Monthly Hydrometeorological Report

Report for October 2023

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): **October 2023** DATE: **November 18th, 2023** SIGNATURE: **Evan Kutta, Hydro Program Manager** **Robin J. Turner, MIC**
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

Precipitation was near normal across most of Upper Michigan during October except at Manistique where thunderstorms dropped locally heavy rain during the first two days of the month. Similar to September, streamflow was near to much below normal across Upper Michigan with particularly dry conditions within the Manistique River watershed. Near normal precipitation combined with near to above-normal temperatures allowed drought conditions to persist through October, mainly near the Wisconsin state line. However, soil moisture analyses indicate below normal values across most of the upper Midwest. Many Upper Michigan sites also observed their first snowflakes of the year during the last day or two of October.

Location	Precipitation	% of Normal	Snowfall
WFO Marquette	3.50”	87%	0.6”
Marquette City	3.62”	106%	0.0”
Quincy Hill	3.36”	M	4.6”
Ironwood	3.67”	91%	1.8”
Iron Mountain	3.01”	92%	0.1”
Manistique	5.86”	147%	0.0”
Munising	4.42”	90%	0.0”
Stambaugh	2.78”	84%	3.0”

NOTE: Precipitation after 8 AM EST October 31st was counted in November 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)	40.93”	132%	4th wettest	36.14”
Marquette City (Records: 1875-2023)	30.07”	116%	24th wettest	23.67”
Ironwood (Records: 1901-2023)	34.84”	114%	22nd wettest	31.94”
Iron Mountain (Records: 1902-2023)	27.10”	103%	43rd wettest	27.15”
Manistique (Records: 1938-2023)	26.12”	100%	30th wettest	25.77”
Munising (Records: 1912-2023)	35.37”	118%	17th wettest	35.60”
Stambaugh (Records: 1900-2023)	25.55”	95%	38th driest	26.85”

Table 4. Total observed precipitation at long-term climate sites across Upper Michigan for January through October 2023.

Year-to-Date Temperature Summary

Location	Avg Temp	Departure	Rank	Last Year
WFO Marquette (Records: 1962-2023)	45.3°F	+2.3°F	6th warmest	43.2°F
Marquette City (Records: 1875-2023)	46.5°F	+0.9°F	27th warmest	44.4°F
Ironwood (Records: 1901-2023)	45.0°F	+1.0°F	35th warmest	41.9°F
Iron Mountain (Records: 1902-2023)	47.5°F	+2.0°F	11th warmest	45.0°F
Manistique (Records: 1938-2023)	45.0°F	+0.5°F	28th warmest	42.5°F
Munising (Records: 1912-2023)	45.5°F	+1.3°F	17th warmest	43.0°F
Stambaugh (Records: 1900-2023)	43.5°F	+0.5°F	45th warmest	40.6°F

Table 5. Total observed precipitation at long-term climate sites across Upper Michigan for January through October 2023.

Flooding Conditions

Other than a flood advisory issued for thunderstorms producing heavy rain over Menominee County on the morning of October 1st, there were no flooding concerns during the month of October 2023.

Media Links

None.

River Conditions

Streamflow during October was near to much below normal across Upper Michigan. Streamflow was particularly low Manistique River watershed with below normal streamflow for the Sturgeon, Ford, and Escanaba watersheds in addition to the large majority of eastern Upper Michigan.

