NWS FORM E-5	**U.S. Department of Commerce** NOAA, NATIONAL WEATHER SERVICE	**HSA OFFICE:** **Grand Rapids, MI**
MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS		REPORT FOR (MONTH & YEAR): **March 2023**
TO:	NATIONAL WEATHER SERVICE (W/OS31) HYDROMETEOROLOGICAL INFO CENTER 1325 EAST-WEST HIGHWAY, RM 13468 SILVER SPRING, MD 20910	DATE: April 13, 2023
		SIGNATURE: Bruce Smith, MIC 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

The active parade of storms and wetter than normal conditions continued through March, as the entire area experienced considerably wetter-than-normal precipitation totals. Overall the rain events did not cause any significant flooding, but they did keep streamflows slightly above-average on all of our major river systems for most of the month.

The heaviest and most widespread rainstorm occurred at the very end of March, dropping over 2 inches of rain in many areas. This got the rivers rising quickly and resulted in the widespread flooding experienced for the beginning of April.

The wetter than normal conditions continued to eradicate remaining drought conditions in southern and southeast parts of the state.

Flood Conditions

With the trend of wetter-than-normal months continuing, it is no surprise that all 3 of our mainstem rivers (Muskegon, Grand, and Kalamazoo) spent most of the month between the 50th and 75th percentile (above average) for this time of year. While this didn't result in widespread flooding, it did set the stage for impactful flooding in April.

During the heavy rain event on March 31, some short-term general flooding occurred near the lakeshore in Ottawa and Kent Counties associated with some repeating thunderstorms. This was handled with flood advisories and did not last for long after the rain ended and drained off into the creeks and streams.

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	110
Whitehall	White	114
Evart	Muskegon	131
Mt. Pleasant	Chippewa	156
Lansing	Grand	180
Grand Rapids	Grand	134
East Lansing	Red Cedar	200
Hastings	Thornapple	159
Battle Creek	Battle Creek	156
Battle Creek	Kalamazoo	160

General Hydrologic Information

March precipitation amounts for Grand Rapids, Lansing, and Muskegon, Michigan, were 5.42, 4.52, and 4.40 inches, respectively (Figure 1). Monthly departures were +3.03, +2.39, and +2.00 inches, respectively. Yearly departures were +5.03, +3.69, and +3.31 inches for Grand Rapids, Lansing and Muskegon, respectively. Percent of mean precipitation for March 2023 is shown in Figure 2.

Temperatures for the month of March at Grand Rapids, Lansing and Muskegon were near or slightly warmer than average. The monthly average temperature departures for these sites were -0.3, +1.0, and +1.5 degrees Fahrenheit, respectively.

