

NWS FORM E-5

U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:

Grand Rapids, MI
REPORT FOR (MONTH & YEAR):
May 2020

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:

June 15, 2020

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

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).

An X inside this box indicates that no significant flooding occurred within this Hydrologic Service Area.

Summary

May 2020 was cooler and wetter than normal. The lion’s share of the rain fell over the course of two different regional rainstorms that were only about 2 days apart. The first storm dropped generally 1 to 3 inches of rain across the Kalamazoo and Grand River basins (Figure 5). This didn’t result in widespread flooding, except around Ottawa County where flooding around inland lakes started to become significant. However, overall this event largely acted to “prime the pump” for the 2nd and larger event that followed about 2 days later. During this 2nd storm, 2 to 4 inches of additional rain fell, with some localized higher bullseyes. While the entire area got hit hard by this storm, the Grand and Muskegon basins (as well as the Chippewa and Pine River watersheds) saw the highest totals (Figure 6). With wet antecedent soil conditions, the stage was set for widespread areal/general flooding impacts, which were exactly what happened. Ultimately, an areal flood warning was issued for the entire HSA, with widespread flooding of roads, inland lakes/homes, and creeks/streams of all sizes. In Kent, Ottawa, and Muskegon counties alone, damages around \$8 Million occurred. In addition, a significant lakeshore flooding event accompanied the storm, leading to a complex and prolonged hazard across the area. More information is available here: <https://www.weather.gov/grr/May2020HeavyRainandRiverFlooding>

Meanwhile, Lake Michigan rose by an additional 3-4 inches over the course of the month, resulting in the 5th straight new monthly record on Lake Michigan-Huron.

Flood Conditions

Most of the river systems in the area started the month between the 75th and 90th percentiles (significantly elevated) as they passed the flows from the heavy rain that fell near the end of April. By the middle of May, most rivers were down near long-term normal (median) levels for this time of year, thanks to relatively dry conditions for the first half of the month. That all changed with two widespread rounds of rain during the middle part of the month, which ultimately sent most of the rivers in Southwest and West-central Michigan above flood levels and in many cases to new historical high levels for this time of year. The mainstem

rivers experienced a general 10-20% AEP (5-10 year recurrence interval) flood, while certain tributaries and medium-sized river systems saw closer to a 5-10% AEP (15-ish year recurrence interval) flood condition. Numerous forecast points saw crests that reached into Top 10 lists, including most of the lower half of the Grand River, as well as the Pine River at Alma and Chippewa River at Mt. Pleasant.

Flood Stage Report

Many forecast points exceeded flood stage during the month. Thus, the NWS Form E-3 “Flood Stage Report” was issued.

River Conditions

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

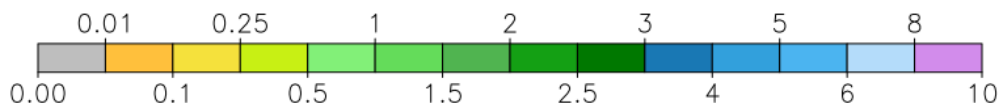
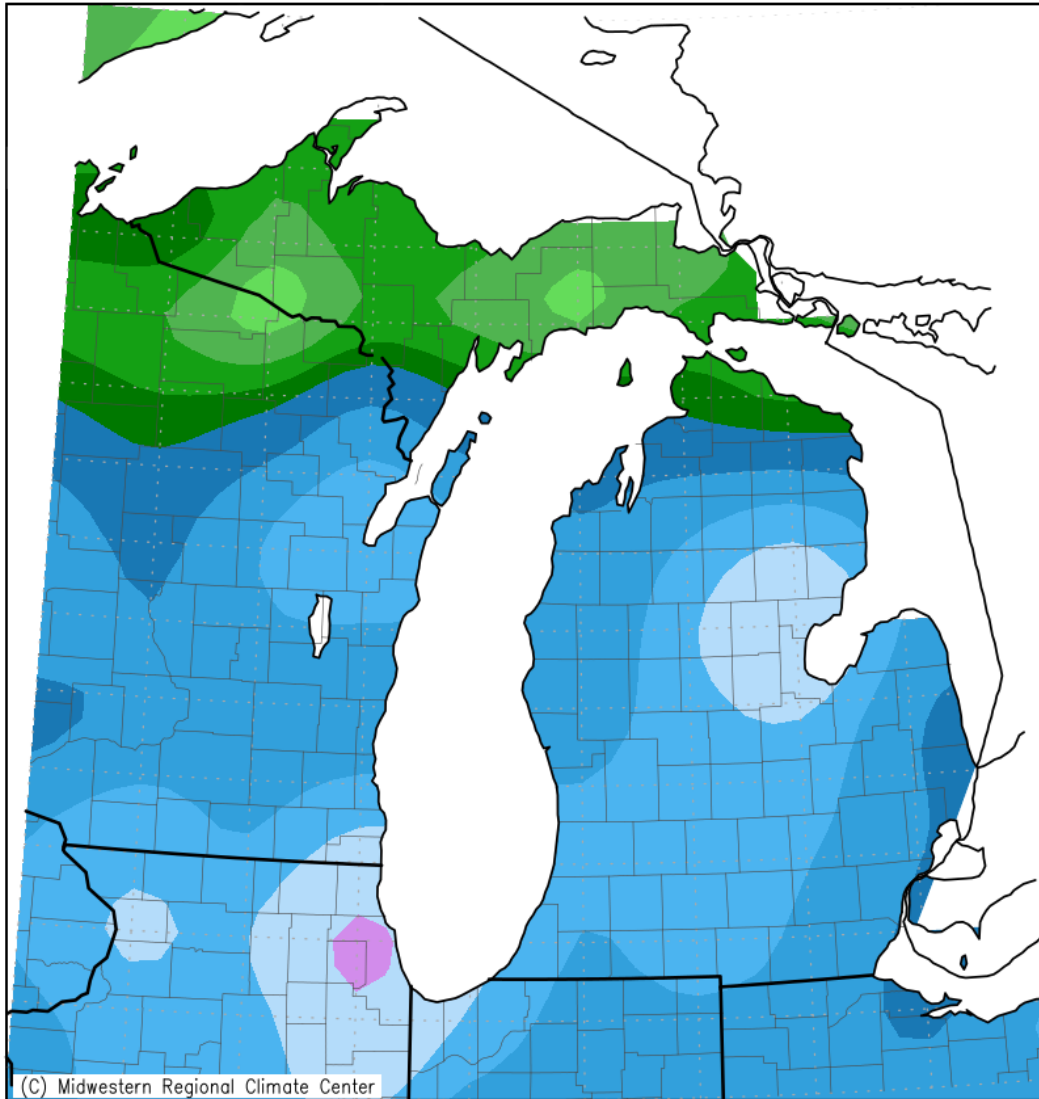
<u>Location</u>	<u>River</u>	<u>% of Normal</u>
Scottville	Pere Marquette	172
Whitehall	White	172
Ewart	Muskegon	233
Mt. Pleasant	Chippewa	250
Lansing	Grand	261
Grand Rapids	Grand	252
East Lansing	Red Cedar	196
Hastings	Thornapple	300
Battle Creek	Battle Creek	197
Battle Creek	Kalamazoo	164

