Monthly Hydrometeorological Report

Report for September 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): **September 2023** DATE: **October 14th, 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

September was the first month since September 2022 with below normal precipitation at WFO Marquette with all but Quincy Hill and Ironwood reporting less than 3 inches of rain for the month. Manistique and downtown Marquette were especially dry during September with less than one inch of rain or less than 30% of the normal monthly rainfall. Above-normal temperatures combined with below-normal rainfall caused streamflow values to decrease below the 25th percentile for several Upper Michigan river basins and below the 10th percentile for the Black River basin (Figure 1). Additionally, abnormally dry to severe drought conditions expanded, particularly near the Wisconsin state line (Figure 4). Similarly, both shallow and deep soil moisture values have decreased below the 25th percentile across the large majority of Upper Michigan (Figures 8 and 9).

Location	Precipitation	% of Normal	Snowfall
WFO Marquette	1.89”	48%	0.0”
Marquette City	0.88”	26%	0.0”
Quincy Hill	3.37”	M	0.0”
Ironwood	3.96”	103%	0.0”
Iron Mountain	2.19”	61%	0.0”
Manistique	0.58”	15%	0.0”
Munising	1.86”	44%	0.0”
Stambaugh	1.75”	50%	0.0”

NOTE: Precipitation after 8 AM EST September 30th was counted in October 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)	37.43”	138%	1st wettest	31.55”
Marquette City (Records: 1875-2023)	26.45”	115%	33rd wettest	21.72”
Ironwood (Records: 1901-2023)	31.17”	114%	25th wettest	28.18”
Iron Mountain (Records: 1902-2023)	24.09”	102%	46th wettest	25.76”
Manistique (Records: 1938-2023)	20.26”	88%	15th driest	23.32”
Munising (Records: 1912-2023)	30.95”	119%	15th wettest	29.56”
Stambaugh (Records: 1900-2023)	22.77”	94%	38th driest	25.09”

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

Year-to-Date Temperature Summary

Location	Avg Temp	Departure	Rank	Last Year
WFO Marquette (Records: 1962-2023)	45.2°F	+2.2°F	7th warmest	42.9°F
Marquette City (Records: 1875-2023)	46.3°F	+1.0°F	30th warmest	44.0°F
Ironwood (Records: 1901-2023)	44.9°F	+1.0°F	34th warmest	41.5°F
Iron Mountain (Records: 1902-2023)	47.6°F	+2.1°F	11th warmest	44.9°F
Manistique (Records: 1938-2023)	44.7°F	+0.6°F	31st warmest	42.2°F
Munising (Records: 1912-2023)	45.2°F	+1.2°F	19th warmest	42.7°F
Stambaugh (Records: 1900-2023)	43.4°F	+0.5°F	42nd warmest	40.3°F

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

Flooding Conditions

A flood advisory was issued for portions of the Keweenaw Peninsula during the early morning hours of Wednesday, September 6th due to thunderstorms producing heavy rainfall. No reports of flooding were received.

Media Links

None.

River Conditions

Streamflow was near to below normal across Upper Michigan during September. The Sturgeon, Manistique, and Pine River basins observed below normal streamflow and the Black River basin observed much below normal streamflow.

