# Monthly Report of River and Flood Conditions

Report for December 2022

| | |
|---|---|
| **NWS FORM E-5** U.S. DEPARTMENT OF COMMERCE NOAA, NATIONAL WEATHER SERVICE<br><br>**MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS**<br><br>TO: NATIONAL WEATHER SERVICE (W/OH12x1)<br>HYDROMETEOROLOGICAL INFO CENTER<br>1325 EAST-WEST HIGHWAY, RM 7116<br>SILVER SPRING, MD 20910 | HSA OFFICE:<br>**Marquette, MI**<br><br>REPORT FOR (MONTH / YEAR):<br>**December 2022**<br><br>DATE: **January 13th, 2023**<br><br>SIGNATURE:<br>**Evan Kutta Hydro Program Manager**<br>**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). | |

☐ An X inside this box indicates no flooding occurred within this Hydrologic Service Area.

## Summary

Near to above normal precipitation was observed across Upper Michigan during December. A wet snow event on the 15th and a winter storm that brought blizzard conditions to portions of the area between the 22nd and the 26th accounted for the majority of the precipitation observed during December. The late month winter storm also produced widespread accumulating snow that established a near to above normal snow pack across Upper Michigan. While not included in this report, temperatures averaged to near normal values with the coldest temperatures leading up to the late month blizzard. Cold temperatures, intense northwest winds, and large waves on Lake Superior during the blizzard resulted in an ice jam at the mouth of the Au Train River. Flooding occurred immediately upstream from the ice jam and resulted in property damage and water quality concerns for 10-20 homes along the river until contractors for Au Train Township were able to break up the ice jam. Above normal streamflow during December may have exacerbated impacts associated with the ice jam.

| Location | Precipitation | % of Normal | Snowfall |
|---|---|---|---|
| WFO Marquette | 3.15 | 121% | 45.9 |
| Marquette City | 1.87 | 94% | 20.7 |
| Quincy Hill | 3.39 | M | 56.0 |
| Ironwood | 4.07 | 172% | 51.5 |
| Iron Mountain | 1.88 | 107% | 15.0 |
| Manistique | 2.28 | 94% | 21.0 |
| Munising | 4.92 | 143% | 53.9 |
| Stambaugh | 1.81 | 124% | 18.9 |

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

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## Flooding Conditions

Cold temperatures, intense northwest winds, and large waves on Lake Superior during the late month blizzard resulted in an ice jam at the mouth of the Au Train River. Flooding occurred immediately upstream from the ice jam and resulted in property damage and water quality concerns for 10-20 homes along the river until contractors for Au Train Township were able to break up the ice jam. Above normal streamflow during December may have exacerbated impacts associated with the ice jam.

## Media Links

- https://www.uppermichiganssource.com/2022/12/27/au-train-river-floods-after-ice-forms-dam/
- https://www.miningjournal.net/news/front-page-news/2022/12/flood-of-concern-au-train-river-overflowing-its-banks/
- https://www.uppermichiganssource.com/2023/01/04/township-worries-about-erosion-after-ice-dam-floods-au-train-river/

## River Conditions

Near to above normal precipitation and near normal temperatures resulted in near to above normal streamflow across Upper Michigan during December.

