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): **July 2019** DATE: **August 3, 2019** SIGNATURE: **Robin J. Turner, MIC** **Keith White, Hydrology Program Manager**
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.

July Precipitation

Mostly light to moderate precipitation events were observed in July, with the exception of July 5th, and portions of the middle of the month. On the 5th, thunderstorms brought 0.5-1" of rain to a good chunk of the area save the Keweenaw, the south-central, and the eastern UP, with localized totals near Watton of 2-2.5". July 14th and 15th featured several thunderstorm complexes that primarily affected western and central portions of the area. Specifically, locations near the WI border received ~1.5" July 15th. A widespread rainfall event late in the month on the 28th again mainly impacted the west half of the UP with 0.5-1" of rain.

The heaviest rainfall this month occurred near Menominee. Marinette, WI (just across the border) recorded 6.29" in July, nearly twice the monthly average. Most of this rain fell in two events on the 14-15th and 19th (the 19th event was the northern edge of a line of powerful thunderstorms that caused widespread wind damage in northern WI.)

On the whole, the far southern and portions of far western Upper Michigan saw above normal precipitation, with much of the rest of the area experiencing below to well below normal rainfall. It was especially dry in the northeastern UP from Alger County eastward.

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.

Location	Precipitation	% of normal	Rank
WFO Marquette	1.97"	69	
Marquette City	2.08"	74	
Quincy Hill	3.35"	135	
Ironwood	3.46"	84	
Iron Mountain	3.60"	104	
Manistique	3.55"	117	
Munising	1.08"	33	95/105
Newberry*			
Stambaugh	3.04"	73	

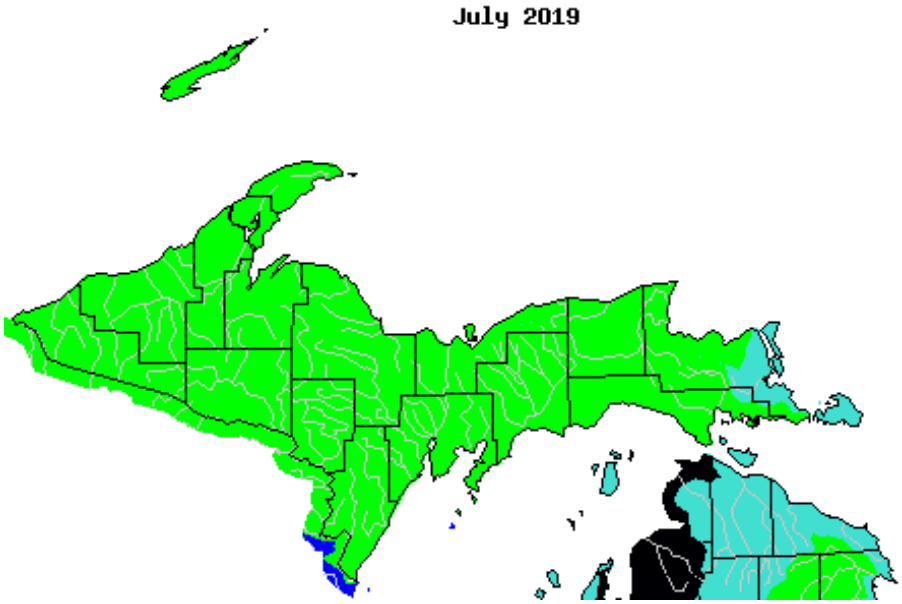
* Indicates there was not enough data this month to create monthly totals.

July Flooding

No flooding was reported in July 2019.

July River Levels

River levels across the NWS Marquette Hydrologic Service area were well within normal bounds in the month of July. Another month of below average rainfall could potentially cause some streams to begin to fall below normal.



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

The August 1st update of the US Drought Monitor **has expanded D0 drought** (Abnormal Dryness) across north-central and northwest portions of the NWS MQT Hydrologic Service Area (HSA). This drought was introduced in early July after a short term rainfall deficit in the area. For the latest drought status, please go to http://www.drought.gov.

