NWS FORM E-5 **U.S. DEPARTMENT OF COMMERCE**
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
Grand Rapids, MI

REPORT FOR (MONTH &YEAR):
August 2018

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
September 7, 2018

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

The month started out with continued dry conditions across the area, and much of the area was in D0 or D1 drought status. Around August 8th, a localized heavy rainfall event produced multiple inches of rain in the Lansing area, with some reports approaching 6 inches in less than 6 hours. An areal flood advisory was issued, which was later upgraded to an areal flood warning, as reports of multiple road closures were received. Antecedent very dry conditions likely kept the area from seeing more significant areal flooding issues, as after the storm local officials expressed surprise that even some of the very commonly flooded areas/basements did not see water like they normally would from an event of this magnitude.

Hot and very humid conditions continued mostly unabated for the middle part of the month. A cluster of slow-moving storms moved through the Mt. Pleasant area on August 21, and dropped 2-5 inches across the area with a small area northwest of Mt. Pleasant of around 7 inches of rainfall in a 12 hour period. This was handled by an areal flood advisory. This event also caused the Chippewa River to jump significantly, but the crest was below flood stage.

Active weather, with repeated rounds of showers and storms continued through the final 10 days of the month. As the end of the month approached, a strong closed high over the southeast CONUS developed, which focused even more instability and almost daily rounds of diurnal and/or MCS activity through the Great Lakes region. This led to several more heavy precipitation events. On August 27th, an areal flood advisory was issued parts of Muskegon County after 4-6 inches of rain fell in a 6-12 hour period. While amounts were a bit lower to the east, several inches of rain also fell in northern Kent County, where an areal flood advisory was also issued. Less than 24 hours later, another round of thunderstorms with heavy rain moved back into the Muskegon and Oceana County areas, requiring another areal flood advisory to be issued.

The next day, on August 28th, another strong and widespread round of rain and storms moved through the area. By this point, antecedent soil conditions were largely saturated, and a Flood Watch was issued for the entire area. As the storms moved in, parts of Kent, Allegan, Ottawa, and Barry Counties were on the receiving end of several more inches of rain, and an areal flood advisory was issued and later upgraded to an areal flood warning.

Flood Conditions

While streamflows started the month generally below the long-term averages, the heavy and repeated heavy rains in the final 10 days of the month completely reversed this trend. By the close of the month, most stations in the HSA were above the 90th percentile flow for this time of year. Several streams responded to all of this rain by rising to near or above action stage, but all crested below flood stage. These rivers were: the Chippewa River, Little Muskegon River at Morley, White River at Whitehall, and Flat River at Smyrna. From a hydrologic perspective, while the majority of the HSA received 5-10 inches of rain in a 10 day period, the individual rounds of heavy rain were spread around the area enough to avoid any of the mainstem rivers exceeding flood stage, though several were near bankfull.

Flood Stage Report

No forecast points exceeded flood stage in our HSA during the month of August 2018. Thus, the NWS Form E-3 "Flood Stage Report" was not issued.

River Conditions

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

Location	River	% of Normal
Scottville	Pere Marquette	220
Whitehall	White	357
Evart	Muskegon	108
Mt. Pleasant	Chippewa	317
Lansing	Grand	109
Grand Rapids	Grand	284
East Lansing	Red Cedar	113
Hastings	Thornapple	195
Battle Creek	Battle Creek	122
Battle Creek	Kalamazoo	100

General Hydrologic Information

The month of August featured below normal precipitation throughout the hydrologic service area. The greatest departures were along the Muskegon River. A small area of the Lower Kalamazoo basin saw above normal precipitation.

August precipitation amounts for Grand Rapids, Lansing, and Muskegon, Michigan, were 6.61, 5.22, and 7.31 inches, respectively (Figure 1). Monthly departures were +3.02, +1.99 and +3.92 inches respectively. Yearly departures were +3.39, +2.96, and +6.25 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 +2.7, +3.2 and +3.4 degrees Fahrenheit respectively.