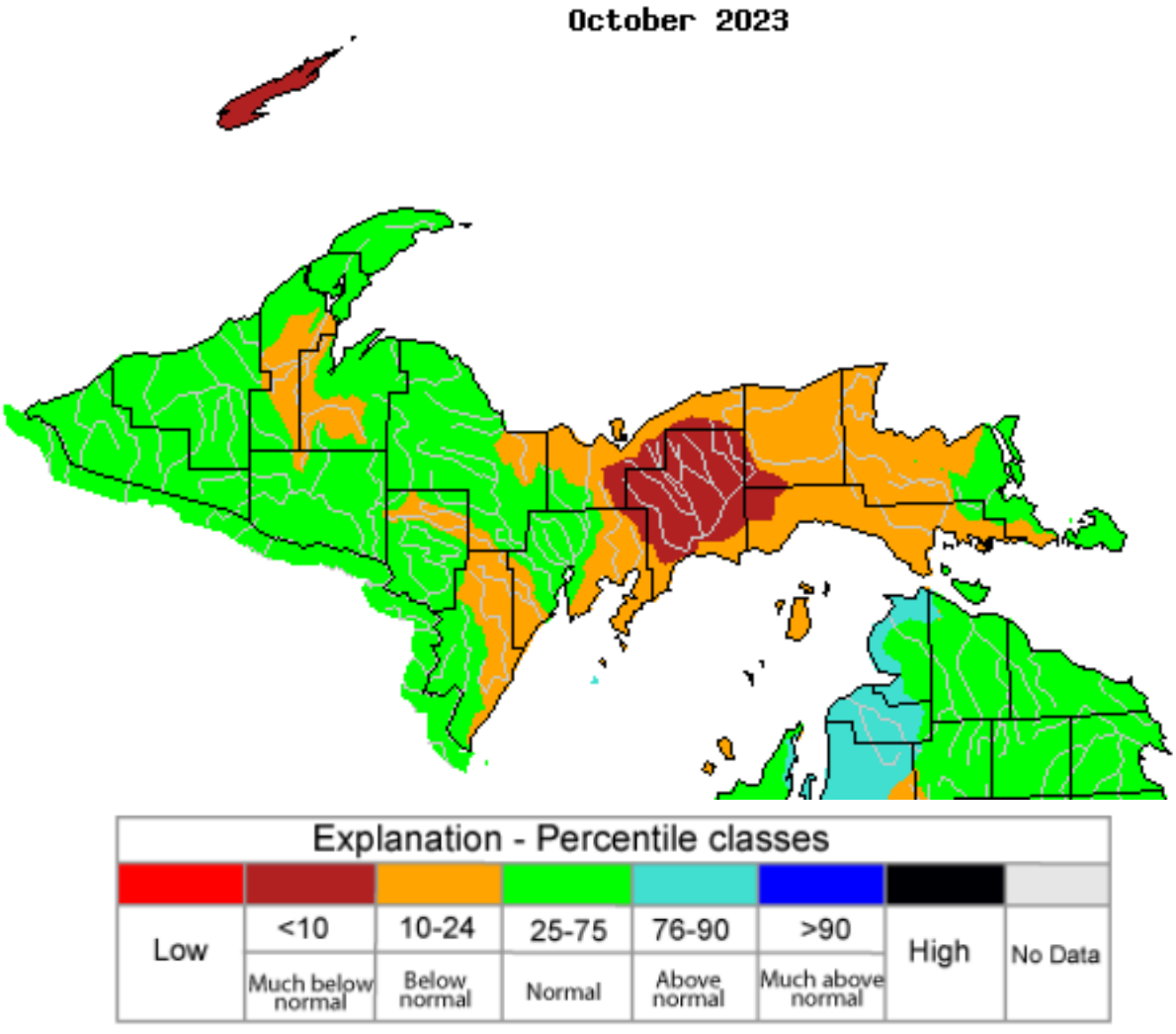


Figure 1: USGS monthly average streamflow in October 2023 across Upper Michigan

Snowpack SWE (Snow Water Equivalent) Conditions

Some snow was observed during late October, but it's still too early to have a seasonal snow pack. That should change during November!

