Monthly Hydrometeorological Report

Report for March 2024

NWS FORM E-5 U.S. DEPARTMENT OF COMMERCE NOAA, NATIONAL WEATHER SERVICE **MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS** TO: NATIONAL WEATHER SERVICE (W/OH12x1) HYDROMETEOROLOGICAL INFO CENTER 1325 EAST-WEST HIGHWAY, RM 7116 SILVER SPRING, MD 20910	HSA OFFICE: **Marquette, MI** REPORT FOR (MONTH / YEAR): **March 2024** DATE: **April 17th, 2024** SIGNATURE: **Evan Kutta, Hydro Program Manager** **Matt Zika, AMIC**
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 no flooding occurred within this Hydrologic Service Area.

Summary

Most sites across Upper Michigan observed above-normal precipitation during March with liquid amounts generally ranging from 2 to 3 inches (Table 1, Figure 5, Figure 6). The first half of the month was generally dry and very warm whereas the second half was cooler and damp with frequent snow events. Even though precipitation was above normal across most of the area during March, long-term precipitation deficits resulted in near-normal amounts for the first three months of 2024 (Table 2) and continued drought conditions (Figure 4). Even though cooler weather occurred later in March, monthly average temperatures were still much above-normal resulting in most sites maintaining a top-5 warmest start to the year (Table 3). A winter storm brought heavy, wet snow to the western UP on Mar 25-26 but much of this fell as rain farther east allowing streamflow to stay near to above normal (Figure 1). Several smaller events combined with the winter storm allowed 1 to 3 inches of snow water equivalent to persist into early April across the western U.P. (Figure 2), but SWE values were much below-normal for the date (Figure 3). Early snowmelt and a generally wetter pattern has allowed shallow soil moisture to recover (Figure 8), but long-term drought and warmth maintained much below-normal deeper soil moisture values across portions of central Upper Michigan (Figure 9).

Location	Precipitation	% of Normal	Snowfall
WFO Marquette	2.71”	101%	20.3”
Marquette City	1.95”	123%	7.5”
Quincy Hill	2.68”	M	23.0”
Ironwood	2.65”	131%	21.6”
Iron Mountain	2.98”	177%	10.4”
Manistique	1.61”	87%	7.0”
Munising	3.09”	154%	20.0”
Stambaugh	2.85”	191%	9.7”

Table 1. Observed liquid equivalent precipitation, percent of normal, and snowfall at long-term climate sites across Upper Michigan for March 2024.

NOTE: Precipitation after 8 AM EST March 31st was counted in April stats for all but the WFO Marquette site due to the reporting structure of our cooperative observers.

Year-to-Date Precipitation Summary

Location	Precipitation	% of Normal	Rank	Last Year
WFO Marquette (Records: 1962-2023)	7.05”	98%	27th wettest	10.86”
Marquette City (Records: 1875-2023)	4.05”	76%	30th driest	6.03”
Ironwood (Records: 1901-2023)	4.75”	86%	44th driest	8.77”
Iron Mountain (Records: 1902-2023)	4.40”	110%	40th wettest	6.48”
Manistique (Records: 1938-2023)	3.11”	67%	13th driest	6.36”
Munising (Records: 1912-2023)	7.85”	111%	28th wettest	8.63”
Stambaugh (Records: 1900-2023)	4.11”	110%	50th wettest	5.10”

Table 2. Total observed precipitation at long-term climate sites across Upper Michigan for January through March 2024.

Year-to-Date Temperature Summary

Location	Avg Temp	Departure	Rank	Last Year
WFO Marquette (Records: 1962-2023)	25.1°F	7.3°F	2nd warmest	21.9
Marquette City (Records: 1875-2023)	28.1°F	5.7°F	6th warmest	25.9
Ironwood (Records: 1901-2023)	24.1°F	6.8°F	4th warmest	20.2
Iron Mountain (Records: 1902-2023)	27.4°F	7.8°F	2nd warmest	24.0
Manistique (Records: 1938-2023)	26.5°F	5.4°F	3rd warmest	24.8
Munising (Records: 1912-2023)	26.9°F	6.1°F	2nd warmest	24.4
Stambaugh (Records: 1900-2023)	24.1°F	7.1°F	2nd warmest	19.8

Table 3. Total observed precipitation at long-term climate sites across Upper Michigan for January through March 2024.

Flooding Conditions

There were no flooding concerns during the month of March 2024.

Media Links

None.

River Conditions

Streamflow was near normal across most of Upper Michigan during March 2024.

