

Review – March 2023

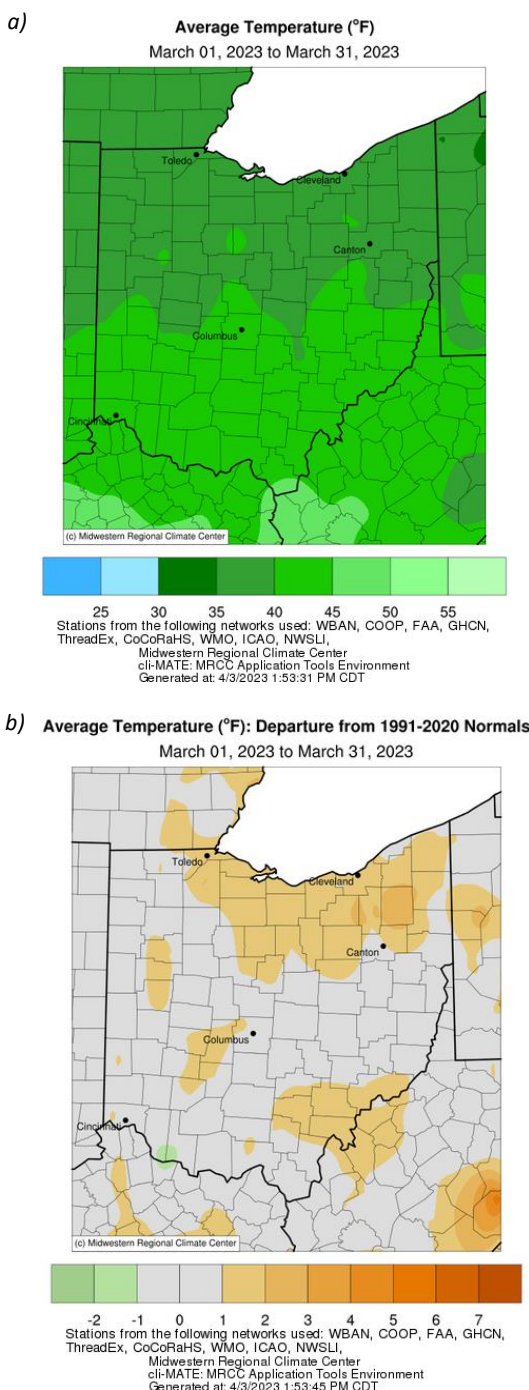


Figure 1a: Average temperature and 1b: Departure from Normal for the month of March 2023. Data courtesy of the Midwestern Regional Climate Center (<http://mrcc.purdue.edu>).

Temperature

After a notably warm start to the year, temperatures in Ohio returned to near-normalcy as conditions fell in line with late-winter expectations in March. The month saw average temperatures of 35-45°F, with the southern half of the state experiencing slightly warmer average temperatures than the north (Fig. 1a). As temperatures mostly stabilized, average departures were minimal, with Ohio seeing temperatures 0-2°F higher than normal (Fig. 1b). The greatest departures were centered around Portage County, at around 2°F higher than normal. At the county level, nearly the entire state ranked near historical normal, with large swaths of the northeast and west just barely reaching the warmest third on record (Fig. 2). The warmest ranking in the state was Wood County in the northwest, seeing its 31st warmest March in the 129-year record.

