

**MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS**

TO: NATIONAL WEATHER SERVICE (W/OS31)  
HYDROMETEOROLOGICAL INFO CENTER  
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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 end of December experienced widespread rainfall of 1 to 2 inches over a snowpack of 11 to 22 inches with temps reaching into the 60's. As a result, areal flood warnings were issued for all 23 counties and river flood warnings were issued for 16 forecast points in our Hydrologic Service Area (HSA). A local State of Emergency was declared on December 27, 2008, for Ottawa County, which was the hardest hit by flooding. Damage to public infrastructure (mostly road washouts) and private structures from flooding was estimated to exceed 3 million dollars in Ottawa County alone. At the height of the flooding in Ottawa County, more than 80 county roads were rendered impassable due to flooding. In all, 17 out of the 23 counties in our HSA had roads washed out or closed due to flooding. The widespread areal flooding rapidly transitioned into river flooding across the area. Moderate River flooding occurred on the Grand River at Comstock Park, and the Kalamazoo River near New Richmond, Michigan. Minor river flooding occurred on the Portage River near Vicksburg, Grand River in Robinson Township, Maple River near Maple Rapids, Thornapple River near Caledonia, Thornapple River near Hastings, Pere Marquette River near Scottville, White River near Whitehall, Red Cedar River at East Lansing, Grand River at Ionia, Grand River at Lowell, Rogue River near Rockford, and Grand River at Ada, Michigan. The significant flooding during the month of December resulted in close to 4 million dollars in damages, but no deaths.

**Flood Conditions**

On Sunday, December 21<sup>st</sup>, our hydrology section within the Area Forecast Discussion (AFD) mentioned ice jams forming in the Muskegon, Pere Marquette, and Flat Rivers due to the recent cold snap. River Statements were issued to provide information on the ice jam situation for these rivers. The AFD also mentioned that several model runs were indicating milder temperatures associated with a significant storm system tapping into the gulf moisture later in the week, with the possibility of flooding by Saturday.

On Monday, December 22<sup>nd</sup>, our AFD once again mentioned the ice jam impacts on Area Rivers and started to focus in on the flood potential for later in the week. The AFD

mentioned the potential for 40 – 50 degree temperatures and significant rain late Friday and into the weekend.

From Tuesday and Wednesday (December 23<sup>rd</sup> – 24<sup>th</sup>), our AFD continued to focus in on the flood threat for the upcoming weekend. Our first river flood warning was issued on Wednesday, December 24<sup>th</sup>, at 04:46 PM EST, for the Grand River at Comstock Park. An ice jam had developed on the Grand River and river levels were getting close to flood stage due to backwater.

On Thursday, December 25<sup>th</sup>, a hydrologic outlook was issued at 05:07 AM EST with the headline...”Heavy rainfall combined with snow melt could lead to some flooding”. The hydrologic outlook talked about one to two inches of rainfall combined with temperatures in the lower 50s over the weekend. The outlook specifically mentions the flood threats from small creeks and streams, clogged drains flooding streets, and ice jam flooding on rivers. Later that day a flood watch was issued at 03:32 PM EST for our entire HSA. The watch focused on the same issues as the outlook.

On Friday, December 26<sup>th</sup>, the flood watch continued for late Friday night and into Saturday. The flood watch mentioned the combination of heavy rain and melting snow would lead to an increased risk for flooding across the HSA. On Friday, a mix of freezing rain and snow moved into the area during the morning hours, and temperatures climb throughout the day. The forecast for heavy rainfall and melting snow over the next 24 hours resulted in river flood warnings being issued for the Grand River at Robinson Township, Looking Glass River near Eagle, Portage River near Vicksburg, Pere Marquette River near Scottville, White River near Whitehall, and the Maple River near Maple Rapids, Michigan, on Friday at 09:53 AM EST.