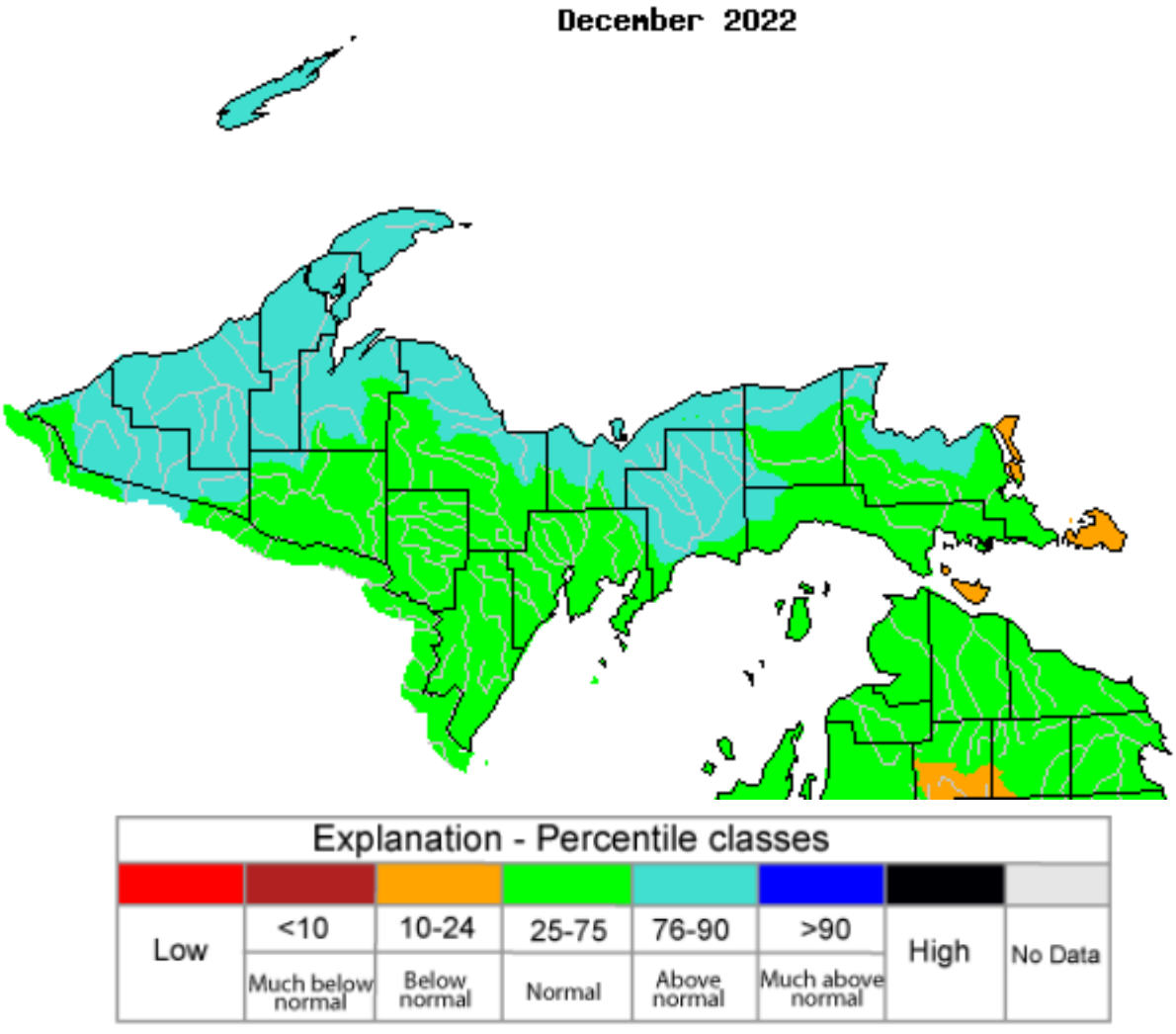


**Figure 1:** USGS monthly average streamflow in December 2022 across Upper Michigan

## Snowpack SWE (Snow Water Equivalent) Conditions

SWE values were near to above average across the UP with SWE values commonly in the 2-4 inch range with higher values at locations favored by lake effect snow and lower values east and south-central.