General Hydrologic Information

May precipitation amounts for Grand Rapids, Lansing, and Muskegon, Michigan, were 4.22, 6.05, and 5.70 inches, respectively (Figure 1). Monthly departures were +0.24, +2.69, and +2.45 inches, respectively. Yearly departures were +2.85, +5.21 and +6.25 inches for Grand Rapids, Lansing and Muskegon respectively. Percent of mean precipitation for May 2020 is shown in Figure 2.

Temperatures for the month of May were cooler than normal at Grand Rapids, Lansing and Muskegon. The monthly average temperature departures for these sites were -2.0, -1.0, and -0.3 degrees Fahrenheit, respectively.

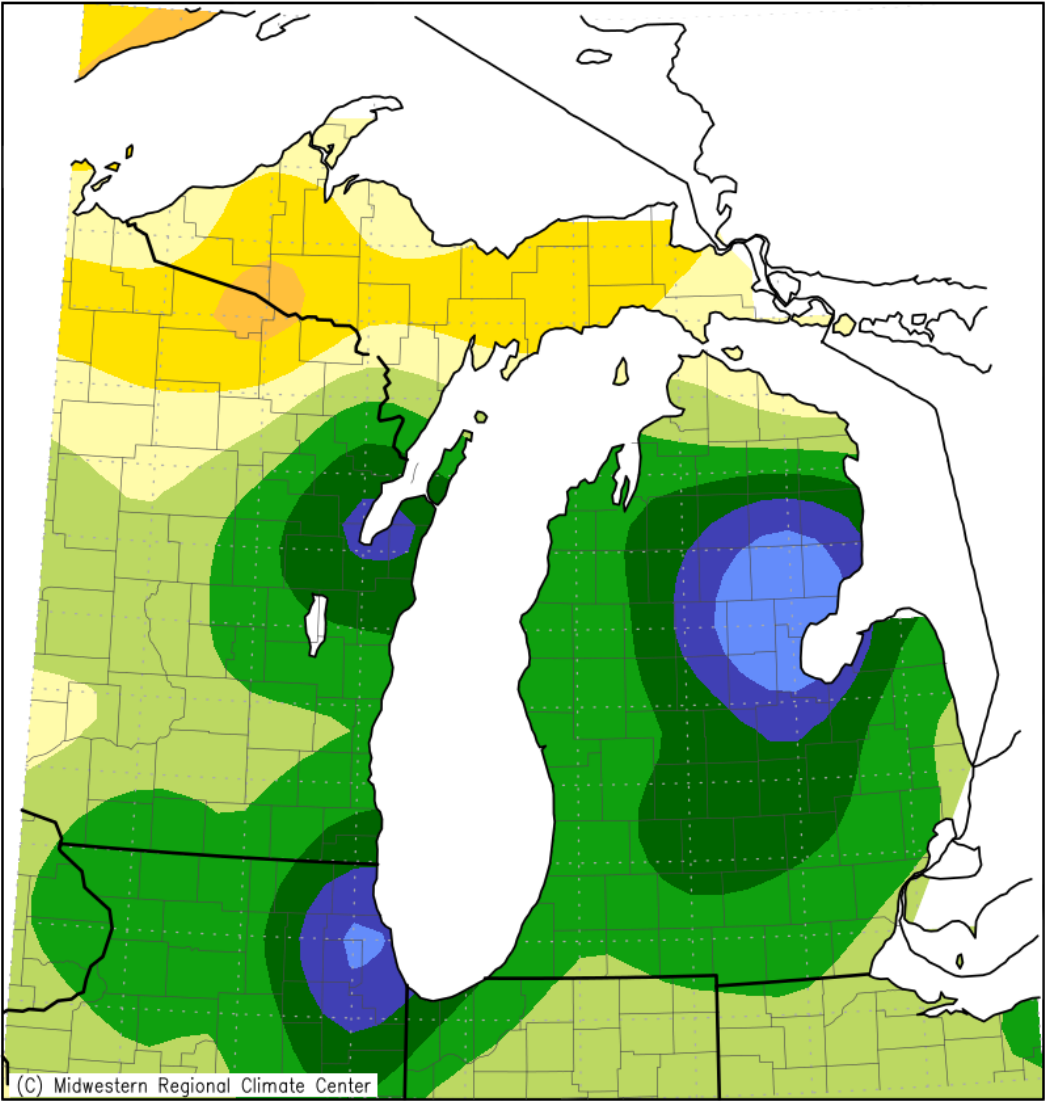
Accumulated Precipitation (in)
May 1, 2020 to May 31, 2020



