NWS FORM E-5	**U.S. Department of Commerce** NOAA, NATIONAL WEATHER SERVICE	**HSA OFFICE:** **Grand Rapids, MI**
MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS		REPORT FOR (MONTH & YEAR): **March 2022**
TO:	NATIONAL WEATHER SERVICE (W/OS31) HYDROMETEOROLOGICAL INFO CENTER 1325 EAST-WEST HIGHWAY, RM 13468 SILVER SPRING, MD 20910	DATE: April 15, 2022
		SIGNATURE: Richard Wagenmaker, MIC Andrew Dixon, Service Hydrologist

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 that no flooding occurred within this hydrologic service area.

Summary

The warm and wet weather pattern that developed in the 2nd half of February continued into March, and spread northward into the Muskegon River basin as well. As March began, most of the snowpack had been melted in the Grand and Kalamazoo basins (generally along and souther of I-96) but the snowpack remained mostly on the ground still across the Muskegon River basin. Much of this remaining snowpack melted during a warmup during the first week of March. Thankfully the warmup was not accompanied by heavy rain, and the snowpack coming out of winter was holding less water equivalent than average. This snowmelt runoff brought the Muskegon River up to typical springtime values, but did not produce any flooding.

By the middle of the month the rainy weather pattern had intensified, and several rounds of significant rain fell across the Grand and Muskegon basins during the 2nd half of the month. Much of the snowmelt had already passed through the Muskegon River, so while this brought river levels up to near bankfull, flooding was avoided. Also helpful was the fact that Consumers Energy was able to absorb a bit of this runoff wave as they began to refill Hardy Dam pond from the wintertime drawdown.

Flood Conditions

The Muskegon River spent most of the winter at well below-average water levels, and started the snowmelt season in March in a similar position - near the 10th percentile flows at Croton for this time of year. The water levels steadily rose through the month, and spent the 2nd half of the month around the 75th percentile (above-average). Meanwhile, the Grand River started the month well above-average (90th percentile) but

steadily dropping as the big February melt and rainfall runoff exited the river system. The Grand then spent most of the month near typical spring levels as rounds of rain every week kept runoff going in the system. The only forecast point that was pushed above flood stage this month was the Maple River at Maple Rapids - a tributary of the Grand River - that ticked a few inches into flood category during the final week of the month.

Flood Stage Report

The forecast points on the Maple River at Maple Rapids exceeded flood stage. Thus, the NWS Form E-3 “Flood Stage Report” was issued.

River Conditions

The end of March percentage of normal flow for selected rivers is listed below:

Location	River	% of Normal
Scottville	Pere Marquette	110
Whitehall	White	126
Evart	Muskegon	179
Mt. Pleasant	Chippewa	203
Lansing	Grand	120
Grand Rapids	Grand	168
East Lansing	Red Cedar	122
Hastings	Thornapple	144
Battle Creek	Battle Creek	126
Battle Creek	Kalamazoo	115

General Hydrologic Information

March precipitation amounts for Grand Rapids, Lansing, and Muskegon, Michigan, were 3.50, 2.99, and 3.54 inches, respectively (Figure 1). Monthly departures were +1.11, +0.86, and +1.14 inches, respectively. Yearly departures were +2.10 +1.45 and -0.13 inches for Grand Rapids, Lansing and Muskegon respectively. Percent of mean precipitation for March 2022 is shown in Figure 2.

Temperatures for the month of March at Grand Rapids, Lansing and Muskegon were above normal. The monthly average temperature departures for these sites were +0.5, +2.3, and +1.4 degrees Fahrenheit, respectively.

