

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 2019
	DATE: November 04, 2019
	SIGNATURE: Robin J. Turner, MIC Keith White, Hydrology Program Manager Joe Phillips, Hydrology Team Member
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.

October Precipitation

Wetter than normal conditions continued across Michigan's Upper Peninsula this month. Several heavier rainfall events occurred, including the three-day stretch of widespread 0.25-0.75" between October 1st and 3rd, the widespread 0.75-1.25" experienced on October 11th, the widespread 0.75-1.00" with isolated 1-2" on October 15th, and the widespread 0.5-1.0" of rain observed on October 21. Total accumulations throughout the month yielded totals above average for all sites, with many sites observing greater than 150% of normal. Manistique observed a record setting 6.77" of rain during October which was 225% above normal.

October began at the tail end of a wet pattern, with most of the Upper Peninsula seeing a quarter to three quarters of an inch at least once in the first 3 days. Many recorded rain over the 3 day period approaching or slightly above 1.0", particularly the western counties and the counties in the Keweenaw Peninsula.

Another large rainfall event took place on October 11th across the region. Widespread rainfall totals between 0.5" and 0.75" was observed but some outliers were observed across Alger, Delta and Menominee counties, including Munising's 1.67", Rapid River's 1.69", Escanaba's 1.25" and the rain gauge on the Escanaba River in Cornell's 1.37". Light rainfall with some places receiving some snow generally between 0.10-0.25" of liquid water continued for the next six days, due to lake effect type systems. The exception being the system rainfall event that occurred on October 15th. During this event, widespread 0.75-1.0" was observed, but across the north central Upper Peninsula counties of Marquette and Alger, 1-2 inches was observed.

Another light rainfall day occurred on October 19th, with most observation sites across the region recording 0.05-0.10", with the exception of Ironwood's observation of 0.39". This preceded a long stretch of light precipitation days between October 21st and October 26th. During this period, widespread 0.10-0.25" was observed at all sites for a few days, with the exception being October 21st's 0.5-1.0" that was observed across the region.

The month ended with a snow and rain event on October 28th and 29th, where the higher liquid precipitation equivalents were focused on the eastern counties. There observed accumulated totals ranged between 0.25-0.70" inches for the event.

Below is a chart of some of the larger cities in the Upper Peninsula, with monthly precipitation in inches and the percent of normal for the month. Any notable monthly ranks are also included. See figures 1 and 2 below for a smoothed out aerial view of these data, and figures 3 and 4 for the radar-estimated precipitation data. It is clear from these data that, with the exception of portions in the Keweenaw Peninsula, the entire area received above normal to well above normal rainfall for the month. This has led to monthly average soil moistures above the 80th percentile over portions of the UP for the third fall in a row heading into the freeze-up season (see figure 5).

Location	Precipitation	% of normal	Rank	Snowfall	Above/Below normal
WFO Marquette	4.95"	129%	17 th	2.8"	-3.2"
Marquette City	5.63"	180%	9 th	1.2"	+0.2"
Quincy Hill	4.20"	140%		0.6"	-4.1"
Ironwood	4.11"	131%		0.0"	-4.6"
Iron Mountain	4.14"	164%	8 th	0.5"	-0.1"
Manistique	6.78"	225%	1 st	1.0"	+0.3"
Munising	6.77"	177%	10 th	1.3"	-1.3"
Newberry	7.23"	203%	2 nd	1.9"	+0.7"
Stambaugh	4.45"	161%	18 th	0.7"	-0.6"

