

Midwestern Regional Climate Services for Agriculture: Working in Regional Partnerships

Dennis Todey- Director

USDA Midwest Climate Hub

**National Laboratory for Agriculture and
the Environment**

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Overview

- What are the USDA Climate Hubs?
- Midwest Climate Hub – Projects
- Agricultural Needs
 - Data
 - Projections



Intro to Climate Hub Work



Assessments and Syntheses
Delivering relevant information

Outreach and Education
Enabling climate-informed decisions

Technical Support
Facilitating engagement, discovery and exchange



FY22 National Hub Priorities



Build Climate Awareness

- Synthesize, Interpret, Communicate

Enhance Resilience and Productivity

- Develop relevant tools
- Inform stakeholders about timely climate concerns and events

Increase Program Effectiveness

- Engage stakeholders
- Scale up existing efforts

Here in the Midwest...



Our Goal

To provide information to help producers cope with climate change through **linkages of research, education and partnerships** in a region that represents one of the **most intense areas of agricultural production** in the world.

Partners/Stakeholders



Crop Consultants
Commodity Organizations
Soil and Water
Conservation Districts
Other USDA Agencies
Cooperative Extension
Land Grant Universities
Farmers
Ranchers
Forest Land Owners
Specialty Crop Growers
...And Many Others

Brief Trip Down Memory Lane


- NWS Ag Weather Service
 - Used to have specific offices to deal with ag issues
- Climate Hubs are not those – have a much larger role in dealing with climate change, adaptation, mitigation.
 - Some of us do try to help in that role because there still are climate services needs for agriculture (data/tools/services)



Partnerships Climate Hubs/NOAA

- Capitalize on expertise and capabilities
- Using existing data/forecasts/outlooks to support agricultural decisions
- Delivery mechanisms to local partners
- Use hub ag expertise and connections
- Downside – “whose responsibility to call for something to happen”

NOAA Inputs: Late Season Cold, Wet, Snow (preceded by anomalous warmth)





Major Cold and Wet Spring Event: Potential Impacts in the North Central U.S. April 26-May 9, 2017

Prepared By:
Barb Mayes Boustead, Ph.D.
Meteorologist and Climatologist, National Weather Service

Dr. Dennis Today
Director – USDA Midwest Climate Hub

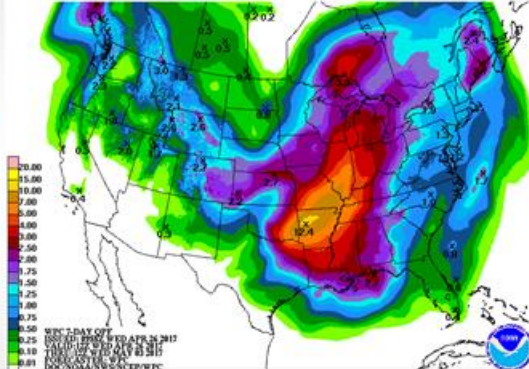

In Partnership With:
Doug Kluck (NOAA/National Centers for Environmental Information), Dannele Peck (USDA Northern Plains Climate Hub), Crystal Stiles (High Plains Regional Climate Center), Mike Timlin (Midwestern Regional Climate Center), Ray Wolf (National Weather Service)

 Building a Climate-Smart Nation



Precipitation: April 26-May 2


- Image: Total forecasted precipitation for the whole week (actual precipitation often is more spotty or varied in coverage)
- Unusually wet conditions likely for much of the central U.S. for April 26-May 3
- Combined with cool temperatures


Temperatures: April 26-May 1


- *Top right:* Coldest high temperatures on any day between April 27 and May 2
- *Bottom right:* Coldest low temperatures on any day between April 27 and May 2
- Freezing temperatures possible from the central and northern Plains to the Great Lakes
- Much below-normal high temperatures possible across the area
- Conditions may occur on several days through the period
- For local weather updates now through 7 days: <http://www.weather.gov/>


