

Review – July 2022

Temperature

We are entering the warmest stretch of the year climatologically in the state of Ohio, and temperatures are really beginning to show it. Average temperatures hung consistently in the 70-75°F range statewide through July. The southwest was the warmest region this month, consistently falling in the 75-80°F range. (Fig. 1a) Several cities experienced daily highs in the upper 80°F/lower 90°F range at points during this stretch. These conditions are close to, but a little above normal when compared to recent (1991-2020) norms, with only segments of the northeast and southwest reaching larger values of 1-3°F or more above normal. (Fig 1b) This was enough for the month to fall just within the top third of the 128 year rankings for the state, as well as for multiple counties. (Fig. 2) Though plenty warm, these kinds of temperatures deep in the summertime are not too uncommon.

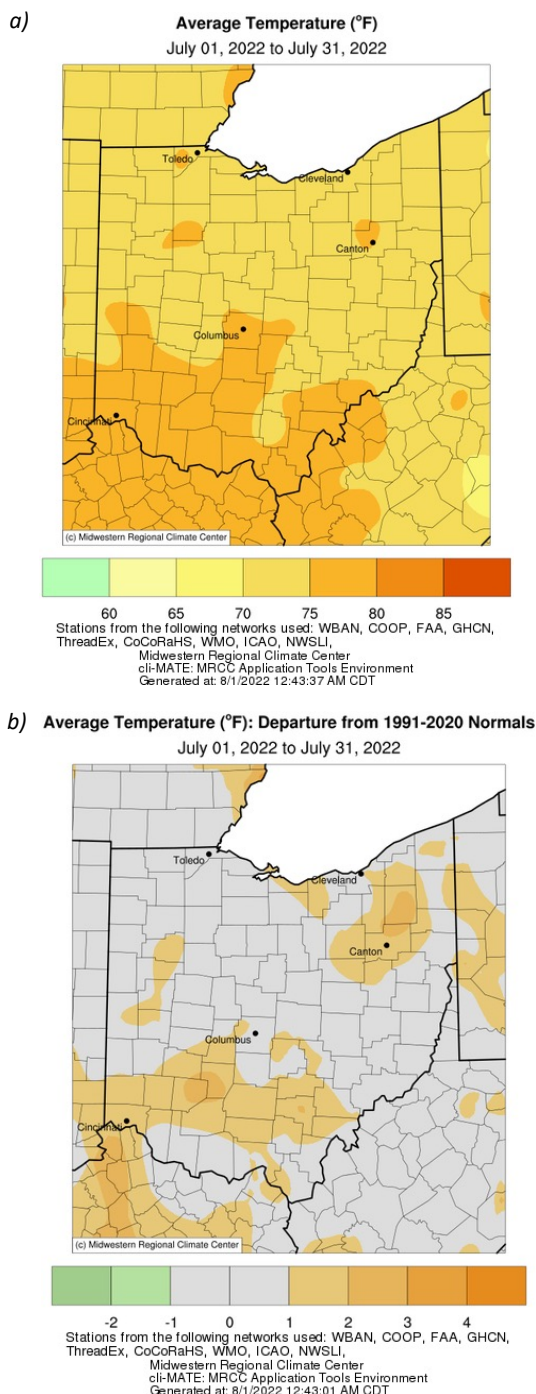


Figure 1a) Average temperature and 1b) Departures from Normal for the month of July 2022. Data courtesy of the Midwestern Regional Climate Center (<http://mrcc.purdue.edu>).