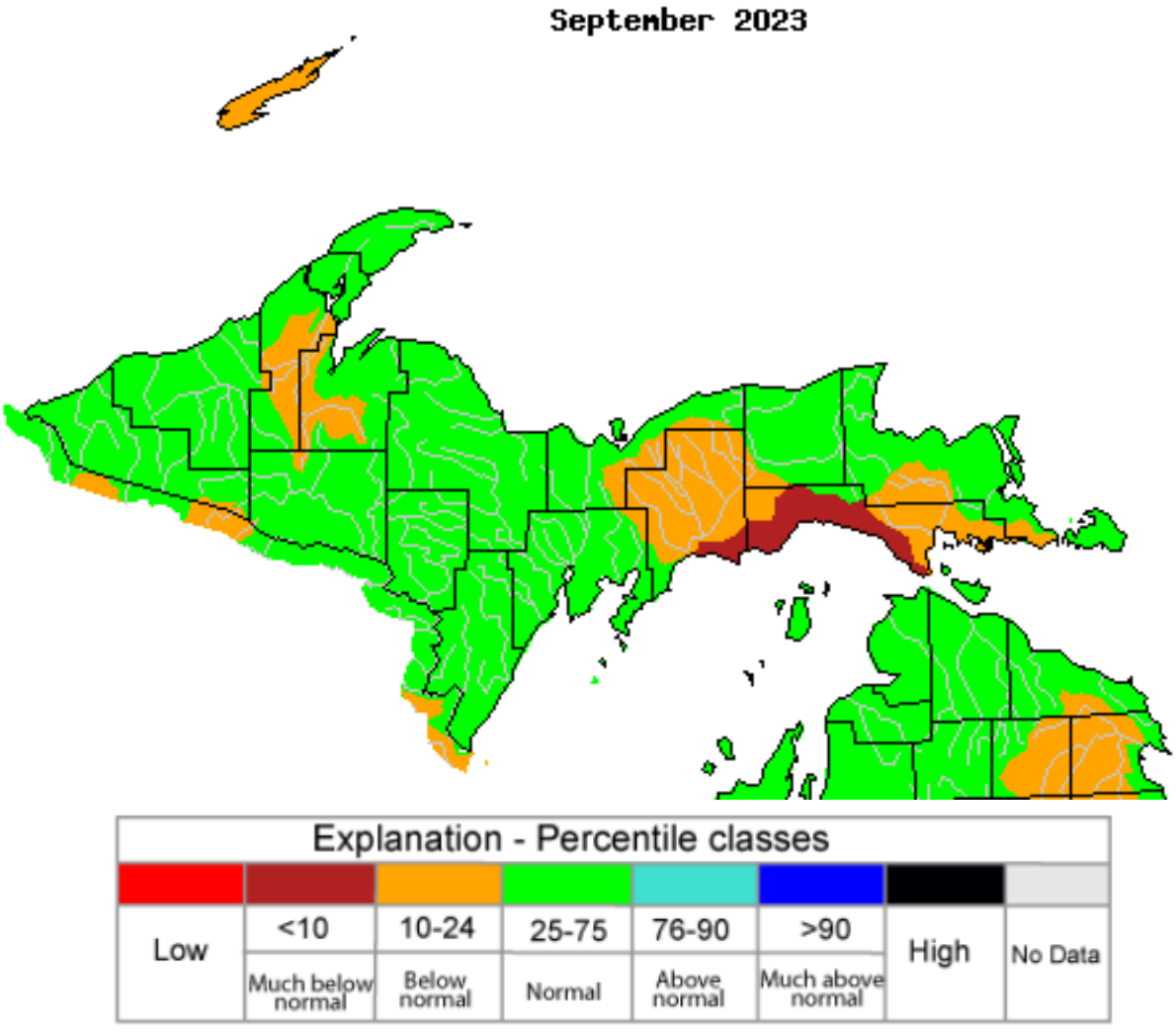


Figure 1: USGS monthly average streamflow in September 2023 across Upper Michigan

Snowpack SWE (Snow Water Equivalent) Conditions

Still on summer vacation!

