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): **December 2020**
TO:	NATIONAL WEATHER SERVICE (W/OS31) HYDROMETEOROLOGICAL INFO CENTER 1325 EAST-WEST HIGHWAY, RM 13468 SILVER SPRING, MD 20910	DATE: January 7, 2021
		SIGNATURE: Daniel K. Cobb, 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).

X An **X** inside this box indicates that no flooding occurred within this hydrologic service area.

Summary

December 2020 was significantly warmer than normal, with near-normal precipitation. Most of the precipitation fell as rain, which is unusual for December. So while overall precipitation was near-normal, the snowfall for the month (and the winter season so far) continued to lag far behind long-term normal values. A brief cold snap around Christmas caused ice to finally begin forming on the larger rivers, but that ice then melted off as temperatures rebounded at the end of the month. No river flooding occurred during the month, and no short-term areal flooding events occurred either.

The unusually quiet weather allowed Lake Michigan water levels to continue a typical seasonal fall, and dropped another 2.5 inches during December. This means water levels are down more than 15 inches from the high point this past summer, but remain significantly higher (>2.5 ft) than long-term average values for this time of year.

Flood Conditions

Despite another fairly dry and uneventful month, the Grand and Muskegon river basins remained at near-normal for this time of year. Part of the explanation for this is the fact that much of the precipitation that fell came as rain and ran off into the rivers, as opposed to starting to build a winter snowpack. The other piece to this puzzle is that groundwater levels are still elevated after years of wetter than normal conditions, which maintains higher baseflow in the rivers than “normal”. The far southwest corner of the state has been even drier over the last several months than the other areas of Michigan, with even less runoff happening in this area, so the Kalamazoo River was able to spend

most of the month between the 10th and 25th percentile (below normal) for this time of year.

Flood Stage Report

No forecast points exceeded flood stage during the month. Thus, the NWS Form E-3 “Flood Stage Report” was not issued.

River Conditions

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

Location	River	% of Normal
Scottville	Pere Marquette	103
Whitehall	White	94
Evart	Muskegon	94
Mt. Pleasant	Chippewa	115
Lansing	Grand	81
Grand Rapids	Grand	94
East Lansing	Red Cedar	84
Hastings	Thornapple	107
Battle Creek	Battle Creek	112
Battle Creek	Kalamazoo	89

General Hydrologic Information

December precipitation amounts for Grand Rapids, Lansing, and Muskegon, Michigan, were 2.81, 2.08, and 2.45 inches, respectively (Figure 1). Monthly departures were +0.31, +0.21, and -0.10 inches, respectively. Yearly departures were -0.83, +4.44 and +2.81 inches for Grand Rapids, Lansing and Muskegon respectively. Percent of mean precipitation for December 2020 is shown in Figure 2.

Temperatures for the month of December at Grand Rapids, Lansing and Muskegon were well above normal. The monthly average temperature departures for these sites were +3.2, +3.4, and +3.1 degrees Fahrenheit, respectively.

