



Review – August 2024

Temperature

In August, temperatures across Ohio were relatively consistent and only slightly above average for around half the state. Average temperatures across Ohio were mainly between 70-75°F with small pockets ranging up to 75-80°F in the south and down to 65-70°F in the northeast (Fig. 1b). Departures from normal temperatures were around 0 to 2°F above normal for the majority of the state (Fig. 1b). At the county level, all but three counties ranked in the warmest third of their record. Williams, Gallia, and Erie County were the only counties that ranked near normal for average temperature. Overall, this ranked as Ohio’s 29th warmest August for Ohio (Fig. 2). These widespread warmer-than-average temperatures contributed to increased evaporation which further enhanced drought conditions that are discussed later in the summary.

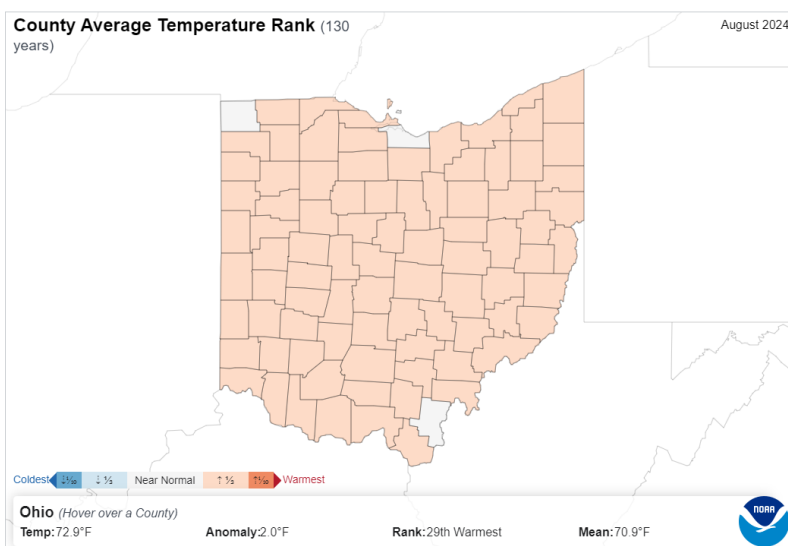
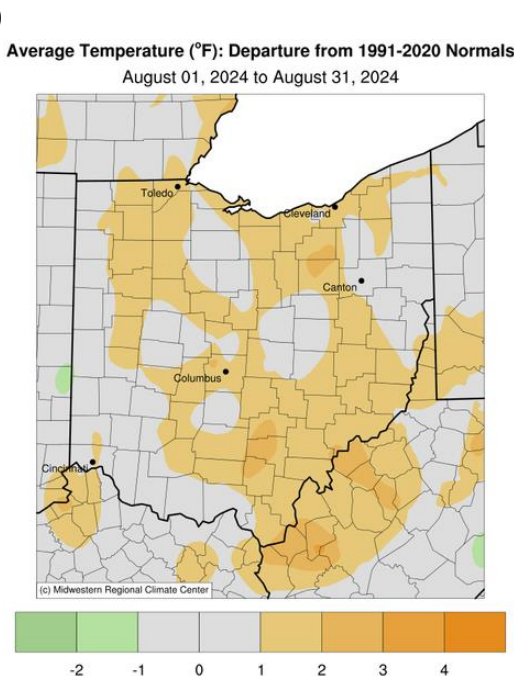
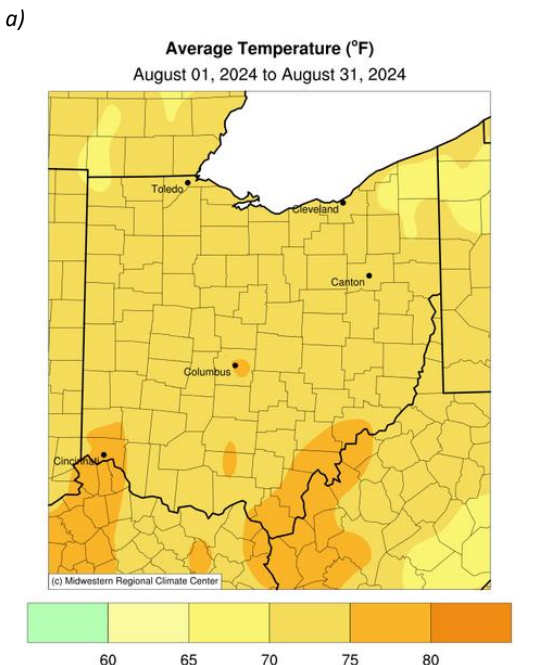