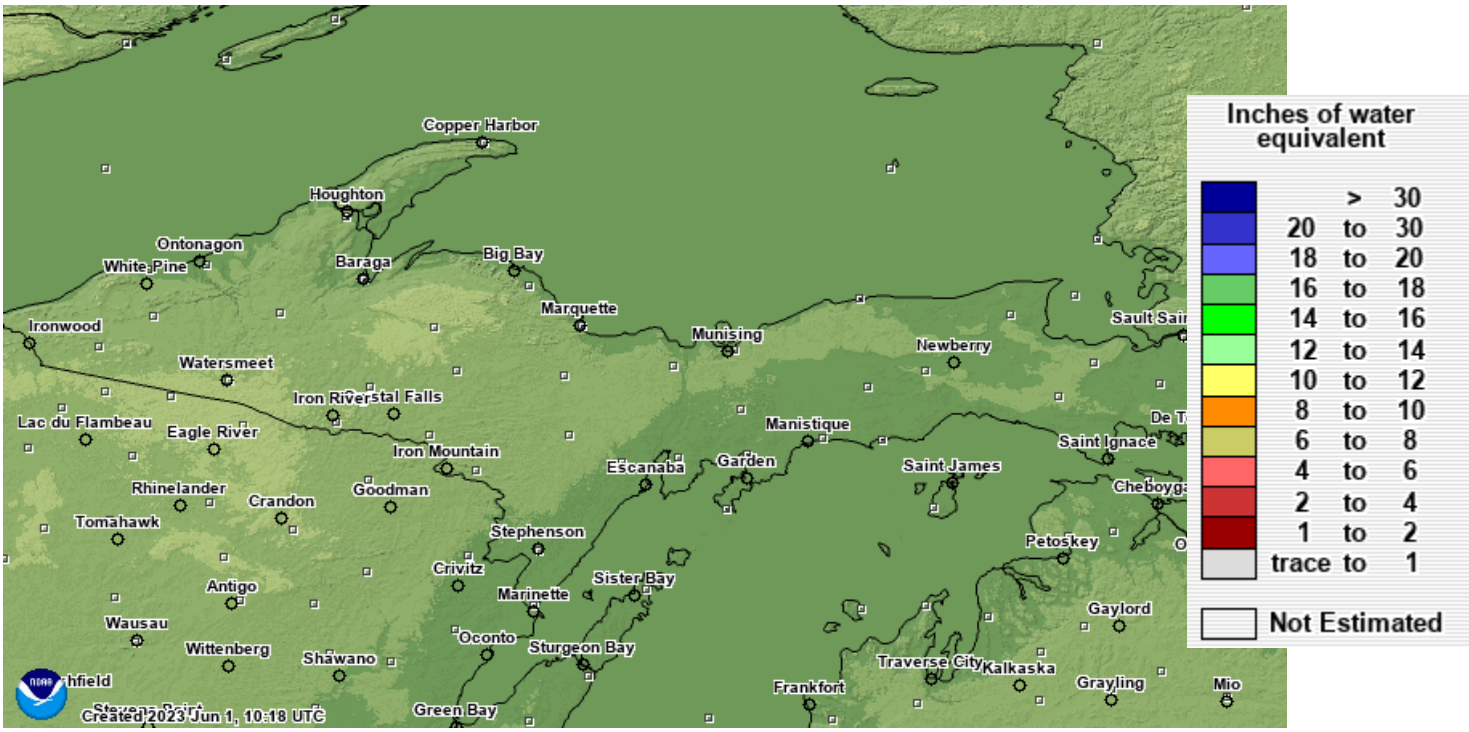


Figure 2: Current modeled snowpack snow water equivalent on October 1st.