Coldest High Temperature
Valid Ending Tuesday May 2nd, 2017 at 7 PM CDT



Coldest Low Temperature
Valid Ending Tuesday May 2nd, 2017 at 7 AM CDT

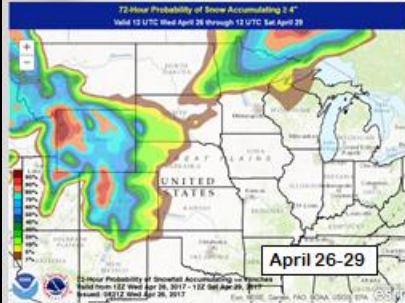


 Building a Climate-Smart Nation




Snowfall: April 26-May 2

12-Hour Probability of Snowfall Accumulating 2.4"
Valid 10 UTC Wed April 26 through 11 UTC Sat April 29




12-Hour Probability of Snowfall Accumulating 0.25"
Valid 10 UTC Wed April 26 through 11 UTC Sat April 29




April 30

12-Hour Probability of Snowfall Accumulating 0.25"
Valid 10 UTC Sun May 1 through 11 UTC Mon May 2



May 1

- *Top left:* Chance of snow >4" total for April 26-29
- *Top right:* Chance of snow >0.25" liquid equivalent for April 30
- *Bottom right:* Chance of snow >0.25" liquid equivalent for May 1
- Significant snowfall possible in Wyoming, Colorado

 Building a Climate-Smart Nation

Short Fuse Extreme Events: Partnership w/USDA

- **“real time” regional briefs:**
 - *2-4 weeks*
 - *Critical impacts, potential extremes*
 - *NOAA climate/weather information*
 - *USDA climate/weather impacts to agriculture*
- **Extremes due to antecedent extremes**
 - Warmth/wet/dry/cold
- **Critical Timing:**
 - Fall harvest, fall/summer early freezes, spring late freezes
 - pollination/seed filling
 - spring livestock
 - spring fire
 - growing season drought, spring planting



Ongoing Projects

Assessments and Syntheses
Delivering relevant information



Quarterly Climate Reports,
Monthly Climate Ag-Focus
Outlooks, and Quarterly
Newsletters

Develop visualization tools for
subregional frost-freeze dates
and low-level temperature
inversions

Agricultural Climate Assessments
for each of 8 states

USDA Midwest Climate Hub
U.S. DEPARTMENT OF AGRICULTURE
November 3, 2021

Midwest Ag-Focus Climate Outlook

Main Points

- Crop harvest is mostly ahead of average
- Soil moisture recharge is quite good, and too much in some places
- La Niña is affecting winter outlooks
- Wet locations are at somewhat increased risk heading into spring




Image from Lynn Betts, USDA Natural Resource Conservation Service

Current Conditions


Departure from Normal Temperature (°F)
10/3/2021 – 11/1/2021

Percent of Normal Precipitation (%)
10/3/2021 – 11/1/2021

The last 30 days (most of October) have been much warmer than average throughout the region by up to 6 to 8°F in northern areas. The warmth made for later first freezes over most of the area, extending the growing season and helping dry crops more quickly. Most of the area also has received well above-average precipitation with several storms bringing rains to much of the region. Areas in the western central plains and Wisconsin have missed some of the recent rains. Final October precipitation totals are being compiled, but many areas of the region will likely have had a top-5 or top-10 record.

Images from High Plains Regional Climate Center (HPRCC), Online Data Services: [AGC Climate Maps](https://www.climatehubs.usda.gov/hubs/midwest). Generated: 11/02/2021

For more information, please visit:
<https://www.climatehubs.usda.gov/hubs/midwest>



Ongoing Projects

Outreach and Education

Enabling climate-informed decisions

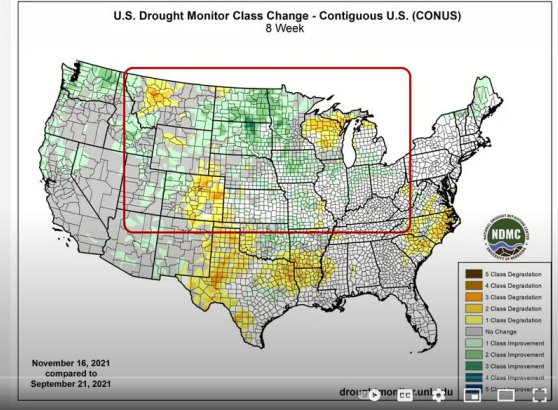
Monthly drought and climate outlook webinars



Recap

NEBRASKA STATE CLIMATE OFFICE

Drought | 2 month change
- Intensification of these same trends.