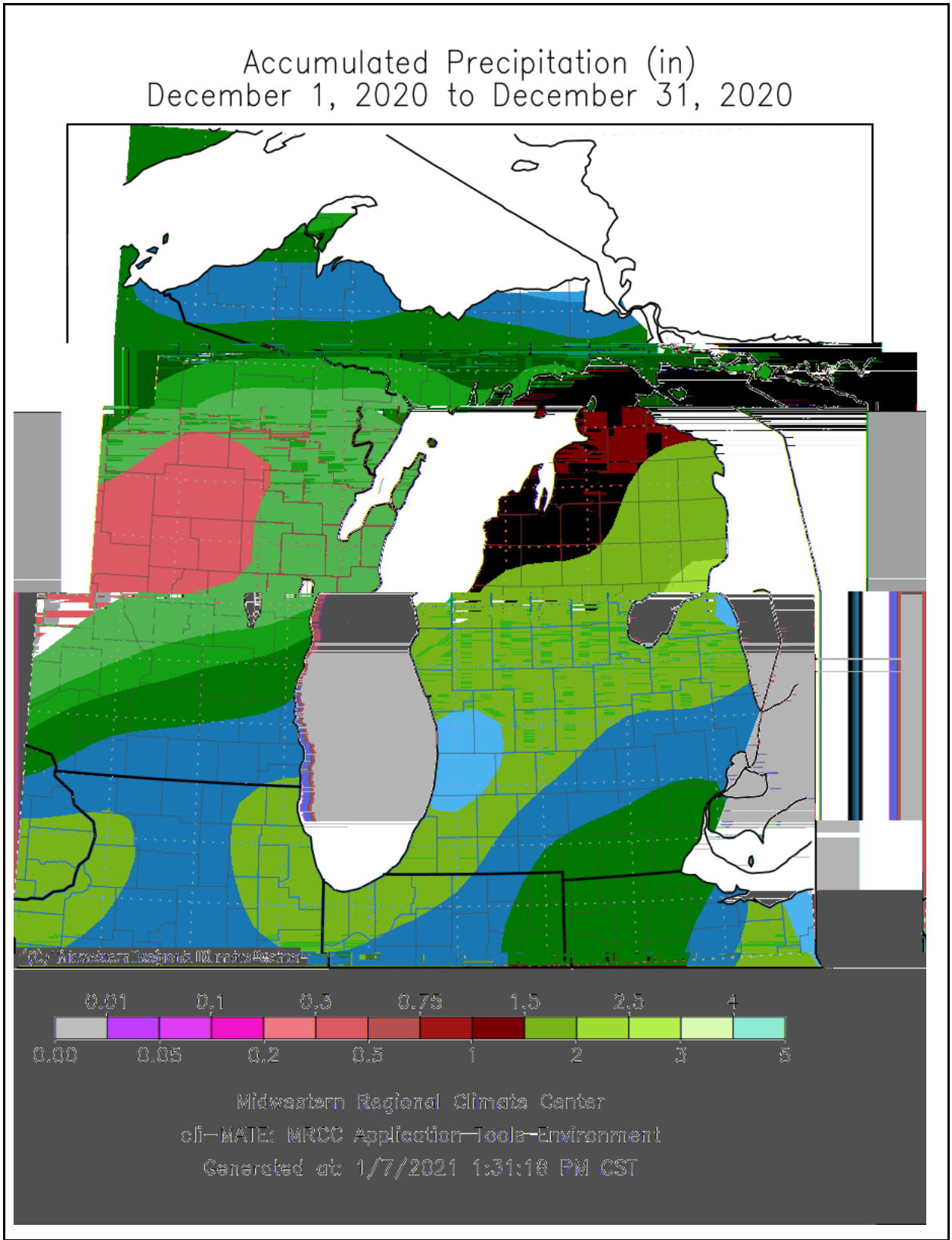

Figure 1. December 2020 Monthly Precipitation Totals.

