

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):
February 2022

TO: NATIONAL WEATHER SERVICE (W/OS31)
HYDROMETEOROLOGICAL INFO CENTER
1325 EAST-WEST HIGHWAY, RM 13468
SILVER SPRING, MD 20910

DATE:
March 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

Persistent wintry conditions continued through the first half of the month, with below average temperatures and above-normal snow. By the middle of the month, there was a fairly typical snowpack on the ground across much of the area, with the ongoing exception of the Muskegon River basin where below-average snowpack conditions prevailed. Around the middle of the month, we abruptly shifted into a warmer and wetter weather pattern. A 2 day storm dropped between 1 and 2 inches of rain across most of the area along and south of I-96, and also melted the majority of the snowpack (that was holding another 1-2 inches of water in it). While this caused significant ponding of water and localized poor drainage flooding issues around multiple counties, the bigger impact was that all of this added up to 3 or more inches of runoff across a large area, which when combined with frozen ground, led to significant amounts of water moving into the Grand and Kalamazoo River systems.

The weather stayed relatively warm and unsettled for most of the rest of the 3rd week of the month before cooling off and settling down for the final week of the month. Despite the mid-month warmup, when the final numbers for the month came in it was a slightly cooler than normal and much wetter than normal month for most of the area.

Flood Conditions

The mid-month snowmelt and heavy rain brought flooding concerns primarily to the Grand and Kalamazoo River basins. Based on runoff alone, widespread flooding was not expected, but some of the most vulnerable trouble-spots on the Grand River like Robinson Township and Comstock Park were expected to (and did) reach flood stage.

In addition, the mid-size tributaries on the Grand all came up to near or slightly above minor flood stage shortly after the rain moved through, but quickly began to recover. By itself, the open-water flooding was generally minor in terms of impacts (streets, parks, and yards flooded). However, perhaps the bigger concern was the fact that nearly all of the Grand River and its tributaries had a solid ice cover heading into this change in the weather pattern. Thus, the concern for ice jam potential was significant, and focused primarily on the Grand River from Lansing downstream all the way to Lake Michigan, where the incremental river rise was the most significant (and thus most likely to force the river ice to break up), and the ice cover was the most significant (strongest and largest area).

As the rivers rose multiple feet, several ice jams did occur on the Grand River in this area. A minor ice jam occurred downstream of Grand Ledge, downstream of the Jones road bridge. This resulted in floodwaters behind the ice jam resulting in the closure of Jones road itself, as flowing water closed the approach to the north side of the bridge.

A more substantial ice jam formed downstream on the Grand River near Robinson Township. Over the span of several days and several jam-release sequences, the vulnerable neighborhoods along the river in this area were flooded out multiple times. In the most dramatic instance, the water rose about 2 ft in less than 1 hour, and mechanical destruction of the NWS staff gage as well as several docks was observed as chunks of ice slammed into the infrastructure.

Another area of concern was in the vicinity of Comstock Park, an area prone to ice jams in the past. With the river already above flood stage with the ice still holding steady, the potential for significant flooding of homes due to ice breakup and jamming was high. Thankfully, the process unfolded slowly enough that significant jamming was avoided, and flooding remained relatively minor in this area.

By the end of the month, all rivers were again declining, with most of the snow gone in the Grand and Kalamazoo basins melted and gone. Meanwhile, the snowpack in the Muskegon Basin remained largely unmelted, and as a result the river levels remained much lower than normal for this time of year, pending spring warmup and runoff.

Flood Stage Report

The forecast points on the Grand River at Comstock Park and Robinson Township, Sycamore Creek at Holt, Buck Creek at Grandville, Maple River at Maple Rapids, and Looking Glass River at Eagle exceeded flood stage. Thus, the NWS Form E-3 "Flood Stage Report" was issued.

