IOWA DEPARTMENT OF NATURAL RESOURCES

WATER SUMMARY UPDATE

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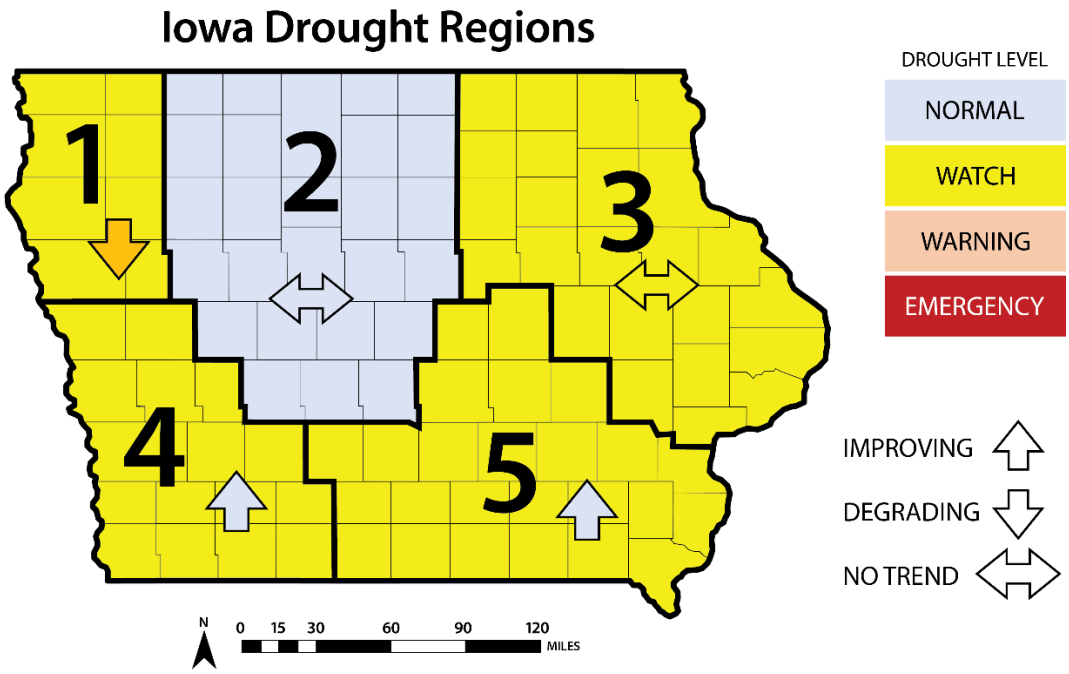
A snapshot of water resource trends for July 2023

