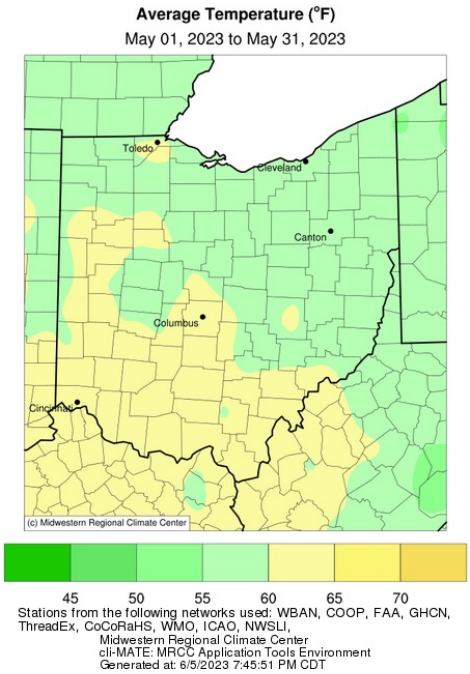
State of Ohio Monthly Climate Update

THE OHIO STATE UNIVERSITY

Review – May 2023

a)



b)

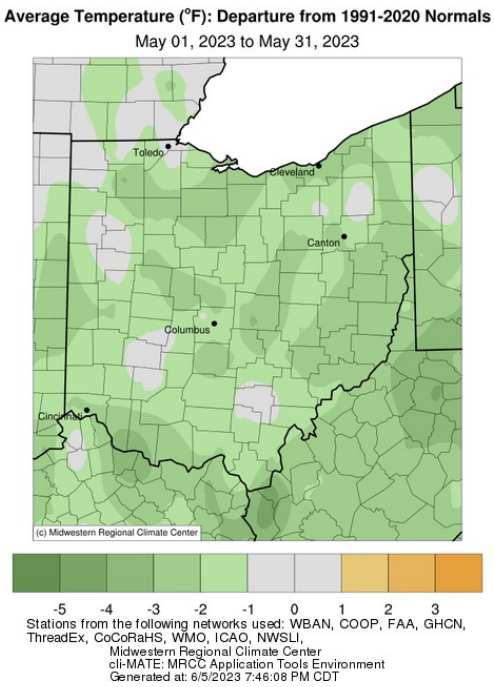


Figure 1a: Average temperature and 1b: Departure from Normal for the month of May 2023. Data courtesy of the Midwestern Regional Climate Center (http://mrcc.purdue.edu).

Temperature

Temperatures in May were generally pleasant and mild as Ohio caught its first glimpses of summer. The southwest saw the highest average temperatures in the month, ranging from 60-65°F, while the rest of the state averaged a slightly lower 55-60°F (Fig. 1a). Temperature departures were inconsistent over Ohio, though the entire state had overall departures of 0-3°F below average (Fig. 1b). At the county level, mild conditions resulted in near normal rankings for most of the state, with the exception of various counties in the north and southeast, which ranked within the coldest third of the 129-year record (Fig. 2). Furthest from normal was Gallia County in southern Ohio, which saw its 24th coolest May on record.