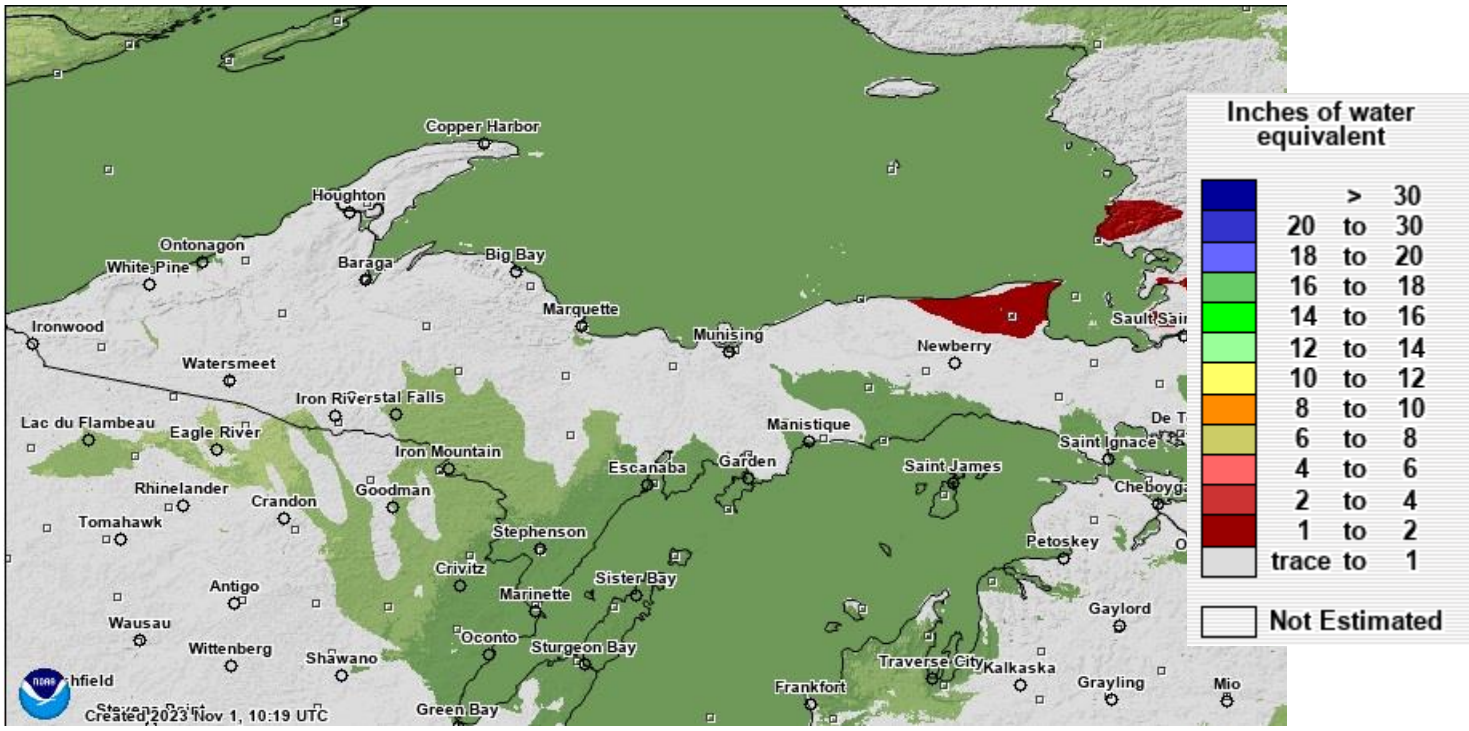


Figure 2: Current modeled snowpack snow water equivalent on November 1st.

