

~~El Niño~~, La Niña, Drought and a Whole Lot More!

IFB Spring Webinar

Dennis Todey, Director

USDA Midwest Climate Hub

4 April 2024



Topics/Agenda

- A brief Background of USDA Climate Hubs
 - Partners, Executive Committee and Steering Committee
 - More on the Midwest Climate Hub
- Tools
- Climate Issues
- Current Conditions
- Drought/El Niño
- Outlook and more
- For More Information
 - Resources
 - Website
 - Contact Info



Intro to Climate Hubs



Assessments and Syntheses
Delivering relevant information

Outreach and Education
Enabling climate-informed decisions

Technical Support
Facilitating engagement, discovery and exchange

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.

Let us know if you have other needs...

TOOLS

Soil Temperature Climatology (ver. 1)

Soil Temperature Climatology

Average Date

- | | | | |
|------------------|----------------|----------------|----------------|
| 09-10 or Earlier | 10-01 to 10-10 | 11-01 to 11-10 | 12-01 to 12-10 |
| 09-11 to 09-20 | 10-11 to 10-20 | 11-11 to 11-20 | 12-11 to 12-20 |
| 09-21 to 09-30 | 10-21 to 10-31 | 11-21 to 11-30 | 12-21 or Later |

Date When Soil Temperature Cools Below 50 °F

Select Threshold (°F)

50

Go to "Warms Above" View

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

About

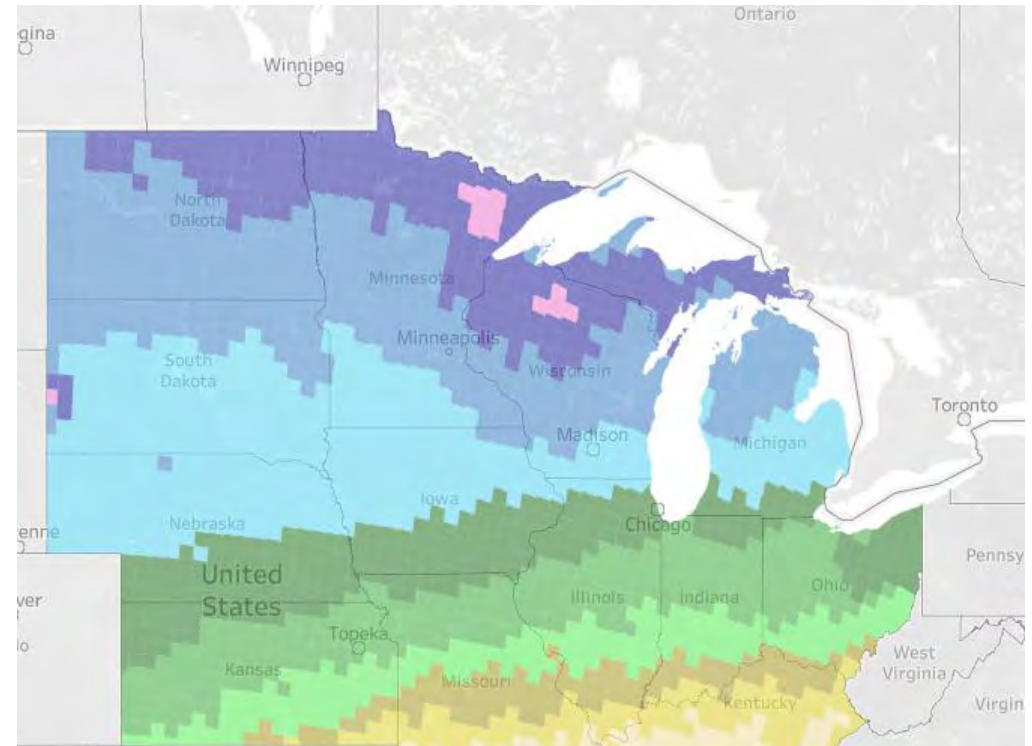


USDA Climate Hubs
U.S. DEPARTMENT OF AGRICULTURE

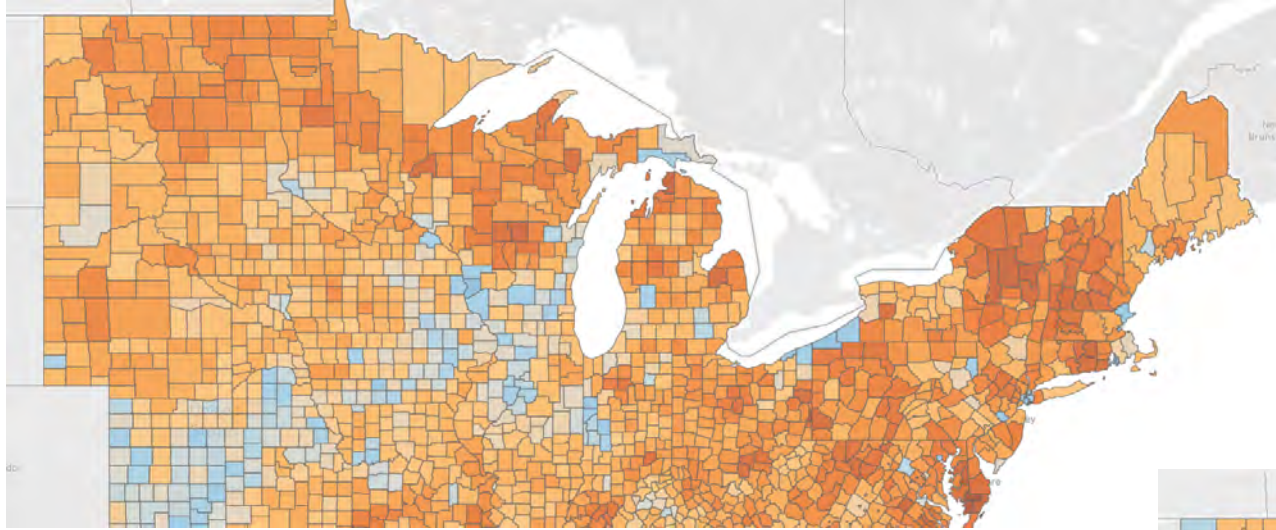
This tool funded by USDA Agricultural Research Service (ARS) Midwest Climate Hub/National Program 216 Sustainable Agriculture.

Soil Temperature Climatology (ver. 1)

- Focus on average dates (50 F – spring and fall)
- Soil freeze dates – much more variable
- Watch for spring webinar
- <https://www.climatehubs.usda.gov/hubs/midwest/tools/tracking-soil-temperatures-north-central-united-states>
-
- Additional updates to the product
 - Changes over time
 - Data availability

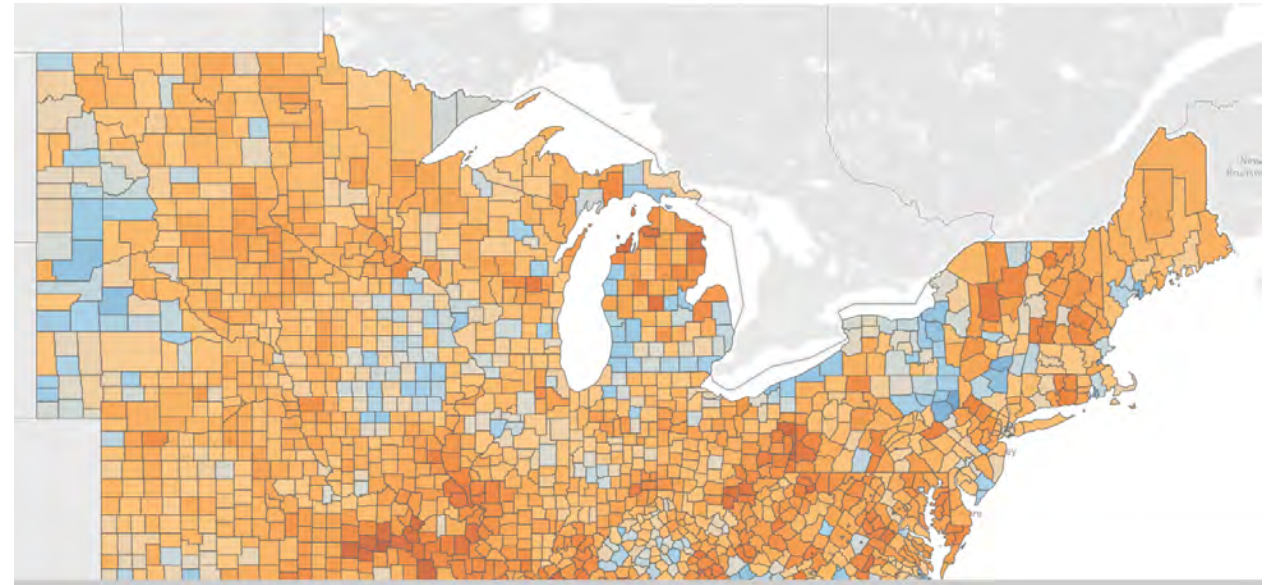


Regional Frost-Free Season Change



Fall – First 28 F Day Trend

Decadal Change (Days)



Spring – Last 28 F Day Trend

Decadal Change (Days)

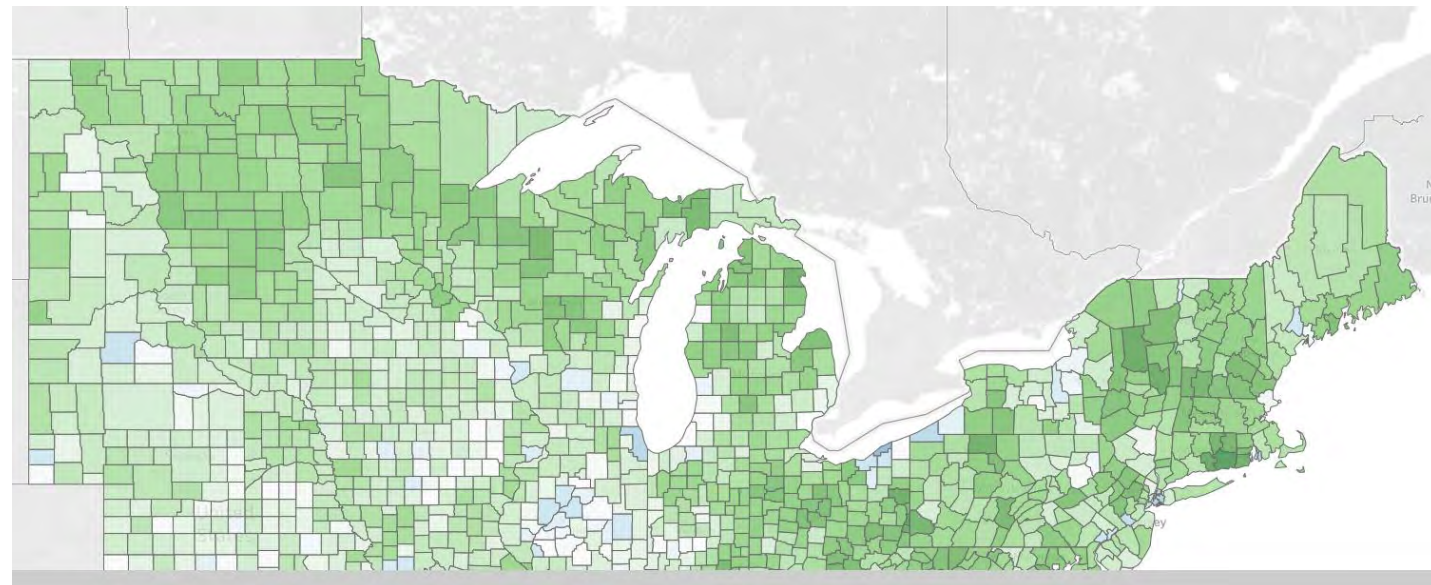


Regional Frost-Free Season Change

- Growing season length
- Statistical significance
- Various temperature cut-offs.
- Understand season lengths
- Regional variations

