IOWA DEPARTMENT OF NATURAL RESOURCES

WATER SUMMARY UPDATE

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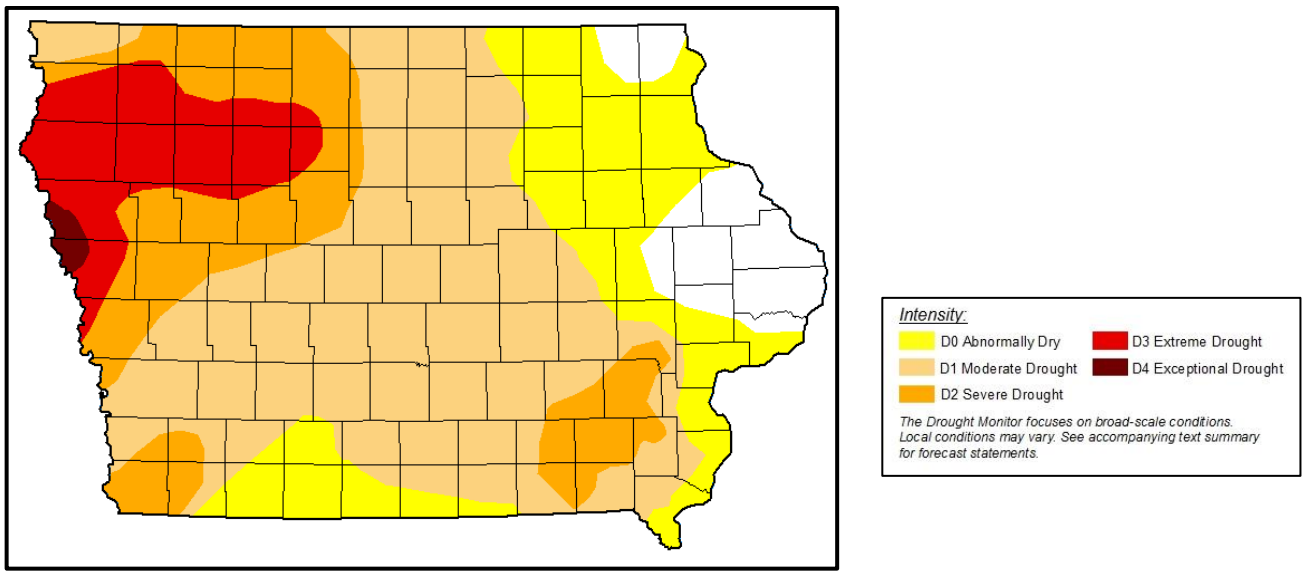
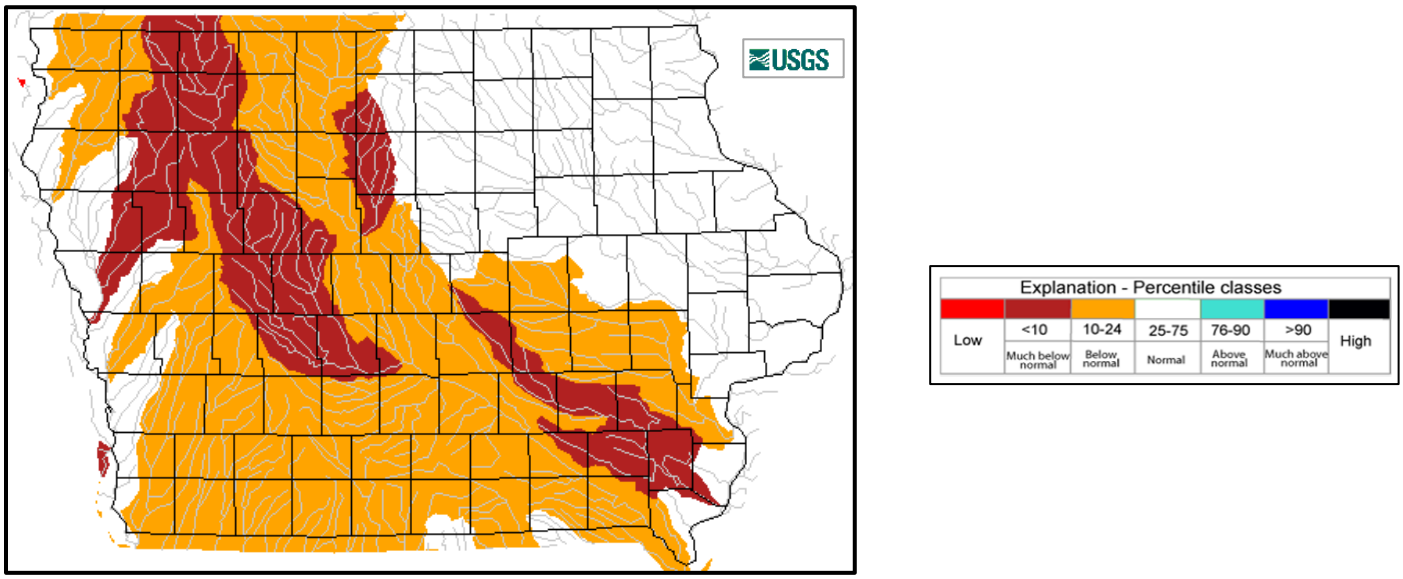
A snapshot of water resource trends for October, 2022