Figure 1a: Average temperature and 1b: Departure from Normal for the month of August 2024. Data courtesy of the Midwestern Regional Climate Center (<http://mrcc.purdue.edu>).

Figure 2: State of Ohio average temperature ranks by county for August 2024. Courtesy of the National Centers for Environmental Information (<https://www.ncdc.noaa.gov/sotc/>).

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Precipitation

August marks the third month in a row of below-normal precipitation levels across the majority of Ohio. Accumulated precipitation varied across the state in with Southeastern regions receiving 0.5 to 2 inches, Northeastern regions recording 2.5 to 8 inches, and Western regions logging 1 to 4 inches (Fig. 3a). Departures from normal indicate a similar pattern with the Southeast reporting 0 to 3 inches below normal, while the region near Cleveland between Holmes County and Lake County noted 0 to 4 inches above normal. The rest of Ohio recorded around 0 to 2 inches below normal with small pockets up to one inch above normal (Fig. 3b). At the county level, the majority of Ohio counties ranked in the warmest tenth of their record and a large portion of them ranked in the warmest third. Guernsey County recorded its driest August. Ashtabula, Geauga, and Lake counties contrastingly ranked in the wettest tenth of their record (Fig. 4).

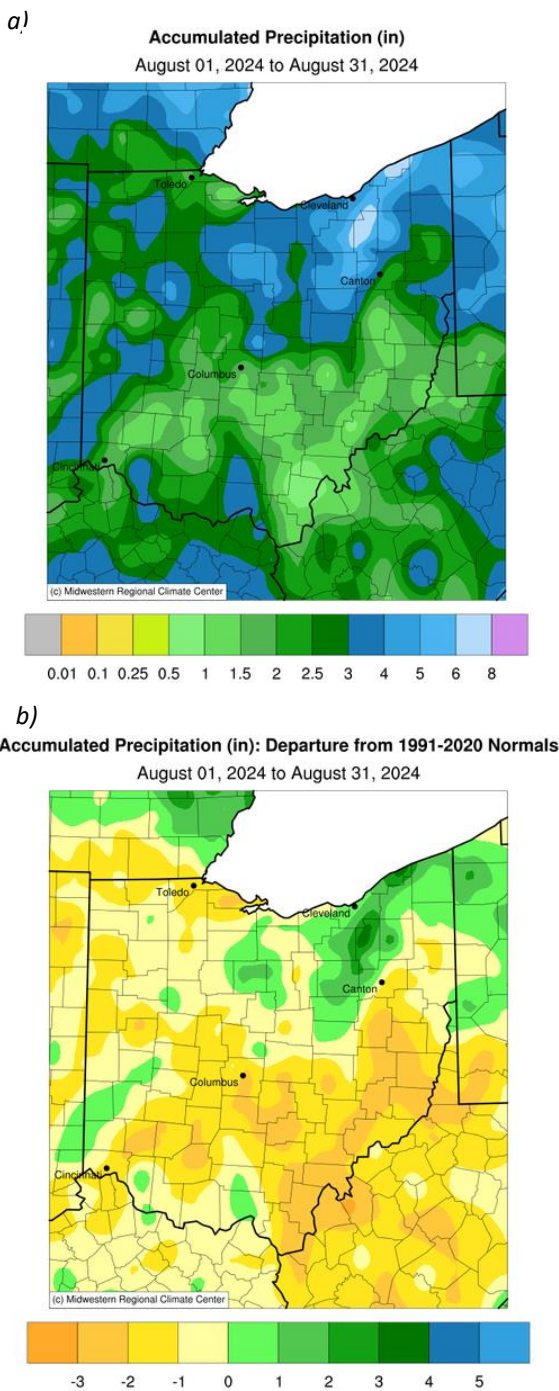


Figure 3a: Accumulated precipitation and 3b: Departures from Normal for the month of August 2024. Data courtesy of the Midwestern Regional Climate Center (<http://mrcc.purdue.edu>).