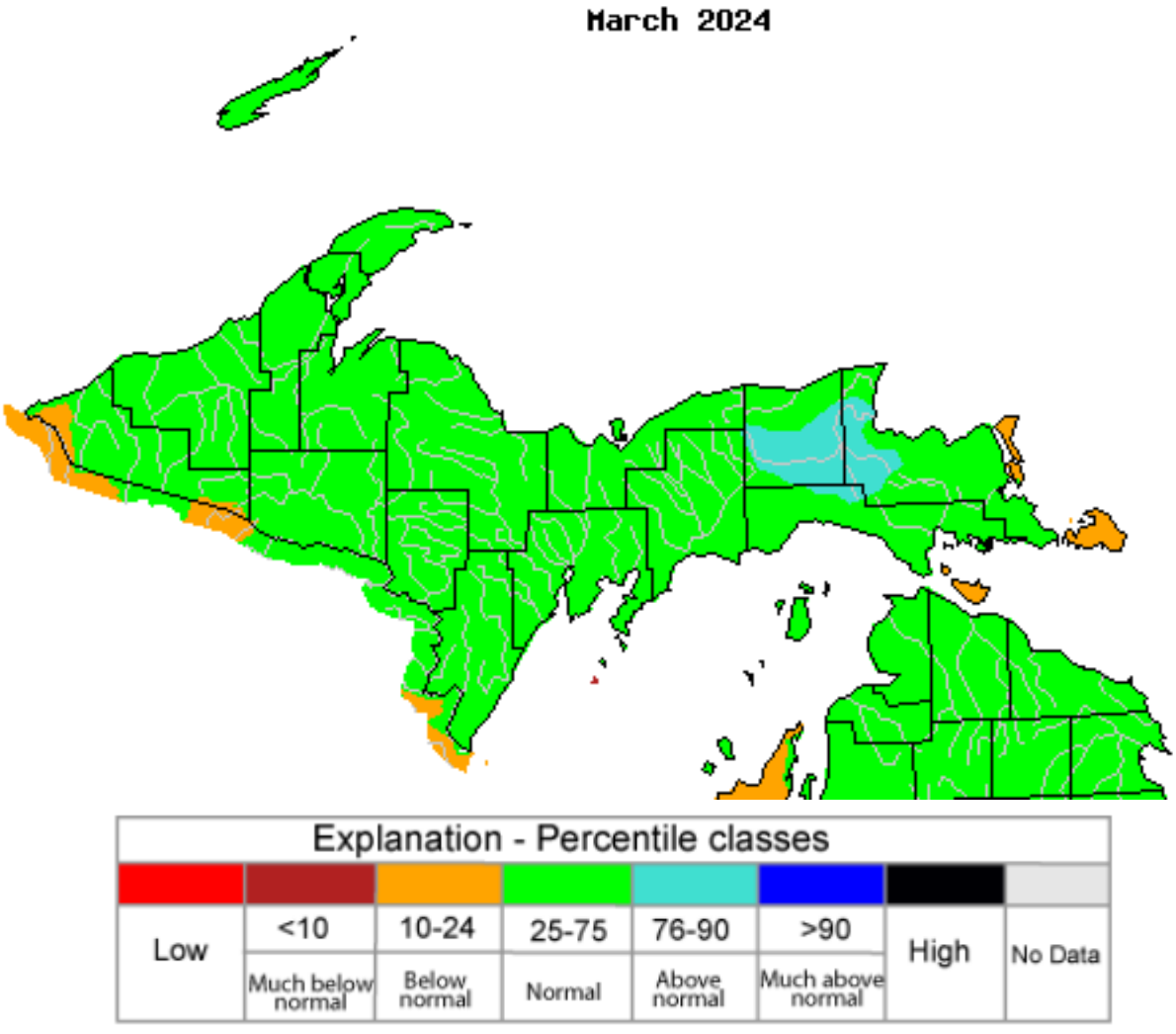

Figure 1: USGS monthly average streamflow in March 2024 across Upper Michigan

Snowpack SWE (Snow Water Equivalent) Conditions

Seasonal snowpack melted completely in mid-March followed by several periods of wintry weather during the second half of March. By April 1st, up to 2-4 inches of snow water equivalent accumulated across portions of western Upper Michigan, but amounts were still mainly less than 50% of normal for April 1st.