Monthly discussions with MAC-T (Extension)

Direct outreach with producers and agribusiness professionals and **advisors**



Monthly Webinars

Making an Impact

"I find all the information very helpful and very well organized and the presentations quickly tell the story of what has happened and what the most current outlooks are indicating is coming. ...Thank your team for their unyielding dedication to sharing their expertise and knowledge with the rest of us in a clear and concise manner—the maps and images are excellent."



86%

of participants increased their ability to incorporate weather or climate into decisions

How?



Informing decision makers about when to activate drought communications



Making temporary water use permitting decisions



Adjusting stocking rates and turn in/out dates for livestock



Monitoring specific triggers in flood plans



Identifying potential risks and preparing and enhancing posture ahead of time



Initiating short-term or long-term wildland fire resource requests

Participants strongly agree that the webinar information is:



New to them



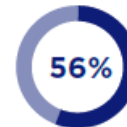
Trusted as legitimate



Easy to understand



Timely



Relevant

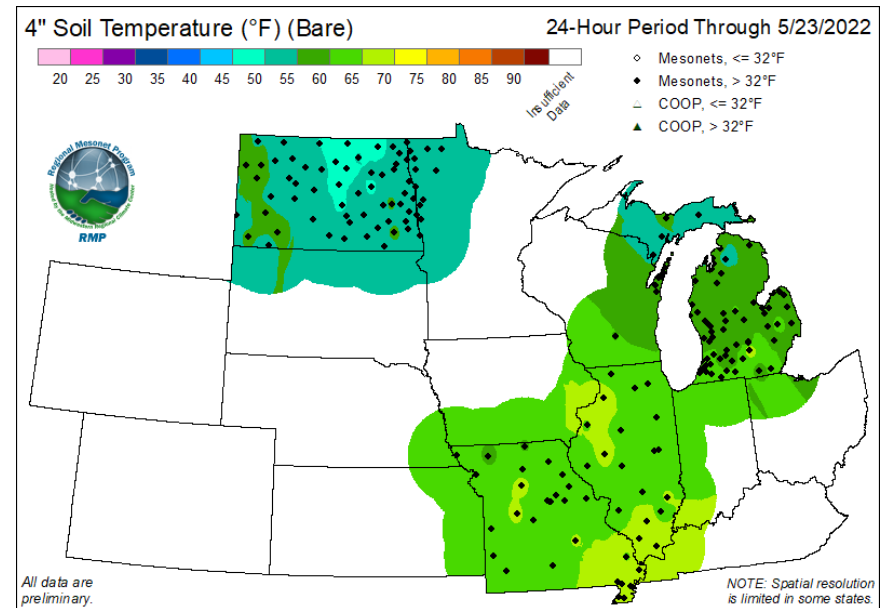
Private Ag Services

- Public-private space in agricultural climate services. Some provide specific services/data.
- A few are decent partners
- Data issues – some climate data collected/not shared
- Tools – not vetted.
- Provided directly to producers.
- Needs to be a public ag services version available in a general sense.