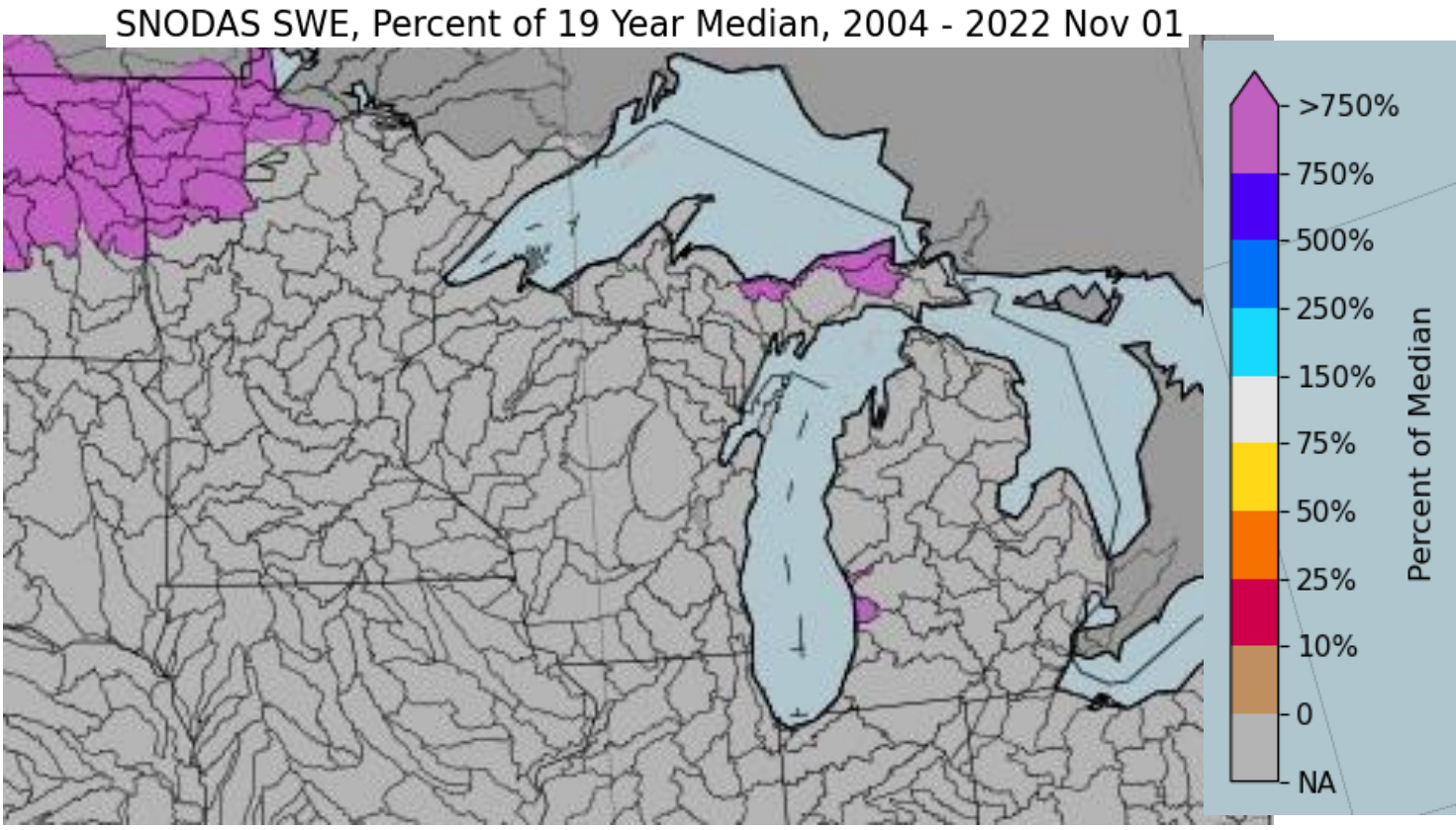
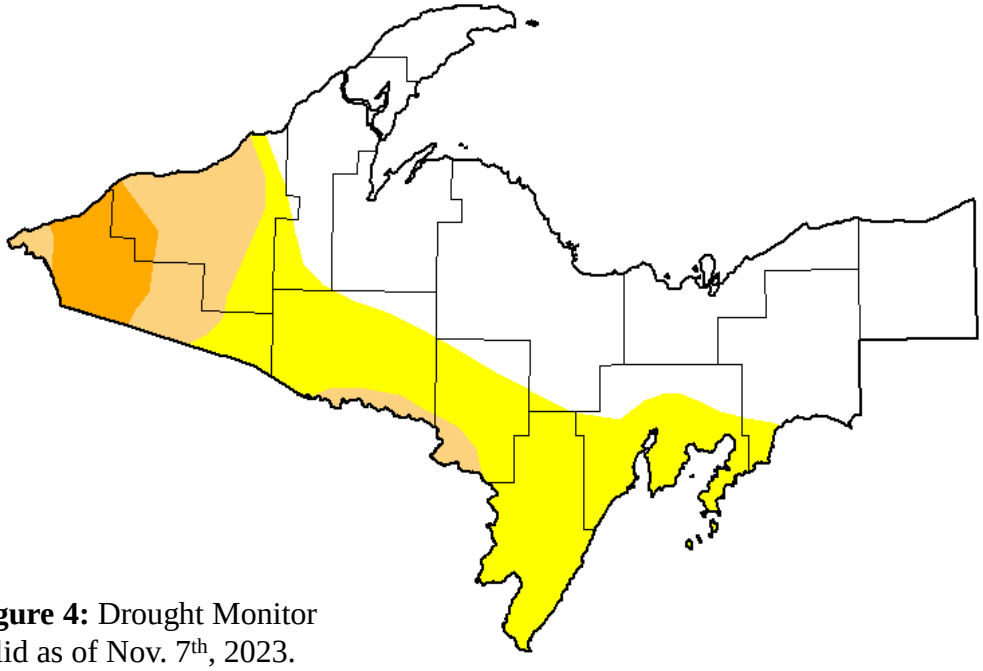


Figure 3: Modeled snow water equivalent for drainage basins on November 1st as a percent of 19-year median.

Drought Discussion

Severe drought that developed early last summer continued across far western portions of Upper Michigan with abnormally dry to moderate drought conditions across much of the southwestern third of the area. For the latest drought status, please visit http://www.drought.gov.



November 14, 2023
(Released Thursday, Nov. 16, 2023)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	54.58	45.42	15.08	4.92	0.00	0.00
Last Week 11-07-2023	46.35	53.65	13.74	4.92	0.00	0.00
3 Months Ago 08-15-2023	69.00	31.00	10.79	5.52	0.00	0.00
Start of Calendar Year 01-03-2023	93.80	6.20	0.00	0.00	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 11-15-2022	94.10	5.90	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

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droughtmonitor.unl.edu

Figure 4: Drought Monitor valid as of Nov. 7th, 2023.