River Conditions

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

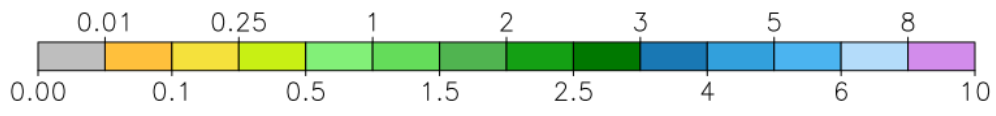
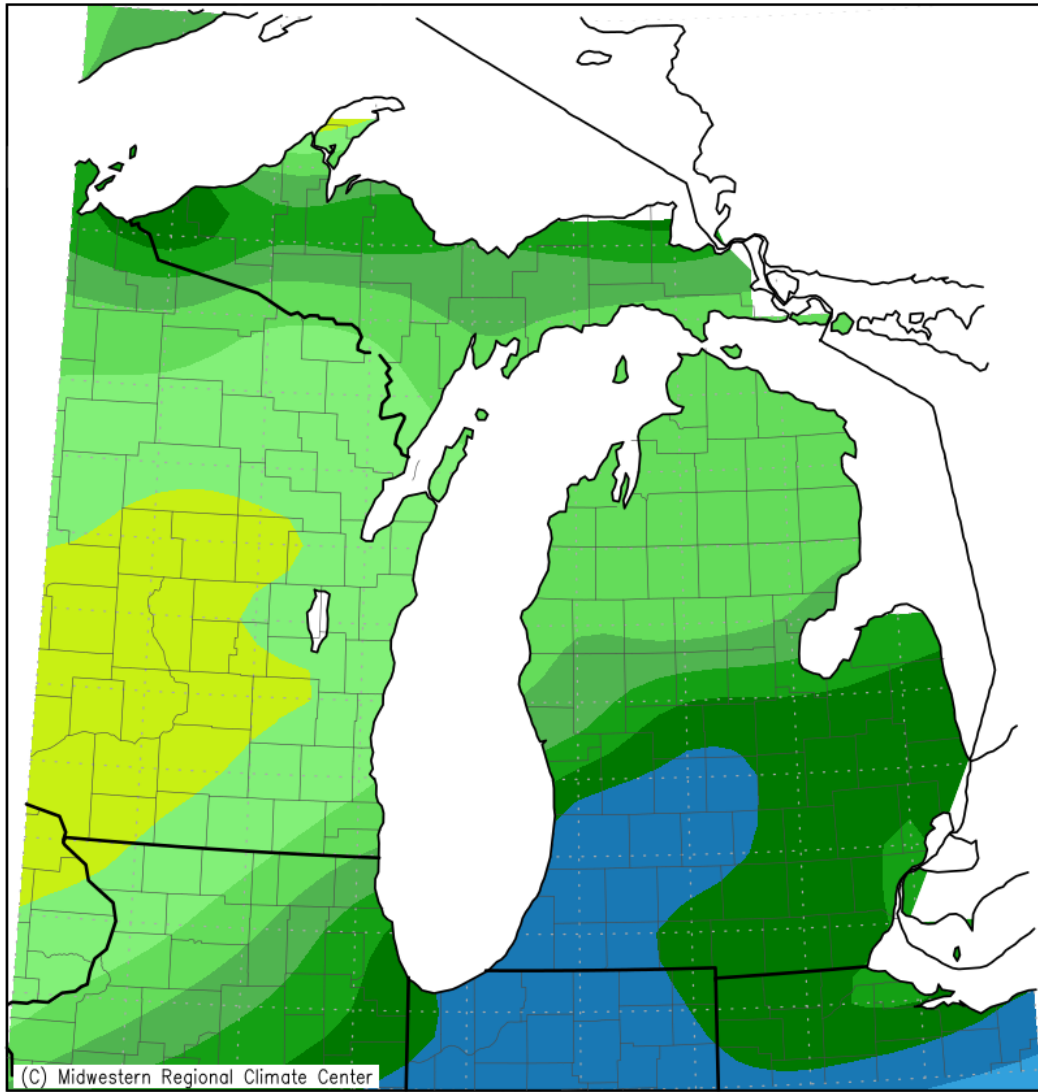
<u>Location</u>	<u>River</u>	<u>% of Normal</u>
Scottville	Pere Marquette	94
Whitehall	White	77
Ewart	Muskegon	76
Mt. Pleasant	Chippewa	90
Lansing	Grand	181
Grand Rapids	Grand	307
East Lansing	Red Cedar	209
Hastings	Thornapple	258
Battle Creek	Battle Creek	198
Battle Creek	Kalamazoo	146

