



Review – October 2024

Temperature

Across Ohio, average temperatures were warm and consistent in October. Nearly the entire state recorded temperatures between 55-60°F with a small region in the northeast that logged 50-55°F (Fig. 1a). Departure from normal temperatures indicates warmer than average conditions for most of the state. In northwest Ohio temperatures of 2-4 °F above normal were noted while in the southeast only 2-3 °F above normal. Small pockets of close-to-average temperatures can also be seen in central Ohio (Fig. 1b). Across the state, every county ranked within the warmest third of its historical record, with 29 counties recording temperatures in the warmest tenth. Hancock and Wyandot Counties saw their seventh warmest October in a 130-year record. All counties experiencing their warmest tenth were concentrated in western Ohio (Fig. 2).

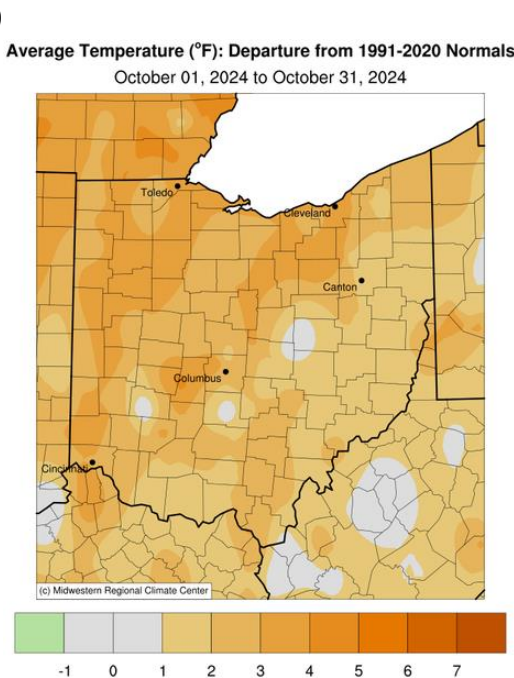
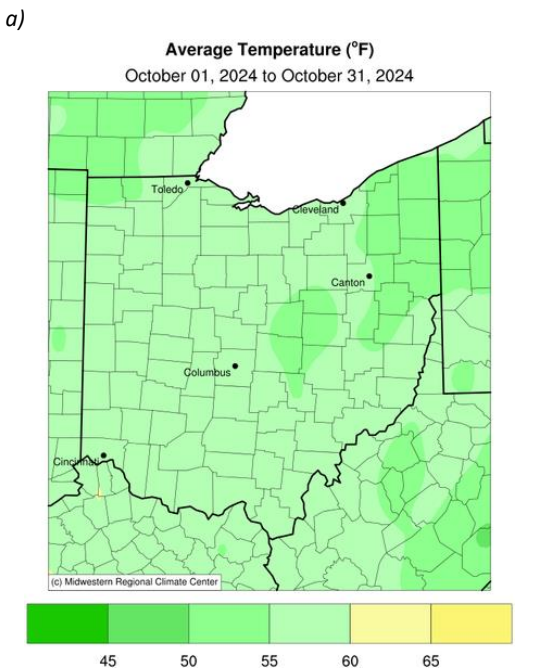


Figure 1a: Average temperature and 1b: Departure from Normal for the month of October 2024. Data courtesy of the Midwestern Regional Climate Center (<http://mrcc.purdue.edu>).

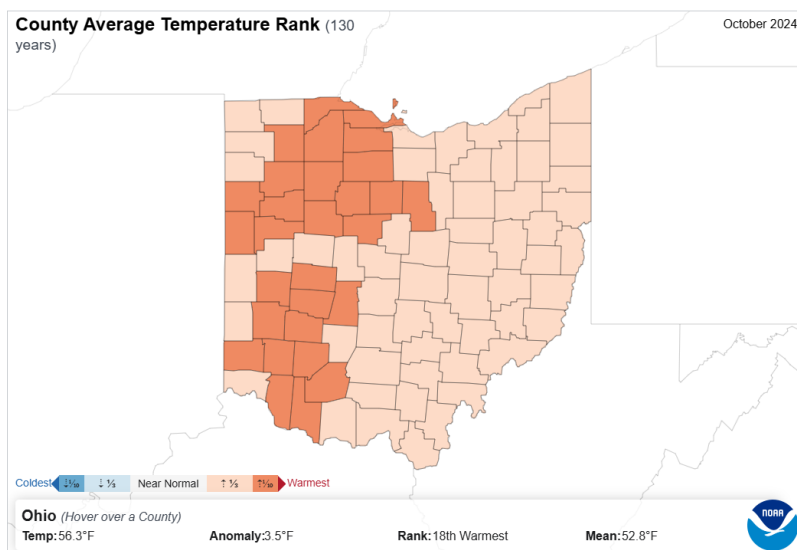


Figure 2: State of Ohio average temperature ranks by county for July 2024. Courtesy of the National Centers for Environmental Information (<https://www.ncdc.noaa.gov/sotc/>).