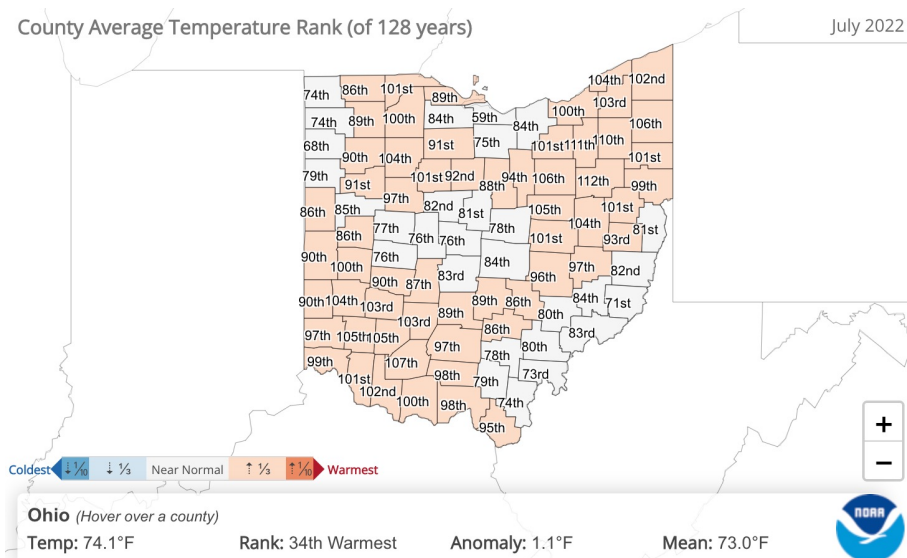
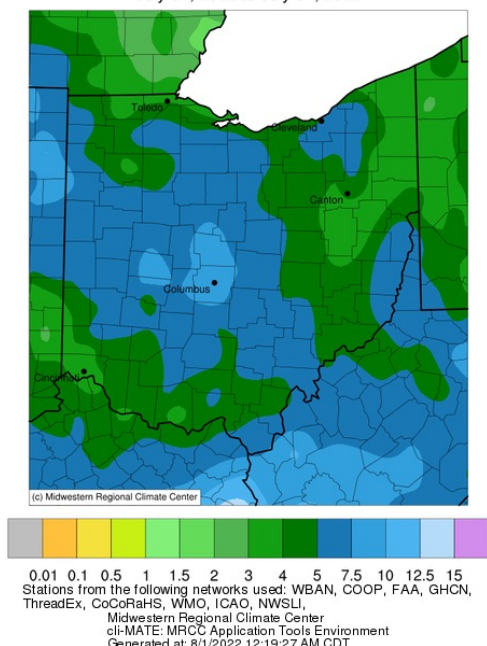


Figure 2). State of Ohio average temperature ranks by county for July 2022. Courtesy of the National Centers for Environmental Information (<https://www.ncdc.noaa.gov/sotc/>).

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a)
Accumulated Precipitation (in)
July 01, 2022 to July 31, 2022



b)
Accumulated Precipitation (in): Departure from 1991-2020 Normals
July 01, 2022 to July 31, 2022

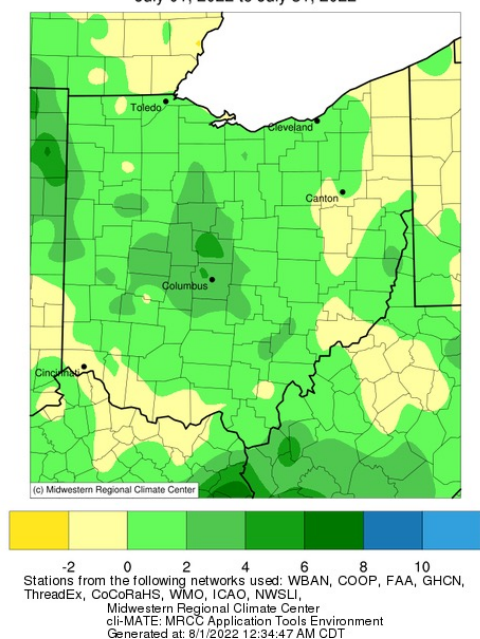


Figure 3a) Accumulated precipitation and 3b) Departures from Normal for the month of July 2022. Data courtesy of the Midwestern Regional Climate Center (<http://mrcc.purdue.edu>).

Precipitation

July offered no shortage of weather activity, with showers and thunderstorms impacting the state on a weekly basis thanks to an active “northwest flow” pattern aloft. Most of the state received healthy amounts of rainfall, with the corridor of heaviest totals stretching northwest to southeast. (Fig. 3a) Widespread 5-7.5 inch amounts were observed here, with amounts remaining in the 3-5 inch range on the fringes. This put much of the region above normal for monthly precipitation, with only a handful of areas in the northeast and along the OH River coming in at or slightly below normal. (Fig. 3b) The quantity of precipitation received was enough to count this July the 20th wettest on record for the state. Central Ohio counties were particularly water-logged, with Franklin County notching it’s 6th wettest July on record thanks in part to a significant rainfall event to start the month. (Fig. 4)

County Precipitation Rank (of 128 years)