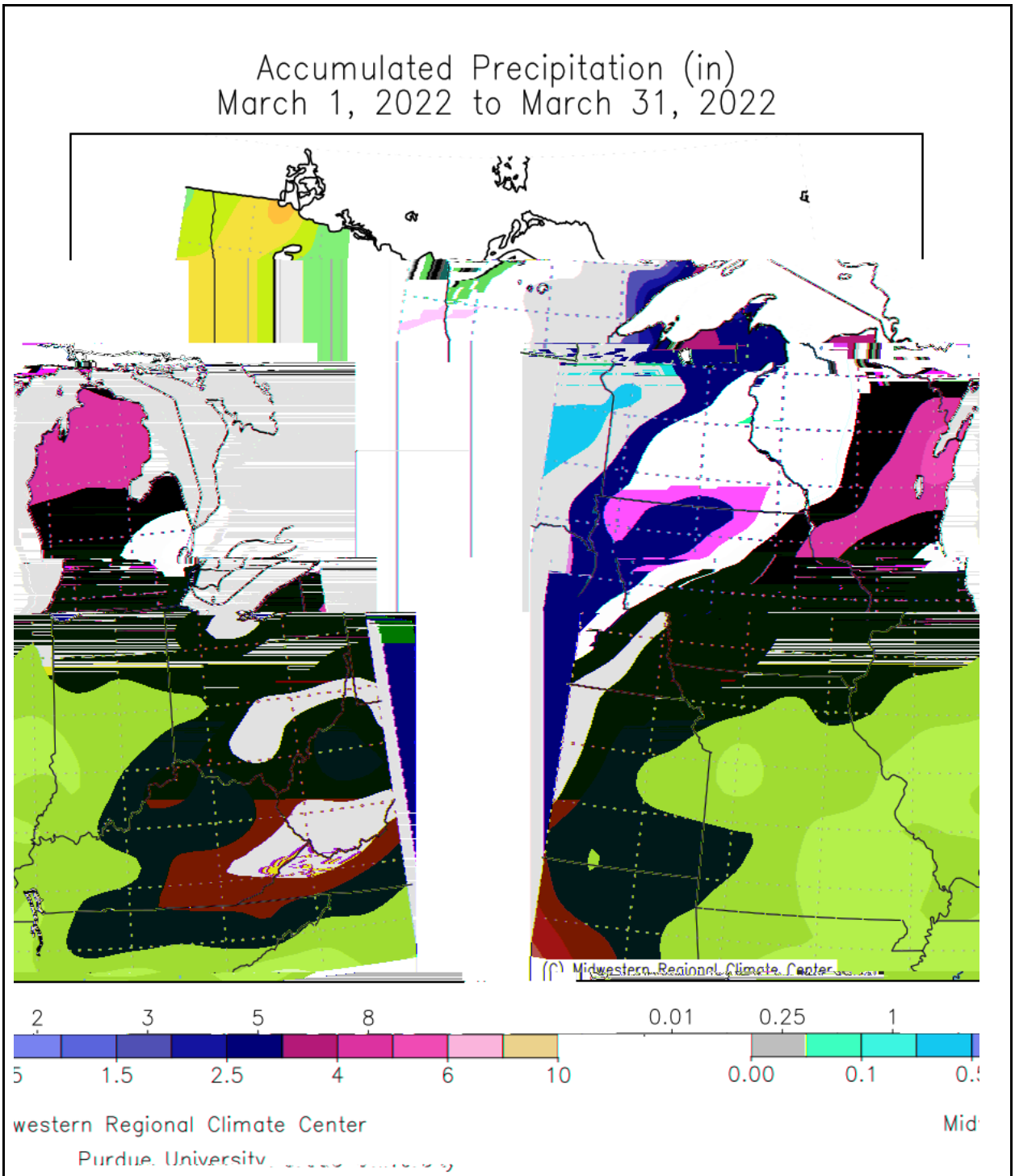