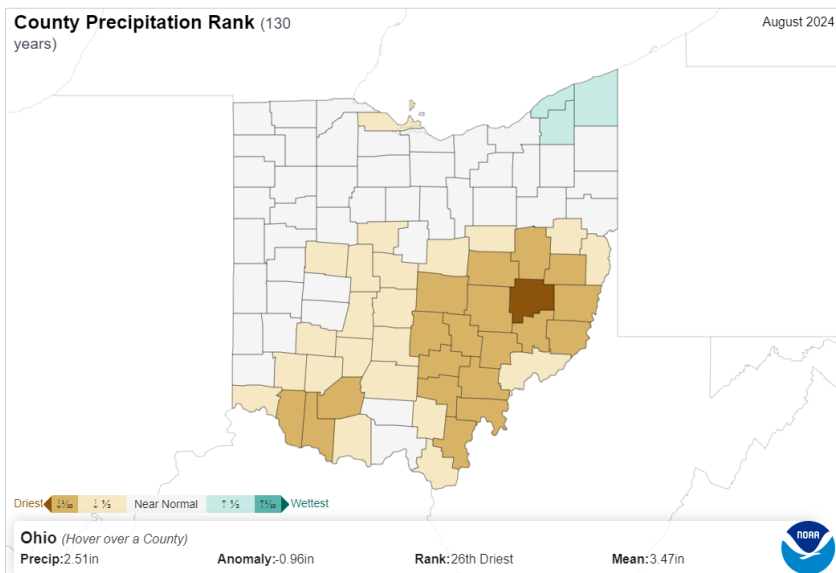


Figure 4: State of Ohio precipitation ranks by county for August 2024. Courtesy of the National Centers for Environmental Information (<https://www.ncdc.noaa.gov/sotc/>).



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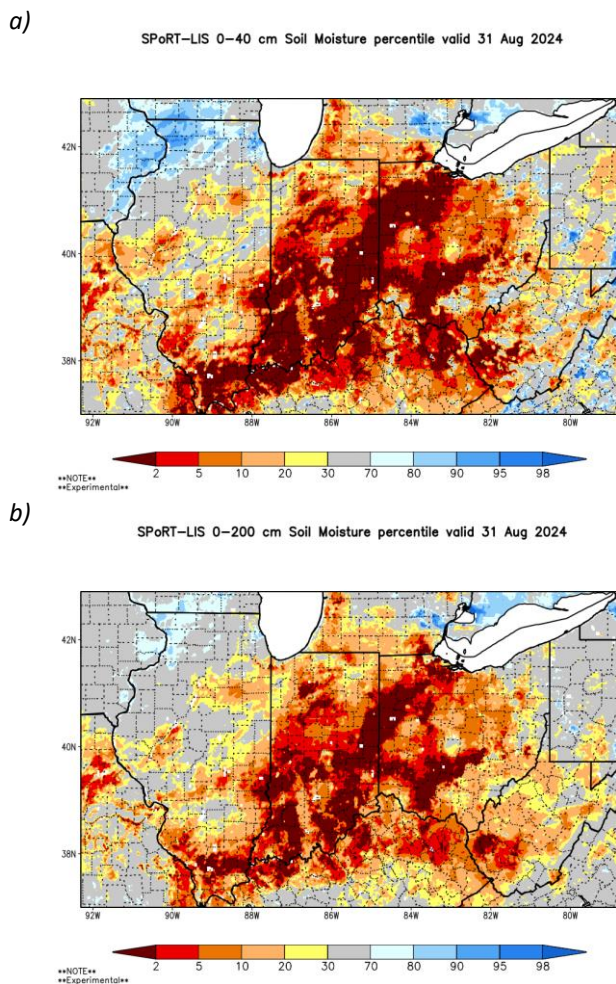