Hydro Products Issued

Product	Number
Hydrologic Outlook (ESF)	0
Flood Watch (FFA)	0
Flood Warning (FLW)	0
Flood Advisories and Statements (FLS)	1
Flash Flood Warning (FFW)	0
Flash Flood Statement (FFS)	0
Hydrologic Summary (RVA)	31

Precipitation Summary

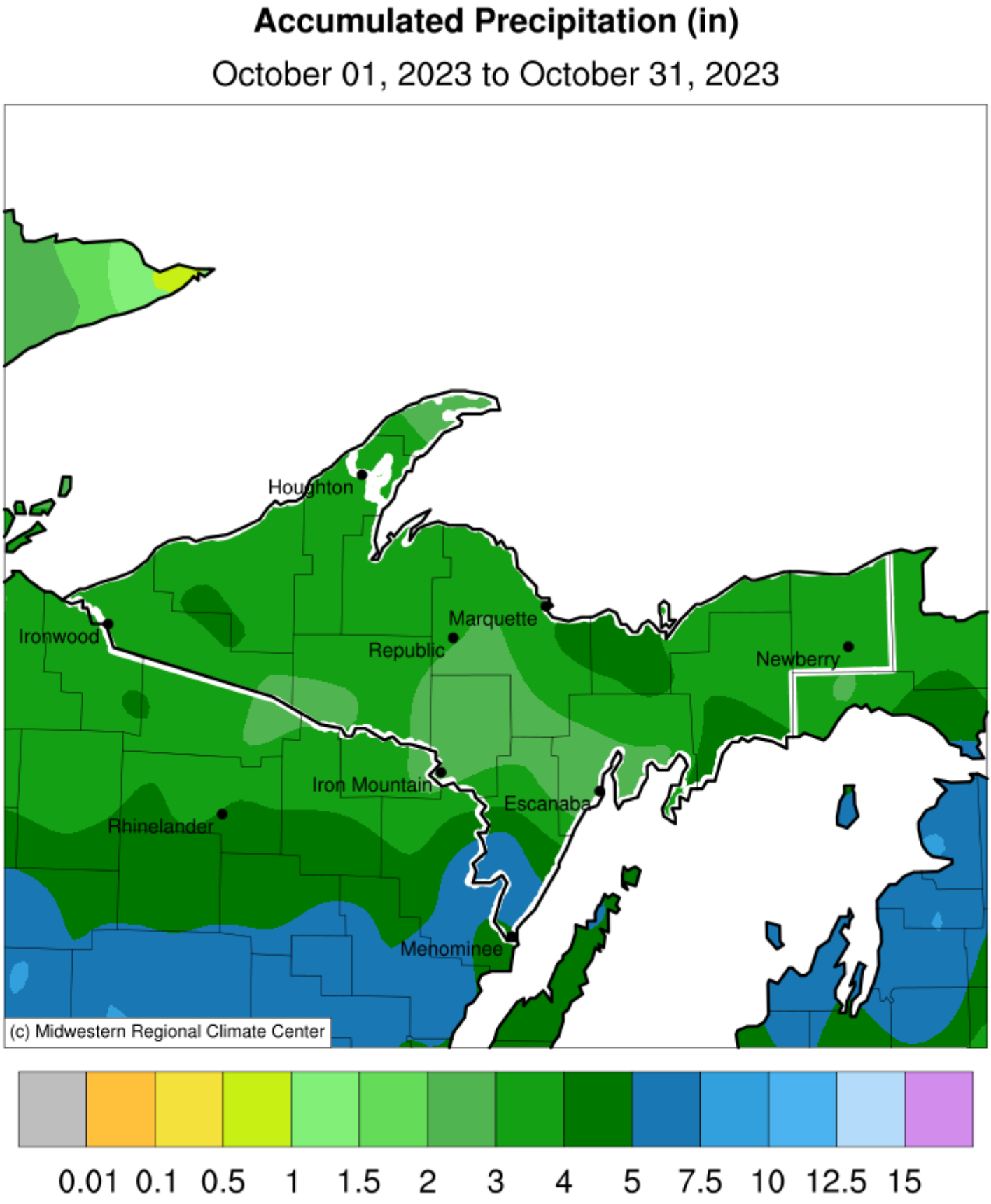

Figure 5: October 2023 Monthly Precipitation Totals.