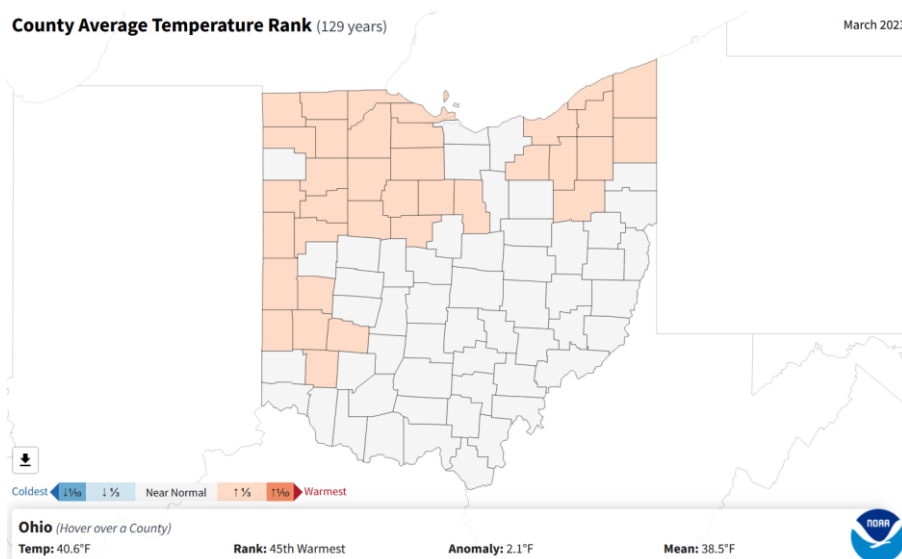


Figure 2: State of Ohio average temperature ranks by county for March 2023. Courtesy of the National Centers for Environmental Information (<https://www.ncdc.noaa.gov/sotc/>).

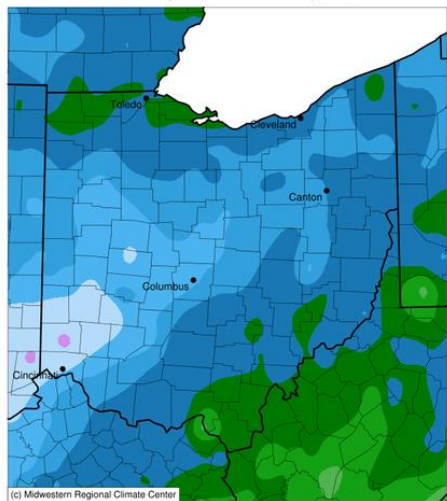
Review – March 2023

Precipitation

With multiple significant precipitation events in March, Ohio saw varied accumulation totals that straddled historical normals. Most of the state received 3-6 inches of precipitation, with areas in the southwest seeing more than 6 inches and areas in the southeast and northwest seeing as low as 2 inches (Fig. 3a). This resulted in the broader southeastern portion of Ohio totaling 0-1 inches less accumulation than normal, and the rest of the state having positive departures of 0-4 inches, with an area centered in Butler County seeing positive departures of more than 4 inches (Fig. 3b). At the county level, most of the southwest and into the northeast ranked in at least the wettest third of historical record, with western Ohio reaching into the wettest tenth. The rest of the state ranked near normal, with the far south being the only region to rank drier than normal (Fig. 4).

a)

Accumulated Precipitation (in)
March 01, 2023 to March 31, 2023

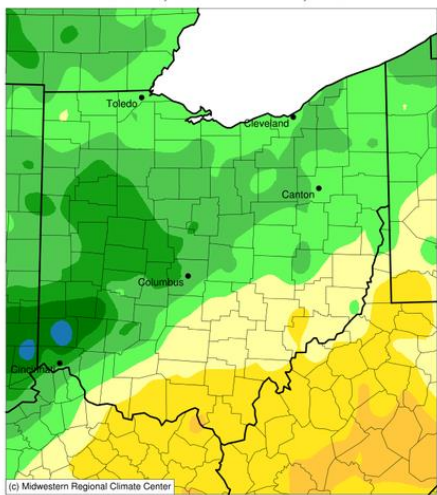


(c) Midwest Regional Climate Center

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, CoCoRaHS, WMO, ICAO, NWSLI, Midwest Regional Climate Center
cli-MATE: MRCC Application Tools Environment
Generated at: 4/3/2023 1:53:04 PM CDT

b)

Accumulated Precipitation (in): Departure from 1991-2020 Normals
March 01, 2023 to March 31, 2023



(c) Midwest Regional Climate Center

-2 -1 0 1 2 3 4
Stations from the following networks used: WBAN, COOP, FAA, GHCN, ThreadEx, CoCoRaHS, WMO, ICAO, NWSLI, Midwest Regional Climate Center
cli-MATE: MRCC Application Tools Environment
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Figure 3a: Accumulated precipitation and 3b: Departures from Normal for the month of March 2023. Data courtesy of the Midwest Regional Climate Center (<http://mrcc.purdue.edu>).

