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| **NWS FORM E-5** | **U.S. Department of Commerce**<br>NOAA, NATIONAL WEATHER SERVICE | **HSA OFFICE:**<br>**Grand Rapids, MI** |
| **MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS** | | REPORT FOR (MONTH & YEAR):<br>**March 2021** |
| TO: | NATIONAL WEATHER SERVICE (W/OS31)<br>HYDROMETEOROLOGICAL INFO CENTER<br>1325 EAST-WEST HIGHWAY, RM 13468<br>SILVER SPRING, MD 20910 | DATE:<br>April 15, 2021 |
| | | SIGNATURE:<br>Daniel K. Cobb, MIC<br>Andrew Dixon, Service Hydrologist |

When no flooding occurs, include miscellaneous river conditions, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (WSOM E-41).

X An **X** inside this box indicates that no flooding occurred within this hydrologic service area.

## Summary

March is always a transitional month for the rivers in Lower Michigan, as snow and river ice melts away. It is also a particularly vulnerable time of year when heavy rains can combine with the melting snow to produce significant flooding. In 2021, March was about as tame as it could possibly be, with almost completely dry conditions over a large area for the first half of the month, as well as warm temperatures, leading to a slow and steady snowpack meltoff. River levels came up, but no flooding occurred.

Continued warm and dry conditions allowed Lake Michigan water levels to remain largely unchanged, even though the melting snow this time of year should have resulted in the beginning of the seasonal increase (that persists through mid Summer). By the end of the month, water levels were nearly 2 feet lower than they were last summer during the annual high-water mark, and were now more than a foot lower than they were at this time last year (2020). Nevertheless, water levels remain significantly higher (~2 ft) than the long-term average levels.

## Flood Conditions

The long-term normal levels on our rivers are steadily rising this time of year, given the predictable snowmelt and typically wet spring weather. This year, however, was a bit different. With a gradual snowmelt and no significant rainfall, our 3 big river systems (and really all rivers in West/Southwest Michigan) came up during the first half of the month, but barely made it to “normal” levels before the continued dry and warm conditions led to falling water levels again during the 2nd half of the month. One significant regional rainstorm in the 3rd week of the month brought another bump up in

water levels, but not enough to change the fact that all of our major rivers ended the month between the 25th and 50th percentile for this time of year - consistently below-average. Meanwhile, the U.S. Drought monitor responded to this uncharacteristic dry weather by expanding “moderate drought” into much of the area (Figure 5).

## Flood Stage Report

No forecast points exceeded flood stage during the month. Thus, the NWS Form E-3 “Flood Stage Report” was not issued.

## River Conditions

The end of March percentage of normal flow for selected rivers is listed below:

| Location | River | % of Normal |
|---|---|---|
| Scottville | Pere Marquette | 64 |
| Whitehall | White | 55 |
| Evart | Muskegon | 56 |
| Mt. Pleasant | Chippewa | 53 |
| Lansing | Grand | 88 |
| Grand Rapids | Grand | 73 |
| East Lansing | Red Cedar | 100 |
| Hastings | Thornapple | 104 |
| Battle Creek | Battle Creek | 143 |
| Battle Creek | Kalamazoo | 93 |

## General Hydrologic Information

March precipitation amounts for Grand Rapids, Lansing, and Muskegon, Michigan, were 1.51, 1.61, and 0.57 inches, respectively (Figure 1). Monthly departures were -0.86, -0.45, and -1.68 inches, respectively. Yearly departures were -1.53, -0.71 and -2.28 inches for Grand Rapids, Lansing and Muskegon respectively. Percent of mean precipitation for March 2021 is shown in Figure 2.

Temperatures for the month of March at Grand Rapids, Lansing and Muskegon were well above normal. The monthly average temperature departures for these sites were +5.6, +6.2, and +5.2 degrees Fahrenheit, respectively.

