State of Ohio Quarterly Climate Summary

THE OHIO STATE UNIVERSITY

Fall Review (Sep-Nov)

Released: 12/30/2024

Temperature and Precipitation

During the fall season, Ohio noted above-average temperatures and variable precipitation patterns. Statewide, average temperatures were 2–4°F higher than normal for the season (Fig. 1a). Precipitation totals ranged widely across the state, with most areas receiving between 5 and 12.5 inches. Isolated regions reported as little as 3–5 inches, while others recorded totals exceeding 12.5 inches, with some areas surpassing 15 inches (Fig. 1b). Precipitation departures from the norm varied significantly. Northern Ohio experienced deficits of 1–6 inches below normal, whereas southern parts of the state recorded surpluses ranging from 0 to more than 5 inches above normal (Fig. 1c). Similarly, the percent of normal precipitation map highlights a distinct contrast: northern areas received just 50–75% of their typical rainfall, while the southern regions saw 100–150% or more of their average (Fig. 1d). A notable factor contributing to the above-normal precipitation in southwestern Ohio was Hurricane Helene, which impacted the area in late September.

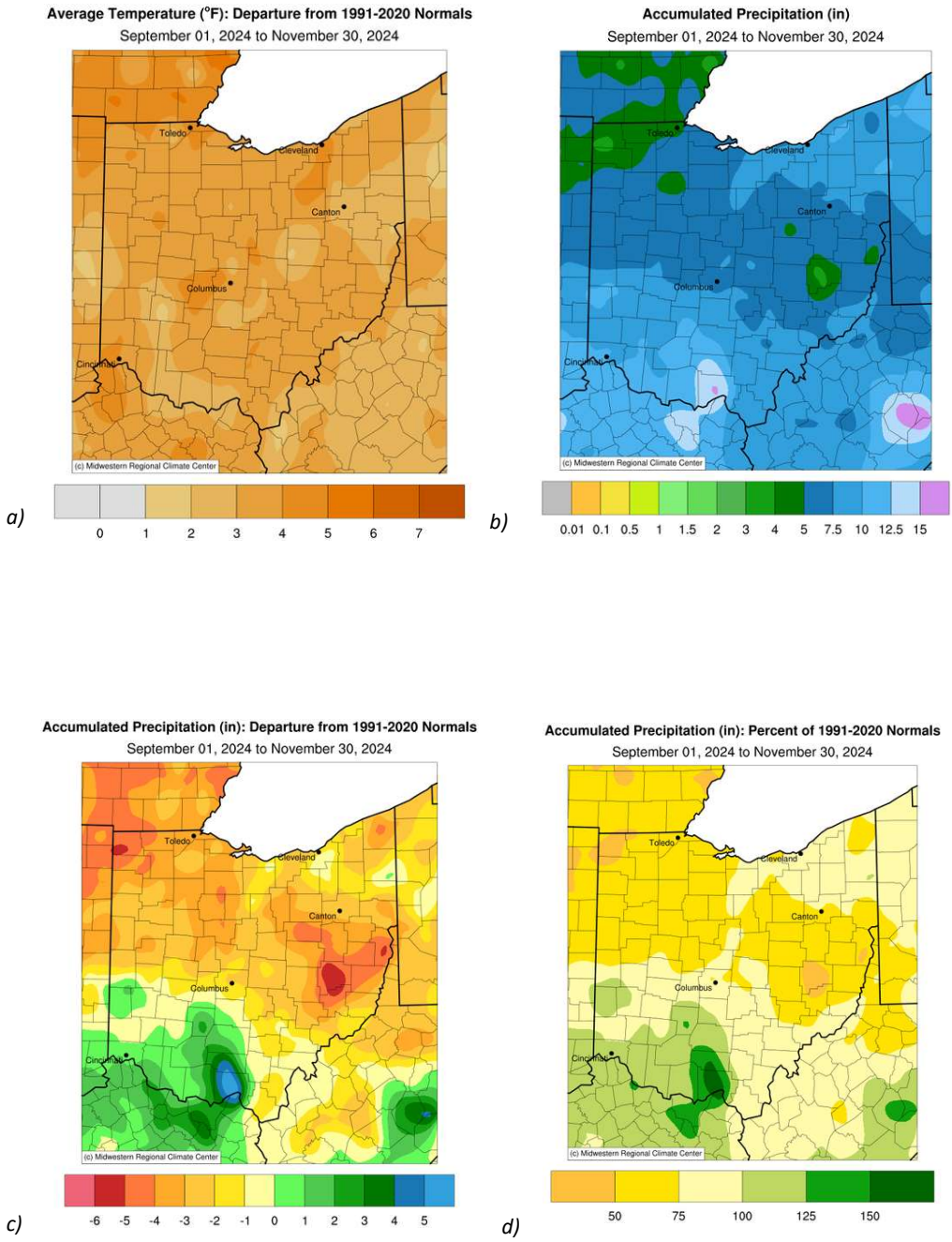