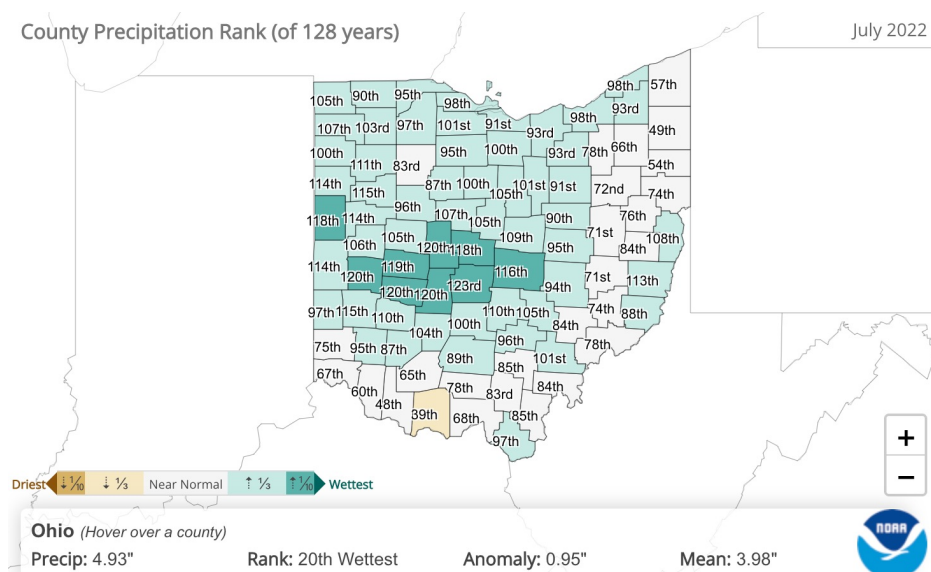


Figure 4). State of Ohio precipitation ranks by county for July 2022. Courtesy of the National Centers for Environmental Information (<https://www.ncdc.noaa.gov/sotc/>).

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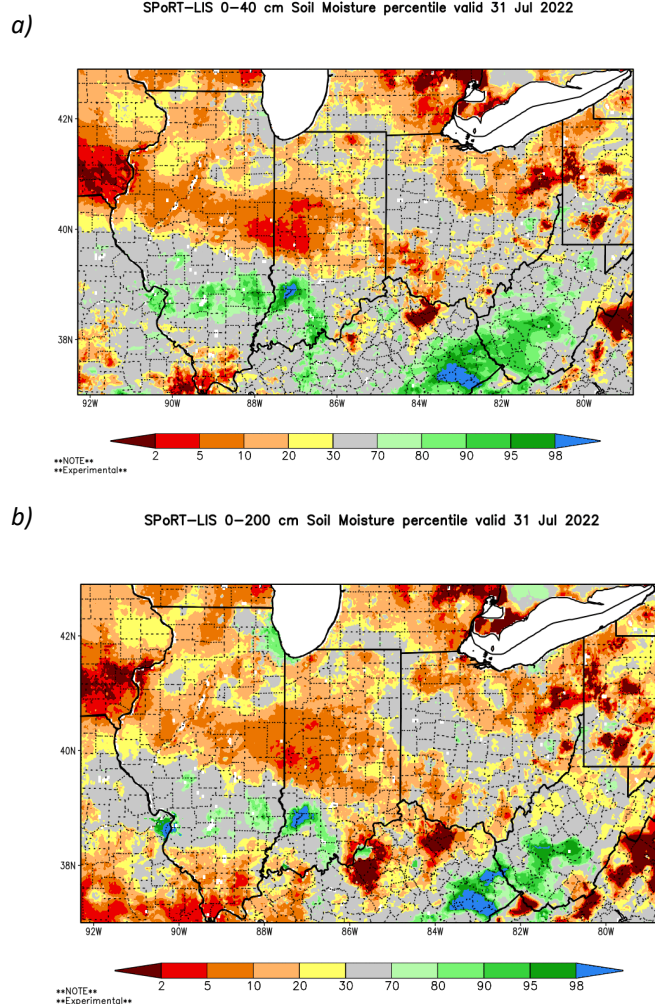


Figure 5a: 0-40 cm and 5b: 0-200 cm soil moisture percentile across the region at the end of July. Courtesy of NASA SPoRTLIS (https://weather.msfc.nasa.gov/sport/case_studies/lis_IN.html).

Soil and Energy

An active July was very beneficial for soil conditions across much of the state. A look at the soil moisture percentile at the end of the month shows large areas of dry conditions were brought back to normal across much of the middle tier of the region at both the 0-40cm (Fig. 5a) and 0-200cm levels (Fig. 5b) thanks to more precipitation than normal. A few areas of drier than normal conditions still exist in the northeast and southwest, however.