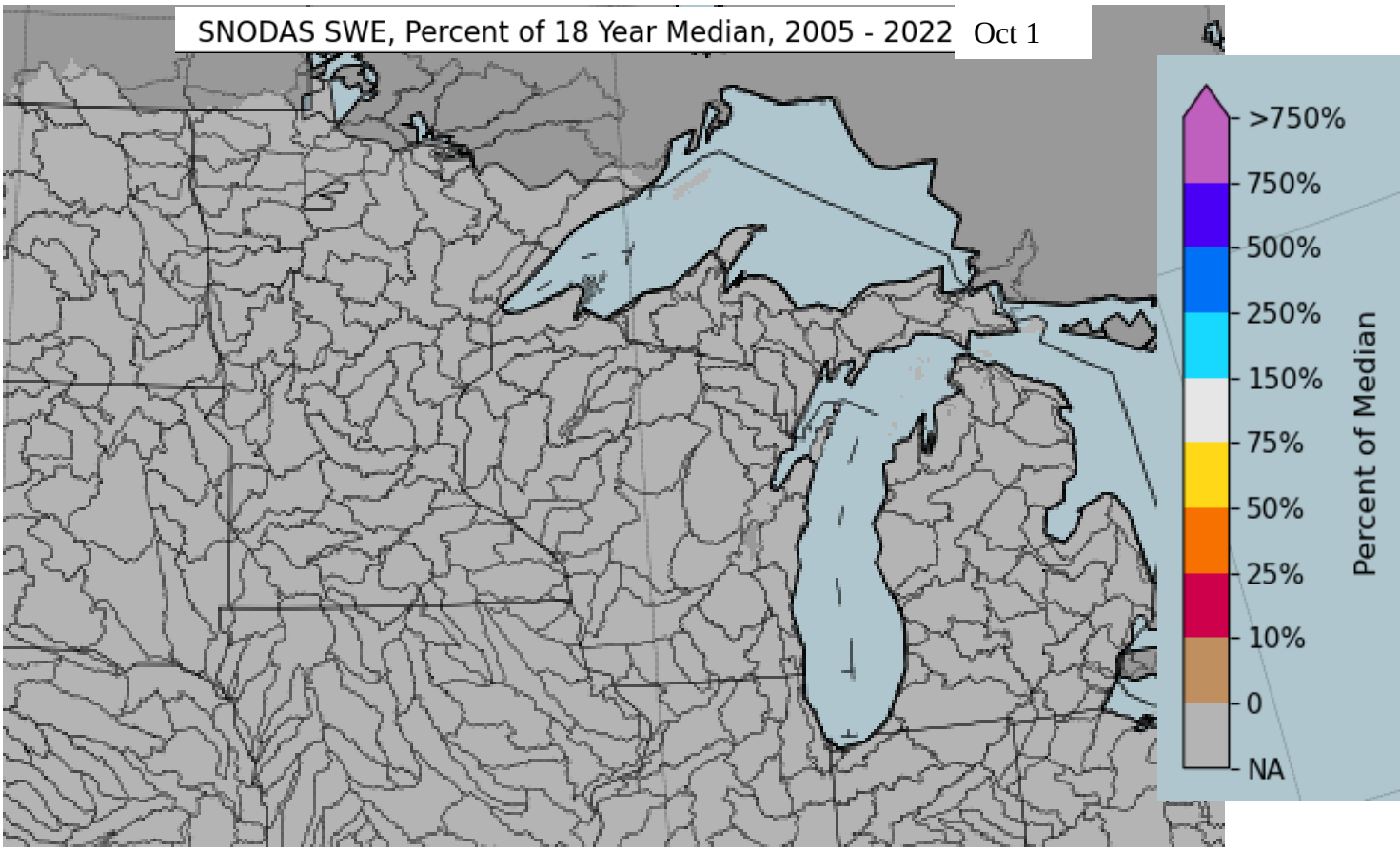
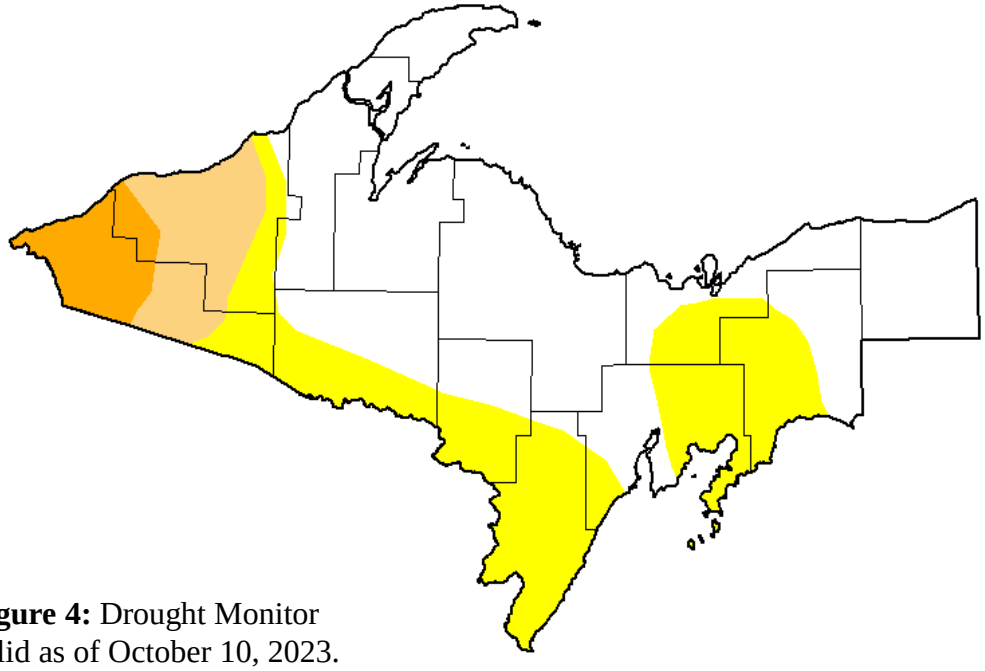


Figure 3: Modeled snow water equivalent for drainage basins on October 1st as a percent of 18-year median.

Drought Discussion

Despite near normal rainfall at Ironwood during September, moderate to severe drought continued across far western Upper Michigan with spots of abnormal dryness near the Wisconsin state line and areas near Manistique. For the latest drought status, please visit http://www.drought.gov.



October 10, 2023
(Released Thursday, Oct. 12, 2023)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	56.15	43.85	13.42	5.42	0.00	0.00
Last Week 10-03-2023	55.88	44.12	13.42	5.42	0.00	0.00
3 Months Ago 07-11-2023	41.36	58.64	18.02	0.00	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 10-11-2022	67.22	32.78	1.96	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

Figure 4: Drought Monitor valid as of October 10, 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)	30