Figure 5a: 0-40 cm and 5b: 0-200 cm soil moisture percentile across the region at the end of August 2024. Courtesy of NASA SPoRTLIS (https://weather.msfc.nasa.gov/sport/case_studies/lis_IN.html).

Soil and Energy

Soil conditions have become extremely dry by the end of August across most of western Ohio. The 0-40 cm map indicates large regions in the northwest and southwest parts of the state with soil moisture being in the lowest 2 percent indicating extremely dry soil conditions (Fig. 5a). The 0-200 cm map shows a similar trend but with a larger region of relatively dry soil across most of Ohio excluding the northeast which is close to normal levels (Fig. 5b). In the southeast precipitation events near the end of August allowed some moisture to enter the soil however the majority of this precipitation was not absorbed and went straight to runoff due to how dry and rough the soil already was.

Similar to last month, seasonal temperatures in August led to very small departures from normal numbers of Cooling Degree Days (CDDs) and Heating Degree Days (HDDs). HDDs were already close to zero which is to be expected in summer as there is little need to heat buildings. The number of CDDs was quite high but departures showed that these numbers were only slightly above average for August (Fig. 6).

Product Note: Both NASA SPoRT LIS soil moisture products contain small pockets of inaccurate data indicating extremely wet or dry conditions. These small-scale errors can emerge in remote sensing products covering large areas or grid-spacings. For more information, please contact Geddy Davis (davis.5694@c)

Climate Division	Heating Degree Days	Normal	Departure	Cooling Degree Days	Normal	Departure
1	9	8	2	235	204	31
2	10	6	4	248	210	38
3	19	12	7	197	166	31
4	11	5	6	258	226	33
5	11	4	7	274	233	41
6	13	8	5	249	193	56
7	11	6	5	248	205	43
8	7	2	4	287	262	25
9	5	2	3	306	263	42
10	9	4	6	290	229	61
State	10	6	5	259	219	40



Figure 6: (Left) August 2024 heating & cooling degree days. (Right) Corresponding Ohio Climate Divisions. Data courtesy of the Midwestern Regional Climate Center (<http://mrcc.purdue.edu>).

Current Event Update

Drought

With the development of extreme and exceptional drought conditions, we will be including a dedicated drought page in all of the upcoming monthly summaries for as long as conditions persist. This is the first time since the drought monitor's inception in 2000 that we have seen D4, exceptional drought conditions in Ohio. As of September 14th, 8.41% of the state is in D4, 15.84% is in D3, 18.21% is in D2, 35.32% is in D1, and 17.65% is in D0. Southeast Ohio has the largest and most significant area of drought but drought conditions in northwestern Ohio are developing quickly. Some recent rainfall has helped regions in the southeast, but conditions will continue declining if more consistent precipitation is not received (Fig. 7). The impacts of this drought are significant, especially in the southeast. Many soybean and corn plants are not filling pods and fruit/nut abandonment has begun on trees (Fig. 8). Insects feeding on already stressed plants only compound the issues. Large areas of pastures are experiencing no growth causing farmers to resort to feeding hay and other alternatives. Some farmers are resorting to hauling water or selling cows early. Trees such as black walnut, boxelder, and maples are turning or abandoning leaves across the drought area. Creeks, ponds, and wells are drying or are currently dry in these areas as well. Steady, long-duration rains will be needed to cure the deficit and curb longer-term impacts.