PUBLIC/PRIVATE

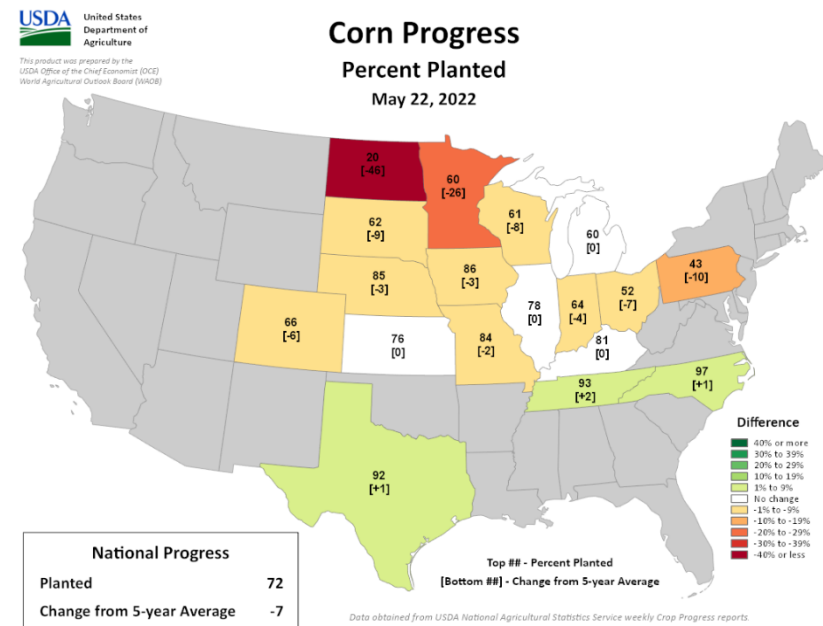
New-Improved Data Needs for Agriculture

- Soil moisture (the ever elusive-beyond just “wet”)
 - Soil temperature
 - Evapo-transpiration
 - Humidity
 - Wind
 - Solar radiation
 - Low-level Inversions
-
- Current – changes over time – and forecast (at multiple time scales) – and climatologies



How to help understand decisions in ag

- Understanding important crop times and impacts
- NWS Does this already with frost-freeze
- How to fill that information gap to various crops?