On Saturday, December 27<sup>th</sup>, the flood watch was upgraded to a flood advisory at 08:24 AM EST, and the flood advisory was upgraded to a flood warning for all 23 counties in our HSA at 10:44 AM EST, with an expiration set for 10:45 AM EST on Monday. The flood warning emphasized the rapid snowmelt, several inches or rain, road washouts and very poor visibility due to dense fog. These conditions made for very dangerous driving on secondary roads. On this day, temperatures into the 60’s combined with one to two inches of rain, resulted in a complete melt of the snowpack for the southern half of our HSA. The snowpack over the area ranged from 11 to 22 inches with a snow water equivalent of 1 to 2 inches. To compound problems, an ice jam formed on the Grand River in Grand Haven, causing the Grand River to rise rapidly and cause flooding in the village of Spring Lake, Grand Haven, and Robinson Township. Sandbagging commenced in the Spring Lake area to protect approximately 30 structures from rising flood waters due to the ice jam. A local State of Emergency was declared on December 27, for Ottawa County (includes Grand Haven, Spring Lake and Robinson Township), which was the hardest hit by flooding. Damage to public infrastructure (mostly road washouts) and private structures from flooding was estimated to exceed 3 million dollars in Ottawa County alone. At the height of the flooding in Ottawa County, more than 80 county roads were rendered impassable due to flooding. In all, 17 out of the 23 counties in our HSA had roads washed out or closed due to flooding. The widespread areal flooding rapidly transitioned into river flooding across the area. At 11:02 PM EST, Saturday, river flood warnings were issued for the Maple River near Maple Rapids, Thornapple River near

Hastings, Thornapple River near Caledonia, and the Rogue River near Rockford, Michigan.

On Sunday, December 28<sup>th</sup>, flood warnings were cancelled for 3 counties (Calhoun, Kalamazoo, and Jackson) but remained in effect for 20 counties in our HSA and river flood warnings were issued for the Pine River near Alma, Grand River at Ionia, Grand River at Lowell, Red Cedar River at East Lansing, and the Kalamazoo River near New Richmond. The river flood warning was cancelled for the Looking Glass River near Eagle when the river crested below flood stage and was forecast to continue a slow fall.

On Monday, December 29<sup>th</sup>, flood warnings were cancelled for the remaining 20 counties in our HSA as the areal flood threat transitioned into river flooding. On Monday, we had river flood warnings issued for 4 forecast points on the Grand River, 1 forecast point on the Portage River, 1 forecast point on the Pere Marquette River, 1 forecast point on the White River, 1 forecast point on the Maple River, 2 forecast points on the Thornapple River, 1 forecast point on the Rogue River, 1 forecast point on the Red Cedar River, and 1 forecast point on the Kalamazoo River.

On Tuesday, December 30<sup>th</sup>, some rivers had crested and fallen below flood stage. As a result, river flood warnings were cancelled for the Thornapple River near Caledonia, Portage River near Vicksburg, Red Cedar River at East Lansing, Rogue River near Rockford, and the White River near Whitehall, Michigan. Late Tuesday, a river flood warning was issued for the Grand River near Ada, Michigan, when the forecast was updated and put the river above flood stage. On Tuesday, we had river flood warnings issued for 5 forecast points on the Grand River, 1 forecast point on the Pere Marquette River, 1 forecast point on the Maple River, 1 forecast point on the Thornapple River, and 1 forecast point on the Kalamazoo River.

On Wednesday, December 31<sup>st</sup>, our last river crested and all the rivers in our HSA were now beginning to fall. River flood warnings were cancelled for the Grand River at Ionia and Ada, Michigan, when the rivers fell below flood stage. On Wednesday, we had river flood warnings still issued for 3 forecast points on the Grand River, 1 forecast point on the Pere Marquette River, 1 forecast point on the Maple River, 1 forecast point on the Thornapple River, and 1 forecast point on the Kalamazoo River.

The river flooding carried over into the New Year, and on Thursday, January 1<sup>st</sup>, river flood warnings were cancelled for the Thornapple River near Hastings and the Kalamazoo River near New Richmond, Michigan as they fell below flood stage. On Thursday, we had river flood warnings still active for 3 forecast points on the Grand River, 1 forecast point on the Pere Marquette River, and 1 forecast point on the Maple River.

On Friday, January 2<sup>nd</sup>, river flood warnings were cancelled for the Grand River at Ionia, and the Pere Marquette River near Scottville, Michigan. On Friday, we had river flood warnings still active for 2 forecast points on the Grand River, and 1 forecast point on the Maple River.

On Saturday, January 3<sup>rd</sup>, river flood warnings continued for the Grand River at Comstock Park and Robinson Township, and for the Maple River near Maple Rapids, Michigan.