July Products Issued

0 – Hydrologic Outlook (ESF; monthly 90 day outlook was issued a couple days late on Aug. 2)
0 – Flood Watch (FFA)
0 – Flood Warning (FLW; Two warnings, one correction and one misplaced cancellation statement)
0 – Flood Advisories and Statements (FLS; includes some corrected products and some carryover statements from warnings issued in April)
0 – Flash Flood Warning (FFW)
0 – Flash Flood Statement (FFS)
31 – Hydrologic Summary (RVA)
31 – Daily River Forecasts (RVD)

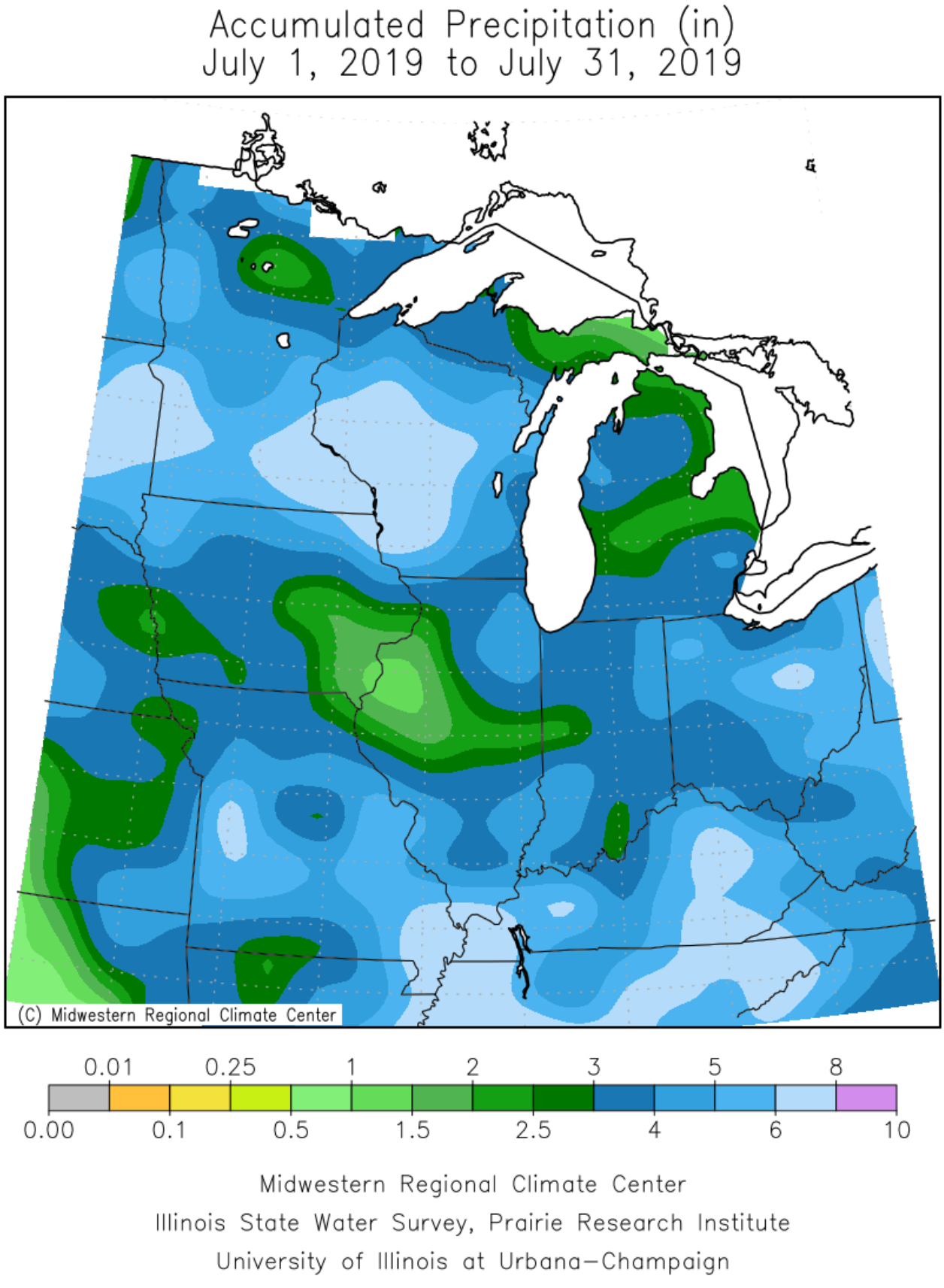


Figure 1. July 2018 Monthly Precipitation Totals.

