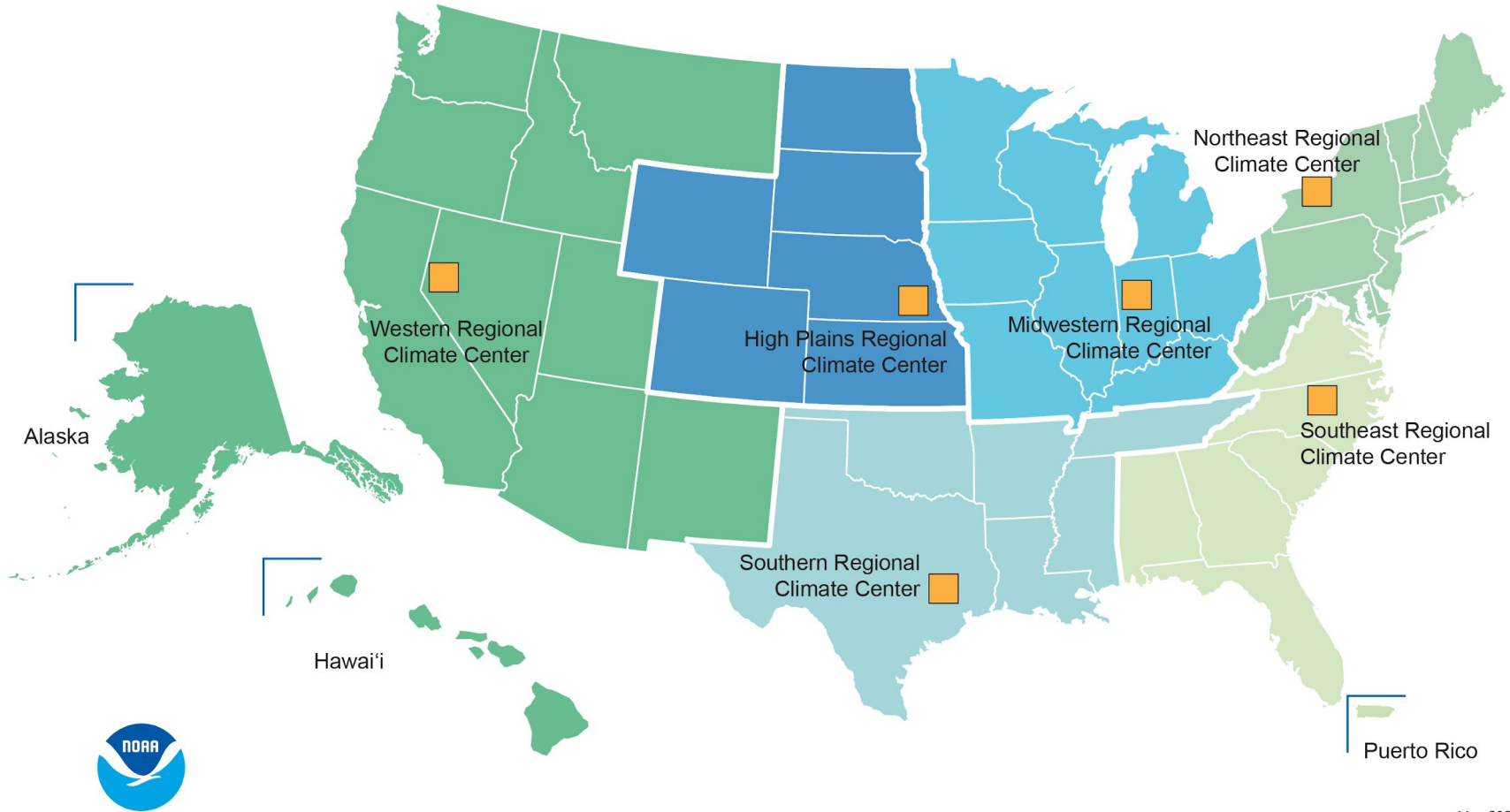


Midwestern Regional Climate Center

~ Update ~



May 2021



MRCC
Midwestern Regional
Climate Center

Dr. Beth Hall
Director, MRCC
October 2022

PURDUE
UNIVERSITY®

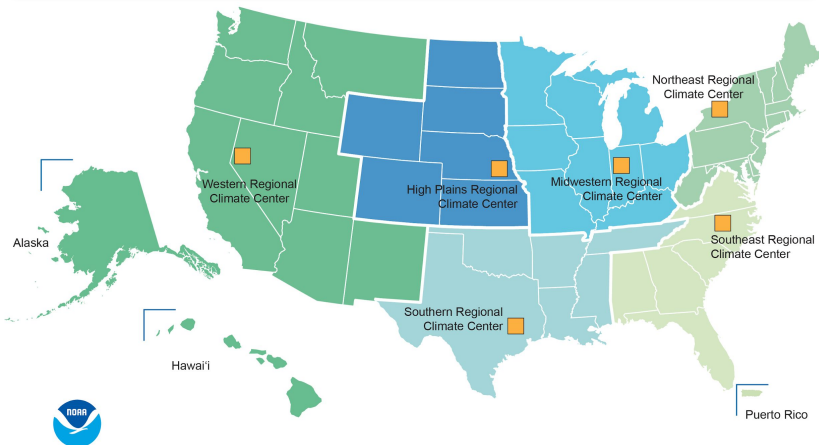
RCCs – *What makes them different?*

RCCs

- Work directly with climate **data**
 - Observational data
- Accesses, organizes, stewards of historical climate **data**
- Develop **decision-support tools**
- Develop **value-added** climate tools and monitoring resources
- **Any sector, stakeholder**

Other Climate Programs

- Identifying sector-specific climate **impacts**
- Establishing **adaptation** plans for impacts
- **Social science** analysis of incorporating plans, policies
- More **agency focused**
- More **future** planning