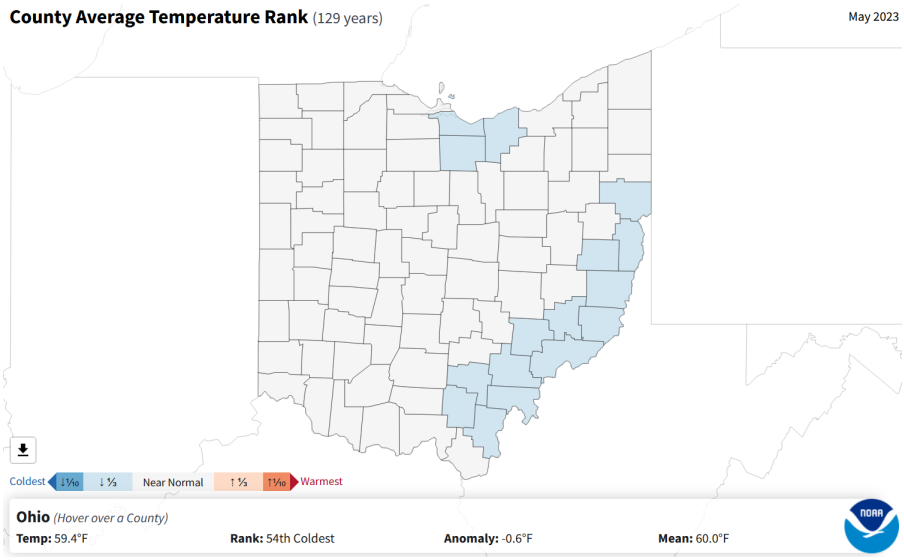
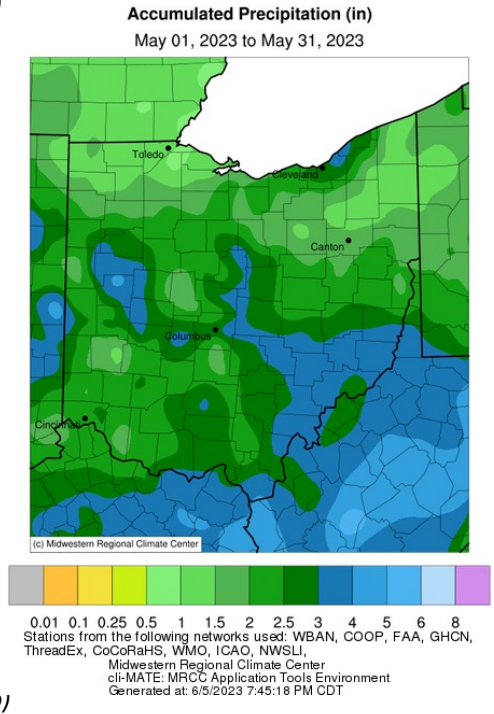


Figure 2: State of Ohio average temperature ranks by county for May 2023. Courtesy of the National Centers for Environmental Information (https://www.ncdc.noaa.gov/sotc/).

a)



b)

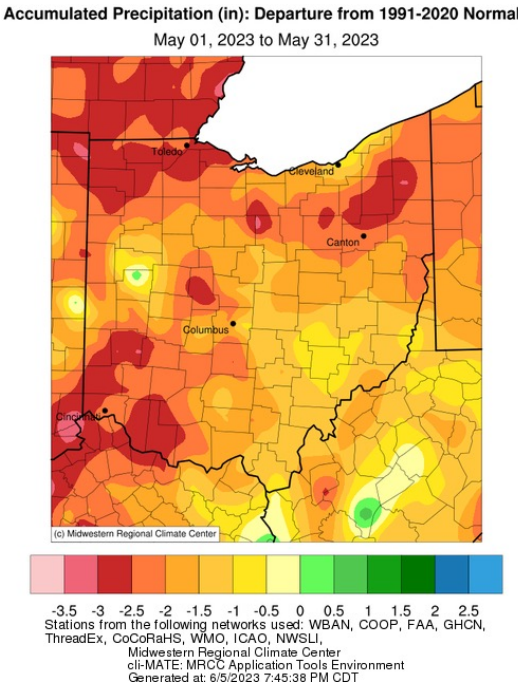


Figure 3a: Accumulated precipitation and 3b: Departures from Normal for the month of May 2023. Data courtesy of the Midwestern Regional Climate Center (http://mrcc.purdue.edu).

Precipitation

With spring maturing into its later half, Ohio fell short of reaching average precipitation totals. While the southeast and portions of the west and northeast received up to 4 inches of precipitation in the month, the rest of the state saw around 0.5-3 inches of accumulation (Fig. 3a). Nearly the entire state saw negative accumulated precipitation departures at around 0.5-3 inches less than average, with only a small bit of Shelby County in western Ohio seeing slightly positive departures (Fig. 3b). At the county level, only a few counties in eastern Ohio ranked near normal for precipitation in the month, with most of the state ranking at least in the drier third, and counties in the northwest and northeast in the driest tenth of the 129-year record (Fig. 4). Furthest from normal was Mahoning County in northeast Ohio, seeing its 2nd driest May on record.

