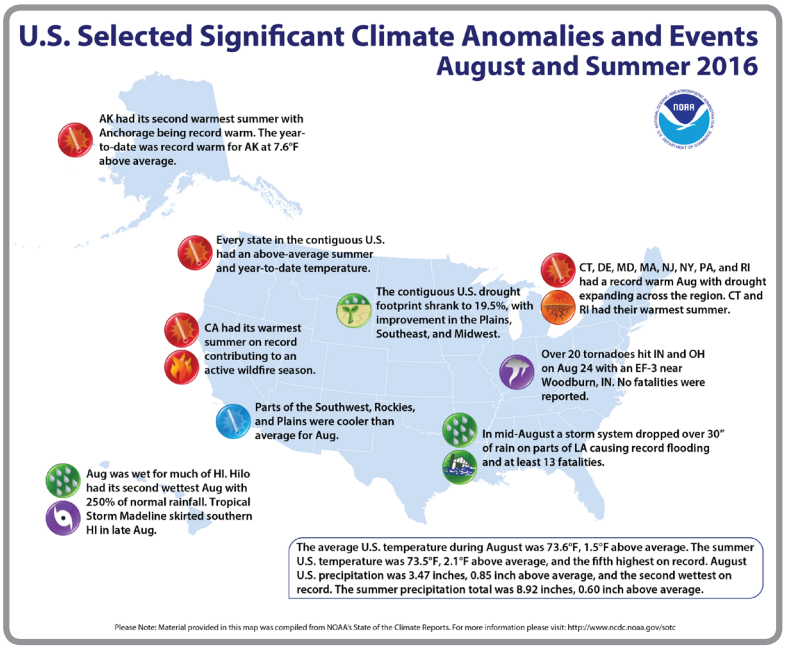
Quarterly Climate Impacts and Outlook

Midwest Region

September 2016

National - *Significant Events for June–August 2016*



Highlights for the Midwest

Temperatures in northern Minnesota, Wisconsin, and Michigan dropped to freezing or below on the mornings of June 8–9, with some areas in Minnesota and Michigan experiencing a hard freeze of 28°F.

Heavy rain across Missouri, southern Illinois, southern Indiana, and Kentucky occurred on multiple occasions the first 10 days of July. Nearly 200 daily precipitation records were recorded across the region, with a majority occurring in Missouri, Illinois, and Kentucky.

Six Midwestern states experienced a top 10 wettest summer: Minnesota (4), Wisconsin (4), Kentucky (5), Indiana (6), Illinois (7), and Michigan (8).

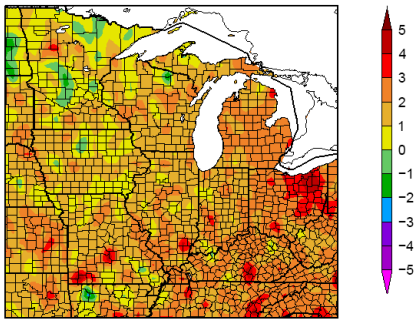
Average minimum temperatures this summer were in the top 10 warmest for all states except Minnesota. Ohio had its warmest on record. The average summer temperature was 2nd warmest in Ohio, 6th warmest in Kentucky, and 11th warmest in Michigan.

An outbreak of tornadoes, unusual for August, occurred in Indiana and Ohio on August 24. Ten tornadoes touched down in Indiana, including three near Kokomo. One of these was rated an EF-3 and caused 20 injuries. Eleven tornadoes touched down in Ohio.

Regional - *Climate Overview for June–August 2016*

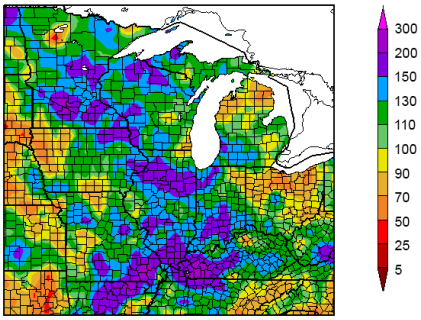
Temperature and Precipitation Anomalies

Departure from Normal Temperature (° F)
6/1/2016–8/31/2016



The average temperature in most of the Midwest was above normal for the summer. The highest departures (+2°F to +3°F) were found in the far eastern and southern portions of the region. June temperatures were near normal over the Great Lakes and northeast Minnesota increasing to +4°F in western Iowa and Missouri. July temperatures were near normal except +2°F to +3°F in eastern Ohio and central-lower Michigan. August temperatures were near normal west of the Mississippi River and, warmer than normal east of the Mississippi, increasing to +5°F across much of Ohio.