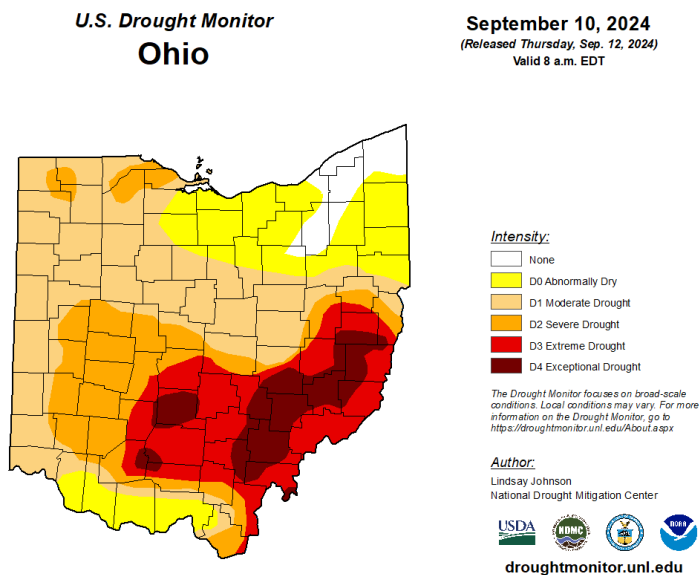


Figure 7: Map of drought conditions in Ohio determined by the U.S. Drought Monitor.
<https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?OH>



Figure 8: Photo of turning soybean field near Coshocton, OH. Image courtesy of Jonny Glessner

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Notable Events

Stepping away from the drought discussion, another notable weather event that occurred was the August 6th severe weather and winds that occurred in northern Ohio. A surface low-pressure system moved east across the region where it interacted with a stationary boundary promoting storm development. The environment was favorable for supercell and tornado development in the region. Multiple embedded supercells were identified along the boundary line which would eventually produce 5 EF-1 tornadoes and widespread straight-line wind damage (Fig. 9).

After the event, a state of emergency was declared for Ashtabula, Cuyahoga, Geauga, Lake, Portage, Summit, and Trumbull Counties. Four hundred thousand residents were without power and countless trees and powerlines were knocked down across roads and houses. A few small structures such as garages, and barns were crushed, and shingles and roofing were torn from larger homes (Fig. 10). The longest tornado went from Brook Park to Bedford and left a 17-mile track of damage which is the longest tornado that Cuyahoga County has recorded since 1953. A macroburst was also identified which stretched between Eastern Cuyahoga, Western Lake, and Northwest Geauga County leaving a large swath of damage from 90 mph winds. Fortunately, there were no reported injuries or deaths.

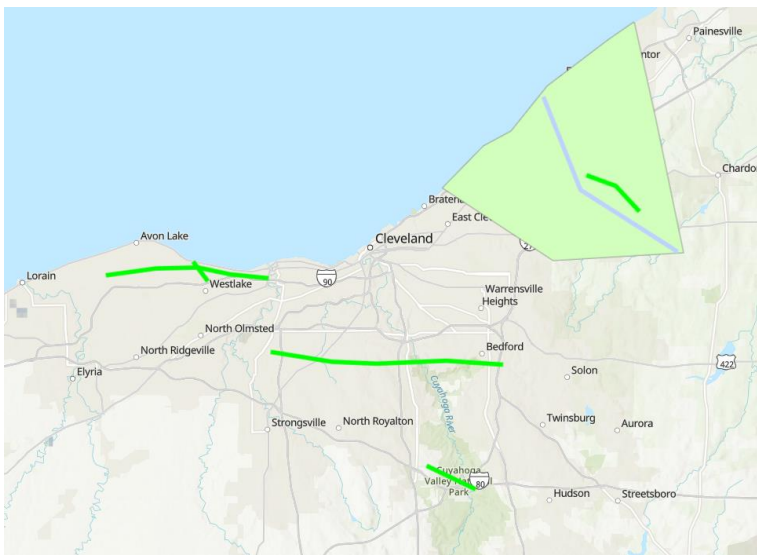


Figure 9: Map of August 6, tornado tracks and macroburst area near Cleveland, OH provided by the NOAA damage assessment toolkit. <https://apps.dat.noaa.gov/stormdamage/damageviewer/>



Figure 10: Photo of downed powerlines and trees, on houses and blocking the road taken in Bedford, OH by Aiden Ridgway.

