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/OS31)
HYDROMETEOROLOGICAL INFO CENTER
1325 EAST-WEST HIGHWAY, RM 13468
SILVER SPRING, MD 20910

HSA OFFICE:
Grand Rapids, MI

REPORT FOR (MONTH &YEAR):
September 2018

DATE:
October 15, 2018

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

The month began with more hot and humid weather, and the continuation of the rounds of heavy convective rains that began across the area in the final week of August. Soils remained saturated, and increasing percentages of the water from these rain events was running off directly into the rivers. Areal flooding was becoming increasingly likely with small streams filled to near capacity. Heavy rain falling on the first day of the month led to issuance of an areal flood advisory in the Muskegon area, due to wet antecedent conditions and also urban-area drainage effects. With additional days of heavy rain expected across the area, an Areal Flood Watch was issued for the entire HSA on the afternoon of September 1. As the next round of rain moved in, the Grand River and Kalamazoo River Basins took the heaviest rainfall, with up to 3 inches of rain falling in some locations. An Areal Flood Warning was issued for the Jackson area, with reports received that Interstate 94 was closed due to water on the road. A few hours later, a River Flood Warning was issued for the fairly flashy Grand River at Jackson (JACM4) in response to the heavy rainfall. The river rose above minor flood stage for approximately 2.5 hours. The next day, a River Flood Warning was issued for the Rogue River near Rockford (ROCM4) due to an expectation of yet another round of heavy rain expected the following evening. Thankfully, the heaviest rain fell north of the Rogue River Basin, and the river began to fall after cresting slightly below Flood Stage. It was about this time that the remnants of Tropical Storm Gordon moved northward from the Gulf of Mexico and threatened to dump widespread additional heavy rains on lower Michigan. Given the antecedent conditions around the area, this very easily could have resulted in significant and widespread flooding. Thankfully, this corridor of heavy rain stayed just south of the area, instead impacting Northern Indiana and Ohio on September 9-10.

After a wet week to start the month, the middle two weeks of the month were much drier, by comparison. Only localized moderate rainfall events happened, which allowed rivers to make progress recovering from the previous two very wet weeks. On September 20th, another round of heavy convective rains dropped multiple inches of rain on the Lansing area, which combined with urban poor-drainage issues to result in significant water on several area roadways. An areal flood advisory was issued until conditions improved shortly after rainfall ended. Multiple days of more widespread heavy rains again moved into the area in the final few days of the month, causing water levels to again begin to rise.

Flood Conditions

Streamflows started the month above the 90th percentile flow for this time of year, due to the very wet final week of August. Additional rounds of heavy rain in the first week of September kept flows well above seasonal averages. The relatively drier middle two weeks of September allowed virtually all of the streams and rivers in the HSA to recover to near long-term median flows. Some of the northern streams like the Muskegon, White, and Pere Marquette Rivers even recovered to *below* the long term median values during this dry period. As heavy rains resumed pummeling the area in the final 10 days of the month, hydrographs again began to climb around the HSA, and continued that climb into the first days of October. From a hydrologic perspective, while the northern 2/3 of the HSA received 4-8 inches of rain during the month, following a very wet end to August, the individual rounds of heavy rain continued to be spread around the area just enough to avoid any significant or widespread flooding on the medium and large streams in the area. Several urban and small-stream flooding events occurred throughout the month. This included on Portage Creek in Kalamazoo, after 1.5 to 2.5 inches of rain fell in the first week of the month. Additionally, the Muskegon area saw small streams and drainages overwhelmed by heavy rain on the first day of the month. Finally, the Lansing area saw some urban flooding/drainage impacts on the 20th of the month. All of these events and flood conditions improved very quickly once the heavy rainfall ended.

Flood Stage Report

The Forecast Point on the Grand River at Jackson – JACM4 – exceeded flood stage during the month of September 2018. Thus, the NWS Form E-3 "Flood Stage Report" was issued.

River Conditions

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

Location	River	% of Normal
Scottville	Pere Marquette	114
Whitehall	White	119
Evart	Muskegon	77
Mt. Pleasant	Chippewa	137
Lansing	Grand	141
Grand Rapids	Grand	122
East Lansing	Red Cedar	182
Hastings	Thornapple	107
Battle Creek	Battle Creek	93
Battle Creek	Kalamazoo	98

General Hydrologic Information

The month of September featured above normal precipitation (100-150% of normal) across much of the Grand River and Muskegon River Basins. The lower sections (closer to the mouth) of both of these basins was even wetter, receiving more on the order of 150-200% of normal for the month. In contrast, the Kalamazoo River Basin generally saw below average precipitation for the month, finishing at roughly 75-100% of normal precipitation.

