

# MRCC's Soil Temperature Climatology Tool

**Austin Pearson**

**Climatologist**

**Midwestern Regional Climate Center (MRCC)**

**Purdue University**

13 November 2024

Authors: Danny Brouillette (MRCC), Beth Hall (MRCC), Jonathan Weaver (MRCC), Melissa Widhalm (MRCC), Dennis Todey (USDA Midwest Climate Hub), Laurie Notwatzke (USDA Midwest Climate Hub)



We have tools to help you  
make decisions.

The **Midwestern Regional Climate Center** provides  
high-quality climate data, tools, interactive maps, and  
customized services for the Midwest and the nation.



**MRCC**  
Midwestern Regional Climate Center

[mrcc.purdue.edu](http://mrcc.purdue.edu)



**P PURDUE**  
UNIVERSITY®

*Partnering with the National Centers  
for Environmental Information and  
Purdue University.*

# Soil Temperature Climatology

---



- Soil temperature information benefits a range of on-farm decisions associated with field work, plant growth, and pest and disease management.
- However, there is a lack of user-friendly interfaces for this information that has a perspective about climate patterns and risks.



# Soil Temperature Climatology

## 4" Soil Temperature Climatology

Go to "Warms Above" View

Go to "Cools Below" View

Go to "Temperatures Given Date" View

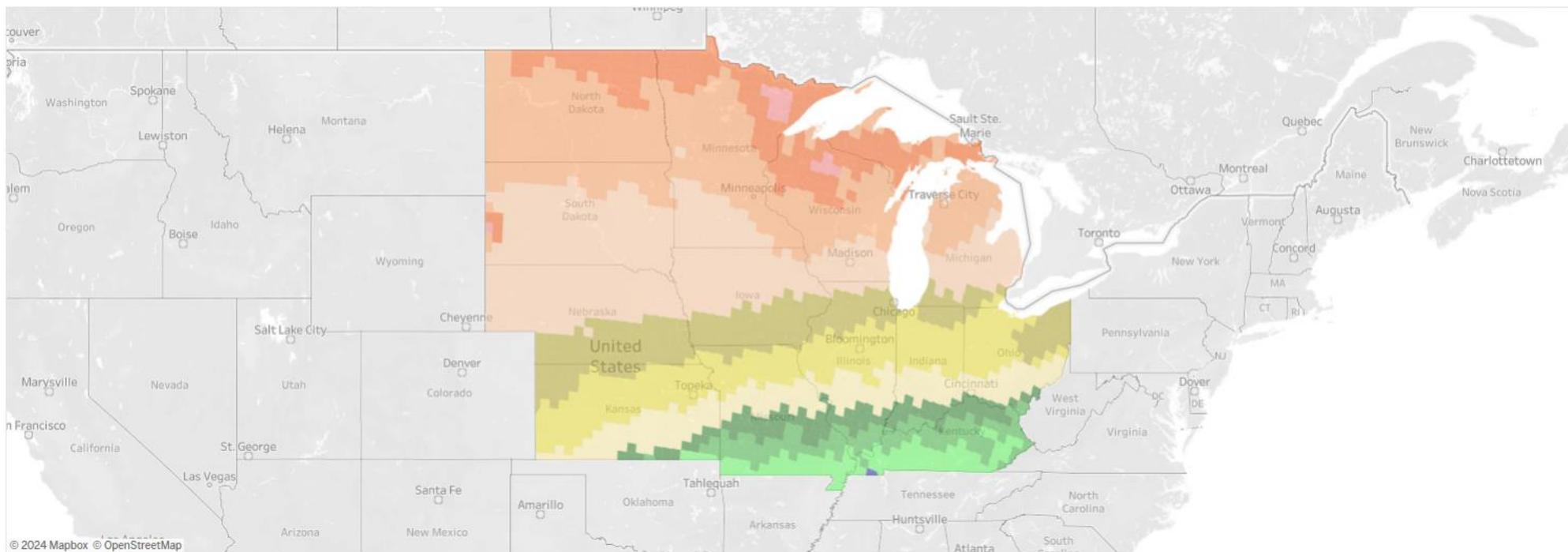
Date When 4" Soil Temperature Cools Below 50°F

Select Threshold (°F)