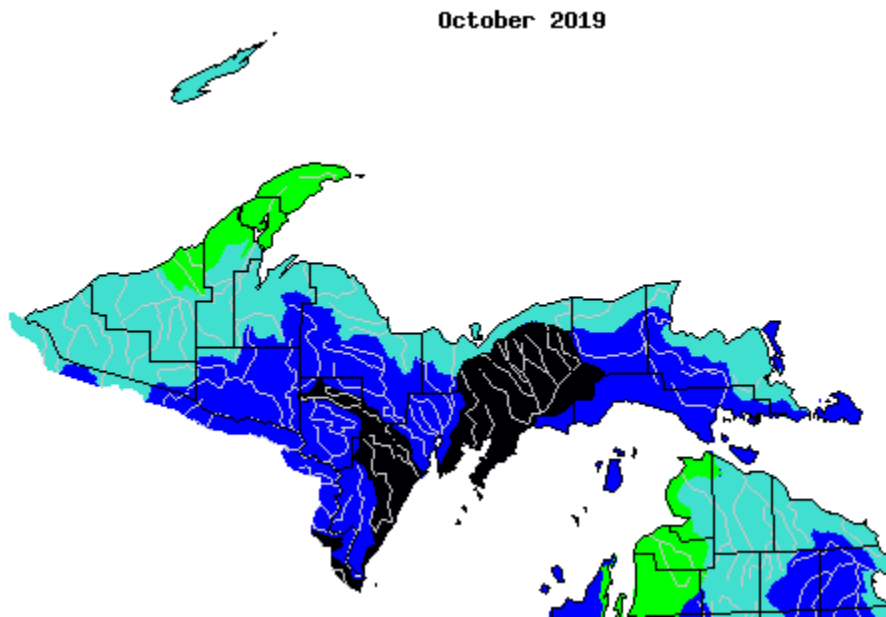
NOTE: Rainfall after 8am EST Sept. 30 was counted in October stats for all but the NWS Marquette site due to the reporting structure of our cooperative observers.

October Flooding

Rivers did not reach flood stage in the Upper Peninsula. However, high river levels and standing water alongside roads were observed at times.

October River Levels

River levels across the NWS Marquette Hydrologic Service Area (HSA) have generally risen over the last month and are abnormally high over much of central and eastern Upper Michigan. Streamflows are the most abnormally high over much of central and eastern Upper Michigan, particularly in the Cedar/Ford, Whitefish, Sturgeon and Manistique basins.



Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	No Data
	Much below normal	Below normal	Normal	Above normal	Much above normal		

Drought Discussion

No drought conditions are depicted in the Upper Peninsula. For the latest drought status, please go to <http://www.drought.gov>.