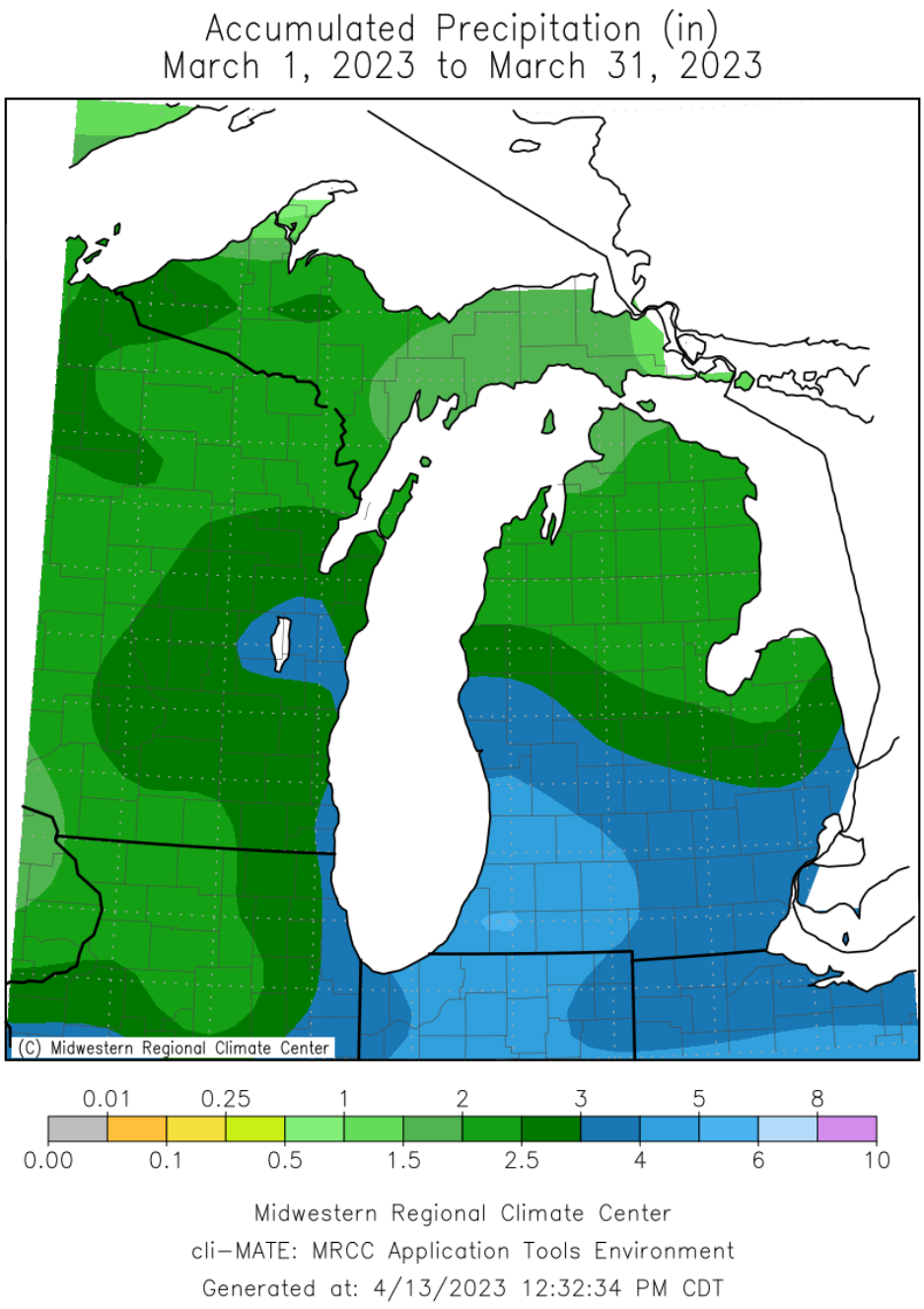

Figure 1. March 2023 Monthly Precipitation Totals.