Growing Season Length Trend

Decadal Change (Days)
-10.0 10.0



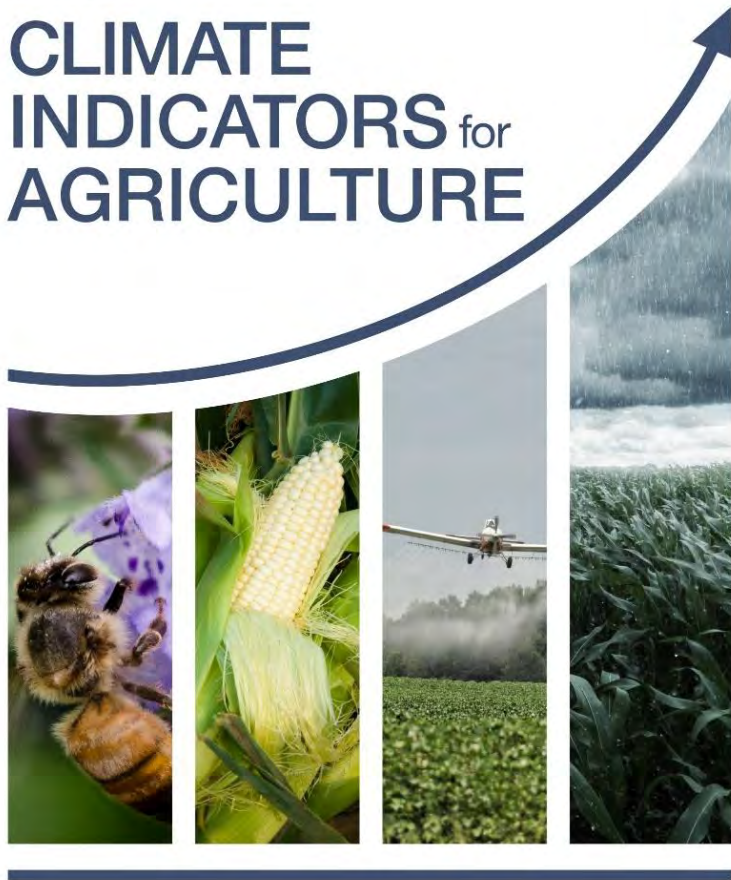
What is happening?

CLIMATE ISSUES AND AGRICULTURE

United States
Department
of Agriculture
Climate Change
Program Office
Technical Bulletin 1953



CLIMATE INDICATORS for AGRICULTURE



Climate Change Indicators for Agriculture

ISU Extension Agronomy Fall Meeting

22 September 2020

Dennis Todey

USDA Midwest Climate Hub


https://www.usda.gov/sites/default/files/documents/climate_indicators_for_agriculture.pdf

<https://naldc.nal.usda.gov/catalog/7201760>

Climate Hub – Ongoing Projects

USDA Climate Hubs
U.S. DEPARTMENT OF AGRICULTURE

GLISA
A NOAA RISA TEAM



Climate Change Impacts on Illinois Agriculture

Kristen Giesting
Todd Ontl
William Baule
Danielle Shannon
Jeff Andresen
Aaron Wilson
Laurie Nowatzke
Dennis Today

October 2022



Minnesota released last week

<https://www.climatehubs.usda.gov/hubs/midwest/topic/assessing-impacts-climate-change-midwest-agriculture>

Precipitation Change

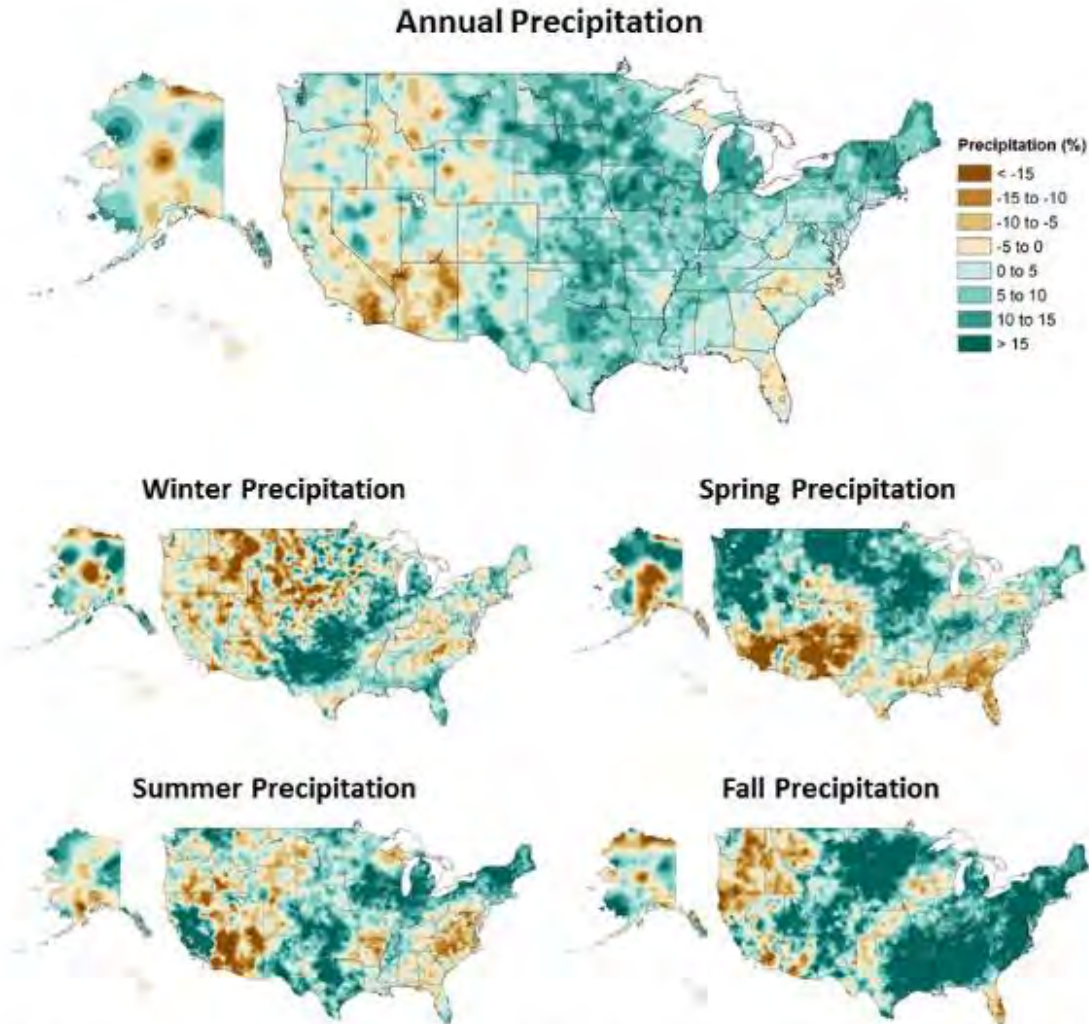


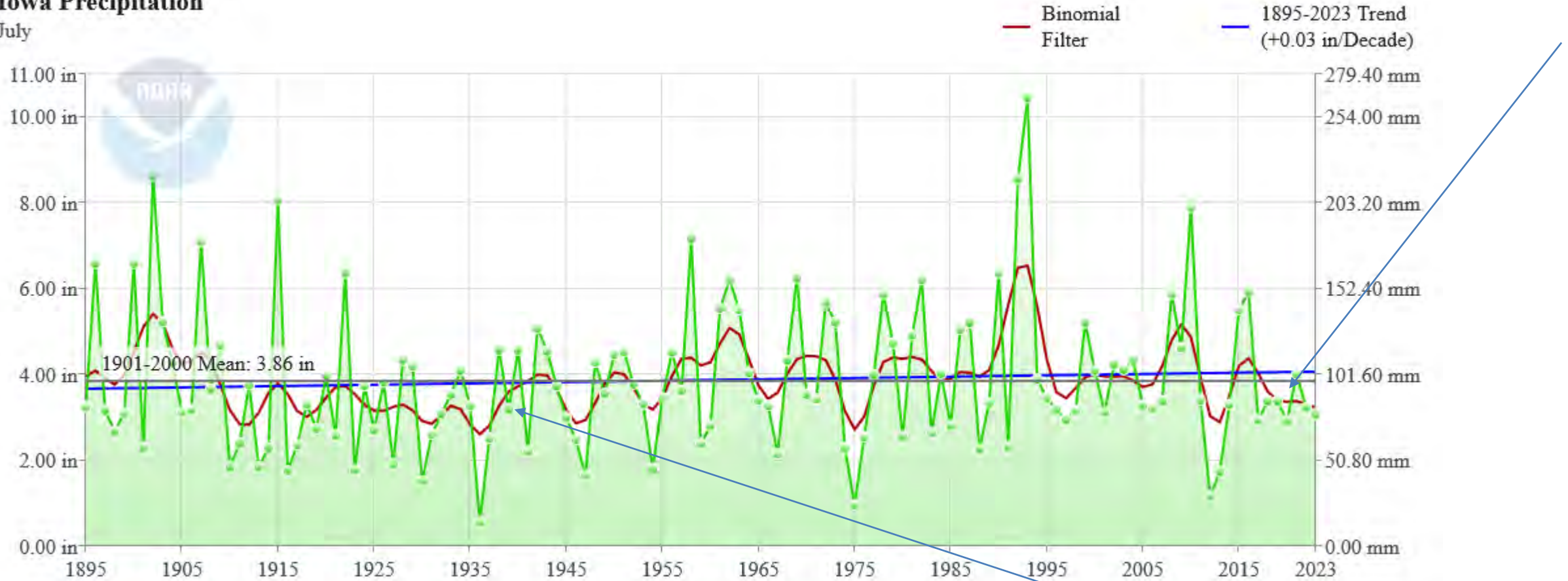
Figure 7.1: Annual and seasonal changes in precipitation over the United States. Changes are the average for present-day (1986–2015) minus the average for the first half of the last century (1901–1960 for the contiguous United States, 1925–1960 for Alaska and Hawai'i) divided by the average for the first half of the century. (Figure source: [top panel] adapted from Peterson et al. 2013,⁷⁸ © American Meteorological Society. Used with permission; [bottom four panels] NOAA, data source: nCLIMDiv).