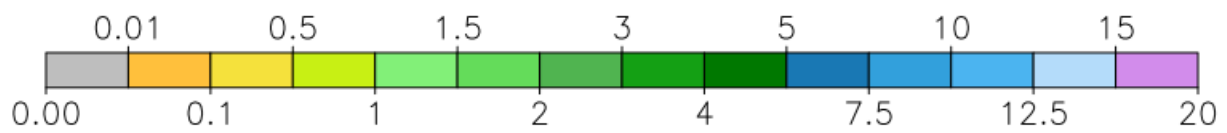
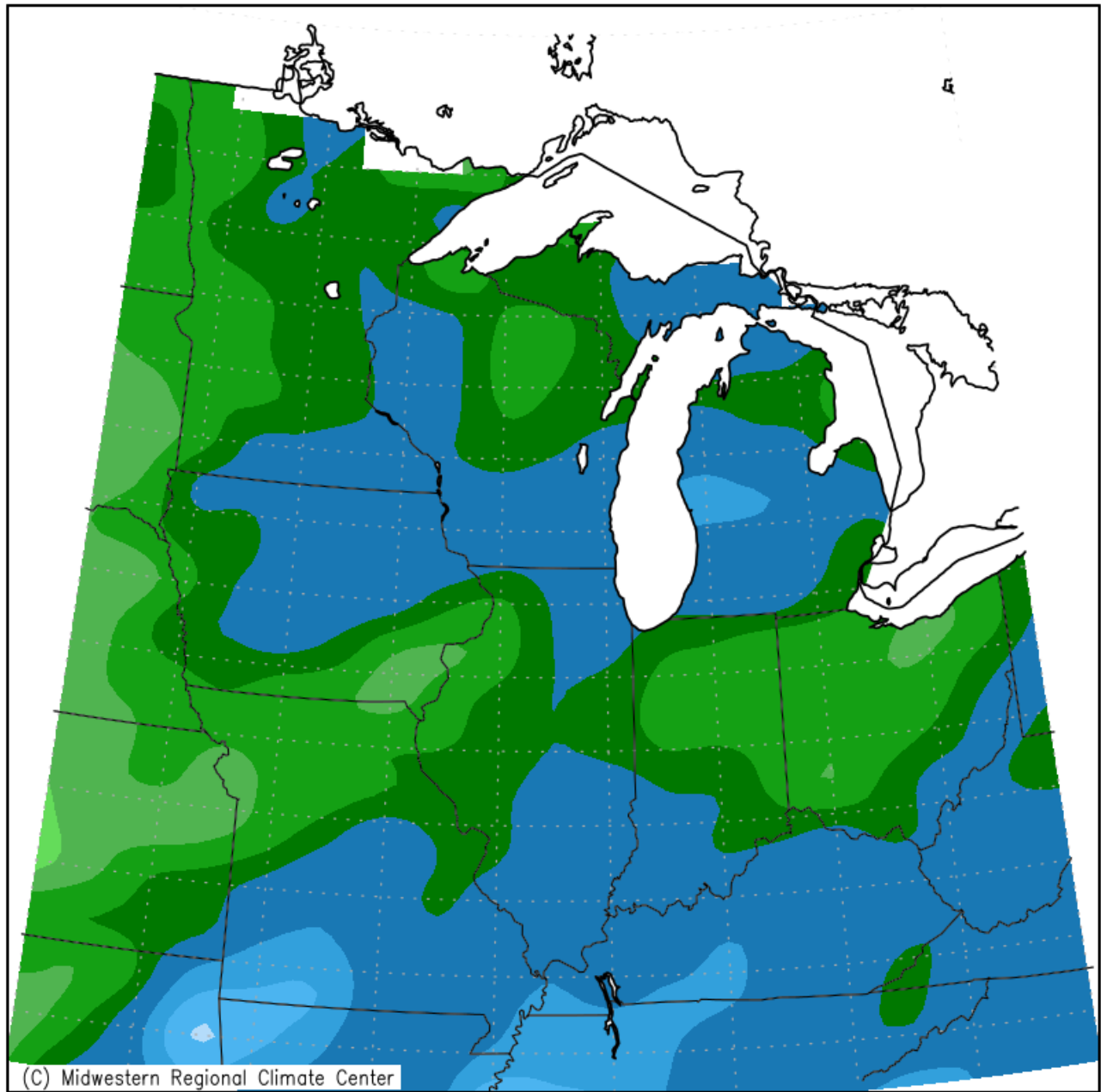
Media Links

[TV6 article](#) on continued recovery efforts from the Houghton County Father's day 2018 flooding:

October Products Issued

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

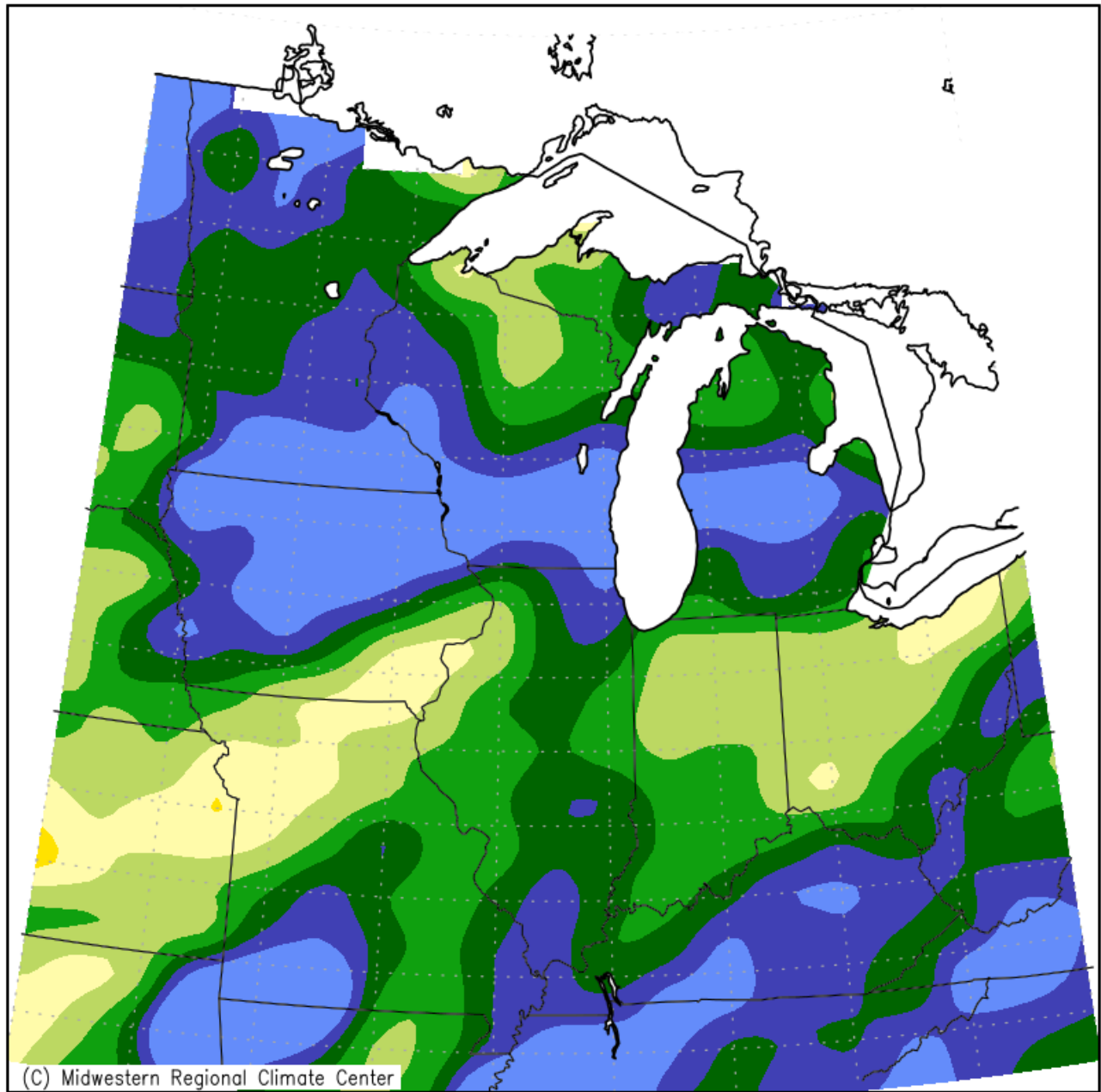
Accumulated Precipitation (in)
October 1, 2019 to October 31, 2019



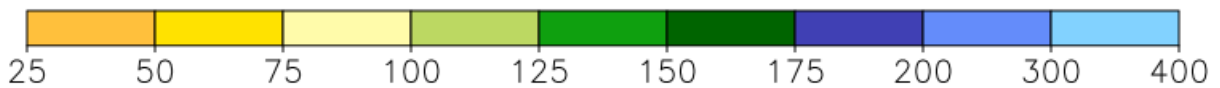
Midwestern Regional Climate Center
Illinois State Water Survey, Prairie Research Institute
University of Illinois at Urbana–Champaign

Figure 1. October 2018 Monthly Precipitation Totals.

Accumulated Precipitation: Percent of Mean October 1, 2019 to October 31, 2019



Mean period is 1981–2010.