August precipitation amounts for Grand Rapids, Lansing, and Muskegon, Michigan, were 5.93, 3.91, and 4.51 inches, respectively (Figure 1). Monthly departures were +1.65, +0.41 and +0.62 inches respectively. Yearly departures were +5.04, +3.37, and +6.87 inches for Grand Rapids, Lansing and Muskegon respectively. Percent of mean precipitation for August 2018 is shown in Figure 2.

Temperatures for the month of August were above normal at Grand Rapids, Lansing and Muskegon. The average monthly temperature departures for these sites were +3.3, +3.4 and +3.8 degrees Fahrenheit respectively.

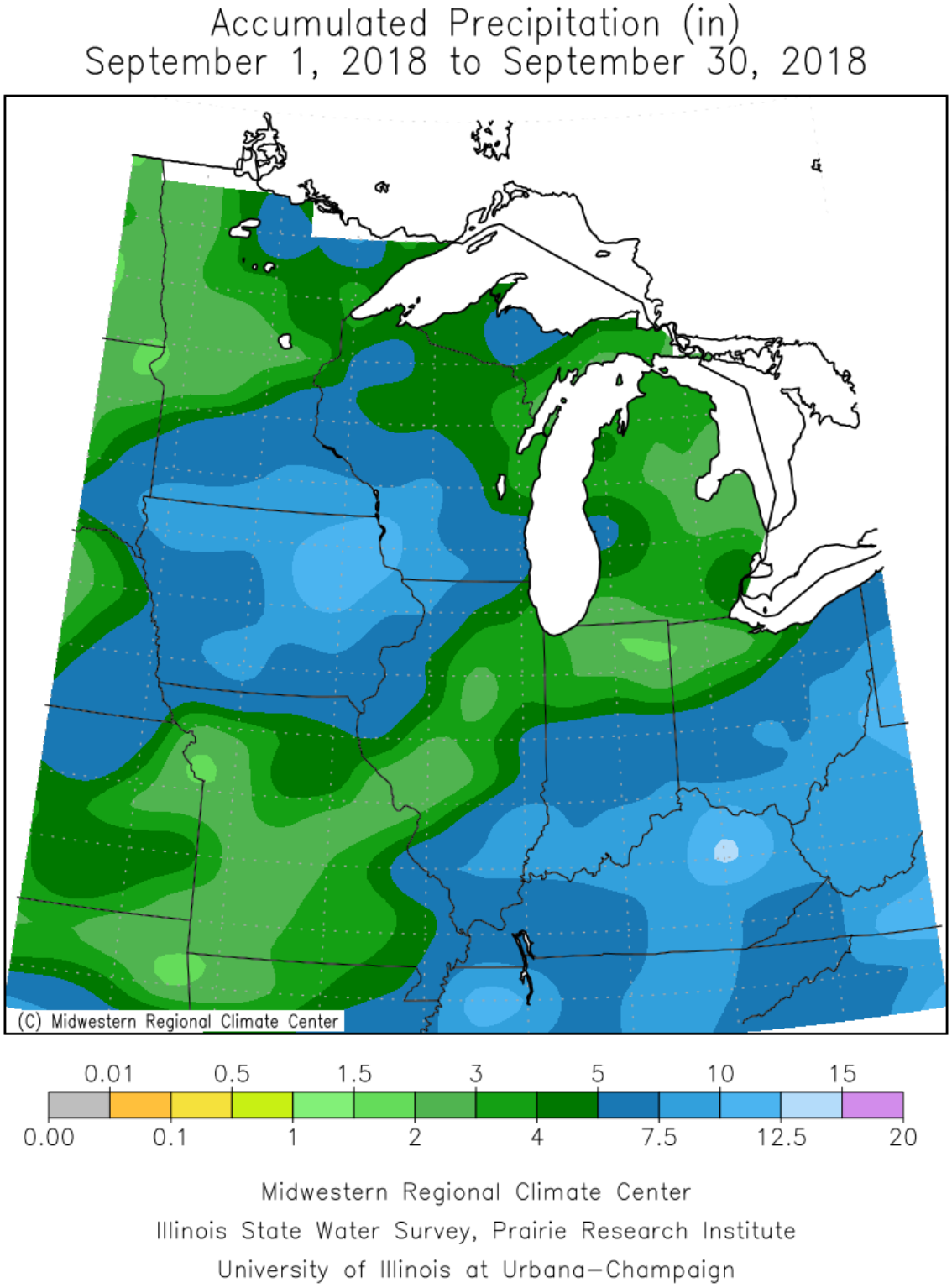