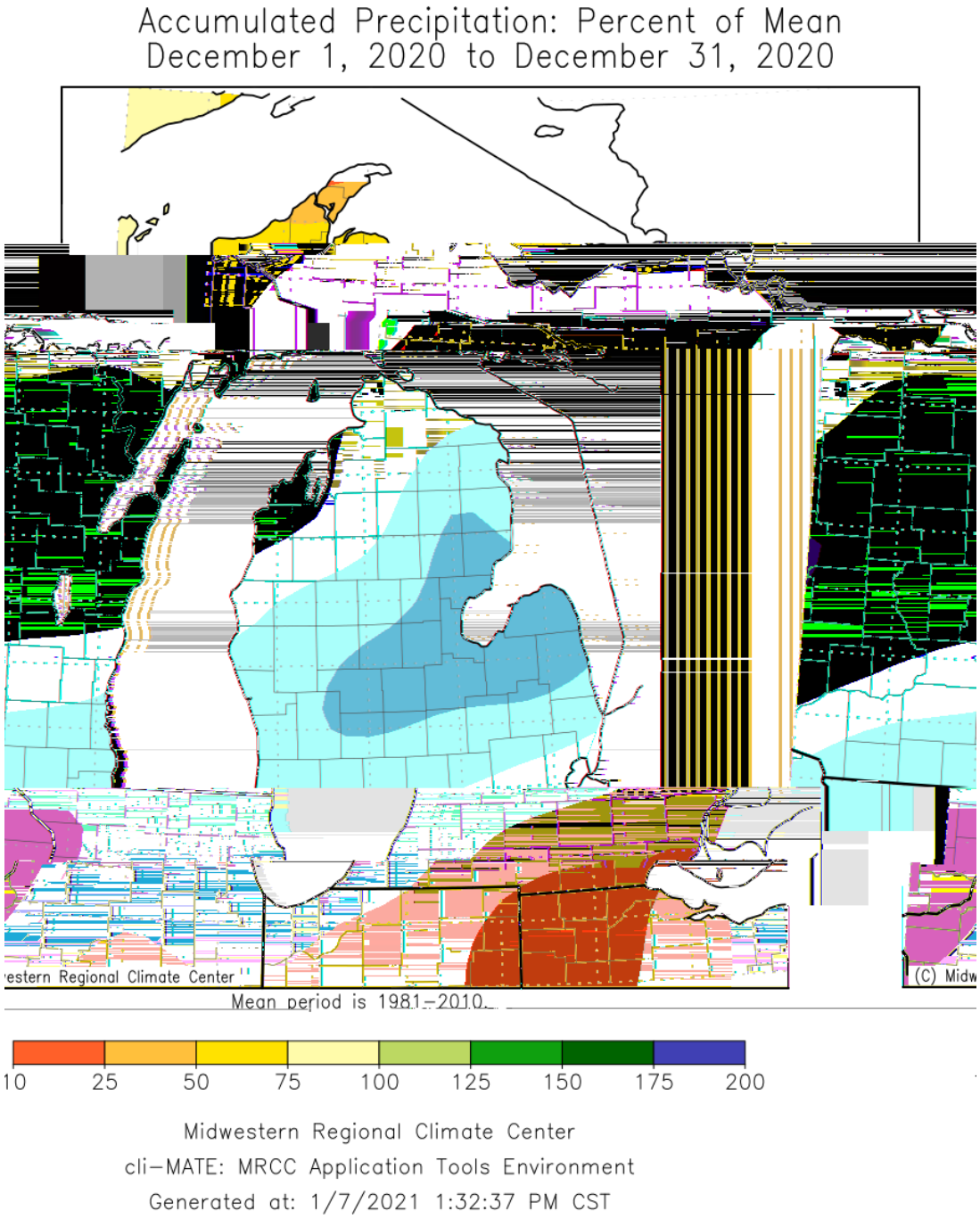

Figure 2. December 2020 Percent of Mean of Accumulated Precipitation.