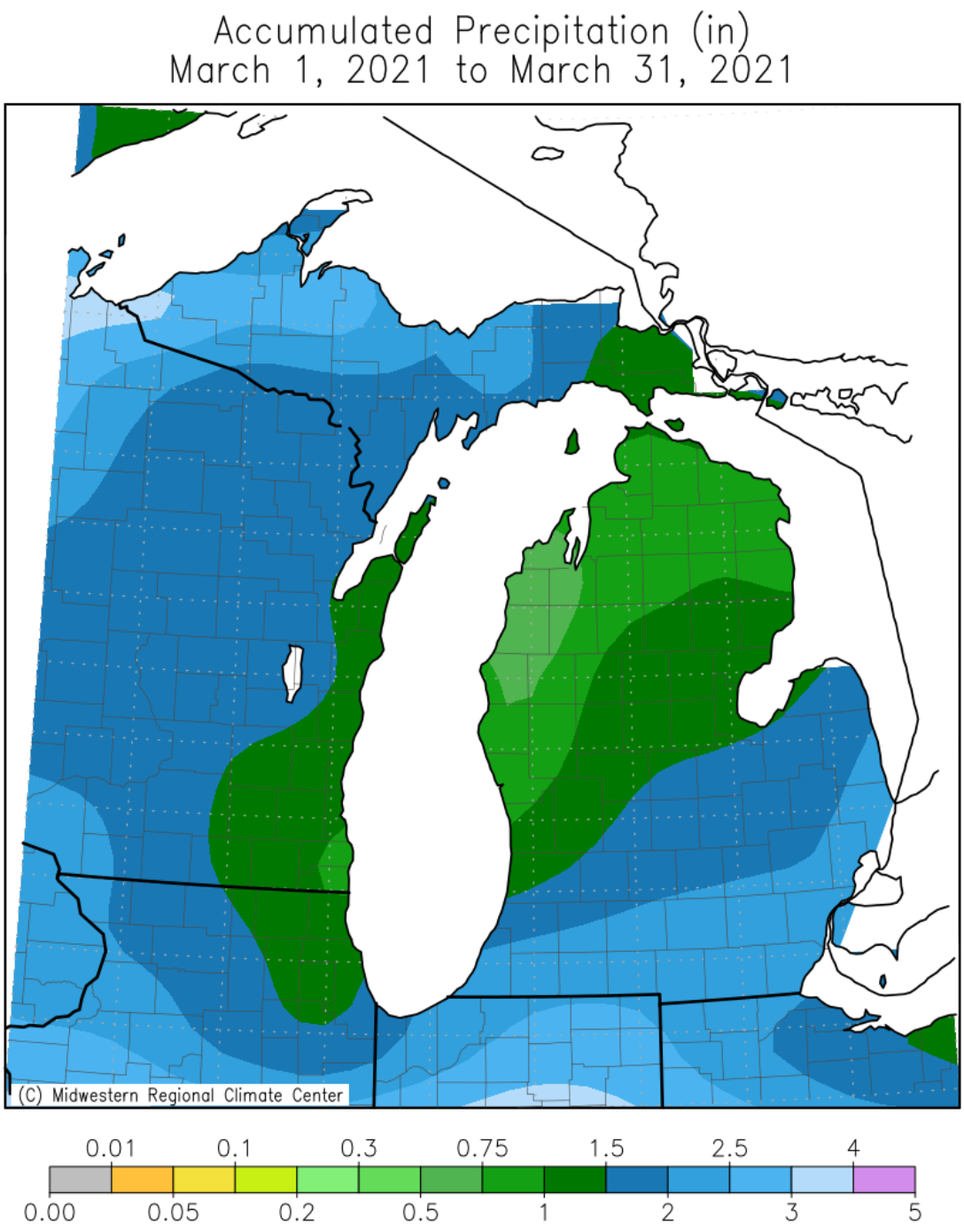


Figure 1. March 2021 Monthly Precipitation Totals.