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Figure 2. October 2018 Percent of Mean of Accumulated Precipitation

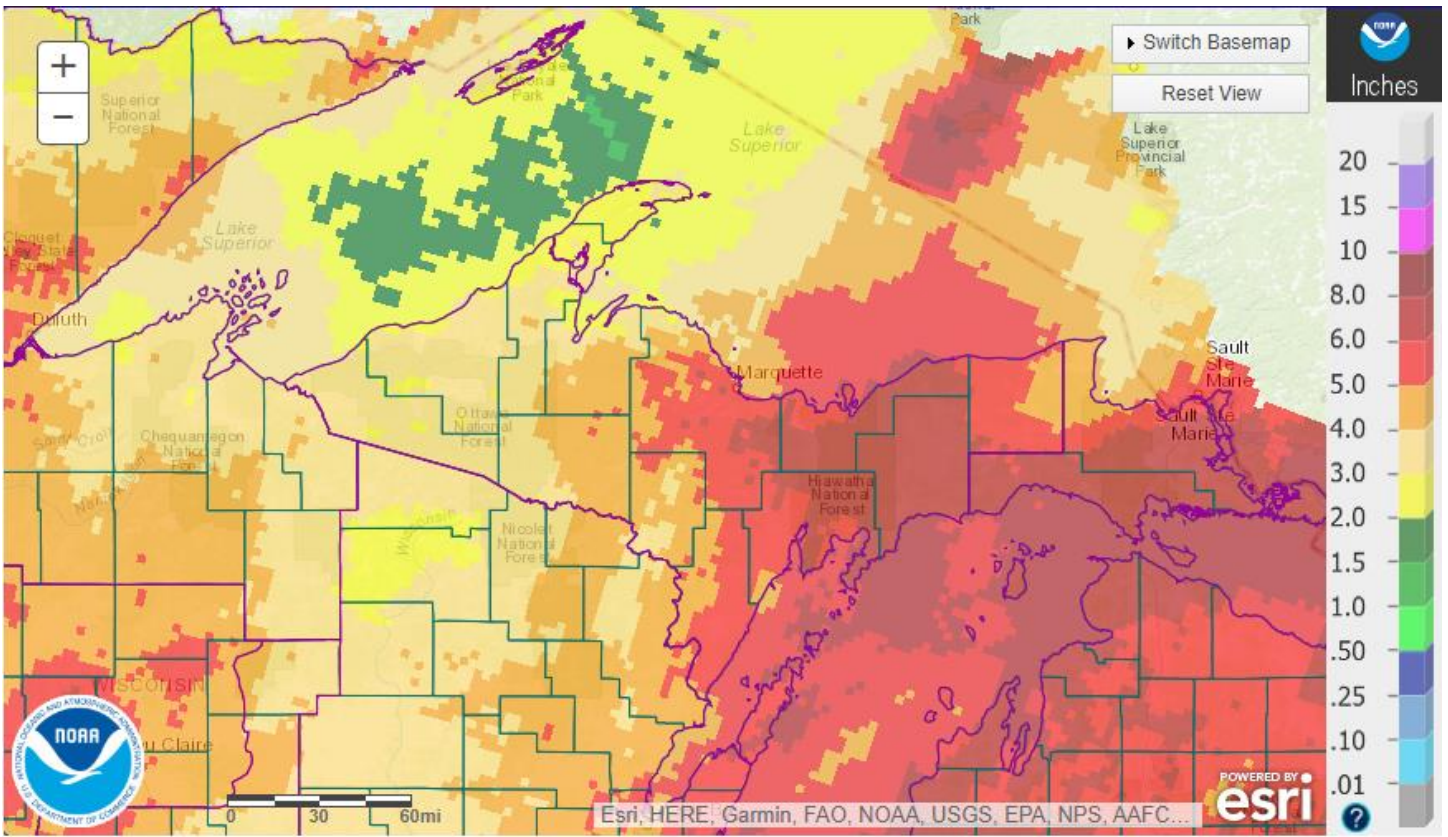


Figure 3. October 2019 AHPS Monthly Precipitation

Note: This data is subject to errors in the estimates produced by the radar, as well as beam blockage across portions of the NW UP.