May 2021



Freeze Date Climatologies

Freeze Date Tool

First Fall Freeze Date Map

Last Spring Freeze Date Map

Growing Season Length Map

First Fall Freeze Trend Map


Last Spring Freeze Trend Map

Growing Season Trend Map

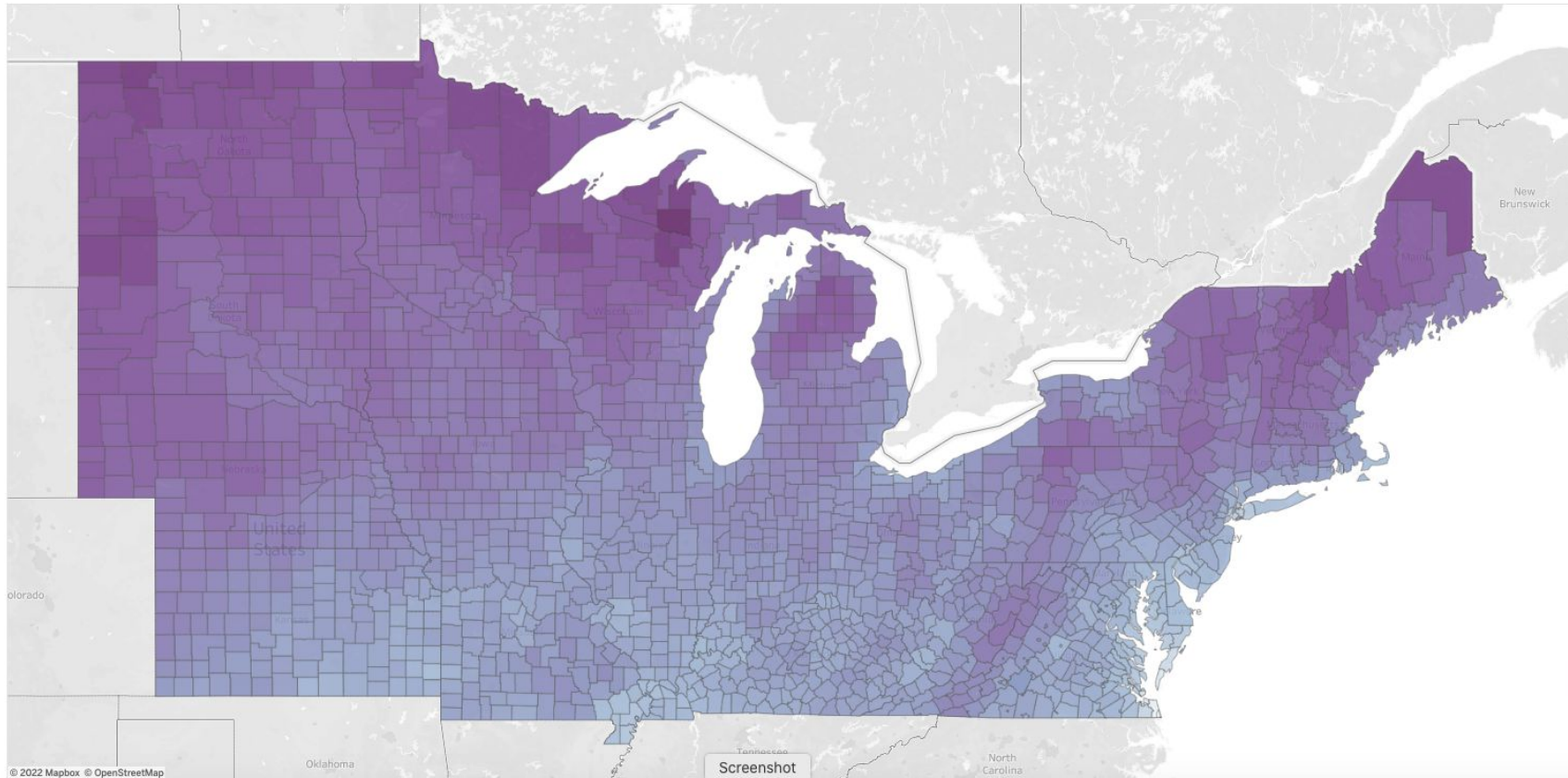
Average First Fall 32°F Freeze Date

Click on a county to see more data for that location.

First Fall Freeze Date
Sep 12  Nov 23

Freeze Temperature:
32 °F 

Select Statistic:
Average



Data from ACIS Gridded Dataset (1950-2021).

Tool Details page coming soon. For immediate questions, please contact us using the "Contact Us" button below.

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

Contact Us

USDA Climate Hubs
U.S. DEPARTMENT OF AGRICULTURE

Freeze Date Tool

[Back to Map](#)

Freeze Date Trend

[Freezes by Decade](#)