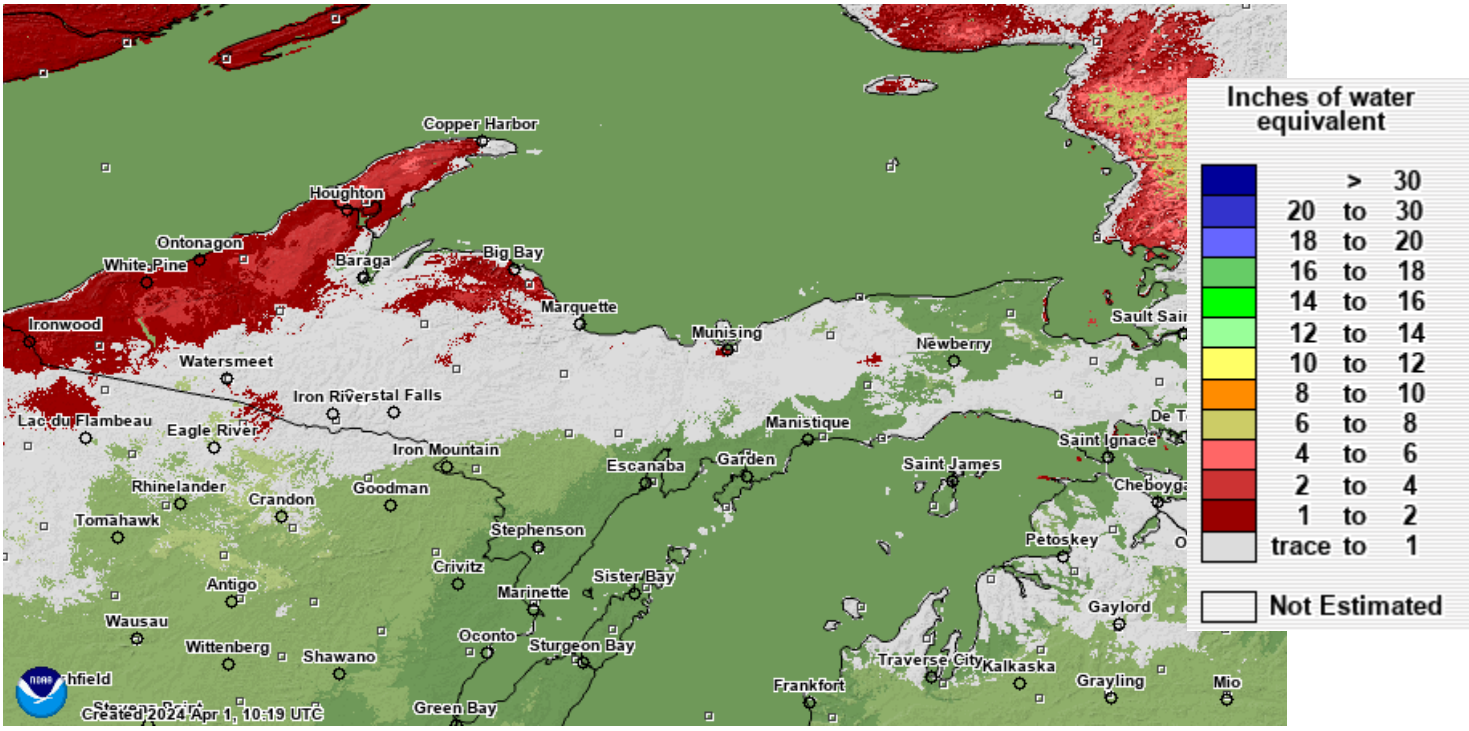

Figure 2: Current modeled snowpack snow water equivalent on April 1st.