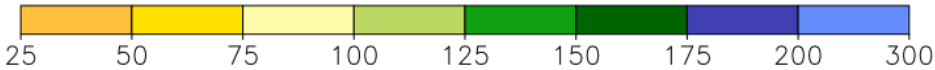
Midwestern Regional Climate Center
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Figure 1. May 2020 Monthly Precipitation Totals

Accumulated Precipitation: Percent of Mean
May 1, 2020 to May 31, 2020

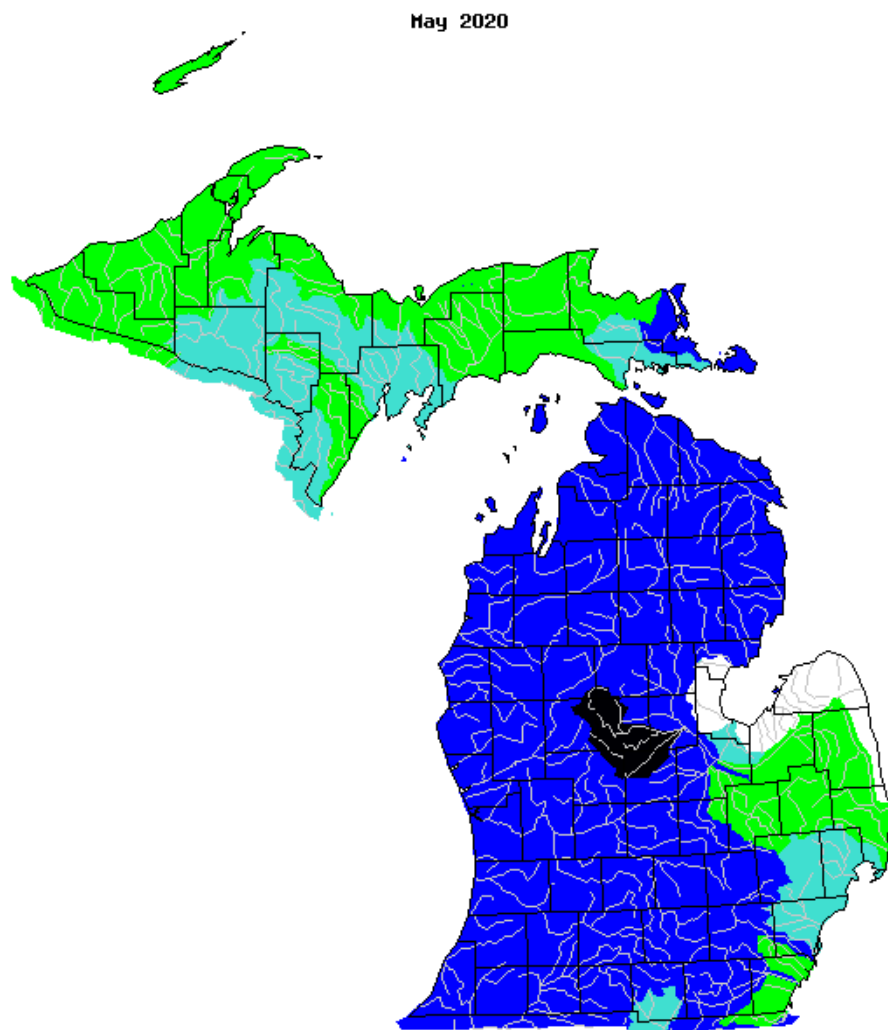


Mean period is 1981-2010.



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



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 May, grouped by significant hydrologic units. Note streamflows well above average across the Lower Peninsula of Michigan.