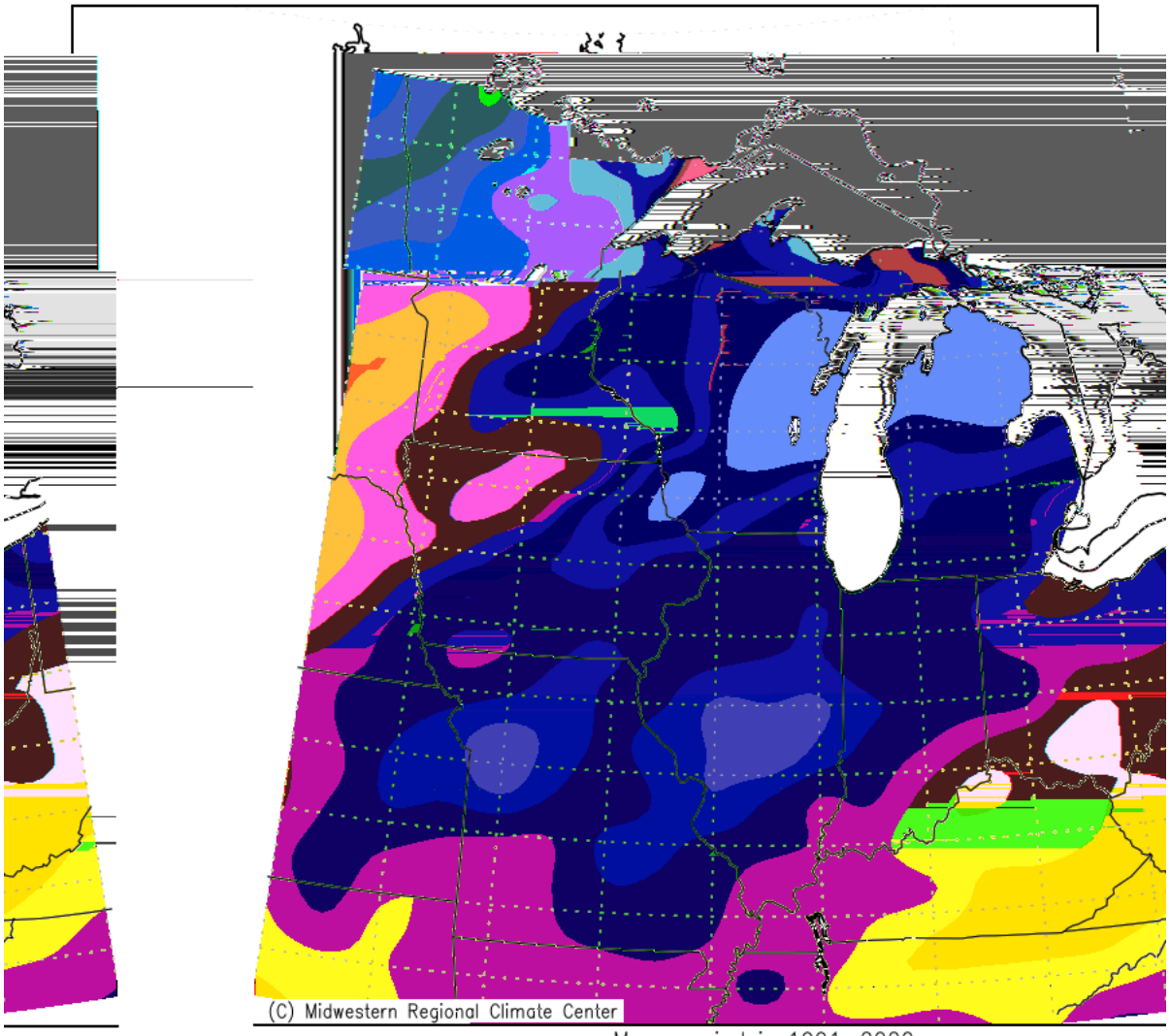