Figure 1. September 2018 Monthly Precipitation Totals

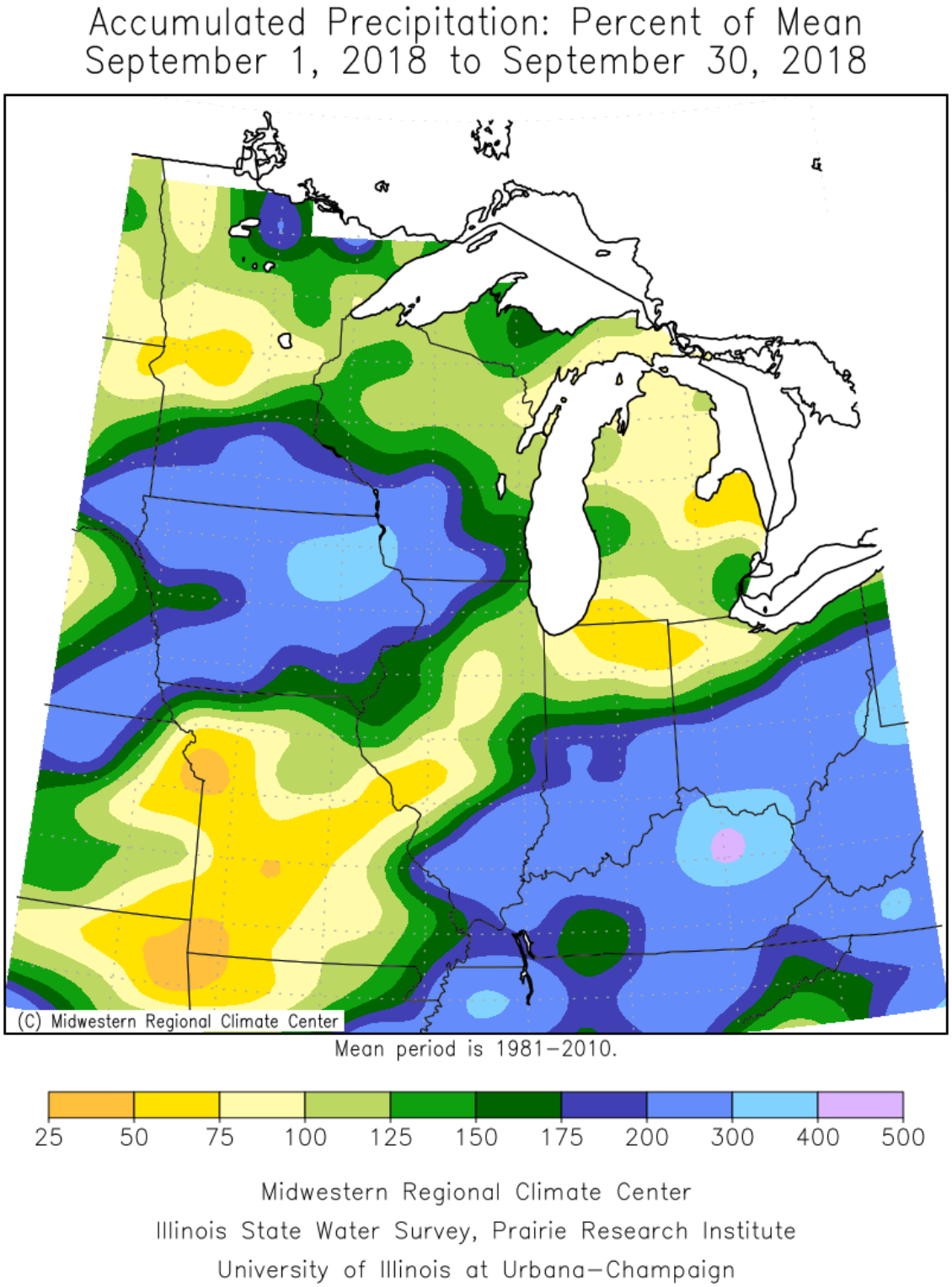

Figure 2. September 2018 Percent of Mean of Accumulated Precipitation

Hydrologic Products issued this month:

30 Hydrologic Summaries (ARBRVAGRR)
1 Probabilistic Hydrologic Outlook (ARBESFGRR)
30 Daily River Forecasts (ARBRVDGRR)
6 Areal Flood Advisory Statements (ARBFLSGRR)
3 Areal Flood Warning Statements (ARBFLWGRR)
3 Flood Watch Statements (ARBFFAGRR)
12 River Statements (ARBRVSGRR)

News Articles and Related Documentation

- https://www.mlive.com/news/grand-rapids/index.ssf/2018/09/much_of_west_michigan_under_fl.html