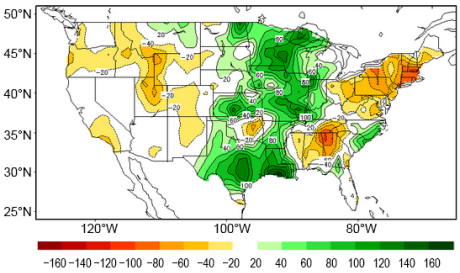
Percent of Normal Precipitation (%)
6/1/2016–8/31/2016



Summer precipitation was generally above to much-above normal throughout most of the region. However, precipitation was only 50–75 % of normal across the northeastern half of Ohio, in northwestern Iowa, and in northern lower Michigan. June was generally very dry across the Midwest except for northwestern Minnesota and Wisconsin. July precipitation was normal to much-above normal across most of the Midwest with the notable exception of Ohio, where rainfall was 25–75% of normal. August rainfall was normal to much-above normal across most of the region.

Soil Moisture

Soil Moistrue Anomalies
9/12/2016



Soil moisture was above normal across most of the Midwest at the end of August and through the first half of September. The exception was much of Ohio. Much of the northern half of Ohio was in moderate drought in early September, while eastern Ohio was in D0 (abnormally dry). If soils remain saturated into early October, it could impact harvest as if producers cannot get equipment into the fields. Most of the region will likely carry a soil moisture surplus into the winter.

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Regional Impacts *for June–August 2016*

Agriculture

Weather during the growing season was favorable overall for corn and soybeans. Crops were impacted in areas that received heavy rain at times during the summer, but these were mostly localized. At the end of August, corn condition in the good to excellent category ranged from 74–87% in seven of the nine Midwestern states. Corn condition in Ohio, where drought conditions existed most of the summer, was only 45% good to excellent, and in Michigan it was 58%.

Soybean condition at the end of August ranged from 74 percent to 87 percent good to excellent except in Ohio (55 percent) and Michigan (67 percent). The September 12 production estimates from the USDA expect a record corn crop and record soybean crop in the U.S.

Flooding

There were a number of heavy rain events during the summer that resulted in significant damages and in some cases fatalities.

Record-and near-record precipitation fell across northwestern Wisconsin on the night of July 11 through the morning of July 12, resulting in widespread flooding. Preliminary damage estimates across eight counties were over $28 million to public infrastructure and over $1.7 million to homes and businesses. Three confirmed fatalities were attributed to the flooding.

Heavy rain in the Kansas City area on August 26 caused severe flash flooding and prompted the National Weather Service to issue a flash flood emergency for downtown Kansas City. Rainfall totals exceeded 11 inches over a two-day period.

Heavy thunderstorms in northwestern Indiana on August 15 caused severe flash flooding. Local rain amounts were as much as 8–10 inches. Numerous roads were closed due to the flooding. Many vehicles were stranded in the floodwaters and a number of water rescues were made. Two houses collapsed when their foundations were washed out.

Street flooding in St. Joseph, Indiana, on Aug. 15. Photo credit: St. Joseph County EMA.

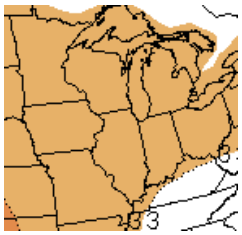
Water pouring off of a flooded field near Hebron, Indiana, on Aug. 28 after 6.43 in. of rain fell in about 2 hrs. This location recorded 17 in. of rain in August. Photo by Kathy Little.

Regional Outlook - *Fall 2016*

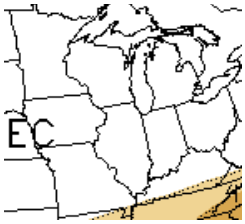
The three-month outlook issued by the Climate Prediction Center is for a slightly higher probability of warmer than normal weather across the Midwest for the period from October through December. A warm fall will be favorable for harvest as it will aid in drying of corn and soybeans prior to harvest. The outlook for enhanced probabilities of warm weather are not an indicator for an early or late freeze. Median first freeze dates range from the first week of September in northern Minnesota to the first week of November in the Ohio Valley. With crop progress mainly ahead of average, the risk of damage from an early freeze is reduced.

The outlook also calls for equal chances of normal, above- and below normal precipitation through the fall. Above-normal rainfall will likely have a negative impact on harvest activities as soils in most of the region are already saturated, and producers could have difficulty getting equipment into the fields.

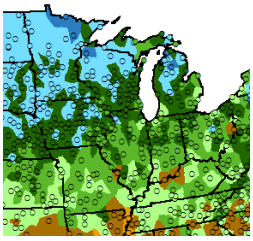
According to the Climate Prediction Center it is less likely that La Niña conditions will develop in the equatorial Pacific this fall and winter. Neutral conditions now exist and there is a 55–60% chance that neutral conditions will persist through the 2016–17 winter.



Three-month temperature outlook from the Climate Prediction Center for October through December. The tan shading depicts a slightly enhanced probability for warmer than normal conditions.



Three-month precipitation outlook from the Climate Prediction Center for October through December. There is an equal chance of below, near normal and above precipitation.



First freeze date climatology.

Aug 10 or Earlier	Sep 1 - 10	Oct 1 - 10	Nov 1 - 10
Aug 11 - 20	Sep 11 - 20	Oct 11 - 20	Nov 11 - 20
Aug 21 - 31	Sep 21 - 30	Oct 21 - 31	Nov 21 or Later
			No Recent Frz

Midwest Region Partners

Climate Science Program, Iowa State University
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