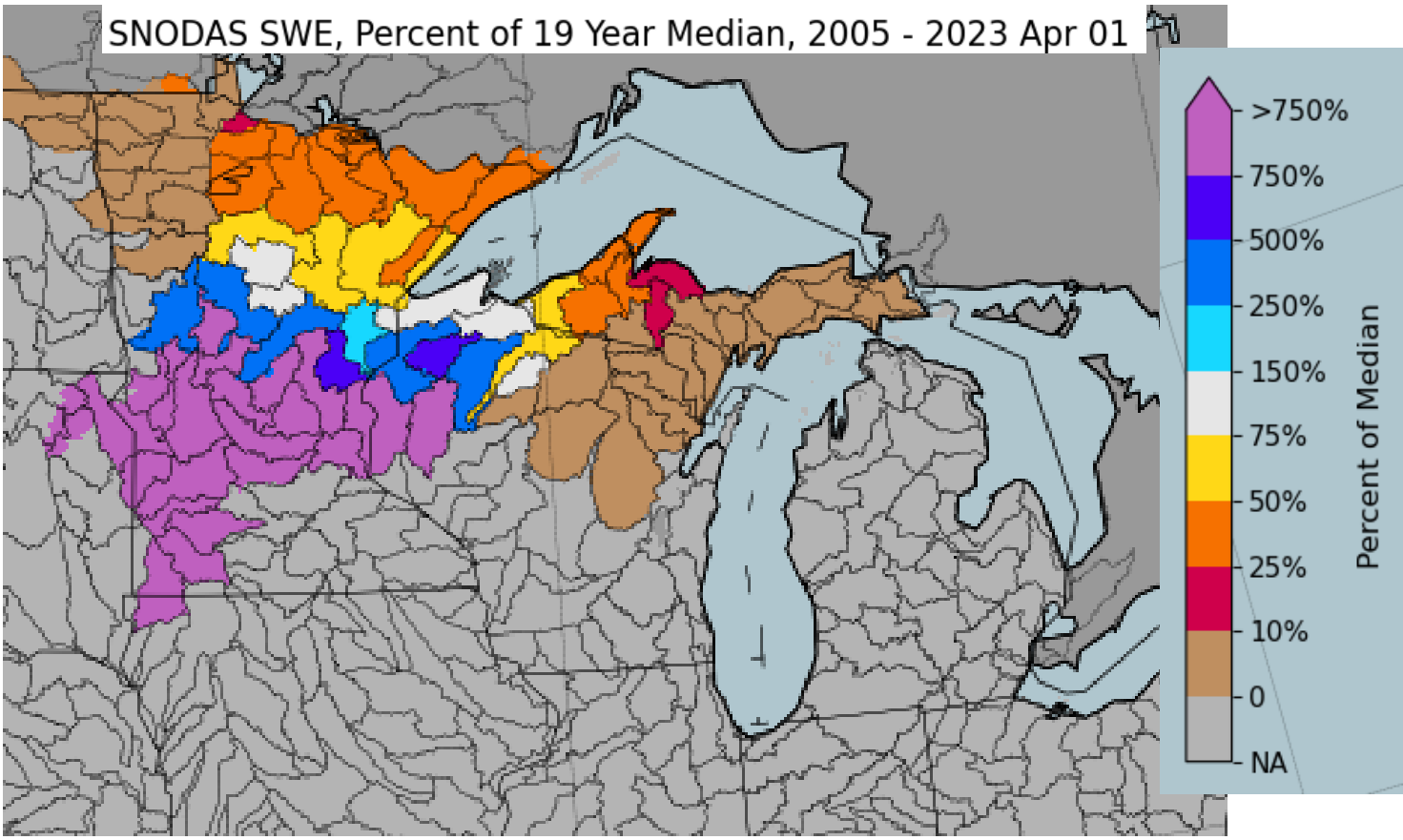

Figure 3: Modeled snow water equivalent for drainage basins on April 1st, 2024 as a percent of 18-year median.

Drought Discussion

Despite above-normal precipitation during March, long-term precipitation deficits combined with continued much above-normal temperatures allowed for drought conditions to continue across most of Upper Michigan. For the latest drought status, please visit http://www.drought.gov.

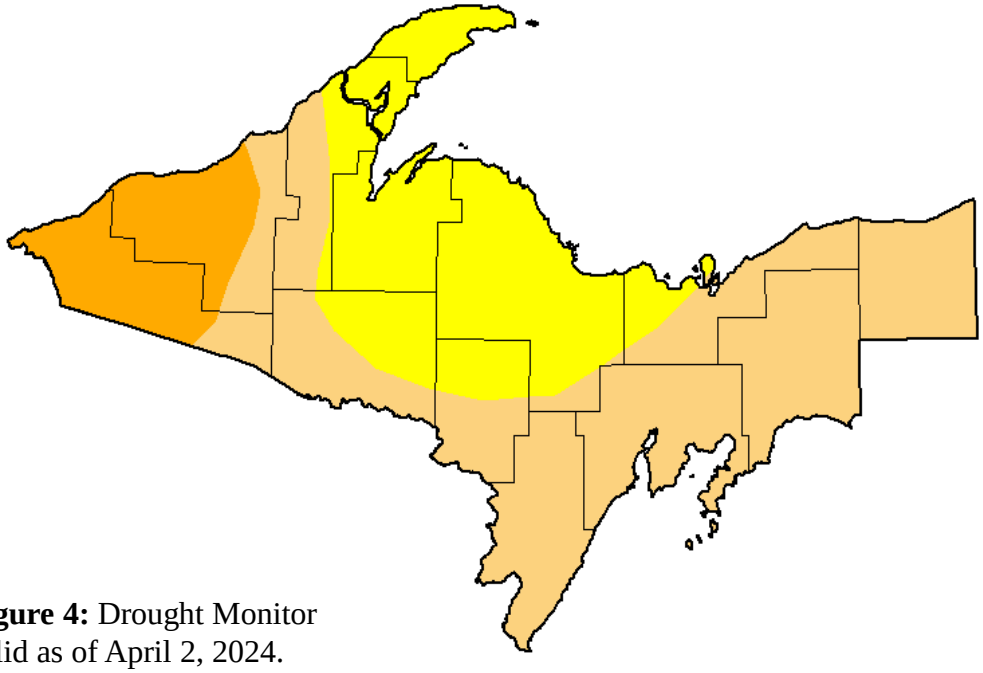

Figure 4: Drought Monitor valid as of April 2, 2024.

