Extreme Wetness of 2019

Midwest Region

April 2020

Overview of Events – *Midwest Region Heavy Precipitation and Flooding of 2019*

Historic rainfall and flooding affected the Midwest* in 2019. Regionwide rainfall totals were more than 3 inches above the previous record year of 2018, and the prior record from 1993. The record rainfall was partially due to major events but an additional factor was the number of days with precipitation. A total of 121 stations set annual records in 2019, and the 2-year totals at 266 stations set new records for 2018–2019.

Flooding hit major levels on all the major river systems including the Missouri, Mississippi, and Ohio along with many of the tributaries. Flooding also persisted throughout much of the year on the Missouri and Mississippi in particular. Along the Iowa-Illinois border, the Mississippi River topped major flood stage multiple times. One occasion lasted for 51 days at Rock Island, much longer than any previous major flood in its history.

*Illinois, Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, Ohio, and Wisconsin.

By the Numbers – *2019 in Context*

95

Counties across the Midwest, at least one in each of the nine states, with crop indemnity losses topping $10 million each.

15

Weeks without drought and abnormally dry conditions across the region. In the preceding 19 years, only two such weeks were recorded.

32

Straight weeks (January through July) with no drought in the Midwest. The previous record streak was 14 weeks, set in 2016.

2nd **Consecutive year setting a new annual precipitation record for the Midwest region.**

3

Weeks of delayed planting and crop development during the 2019 growing season due to weather.

51

Straight days above major flood stage and a new record crest at the Quad Cities.

3

Major river systems (Mississippi, Missouri, and Ohio) in the region that reached major flood stage in 2019.