Iowa July Precipitation

Monthly Climate Normals (1991-2020) – REDWOOD FALLS MUNICIPAL AIRPORT, MN

Iowa Precipitation

July



Powered by ACIS

Temperature Change

- Warming
 - Winter
 - Nights
- Adds livestock/human stress
- Push GDD accumulation/phenological state
- Does help increase frost free season period

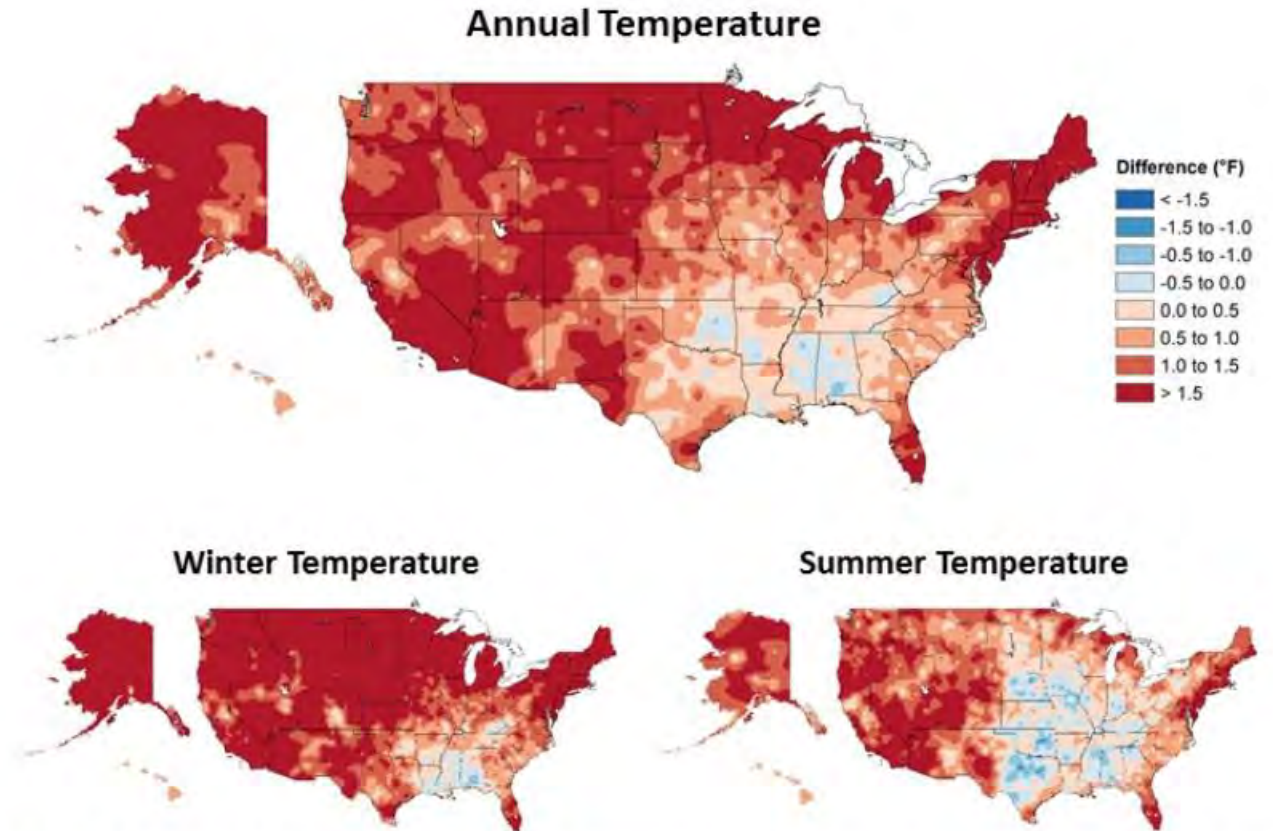
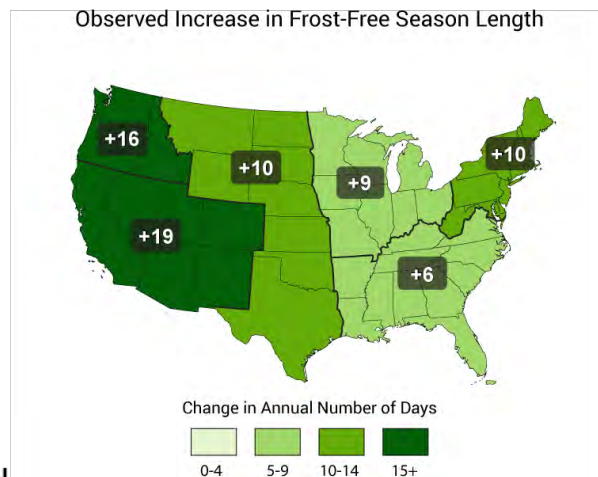
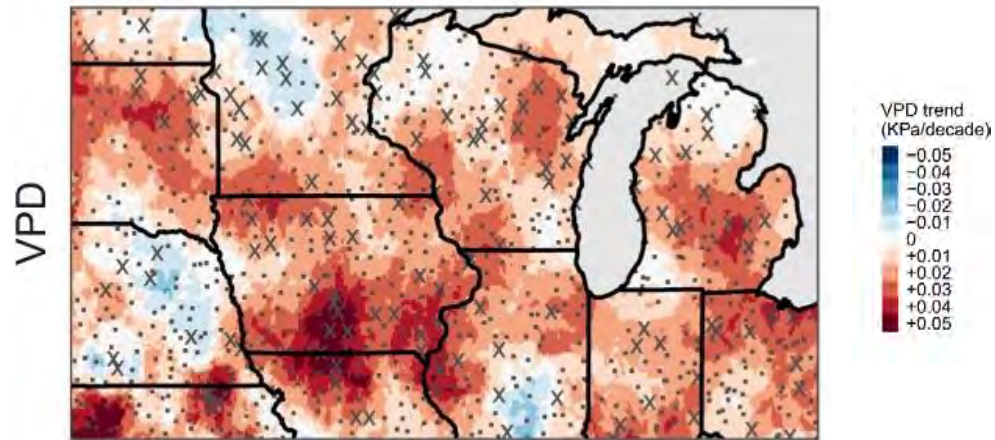
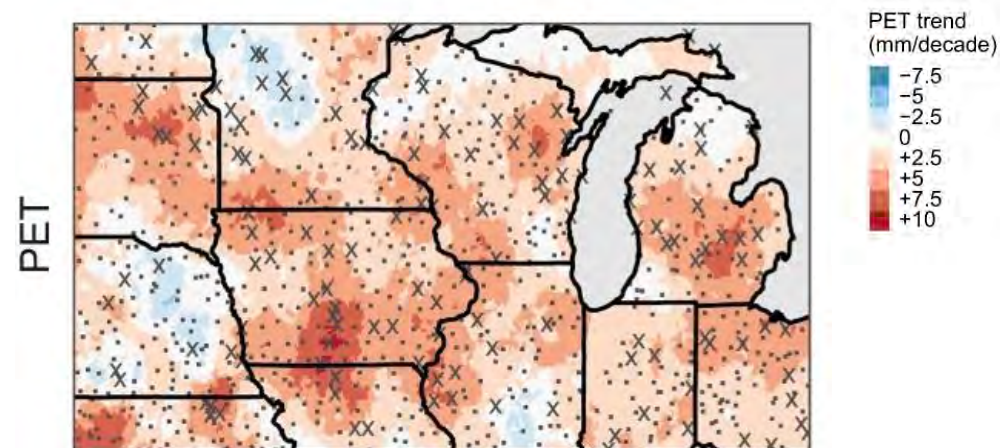


Figure 6.1. Observed changes in annual, winter, and summer temperature (°F). Changes are the difference between the average for present-day (1986–2016) and the average for the first half of the last century (1901–1960 for the contiguous United States, 1925–1960 for Alaska and Hawaii). Estimates are derived from the nClimDiv dataset.^{1,2} (Figure source: NOAA/NCEI).

30 Year Trend (Summer VPD and PET)



Trend to drier air – higher PET.



Where do we stand right now?

