

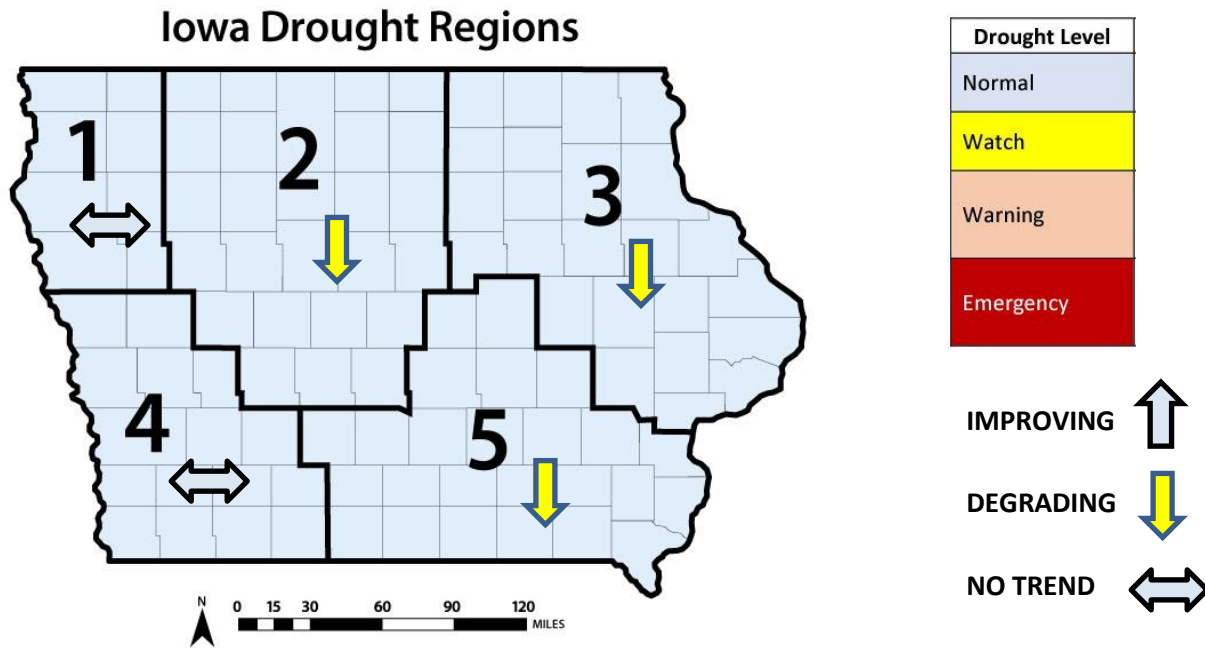


WATER SUMMARY UPDATE

Published Date May 4, 2023 | Issue 143

A snapshot of water resource trends for April, 2023

IOWA DROUGHT CONDITIONS

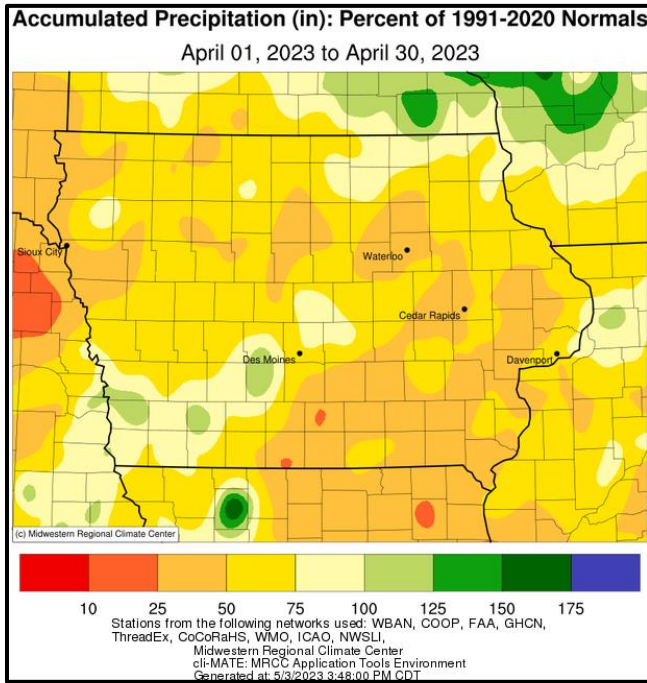


INTRODUCTION: This edition of the Water Summary Update continues to reflect use of the 2023 Iowa Drought Plan (IDP), which was developed as a collaborative effort between the Department of Natural Resources, the Department of Agriculture and Land Stewardship, and the Department of Homeland Security and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