As mentioned in the temperature section, we are entering the warmest time of year, and as a result heating degree days (HDDs) have taken their annual plummet. Not a single HDD was recorded in any climate division of Ohio this month. Cooling degree days (CDDs), however, are reaching their peak. CDDs were near or above average for the region, following the temperature trend fairly closely. The highest departures from normal were in Divisions 6, 7, and 8: roughly where the highest average temperatures existed as well. (Fig. 6)

Climate Division	Heating Degree Days	Normal	Departure	Cooling Degree Days	Normal	Departure
1	0	2	-2	270	265	6
2	0	2	-2	278	263	15
3	0	6	-6	224	212	12
4	0	1	-1	291	277	14
5	0	1	-1	290	280	9
6	0	3	-3	273	239	33
7	0	2	-2	271	247	24
8	0	0	0	339	304	35
9	0	0	0	321	304	17
10	0	1	-1	288	269	20
Statewide	0	2	-2	286	268	18



Figure 6: (Left) July 2022 heating & cooling degree days. (Right) Corresponding Ohio Climate Divisions. Data courtesy of the Midwestern Regional Climate Center (<http://purdue.mrcc.edu>).

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Notable Events

With rainfall being a prevalent condition for the month of July, it is no surprise that some flooding occurred in regions around the state. The most notable example came early in the month during the morning hours of July 6th. A complex of heavy rain and thunderstorms "trained", or moved repeatedly over, the Columbus region in a span of 3-5 hours. John Glenn Int'l Airport in Columbus received 3.70in of rain during this span, while multiple stations and CoCoRaHS gauges in downtown and around the Grandview neighborhood recorded 4-5in (Fig. 7). This much rainfall in a relatively short period resulted in flash flooding. Most interstate thoroughfares and many side roads were closed due to high water, among other disruptive impacts.

Severe weather reports were also quite common across the month of July. A different storm complex impacted southwest OH on July 6th, spawning multiple tornadoes and causing a concentration of wind damage reports east of the Cincinnati metro. Another damaging storm complex occurred across central OH on July 23rd, with strong winds being reported across much of the middle tier of the state (Fig. 8).

Accumulated Precipitation (in)

July 05, 2022 to July 06, 2022

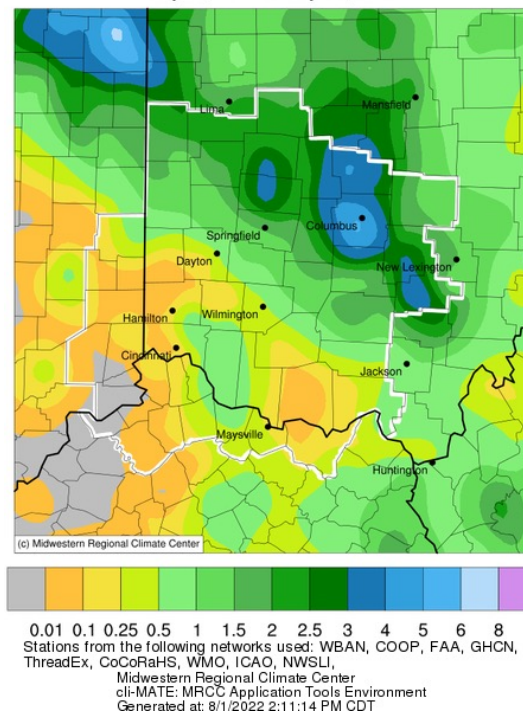


Figure 7: Accumulated precipitation in southwest Ohio from July 5-6, 2022 portraying a significant rainfall event in the Columbus, OH area, thanks to training thunderstorms. Data courtesy of the Midwest Regional Climate Center (<http://mrcc.purdue.edu>).