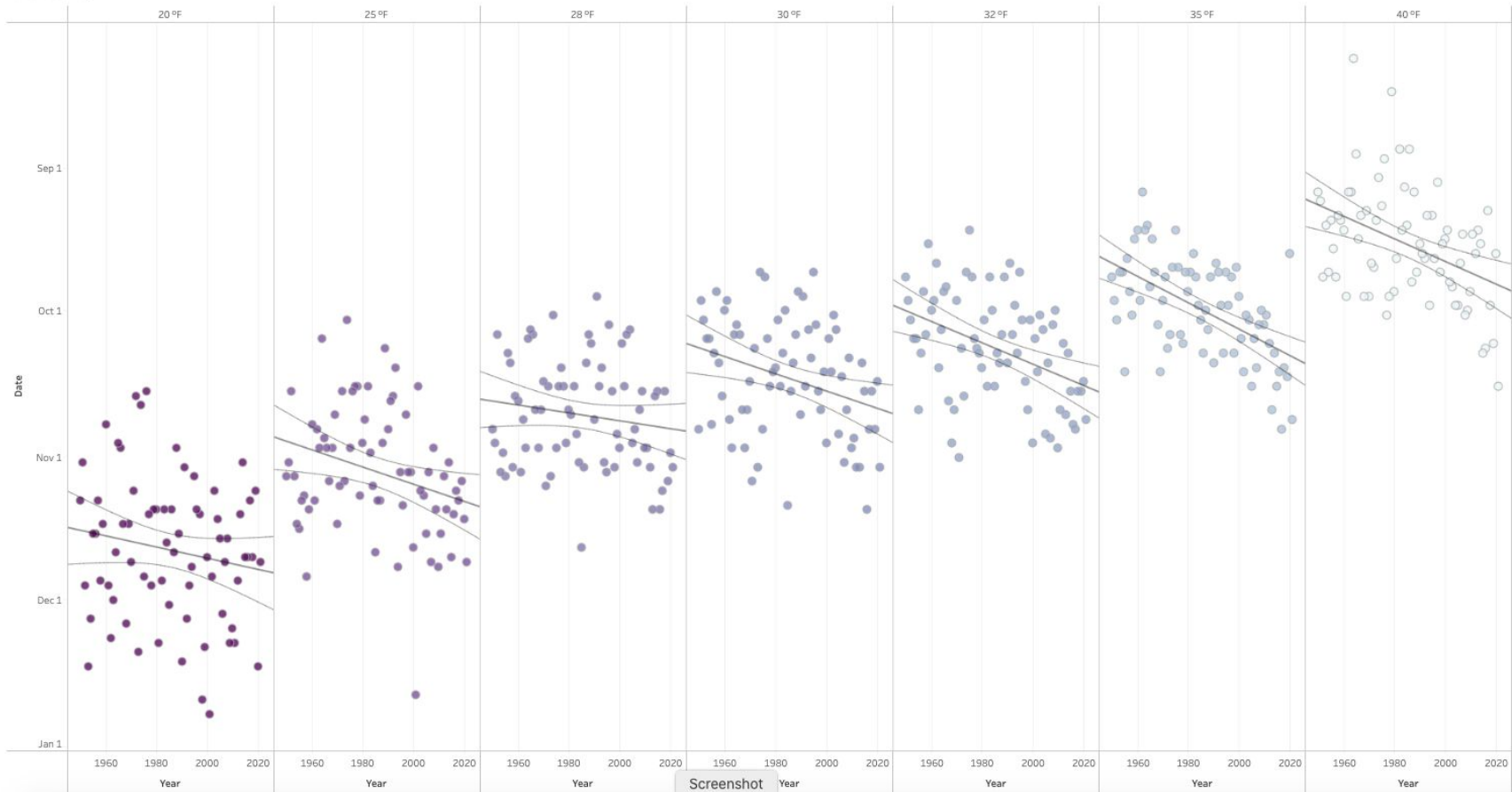
[Growing Season](#)

[Freeze Dates Table](#)

[Growing Season Table](#)

[Summary Stats Table](#)

Trend in First Fall Freeze Dates
Eaton County, MI



Choose Freeze Date:

Freeze Temperature:

Show Data For:

Data from ACIS Gridded Dataset (1950-2021).

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U.S. DEPARTMENT OF AGRICULTURE