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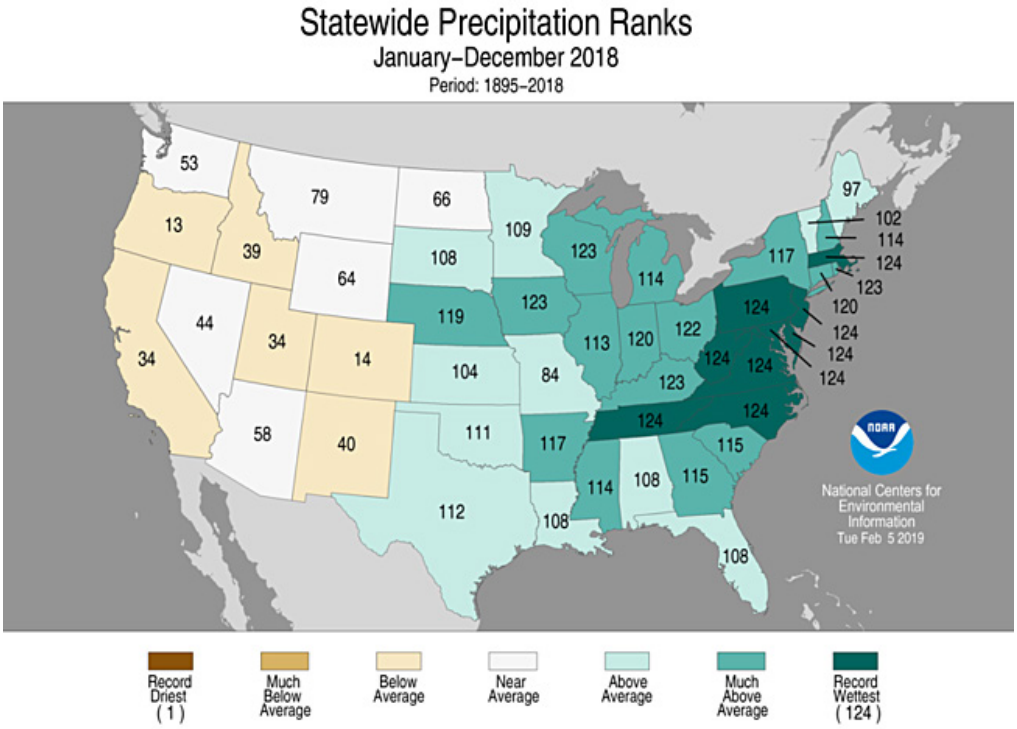
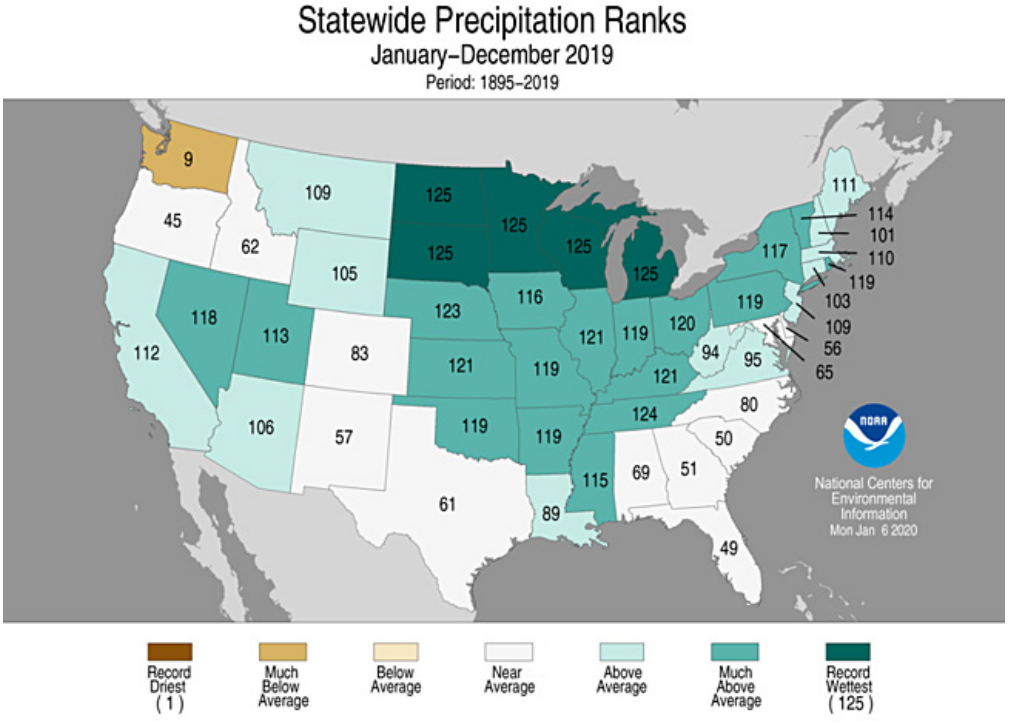
Extreme Wetness of 2019 – *A Retrospective*

For the Midwest as a whole, 2019 was the wettest calendar year in history (1895–2019). The historic year of 1993 held the annual record of 42.73 inches until it was broken in 2018 when 43.06 inches fell. The annual record was broken again in 2019 with a total of 46.21 inches. In the 125-year history of annual precipitation values, all fell in a range of 16.56 inches, from 26.50 inches (1930) to 43.06 inches (2018), and then 2019 extended that range by an additional 3.15 inches or 19%.

Further showing the extent of the wetness, each 12-month period ending in 2019 was the record wettest for that time of year (eg., Feburary 2018–January 2019, March 2018–Feburary 2019, and so forth). The last nine such 12-month periods (starting with May 2018–April 2019) were the wettest regardless of the time of year and August 2018–July 2019 established the new record with 48.01 inches.





Statewide values for 2019 were also record wet in the upper Midwest. Minnesota, Wisconsin, and Michigan all set records for calendar-year precipitation in 2019, while the other six states in the region all ranked among the top-10 wettest. An analysis of 12-month periods ending in each month of 2019 for all nine Midwest states revealed that there were 102 out of a possible 108 periods that ranked among the top 10 wettest for that state and time of year, 37 of which ranked as the wettest. The record statewide values were spread across seven states and the remaining two states had at least one 12-month period that ranked second wettest.

While the Midwest was extremely wet and numerous annual and other 12-month periods set records, only February 2018 set a regional single month record (in 2018 and 2019). Monthly state-by-state values in 2018 and 2019 only set four new records but all states were very wet with 53% of the monthly individual state values ranking in the top third of years (1895–2019) and only 7% ranked among the driest third of years.