IOWA DROUGHT CONDITIONS

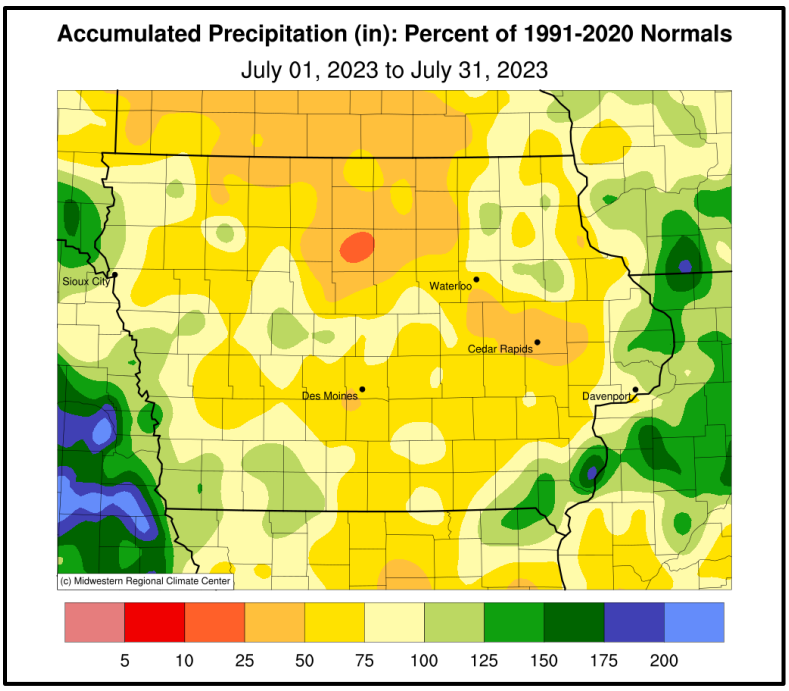


CONDITION SUMMARY

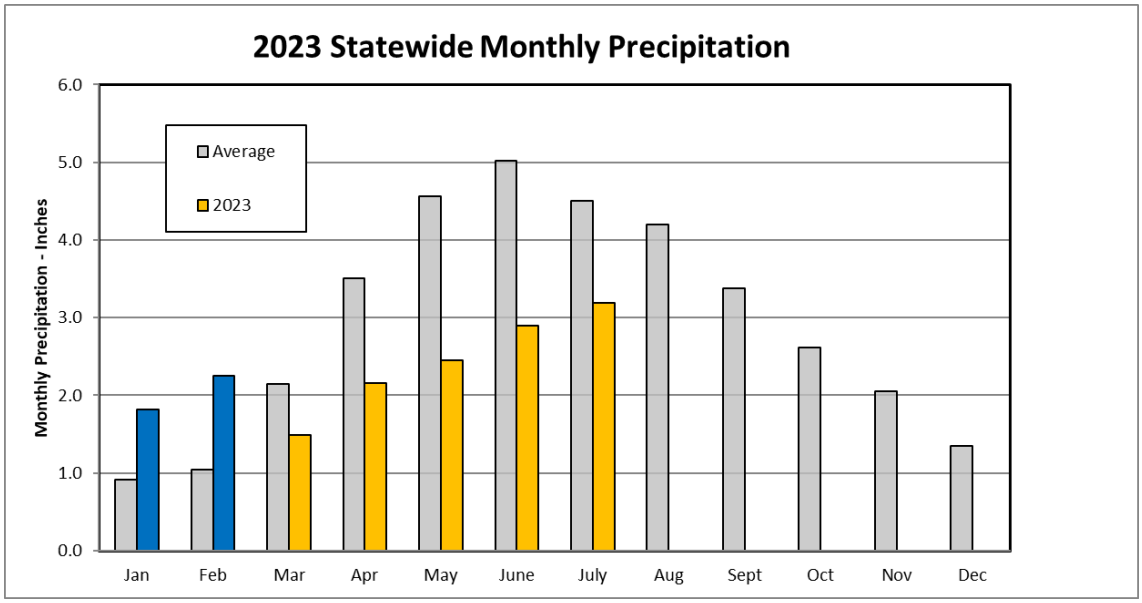
For the fifth month in a row Iowa received below normal rainfall. July rainfall was 3.10 inches, 1.07 inches below normal. For the months of March thru July rainfall in the state totaled 12.18 inches, about two thirds of the expected 18.35 inches. Most of Iowa had below normal rainfall in July, although stations on the eastern and western periphery of the state reported slightly wetter conditions. Streamflow has recovered somewhat from the extremely low flows on early summer, but remains very low in parts of central and western Iowa. Soil moisture continues to be low across much of the state. The US Drought Monitor shows all of the state in some form of dryness or drought, with over half of Iowa in D1 - Moderate Drought.

July Precipitation

National Weather Service co-op stations in north-central Iowa reported comparatively large precipitation deficits, nearing three inches for the month. A majority of the unseasonably dry stations in Iowa reported deficits of one to two inches. Only stations along the eastern and western borders of Iowa observed above-average rainfall. Monthly precipitation totals ranged from 0.79 inches in St. Ansgar to 7.34 inches in Burlington.



The graph below shows monthly precipitation in Iowa compared to normal (the gray bars). The blue bars in January and February show precipitation that was above normal for those two months. Since then, monthly precipitation has fallen short of expected as shown by the orange bars. It is worth noting that each month that remains in the year typically brings less precipitation than the previous month, and by November the average monthly precipitation is less than half of August's.