Precipitation Summary

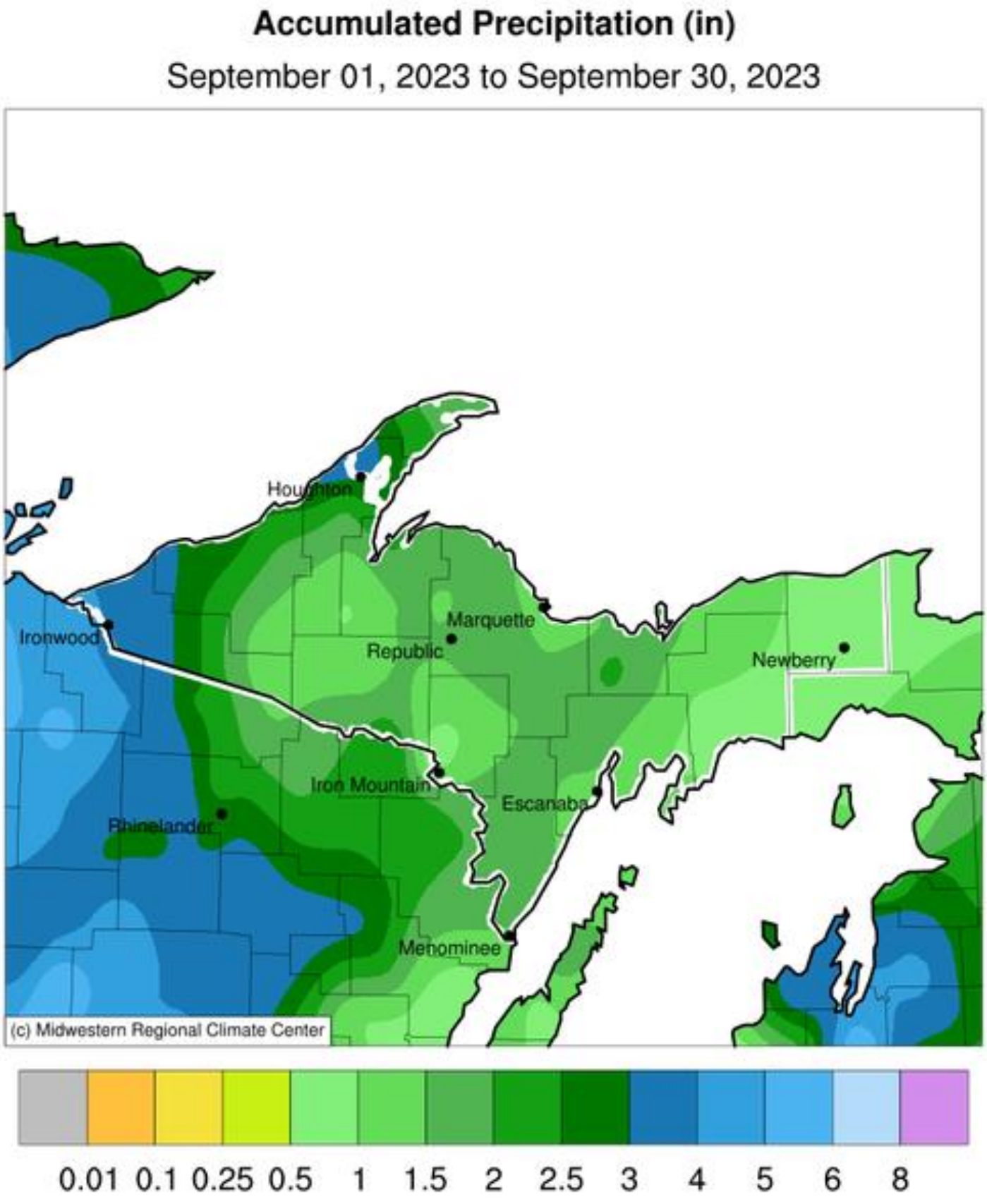


Figure 5: September 2023 Monthly Precipitation Totals.