General Hydrologic Information

February precipitation amounts for Grand Rapids, Lansing, and Muskegon, Michigan, were 4.20, 3.71, and 1.79 inches, respectively (Figure 1). Monthly departures were +2.08, +2.00, and -0.32 inches, respectively. Yearly departures were +0.99, +0.59 and -1.27 inches for Grand Rapids, Lansing and Muskegon respectively. Percent of mean precipitation for February 2022 is shown in Figure 2.

Temperatures for the month of February at Grand Rapids, Lansing and Muskegon were below normal. The monthly average temperature departures for these sites were -2.0, -0.1, and -1.4 degrees Fahrenheit, respectively.

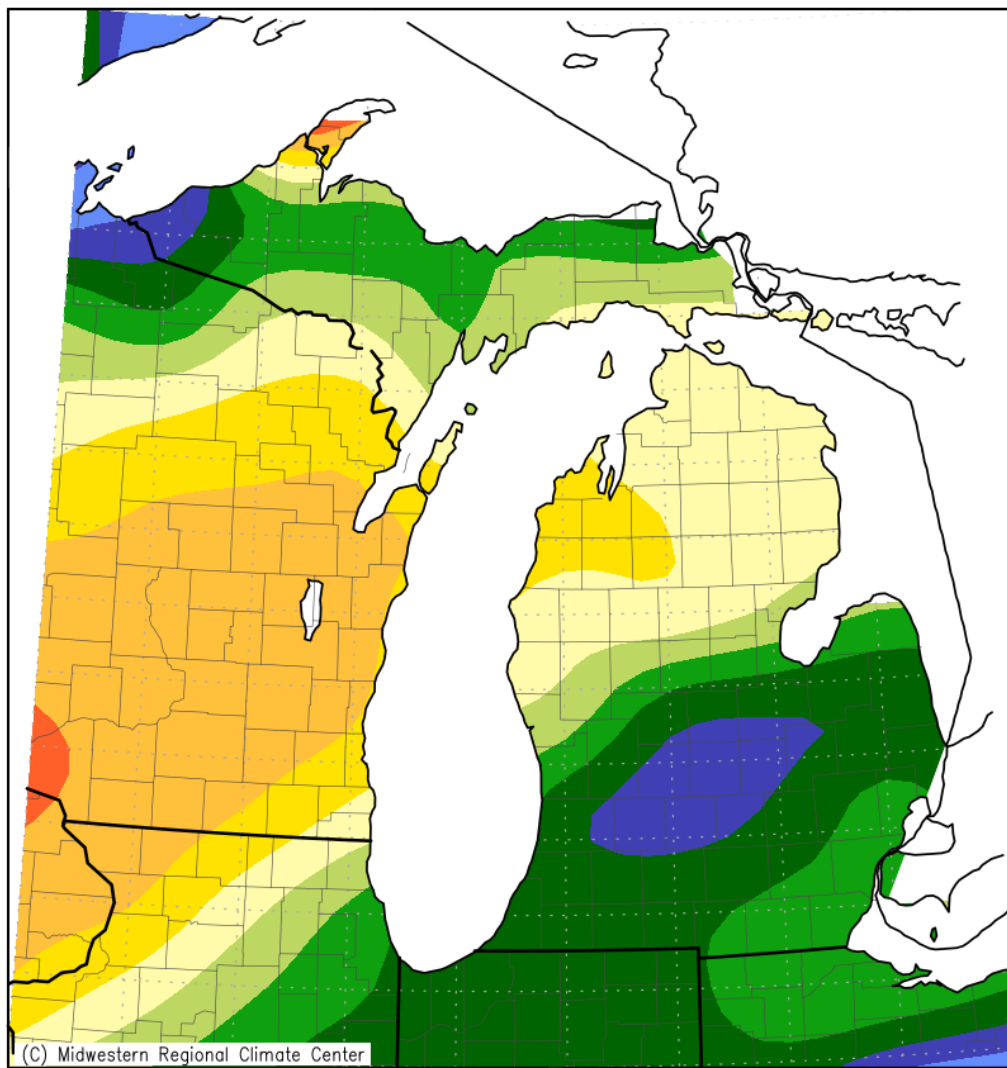
Accumulated Precipitation (in)
February 1, 2022 to February 28, 2022



