of the state. As of the first week in June, only about 1 percent of the state is free from dryness and drought. It should be noted that D0 is rated as “abnormally dry” and is not technically a drought situation. However, D0 conditions can become D1 if dry and warm conditions continue.



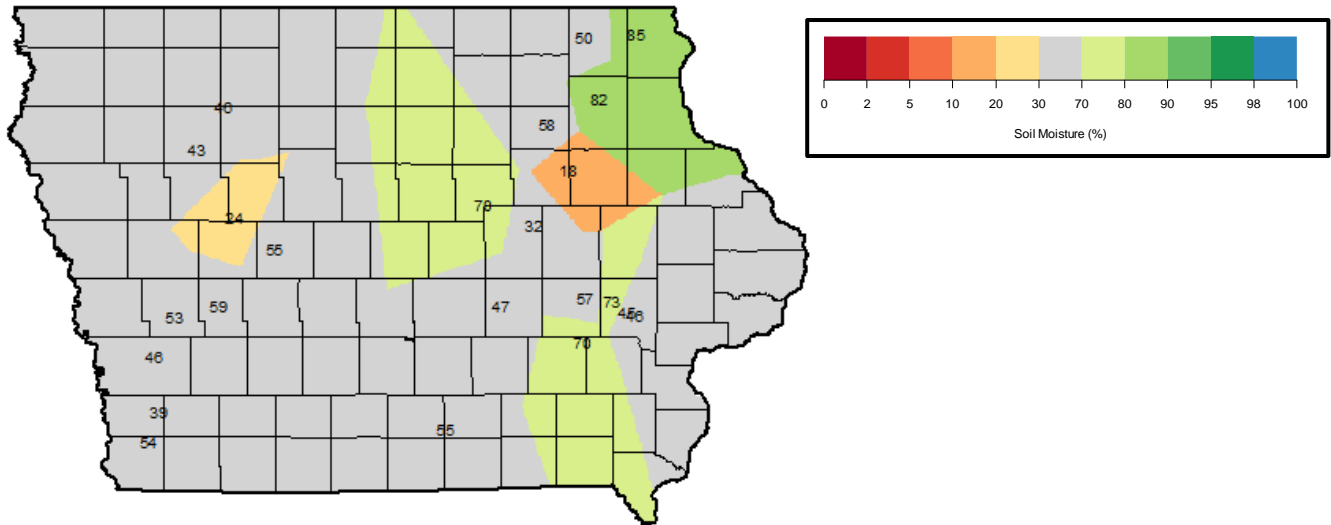
The Seasonal Drought Outlook issued by the CPC, valid for June 1 through August 31, shows persistent drought in western Iowa, drought development across much of northern Iowa, and drought removal in southeast and southwest areas of the state. This outlook also shows large areas of potential drought improvement or drought removal in the states of Nebraska, Kansas, Missouri, and Oklahoma.



The most significant drought conditions nationally remain in the states of Missouri, Nebraska, Kansas, Oklahoma, and Texas. At the end of May those were the only states that had D3 or D4 conditions (in addition to the small area of D3 in Iowa.). Kansas is currently experiencing the driest conditions, with over half that state rated as D3 or D4 drought conditions.

OTHER WATER RESOURCE INFORMATION

MAY SOIL MOISTURE



Despite recent rainfall scattered across all state and high temperatures experienced in May, soil moisture conditions have decreased considerably over the past month. Conditions have particularly worsened in south central Iowa and a few counties in eastern and western Iowa.

BORDER RIVER CONDITIONS

In their weekly update of Missouri River conditions dated June 6, the Army Corps of Engineers indicated that system storage is 52.6 million-acre feet (MAF), an increase in stored water of 3 MAF over the past month. Available storage in the reservoir system for the season’s remaining runoff capacity remains well above normal. Warm temperatures in the mountainous region of the upper Missouri River Basin led to a quick melt of the mountain snowpack, with only about ten percent of the snowpack remaining. The rapid melting combined with precipitation in the western half of the Basin resulted in 144 percent of normal inflow into the reservoir system during May. Despite this above normal May runoff, annual runoff above Sioux City, IA is forecasted to be 26.8 MAF, about 104% of the average.

The Mississippi River basin along the Iowa border experienced flooding due to high winter 2023 snowpacks in Minnesota and Wisconsin. Flood levels peaked in early May, and have generally returned to normal levels.

ADDITIONAL INFORMATION

For additional information on this Water Summary Update please contact any of the following:

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