Ohio Severe Weather Reports: July 2022

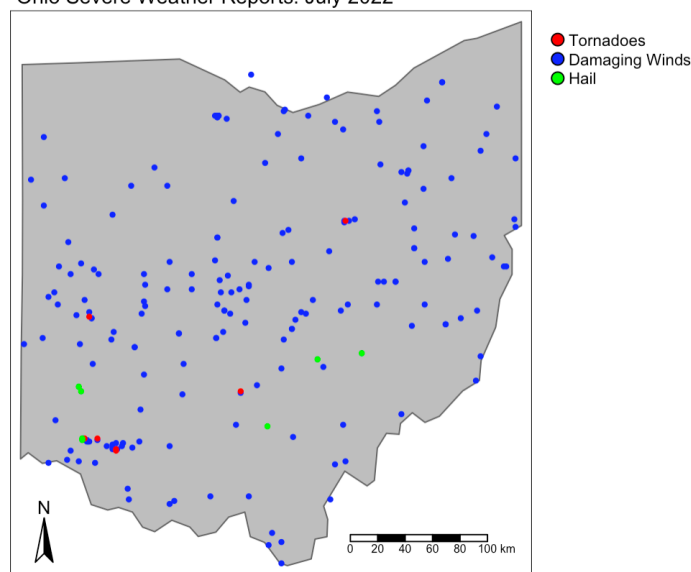


Figure 8: Statewide severe weather reports for July 2022. Includes damaging winds, hail, and tornadoes. Data courtesy of National Weather Service Local Storm Report archive, accessed via Iowa Environmental Mesonet. (<https://mesonet.agron.iastate.edu/>)

All data plotted in R Studio.

Forecast: Aug-Oct 2022

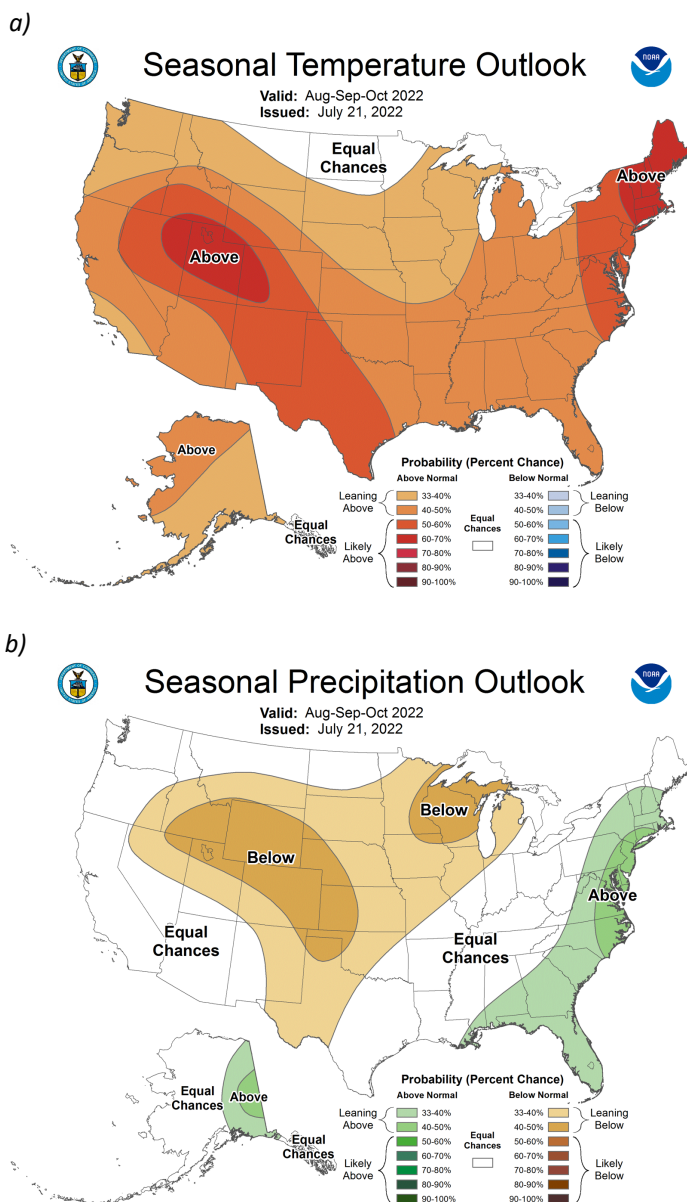


Figure 9a: Nationwide Seasonal Temperature and 9b: Precipitation Outlook for August-October. Courtesy of the Climate Prediction Center (<https://www.cpc.ncep.noaa.gov/>).

Looking Ahead

Persistence has been the tune from the longer-range outlooks lately, with the newest Climate Prediction Center 3-month forecast continuing this trend. Probabilities continue to favor above average temperatures for the remainder of the summer as well as the beginning of fall in the Great Lakes region. (Fig. 9a) Interestingly enough, it looks like the period will begin slightly below average, before things warm back up in the near future. Equal chances for either above average, below average, or normal amounts of precipitation across the region also remain, once again highlighting the subtle and uncertain nature of weather systems moving around the region. (Fig. 9b) Once again, look for some areas to receive repeated rounds of rainfall, while others receive not quite as much. Note: these outlooks do not provide the quantity of above or below normal conditions, just the likelihood of occurrence (i.e., the probability).

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