April 2, 2024
(Released Thursday, Apr. 4, 2024)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	65.90	13.00	0.00	0.00
Last Week 03-26-2024	0.00	100.00	65.90	13.00	0.00	0.00
3 Months Ago 01-02-2024	0.01	99.99	15.20	4.96	0.00	0.00
Start of Calendar Year 01-02-2024	0.01	99.99	15.20	4.96	0.00	0.00
Start of Water Year 09-26-2023	55.88	44.12	13.42	5.42	0.00	0.00
One Year Ago 04-04-2023	100.00	0.00	0.00	0.00	0.00	0.00

Intensity:
None
D0 Abnormally Dry
D1 Moderate Drought
D2 Severe Drought
D3 Extreme Drought
D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:
Brad Pugh
CPC/NOAA

droughtmonitor.unl.edu

Hydro Products Issued

Product	Number
Hydrologic Outlook (ESF)	2
Flood Watch (FFA)	0
Flood Warning (FLW)	0
Flood Advisories and Statements (FLS)	0
Flash Flood Warning (FFW)	0
Flash Flood Statement (FFS)	0
Hydrologic Summary (RVA)	31

Precipitation Summary

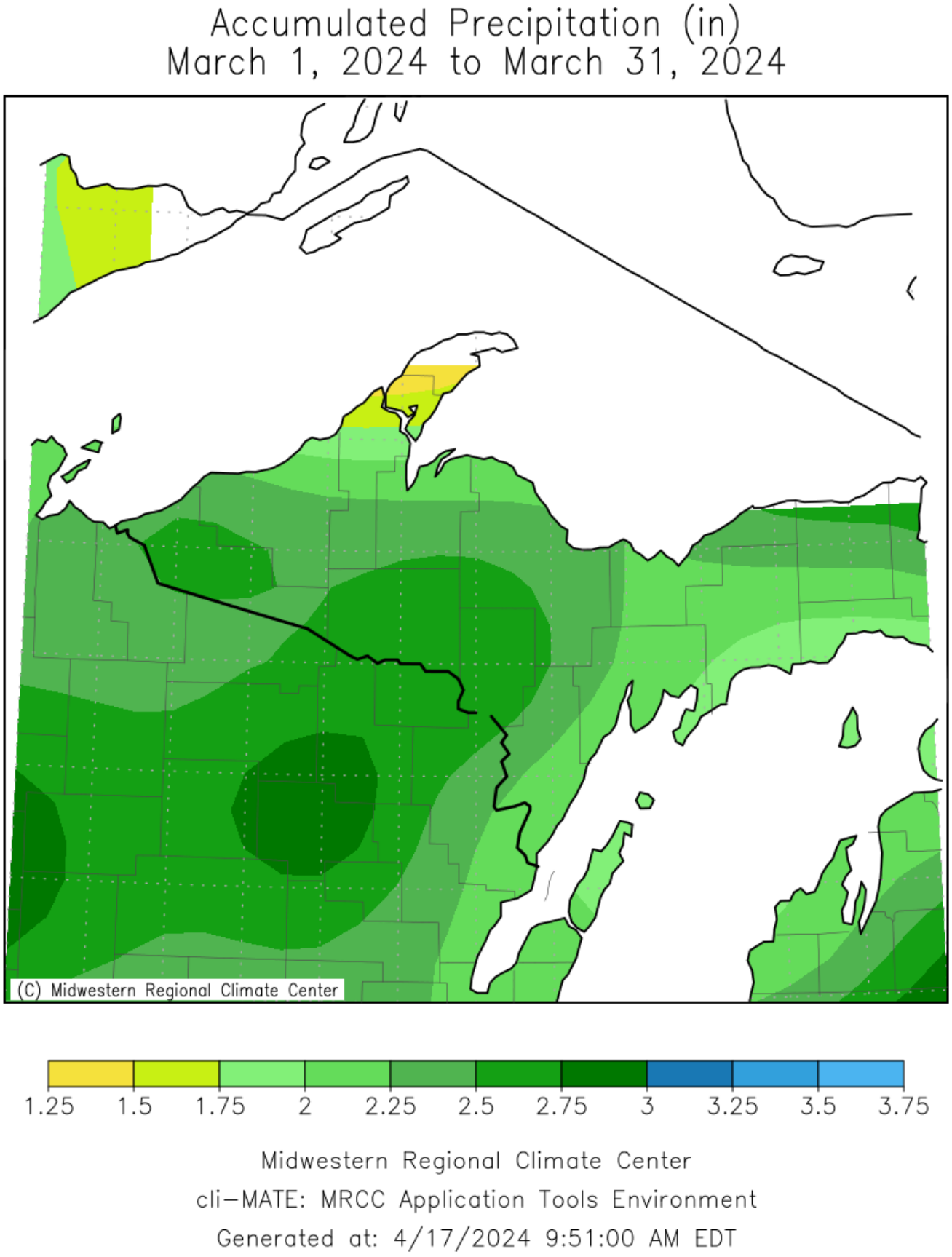

Figure 5: March 2024 Monthly Precipitation Totals.