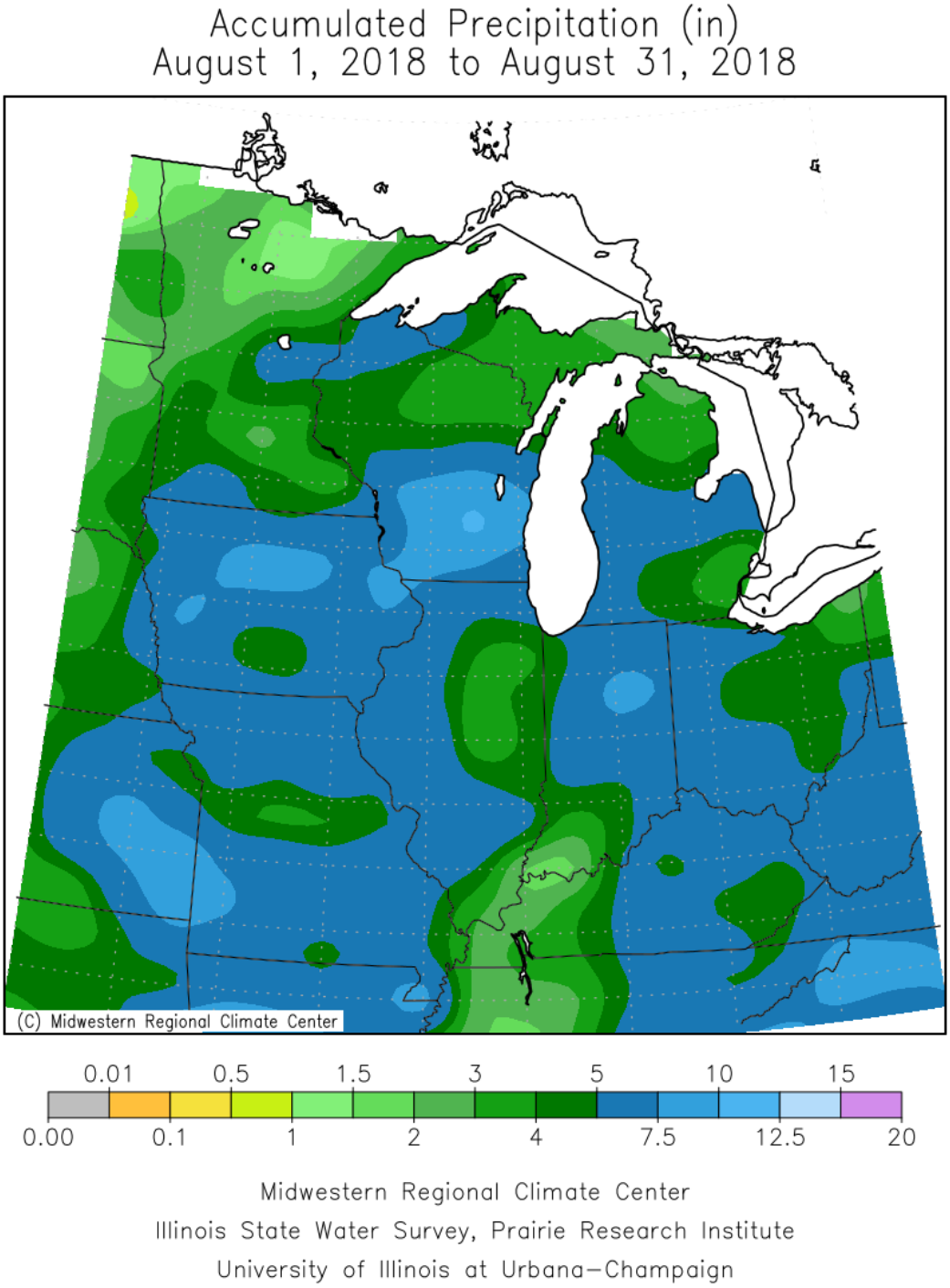

Figure 1. August 2018 Monthly Precipitation Totals

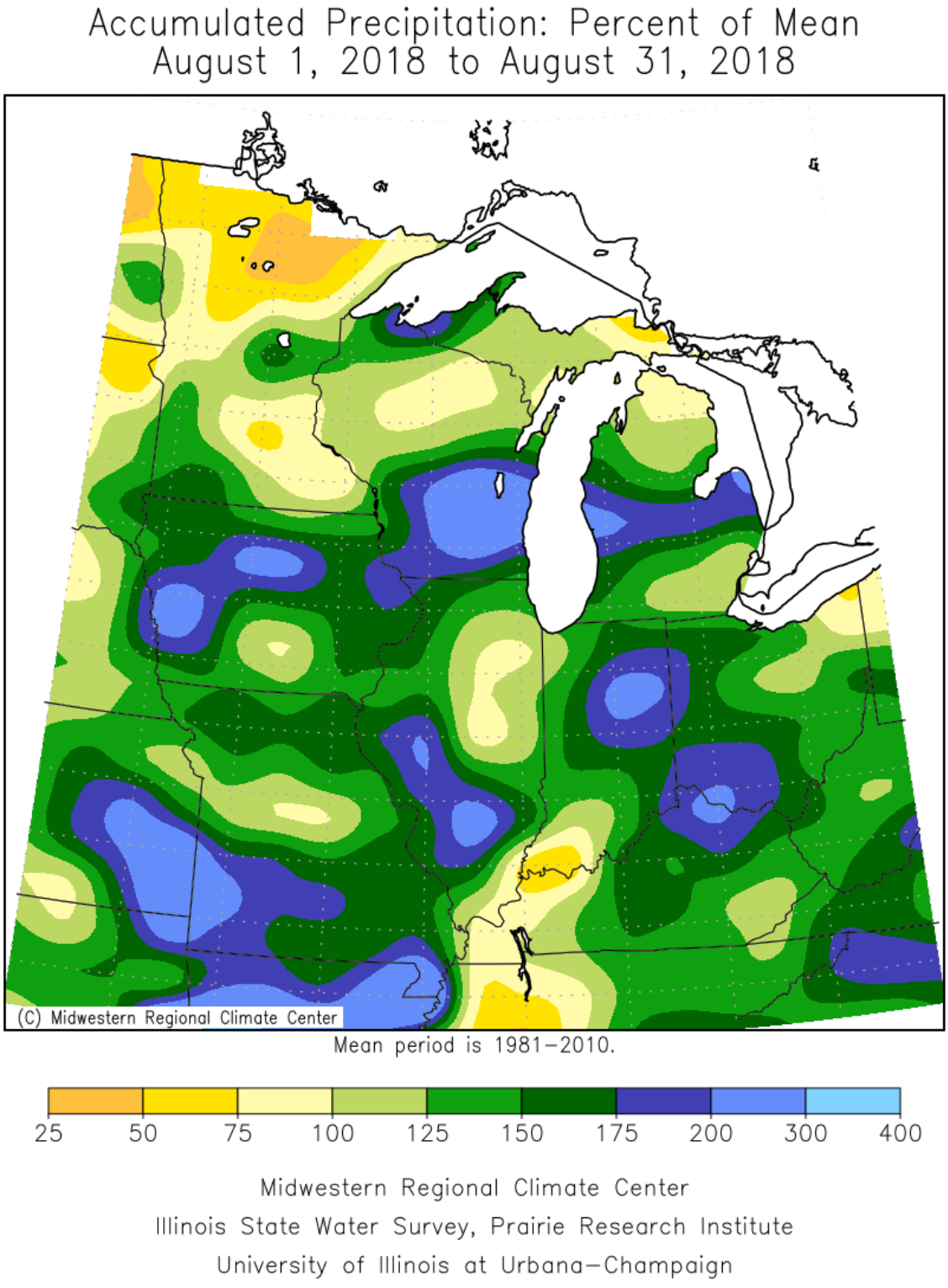

Figure 2. August 2018 Percent of Mean of Accumulated Precipitation

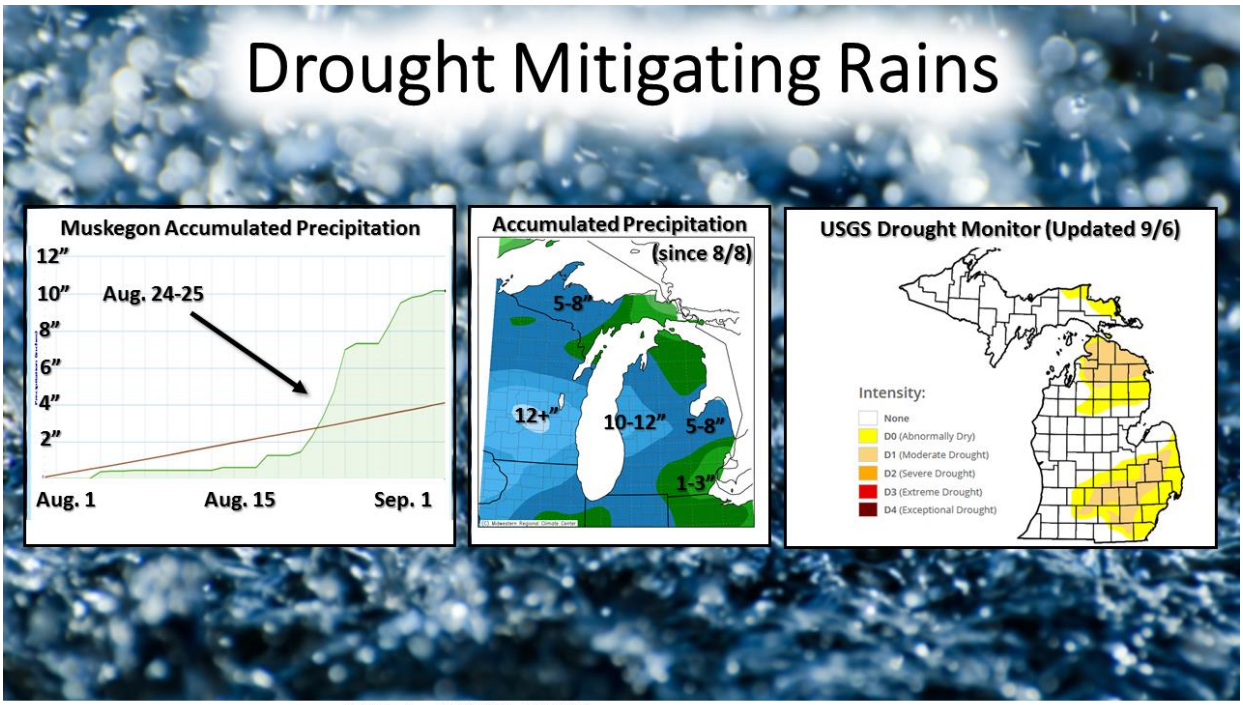

Figure 3. A tale of two weather patterns. Dry/drought conditions at the start of August gave way to saturated soils and excessive rainfall by the end of the month.

Hydrologic Products issued this month:

31 Hydrologic Summaries (ARBRVAGRR)
1 Probabilistic Hydrologic Outlook (ARBESFGRR)
31 Daily River Forecasts (ARBRVDGRR)
15 Areal Flood Advisory Statements (ARBFLSGRR)
2 Areal Flood Warning Statements (ARBFLWGRR)
4 Flood Watch Statements (ARBFFAGRR)
10 River Statements (ARBRVSGRR)

News Articles and Related Documentation

- https://www.mlive.com/weather/index.ssf/2018/08/from_drought_to_deluge_see_how.html
- https://www.mlive.com/weather/index.ssf/2018/09/recent_heavy_rain_dramatically.html#incart_river_index