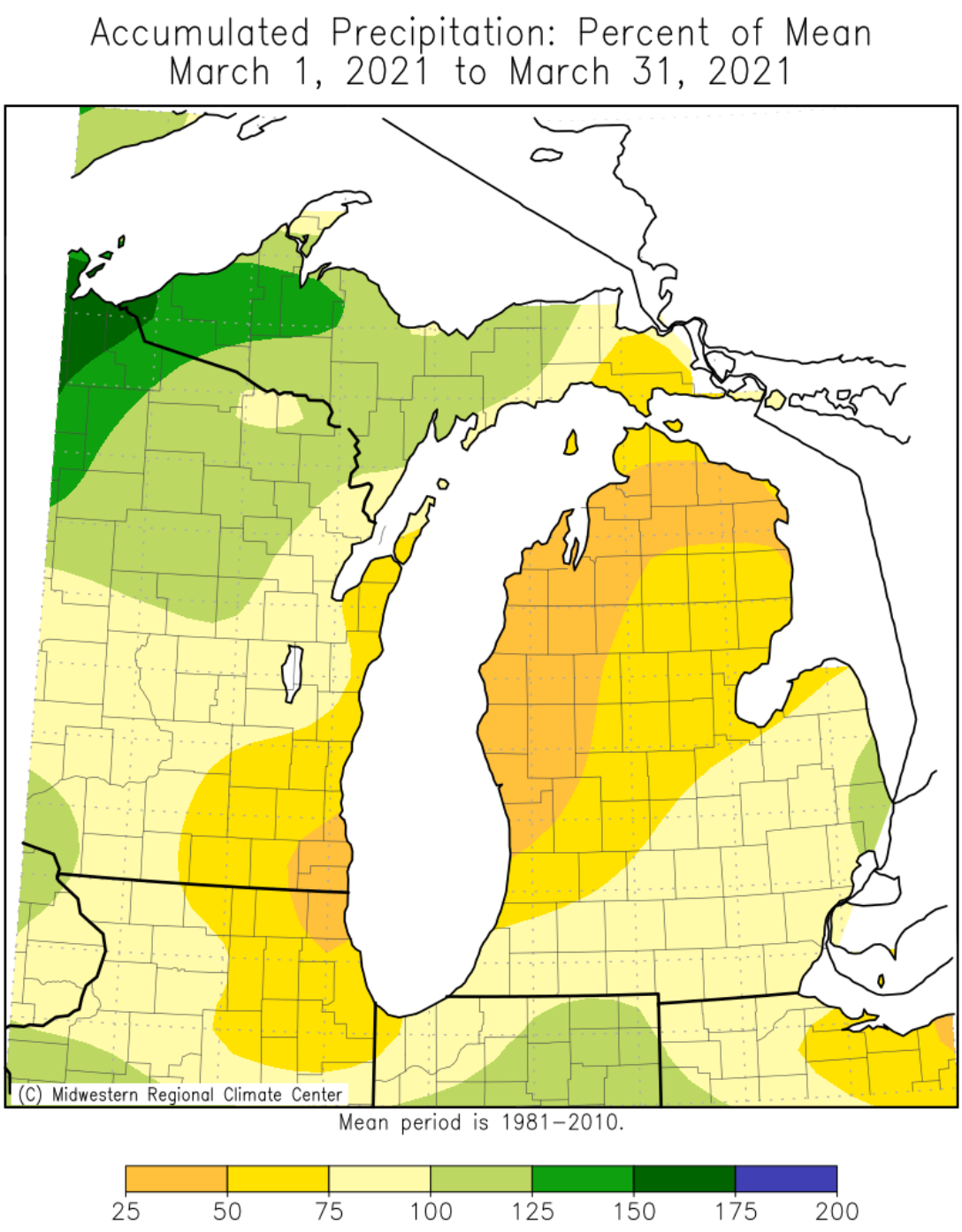


Figure 2. March 2021 Percent of Mean of Accumulated Precipitation.