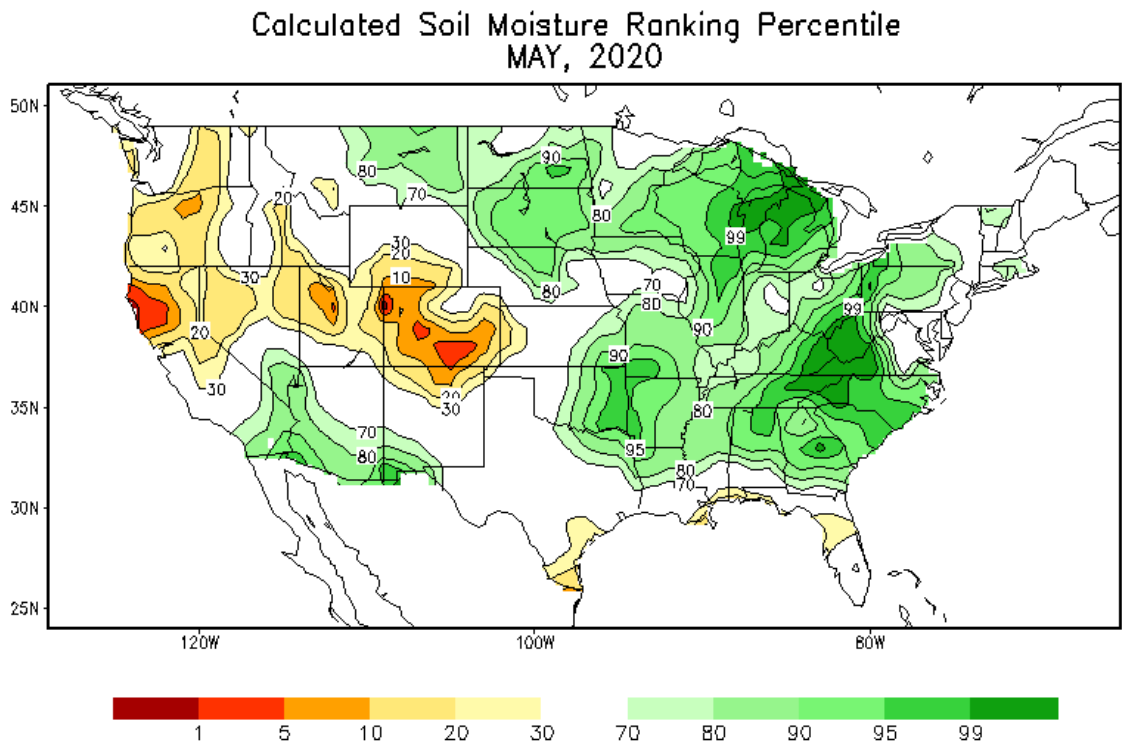
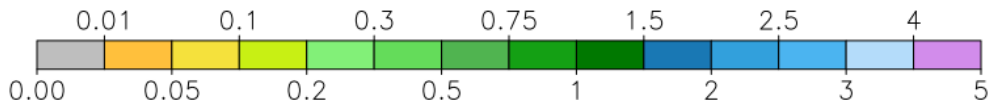
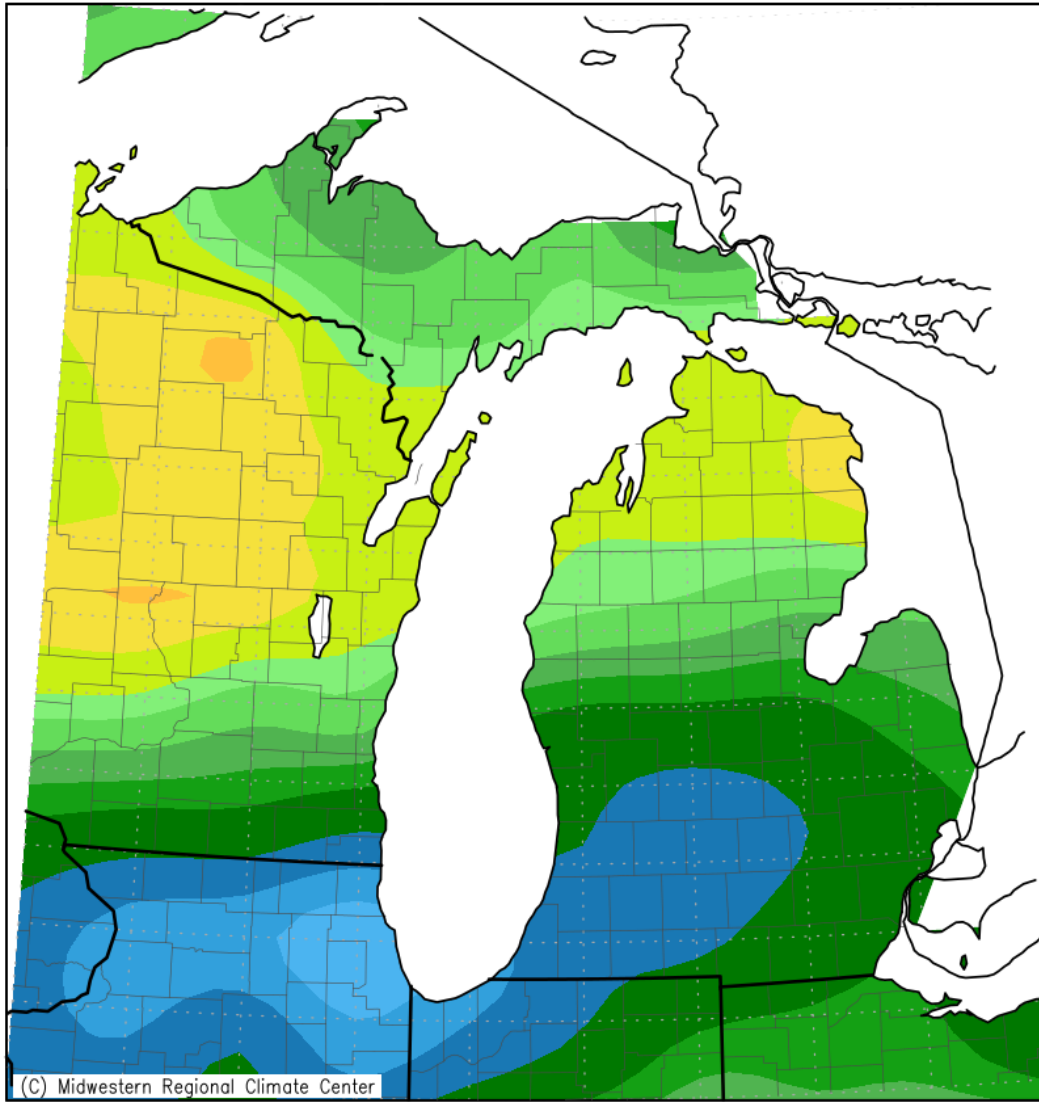


Figure 4. Chart of monthly values of soil moisture, by percentile ranking. This is the 20th consecutive month West Michigan has been at or above the 80th percentile. This saturated ground leads to increased runoff efficiency of rainfall into rivers and streams.