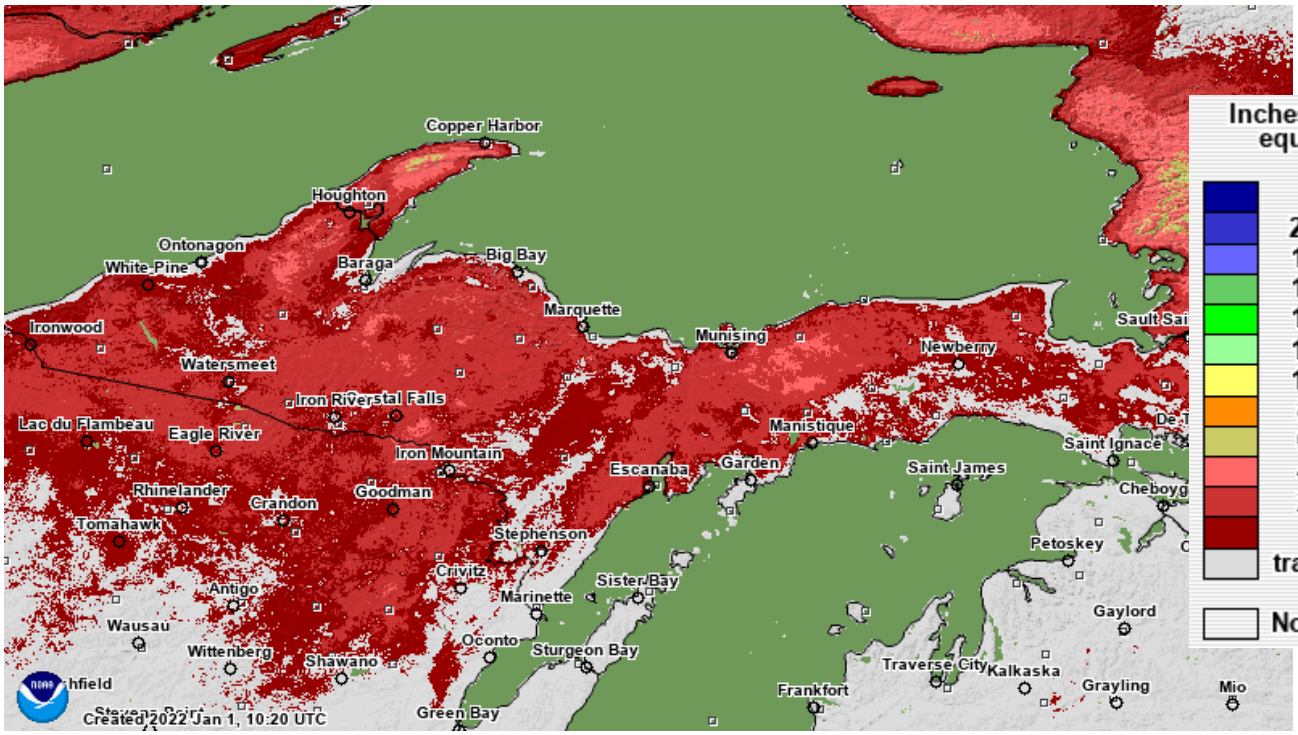


**Figure 2:** Current modeled snowpack snow water equivalent on January 1st.

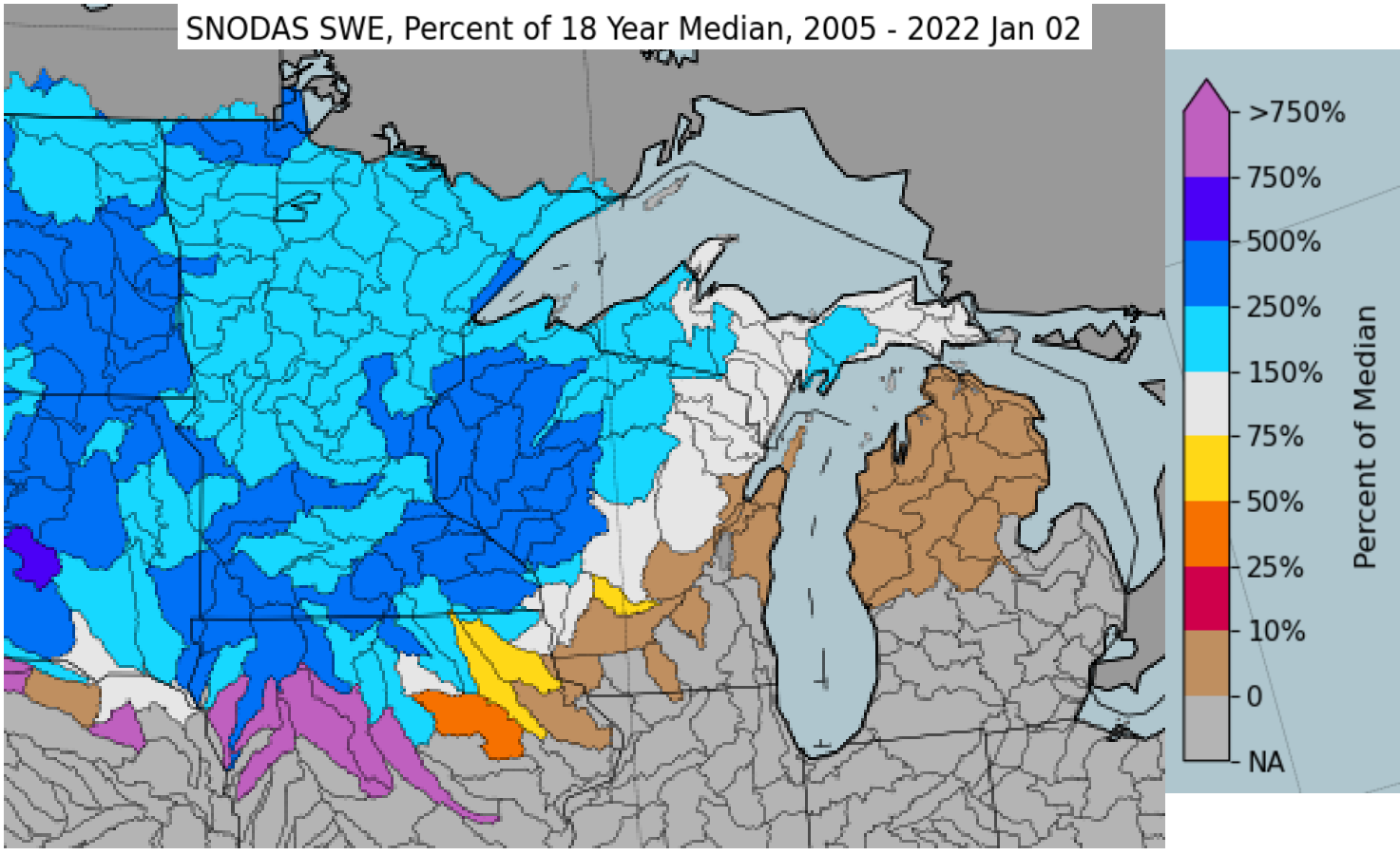


**Figure 3:** Modeled snow water equivalent for drainage basins on January 2nd as a percent of 18-year median.

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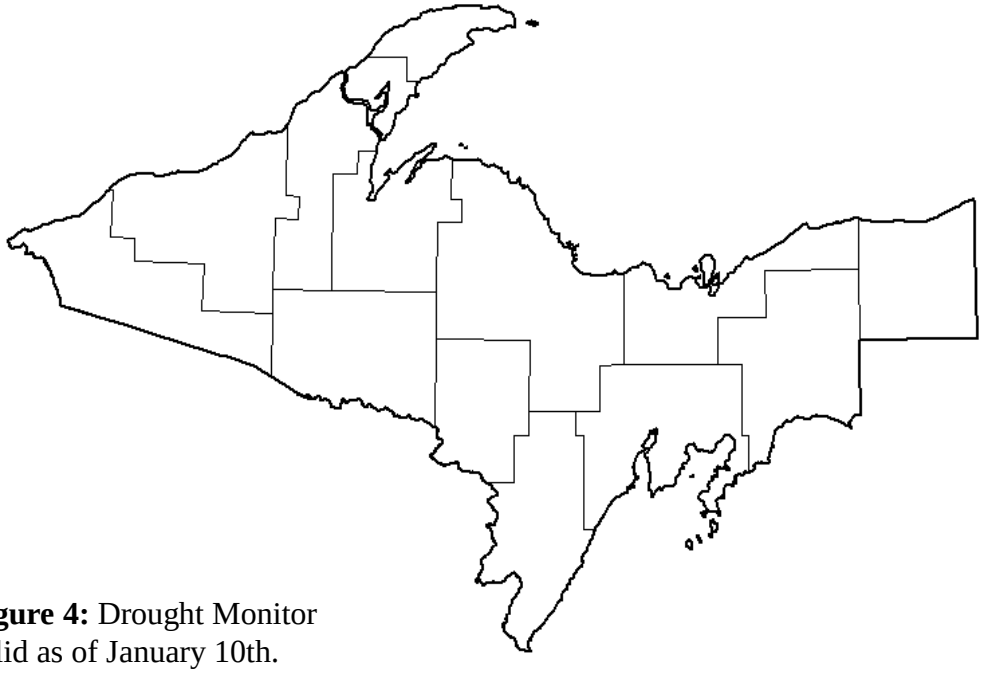
## Drought Discussion

Drought is not present across Upper Michigan. For the latest drought status, please visit http://www.drought.gov.



**January 10, 2023**
*(Released Thursday, Jan. 12, 2023)*
Valid 7 a.m. EST

*Drought Conditions (Percent Area)*

| | None | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4 |
|---|---|---|---|---|---|---|
| Current | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Last Week 01-03-2023 | 93.80 | 6.20 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3 Months Ago 10-11-2022 | 67.22 | 32.78 | 1.96 | 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 09-27-2022 | 88.48 | 11.52 | 1.94 | 0.00 | 0.00 | 0.00 |
| One Year Ago 01-11-2022 | 45.28 | 54.72 | 27.69 | 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:*
Richard Tinker
CPC/NOAA/NWS/NCEP

droughtmonitor.unl.edu

**Figure 4:** Drought Monitor valid as of January 10th.

## Hydro Products Issued

| Product | Number |
|---|---|
| Hydrologic Outlook (ESF) | 0 |
| Flood Watch (FFA) | 0 |
| Flood Warning (FLW) | 2 |
| Flood Advisories and Statements (FLS) | 1 |
| Flash Flood Warning (FFW) | 0 |
| Flash Flood Statement (FFS) | 0 |
| Hydrologic Summary (RVA) | 31 |
| Daily River Forecasts (RVD) | 0 |