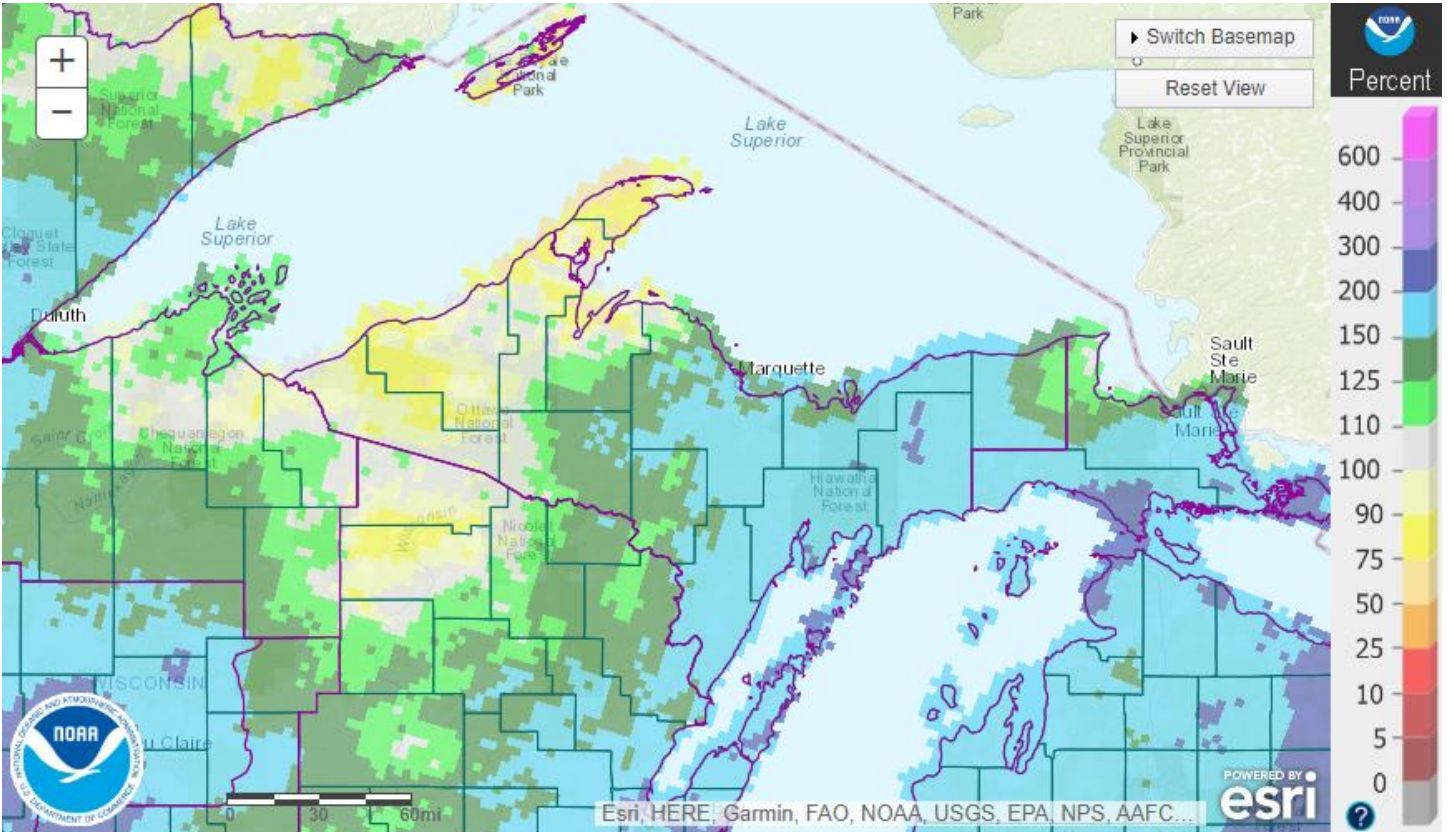


Figure 4. October 2019 AHPS Percent of Mean of Accumulated Precipitation

Note: This data is subject to errors in the estimates produced by the radar, as well as beam blockage across portions of the NW UP.