Statewide average temperatures in July were near-normal across portions of eastern and southern Iowa with negative departures of up to three degrees in the northwest. Keokuk Lock and Dam reported the month's high temperature of 101 degrees on the 28th, 16 degrees above normal. Vinton reported the month's low temperature of 42 degrees on the 7th, 18 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 July (comparing May, June, and July precipitation) range from -0.8 to -1.2. These negative SPI values found across nearly all of Iowa, but show some improvement from last month, with the precipitation deficits in July not being as significant.

Drought Region	3-month SPI	6-month SPI	IDP Classification ↑ = improving ↓ = degrading ↔ = no trend
1	-0.9	-1.1	Drought Watch ↔
2	-0.9	-0.9	Normal ↔
3	-1.2	-0.9	Drought Watch ↓
4	-0.8	-0.6	Normal ↓
5	-1.1	-1.1	Drought Watch ↓

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. 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 July, the SSI for each drought region are:

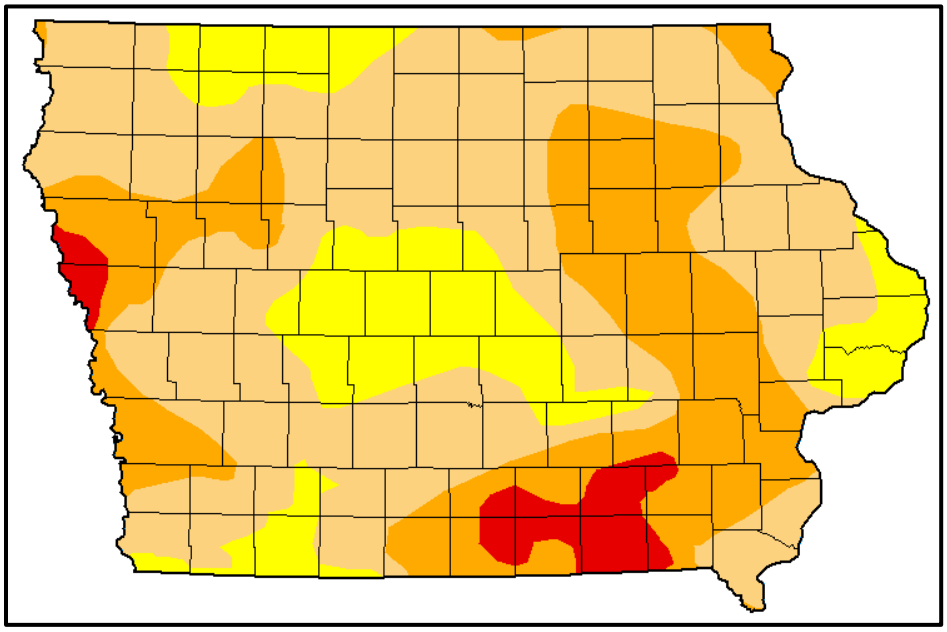
Drought Region	30-Day SSI	365-Day SSI	IDP Classification ↑ = improving ↓ = degrading ↔ = no trend
1	-1.07	-0.84	Drought Watch ↓
2	-0.87	-0.69	Normal ↔
3	-1.07	-0.07	Drought Watch ↔
4	-1.28	-1.07	Drought Watch ↑
5	-1.08	-1.08	Drought Watch ↑

During July, the USGS notes that streamflow conditions across most of the state remained below normal, with a few areas in much below-normal conditions. The Maple, Boyer, Nishnabotna, remained in much below-normal conditions. The Soldier, Thompson, Chariton, Skunk, Raccoon, and lower Des Moines all improved since last month and moved into below-normal conditions. The Upper Iowa, Upper Cedar, and Ocheyedan Rivers moved into the below-normal condition.