CONDITION SUMMARY: 2023 started with wetter than normal winter months, but March and now April have been drier than normal. April’s preliminary statewide temperatures averaged 49.0 degrees or 0.4 degree above normal, while precipitation totaled 2.16 inches, 1.51 inches below normal. Even with the drier past two months, Iowa has received about the normal amount of moisture for the year so far. May and June are normally the two wettest months of the year in Iowa, averaging well over an inch per week of rainfall. If normal conditions are seen over the next two months, then conditions should show much needed improvement. However, continued drier than normal conditions could move much of the state into “Drought Watch.” The Climate Prediction Center’s drought outlook map, issued May 1, shows drought persisting in western and northwest Iowa, and drought development likely in southern Iowa.

Iowa Drought Plan Triggers: 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.

April Precipitation



For the second month in a row, unseasonably dry conditions were reported in Iowa. Many of the state’s National Weather Service (NWS) co-op stations registered precipitation deficits on the order of an inch with pockets of two inches or more in southern and eastern Iowa. Several stations in southwestern Iowa received almost an inch of above normal precipitation. Monthly precipitation totals ranged from 0.52 inch in Clive to 5.07 inches in Winterset.

Periods of unseasonably warm temperatures along with cooler than normal conditions were reported through April. Notably, average temperatures from April 12-15 were 15.1 degrees above normal with daytime high temperatures in the 80s and 90s across much of Iowa. Overall, temperatures for the month were near average across much of Iowa with pockets of slightly warmer temperatures as well. Airports in Sioux City and Spencer reported the month’s high temperature of 92 degrees on the 12th, on average 33 degrees above average. Atlantic and Audubon reported the week’s low temperature of 13 degrees on the 6th, on average 19 degrees below normal.

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 April (comparing January, February, and March precipitation) range from -0.7 to +0.2. The negative SPI values in Drought Region 1 (-0.7) and Drought Region 5 (-0.1) are a deterioration from last month, and show the impact of a drier than normal March and a drier than normal April. 0.9 to 1.9. The remaining Drought Regions have positive SPI values, indicating conditions wetter than normal for the past 90 days, despite a drier than normal March and April.

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.

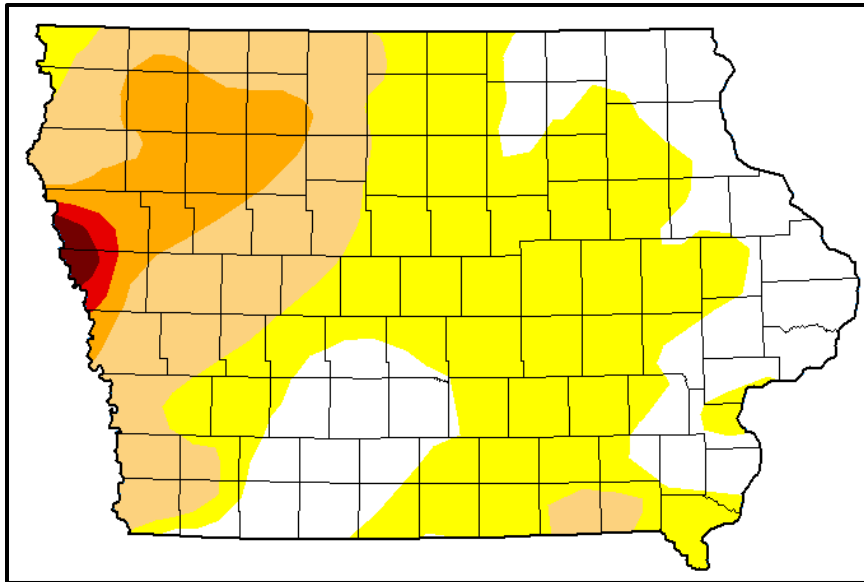
For April, the SSI for drought regions are:

Drought Region	30-Day SSI	365-Day SSI	IDP Classification ↑ = improving ↓ = degrading ↔ = no trend
1	-0.07	-0.76	Normal ↓
2	-0.32	-0.49	Normal ↓
3	-0.05	+0.49	Normal ↓
4	-0.50	-0.59	Normal ↔
5	-0.76	-0.86	Drought Watch ↓

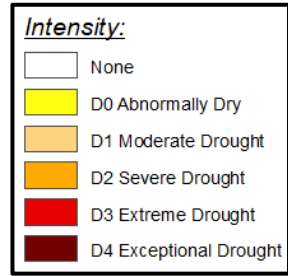
Of concern is the fact that below normal precipitation for two months in a row is beginning to show up in decreasing streamflows – especially at a time when normal increasing rainfall should be increasing flows in nearly all interior streams and rivers. At this time, only Drought Region 5 is close to the “drought watch” trigger for SSI.

During April the US Geological Survey notes that stream flows decreased from normal to below-normal conditions in a third of the state. Portions of the Upper Cedar and Upper Des Moines decreased from above normal to normal conditions. The Racoon, Des Moines, Nishnabotna, Chariton, Skunk, Thompson, and Middle Iowa Rivers have moved or remained in below normal condition.

US DROUGHT MONITOR

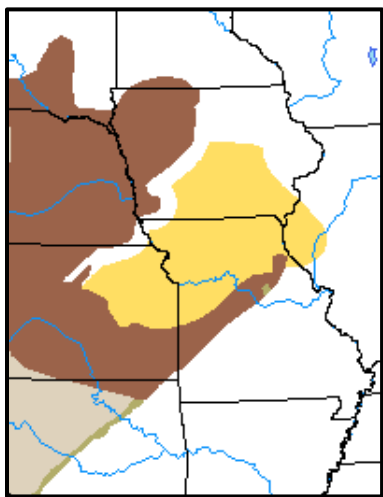


May 2, 2023
 (Released Thursday, May 4, 2023)
 Valid 8 a.m. EDT



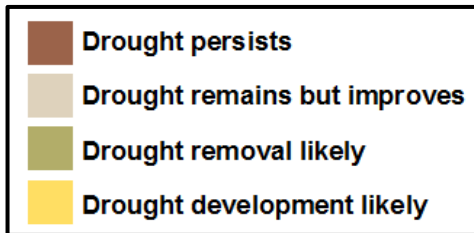
Over the last month the US Drought Monitor shows some parts of Iowa improving, and some deteriorating. Overall, 75 percent of Iowa is now rated at some level of dryness or drought. In northwest Iowa, the area in Severe Drought (D2) has been reduced by over one third. At the same time, the area of southeast Iowa has shown expansion in abnormally dry conditions (D0) as well as the introduction of Moderate Drought (D1) in Davis and Van Buren Counties. This area of D1 in southeast Iowa is the first since the middle of February. The area designated as D4 – Exceptional Drought stands at 0.54 percent of the state, and the area of D3 – Extreme Drought stands at 0.73 percent. These areas of drought conditions are in Woodbury and Monona Counties in western Iowa. The area of D2 covers 8 percent of Iowa, while D1 covers about 21 percent of the state. Only 25 percent of the state is free from any drought designation.

The Seasonal Drought Outlook issued by the Climate Prediction Center, valid for May 1 through July 31, shows continued drought conditions in northwest Iowa, and the likely development of drought conditions in south central and southeast Iowa.



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

Valid for May 1 - July 31, 2023
Released April 30, 2023



The most significant drought conditions nationally remain in are in the states of Nebraska, Kansas, Oklahoma, and Texas. California now shows no D4, no D3, and no D2 drought, with less than 8 percent of that state shown