Calculated Soil Moisture Ranking Percentile OCT, 2019

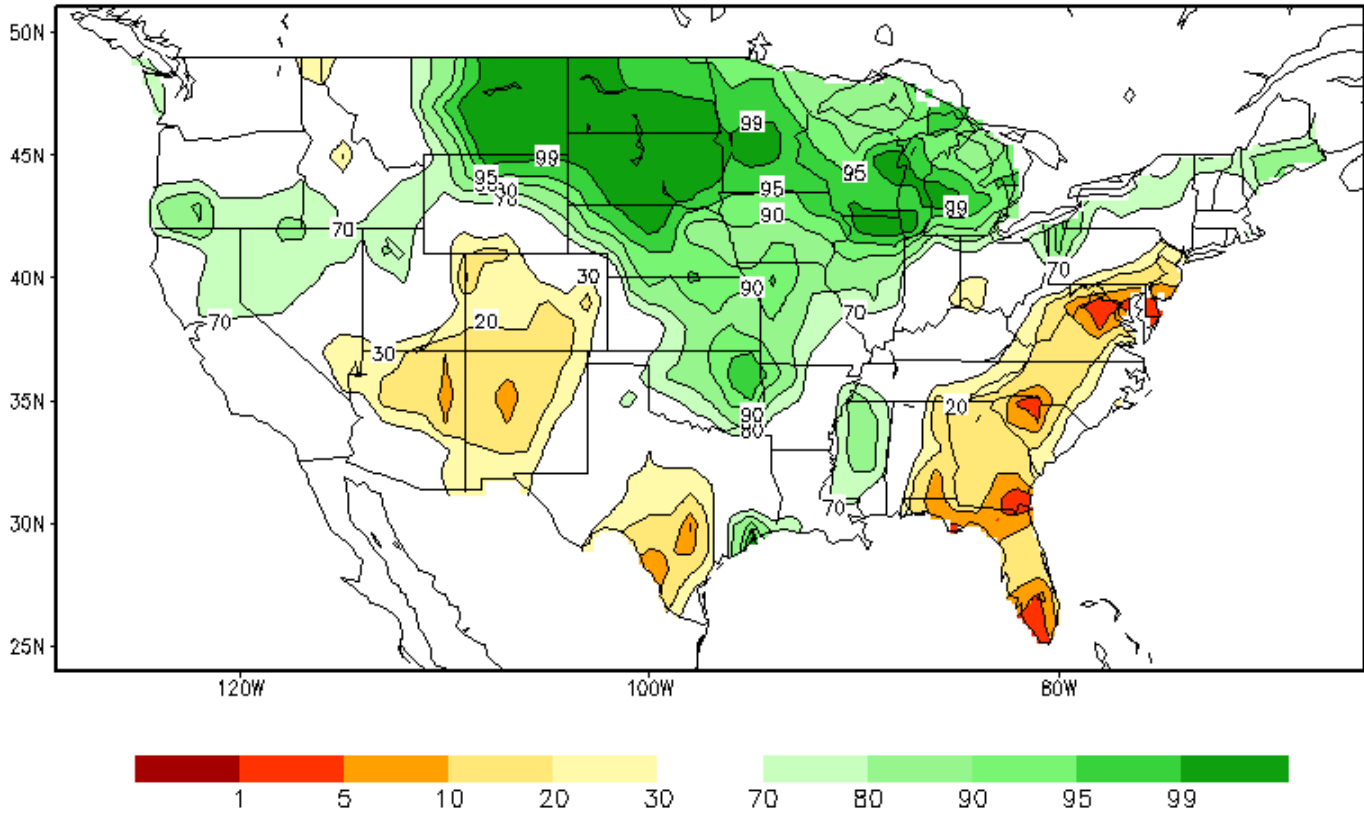


Figure 5: Climate Prediction Center monthly average soil moisture percentile for October 2019