On Sunday, January 4<sup>th</sup>, the river flood warning for the Grand River at Comstock Park was cancelled. River flood warnings continue for the Grand River at Robinson Township and for the Maple River near Maple Rapids, Michigan.

On Monday, January 5<sup>th</sup>, the final two river flood warnings were cancelled when the Grand River at Robinson Township and the Maple River near Maple Rapids, Michigan, fell below flood stage.

### **Flood Stage Report**

Rivers with moderate flooding:

The Kalamazoo River near New Richmond, Michigan, with a flood stage of 11 feet, went above flood stage at 2:45 PM EST on December 28<sup>th</sup>, crested at 13.18 feet at 8:45 PM EST on December 29<sup>th</sup>, and fell back below flood stage on January 1<sup>st</sup>, at 00:30 AM EST. Ice jams impacted stage levels and resulted in rapid rises and significant backwater in the area.

The Grand River at Comstock Park, Michigan, with a flood stage of 12 feet, went above flood stage at 05:00 PM EST on December 24<sup>th</sup>, crested at 15.19 feet at 00:10 AM EST on January 1<sup>st</sup>, and fell back below flood stage on January 5<sup>th</sup>, at 10:00 PM EST. Ice jams impacted stage levels and resulted in significant and rapid fluctuations in river levels in the area.

Rivers with minor flooding:

The Portage River near Vicksburg, Michigan, with a flood stage of 5 feet, went above flood stage at 05:00 PM EST on December 28<sup>th</sup>, crested at 5.05 feet at 07:35 PM EST on December 28<sup>th</sup>, and fell back below flood stage on December 30<sup>th</sup>, at 10:00 AM EST.

The Grand River in Robinson Township, Michigan, with a flood stage of 13.3 feet, went above flood stage at 10:00 AM EST on December 28<sup>th</sup>, crested at 14.90 feet at 03:14 PM EST on December 28<sup>th</sup>, and fell back below flood stage on January 5<sup>th</sup>, at 09:00 AM EST. Ice Jams impacted stage levels and resulted in rapid rises and significant backwater in the area.

The Maple River near Maple Rapids, Michigan, with a flood stage of 9 feet, went above flood stage at 11:00 AM EST on December 28<sup>th</sup>, crested at 9.57 feet at 12:30 PM EST on December 30<sup>th</sup>, and fell back below flood stage on January 4<sup>th</sup>, at 03:00 PM EST.

The Thornapple River near Caledonia, Michigan, with a flood stage of 10 feet, went above flood stage at 10:00 AM EST on December 28<sup>th</sup>, crested at 10.26 feet at 11:05 AM EST on December 28<sup>th</sup>, and fell back below flood stage on December 28<sup>th</sup>, at 01:00 PM EST.

The White River near Whitehall, Michigan, with a flood stage of 6 feet, went above flood stage at 08:00 PM EST on December 28<sup>th</sup>, crested at 6.90 feet at 10:15 AM EST on December 29<sup>th</sup>, and fell back below flood stage on December 30<sup>th</sup>, at 03:00 AM EST.

The Pere Marquette River near Scottville, Michigan, with a flood stage of 5.5 feet, went above flood stage at 02:30 AM EST on December 28<sup>th</sup>, crested at 6.18 feet at 10:15 AM EST on December 29<sup>th</sup>, and fell back below flood stage on January 2<sup>nd</sup>, at 10:30 AM EST.

The Rogue River near Rockford, Michigan, with a flood stage of 8 feet, went above flood stage at 00:30 AM EST on December 29<sup>th</sup>, crested at 8.84 feet at 08:00 AM EST on December 29<sup>th</sup>, and fell back below flood stage on December 30<sup>th</sup>, at 12:00 PM EST.

The Grand River at Ionia, Michigan, with a flood stage of 21 feet, went above flood stage at 08:15 PM EST on December 28<sup>th</sup>, crested at 21.90 feet at 10:30 PM EST on December 29<sup>th</sup>, and fell back below flood stage on December 31<sup>st</sup>, at 10:45 AM EST.

The Red Cedar River at East Lansing, Michigan, with a flood stage of 7 feet, went above flood stage at 08:00 AM EST on December 29<sup>th</sup>, crested at 7.11 feet at 05:30 PM EST on December 29<sup>th</sup>, and fell back below flood stage on December 30<sup>th</sup>, at 01:00 PM EST.