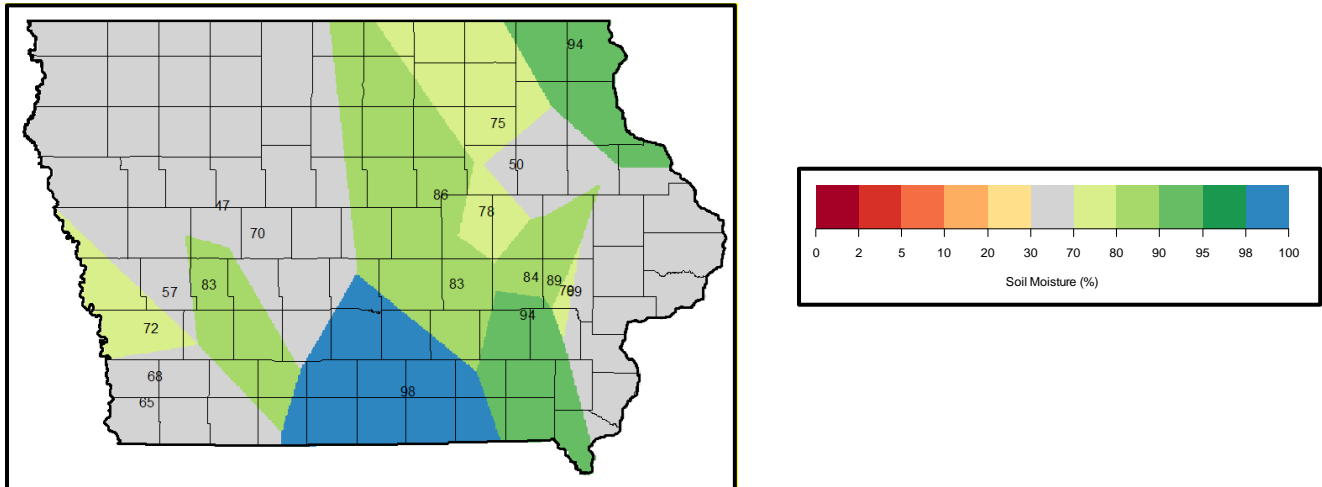
in moderate drought (D1). One year ago nearly the entire state of California was designated as severe drought (D2) or worse.

OTHER WATER RESOURCE INFORMATION

APRIL SHALLOW GROUNDWATER

Continued dry weather and low stream flows are likely to result in decreasing shallow groundwater availability in Iowa. As Iowa enters the growing season, shallow groundwater (and soil moisture) can be more readily depleted as demand or water grows.

APRIL SOIL MOISTURE



Soil moisture has decreased slightly compared to last days of March. Most of the state shows soil moisture levels between 30 and 70 percent, and higher values around 80 percent% for south central and north eastern Iowa.

BORDER RIVER CONDITIONS

In their weekly update dated May 2, the Army Corps of Engineers indicated that the calendar year forecast for the upper Missouri River Basin runoff, above Sioux City, stands at 26.9 MAF, or 105 percent of average. The plains snowpack has all but melted in the basin, and mountain snowpack has peaked above normal in both reaches. The Fort Peck reach peaked at 117 percent of normal on April 24 and has 88 percent of its snowpack remaining. The Garrison reach peaked at 109 percent of normal on April 6 and has 85 percent of the peak remaining. Available storage in the reservoir system for the season’s remaining runoff capacity remains well above normal.

The Mississippi River basin along the Iowa border remains in moderate or major flood stage. Dubuque and locations downstream are currently experiencing major flood stages, while locations upstream from Dubuque are experiencing moderate flood stages. While peak flooding conditions have either occurred, or will soon occur, it will likely be some time before river levels return to normal.

ADDITIONAL INFORMATION

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

General Information, Tim Hall, Iowa DNR Tim.Hall@dnr.iowa.gov 515-452-6633
State Drought Coordinator, Justin Glisan, IDALS Justin.Glisan@iowaagriculture.gov 515-281-8981
Standardized Streamflow Index (SSI), Elliot Anderson, IGS elliott-anderson@uiowa.edu 319-335-1575
Stream Flow, Dan Christiansen, USGS dechrist@usgs.gov 319-358-3639
Stream Flow, Mike Anderson, Iowa DNR Michael.Anderson@dnr.iowa.gov 515-725-0336
Shallow Groundwater, Greg Brennan, IGS greg-brennan@uiowa.edu 319-335-4465
Soil Moisture, Filipe Quintero Duque, Iowa Flood Center felipe-quintero@uiowa.edu 319-384-1727