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Precipitation

Accumulated precipitation was significantly below normal across the entire state for October. In southern Ohio, accumulated precipitation ranged from 0.1 to 0.5 inches, while in central Ohio it measured between 0.3 and 1 inch. In the northern region along the lake belt, precipitation totals were higher, ranging from 1 to 4 inches (Fig. 3a). Departure from normal levels indicates that most of the state noted 2-3 inches below normal precipitation levels except the lake belt region in the north which logged only 0.5 – 2 inches below normal (Fig. 3b). At the county level, 68 counties ranked within the driest tenth of their historical record, with an additional 18 counties in the driest third. Only Cuyahoga and Lake Counties ranked near normal, likely due to lake-effect precipitation. Scioto County recorded its second driest October in 130 years, with 16 counties logging their third driest October (Fig. 4).

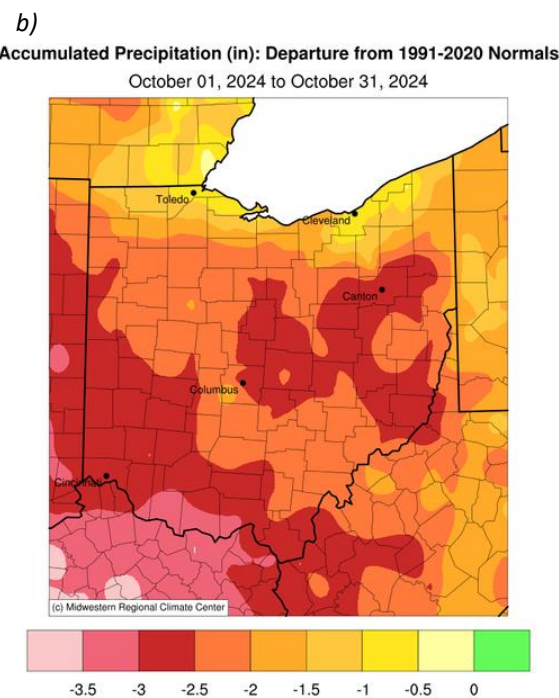
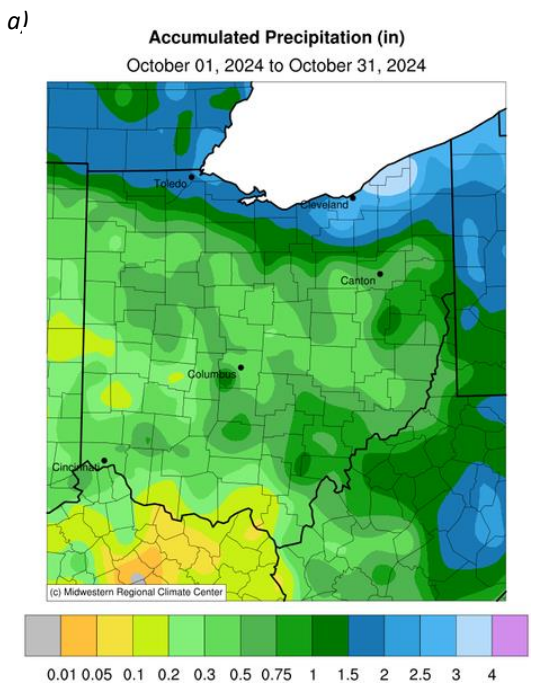


Figure 3a: Accumulated precipitation and 3b: Departures from Normal for the month of October 2024. Data courtesy of the Midwestern Regional Climate Center (<http://mrcc.purdue.edu>).