Freeze Date Tool

First Fall Freeze Date Map

Last Spring Freeze Date Map

Growing Season Length Map

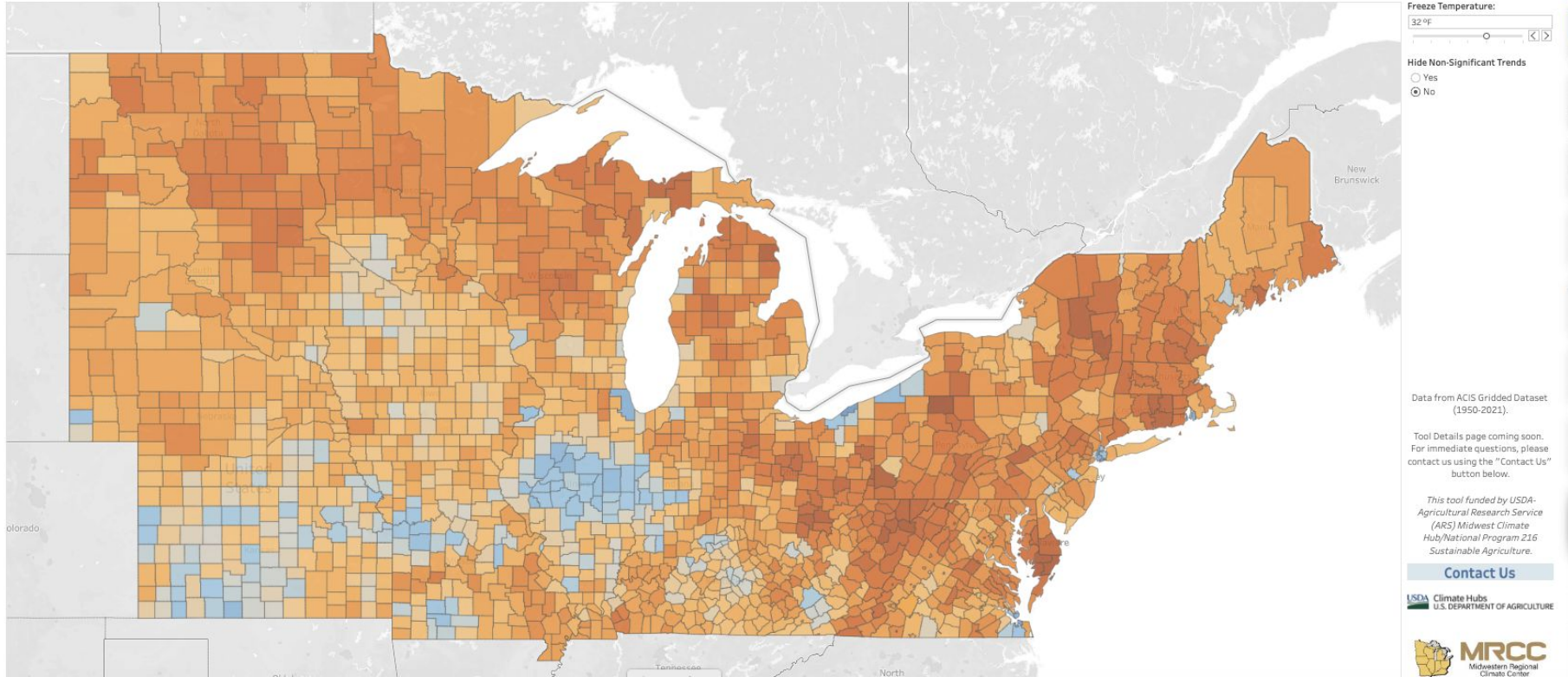
First Fall Freeze Trend Map

Last Spring Freeze Trend Map

Growing Season Trend Map

Trend in First Fall 32 °F Freeze Date

Click on a county to see more data for that location.