## Precipitation Summary

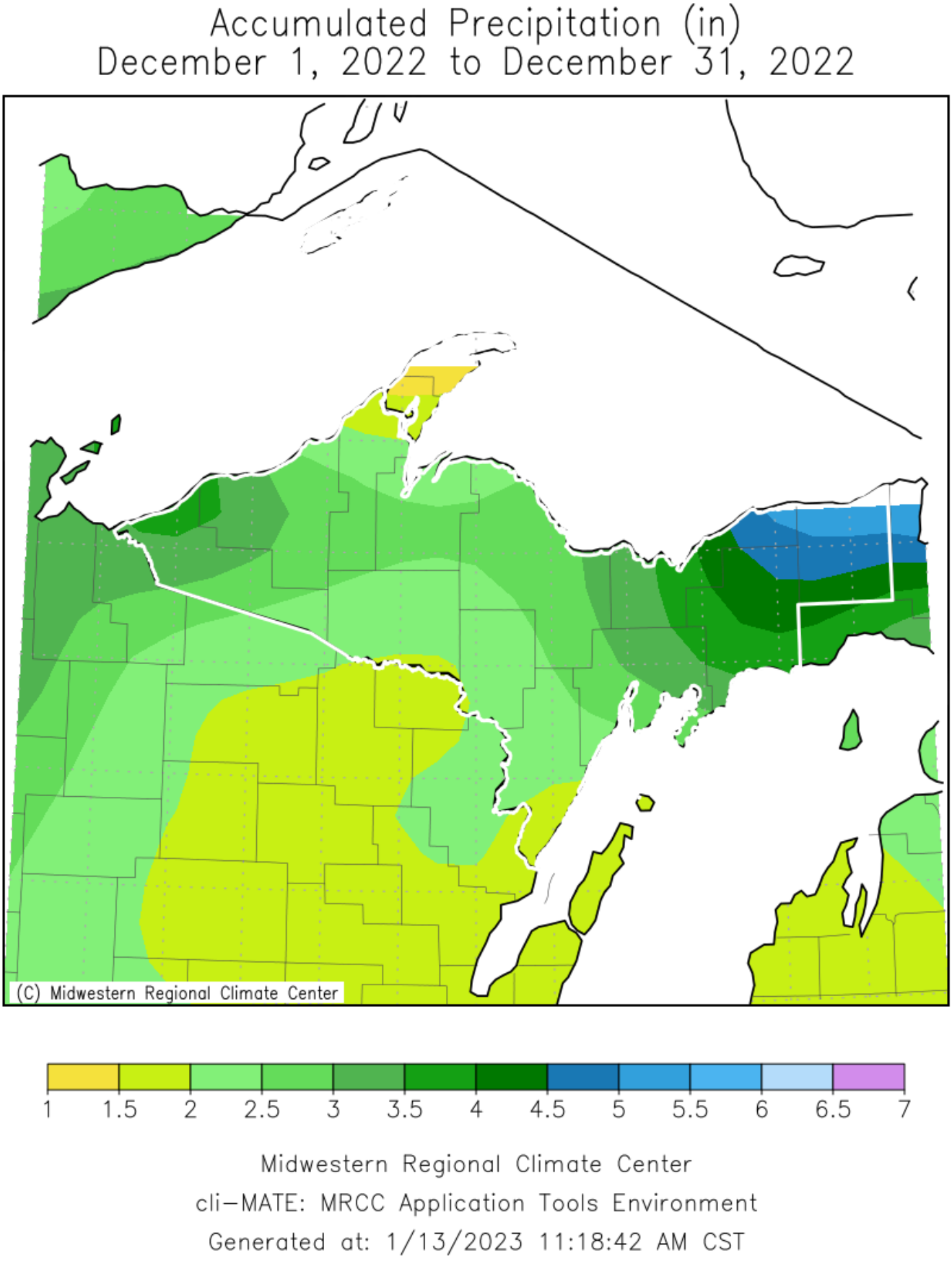



**Figure 5:** December 2022 Monthly Precipitation Totals.

## Precipitation Summary Continued

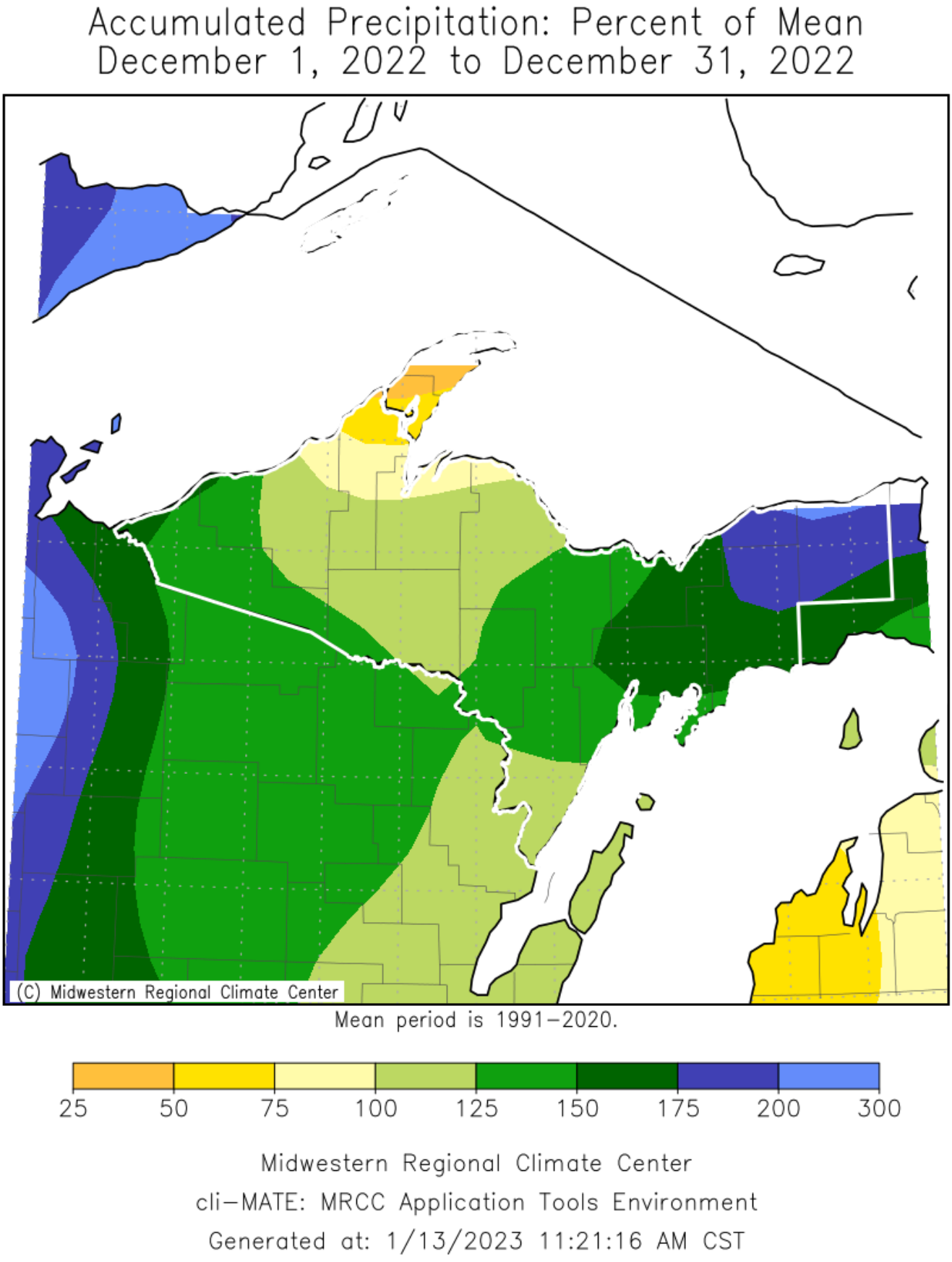