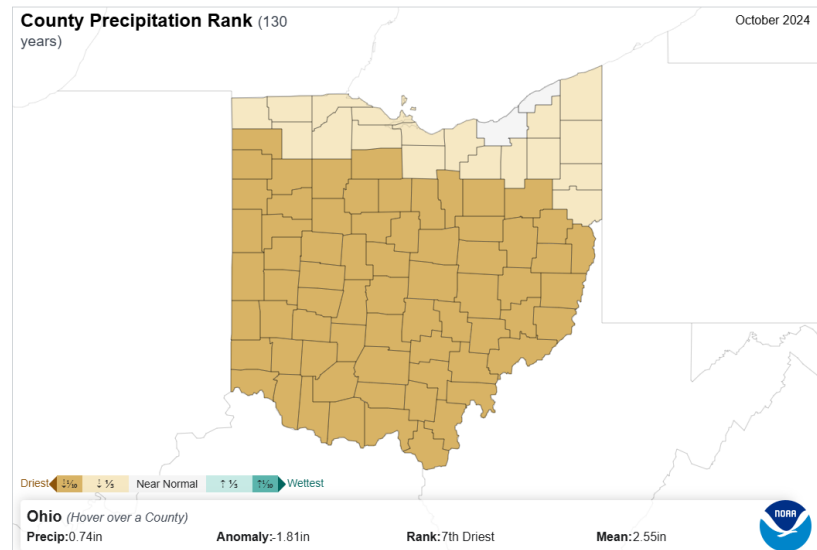
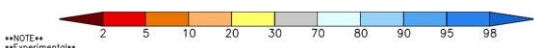
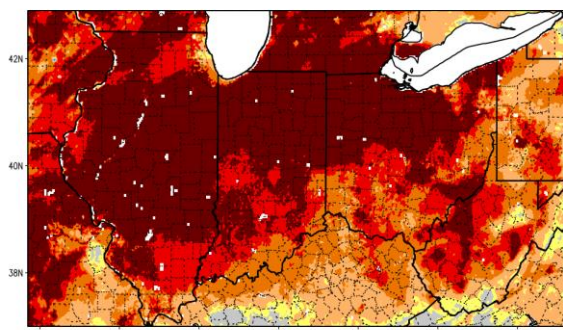


Figure 4: State of Ohio precipitation ranks by county for July 2024. Courtesy of the National Centers for Environmental Information (<https://www.ncdc.noaa.gov/sotc/>).

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a)

SPoRT-LIS 0–40 cm Soil Moisture percentile valid 31 Oct 2024



b)

SPoRT-LIS 0–200 cm Soil Moisture percentile valid 31 Oct 2024

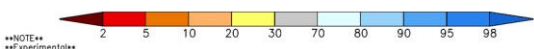
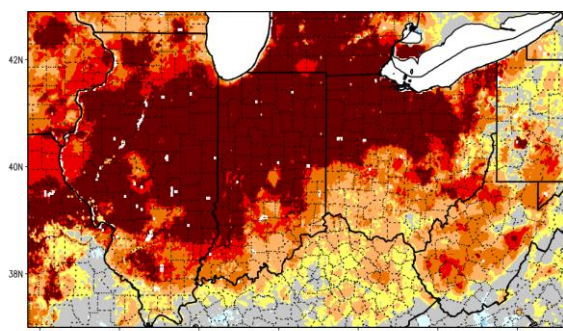


Figure 5a: 0-40 cm and 5b: 0-200 cm soil moisture percentile across the region at the end of October 2024. Courtesy of NASA SPoRTLIS (https://weather.msfc.nasa.gov/sport/case_studies/lis_IN.html).

Soil and Energy

Dry soil conditions persisted through late October. The 0–40 cm soil moisture map indicates extremely dry conditions in the northwest, with slightly less severe dryness in the southwest (Fig. 5a). Similarly, the 0–200 cm map highlights very dry soils in the northwest, with somewhat milder dryness across southern Ohio (Fig. 5b). As days shorten and crop cover and green vegetation decrease, evaporation rates are also declining, which may slow further soil drying. However, a shift to a more active weather pattern would be needed to help alleviate the overall precipitation deficit that has driven these dry soil conditions in recent months.

Warmer than average temperatures throughout October resulted in fewer Heating Degree Days (HDDs) than normal. Additionally, since average temperatures are now below 65°F, the number of Cooling Degree Days (CDDs) is approaching zero (Fig. 6). As we transition into the winter season the number of HDDs will continue to grow as temperatures begin to cool.