Drought Monitor - Conditions as of November 8, 2022

National Drought Mitigation Center and partners

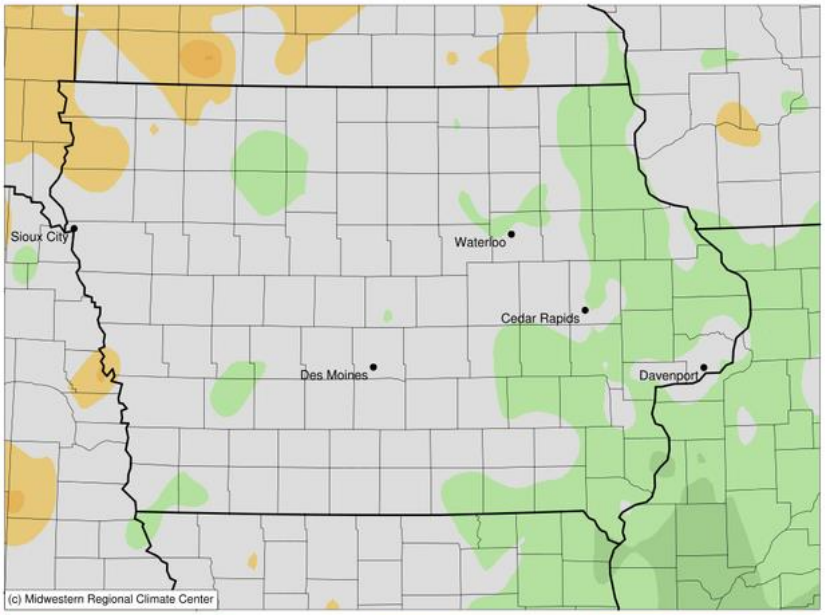


Stream Flow – October, 2022



Average Temperature (°F): Departure from 1991-2020 Normals

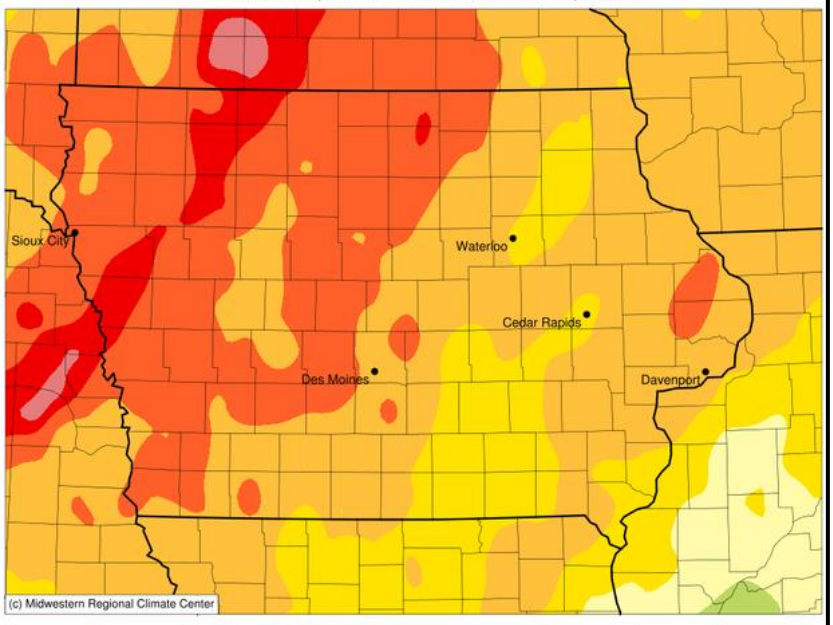
October 01, 2022 to October 31, 2022



Stations from the following networks used: WBAN, COOP, FAA, GHCN, ThreadEx, CoCoRaHS, WMO, ICAO, NWSLI,
Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment
Generated at: 11/10/2022 7:27:55 AM CST

Accumulated Precipitation (in): Percent of 1991-2020 Normals

October 01, 2022 to October 31, 2022



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Midwestern Regional Climate Center
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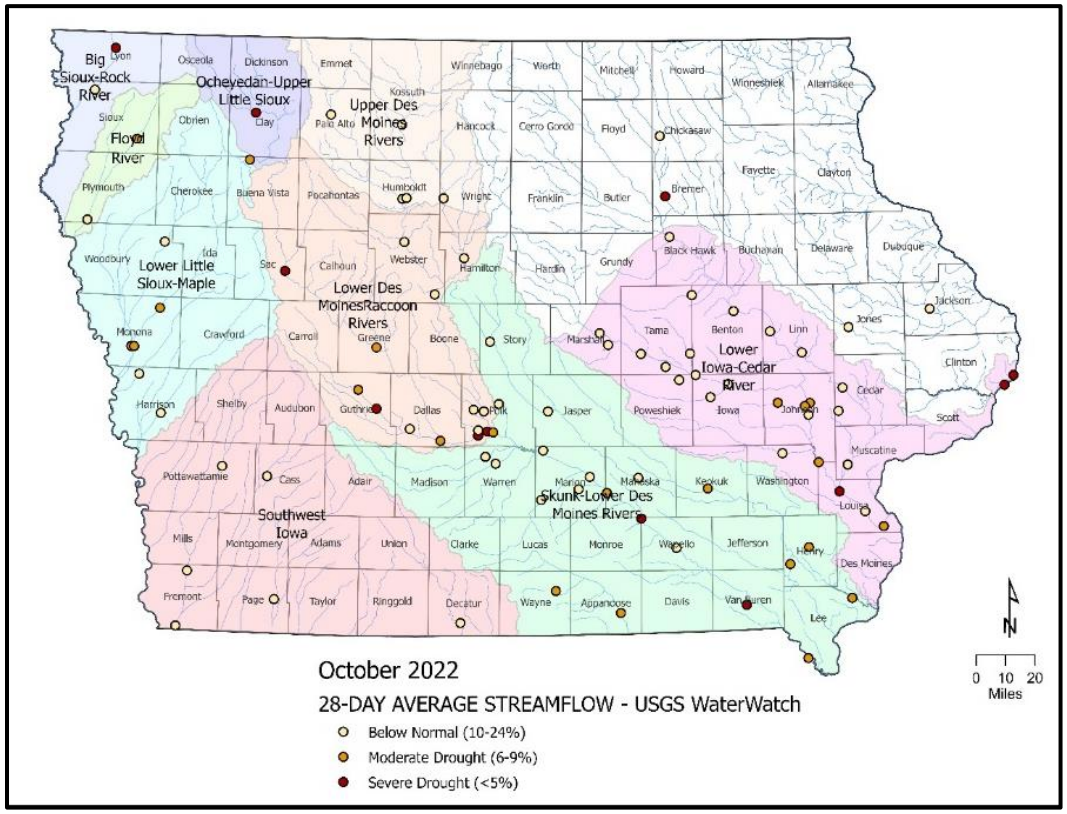
Shallow Groundwater - Conditions for October 2022