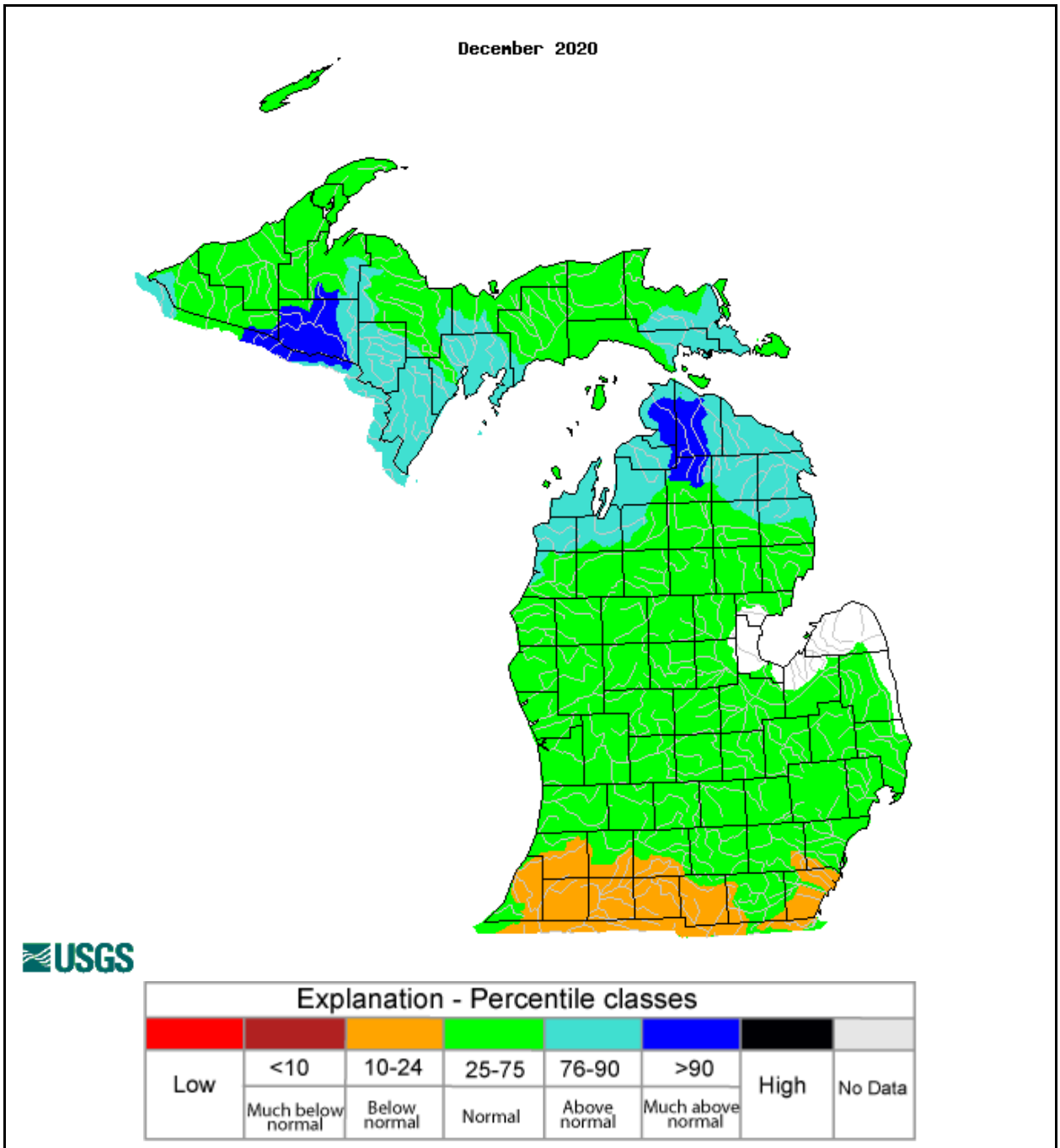

Figure 3. USGS monthly average streamflow for December, grouped by significant hydrologic units. Note streamflows across Lower Michigan widespread near normal for the month, despite several months of near to below normal precipitation. This is due to elevated water tables resulting in elevated base flow in the rivers.

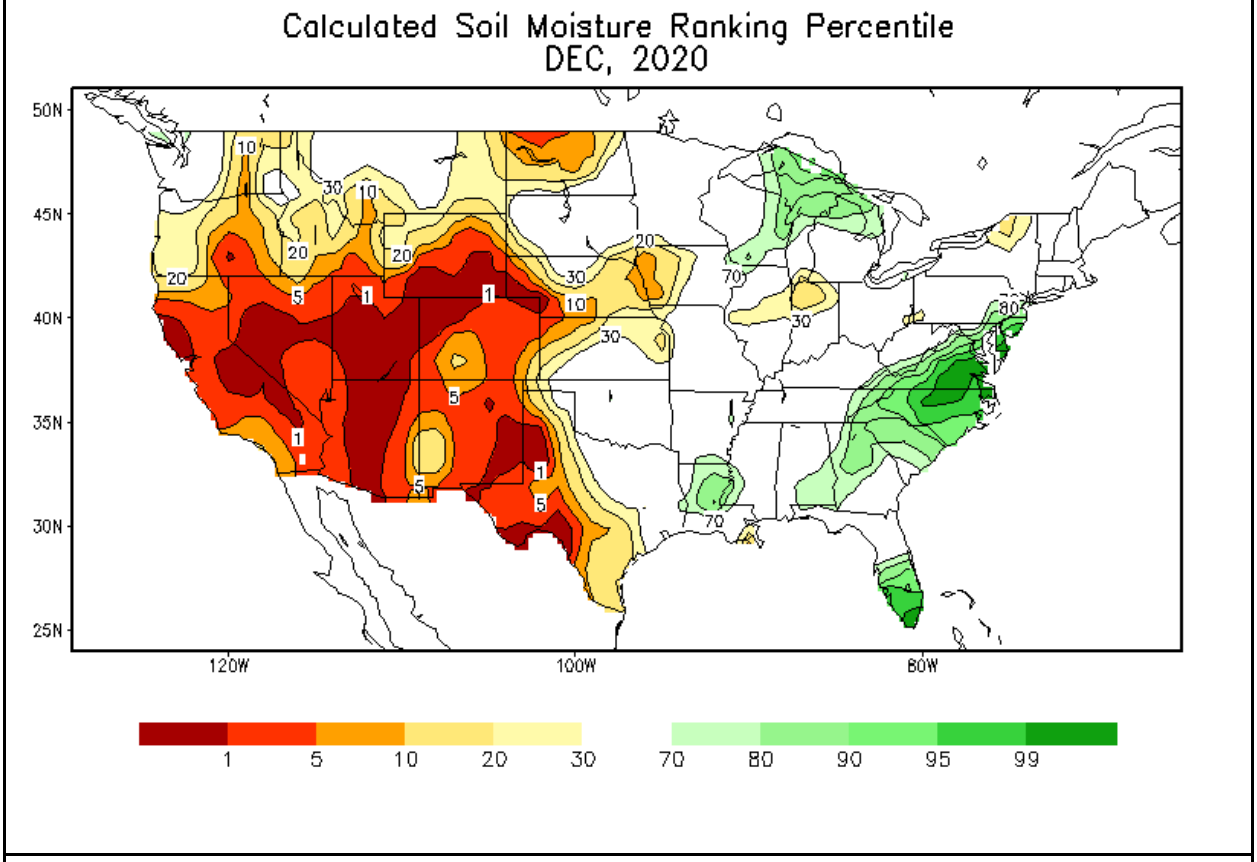

Figure 4. Chart of monthly values of soil moisture, by percentile ranking.

Hydrologic Products issued this month

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

News Articles and Related Documentation

none