**Figure 6:** December 2022 Percent of Normal of Accumulated Precipitation.

## Soil Moisture Anomaly

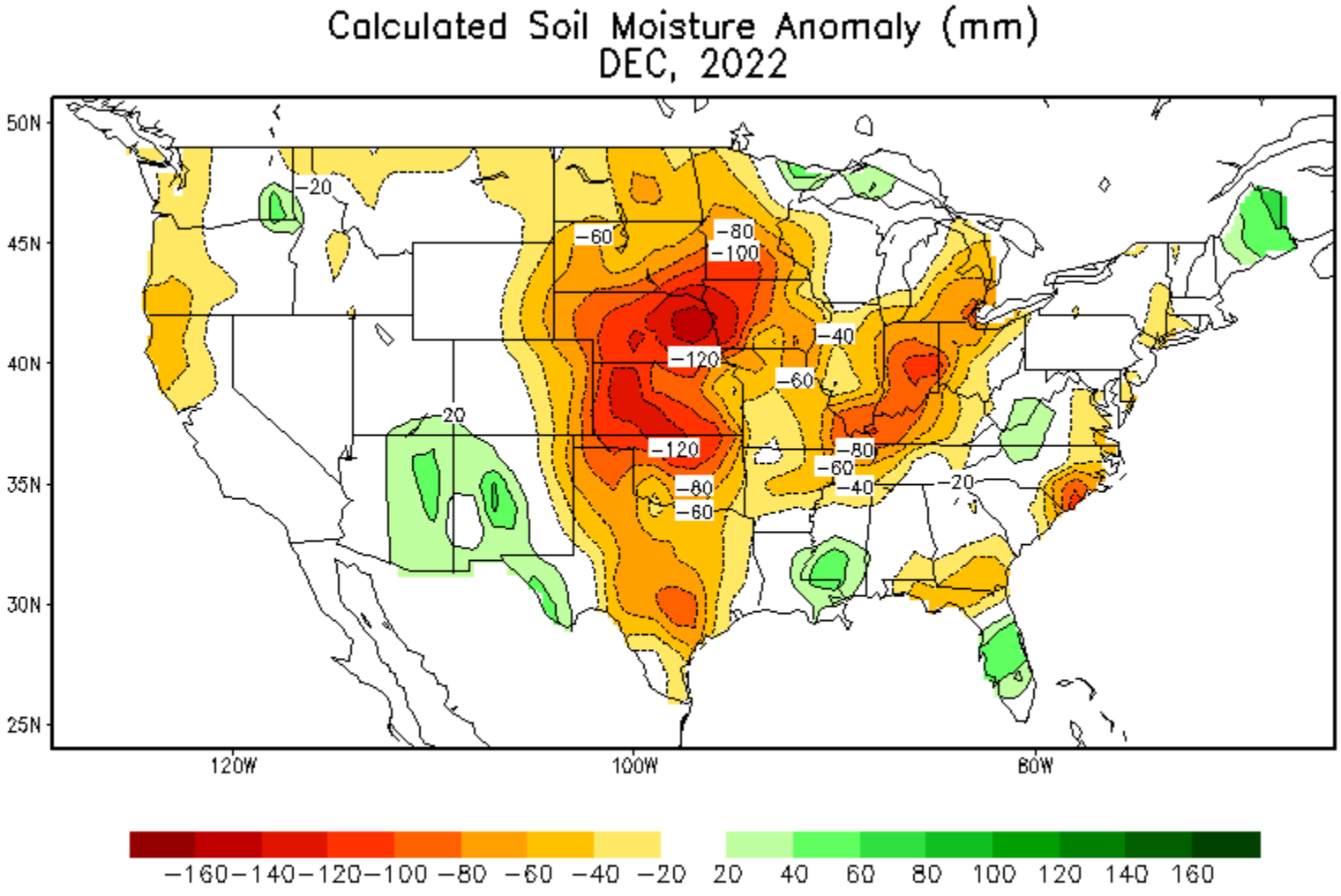



**Figure 7:** Climate Prediction Center's monthly average soil moisture anomaly for December 2022.