Forecast: September - November

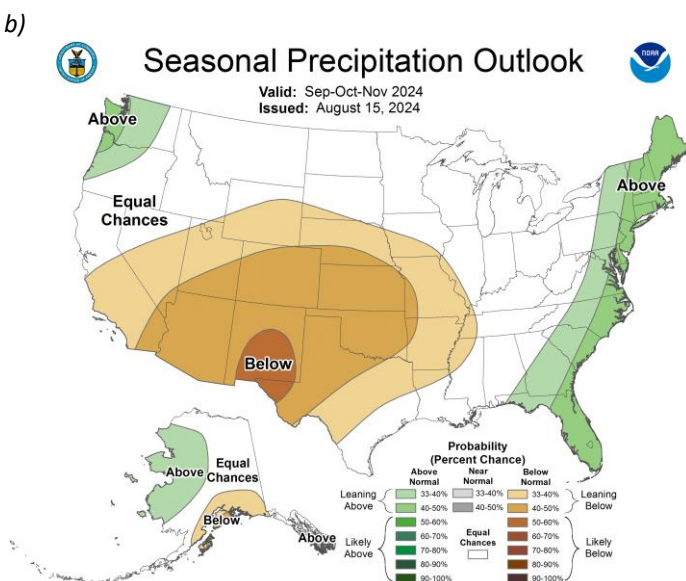
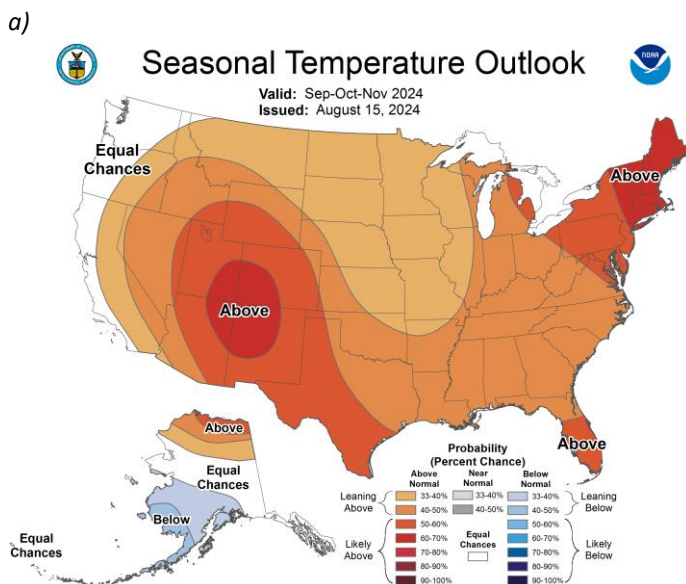


Figure 11a: Nationwide Seasonal Temperature and 9b: Precipitation Outlook for September-November. Courtesy of the Climate Prediction Center (<https://www.cpc.ncep.noaa.gov/>).

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Looking Ahead

The CPC's 3-month outlooks suggest a warmer-than-average fall season for Ohio over the next three months. The temperature outlook shows above-average temperatures across the state with moderate confidence and higher confidence in the northeast corner (Fig. 11a). The precipitation outlook indicates equal chances of above-normal or below-normal precipitation levels across Ohio over the next three months (Fig. 11b). Warmer-than-average temperatures combined with uncertain precipitation levels continue to cast uncertainty on the prolonged drought situation in the state. Short-term impacts of drought have already been experienced and now the impacts of long-term drought are beginning. Long periods of drought will typically increase hydrologic and municipal impacts such as groundwater pumping and reduced reservoir levels. Livestock agriculture is also affected by these sustained drought conditions as they will be forced to continue to haul supplemental water and feeds.

Note: these outlooks do not provide the quantity of above or below normal conditions, just the likelihood of occurrence (i.e., the probability).