Precipitation Summary Continued

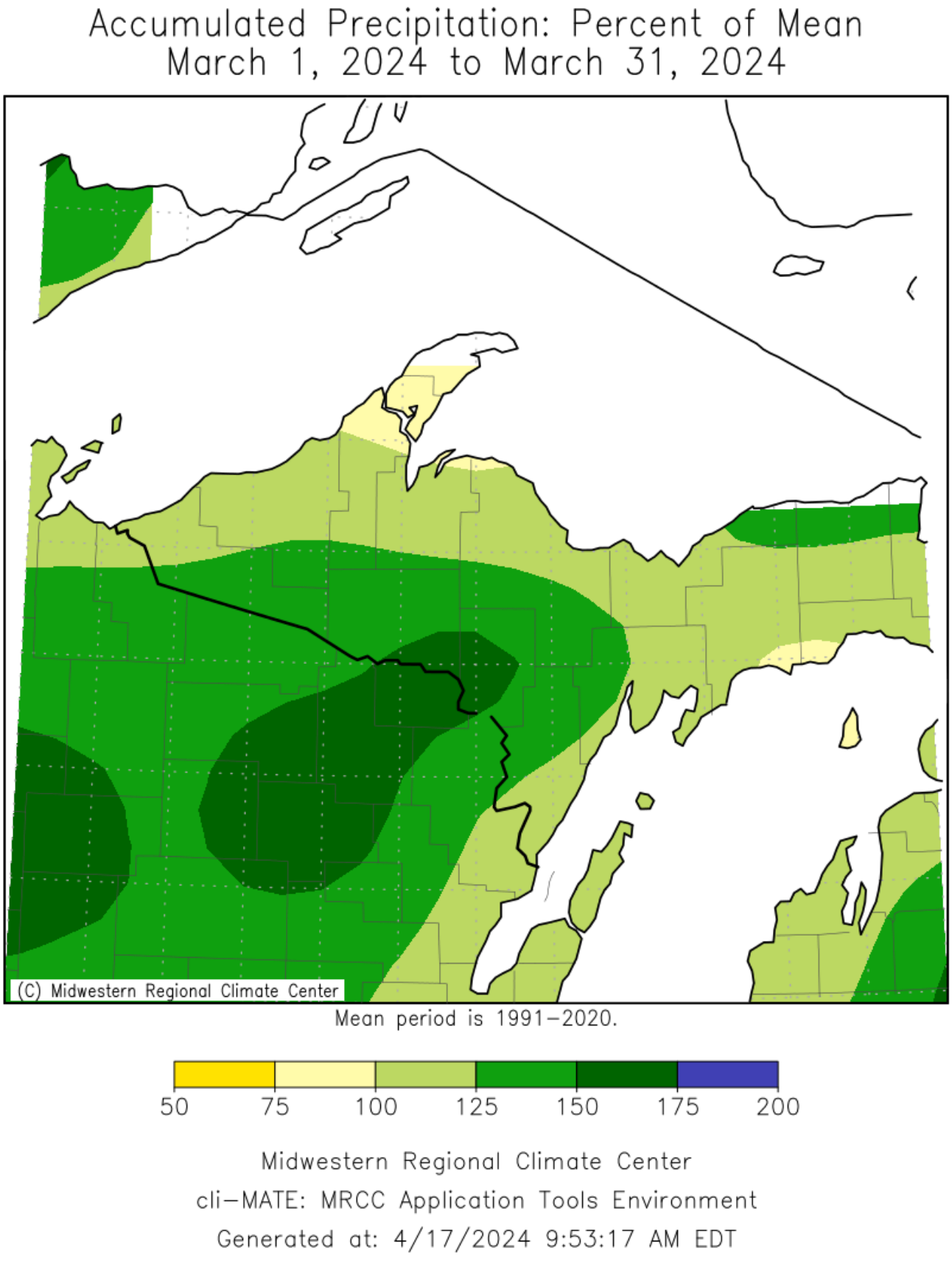

Figure 6: March 2024 Percent of Normal of Accumulated Precipitation.