Figure 1: Statewide departures from normal temperature (a) and accumulated precipitation (b) over the summer months at top, followed by statewide accumulated precipitation departures (c) and percent of normals for precipitation (d) at bottom. All data courtesy of the Midwestern Regional Climate Center (http://mrcc.purdue.edu).

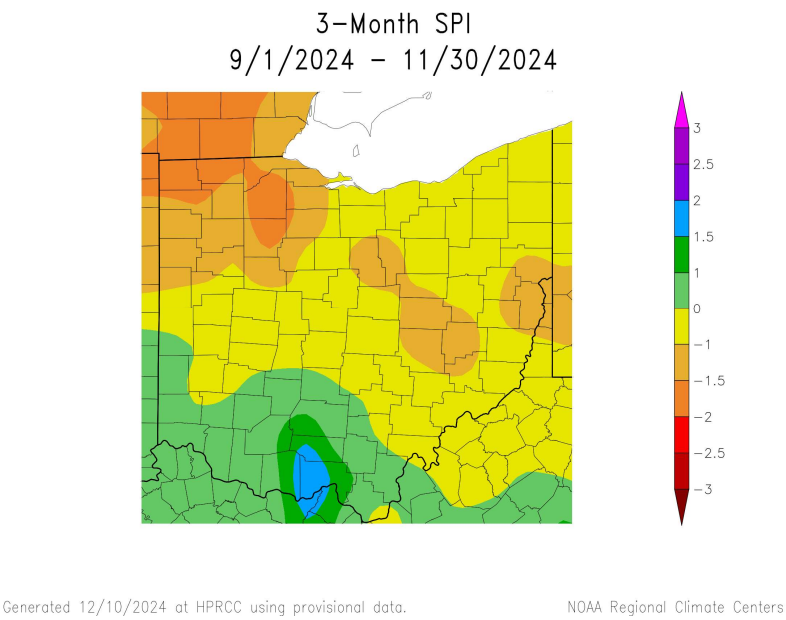


Figure 2: Three-month Standardized Precipitation Index (SPI) across the state of Ohio from September 2024 through November 2024, used as a proxy for soil moisture conditions. Data courtesy of the High Plains Regional Climate Center (https://hprcc.unl.edu/)

Soil and Energy

The 3-month Standardized Precipitation Index (SPI) for the fall season indicated a return to near-normal conditions compared to the summer. Most areas across the state recorded SPI values between -1 and 1, with localized regions ranging from -2 to -1 and 1 to 2 (Fig. 2). Improvements in soil moisture conditions were primarily observed in November, attributed to reduced evaporation rates as daylight hours shortened. The elevated SPI values in the southern region can again be linked to Hurricane Helene, which brought substantial rainfall to this area.