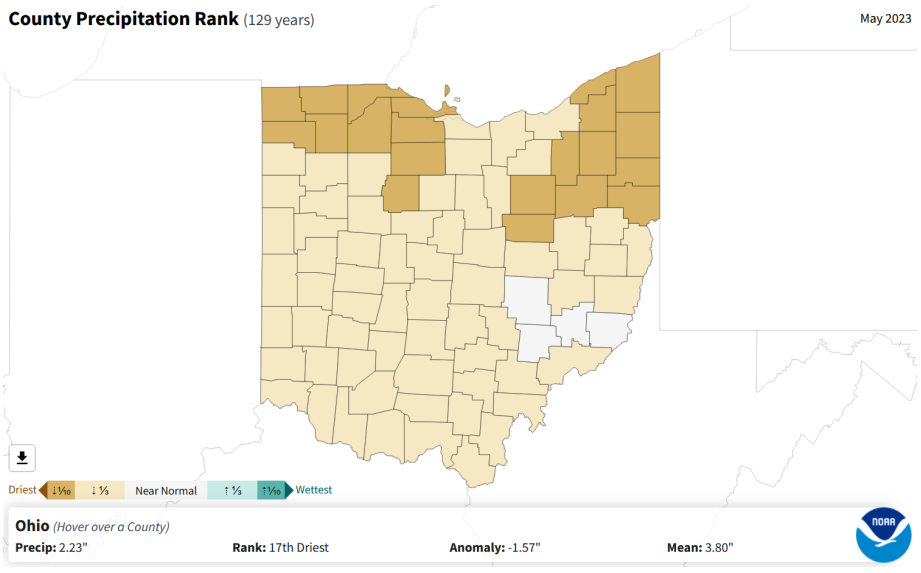
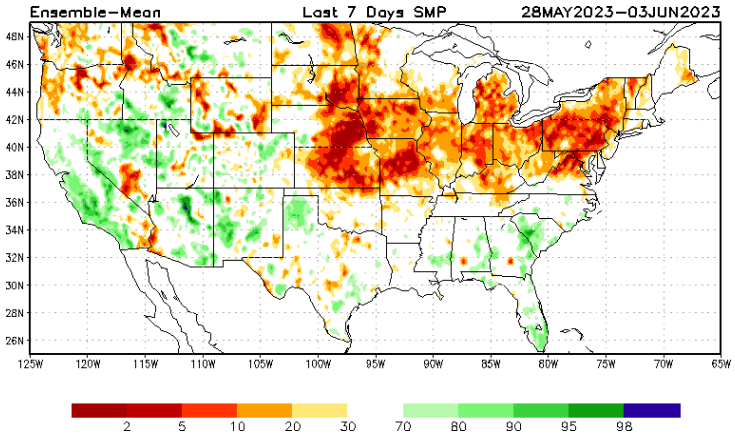


Figure 4: State of Ohio precipitation ranks by county for May 2023. Courtesy of the National Centers for Environmental Information (https://www.ncdc.noaa.gov/sotc/).

a)



b)

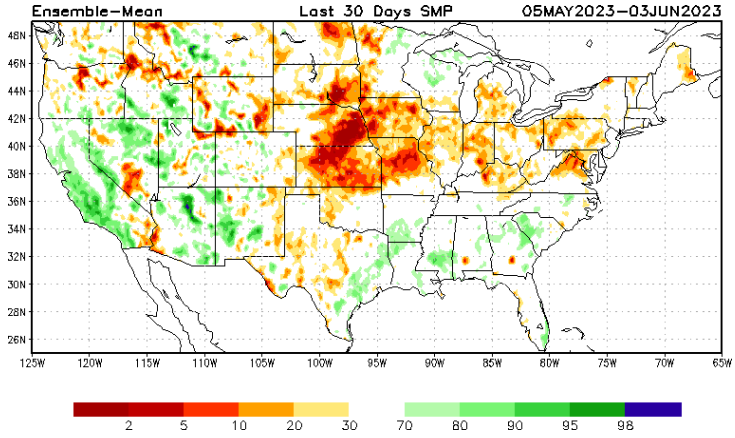


Figure 5a: Last 7 days and 5b: last 30 days mean soil moisture percentile across the United States. Courtesy of the Climate Prediction Center (https://www.cpc.ncep.noaa.gov/products/Drought/Monitoring/smp_new.shtml#).

Soil and Energy

Below-average precipitation combined with the further development of warmer conditions led to soil drying in Ohio during the month. While the last 30 days have seen generally moderate soil moisture in the state, mean soil moisture percentages in the last 7 days imply rapidly drying conditions as Ohio gradually moves towards mild drought (Figs. 5a and 5b). At a regional scale, this drying falls in line with the recent widespread lack of significant precipitation across the northeast and Great Lakes.