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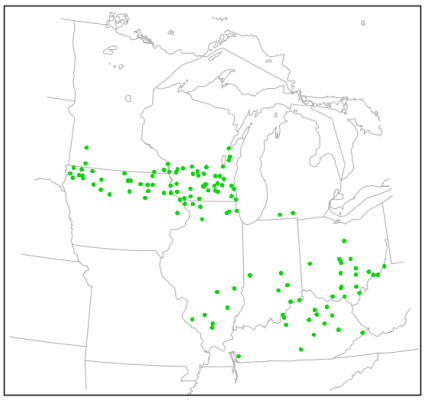
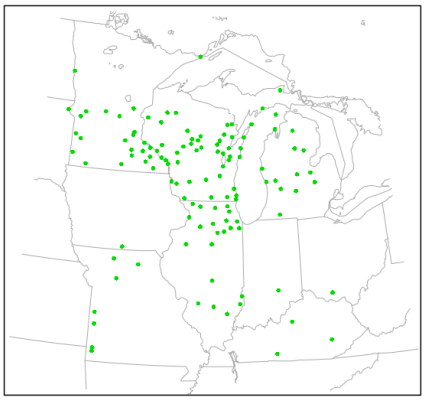
Extreme Wetness of 2018 and 2019 – *Local Records*