CURRENT CONDITIONS

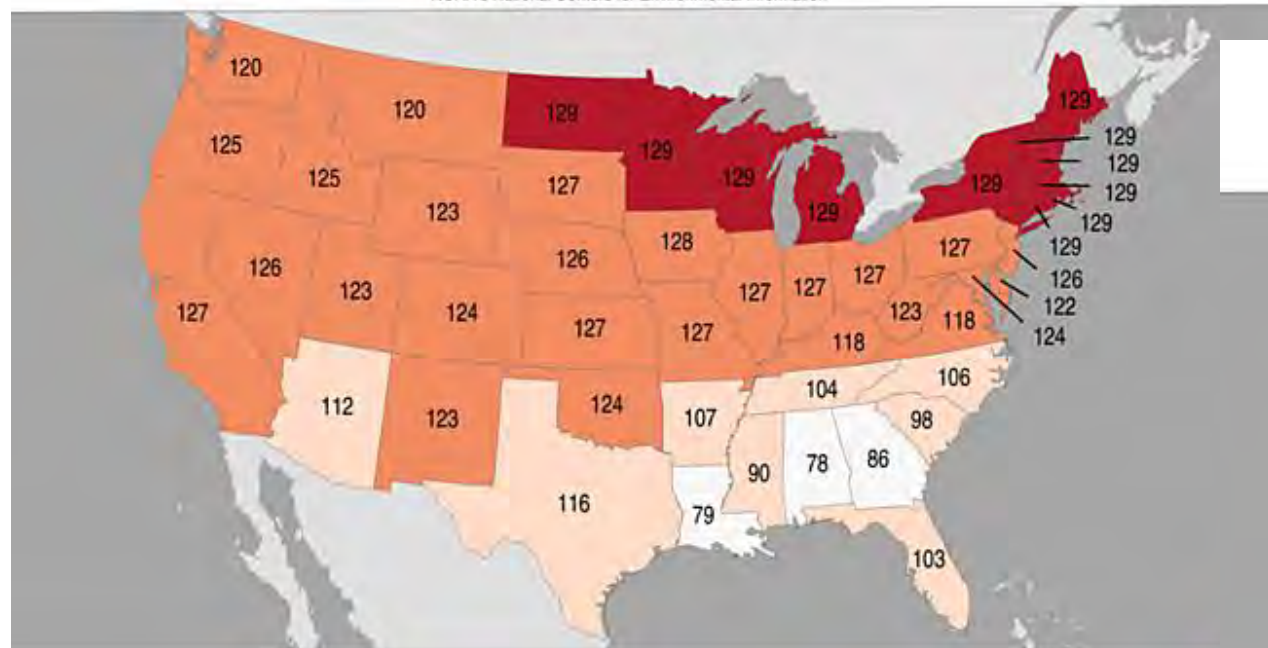
Winter Recap

Statewide Minimum Temperature Ranks

December 2023 – February 2024

Ranking Period: 1895–2024

NOAA's National Centers for Environmental Information



Created: Wed Mar 6 2024
Source: nClimGrid - Monthly

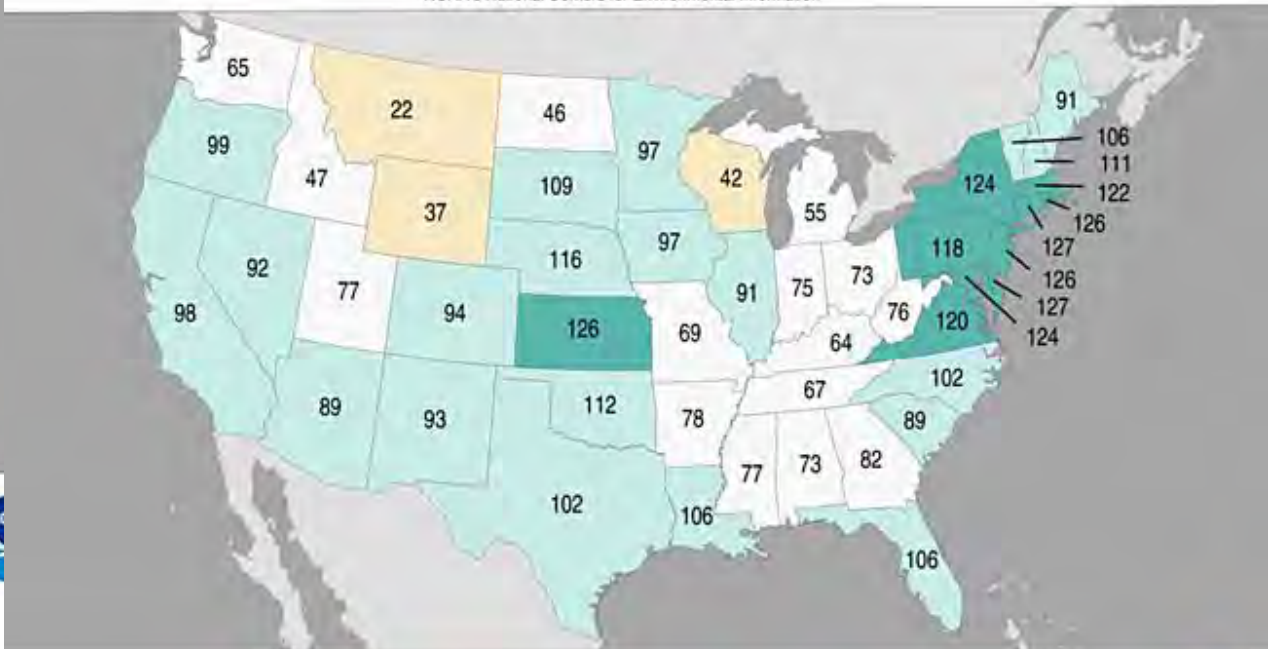
Winter near warmest/warmest on record Variable precipitation.

Statewide Precipitation Ranks

December 2023 – February 2024

Ranking Period: 1895–2024

NOAA's National Centers for Environmental Information



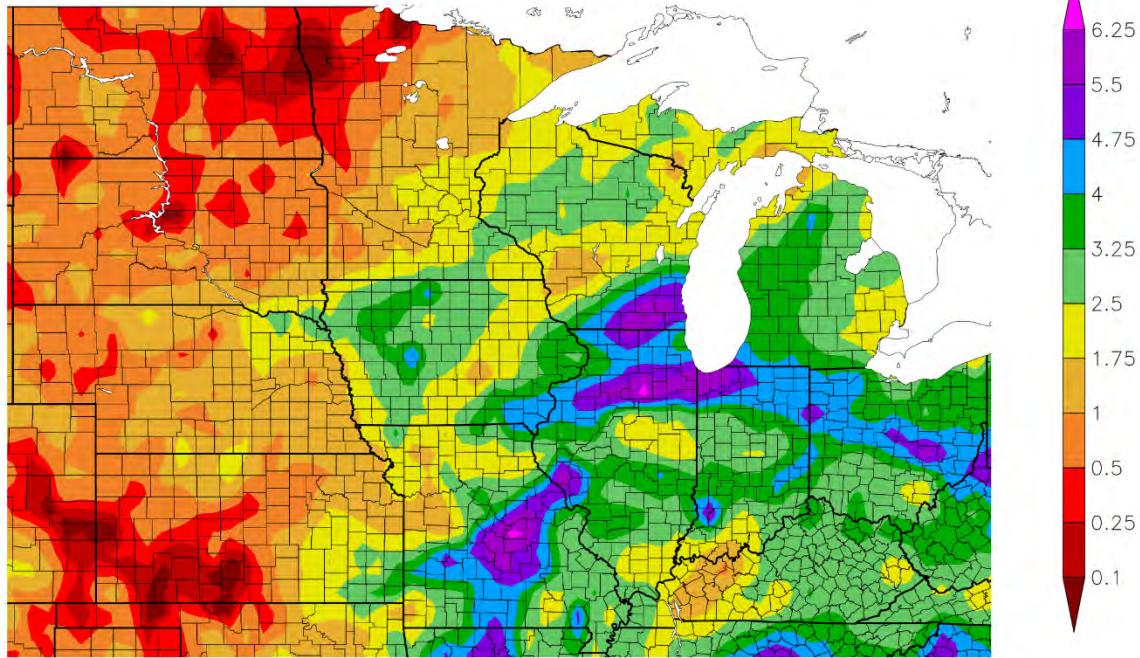
Created: Wed Mar 6 2024
Source: nClimGrid - Monthly

<https://www.ncei.noaa.gov/access/monitoring/us-maps/>



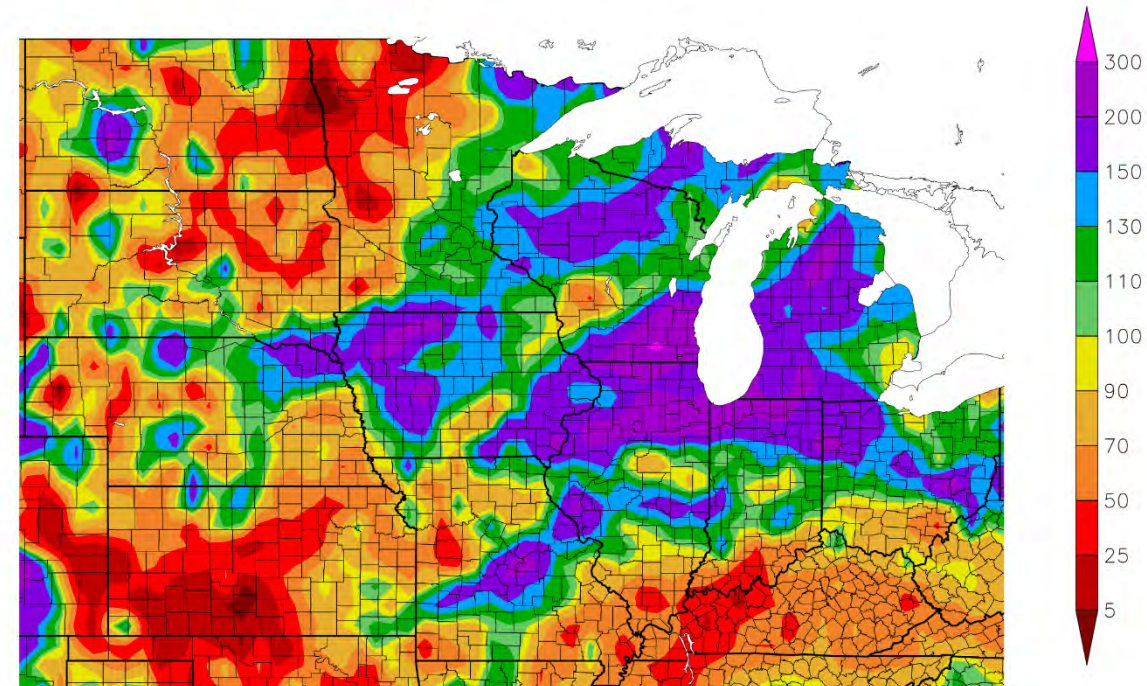
Precipitation (30 days)

Precipitation (in)
3/4/2024 – 4/2/2024



Dry conditions continue (north) – some improvement (south).

Percent of Normal Precipitation (%)
3/4/2024 – 4/2/2024



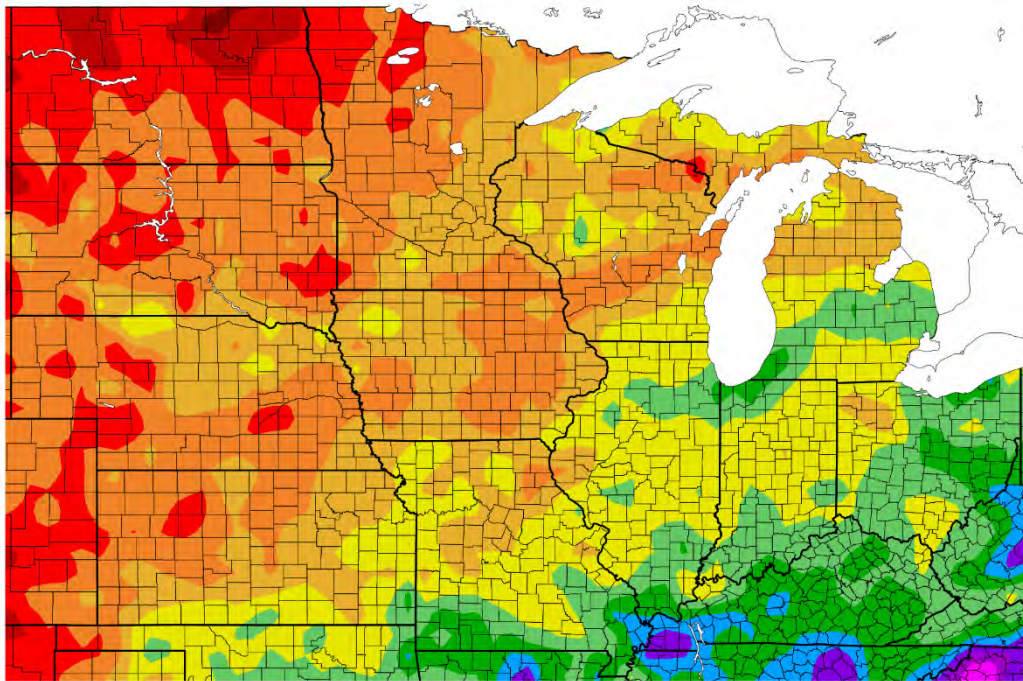
Generated 4/3/2024 at HPRCC using provisional data.