With mild conditions dominating temperatures in the month, heating degree days (HDDs) were nearly universally below normal, with only the southwest seeing slightly more than average. A lack of overly warm days resulted in in negative departures in cooling degree days (CDDs) as well (Fig. 6).

Product Note: The NASA SPoRT LIS soil moisture product is currently unavailable due to a technical failure. While this is repaired, we will be using national soil moisture percentage products from the Climate Prediction Center. For more information, please contact Geddy Davis (davis.5694@osu.edu).

Climate Division	Heating Degree Days	Normal	Departure	Cooling Degree Days	Normal	Departure
1	432	479	-48	3	5	-1
2	412	474	-62	6	5	0
3	442	506	-64	2	4	-1
4	405	424	-19	0	6	-6
5	386	401	-14	1	6	-5
6	407	453	-46	1	4	-4
7	399	440	-41	0	4	-4
8	378	368	9	2	8	-6
9	324	342	-18	4	9	-5
10	363	387	-24	1	6	-5
Statewide	393	424	-31	2	6	-4

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

Notable Events

With broadly mild conditions and a lack of any significant weather patterns over Ohio, few singular events reached the status of notability in May. Instead, the most impactful trend was the development of drought throughout the state in the later portion of the month. After more than three months of the total absence of drought in Ohio, the U.S. Drought Monitor is reporting that most of the state is now experiencing moderate drought, with portions of the west, southeast, and northeast seeing abnormally dry conditions, and the southernmost tip of the state seeing no dryness (Fig. 7). Many locations within the highlighted areas ran 1 to 3 inches below normal for monthly precipitation (Fig. 8) which, combined with primarily sunny skies and low relative humidity, led to high evaporation rates and rapidly drying conditions across the soil column.

Observed impacts so far have been dormant lawns, cracked surface soils, low streamflows in rivers and streams, and stresses on young crops and gardens. Chances for rain are encouraging in the short term, but consistent precipitation will be necessary to makeup deficits and provide long term relief.