Precipitation Summary Continued

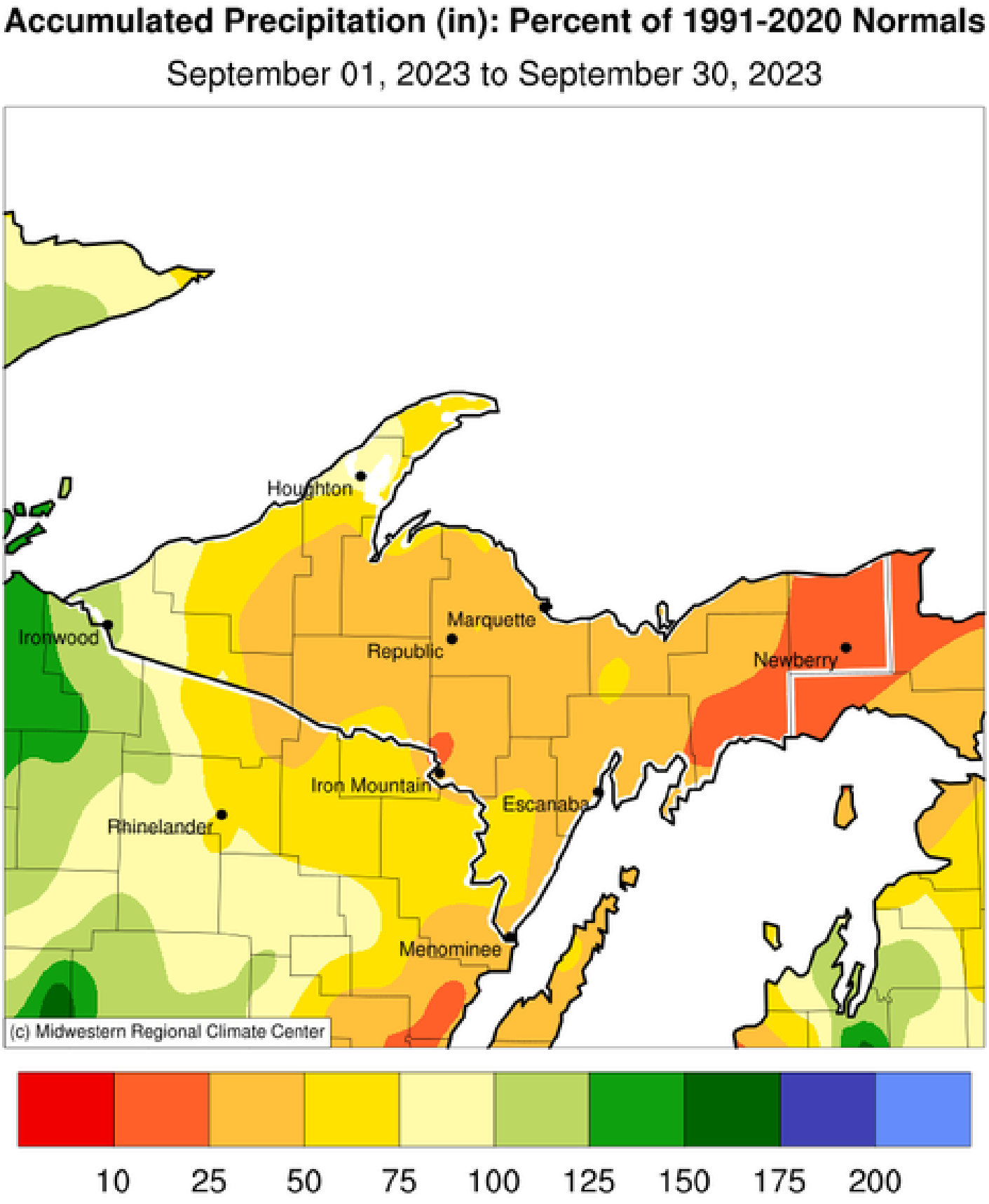


Figure 6: September 2023 Percent of Normal of Accumulated Precipitation.