NOAA Regional Climate Centers

<https://hprcc.unl.edu/maps.php?maps=ACISClimateMaps>

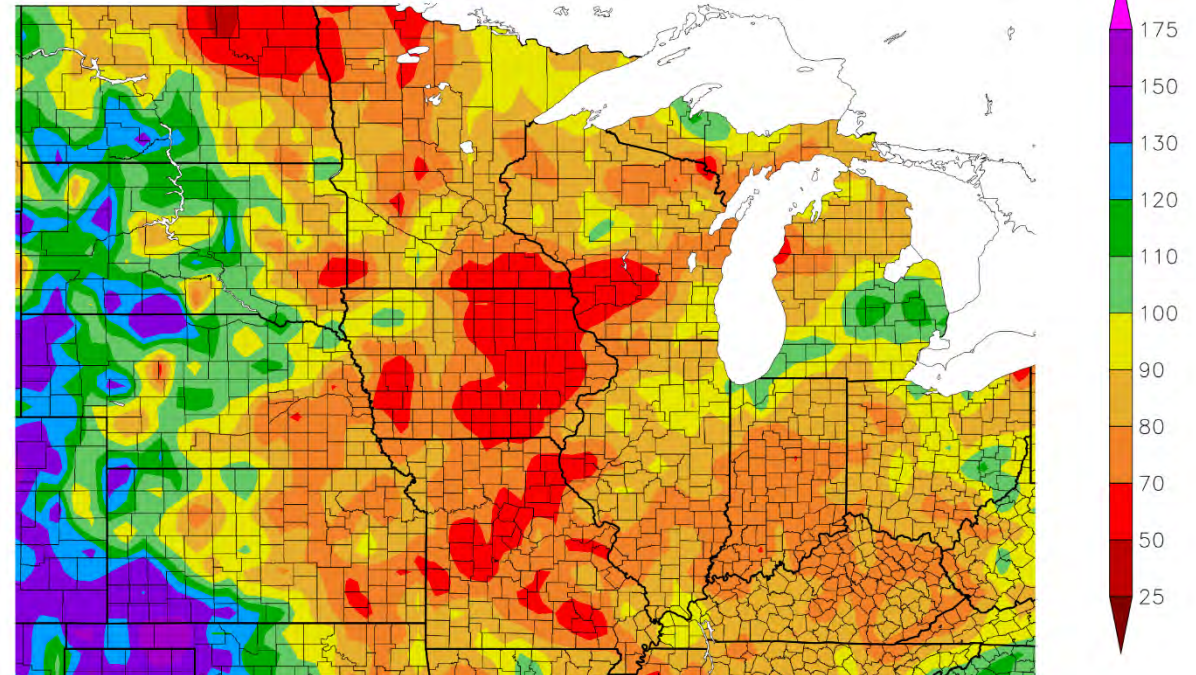
Precipitation (12 months)

Precipitation (in)
4/3/2023 - 4/2/2024



Longer term dry issues.

Percent of Normal Precipitation (%)
4/3/2023 - 4/2/2024

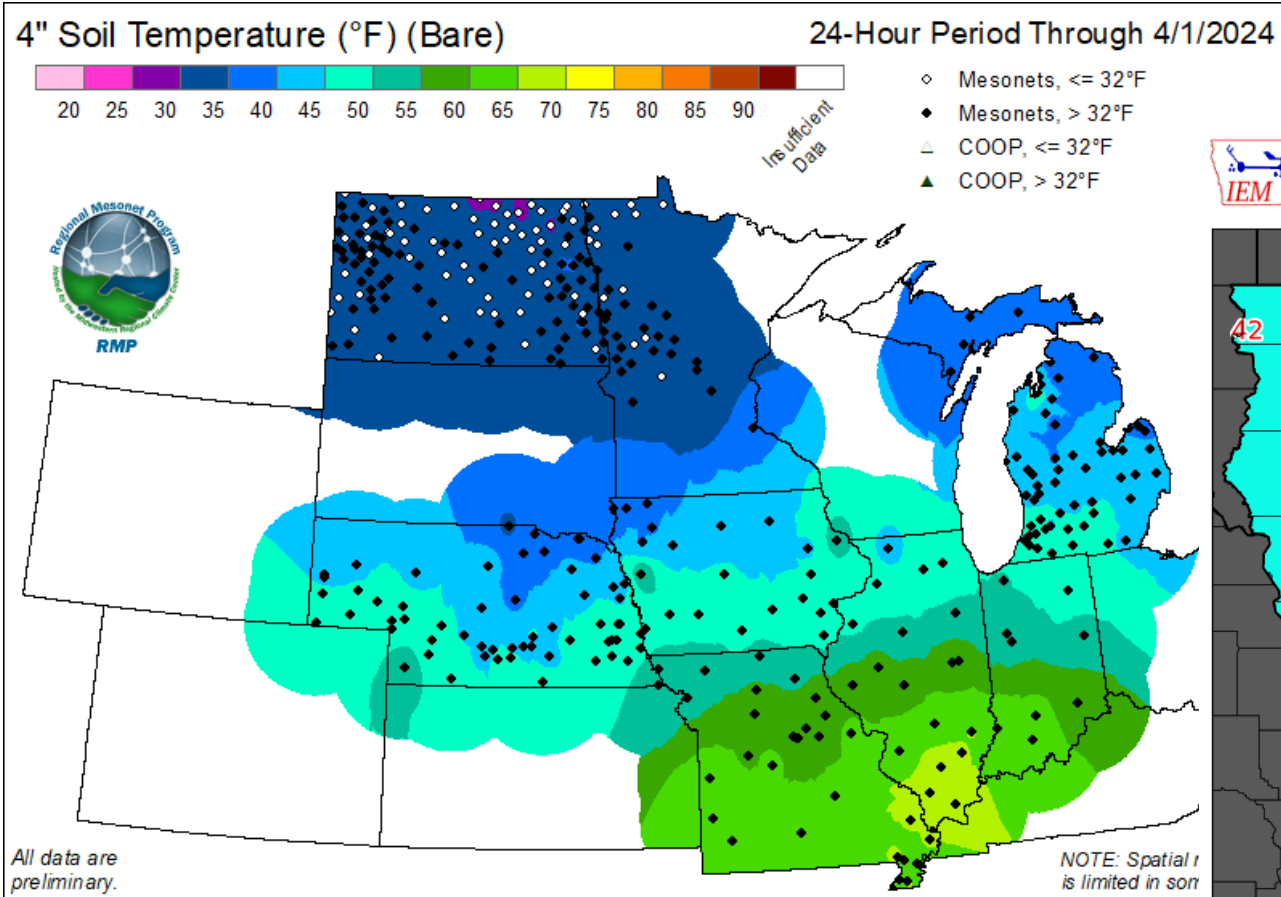


Generated 4/3/2024 at HPRCC using provisional data.

NOAA Regional Climate Centers

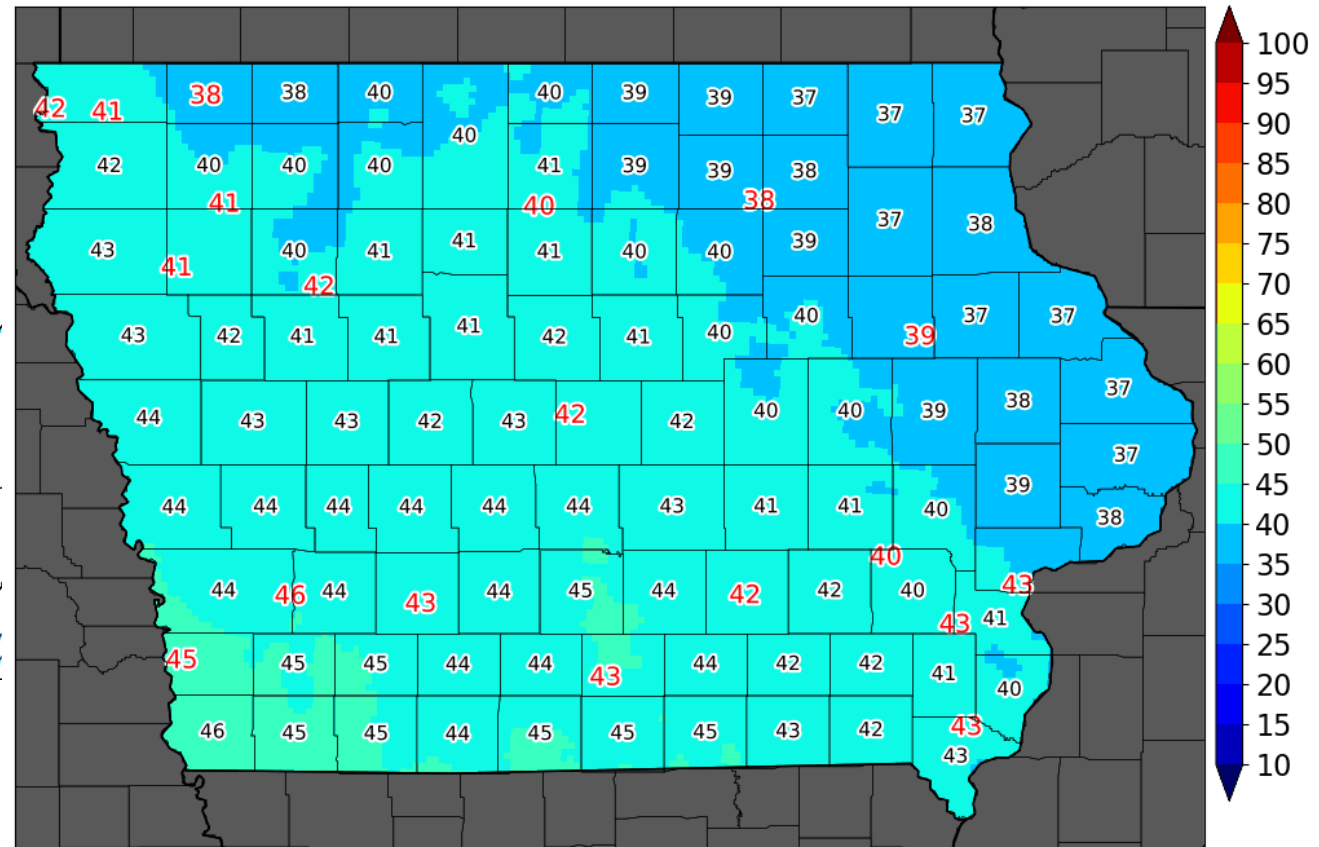
<https://hprcc.unl.edu/maps.php?maps=ACISClimateMaps>

Soil Temperature



Apr 03, 2024 Avg [(Hi+Lo)/2] Daily 4 inch Depth Soil Temp

County est. based on bias adj. NWS NAM Model (black numbers), ISUSM network observations (red numbers)