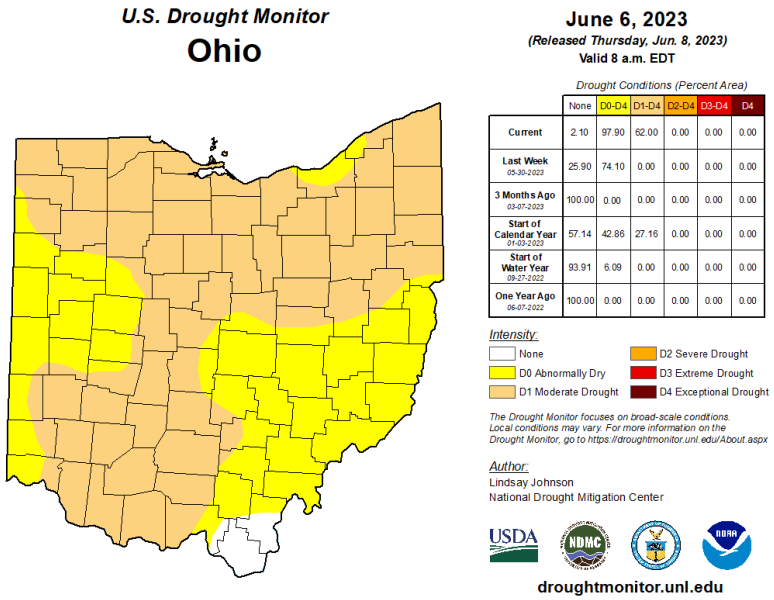


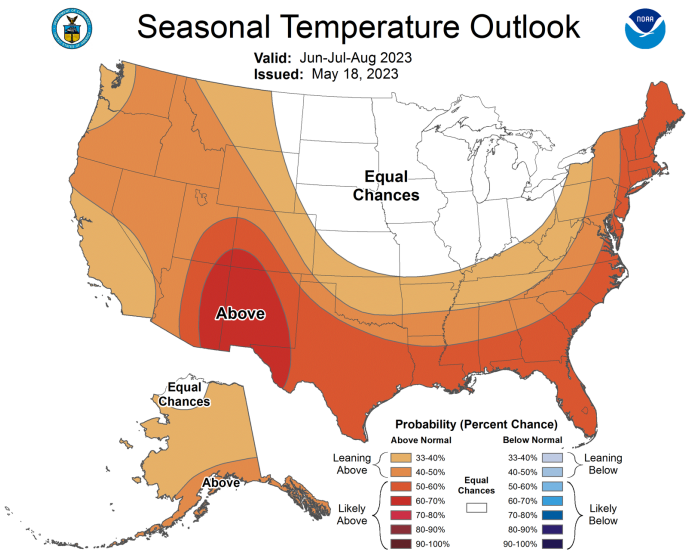
Figure 7: Drought monitor for the state of Ohio as of June 6, 2023, showing levels of drought by intensity. Courtesy of the U.S. Drought Monitor. (https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?OH)

Site	Total Precipitation (in)	Departure from Normal
Columbus (CMH)	2.28	-2.5
Cincinnati (CVG)	2.16	-2.51
Dayton (DAY)	1.89	-2.62
Toledo Express (TOL)	0.9	-2.92
Lima	2.66	-1.72
Cleveland (CLE)	2.55	-1.24
Youngstown	1.3	-2.42
Athens	2.27	-1.93
Portsmouth	3.06	-1.54
Washington C.H.	2.34	-2.11

Figure 8: May 2023 Total Precipitation and Departures from Normal at sites in and around the drought area. Data courtesy of Data courtesy of NOAA's Applied Climate Information System. (https://scacis.rcc-acis.org/)

Forecast: June - August 2023

a)



b)

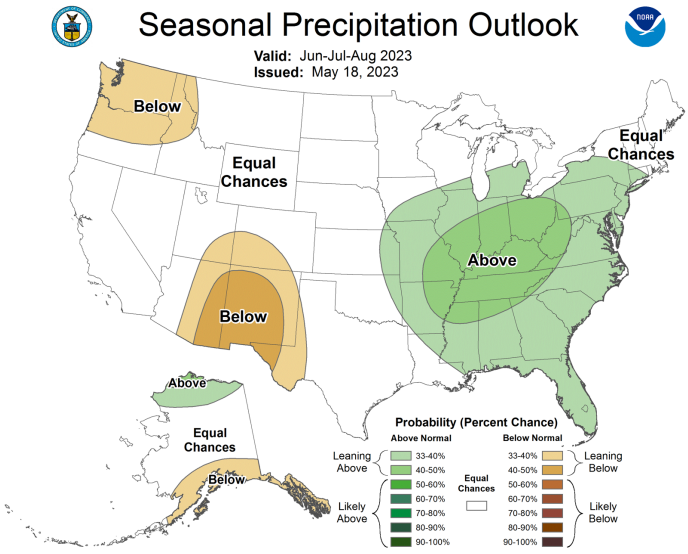


Figure 8a: Nationwide Seasonal Temperature and 8b: Precipitation Outlook for June-August. Courtesy of the Climate Prediction Center (https://www.cpc.ncep.noaa.gov/).

Looking Ahead

The CPC's 3-month outlooks predict shifting patterns of temperature and precipitation with gradual changes to Ohio. The bulk of the state has equal chances of above or below normal temperatures this summer, with a small sliver in the southeast having a slight chance of above-normal temperatures (Fig. 8a). Meanwhile, the entire state is predicted with generally high confidence to experience above-normal precipitation in the following months (Fig. 8b). Additionally, official development of an El Niño has recently been declared, with an above-90% chance of persistence into winter. For Ohio, this may mean more warm and dry conditions throughout the remainder of the year in contrast to the outlook. Consistent monitoring of the weather patterns moving forward will help to determine whether beneficial precipitation becomes more certain in the long term.

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

Authors:

Jacob L. Fields
Atmospheric Sciences Undergraduate
Student Assistant: Climate Services
Byrd Polar and Climate Research Center
The Ohio State University
fields.609@osu.edu

Geddy R. Davis
Meteorologist/Atmospheric Scientist
Program Coordinator: Climate Services
Byrd Polar and Climate Research Center
The Ohio State University
davis.5694@osu.edu

Aaron B. Wilson
State Climate Office of Ohio
Byrd Polar and Climate Research Center
OSU Extension
The Ohio State University
wilson.1010@osu.edu