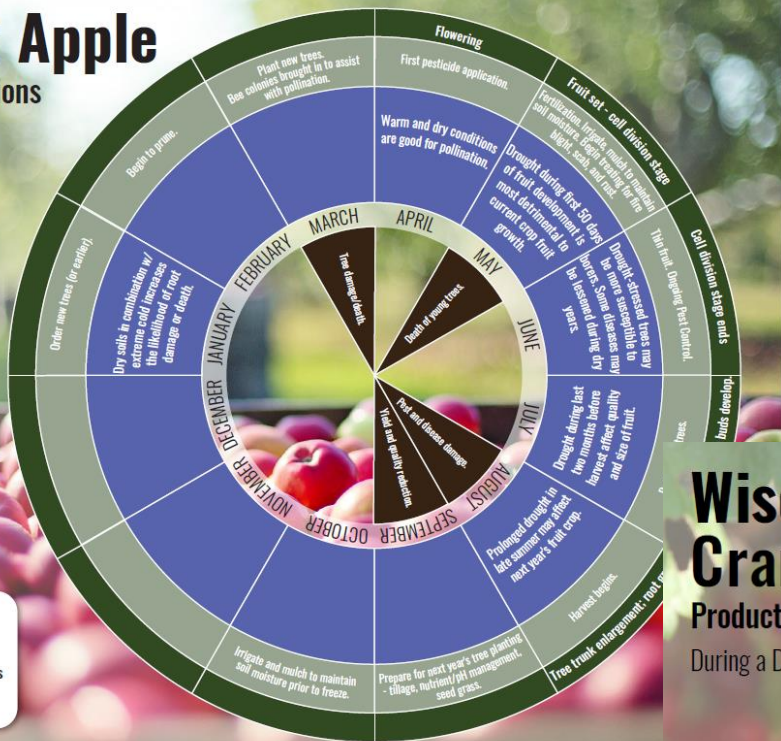


How to help understand decisions in ag

Midwest Apple Production Decisions

During a Drought Year

During a Drought Year



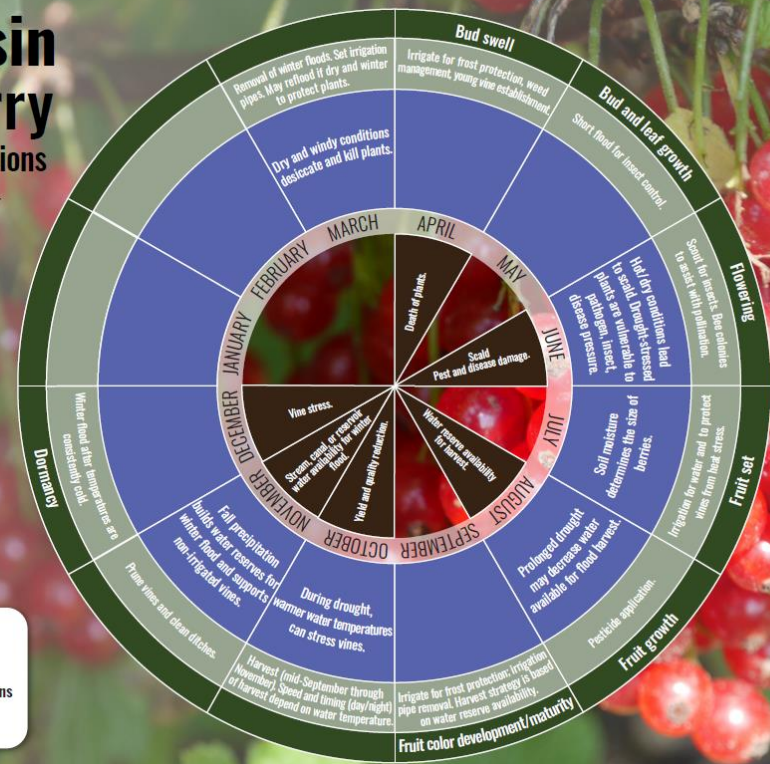
Legend:
 ■ Outcome Observed
 ■ Drought Concerns
 ■ Management Decisions
 ■ Crop Phenology

- Developed around drought
- Decision-vortex (time of year) – actions/decisions

- Tonya Haigh/NDMC
- Jason Otken (UW-Madison)

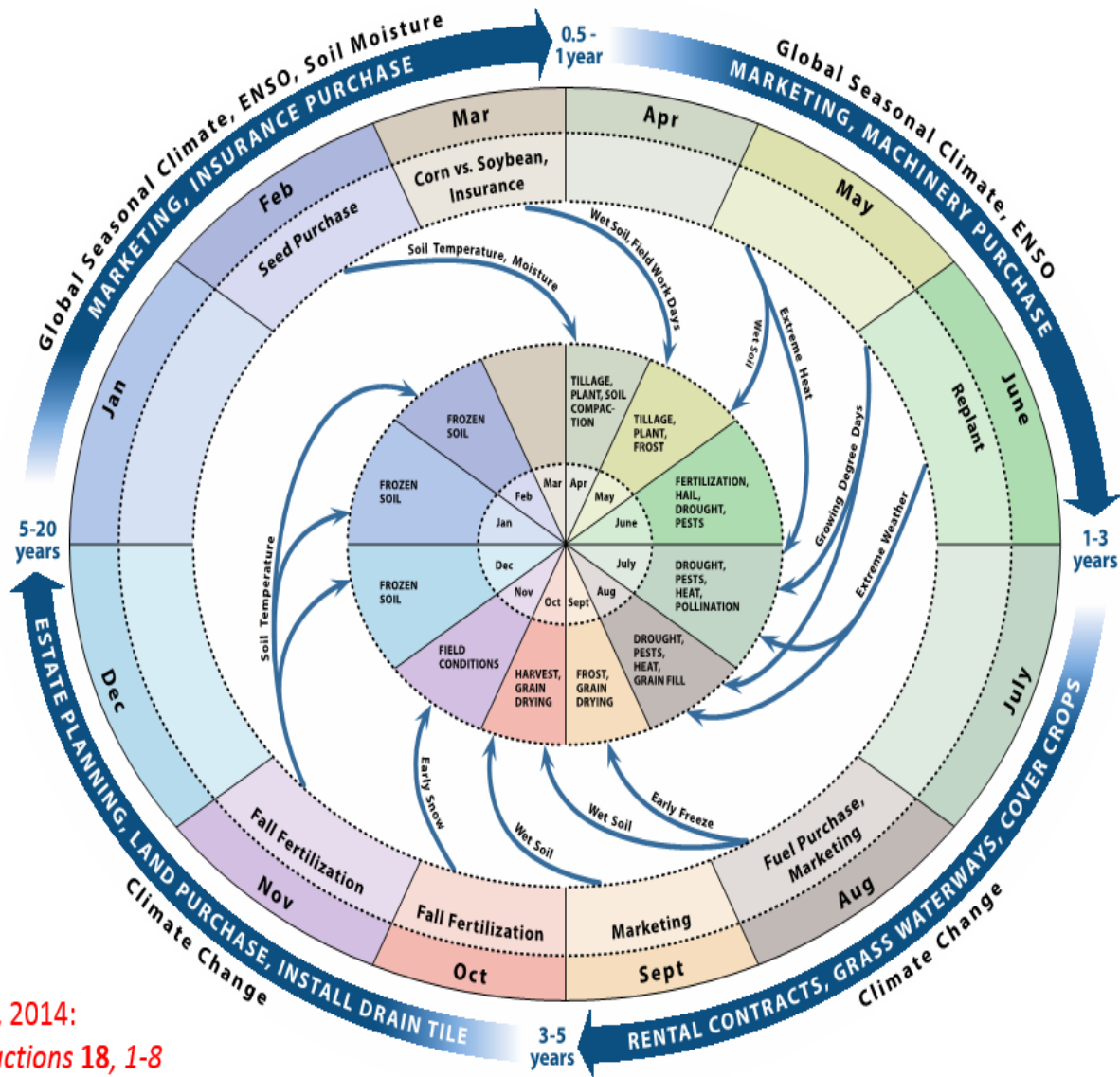
Wisconsin Cranberry Production Decisions