Iowa DNR and IIHR-Hydroscience and Engineering



RECENT DEVELOPMENTS AND CHANGES

SUMMARY

The month of October continued the pattern of below-normal months of precipitation for 2022. Although the first weekend in November brought much-needed rain to the state, much of the state remains in drought conditions, with the entire western side of Iowa more than 8 inches behind normal in rainfall for the year – including the recent November rains. Thus far in 2022 nine out of ten months have been below normal for rainfall, including October, which was 1.80 inches below normal. Areas of northwestern Iowa continue to be the most impacted, with Iowa's D3 and D4 conditions seen in that part of the state. Rainfall in early November improved streamflow and soil moisture in some areas, but large areas of drought impact remain.

DROUGHT MONITOR

Over the last month the US Drought Monitor showed continued worsening of conditions, with some intermittent areas of improvement mixed in. Between October 4 and November 7, the drought monitor for Iowa showed degradation in every category of drought or dryness. The worst conditions peaked on November 1, just before the rainfall of last weekend. That rain brought some improvement in drought conditions, but drought conditions remain across nearly all of the state. Over 11% of Iowa is in Extreme (D3) or Exceptional (D4) Drought, and almost three quarters of the state is in at least Moderate Drought. The least impacted parts of Iowa are the counties in east central and eastern Iowa, with about 7% of the state free from any dryness or

drought. Long-term significant precipitation deficits remain in much of Iowa, and consistent rainfall is needed to move more of the state out of drought conditions. Significant drought conditions exist to our west and south in Nebraska and Kansas, while drought conditions spread eastward as far as Ohio, Kentucky, Tennessee, and Georgia.

OCTOBER PRECIPITATION AND TEMPERATURE

While widespread rain fell across Iowa, all National Weather Service co-op stations reported below-average totals in October with the driest conditions found in the state's western one-half; precipitation deficits approached 2.50 inches at several stations. The statewide average precipitation was 0.89 inches, 1.80 inches below normal. This ranks as the 15th driest October in 150 years of statewide records. October 2011 was drier and the 10th driest on record. Monthly precipitation totals ranged from only 0.06 inches at Estherville Municipal Airport to 2.49 inches at Keokuk Lock and Dam.

October temperatures averaged 50.4 degrees, 0.6 degrees below normal, tying 1906 and 2013 as the 49th coldest on record. A colder October occurred in 2020. Monthly temperatures were near normal across most of Iowa with pockets of colder than average conditions on the eastern side of the state. October's statewide average maximum temperature was 64.4 degrees, 2.1 degrees above normal while the average minimum temperature was 36.4 degrees, 3.2 degrees below normal. Oskaloosa reported the month's high temperature of 88 degrees on the 23rd, 26 degrees above normal. Spencer Municipal Airport reported the month's low temperature of 7 degrees on the 18th, 30 degrees below normal.

OCTOBER STREAM FLOW

During the month of October, streamflow conditions continued to decrease across the state to the below-normal condition and much below normal for over three-quarters of the state. The Little Sioux, Ocheyedan, Maple, Raccoon, Boone, and portions of the Skunk River moved to the much below condition. Portions of the Skunk, Lower Des Moines, Nishnabotna, Lower Iowa, Chariton, Thompson, Nodaway Rivers have moved into the below normal condition or remained below normal since the last water summary. The significant rainfall event on the first weekend of November helped alleviate some of the low flow conditions in the state, especially in southeastern Iowa. Despite the recent rainfall, streamflow in northwest Iowa remains largely below normal or much below normal.