Accumulated Precipitation (in)
May 14, 2020 to May 15, 2020



Midwestern Regional Climate Center
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Figure 5. Rain totals from first round of heavy rain to affect Lower Michigan in May, 2020. The Grand River and Kalamazoo River basins bore the brunt of this first storm.

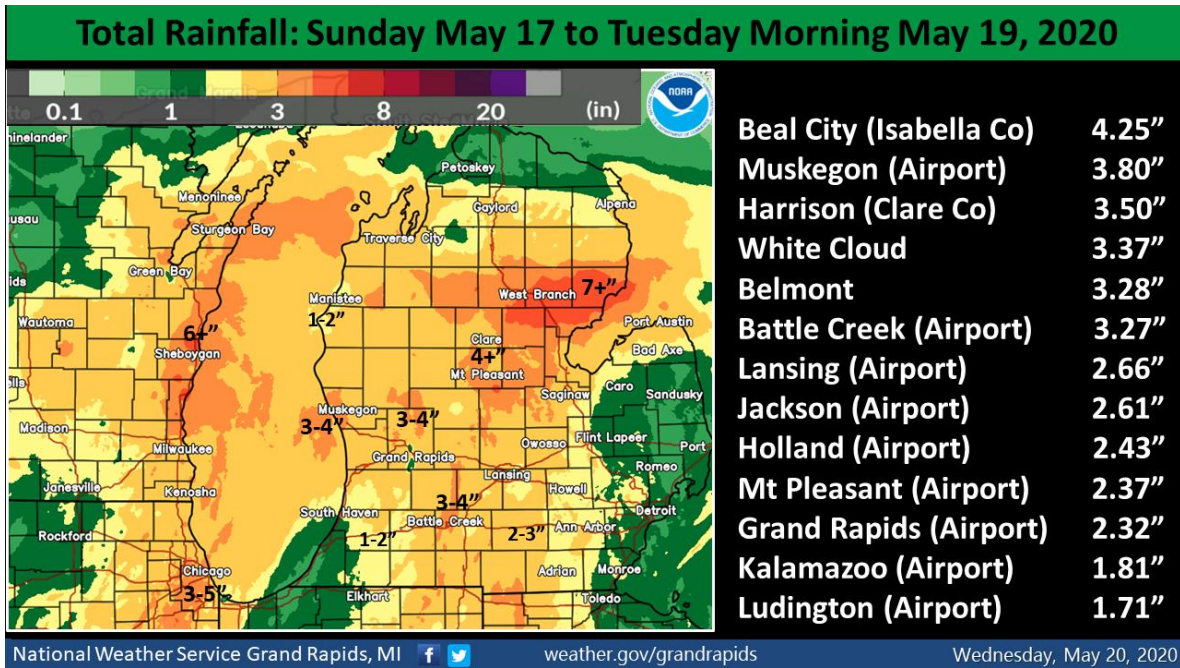
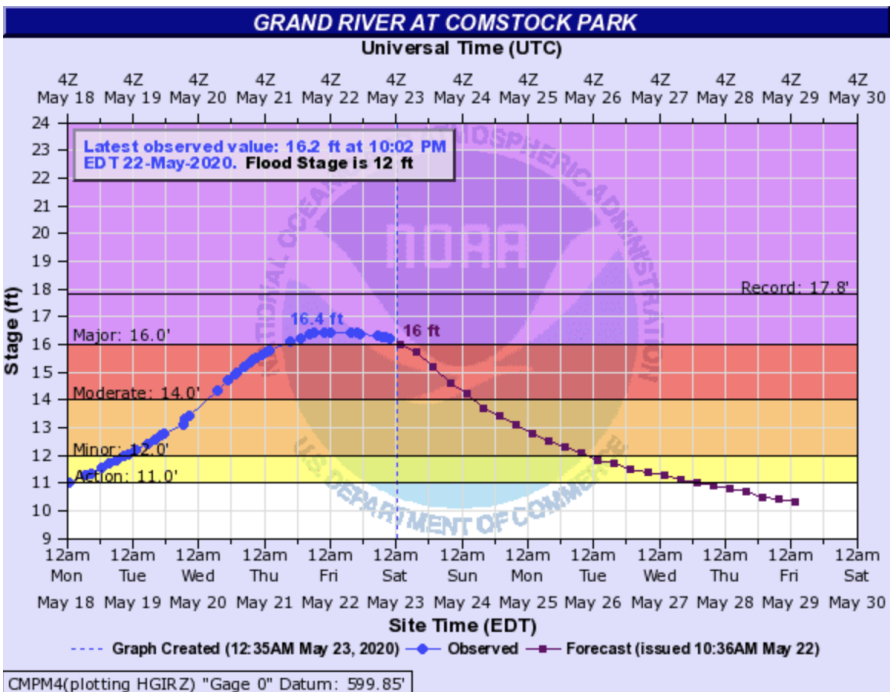