Iowa Environmental Mesonet :: generated 04 April 2024 01:51 AM

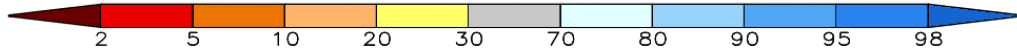
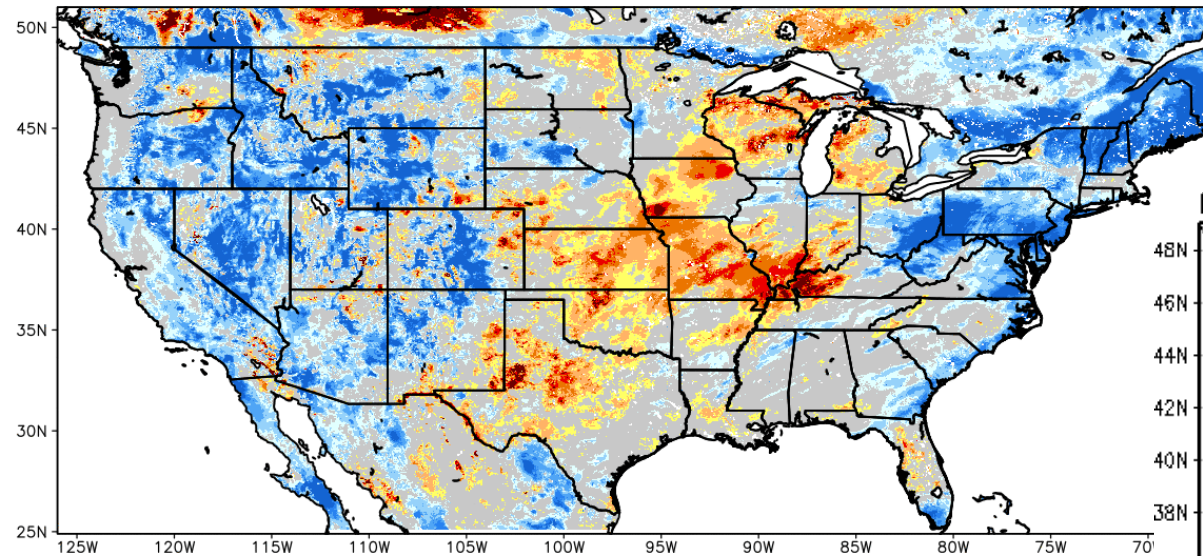
data units :: °F

<https://mrcc.purdue.edu/RMP/currentMaps>

<https://mesonet.agron.iastate.edu/agclimate/soilt.php>

Modeled Soil Moisture

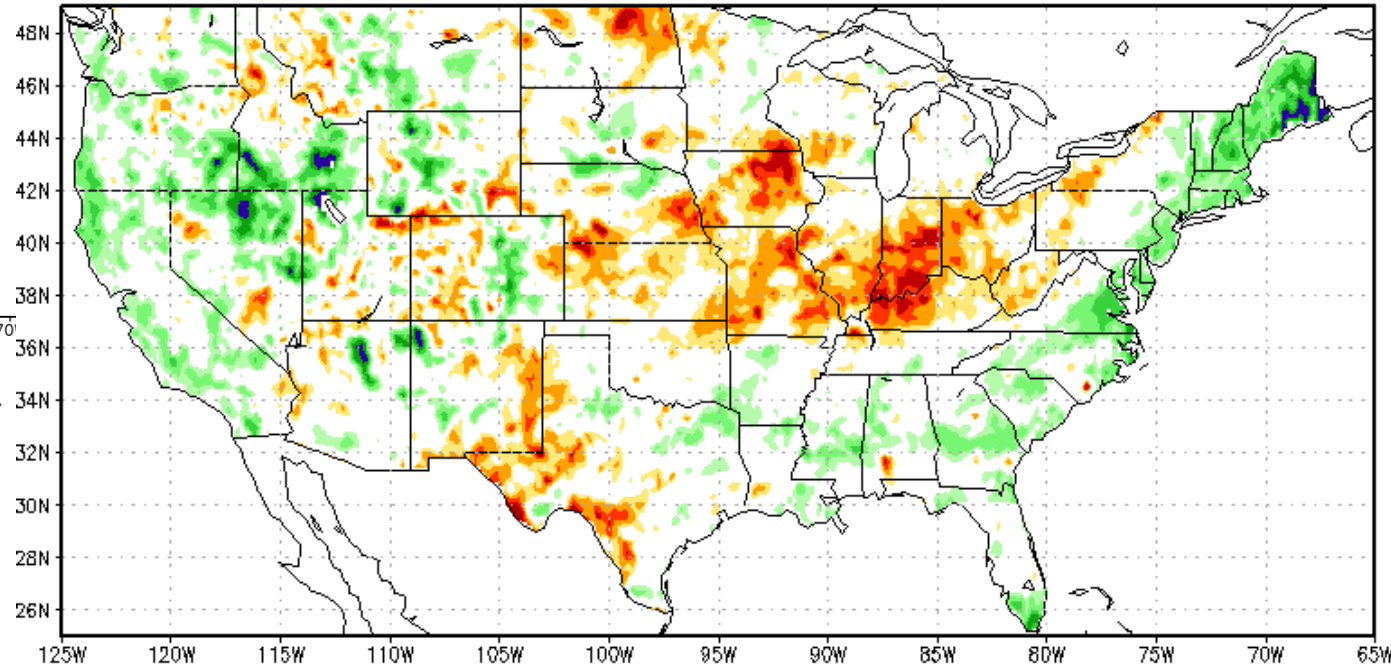
SPoRT-LIS 0-200 cm Soil Moisture percentile valid 04 Apr 2024



NOTE
Experimental

https://weather.msfc.nasa.gov/sport/case_studies/lis_CONUS.html
https://www.cpc.ncep.noaa.gov/products/Drought/Monitoring/smp_new.shtml#

Ensemble-Mean Current SMP 30Mar2024

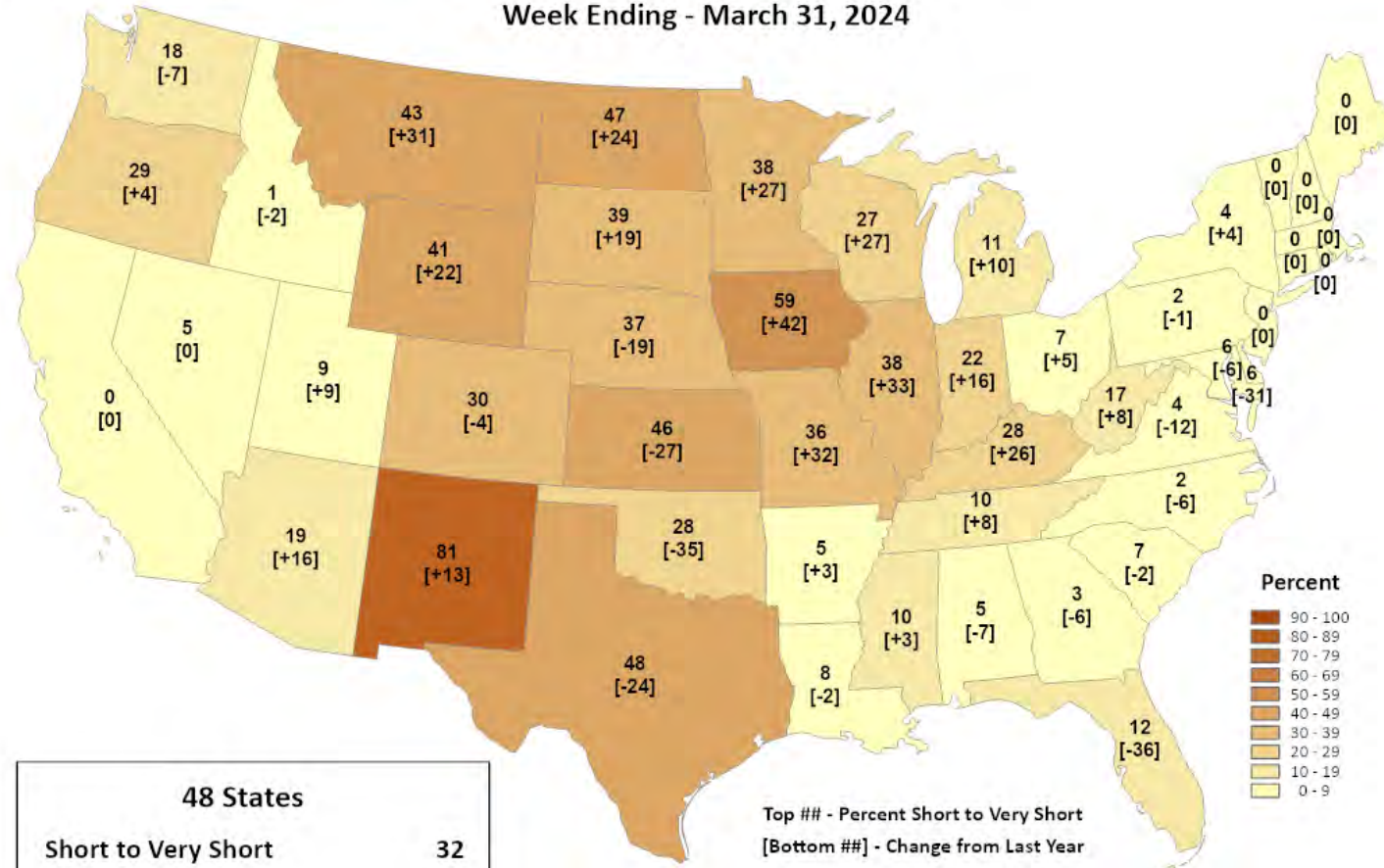


Soil Moisture (NASS)



This product was prepared by the
USDA Office of the Chief Economist (OCE)
World Agricultural Outlook Board (WAOB)