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@osu.edu).

| Climate Division | Heating Degree Days | Normal | Departure | Cooling Degree Days | Normal | Departure |
|------------------|---------------------|--------|-----------|---------------------|--------|-----------|
| 1 | 285 | 392 | -107 | 11 | 9 | 2 |
| 2 | 281 | 380 | -98 | 13 | 11 | 2 |
| 3 | 349 | 414 | -65 | 2 | 7 | -5 |
| 4 | 271 | 364 | -93 | 11 | 12 | -1 |
| 5 | 280 | 357 | -77 | 11 | 13 | -1 |
| 6 | 304 | 397 | -93 | 9 | 9 | -1 |
| 7 | 306 | 380 | -74 | 2 | 9 | -7 |
| 8 | 257 | 331 | -74 | 13 | 15 | -2 |
| 9 | 252 | 322 | -70 | 9 | 14 | -5 |
| 10 | 282 | 357 | -75 | 5 | 11 | -6 |
| State | 287 | 369 | -83 | 9 | 11 | -2 |



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



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Notable Events

In October, Ohio experienced relatively calm weather compared to prior months. The most significant weather event that occurred was the first freeze/frost in many counties. The first freeze/frost is important because it is typically linked with the end of the harvest season. This first freeze, with temperatures dropping to the key 32°F mark, occurred across most of Ohio between October 11 and 20 (Fig. 7). Due to the dry soil conditions that allowed for an early harvest, this frost and freeze event had little impact on harvest timing, as most crops were already gathered beforehand.

Drought

Since the harvest season has ended the impacts of the drought will not be as relevant until spring. As a result of this, the drought page will now be consolidated into this section of the notable events page. Throughout October drought conditions once again began to worsen after another month of below-average precipitation throughout Ohio with the primary change being the increase in the D2 area. The current drought percentages are now 11.31% of the state in no drought, 16.74% in D0, 13.55% in D1, 38.02% in D2, 12.39% in D3, and 7.99% in D4 (Fig. 8). The main risk moving forward is increased chance of wildfires as a result of dry conditions. Additionally, farmers are continuing to feed their cattle winter stock which will require them to find an alternative food source towards the end of the winter season.

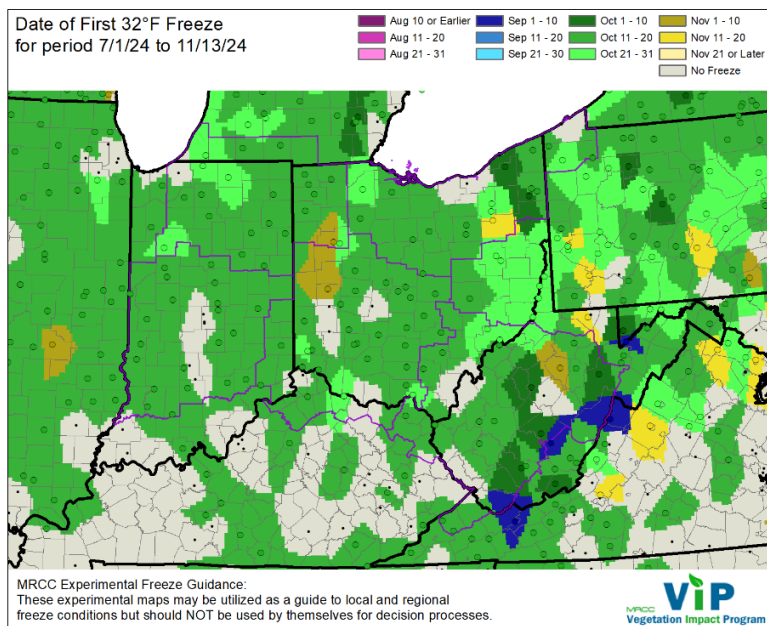


Figure 7: Graphic of date of First 32°F Freeze in Ohio and surrounding states. Data courtesy of the Midwestern Regional Climate Center (<http://mrcc.purdue.edu>).