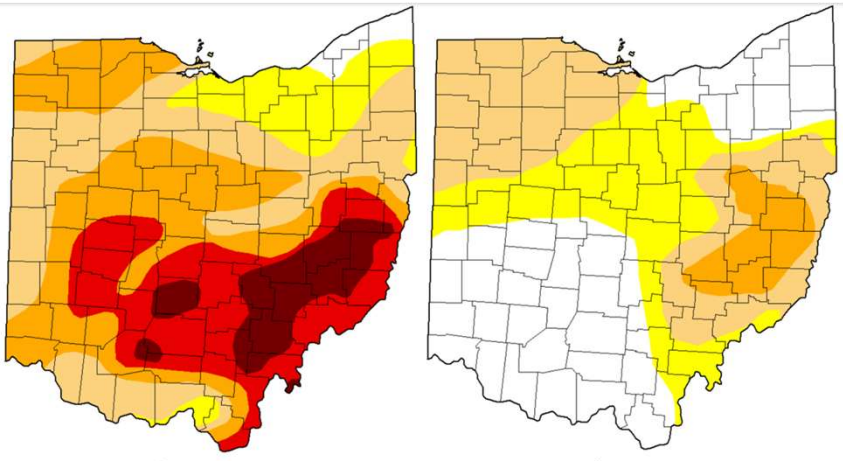
Above-average temperatures throughout the fall resulted in fewer Heating Degree Days (HDDs) and a slightly higher number of Cooling Degree Days (CDDs) than normal (Fig. 3). This led to reduced energy demand overall, as the warmer temperatures decreased the need for building heating.

Climate Division	Heating Degree Days	Normal	Departure	Cooling Degree Days	Normal	Departure
1	899	1217	-319	126	91	34
2	871	1174	-303	138	94	43
3	986	1246	-261	73	66	7
4	866	1143	-277	143	108	35
5	852	1112	-260	152	108	44
6	924	1209	-285	118	81	37
7	912	1160	-249	105	85	20
8	817	1054	-237	165	127	38
9	760	1016	-257	158	127	30
10	835	1102	-267	137	103	35
Statewide	867	1139	-271	133	101	33

Figure 3: (Left) Total September-November heating & cooling degree days. (Right) Corresponding Ohio Climate Divisions. Data courtesy of the Midwestern Regional Climate Center (http://mrcc.purdue.edu).

Notable Events

During the fall season, drought conditions in Ohio showed significant improvement, particularly in November. The most severe drought categories, D4 and D3, were eliminated, with the highest remaining classification now being D2. The total area affected by drought (D1-D4) decreased by an impressive 52.33%. Currently, 7.06% of the state is classified as D2, 28.06% as D1, 23.76% as D0, and the remaining 41.13% is not classified as experiencing drought (Fig. 4). These improvements mark the beginning of a recharge in soil moisture, which is essential for field preparation ahead of the growing season. Restoring normal soil moisture levels will reduce erosion and enhance tillage conditions for early planting. Most of these positive changes occurred during the latter half of the fall, from early November through mid-December. The key factors contributing to the improvement were increased precipitation and reduced evaporation due to shorter daylight hours. The accumulated precipitation map highlights a broad band of higher rainfall amounts stretching from southwestern to northeastern Ohio, with additional precipitation in the southern region (Fig. 5). This renewed moisture benefits farmers by initiating groundwater recharge, setting the stage for healthier growing conditions. Although it is still winter, the growing season is fast approaching, making it essential to continue monitoring soil moisture trends.



Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4	DSCI
2024-09-17	2.08	10.47	27.99	29.41	20.53	9.52	284
2024-12-24	41.13	23.76	28.06	7.06	0.00	0.00	101
Change	39.05	13.29	0.07	-22.35	-20.53	-9.52	-183

Figure 4: Image of the comparison between the Drought Monitor Map for September 17 vs December 24. The first map shows exceptional drought conditions, and the second shows only moderate drought conditions based on the U.S. Drought Monitor (2000-present). *(https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?OH)*