Precipitation Summary Continued

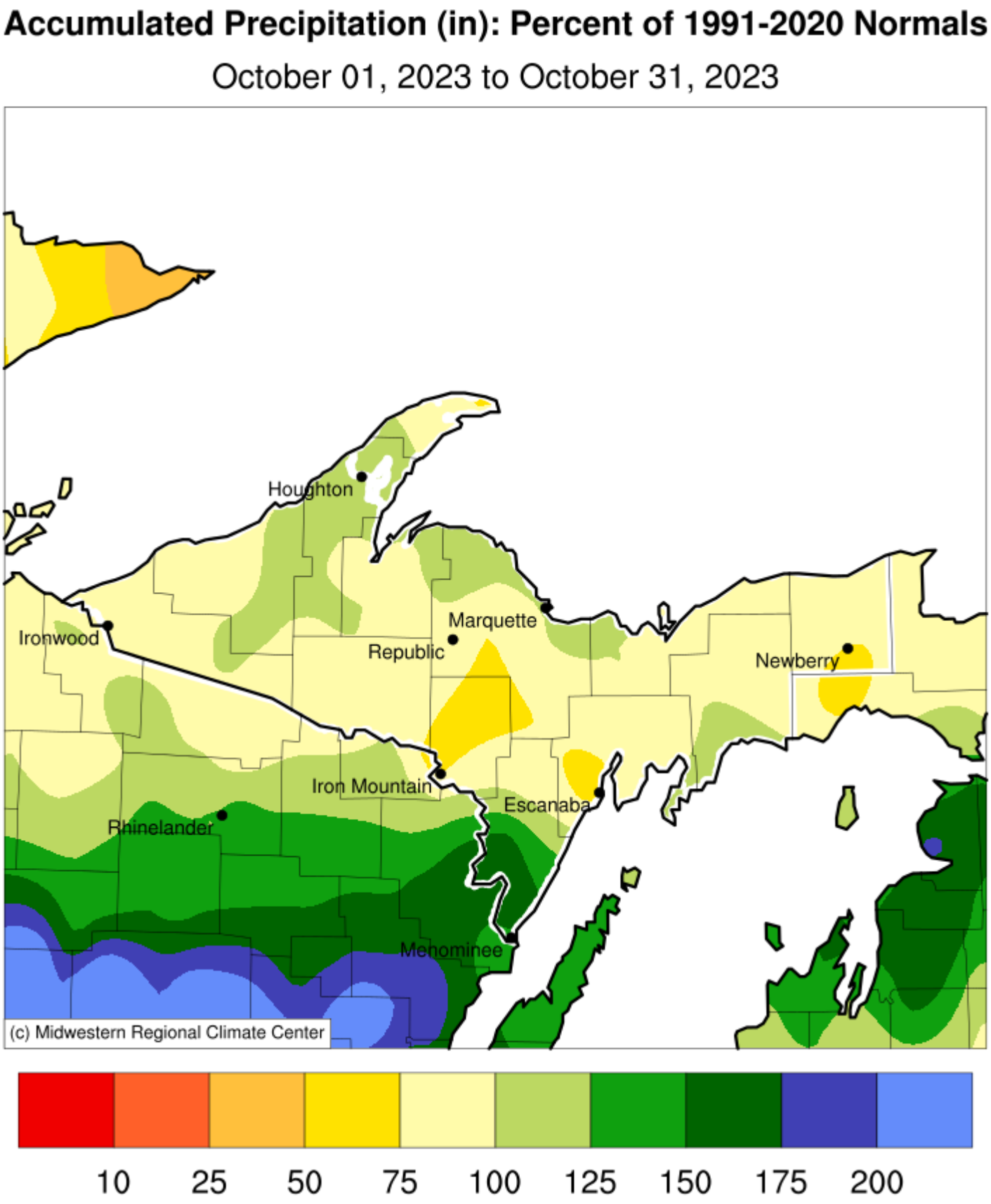

Figure 6: October 2023 Percent of Normal of Accumulated Precipitation.