County Precipitation Rank (129 years)

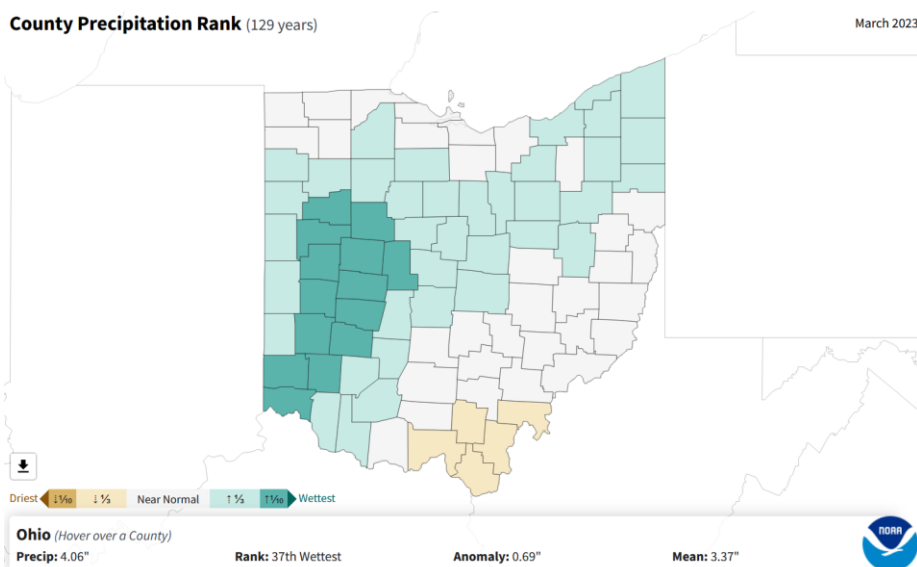


Figure 4: State of Ohio precipitation ranks by county for March 2023. Courtesy of the National Centers for Environmental Information (<https://www.ncdc.noaa.gov/sotc/>).

Review – March 2023

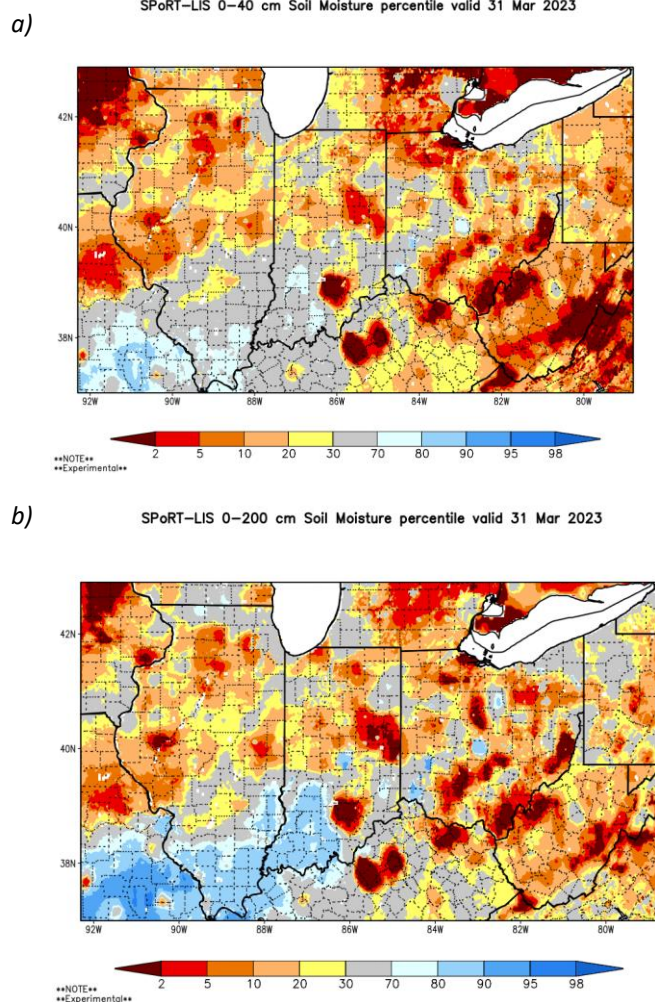


Figure 5a: 0–40 cm and 5b: 0–200 cm soil moisture percentile across the region at the end of March. Courtesy of NASA SPoRTLIS (https://weather.msfc.nasa.gov/sport/case_studies/lis_IN.html).

Climate Division	Heating Degree Days	Normal	Departure	Cooling Degree Days	Normal	Departure
1	825	856	-31	0	1	-1
2	796	851	-55	0	1	-1
3	843	892	-49	0	0	0
4	775	796	-21	0	1	-1
5	762	770	-8	0	1	-1
6	791	829	-38	0	1	-1
7	787	815	-28	0	1	-1
8	722	727	-5	0	2	-2
9	680	693	-12	0	1	-1
10	727	749	-22	0	1	-1
Statewide	768	793	-25	0	1	-1

Soil and Energy

Frequent precipitation resulted in minimal soil dryness in Ohio at the end of March. At both 0–40cm and 0–200cm levels, southwest and northeast Ohio recorded no soil dryness on the last day of the month, while the rest of the state lacked significant moisture in only a few scattered areas, mostly based in Ottawa, Belmont, Gallia, and Lawrence Counties (Figs. 5a and 5b). The abundance of moisture is representative of the continued wet soil conditions seen throughout winter, and now into spring.