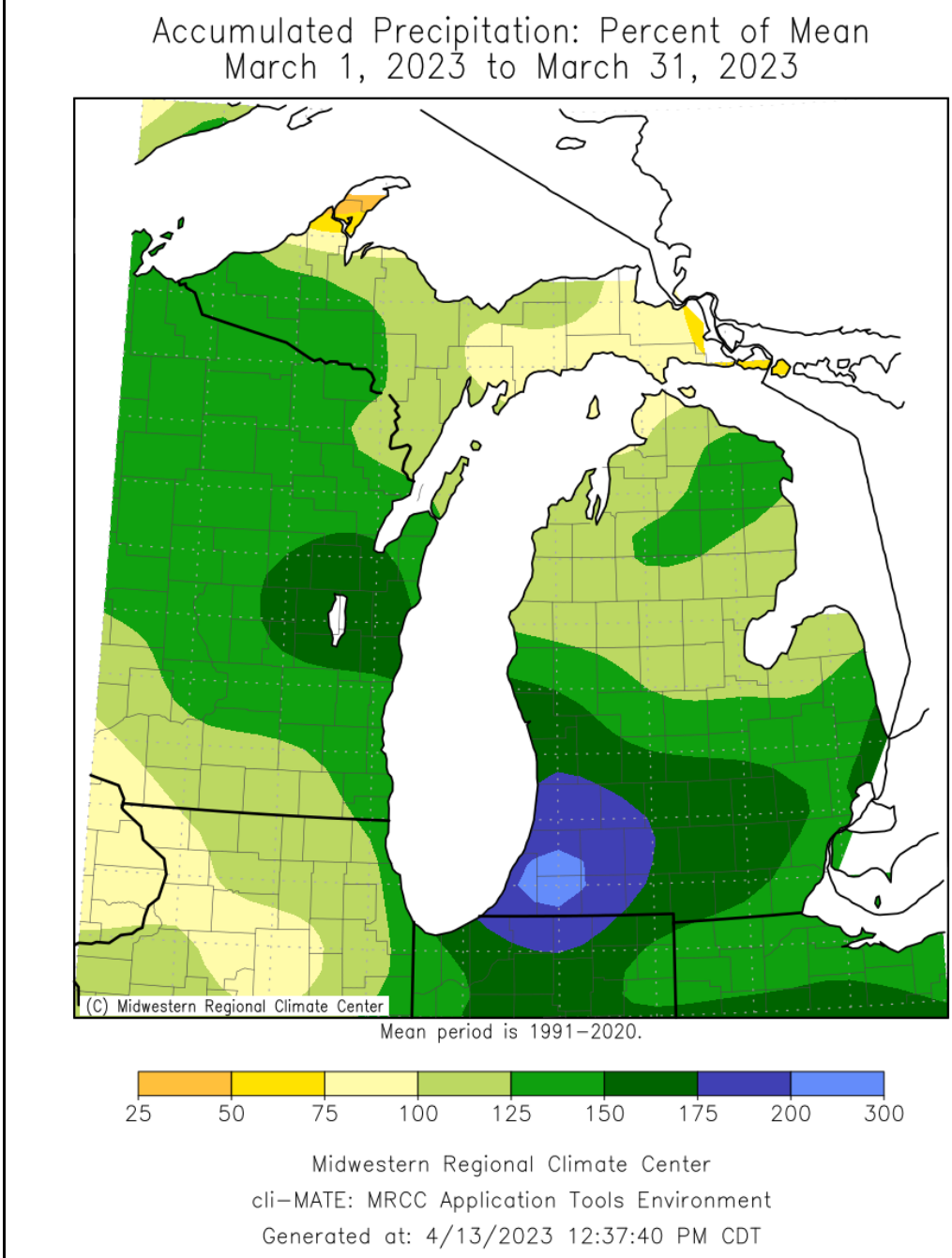

Figure 2. March 2023 Percent of Mean of Accumulated Precipitation.