Midwestern Regional Climate Center
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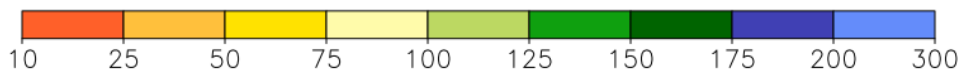
Figure 1. February 2022 Monthly Precipitation Totals.

Accumulated Precipitation: Percent of Mean February 1, 2022 to February 28, 2022



(C) Midwestern Regional Climate Center

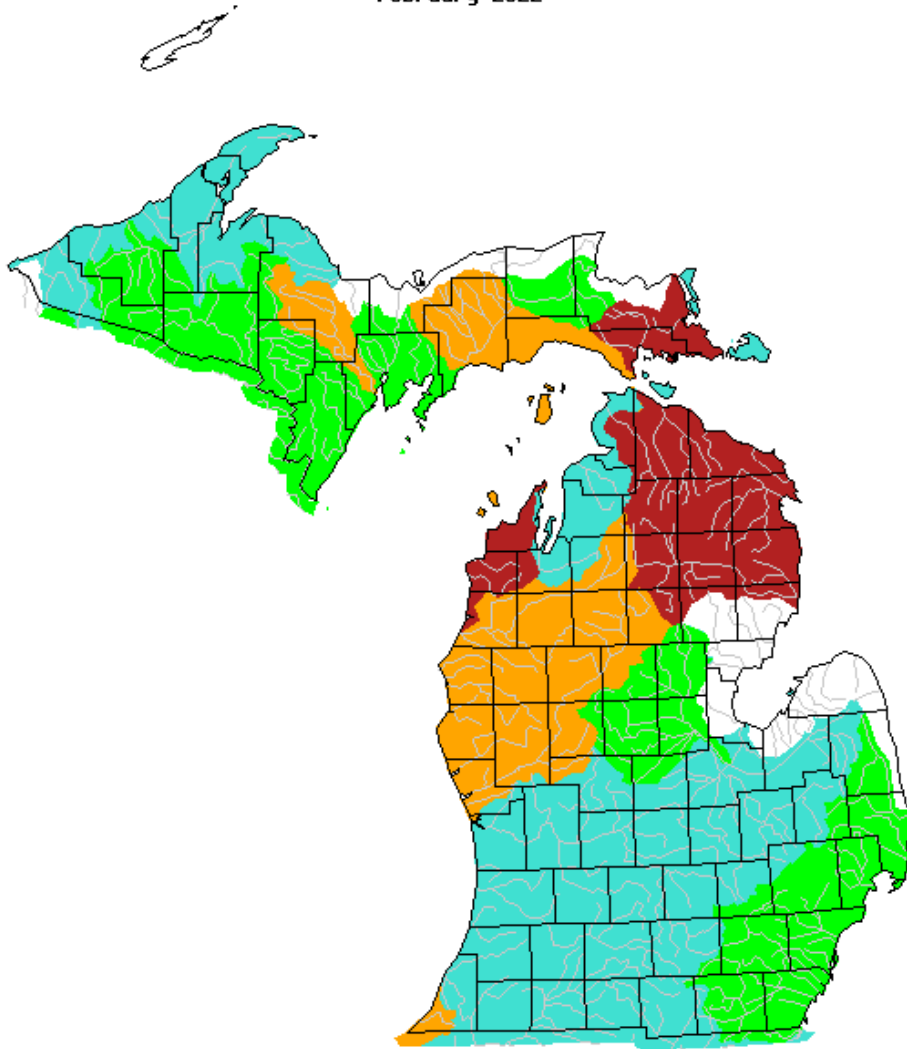
Mean period is 1991–2020.