Soil Moisture Anomaly

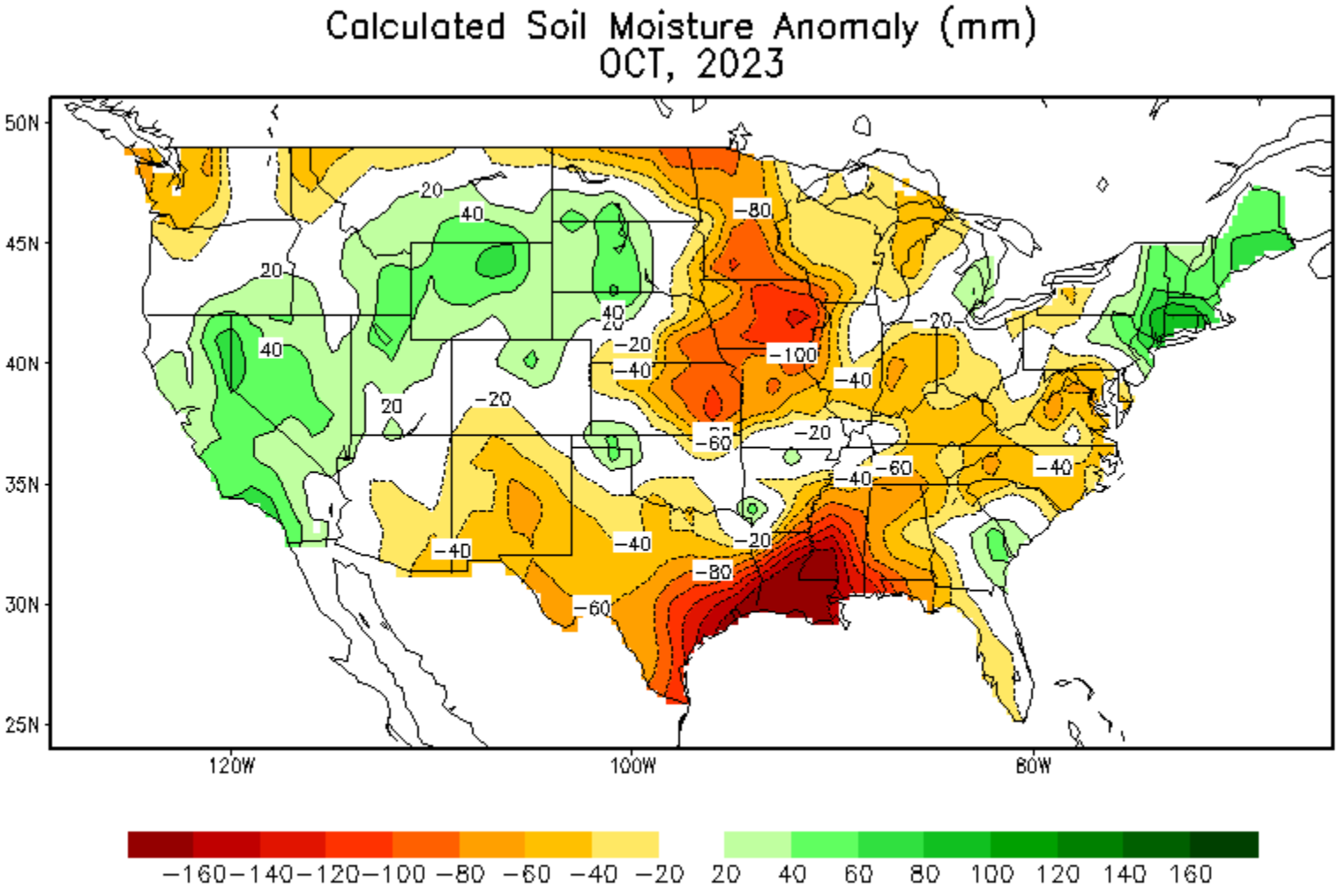

Figure 7: Climate Prediction Center's monthly average soil moisture anomaly for October 2023.