With consistently near-normal temperatures throughout the month, Heating Degree Days (HDDs) were generally close to expectations in March, although slightly warmer conditions in the northeast led to fewer HDDs than normal in the region. Cooling Degree Days (CDDs) were absent in the state, resulting in slight departures from the very few CDDs expected in March (Fig. 6).



Figure 6: (Left) March 2023 heating & cooling degree days. (Right) Corresponding Ohio Climate Divisions. Data courtesy of the Midwestern Regional Climate Center (<http://purdue.mrcc.edu>).

Review – March 2023

Notable Events

The passage of a strong low-pressure system on March 24th and 25th brought about significant rainfall to the southern half of the Ohio, followed by sustained high winds throughout the state. The arrival of the low in the evening of the 24th introduced widespread showers that produced 1-3 inches of precipitation over southern Ohio, prompting flood warnings throughout the region overnight (Fig. 7). After the passing of the low's cold front on the 25th, Ohio was subjected to substantial high winds throughout the afternoon, with wind gusts reaching more than 50 miles per hour in most areas (Fig. 8). Damage to the power grid from this event resulted in outages for more than 350,000 people around the state, with over 1,200 homes in eastern Ohio left without power for more than two days.

Also important to note is the wider impact of the cold front in Mississippi, which hit the state with multiple devastating tornados on the night of March 24th, resulting in 25 deaths and dozens of injuries. This event, along with the tornado-producing storm in Ohio at the very end of the month, is a reminder of the need to remain weather alert as the storm season develops in the spring months.

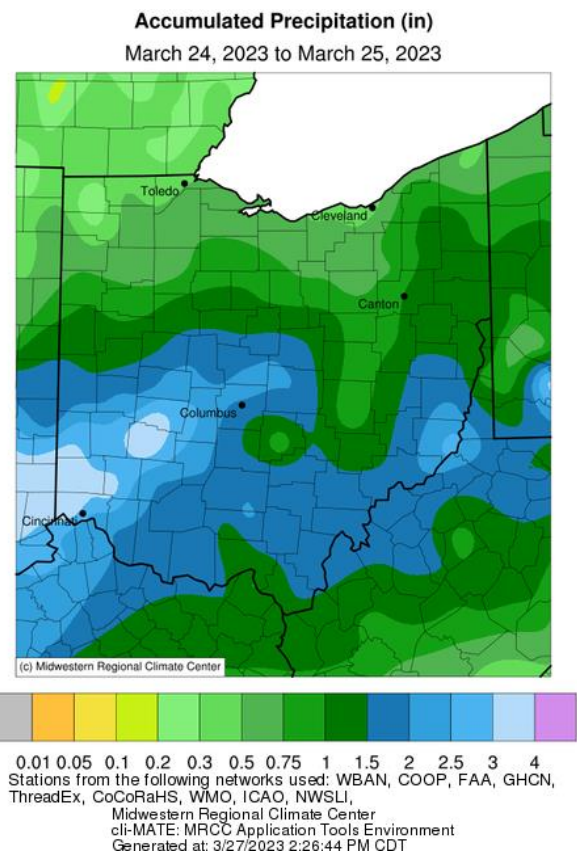
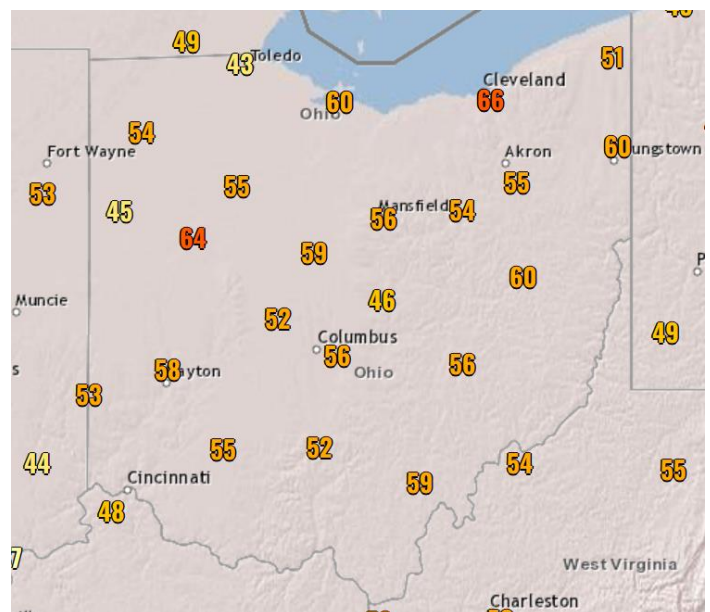
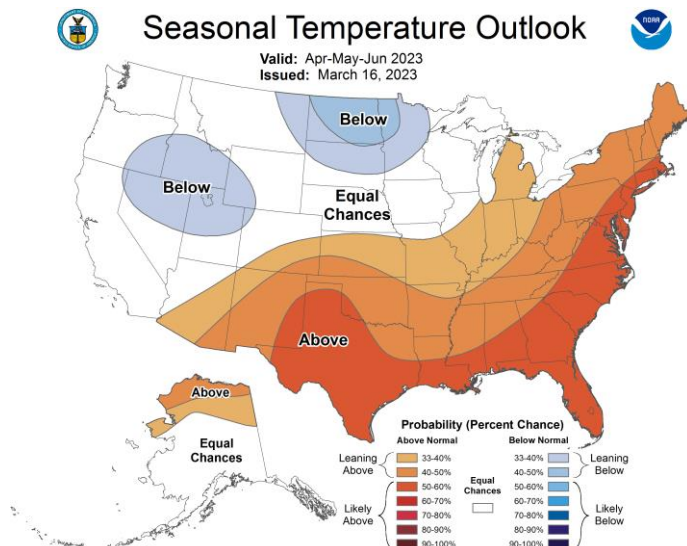