Midwestern Regional Climate Center
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Figure 2. February 2022 Percent of Mean of Accumulated Precipitation.

February 2022



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		

Figure 3. USGS monthly average streamflow for February, grouped by significant hydrologic units. Note streamflows above-average in the Grand and Kalamazoo basins, but significantly below-average over the Muskegon basin for this time of year.

Calculated Soil Moisture Ranking Percentile
FEB, 2022

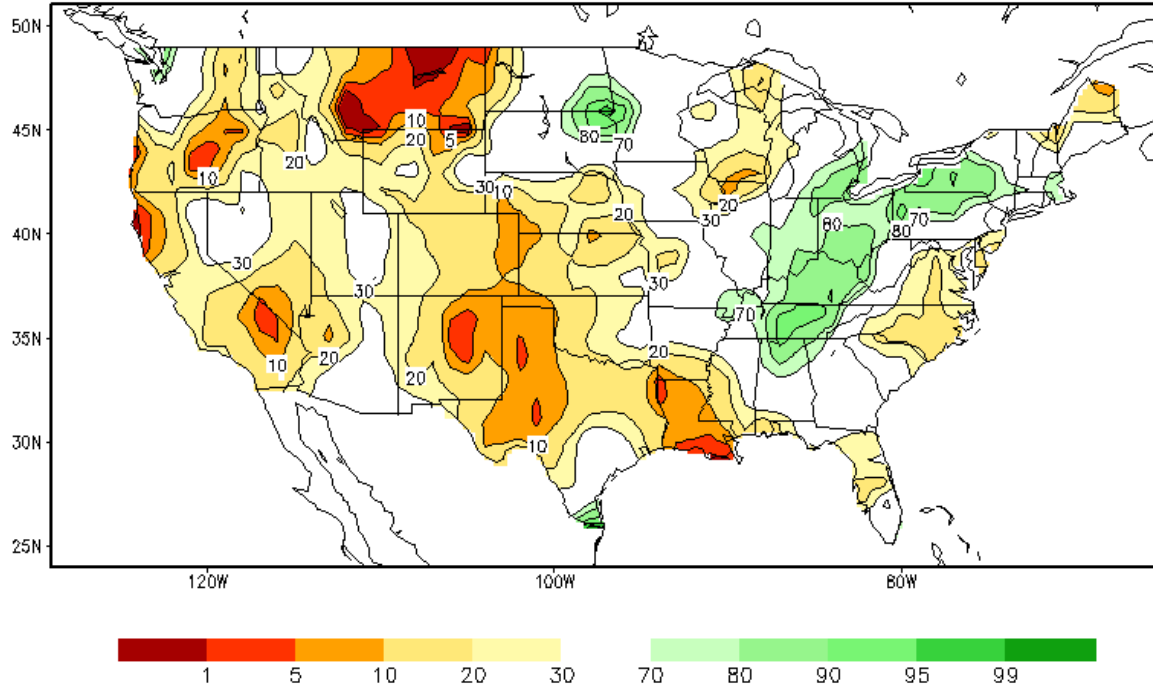


Figure 4. Chart of monthly values of soil moisture, by percentile ranking.

Hydrologic Products issued this month

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

News Articles and Related Documentation

<https://www.mlive.com/news/grand-rapids/2022/02/drone-video-shows-flooding-after-grand-river-ice-jam.html>

<https://wwmt.com/news/local/another-ice-jam-likely-on-grand-river-prompting-flood-warning-in-onia-county>

<https://www.wzzm13.com/article/news/local/leaders-warn-grand-river-flooding/69-0c3d89a0-9f97-42b7-9fe2-411131e09464>