During a Drought Year



Legend:
 ■ Outcome Observed
 ■ Drought Concerns
 ■ Management Decisions
 ■ Crop Phenology

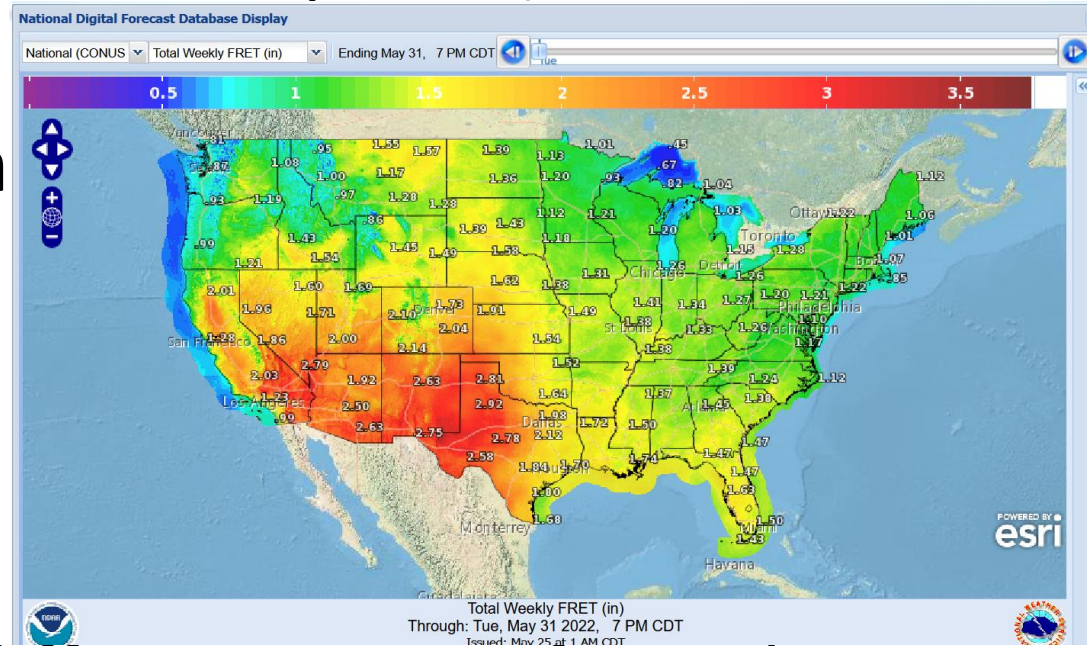
Midwest Corn Growers' Decision Calendar



Takle, et al., 2014:
Earth Interactions 18, 1-8

New-Improved Outlooks - Agriculture

- Growing season issues
- Soil moisture (when can we plant?)
- Soil temperature
- Evapo-transpiration
- Humidity
- Solar radiation
- Extreme heat – at different times of year (not just threatening)
- Extreme humidity events



Some “best practices”

- Go to groups where they are – “listen”
- Work with intermediaries who can speak and understand weather/climate and end users.
- *You can have any color you want as long as it is black...* Be will to adapt products services to needs.