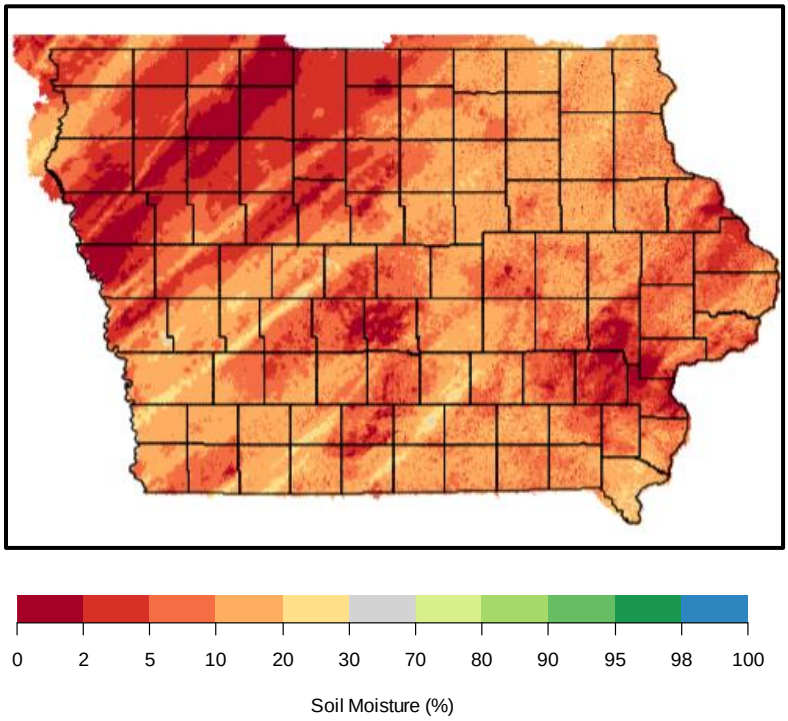
OCTOBER SHALLOW GROUNDWATER

October shallow groundwater level conditions were inferred to be below normal to drought conditions across most of the western two-thirds of the state. The northeast part of the state continues under mostly normal aquifer conditions but with a few streams below normal flows. The extent of the dry areas is like September, but the intensity of dryness has increased resulting in still greater vulnerability to declining shallow groundwater levels. This is subjectively verified by certain well and pump contractors in the northwest Iowa who reported they are unable to meet demand for drilling new wells and for dropping well pumps deeper in existing wells. In lieu of a direct shallow groundwater monitoring network, the USGS's 28-day average stream baseflow statistical trends are used as an indicator of longer-term water level changes in shallow aquifers.

OCTOBER SOIL MOISTURE

Recent rainfall in the state improved soil moisture, but areas of the state remain very dry. The figure below shows soil wetness in percentage, aggregated to 8-inch depth for the last day of October. The map shows areas of northwest and southeast Iowa where shallow soil moisture is below 5%. The most recent Iowa Crop Progress

& Condition report from the National Agricultural Statistics Service (released November 7, 2022) indicates that in northwest Iowa 85% of both shallow and deep soils are short or very short of soil moisture.



MISSOURI RIVER BASIN CONDITIONS

At its recent Fall 2022 Missouri River Basin Water Management Public Meetings the Corps of Engineers provided a summary of this years' conditions in the basin. Currently 75% of the basin is categorized as being in drought, with drought conditions likely to persist, if not expand. This year has been a very dry and warm year, which has led to continued soil moisture deficits and persistent drought. While chances do favor a wet winter for the northern Rockies, the remainder of the basin is either expected to be drier than normal, or with equal chances for above-, near-, or below-normal precipitation. There is no clear indication of precipitation outlook for much of the basin. The 2022 runoff forecast above Sioux City is 19.5 million-acre-feet (MAF), or about 75 percent of normal runoff. These dry conditions have resulted in the continuation of water conservation measures. All of the 16.3 MAF of designated flood storage is available to start 2023 runoff season in addition to more than 9 MAF of conservation storage. Dry conditions and lower storage volumes are likely to result in river flows during the 2023 navigation season at or below full service, and possibly at minimum service.

ADDITIONAL INFORMATION

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

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