Soil Moisture Anomaly

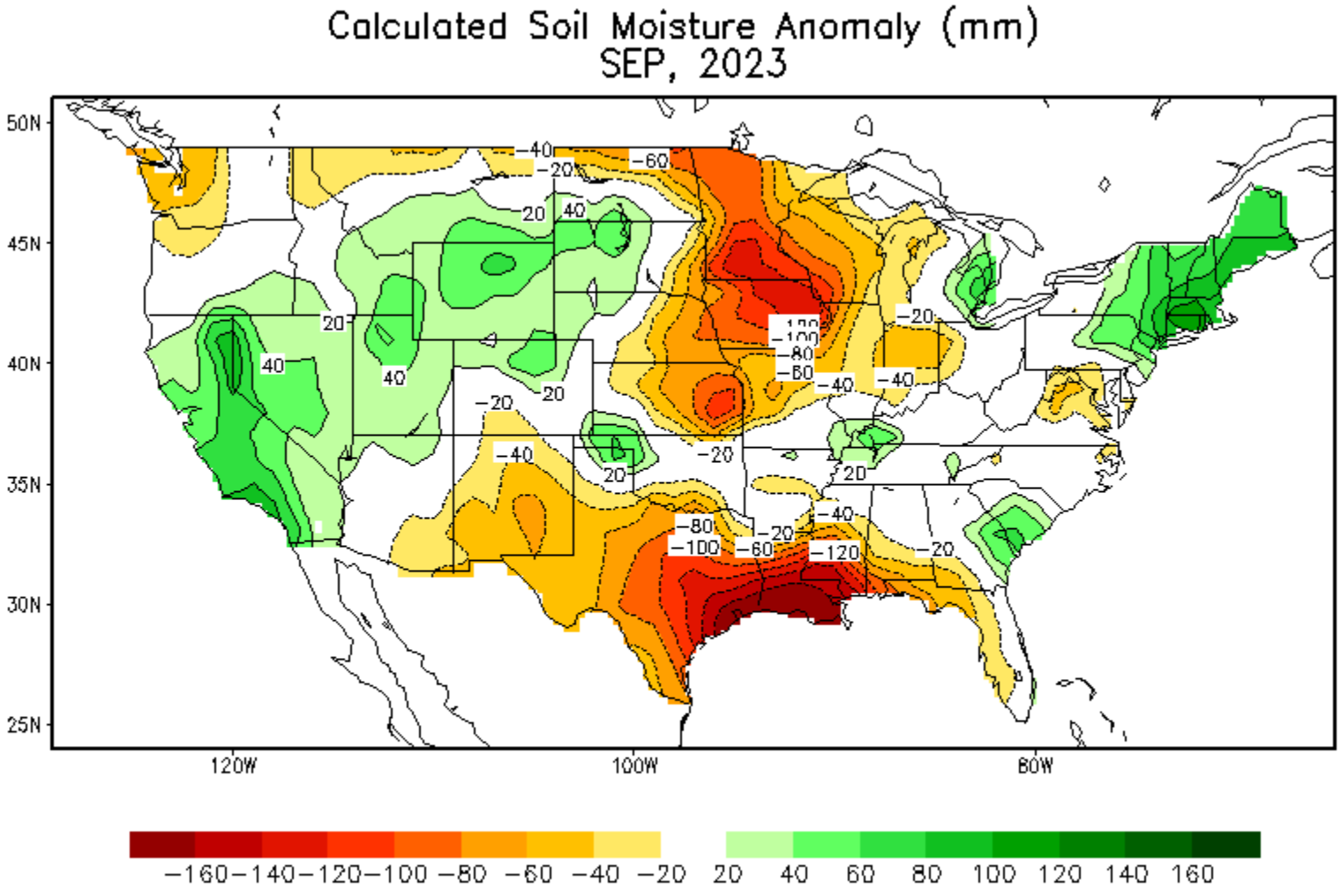


Figure 7: Climate Prediction Center's monthly average soil moisture anomaly for September 2023.