50

### Average Date

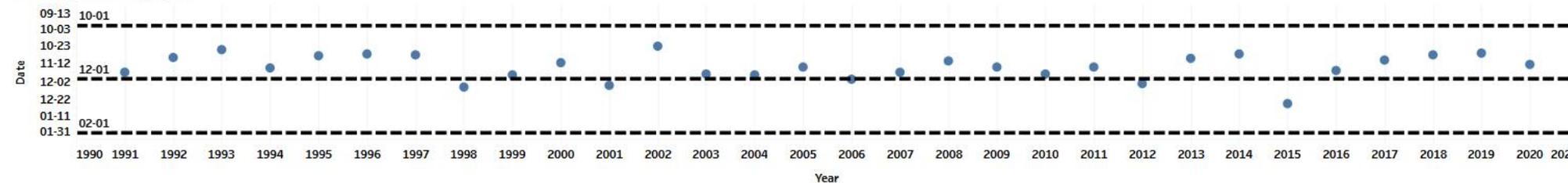
- Sep 9 or Before
- Sep 10-19
- Sep 20-30
- Oct 1-9
- Oct 10-19
- Oct 20-31
- Nov 1-9
- Nov 10-19
- Nov 20-30
- Dec 1-9
- Dec 10-19
- Dec 20-31
- Jan 1-9
- Jan 10-19
- Jan 20-31
- Feb 1-9
- Feb 10-19
- Feb 20 or Later



Climatology is based on 1991-2020 values at 4" depth. Map shows seven-day running average values. See About page for more information.

### Dates of Occurrence over 1991-2020 Period

Click on a gridbox to display dates.



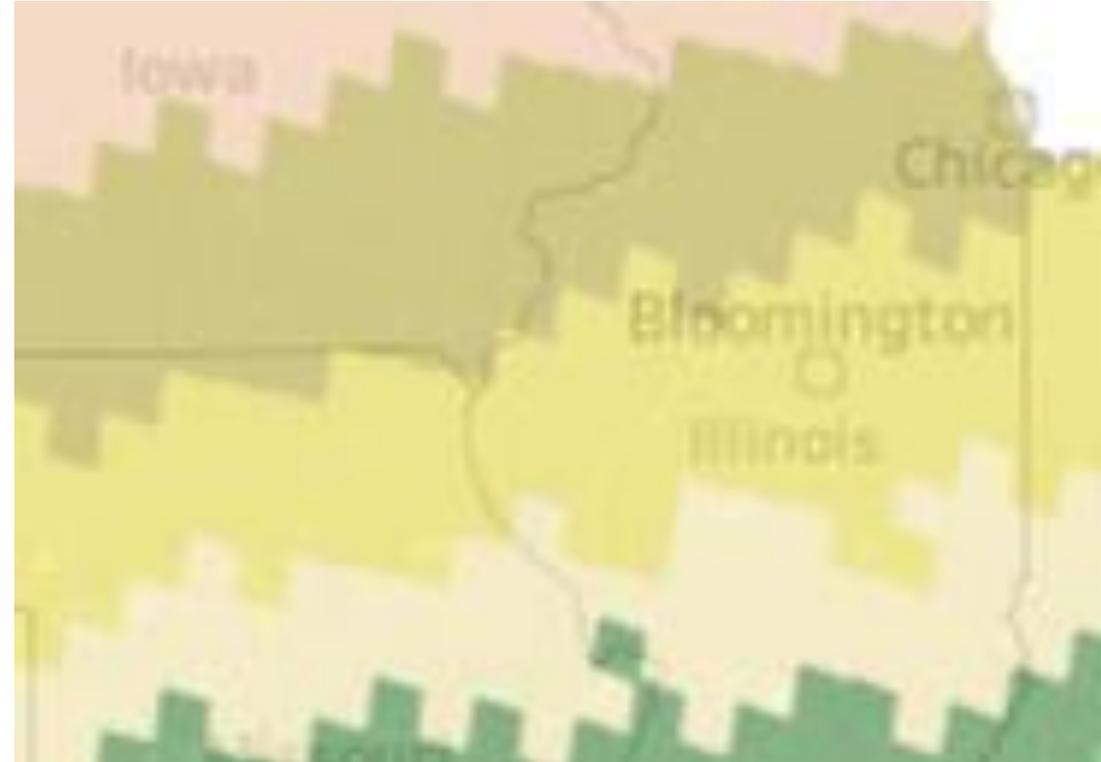
This tool funded by USDA Agricultural Research Service (ARS) Midwest Climate Hub/National Program 216 Sustainable Agriculture.