Soil Moisture Anomaly

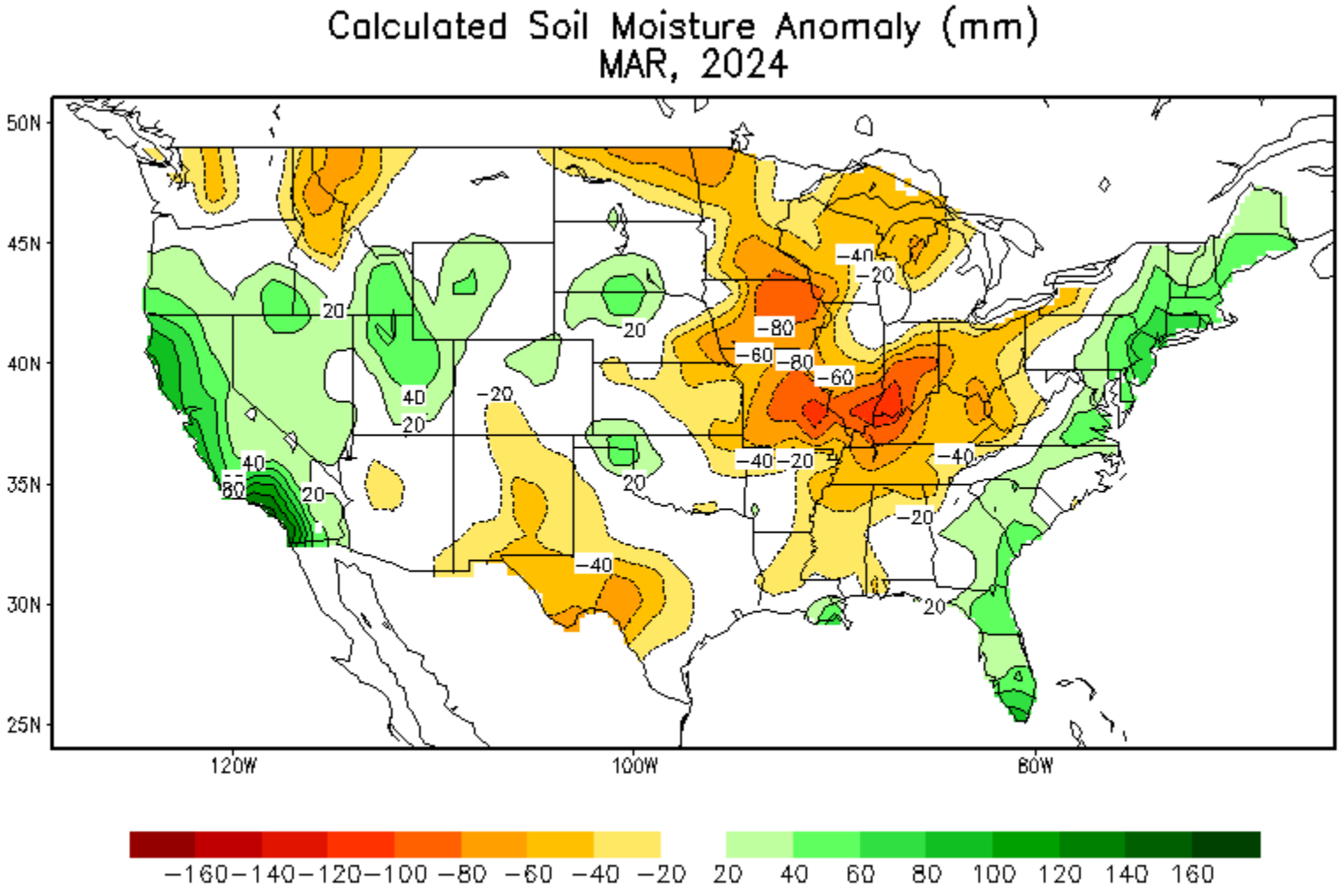

Figure 7: Climate Prediction Center's monthly average soil moisture anomaly for March 2024.