Shallow and Deep Soil Moisture Percentiles

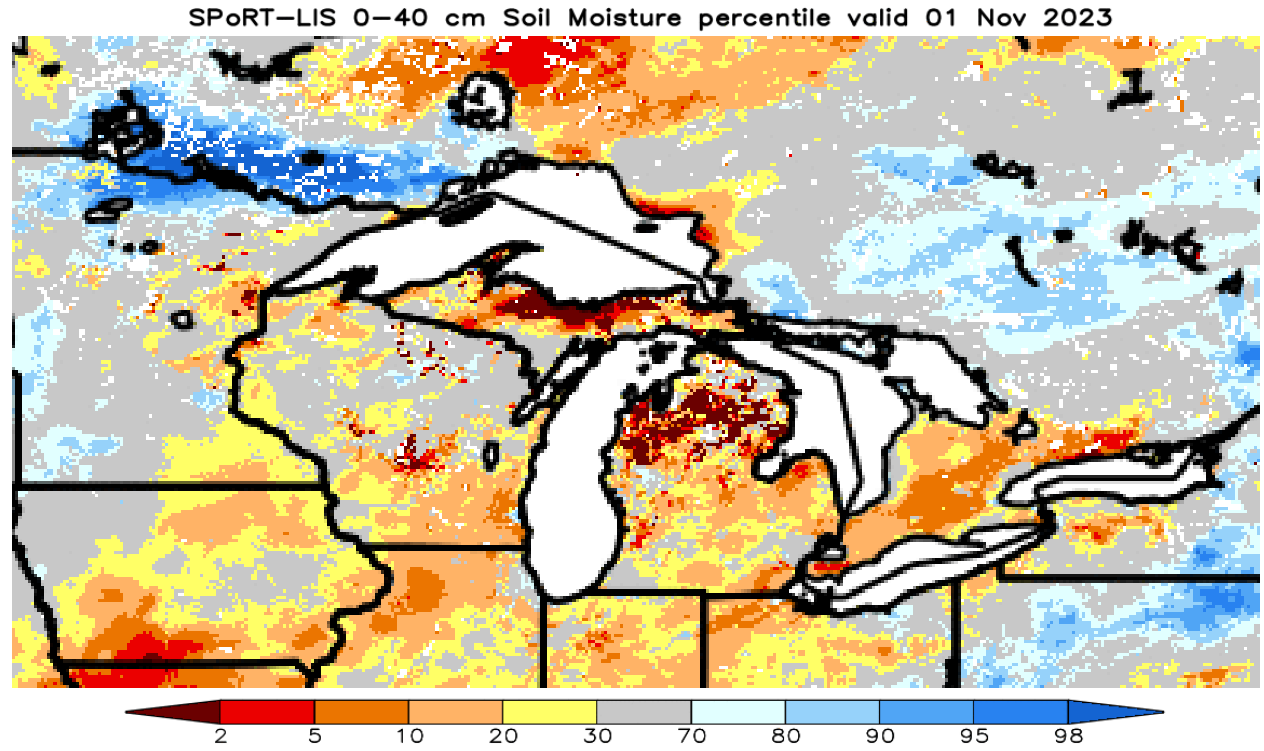

Figure 8: NASA's Short-term Prediction Research and Transition (SPoRT) Center's shallow (0-40 cm) soil moisture percentile valid November 1, 2023.

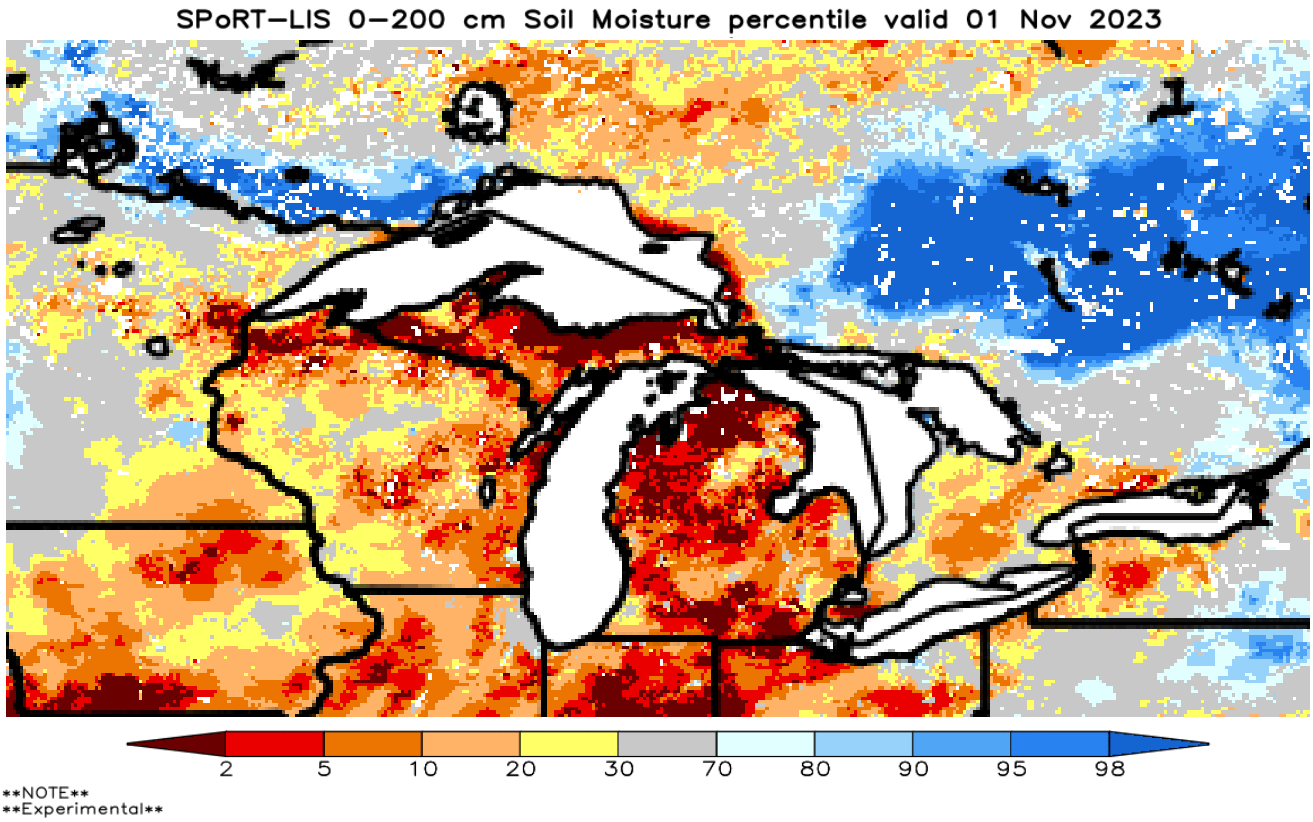

Figure 9: NASA's Short-term Prediction Research and Transition (SPoRT) Center's deep (0-200 cm) soil moisture percentile valid November 1, 2023.