“Climate Change directly impacts our economic and environmental sustainability.”
Seasonal Differences in Warming

- More than 95% of the land surface demonstrated an increase in annual average temperature
- Paleoclimate records suggest recent period the warmest in at least the past 1,500 years
- Greatest and most widespread in winter

Annual average temperature over the contiguous United States has increased by 1.2°F (0.7°C) for the period 1986–2016 relative to 1901–1960 and by 1.8°F (1.0°C) based on a linear regression for the period 1895–2016: National Climate Assessment CCSR: [https://science2017.globalchange.gov/](https://science2017.globalchange.gov/)
Annual and Seasonal Changes in Precipitation

- National average increase of 4% in annual precipitation since 1901: Ohio: 5-15%
- Driven strongly by fall trends (10-15% in some locations)
- Regional Spring, Summer, and Fall Trends across Ohio
- Increased Intensity of rainfall events

National Climate Assessment CCSR: https://science2017.globalchange.gov/
Great Lakes Seasonal Changes

Spring Mean Temperature Change 1950-2012

Winter Mean Temperature Change 1950-2012

Spring Mean Precipitation Change 1950-2012

Fall Mean Precipitation Change 1950-2012
2018 for the State of Ohio

- 19th Warmest
- 3rd Wettest
- Modern Period (1895 – 2018)
Recall the Variability of Spring 2018

- MAM 2018 ranks as the 49th warmest – close to average
- Extreme monthly variability
- 9th coldest April on record (1895-present)
- Warmest May (1895-present)
- Stayed wet and cool across northern Ohio through about mid-May
How can it be so dry, when it’s been so wet?

- June 2018 ranks as the 4\textsuperscript{th} warmest with the summer of 2018 ranked as the 17\textsuperscript{th} warmest (1895-2018)
- Warmth driven strongly by warm overnight lows
- Moderate drought conditions were experienced across parts of NW Ohio (Ottawa, Lucas, Wood, Sandusky, Huron Counties)
A Crazy Fall in Ohio

Fall 2018: Extreme Variability

- 3rd wettest on record since 1895.
- Sep. 2018 ranks as 2nd wettest.
- Driven largely by tropical activity
2019 – Wet Again!

• Winter was the 11th wettest for Ohio – focused mostly along and south of I-70
• March-May 2019 rank as the 36th warmest and 32nd wettest for the state
• West-central and northwest Ohio ranked 7th and 3rd wettest on record, respectively.
• St. Marys, Ohio (Auglaize County), CoCoRaHS observer reported over 20 inches of precipitation between March 1 and May 31 - that’s over half of their normal yearly rainfall in just three months.
• Multiple observers in excess of 15 inches
• Reports of 20-26 days of at least a trace of precipitation during the month of May
• Only 7 days suitable for fieldwork during May
Spring 2019 In the Western Basin

Accumulated Precipitation (in)
March 01, 2019 to May 31, 2019

Accumulated Precipitation (in): Percent of 1981-2010 Normals
March 01, 2019 to May 31, 2019
Western Basin Precipitation Trends

- Great Lakes Climate Divisions
- SE Michigan: March - June
- NE Indiana: March - June
- NW Ohio: March - June
It’s Been a VERY Wet Year!

Statewide Precipitation Ranks
August 2018–July 2019
Period: 1895–2019

Divisional Precipitation Ranks
August 2018–July 2019
Period: 1895–2019
Long-term Precipitation Trends in Ohio

Ohio’s Annual Departure From Average (1981-2010)

Data Source: NCEI

https://statesummaries.ncics.org/oh
Intensity of Rainfall

Northern Ohio Rainfall Trends


Data Source: NCEI
Spring Precipitation and HABs

Significant HAB

Accumulated Precipitation (in): Percent of 1981-2010 Normal
March 01, 2011 to May 31, 2011

2011

Accumulated Precipitation (in): Percent of 1981-2010 Normal
March 01, 2015 to May 31, 2015

2015

Mild HAB

Accumulated Precipitation (in): Percent of 1981-2010 Normal
March 01, 2012 to May 31, 2012

2012

Accumulated Precipitation (in): Percent of 1981-2010 Normal
March 01, 2018 to May 31, 2018

2018
Future Climate

**Difference in Average Temperature**
- Period: 2041-2070
- Emission Scenario: A2

**Projected Change in Average Precipitation**
- Period: 2041-2070
- Emission Scenario: A2
Temperature Changes

Change in annual #days Tmax > 90F by mid 21st century

Change in annual # of frost days by mid 21st century

https://scenarios.globalchange.gov/loca-viewer/
Seasonal Redistribution of Precipitation

-Fourth National Climate Assessment
https://nca2018.globalchange.gov/
Summary

• Trends are clear:
  • Warmer (winter-spring, overnight)
  • Wetter (especially during “Ag off-season”)

• Recent period (turn of the century) very challenging weather-wise from a water quantity/quality standpoint

• Future trends are more of the same: 2019 more of a new normal?
STATE CLIMATE OFFICE
OF OHIO
THE OHIO STATE UNIVERSITY

SCOO members installing new instruments at DAREC-SCOO.

NEWS
Hydrologic and Climate Assessment
September 3, 2019

Ohio Quarterly Climate Summary
WINTER (December-February) 2019

READ THE SUMMARY [PDF]

farm.byrd.osu.edu

Aaron B. Wilson, PhD
CFAES-OSU Extension | Climate Specialist
Byrd Polar & Climate Research Center | Research Scientist
State Climate Office of Ohio
Affiliated Faculty, Sustainability Institute
040 Scott Hall, 1090 Carmack Rd., Columbus, OH 43210
(614) 292-7930 Office
wilson.1010@osu.edu

Ohio Climate
https://www.facebook.com/ohioclimate/

Climate Specialist
CFAES-OSU Extension
Byrd Polar & Climate Research Center
State Climate Office of Ohio
Affiliated Faculty, Sustainability Institute
040 Scott Hall, 1090 Carmack Rd., Columbus, OH 43210
(614) 292-7930 Office
wilson.1010@osu.edu

Facebook
https://www.facebook.com/ohioclimate/

Twitter
@Ohio_Climate