# Soil Temperature Climatology

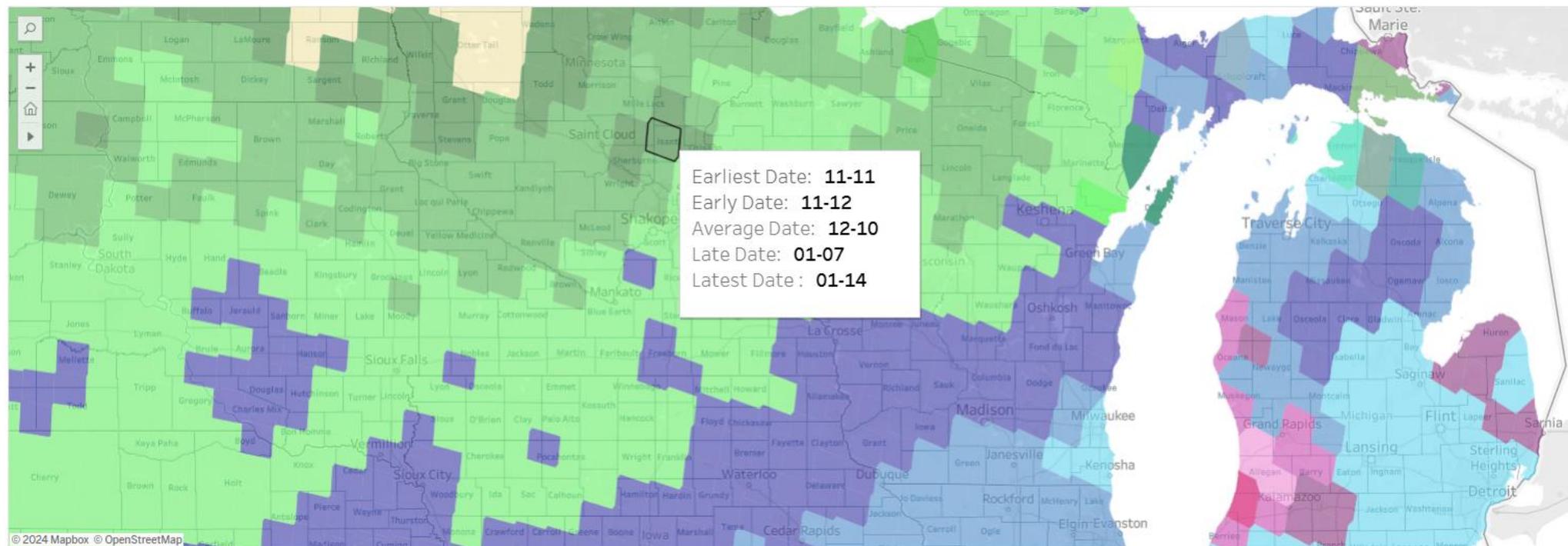
---

- Daily-resolution 4" soil temperature values from the NARR were obtained for the 1991 to 2020 period for much of the north-central U.S.
- Daily values composited into seven-day running mean values.
  - 02/10/2020: 02/04/2020-02/10/2020
- These values were then bias-corrected on a day-by-day basis using local weather networks.
- NARR soil T's used to calculate annual "warm above" and "cool below" dates and other statistics.
- We may expand this climatology to other regions in the future, but that will require further region-by-region analysis.



# Soil Temperature Climatology

Date When 4" Soil Temperature Cools Below 32°F



Select Threshold (°F)

Average Date

- Sep 9 or Before
- Sep 10-19
- Sep 20-30
- Oct 1-9
- Oct 10-19
- Oct 20-31
- Dec 1-9
- Dec 10-19
- Dec 20-31
- Jan 1-9
- Jan 10-19
- Jan 20-31
- Nov 1-9
- Nov 10-19
- Nov 20-30
- Feb 1-9
- Feb 10-19
- Feb 20 or Later

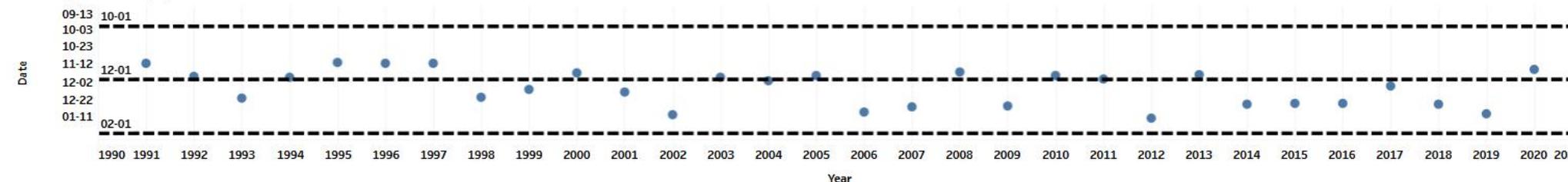
Climatology is based on 1991-2020 values at 4" depth. Map shows seven-day running average values. See About page for more information.

This tool funded by USDA Agricultural Research Service (ARS) Midwest Climate Hub/National Program 216 Sustainable Agriculture.