Figure 1. March 2022 Monthly Precipitation Totals.

Accumulated Precipitation: Percent of Mean
March 1, 2022 to March 31, 2022



Mean period is 1991–2020.

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0 2 5 10 25 50 75 100 125 150 175 200 30

Midwestern Regional Climate Center

Purdue University

Figure 2. March 2022 Percent of Mean of Accumulated Precipitation.

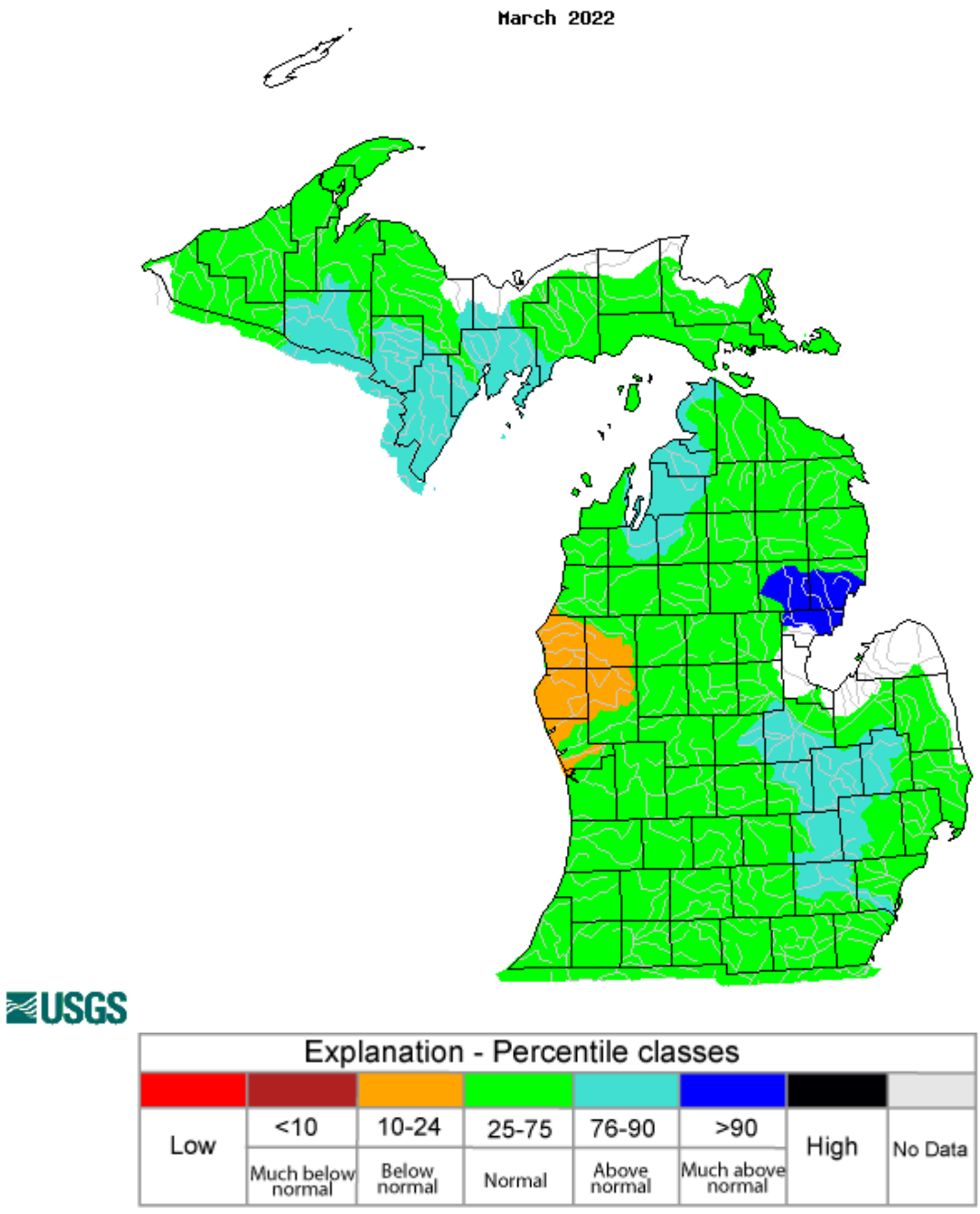

Figure 3. USGS monthly average streamflow for March, grouped by significant hydrologic units. Note streamflows near to above average across most of Lower Michigan for this time of year.