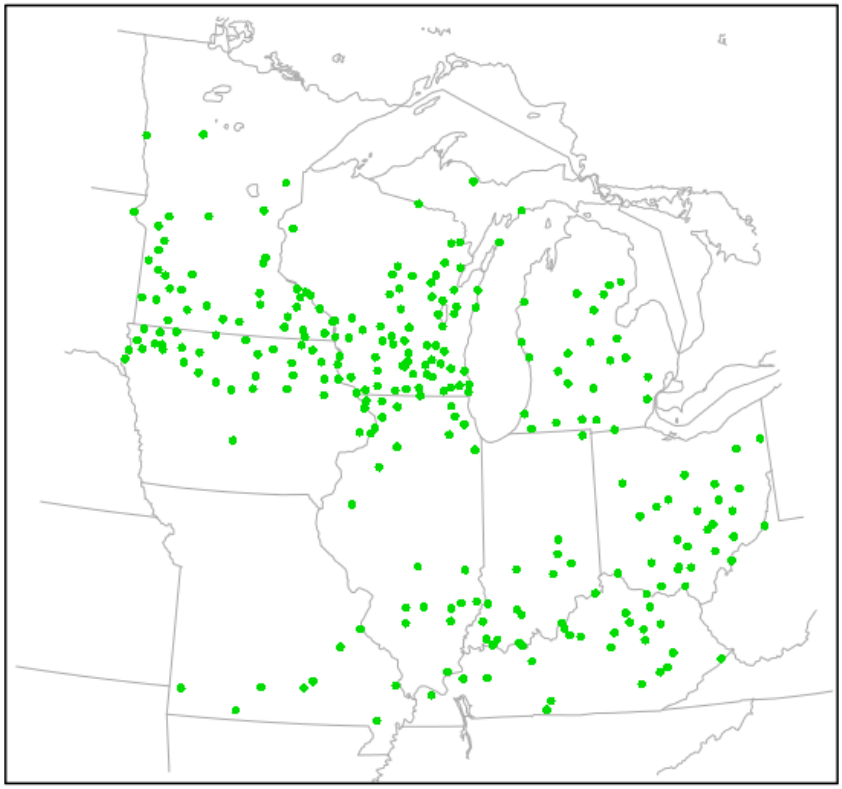
Annual Precipitation Records: 2018



Annual Precipitation Records: 2019



2-Year Precipitation Records: 2018–19

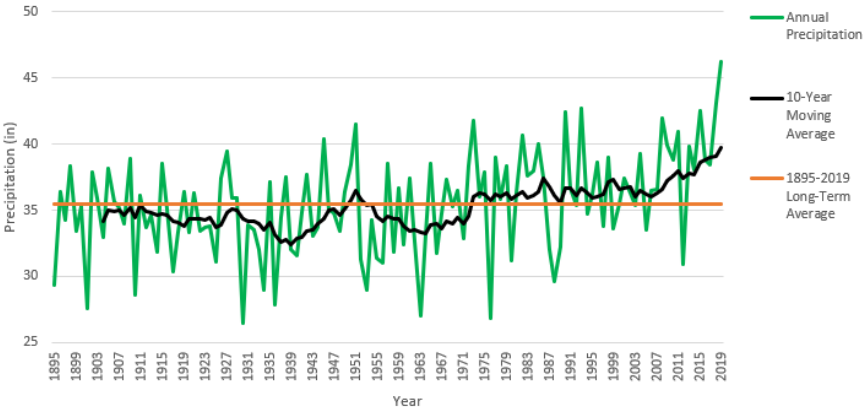


Extreme Wetness of 2019 – *Long-Term Trends*

After setting calendar-year records for the Midwest region in back-to-back years (2018 and 2019), the 2-year record precipitation was also clearly established. At the end of 2019, the 2-year, 3-year, 5-year, and 10-year periods were all new records. In fact, all multi-year records (2-year to 124-year) for the Midwest were set in the multi-year period ending in 2019.

The time series of annual precipitation totals (green line) shows an upward trend in the latter years of the record for the Midwest. With the exception of 2012 when drought was widespread, annual precipitation in 11 of the last 12 years has exceeded the 1895–2019 average (orange line) by more than 2.60 inches in each year. The 10-year average values (black line) show the upward trend also. As noted in the table to the right, the 10 most recent 10-year periods rank in the top 11 wettest in history.

Midwest Annual Precipitation 1895–2019



Midwest Region Wettest Ten-Year Periods

Ten-Year Period	Average Annual Precipitation (in)	Rank
2010-2019	39.75	1
2009-2018	39.13	2
2008-2017	39.02	3
2007-2016	38.83	4
2006-2015	38.6	5
2002-2011	37.93	6
2004-2013	37.83	7
2005-2014	37.71	8
2001-2010	37.57	9
1977-1986	37.44	10
2003-2012	37.39	11
Using NCEI nClimDiv Data 1895-2019		

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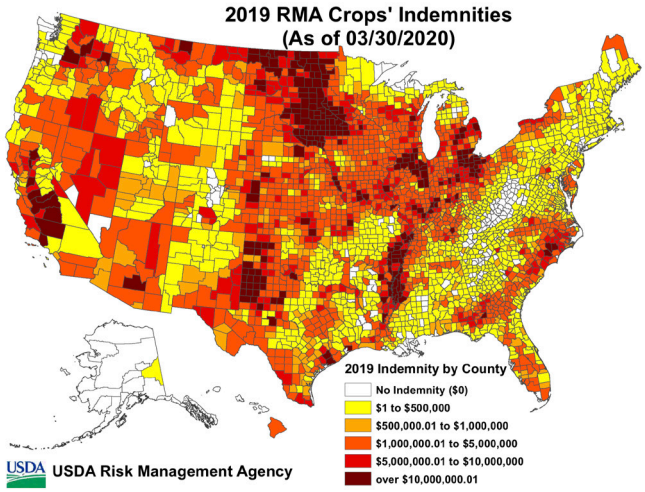
Agriculture Impacts

Wet conditions in the fall of 2018 increased soil moisture prior to the winter of 2018-19. Once soils froze, the moisture was locked in until the spring thaw. The combination of wet soils and additional heavy precipitation in the spring of 2019 caused widespread planting delays because muddy fields limited accessibility. Ultimately, spring planting moved at a record slow pace for maize (corn), soybeans, small grains, and other crops. Nearly 20 million acres went unplanted, with the largest areas occurring in Illinois, Minnesota, Ohio, and the Dakotas.

The delayed spring planting significantly shortened the growing season. Summer temperatures were largely near normal; however, below-normal maximum temperatures hindered crop development. This resulted in slowly maturing crops, which continued the near-record delayed progress for most crops. Despite the slow development, most crops reached maturity, or were close to it, prior to the fall freeze. Crops that were still somewhat immature required additional drying and management.