## Shallow and Deep Soil Moisture Percentiles

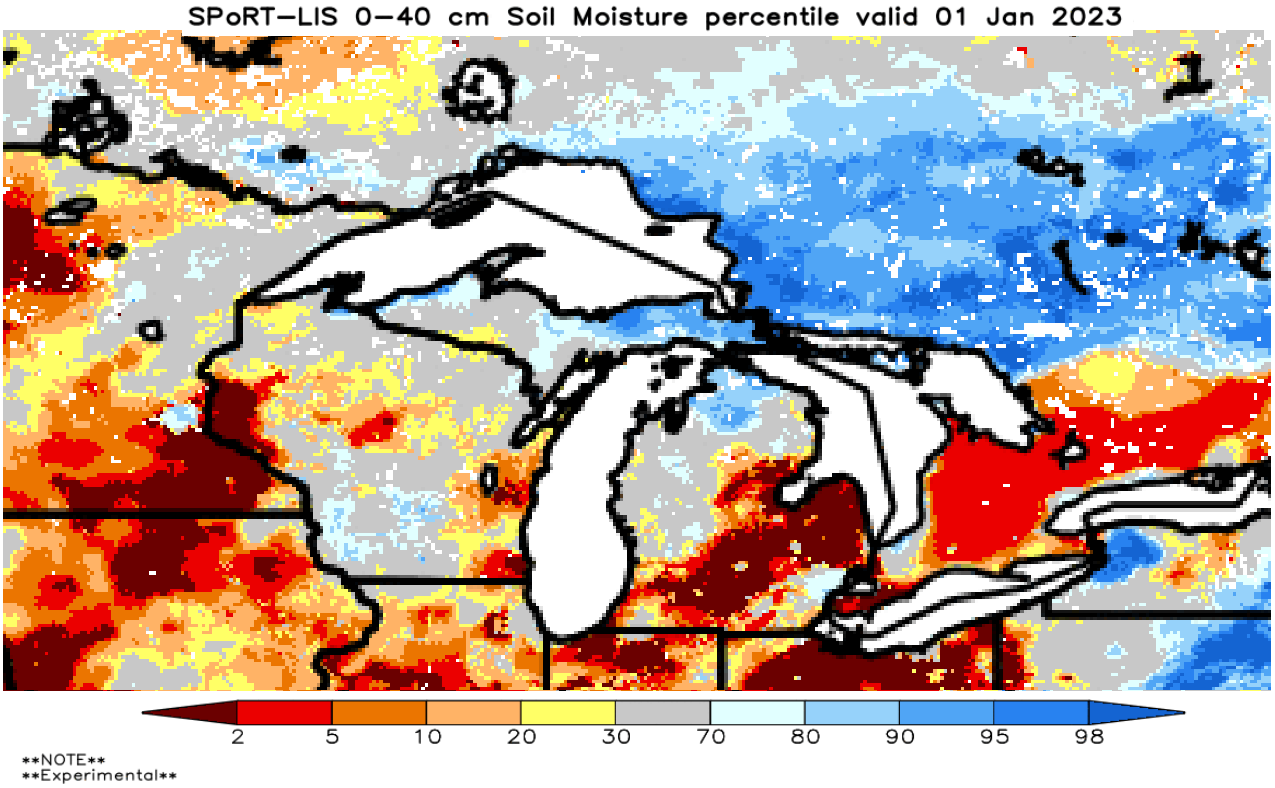



**Figure 8:** NASA's Short-term Prediction Research and Transition (SPoRT) Center's shallow (0-40 cm) soil moisture percentile valid January 1, 2023.