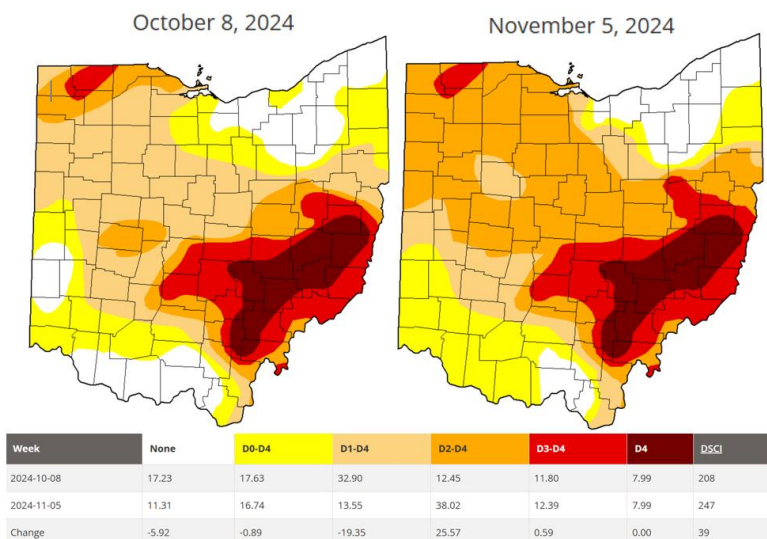


Figure 8: Maps comparing drought conditions in Ohio between October 8, and November 5, determined by the U.S. Drought Monitor. <https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?OH>

Forecast: November - January

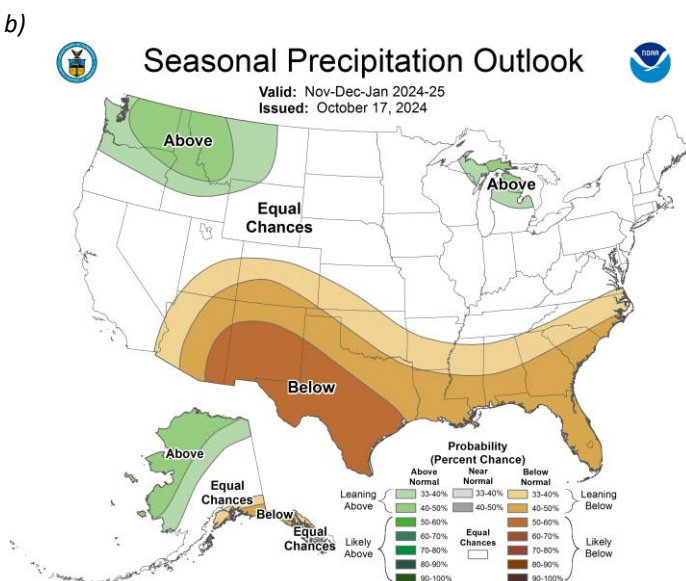
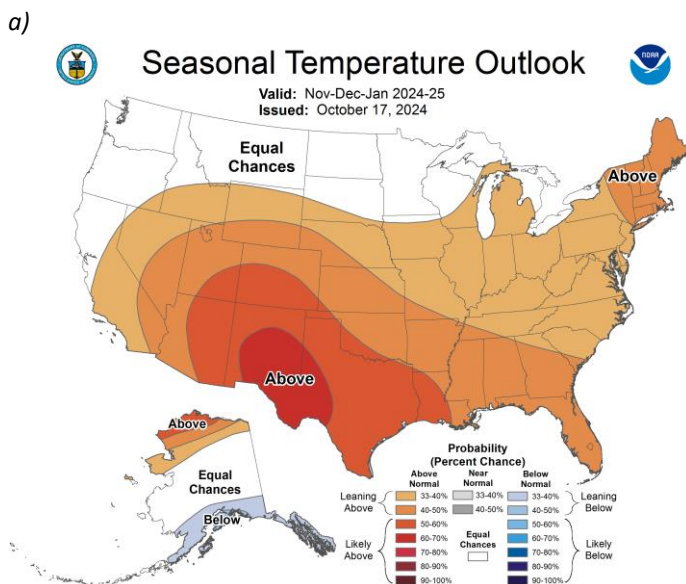


Figure 9a: Nationwide Seasonal Temperature and 9b: Precipitation Outlook for November-January. Courtesy of the Climate Prediction Center (<https://www.cpc.ncep.noaa.gov/>).

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Looking Ahead

The CPC's 3-month outlooks depict seasonable precipitation levels with warmer-than-average temperatures for Ohio. The temperature outlook predicts warmer-than-average temperatures across the entire state with slight confidence (Fig. 9a). The precipitation outlook indicates equal chances of above or below-average levels over the next three months (Fig. 9b). The current forecast of warmer-than-average temperatures, combined with equal chances of above or below-average precipitation, aligns well with our neutral position in the El Niño-Southern Oscillation (ENSO) cycle. Although a shift toward La Niña conditions has been anticipated for several months, this transition is still projected to occur even though we are still seeing neutral conditions. La Niña is generally associated with colder and wetter winters in Ohio. Should this transition happen, it may significantly alter our temperature and precipitation outlooks for the coming season.

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