Continuing the slow pattern from spring and summer, the 2019 fall harvest was also slow. This was due to a combination of wet soil conditions and slow dry-down of crops. As mentioned above, somewhat immature crops required additional drying time, which slowed the ability to dry the large crops.

Early season snowstorms in parts of the Upper Midwest complicated matters by damaging crops and slowing harvest even further. Into 2020, many fields of corn in Minnesota, Wisconsin, and Michigan remained unharvested from the 2019 season.



Other Impacts

Transportation was impacted due to persistent high water. Impacts were felt in river barge traffic, passenger and cargo rail, and automobile and trucking. The high water levels on the Ohio, Mississippi, and Missouri river systems caused barge traffic to come to a halt as many locks were closed. The lock closures on the Mississippi River extended all along the Illinois border and up into tributaries such as the Illinois and Sangamon Rivers.

Rail lines were also closed due to high water and, in some cases, bridge damage. The flooding also affected highways and even interstates in the region. Interstate 29 in western Missouri and Iowa was shut down on multiple occasions.

Levees across the Midwest failed, flooding huge areas of farmland and cities. Davenport, Iowa, was flooded due to a failed levee. The levee failures also closed numerous roads in these areas.

Recreational areas were closed in the region, impacting boating and fishing. Many wooded areas were inundated with standing water that is expected to lead to enhanced tree fatalities in the coming years. Some migratory species benefitted from expanded wetland areas in the region.

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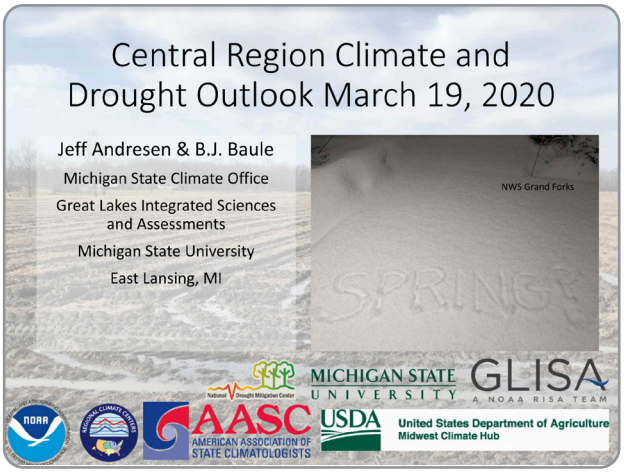
For More Information – *Ongoing Resources in the Midwest*

North Central U.S. Monthly Climate and Drought Summary and Outlook Webinar

The webinars occur on the third Thursday of each month at 1:00 p.m. (Central). These webinars cover the latest climate conditions, impacts, and outlooks.



To sign up for future webinars:
https://www.drought.gov/drought/calendar/webinars

View past webinars:
https://mrcc.illinois.edu/multimedia/webinars.jsp

Midwest Quarterly Impacts and Outlook Reports

For more information:
https://mrcc.illinois.edu/pubs/pubsMWquarterly.jsp

For More Information – *Climate Partners in the Midwest*

For the latest climate and weather outlooks:

NOAA NWS Climate Prediction Center
www.cpc.ncep.noaa.gov

NOAA NWS - Central Region
www.weather.gov/crh

For climate data, information, and impacts:

Midwestern Regional Climate Center
mrcc.illinois.edu

NOAA National Center for Environmental Information
www.ncdc.noaa.gov

USDA Midwest Climate Hub
www.climatehubs.oce.usda.gov

For the latest flood information:

NOAA NWS North Central River Forecast Center
www.weather.gov/ncrfc

NOAA NWS Ohio River Forecast Center
www.weather.gov/orfc

NOAA NWS Missouri Basin River Forecast Center
www.weather.gov/mbrfc

NOAA NWS River Forecasts
water.weather.gov/ahps/forecasts.php

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NOAA NWS - Central Region
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www.weather.gov/ohrfc

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www.cpc.ncep.noaa.gov

American Association of State Climatologists
www.stateclimate.org/

National Drought Mitigation Center
drought.unl.edu

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