Freeze Date Tool

First Fall Freeze Date Map

Last Spring Freeze Date Map

Growing Season Length Map

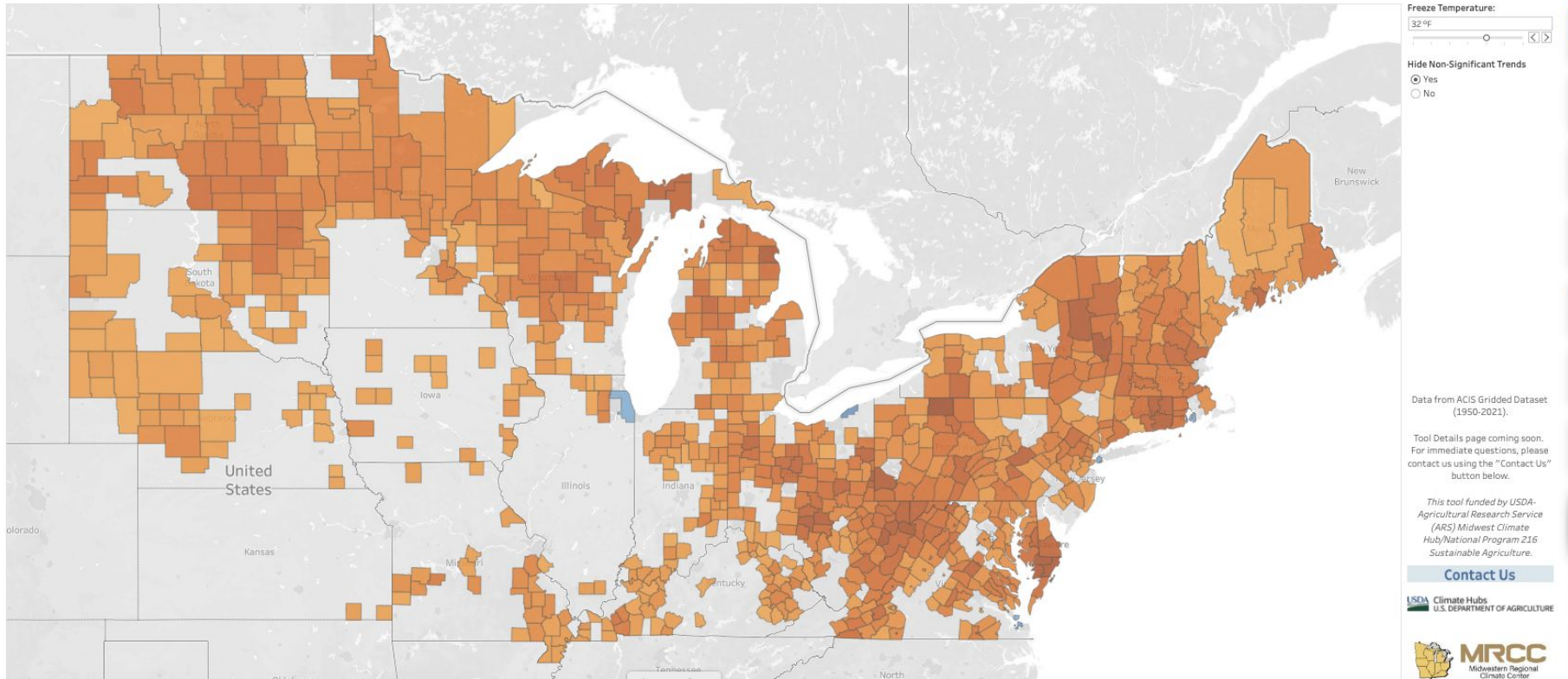
First Fall Freeze Trend Map

Last Spring Freeze Trend Map

Growing Season Trend Map

Trend in First Fall 32 °F Freeze Date