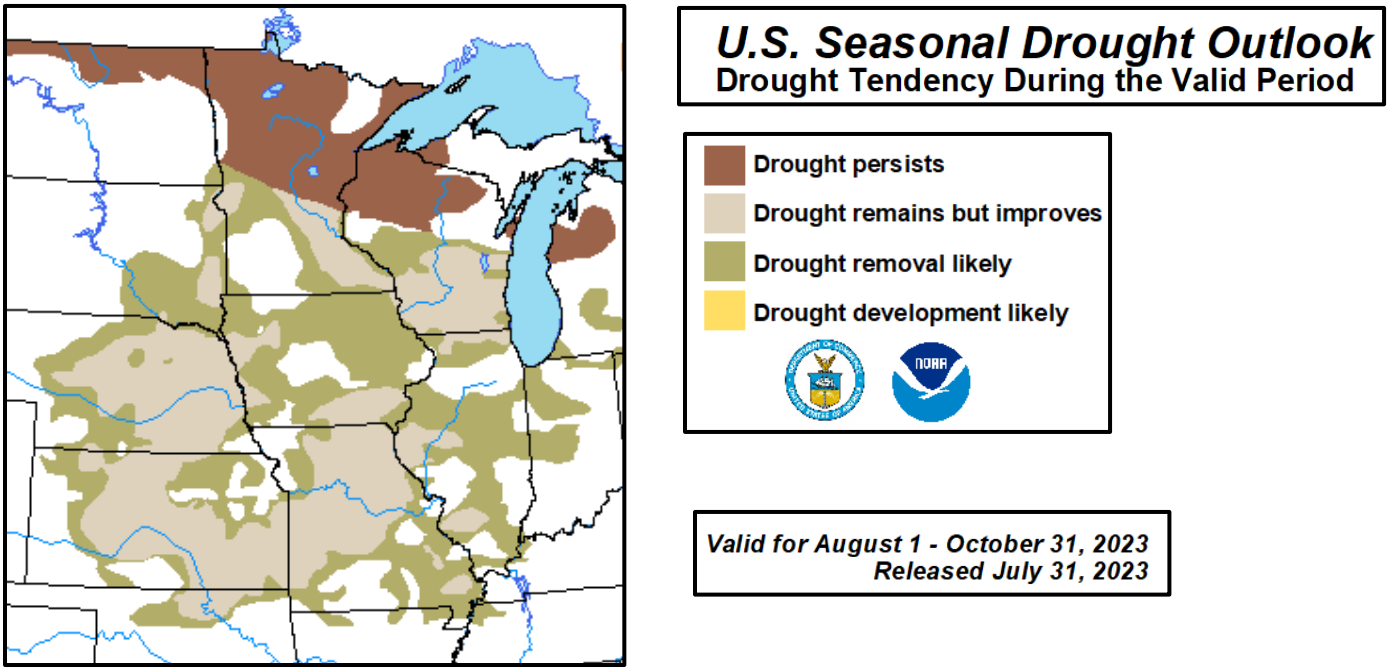
US DROUGHT MONITOR AND DROUGHT CONDITIONS

During the month of July, drought conditions remained generally steady across the state, with some improvement in eastern Iowa. A large area of D2 - Severe Drought that covered part or all of nearly 20 counties in eastern and northeastern Iowa has improved to D1 - Moderate Drought., and the designation of D3 - Extreme Drought has been reduced from 5.5 to 4.2 percent of the state. At the end of July 261 percent of the state was rated in D2 - Severe Drought, and 52.2 percent of the state was rated in D1 - Moderate Drought. D0 - Abnormally Dry conditions cover the remaining 17.5 percent of the state

Abnormal dryness or drought conditions have now been continuously present in Iowa for more than three years. The last USDM to show no dryness or drought in the state was May 5, 2020, a stretch of 169 weeks. This is the longest continuous period of dryness or drought in Iowa since the start of the USDM in 2000. On a national scale, about half of the continental United States is free from dryness or drought, with the most significant drought conditions extending from Texas north and east thru Kansas, Nebraska, Missouri, Iowa, Wisconsin, and Minnesota. Aside from the Pacific Northwest, much of the western United States is free from any designation of dryness or drought, with only small areas D0 and D1 conditions in and to the west of the Rocky Mountain states.