## Dates of Occurrence over 1991-2020 Period

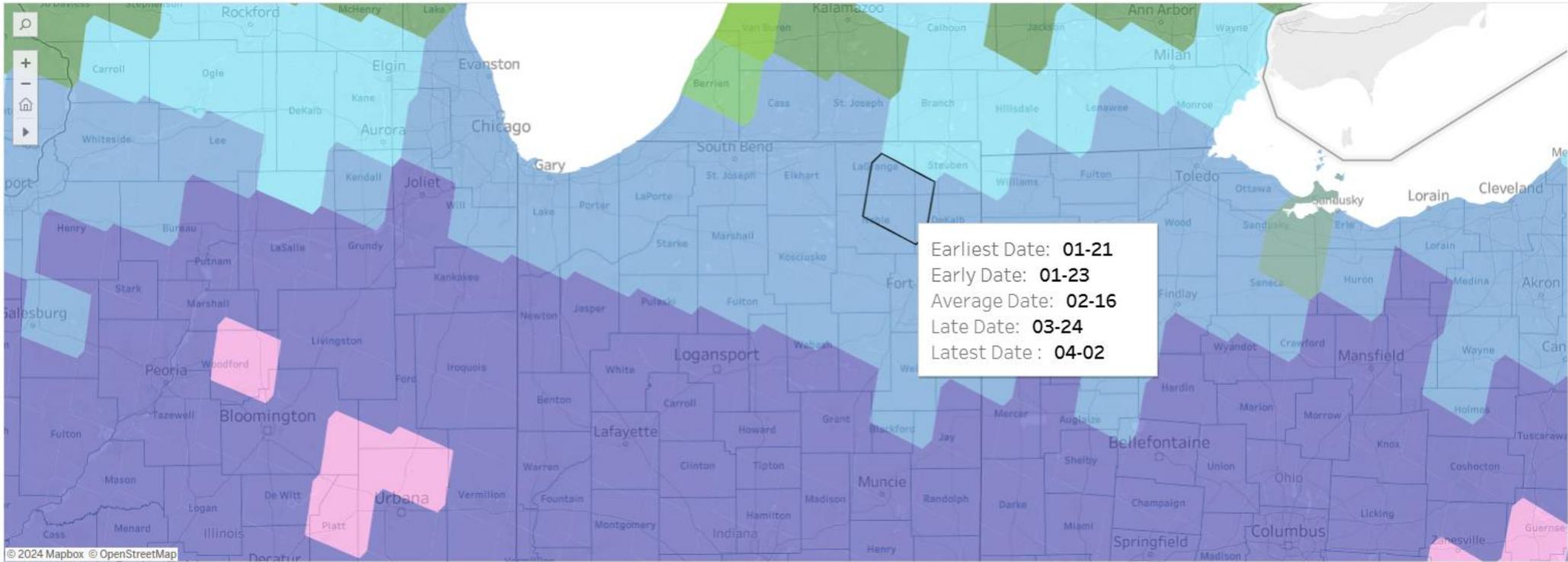
Click on a gridbox to display dates.



# Soil Temperature Climatology

Date When 4" Soil Temperature Warms Above 32°F

Select Threshold (°F)  
32



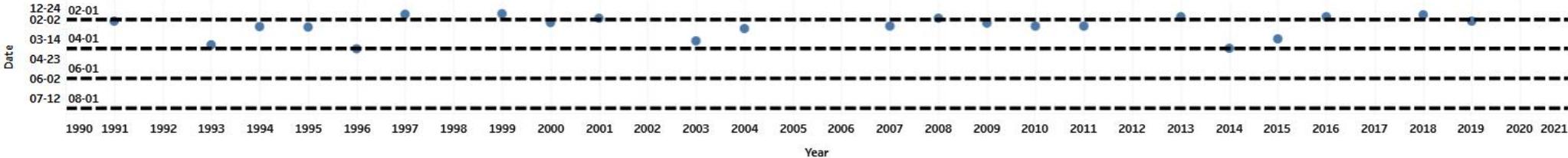
- Average Date**
- Jan 9 or Before
  - Jan 10-19
  - Jan 20-31
  - Feb 1-9
  - Feb 10-19
  - Feb 20-28
  - Mar 1-9
  - Mar 10-19
  - Mar 20-31
  - Apr 1-9
  - Apr 10-19
  - Apr 20-30
  - May 1-9
  - May 10-19
  - May 20-31
  - Jun 1-9
  - Jun 10-19
  - Jun 20 or Later

Climatology is based on 1991-2020 values at 4" depth. Map shows seven-day running average values. See About page for more information.

This tool funded by USDA Agricultural Research Service (ARS) Midwest Climate Hub/National Program 216 Sustainable Agriculture.

## Dates of Occurrence over 1991-2020 Period

Click on a gridbox to display dates.



# Soil Temperature Climatology

Average 4" Soil Temperature on Selected Calendar Date



Select a Month

March

Select a Day

12

Average 4" Soil Temperature

- <30°F
- 30°F to 34°F
- 35°F to 39°F
- 40°F to 44°F
- 45°F to 49°F

Climatology is based on 1991-2020 values at 4" depth. Map shows seven-day running average values. See About page for more information.

This tool funded by USDA Agricultural Research Service (ARS) Midwest Climate Hub/National Program 216 Sustainable Agriculture.



About this Tool

**QUESTIONS?**