Some “best practices”

- Develop relationships and cultivate them.
- Where possible evaluate services. Ask if needs are being met. How are people using them.
- Develop a relationship with your Climate Hub (let me know if you can't....)

For More Information



@USDAClimateHubs
@dennistoday



<https://www.climatehubs.usda.gov/hubs/midwest>



Midwest Climate Hub
U.S. DEPARTMENT OF AGRICULTURE

**National Laboratory for Agriculture and the
Environment**

Attn: Midwest Climate Hub
1015 N University Blvd
Ames, Iowa 50011-3611

Dennis Todey, Director

515-294-2013

Dennis.todey@usda.gov

Laurie Nowatzke,

Coordinator

515-294-0213

Laurie.nowatzke@usda.gov

Ongoing Projects

Technical Support

*Facilitating engagement, discovery
and exchange*

Informing updates to NRCS practice standards



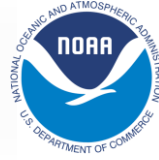
Convening relevant partners for collaboration and technical discussions around special/emerging topics

- Inversion drift
- State climate ag summaries
- Specialty crop impacts and adaptation

Connecting with NRCS on new practices/standards/education (developing)

Ongoing Projects

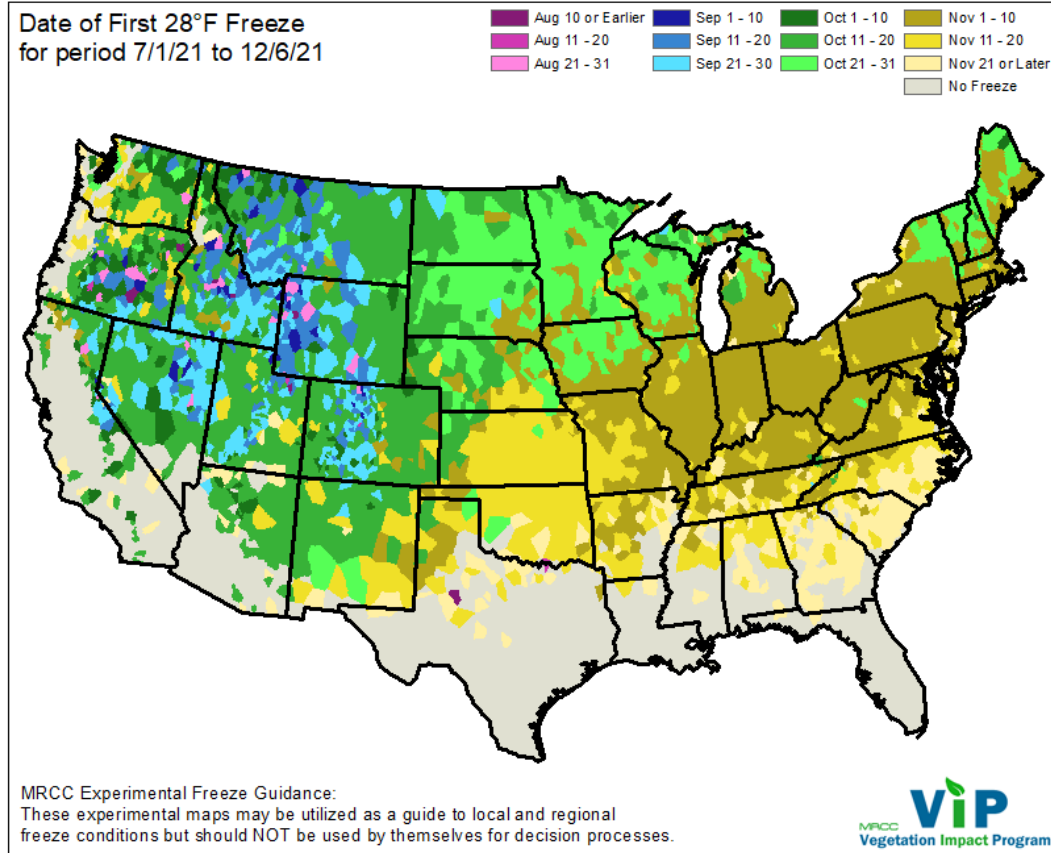
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