Shallow and Deep Soil Moisture Percentiles

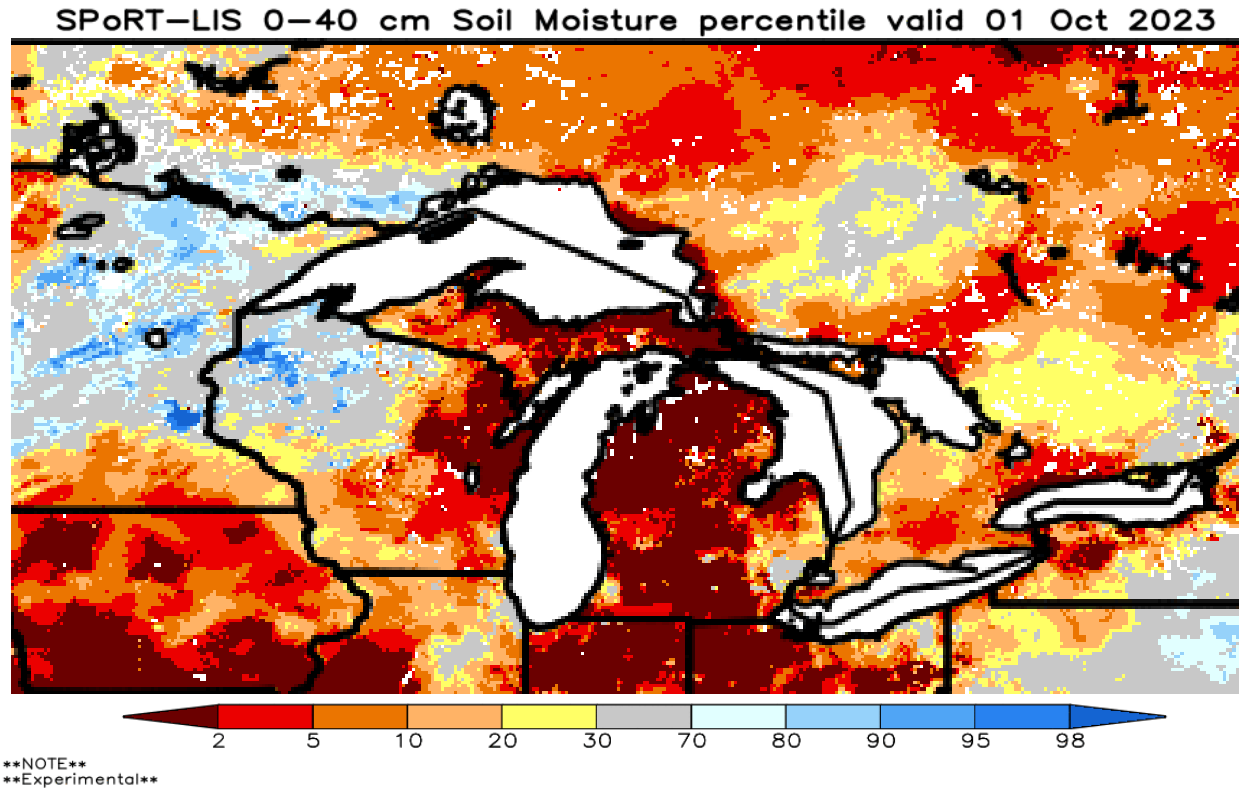


Figure 8: NASA's Short-term Prediction Research and Transition (SPoRT) Center's shallow (0-40 cm) soil moisture percentile valid October 1st, 2023.

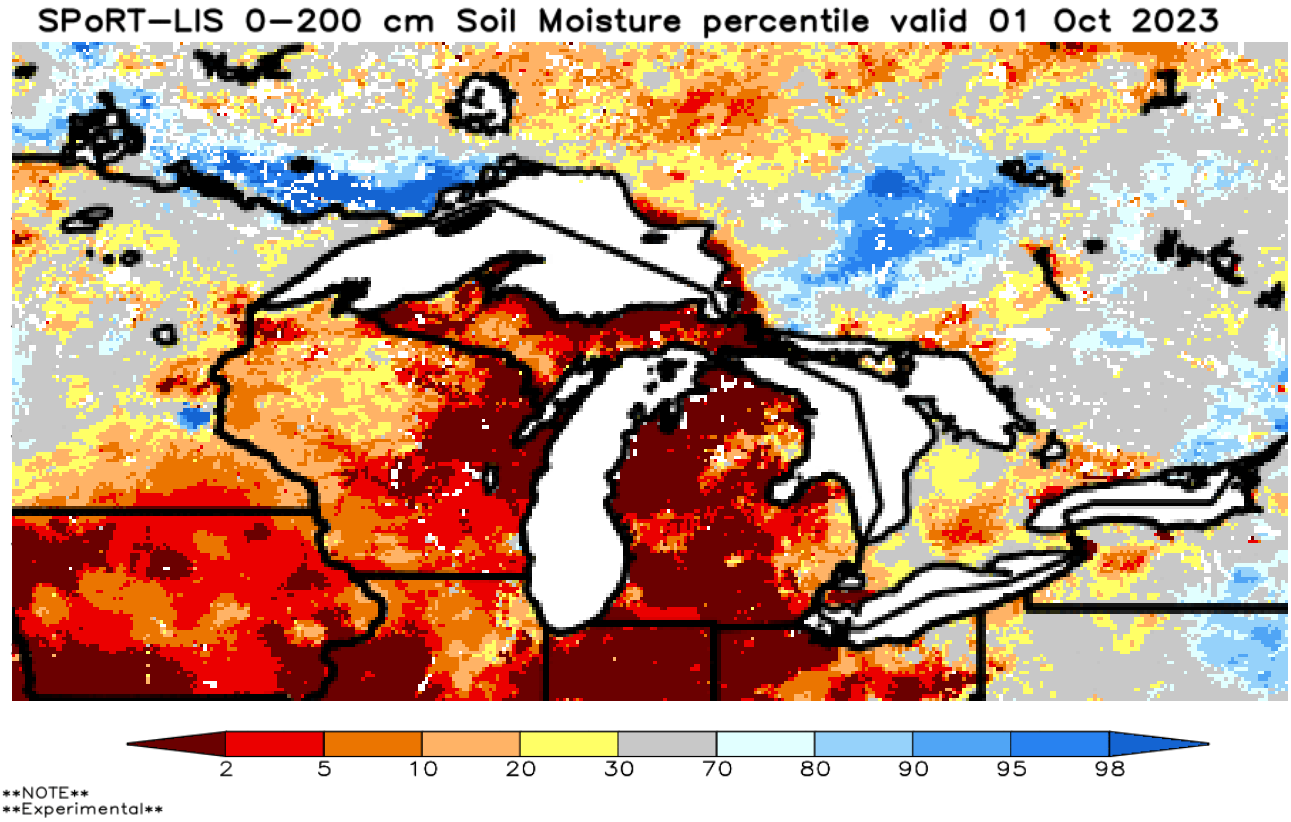


Figure 9: NASA's Short-term Prediction Research and Transition (SPoRT) Center's deep (0-200 cm) soil moisture percentile valid October 1st, 2023.