Click on a county to see more data for that location.



Rapid Drought Intensification Risk Tool

Goals

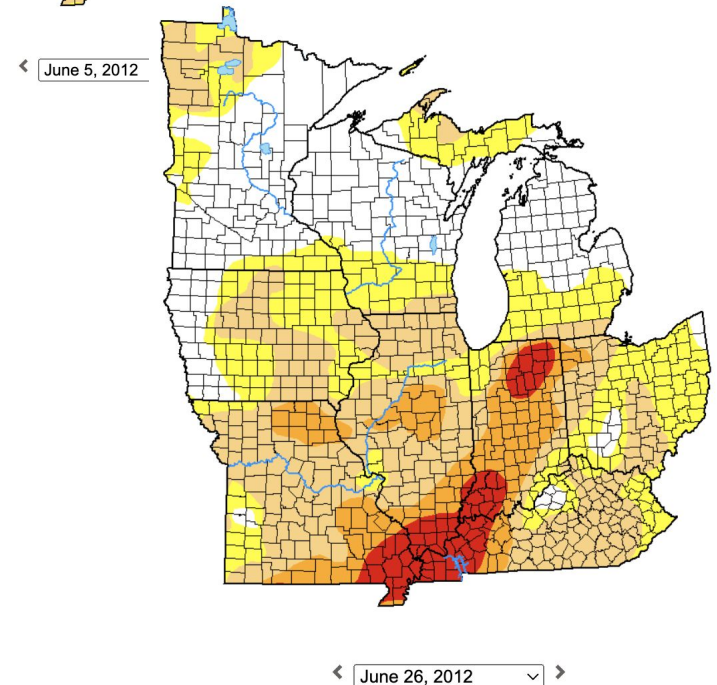
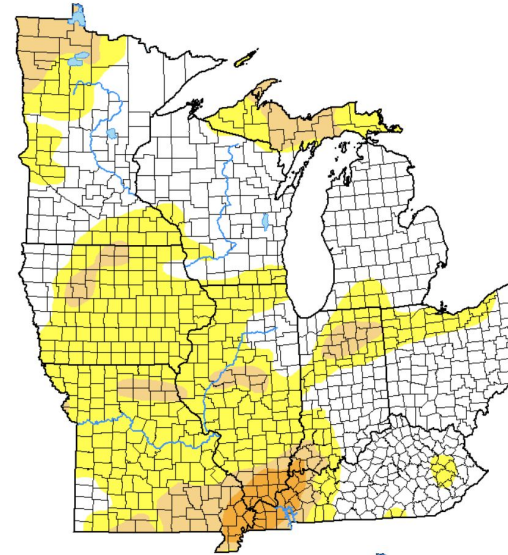
- Use AI to predict risk of rapid drought intensification
- April – October
- Eastern U.S.