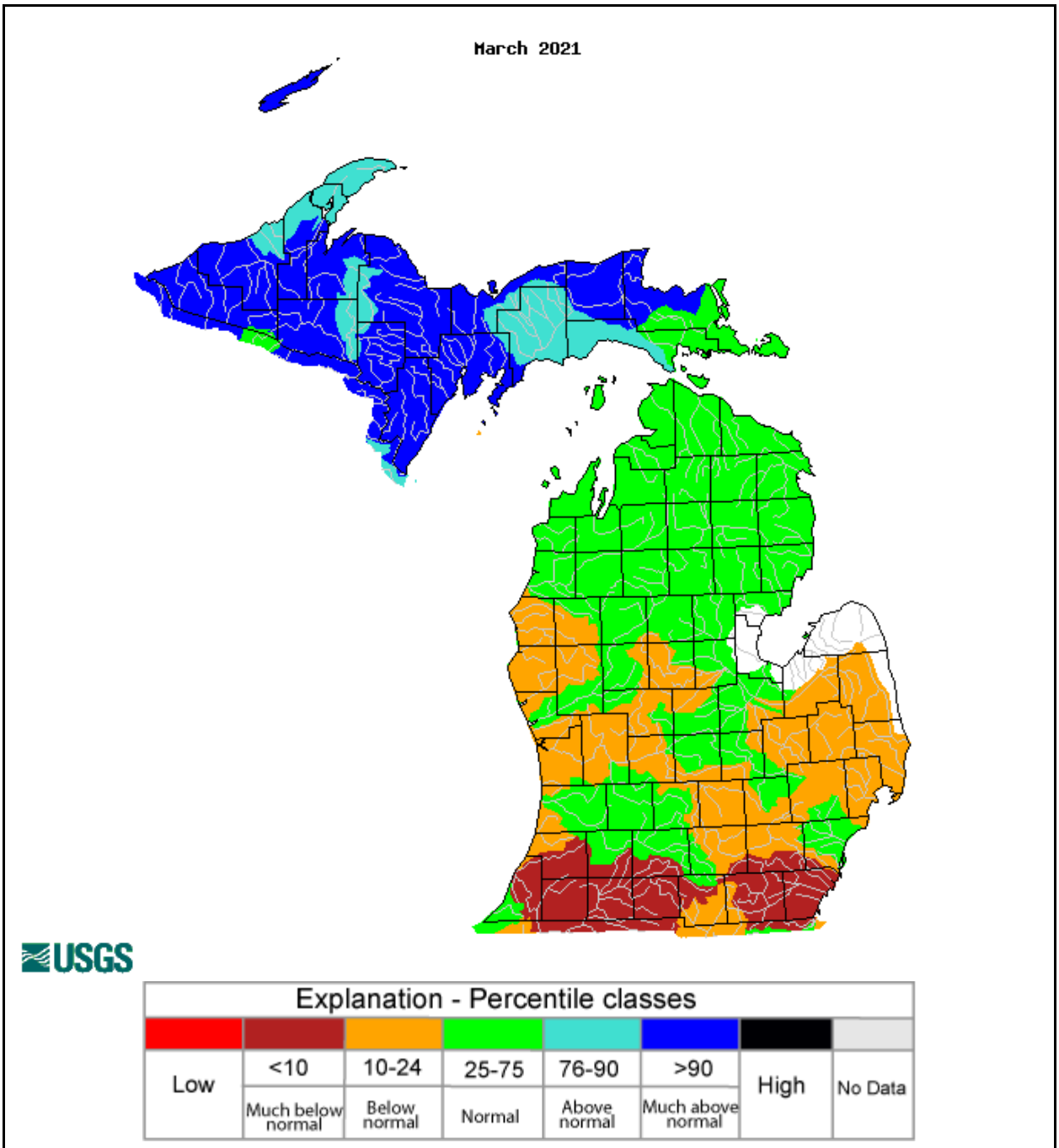


Figure 3. USGS monthly average streamflow for March, grouped by significant hydrologic units. Note streamflows across Lower Michigan generally below-average, owing to several months of relatively dry conditions.