Figure 7: Accumulated Precipitation on March 24-25, 2023 (above) and Figure 8: Statewide maximum wind gust (mph) observations for March 25, 2023 (below). Data courtesy of the Midwestern Regional Climate Center (<http://mrcc.purdue.edu>) and the National Weather Service Weather & Hazards Data Viewer (<https://www.wrh.noaa.gov/map/>).



Forecast: April - June 2023

a)



b)

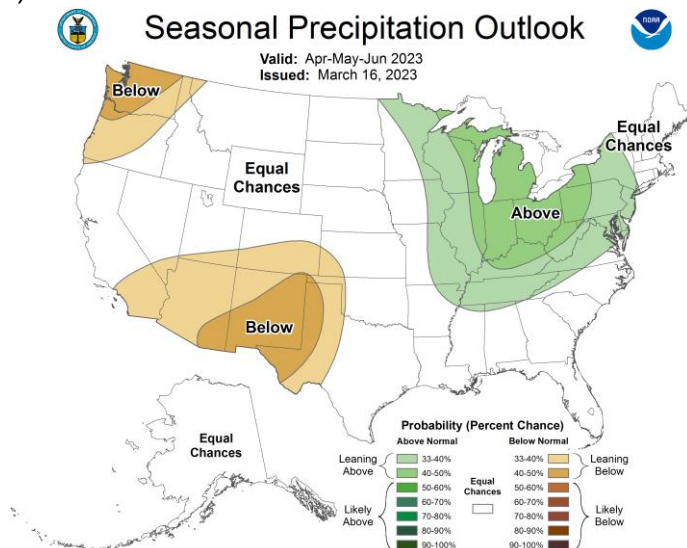


Figure 9a: Nationwide Seasonal Temperature and 9b: Precipitation Outlook for April-June. Courtesy of the Climate Prediction Center (<https://www.cpc.ncep.noaa.gov/>).

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Looking Ahead

The CPC's 3-month outlooks shows little variation from previous forecasts as Ohio moves towards summer in the following months. The entire state is predicted to see above-normal temperatures, although projections for the western half of the state come with low confidence (Fig. 9a). In a similar vein, the entire state of Ohio is expected with high confidence to receive above-normal precipitation over the next three months (Fig. 9b). With a persistently warm and wet environment throughout spring, an abundance of impactful storms is possible in association with the development of a strong storm season. In addition, above-normal temperatures in April and May would minimize the risk for damaging frost events, which may assist in the successful planting of crops early in the agricultural season.

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