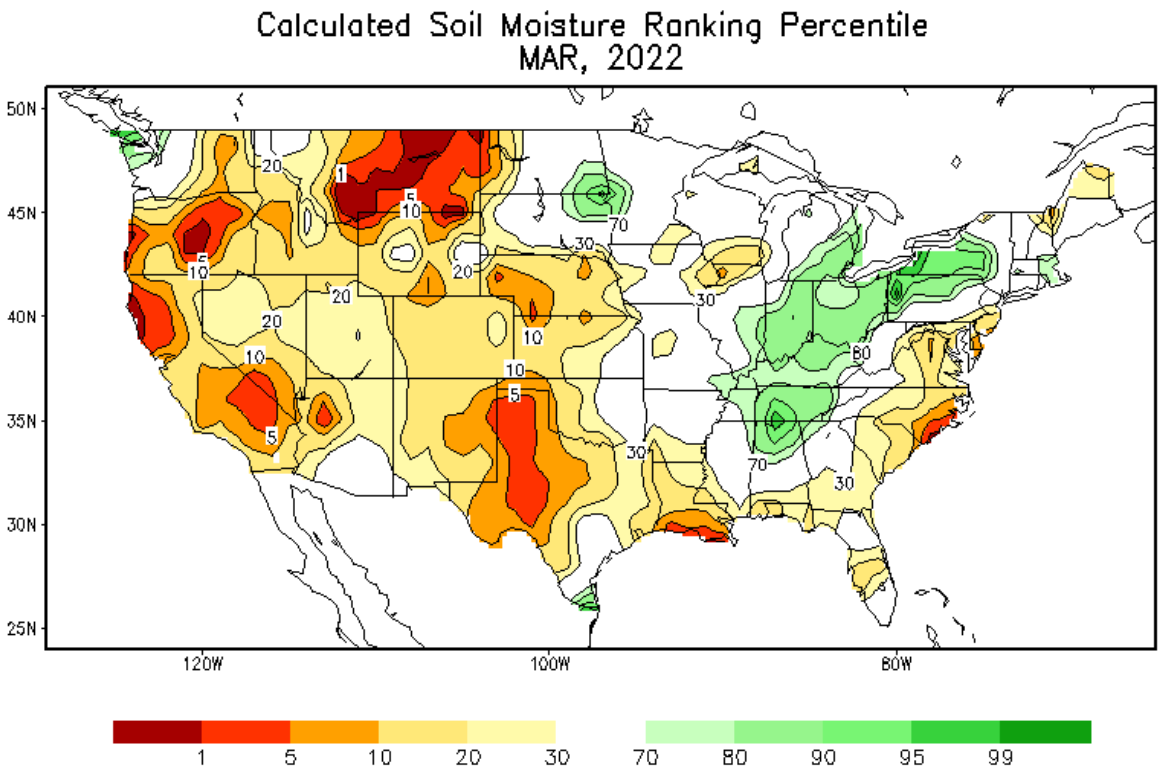

Figure 4. Chart of monthly values of soil moisture, by percentile ranking.

Hydrologic Products issued this month

31 Hydrologic Summaries (ARBRVAGRR)
2 Probabilistic Hydrologic Outlook (ARBESFGRR)
0 Event-driven Hydrologic Outlook (ARBESFGRR)
0 Daily River Forecasts (ARBRVDGRR)
0 Areal Flood Advisory Statements (ARBFLSGRR)
3 Flood Warning Statements (ARBFLWGRR)
0 Flood Watch Statements (ARBFFAGRR)
0 River Statements (ARBRVSGRR)

News Articles and Related Documentation

None