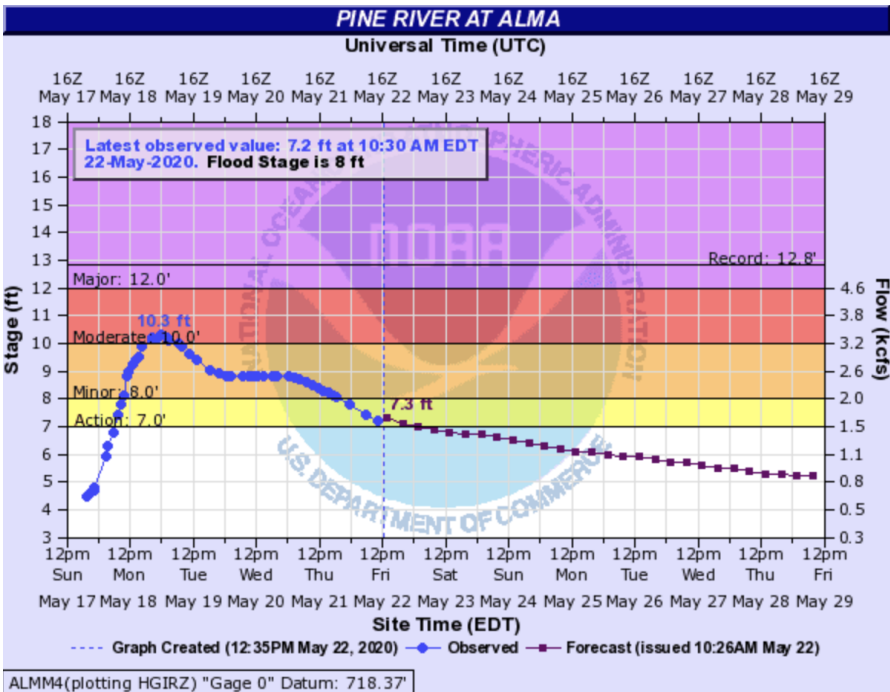
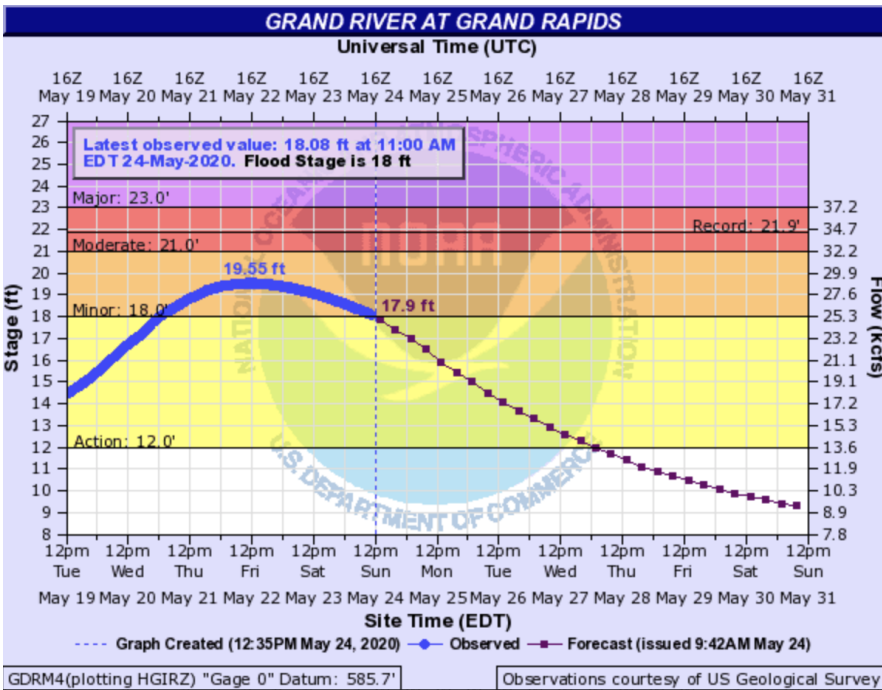
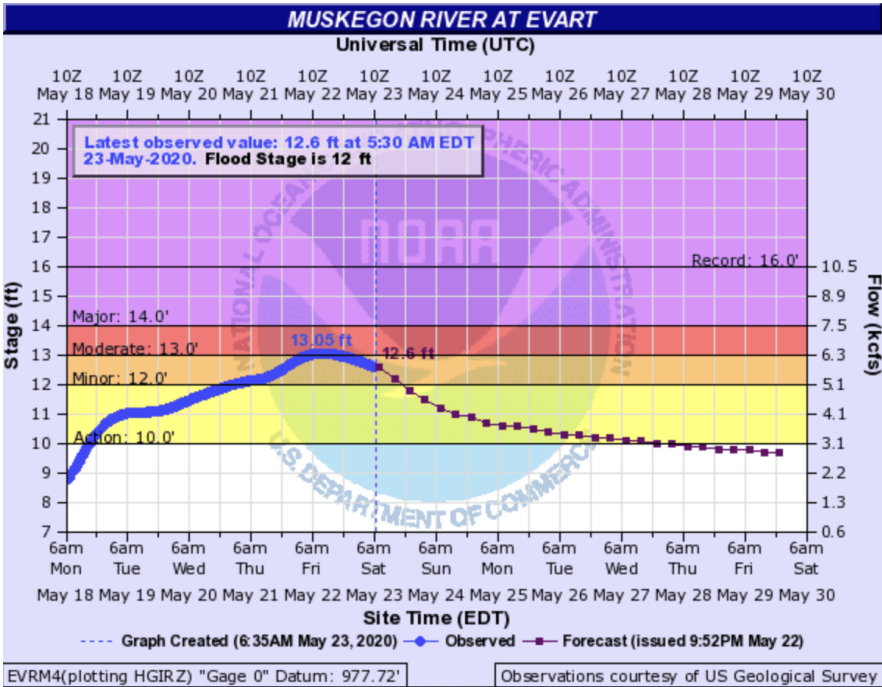
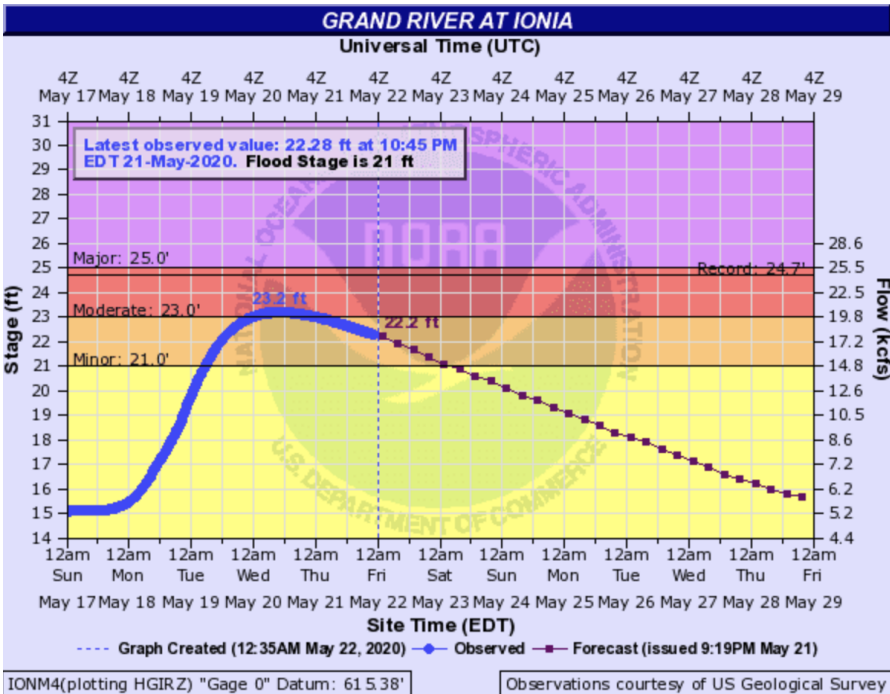
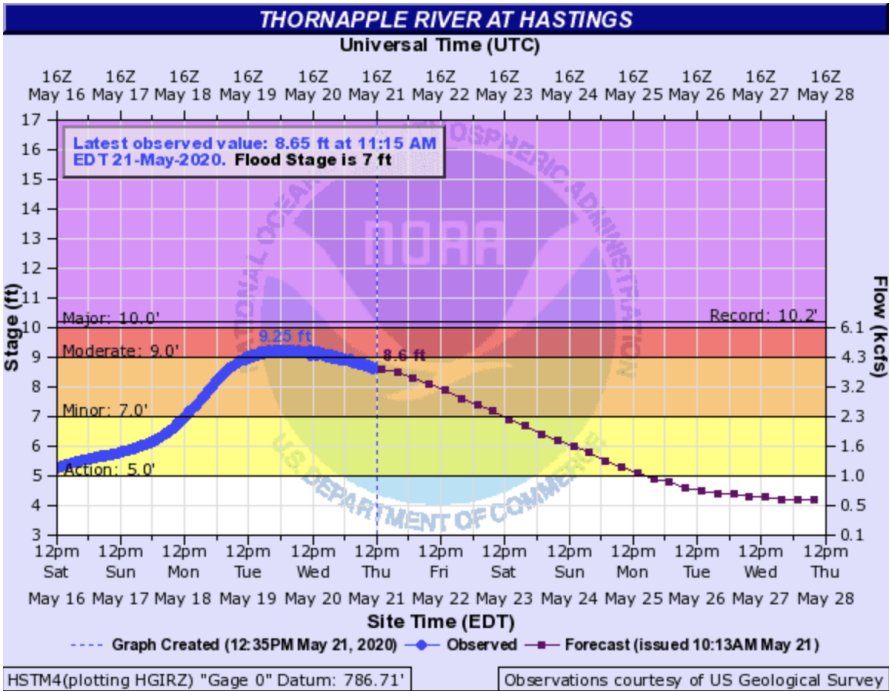