Topsoil Moisture Percent Short to Very Short Week Ending - March 31, 2024



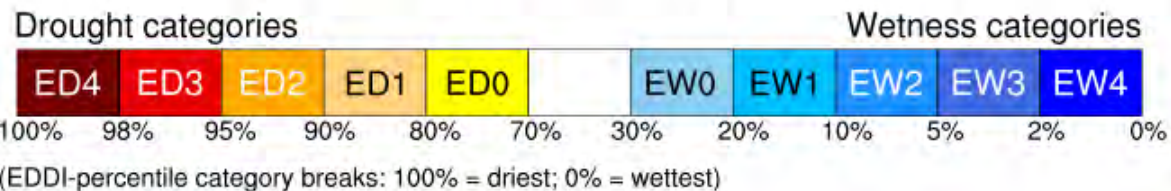
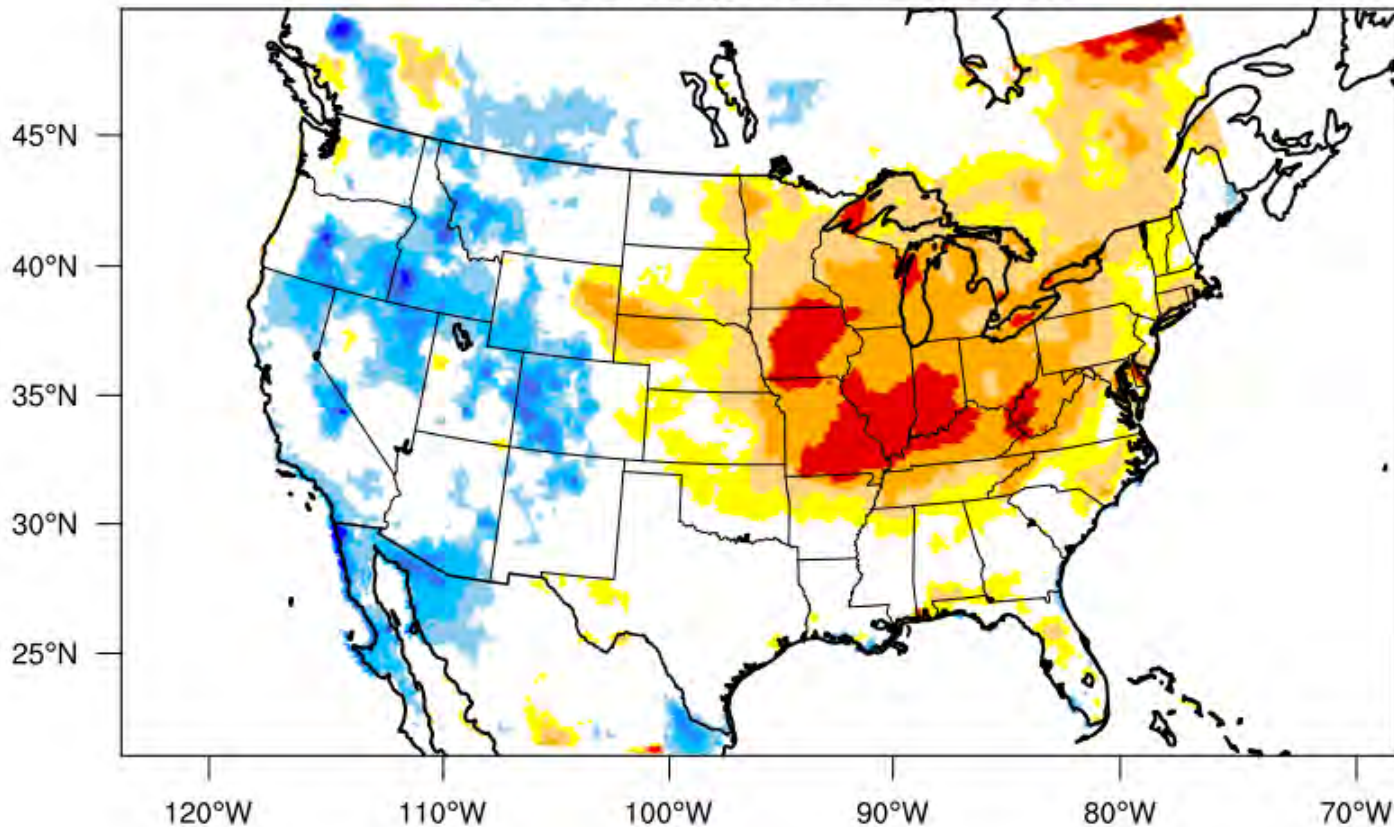
48 States	
Short to Very Short	32
Change from Last Year	+8

Top ## - Percent Short to Very Short
[Bottom ##] - Change from Last Year

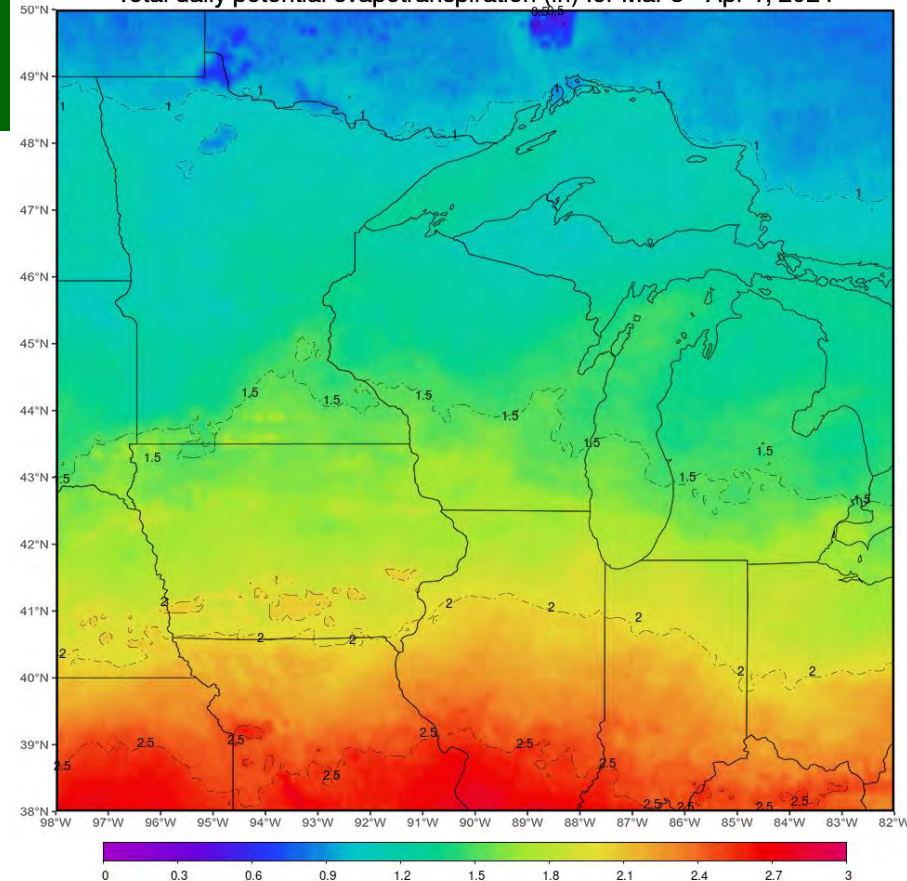
Data obtained from USDA National Agricultural Statistics Service weekly Crop Progress reports.

Evapo-transpiration

1-month EDDI categories for March 29, 2024



Total daily potential evapotranspiration (in) for Mar 3 - Apr 1, 2024



- ET – EDDI product eased since last month but still D2-D3 category common
- Plains not quite as significant.
- Amounts pushing 2" possible

Evaporation Growing Season 2023

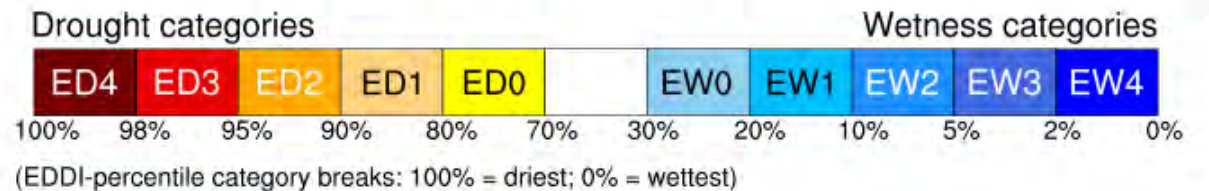
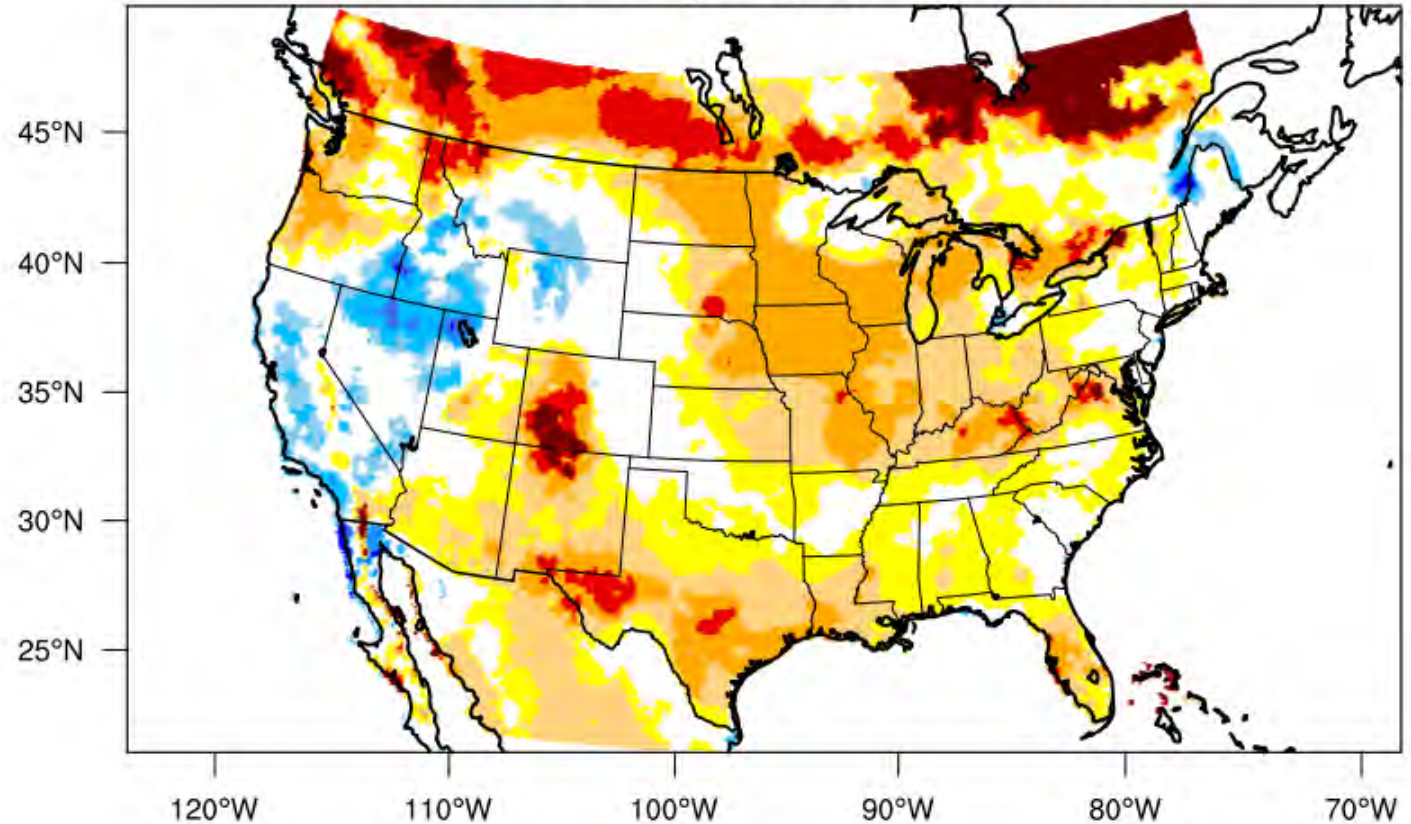
Very dry conditions continue.