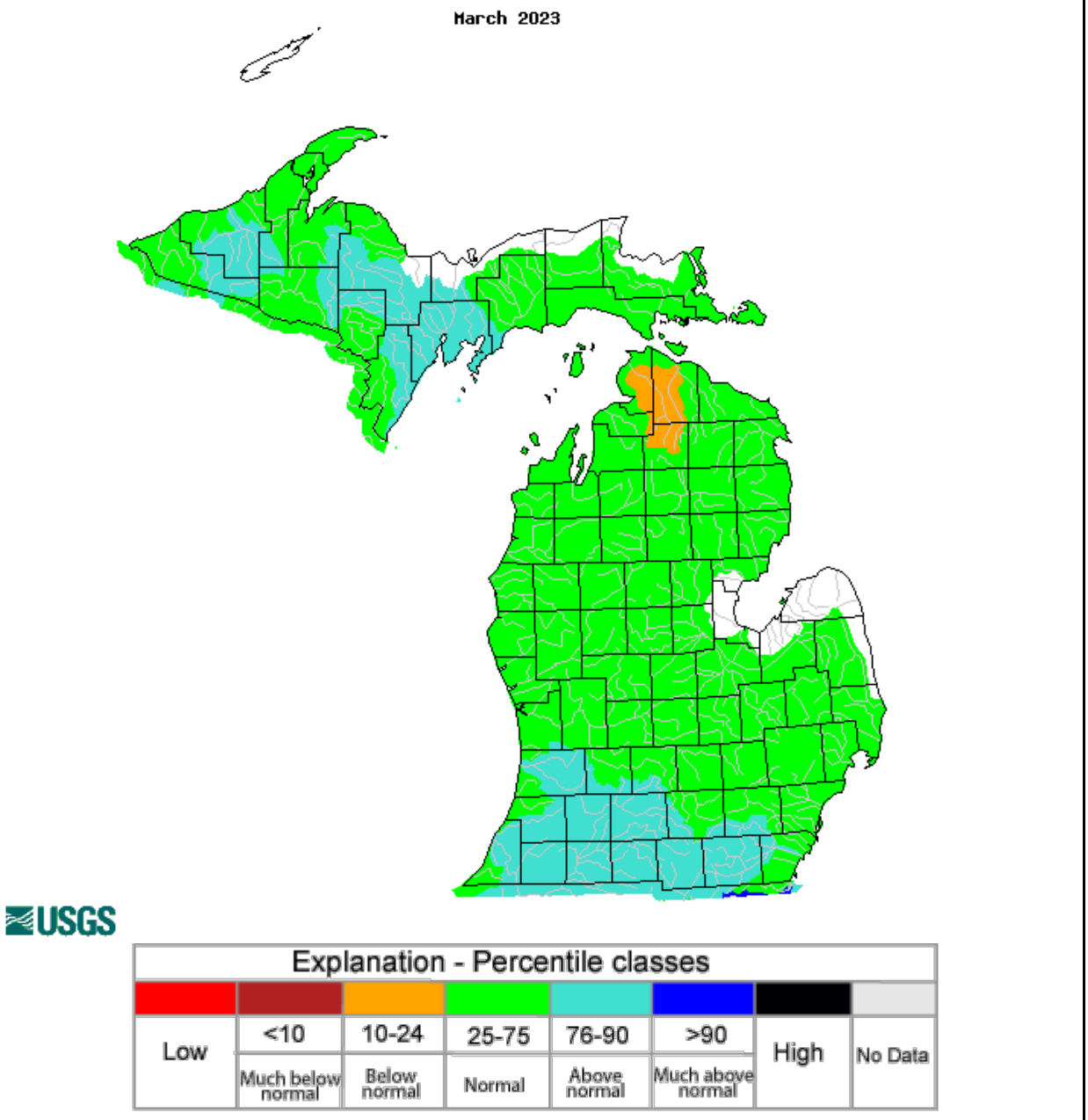

Figure 3. USGS monthly streamflow for March, grouped by significant hydrologic units. Note streamflows general near to above normal for this time of year year, especially over Southern Lower Michigan.

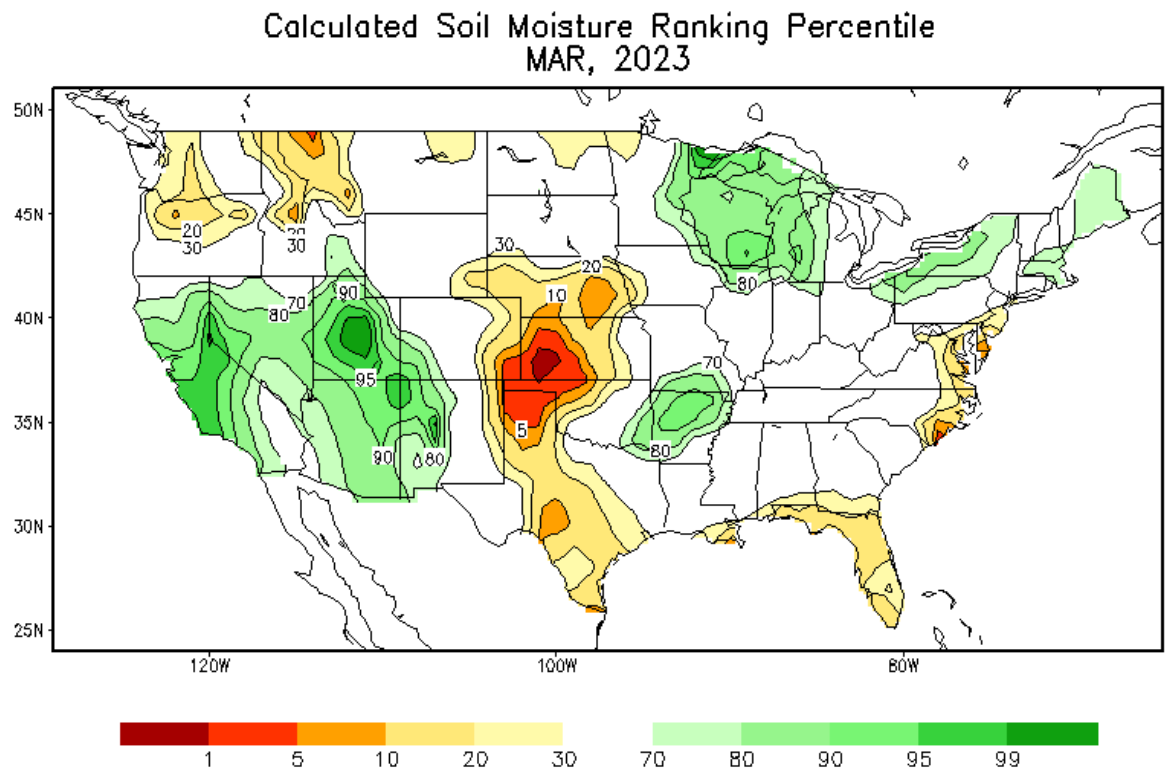

Figure 4. Chart of monthly values of soil moisture, by percentile ranking. This data supports the idea that drought concerns over Southeast Lower Michigan continue to diminish as unusually high soil moisture values spread across much of the Lower Peninsula.

Hydrologic Products issued this month

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

News Articles and Related Documentation

None