Shallow and Deep Soil Moisture Percentiles

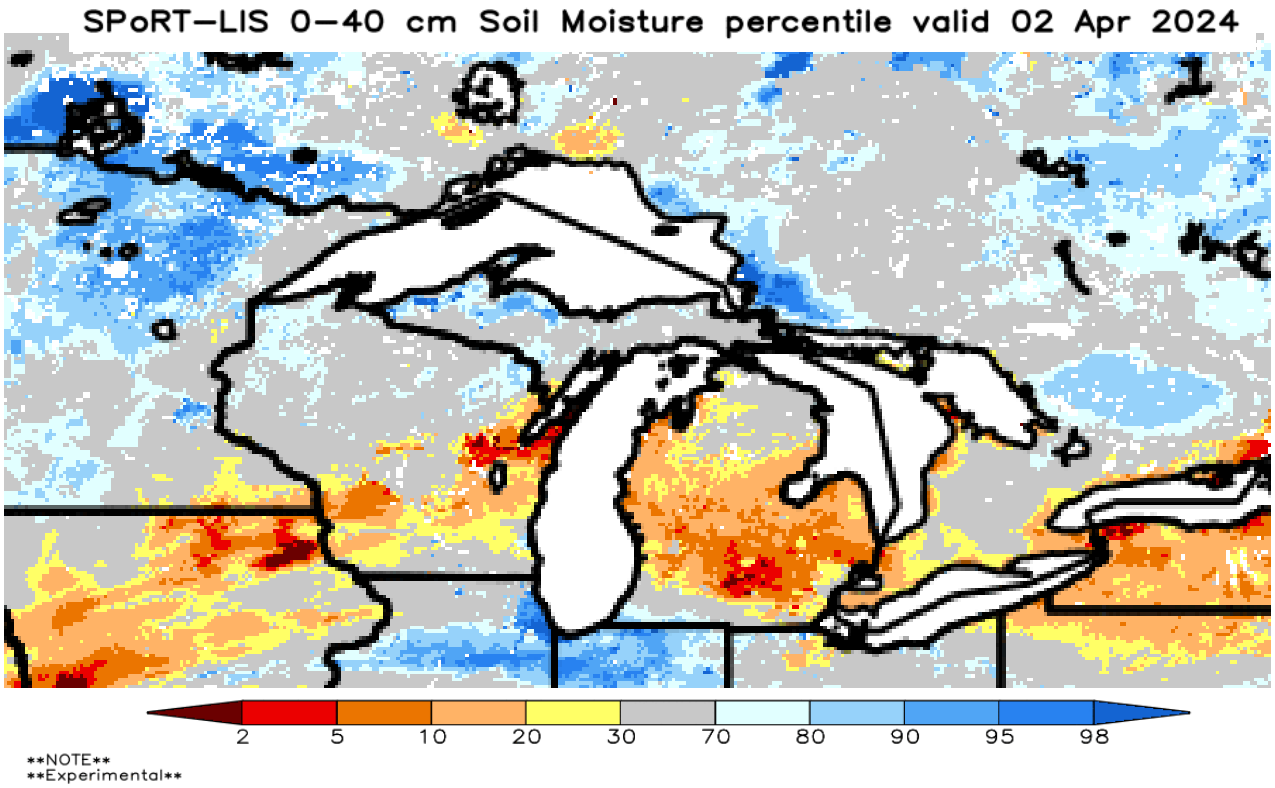

Figure 8: NASA's Short-term Prediction Research and Transition (SPoRT) Center's shallow (0-40 cm) soil moisture percentile valid April 2, 2024.

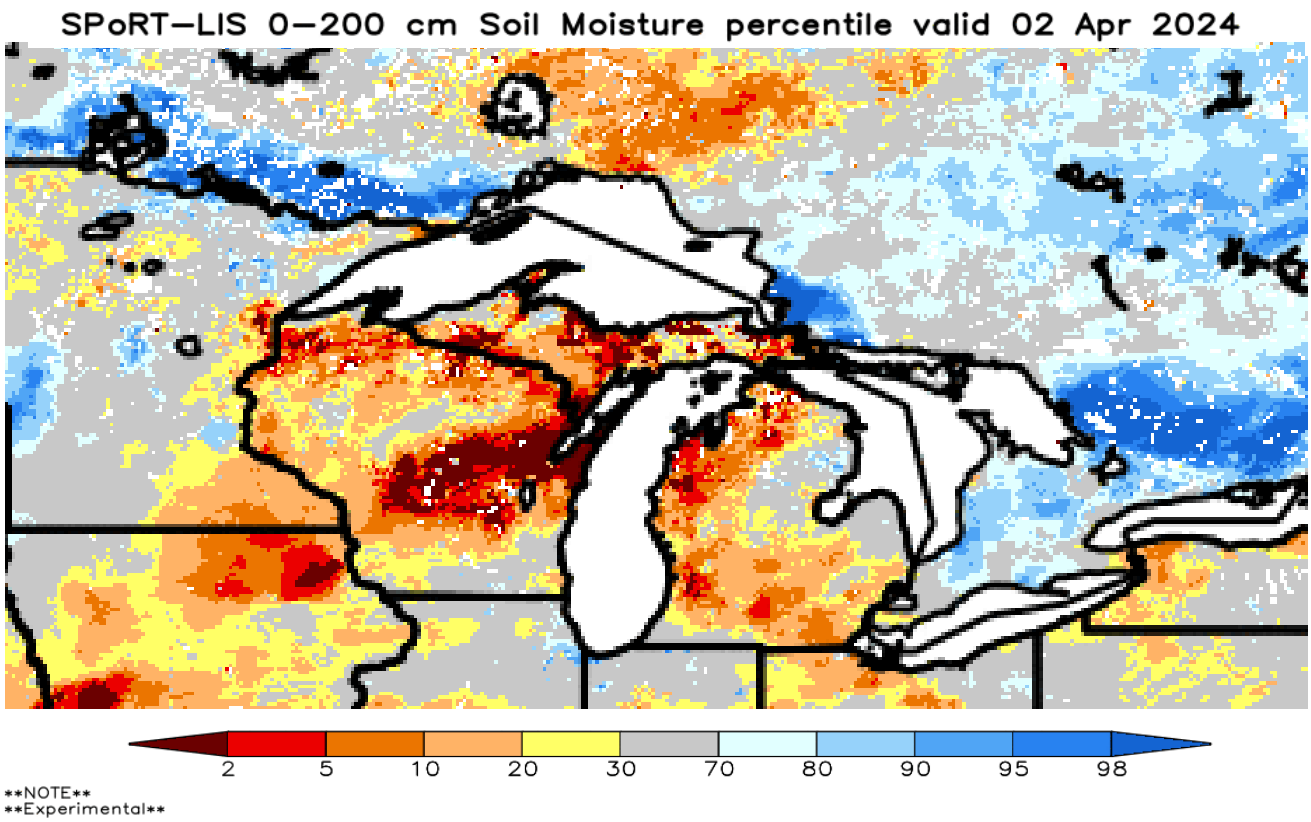

Figure 9: NASA's Short-term Prediction Research and Transition (SPoRT) Center's deep (0-200 cm) soil moisture percentile valid April 2, 2024.