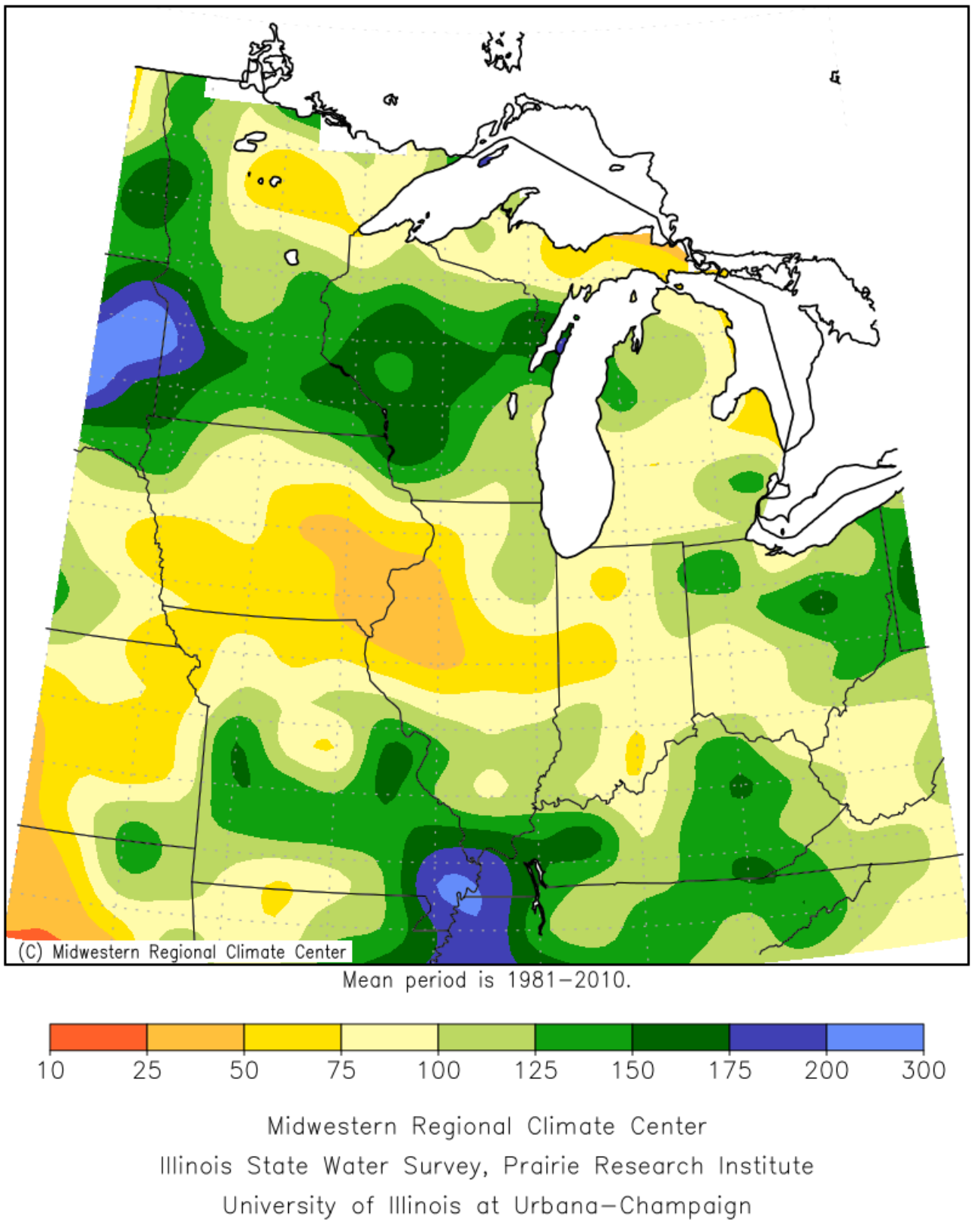


Figure 2. July 2018 Percent of Mean of Accumulated Precipitation

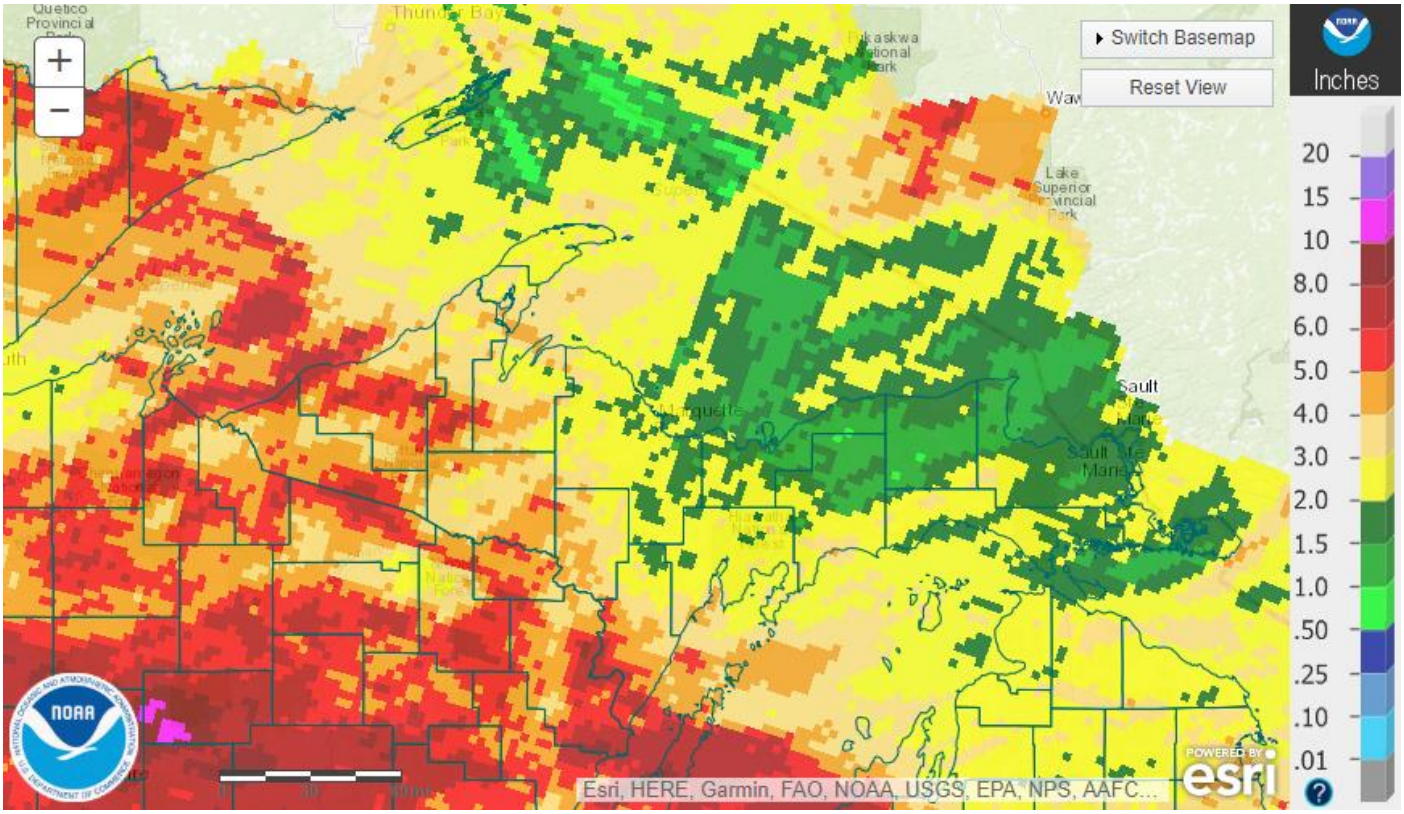


Figure 3. July 2019 AHPS Monthly Precipitation
Note: This data is subject to errors in the estimates produced by the radar, as well as beam blockage across portions of the NW UP.