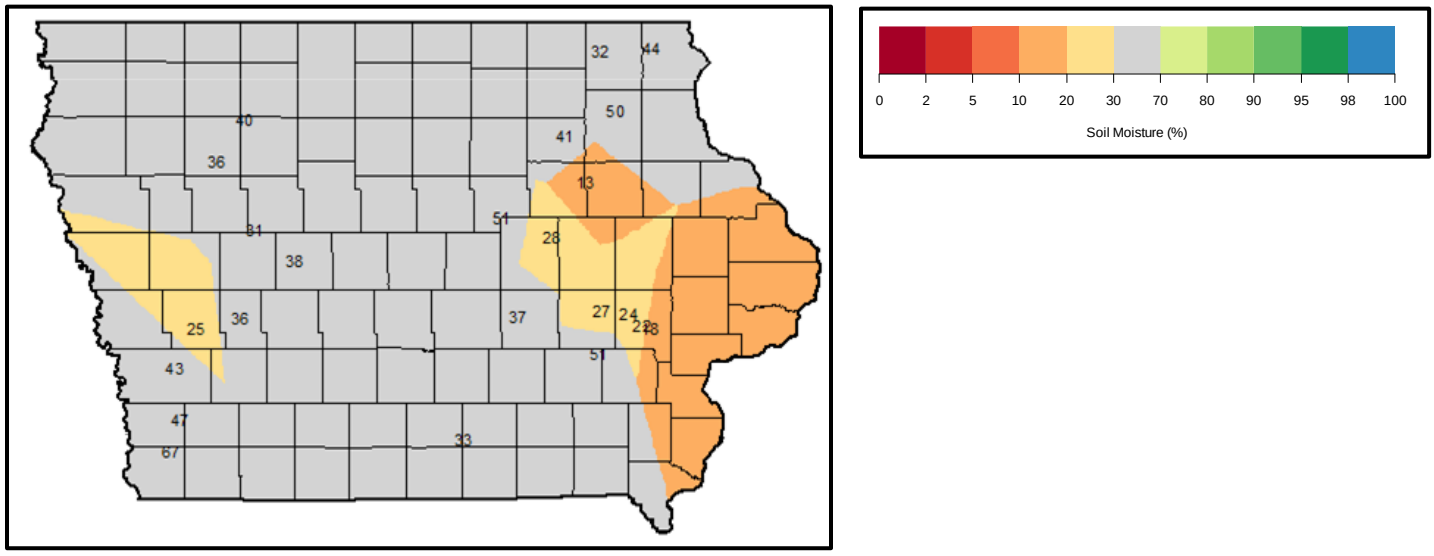
The Seasonal Drought Outlook issued by the CPC, valid for August 1 through October 31, shows much of Iowa with a tendency for improvement or even removal of drought conditions. This improvement in drought conditions is also shown for the surrounding states of South Dakota, Nebraska, Kansas, Missouri, and Illinois.



OTHER WATER RESOURCE INFORMATION

June Soil Moisture

Soil moisture conditions deteriorated considerably from in July across the state. The lack of rainfall has reduced soil moisture, especially in eastern and western Iowa. Deeper soil moisture has also been reduced, but still some areas in northcentral and northeastern Iowa continue to better conditions than the rest of the state. The figure below shows shallow soil moisture conditions as of the end of July.



Another source of soil moisture information is the US Department of Agriculture's National Agricultural Statistics Service (NASS) that reports conditions weekly. In the report from July 31, 80 percent of subsoil in east central Iowa is reported as being short or very short of soil moisture, with 77 percent of southeastern Iowa in that conditions. Better soil moisture conditions are indicated in northeast and southwest Iowa, with 55 to 60 percent of subsoil rated as short or very short of soil moisture.

BORDER RIVER CONDITIONS

In their weekly update of Missouri River conditions dated August 17, the Army Corps of Engineers indicated that system storage is 56.3 million-acre feet (MAF), an increase in stored water of 3.7 MAF over the past month. Available storage in the reservoir system for the season's remaining runoff remains well above normal. Gavins Point releases are currently 31,500 cfs. According to the US Drought Monitor, over the past 4 weeks conditions have dried out in northern Montana and parts of North Dakota within the Basin (lower right). Drought conditions are still present but have improved slightly in eastern Nebraska. Flow volumes on the Mississippi River continue to decline as conditions in the Upper Mississippi River basin get drier.

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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