The Thornapple River near Hastings, Michigan, with a flood stage of 7 feet, went above flood stage at 09:00 PM EST on December 28<sup>th</sup>, crested at 8.07 feet at 04:15 AM EST on December 30<sup>th</sup>, and fell back below flood stage on January 1<sup>st</sup>, at 06:15 AM EST.

The Grand River at Lowell, Michigan, with a flood stage of 15 feet, went above flood stage at 03:00 AM EST on December 30<sup>th</sup>, crested at 15.75 feet at 05:47 PM EST on December 30<sup>th</sup>, and fell back below flood stage on January 1<sup>st</sup>, at 11:39 AM EST.

The Grand River near Ada, Michigan, with a flood stage of 20 feet, went above flood stage at 02:30 AM EST on December 31<sup>st</sup>, crested at 20.05 feet at 08:30 AM EST on December 31<sup>st</sup>, and fell back below flood stage on December 31<sup>st</sup>, at 09:30 AM EST.

Please refer to NWS Form E-3 "Flood Stage Report".

### **River Conditions**

River levels by the end of December were significantly above normal for our HSA, with many rivers above flood stage going into the New Year. Prior to the rise in river levels, significant ice had built up on Area Rivers which resulted in backwater and higher stages than normal from a typical "run-off" event. Ice jams occurred on the following rivers: Grand, Thornapple, White, and Kalamazoo Rivers.

### **General Hydrologic Information**

December 2008 will be remembered most for the snow that fell. Snowfall for the month ranged from 15 inches in southern Lower Michigan to over 60 inches in the snow belt areas. This is 10 to over 45 inches above normal. Precipitation totals for the month were also above normal. Precipitation ranged from 4 inches to over 6.25 inches. The departure from normal ranged from over an inch to over 4 inches.

December precipitation totals at Grand Rapids, Lansing, and Muskegon, Michigan, were 6.27, 3.80, and 6.99 inches, respectively. Precipitation totals for the month at these three sites were 3.57 inches above normal at Grand Rapids, 1.63 inches above normal at Lansing, and 4.35 inches above normal at Muskegon, Michigan. For Grand Rapids it was the 4<sup>th</sup> wettest, Lansing the 7<sup>th</sup> wettest, and for Muskegon, Michigan, the wettest December on record. Yearly precipitation totals were 11.67 inches above normal for Grand Rapids, 4.40 inches above normal for Lansing, and 13.10 inches above normal for Muskegon, Michigan. Snowfall totals for the month at Grand Rapids, Lansing, and Muskegon were above normal with readings of 54.6 (+35.8), 29.0 (+15.8), and 68.6 (+39.3) inches, respectively. For Grand Rapids, it was 2<sup>nd</sup> snowiest, Lansing the 3<sup>rd</sup> snowiest, and for Muskegon, Michigan, the 3<sup>rd</sup> snowiest December on record. Snow depth during the month of December reached a high of 17 inches at Grand Rapids, 11 inches at Lansing, and 22 inches at Muskegon. A December thaw near the end of the month, with temperatures in the 60's, resulted in a complete melt of the snowpack in Grand Rapids, Lansing, and Muskegon, Michigan. Due to the significant snowpack for most of December, the frost depths across the HSA were typically less than 2 inches.

The daily mean temperature for the month was cooler than average across much of Southwest Lower Michigan. Temperatures for the month of December were below normal at Grand Rapids, Lansing, and Muskegon, with average monthly departures of -1.4, -1.4 and -1.4 degrees Fahrenheit, respectively.

**Hydrologic Products issued this month:**

- 8 Areal Flood Watches (ARBFFAGRR)
- 1 Areal Flood Warning (ARBFLWGRR)
- 6 Areal Flood Statements (ARBFLSGRR)
- 7 Flood Advisories (ARBFLSGRR)
- 10 River Flood Warnings (ARBFLWGRR)
- 22 River Flood Statements (ARBFLSGRR)
- 42 Hydrologic Statements (ARBRVSGRR)
- 31 Hydrologic Summaries (ARBRVAGRR)
- 2 Hydrologic Outlooks (ARBESFGRR)