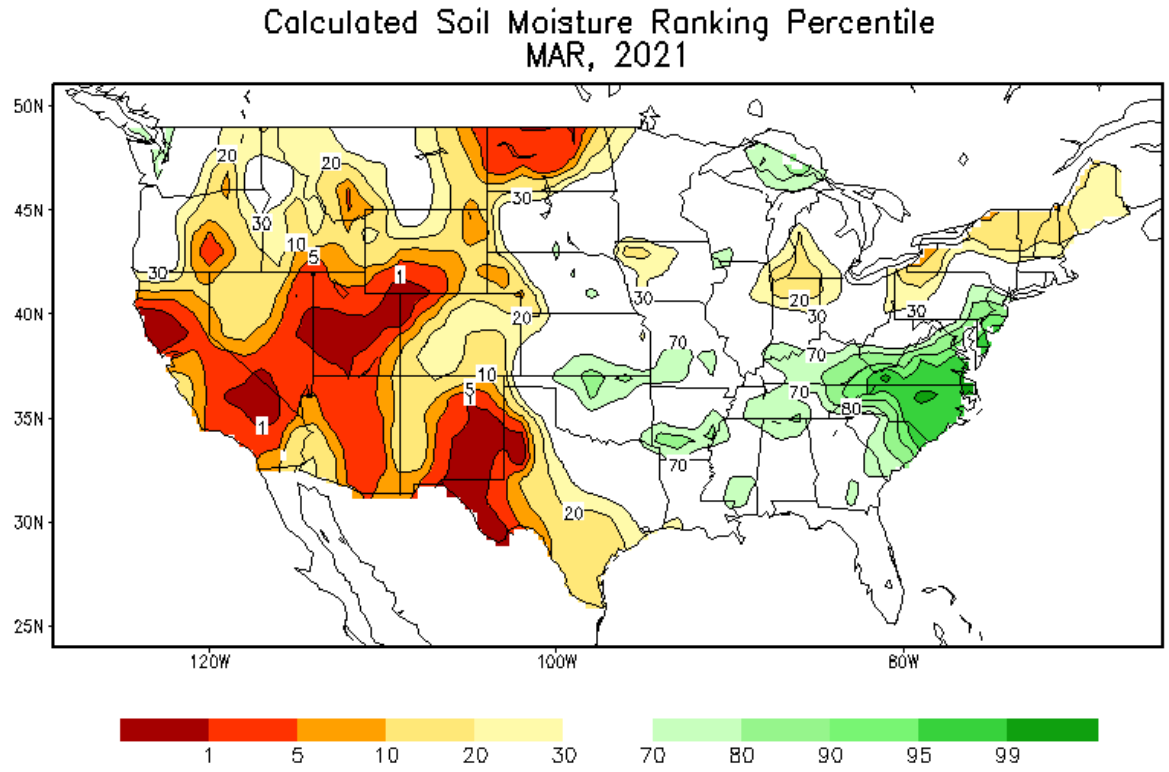


Figure 4. Chart of monthly values of soil moisture, by percentile ranking.

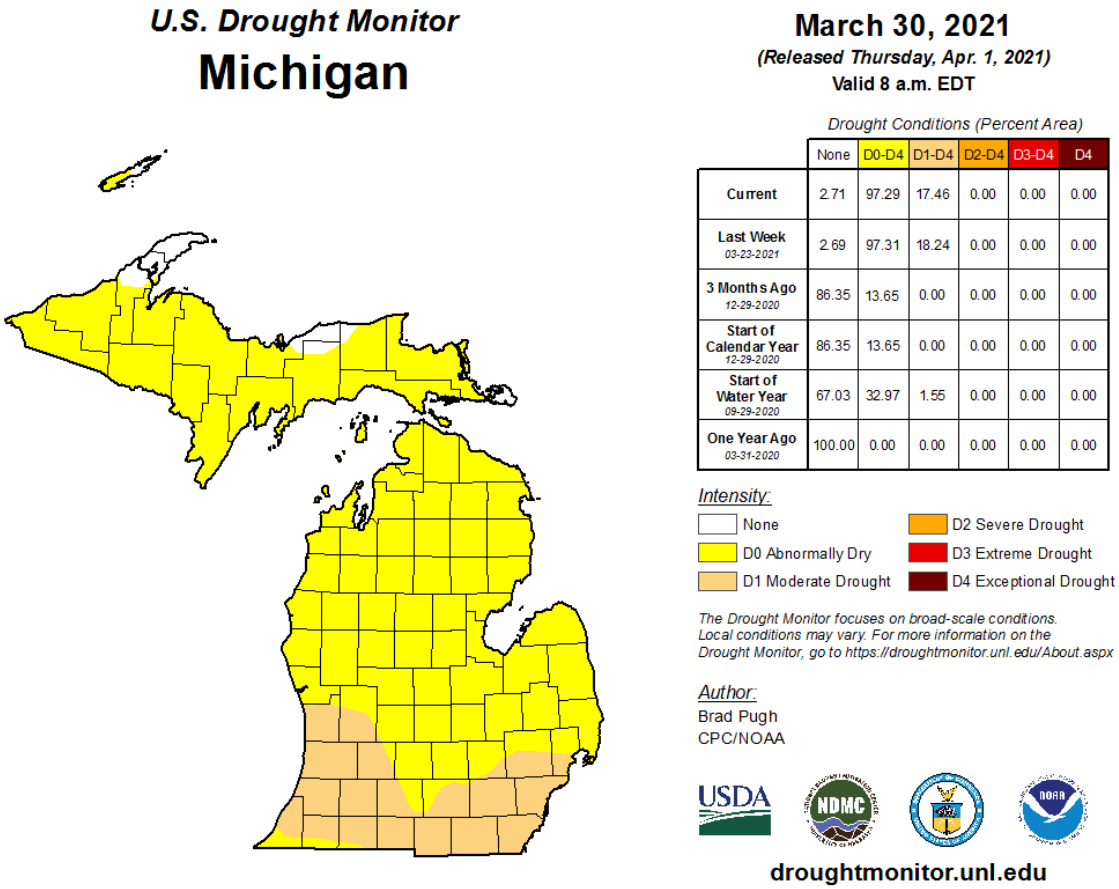


Figure 5. U.S. Drought Monitor analysis for March 30, 2021

## Hydrologic Products issued this month

31 Hydrologic Summaries (ARBRVAGRR)
2 Probabilistic Hydrologic Outlook (ARBESFGRR)
0 Event-driven Hydrologic Outlook (ARBESFGRR)
0 Daily River Forecasts (ARBRVDGRR)
0 Areal Flood Advisory Statements (ARBFLSGRR)
0 Flood Warning Statements (ARBFLWGRR)
0 Flood Watch Statements (ARBFFAGRR)
0 River Statements (ARBRVSGRR)

## News Articles and Related Documentation

none