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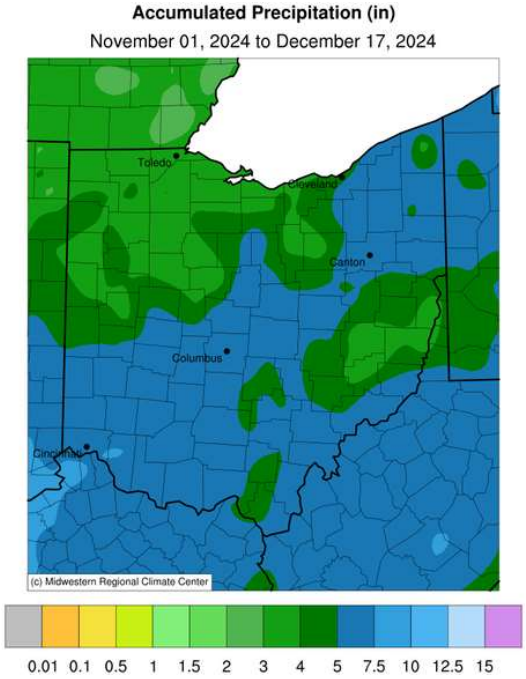
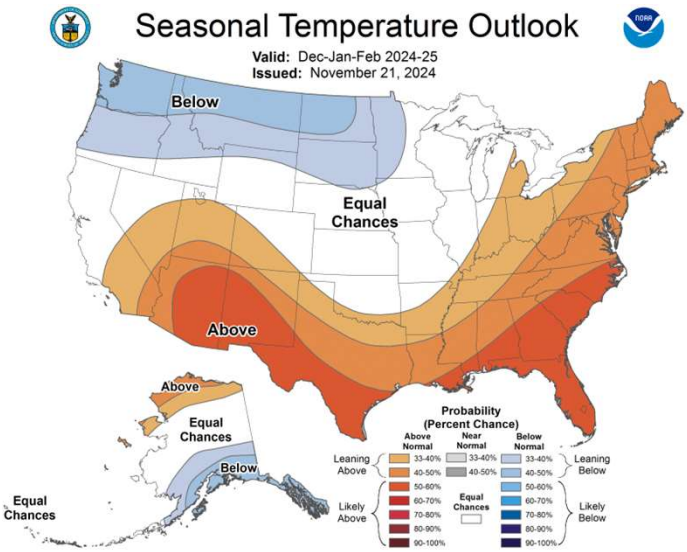


Figure 5: Accumulated Precipitation map for November into mid December. All data courtesy of the Midwestern Regional Climate Center (http://mrcc.purdue.edu).

a)



b)

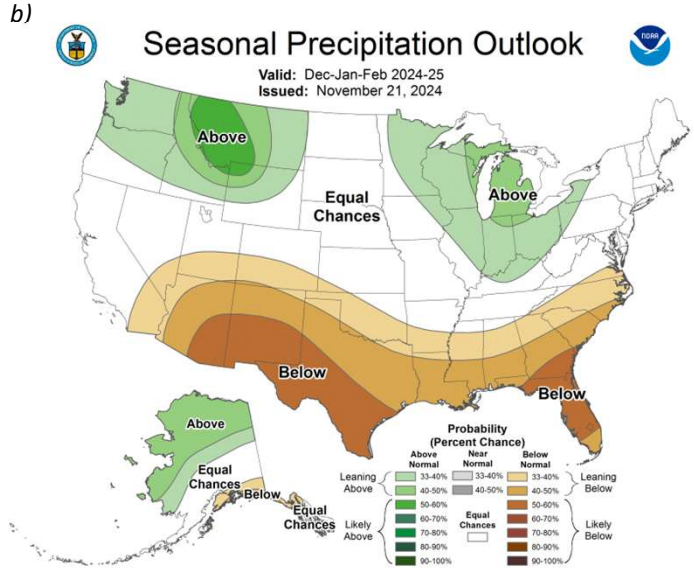


Figure 6: a) Nationwide Seasonal Temperature and b) Precipitation Outlook for December 2024 - February 2025. Courtesy of the Climate Prediction Center (https://www.cpc.ncep.noaa.gov/).

Looking Ahead

The Climate Prediction Center's (CPC) three-month outlook suggests a likelihood of warmer-than-average temperatures and above-average precipitation for Ohio, albeit with slight confidence. The seasonal temperature outlook indicates warmer-than-normal conditions across the state for the winter season (Fig. 6a). Similarly, the precipitation outlook projects above-average levels of precipitation statewide, also with slight confidence (Fig. 6b).

This combination of warmer and wetter conditions aligns with the current neutral ENSO phase, which often results in less predictable seasonal patterns. Typically, El Niño winters in Ohio are warmer and drier, while La Niña winters tend to be colder and wetter. The current outlook, reflecting elements of both scenarios, highlights the uncertainty associated with a neutral ENSO phase and suggests potential variability in Ohio's winter climate this year. Variations from this forecast have already occurred with multiple spells of below normal temperatures experienced in the early parts of December.

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

Authors:

Aiden Q. Ridgway
Atmospheric Sciences Undergraduate
Student Assistant: Climate Services
Byrd Polar and Climate Research Center
The Ohio State University
ridgway.72@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