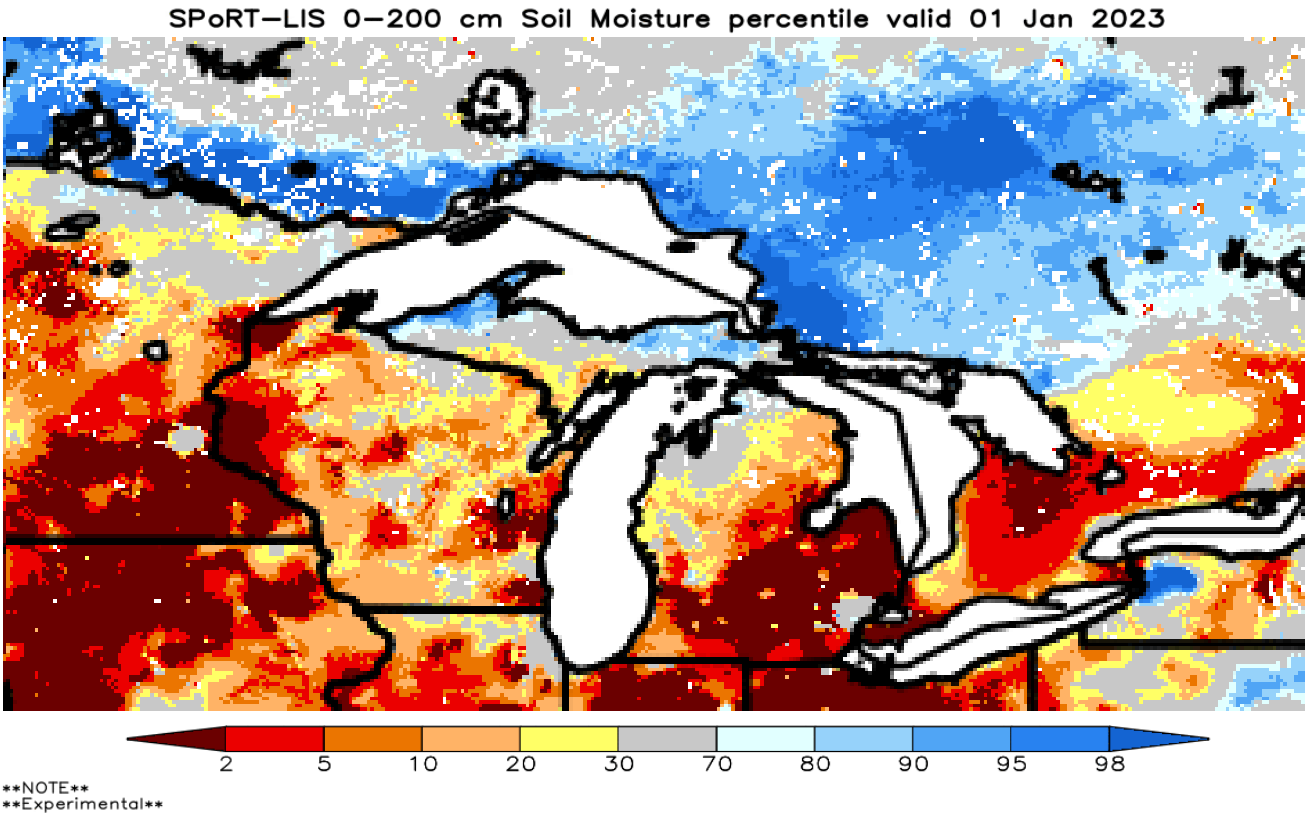



**Figure 9:** NASA's Short-term Prediction Research and Transition (SPoRT) Center's deep (0-200 cm) soil moisture percentile valid January 1, 2023.