

Review – September 2022



b) Average Temperature (°F): Departure from 1991-2020 Normals September 01, 2022 to September 30, 2022



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

Temperature

September brought the first tastes of Autumn to the state of Ohio after an initially warm start. Temperatures slightly above average consistently until the middle of the month, where an unusually stout high pressure system brought temperatures of 80 to 90°F to the region. These much warmer than normal temperatures lasted for around a week, before a frontal system ushered in a pattern change during the month's third week. Temperatures dropped below average after this system and remained there for the rest of the month. This resulted in another relatively average temperature spread in the 65-70°F range, as the warm-up and cool-down generally cancelled each other out. This is evident in Fig. 1b, with a vast majority of the state hovering around average compared to decadal norms. This is evident at the county level as well, with only a few northern and western counties achieving a warmer than average September. (Fig. 2)



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

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a)

b)

0.01 0.1 0.25 0.5 1 1.5 2 2.5 3 4 5 6 8 Stations from the following networks used: WBAN, COOP, FAA, GHCN, ThreadEx, CocOraBHS, WMO, ICAO, NWSLI, Midwestern Regional Climate Center cli-MATE: MRCC Application Tools Environment Generated at: 10/3/2022 12:33:06 AM CDT

Accumulated Precipitation (in): Departure from 1991-2020 Normals September 01, 2022 to September 30, 2022



-3 -2 -1 0 1 2 3 4 5 Stations from the following networks used: WBAN, COOP, FAA, GHCN, ThreadEx, CoCoRaHS, WMO, ICAO, NWSLI, Midwe stern Regional Climate Center cli-MATE: MRCC Application Tools Environment Generated at: 10/3/2022 12:36:14 AM CDT

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

Precipitation

Another variable precipitation pattern came to be during the month of September. Northeast, north-central, and southwest Ohio were the big winners, where totals of 3-5 inches of rain for the month were widespread. (Fig. 3a) Amounts in excess of 6 inches fell in the northeast; where lake effect rains enhanced totals, and in the southwest; where training thunderstorms caused some urban and rural flooding. In the south and far northwest, only a half inch to 3 inches fell. This led to another noticeable disparity in rainfall compared to normal in these areas, with the northwest running 1-2in below normal, and parts of the south falling 2-3in below normal. (Fig. 3b) This is noted with more definition at the county level, with clusters of drier than average counties in the south and northwest. Meigs and Gallia Counties even notched a top 10 driest September due to the lack of rain. (Fig. 4)



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





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SPoRT-LIS 0-40 cm Soil Moisture percentile valid 30 Sep 2022



b)

SPoRT-LIS 0-200 cm Soil Moisture percentile valid 30 Sep 2022



Soil and Energy

Variation in precipitation combined with cool, dry airmasses to end the month of September led to the ground drying out quite efficiently by the end of the month. In fact, both 0-40cm (Fig. 5a) and 0-200cm (Fig. 5b) soil moisture percentile snapshots at the end of the month show relatively low percentiles across the region, outside of the northeast. Due to the time of season, this is not unprecedented, and impacts will be relatively minimal for now. Conditions on the dry side will be positive for farmers continuing to harvest this fall, though if dryness persists, a few more widespread areas of low-grade drought may develop.

Heating (HDDs) and Cooling (CDDs) Degree Days are beginning their seasonal turnabout, with HDDs increasing and CDDs decreasing. Both metrics had higher than normal totals this month, with more CDDs than average thanks to the hot middle section of the month, and more HDDs than average from the resulting cooldown to end the period. (Fig. 6)

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

Climate Division	Heating Degree Days	Normal	Departure	Cooling Degree Days	Normal	Departure
1	91	92	-1	100	82	18
2	84	87	-3	103	83	20
3	100	110	-10	65	59	6
4	87	78	-9	107	96	11
5	85	72	13	94	96	-2
6	92	96	-4	89	72	17
7	90	85	5	87	76	11
8	67	63	5	122	112	10
9	71	58	14	109	113	-4
10	83	73	10	91	91	-1
Statewide	84	80	4	97	89	8



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

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Notable Events

Before the shift autumn-like to temperatures end the to month, September experienced a notable week of above average temperatures. From September 15th-21st, high temperatures in the 80-90°F range dominated most of the region thanks to a strong high pressure ridge established to the south. (Fig. 7a) On average, temperatures during this stretch were 4-6°F above normal for the state, with the hottest weather concentrated in the western half. (Fig. 7b)

The hottest day of the stretch was on September 21st, with multiple locations including Dayton and Cincinnati recording highs in the low to mid 90°Fs. (Fig. 8a) Dayton officially reached 94°F, one degree shy of tying its record daily high for the day. High temperatures on the 21st reached as much as 10-15°F above average compared to the decadal normal for this time period (Fig. 8b), making for a remarkably hot day before temperatures fell behind the passage of a sharp cold front.

Average Maximum Temperature (°F) September 15, 2022 to September 21, 2022

Average Maximum Temperature (°F): Departure from 1991-2020 Normals September 15, 2022 to September 21, 2022



60 65 70 75 80 85 90 Stations from the following networks used: WBAN, COOP, FAA, GHCN, ThreadEx, CoCRaHS, WMO, ICAO, NWSU, COOP, FAA, GHCN, Midwestern Regional Climate Center cli-MATE: MRCC Application Tools Environment Generated at: 10/32022 2:1659 PM CDT

0 1 2 3 4 5 6 7 8 9 10 Stations from the following networks used: WBAN, COOP, FAA, GHCN, ThreadEx, CoORaHS, WMO, ICAO, NWSLI, Midwestern Regional Climate Center cli-MATE: MRCC Application Tools Environment Generated at 103/2022 22:002 PM GDT

Figure 7a: Average maximum high temperatures (left) and 7b: departure from mean (right) across Ohio on September 15th-21st, 2022. Data courtesy of the Midwestern Regional Climate Center (http://mrcc.purdue.edu).



Average Maximum Temperature (°F): Departure from 1991-2020 Normals September 21, 2022 to September 21, 2022



60 65 70 75 80 85 90 95 100 Stations from the following networks used: WBAN, COOP, FAA, GHCN, ThreadEx, CoCRaHS, WMO, ICAO, NWSU,I Midwestern Regional Climate Center cli-MATE: MRCC Application Tools Environment Generated at 101 / 1022 10:3736 AM CDT

-1 9 14 Stations from the following networks used: WBAN, COOP, FAA, GHCN, ThreadEx, CoCoRaHS, WMO, ICAO, NWSU, Midwestern Regional Climate Center cli-MATE: MRC Application Tools Environment Generated at: 10/11/2022 10:25:04 AM CDT

Figure 8a: Average maximum high temperatures (left) and 8b: departure from mean (right) across Ohio on September 21st, 2022. Data courtesy of the Midwestern Regional Climate Center (http://mrcc.purdue.edu).



Forecast: Oct-Dec 2022



Looking Ahead

The outlook from the Climate Prediction Center heading into the fall months continues to remain There consistent. are slightly increased probabilities of above average temperatures in the region, and equal probabilities for above average, below average, or near average precipitation. Despite the increased probabilities of above average temperatures, many areas should start to see their first frost/freeze events during the coming weeks as a cooler airmass maintains its grip on the region. A neutral precipitation forecast also bodes well for farmers in the region with field harvesting ramping up, though a few regions of Ohio that missed out on meaningful September precipitation may start to slip into early stages of drought should dry conditions persist. Note: these outlooks do not provide the quantity of above or below normal conditions, just the likelihood of occurrence (i.e., the probability).

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

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