Figure 6. Rain totals from second round of heavy rain to affect Lower Michigan in May, 2020. In general, it was the northern river basins in the area that saw the heaviest rain totals.







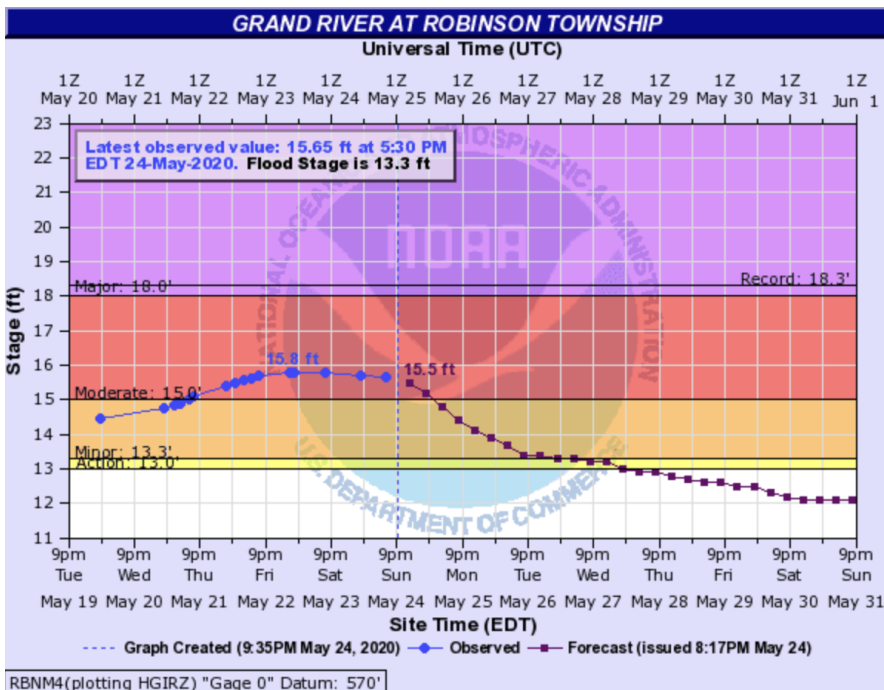
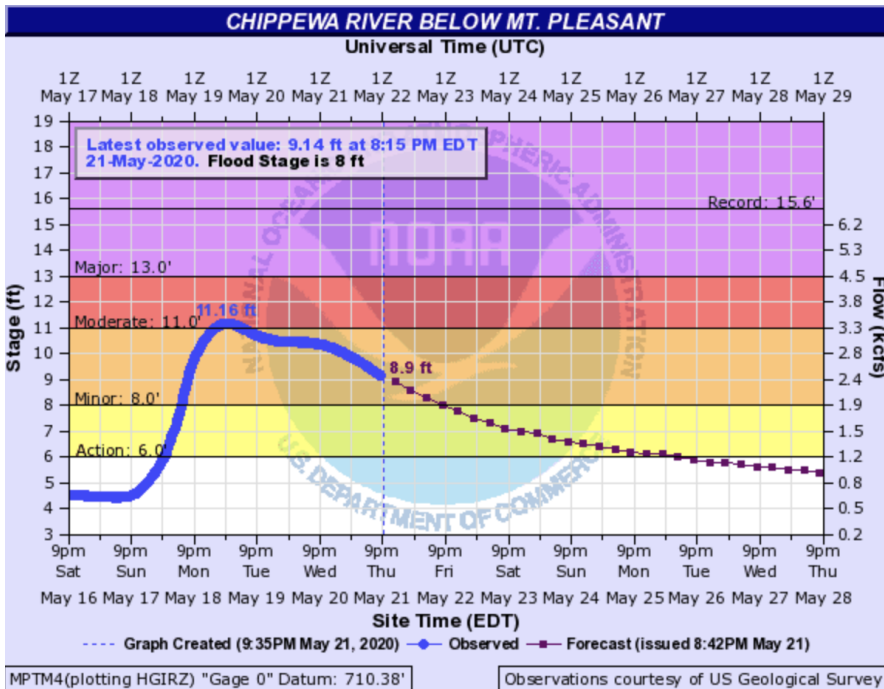


Figure 7. Selected hydrographs from around WFO GRR HSA after May 2020 flood.

Hydrologic Products issued this month:

31 Hydrologic Summaries (ARBRVAGRR)

1 Probabilistic Hydrologic Outlook (ARBESFGRR)
3 Event-driven Hydrologic Outlook (ARBESFGRR)
23 Daily River Forecasts (ARBRVDGRR)
9 Areal Flood Advisory Statements (ARBFLSGRR)
30 Flood Warning Statements (ARBFLWGRR)
3 Flood Watch Statements (ARBFFAGRR)
24 River Statements (ARBRVSGRR)

News Articles and Related Documentation

- <https://www.mlive.com/news/muskegon/2020/05/west-michigan-residents-face-catastrophic-flooding-after-record-breaking-rainfall.html>
- <https://www.mlive.com/news/grand-rapids/2020/05/grand-river-in-comstock-park-peaks-at-7th-highest-point-in-history.html>
- <https://www.mlive.com/weather/2020/05/michigan-flooding-one-two-three-punch-of-rain-overwhelms-soggy-state.html>
- <https://www.mlive.com/weather/2020/05/heavy-rain-update-how-much-fell-how-much-more-as-flood-warnings-expand.html>
- <https://www.mlive.com/news/grand-rapids/2020/05/ottawa-county-issues-local-state-of-emergency-due-to-flooding.html>
- <https://www.mlive.com/news/grand-rapids/2020/05/heavy-rains-in-kent-county-bring-river-flooding-closed-roads.html>
- <https://www.mlive.com/weather/2020/05/significant-flooding-expected-in-lake-michigan-beach-towns-beginning-today.html>
- <https://www.mlive.com/weather/2019/12/flood-warnings-issued-for-grand-river-muskegon-river-homes-could-be-affected.html>
- https://www.themorningsun.com/news/local/heavy-rains-cause-mid-michigan-flooding/article_533b73a6-9918-11ea-ae5b-175af9133077.html
- <https://www.mlive.com/public-interest/2020/05/flooding-chaos-hits-third-year-around-hundreds-of-michigan-lakes.html>