Pros

- Provides “early warning”
- Objectively driven by past patterns

Cons

- Only shows future risk, not current conditions
- Difficult to identify historical cases
 - *Used US Drought Monitor, 2-category change sustained for 2 weeks*
- Is 2 weeks enough early warning?

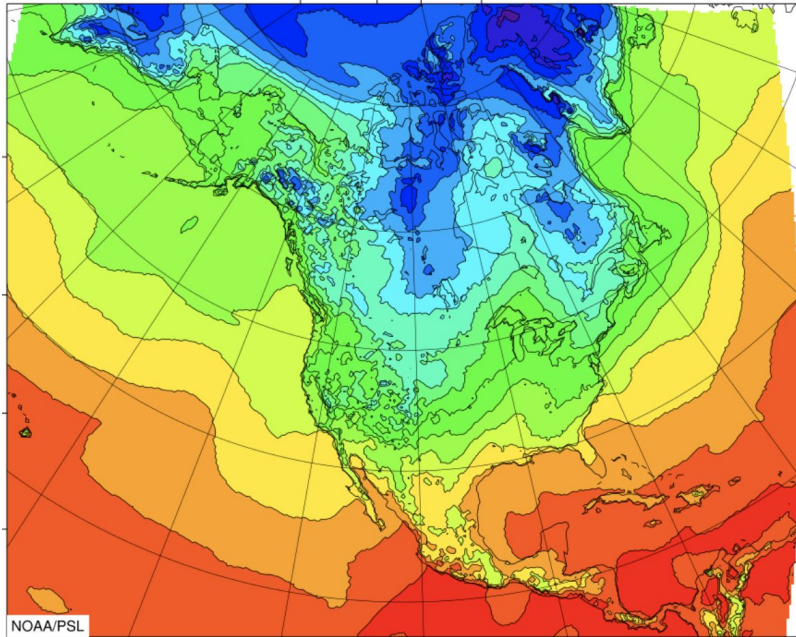


Rapid Drought Intensification Risk Tool

Daily Mean 2 m Air temperature

K

180° 90°W



Predictors Used

- Latitude
- Longitude
- Day of the year
- Temperature
- Precipitation
- Dew point
- Relative humidity
- Mean Sea Level Pressure
- Air pressure
- Wind speed and direction

Building the Model

- Used North American Regional Reanalysis (NARR) data for environmental conditions.
- Gave the model millions of datapoints to learn from.
- Model trained on these data and “learned” what conditions were required for a flash drought to occur.

Rapid Drought Intensification Risk Tool

What forecast data to use?