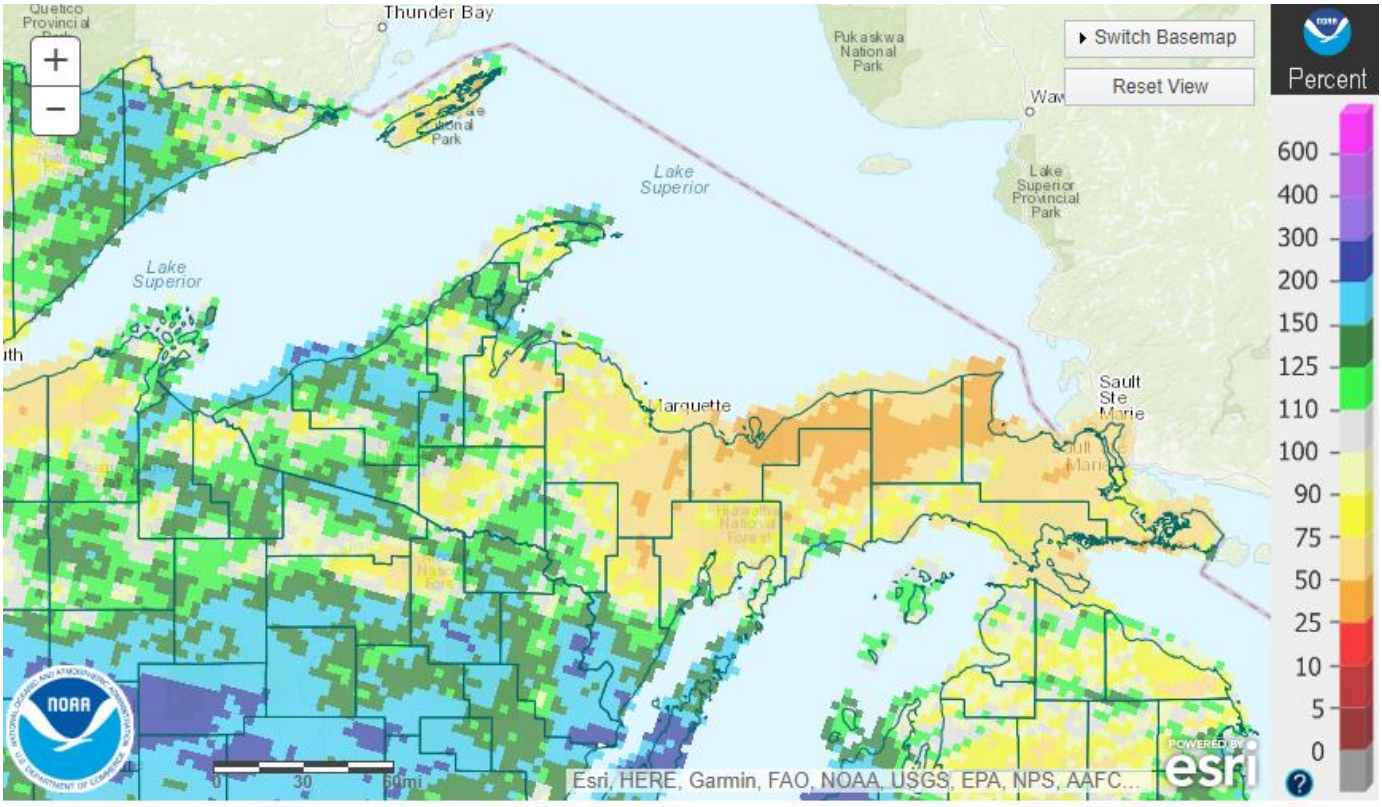


Figure 4. July 2019 AHPS Percent of Mean of Accumulated Precipitation
Note: This data is subject to errors in the estimates produced by the radar, as well as beam blockage across portions of the NW UP.