- GFS
 - *Updated regularly*
 - *Includes all the variables we trained with*
 - *Forecast goes out at least 14 days*
- Updates every 6 hours

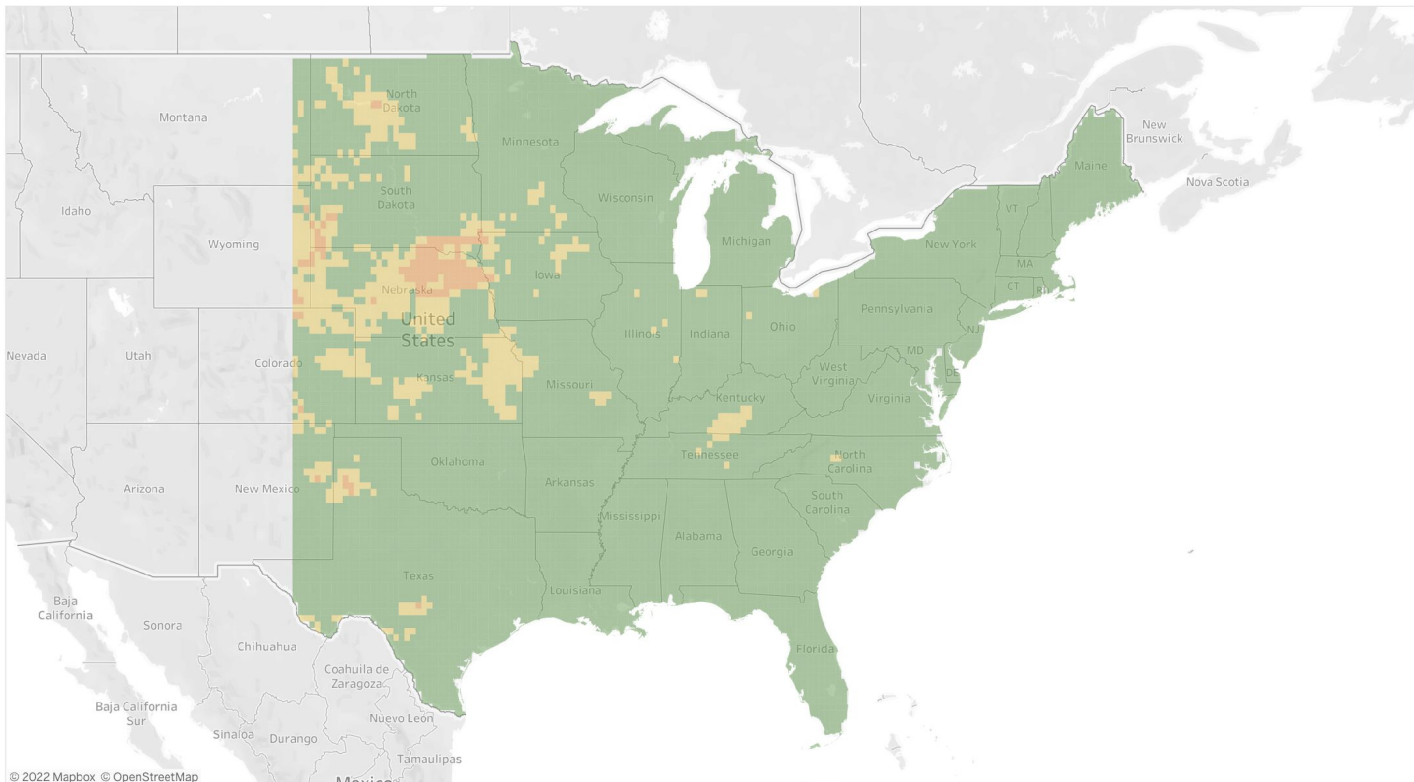


Rapid Drought Intensification Risk Tool

Risk of Rapid Drought Intensification (Experimental)
(Oct 11, 2022 - Oct 25, 2022)

Choose Time:

Oct 11, 2022 - 12z

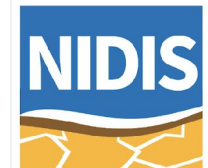


Moderate (>25% Chance)
Slight (>10% Chance)
Low (≤10% Chance)

Give Feedback



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Midwestern Regional Climate Center



<https://mrcc.purdue.edu/MWDEWS/flashdroughttool.html>

Next Steps:

- Assess success of 2022 season
- Provide validation, comparison tool of current conditions with predicted
- Publish findings
- Explore other forecast models



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