Evaporative demand adding to the issue

Winter warmth also helps dry soils some.

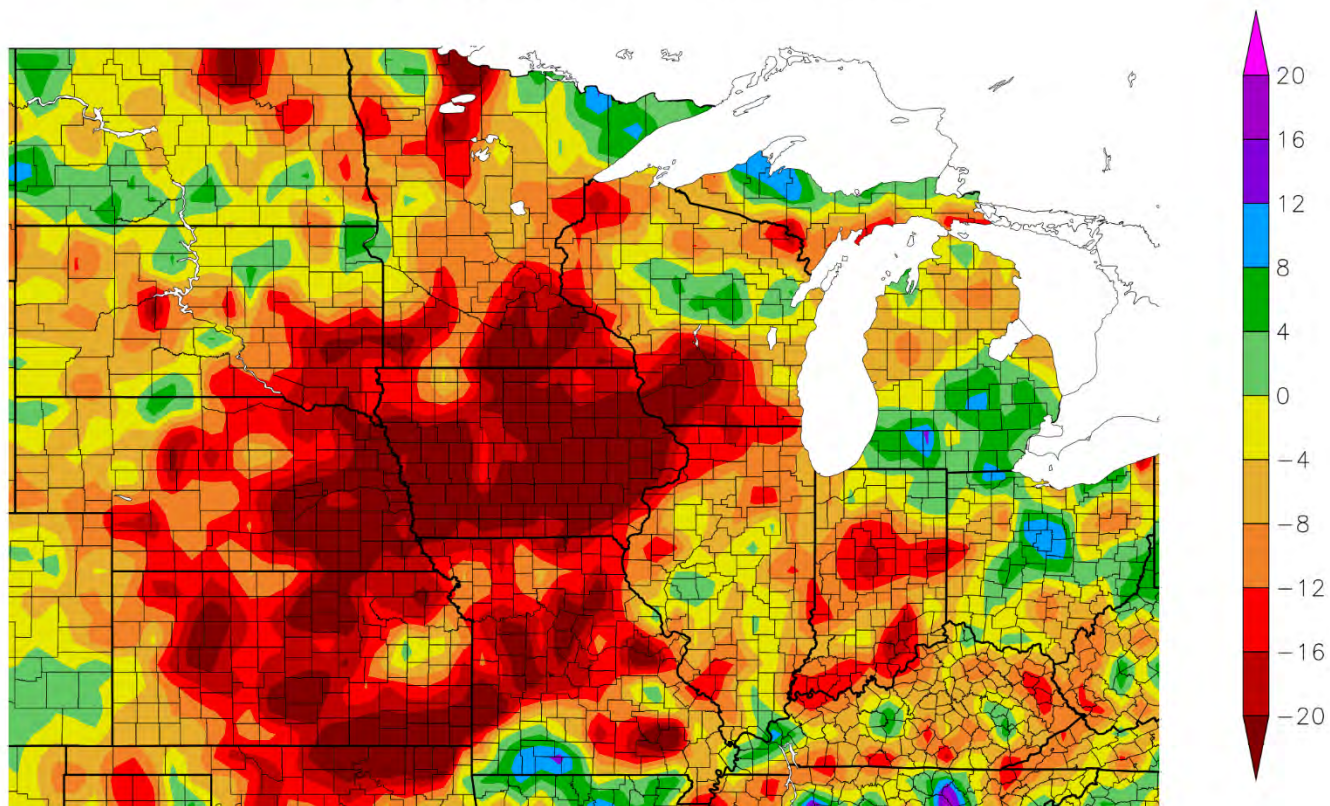
https://psl.noaa.gov/eddi/#current_conditions

9-month EDDI categories for November 27, 2023



Precipitation (departure last 3 years)

Departure from Normal Precipitation (in)
3/27/2021 – 3/26/2024



Generated 3/27/2024 at HPRCC using provisional data.

NOAA Regional Climate Centers

<https://hprcc.unl.edu/maps.php?maps=ACISClimateMaps>

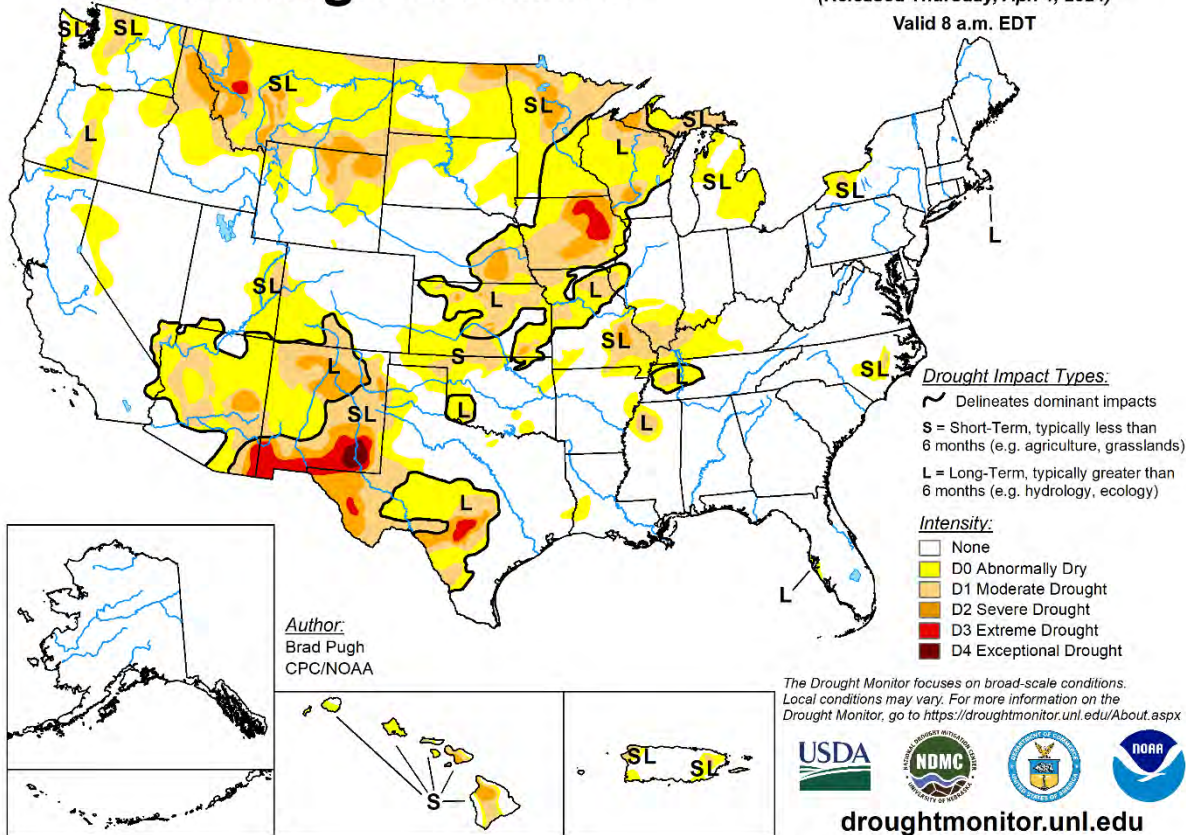
Climate context

DROUGHT

Drought Monitor

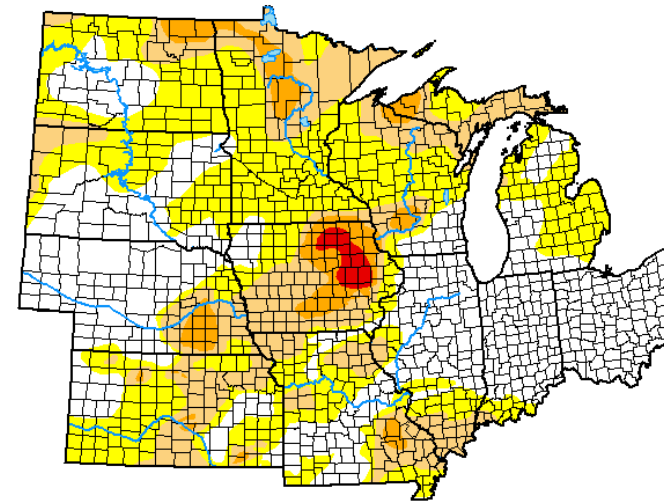
U.S. Drought Monitor

April 2, 2024
 (Released Thursday, Apr. 4, 2024)
 Valid 8 a.m. EDT



U.S. Drought Monitor North Central States

April 2, 2024
 (Released Thursday, Apr. 4, 2024)
 Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	38.82	61.18	25.26	5.92	0.85	0.00
Last Week 03-26-2024	36.99	63.01	24.79	6.05	0.89	0.00
3 Months Ago 01-02-2024	37.52	62.48	38.54	16.91	3.77	0.02
Start of Calendar Year 01-02-2024	37.52	62.48	38.54	16.91	3.77	0.02
Start of Water Year 09-26-2023	25.87	74.13	49.98	25.16	7.67	0.73
One Year Ago 04-04-2023	50.91	49.09	27.71	16.49	9.03	4.59

Intensity:
 None
 D0 Abnormally Dry
 D1 Moderate Drought
 D2 Severe Drought
 D3 Extreme Drought
 D4 Exceptional Drought

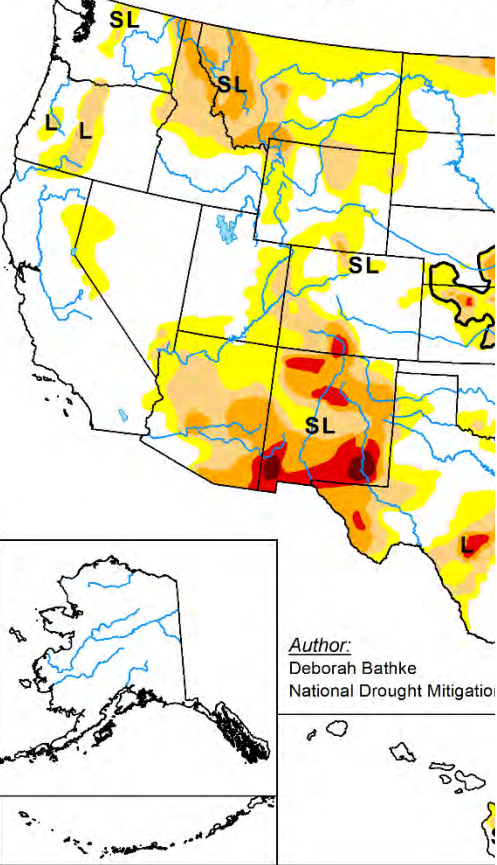
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:
 Brad Pugh
 CPC/NOAA

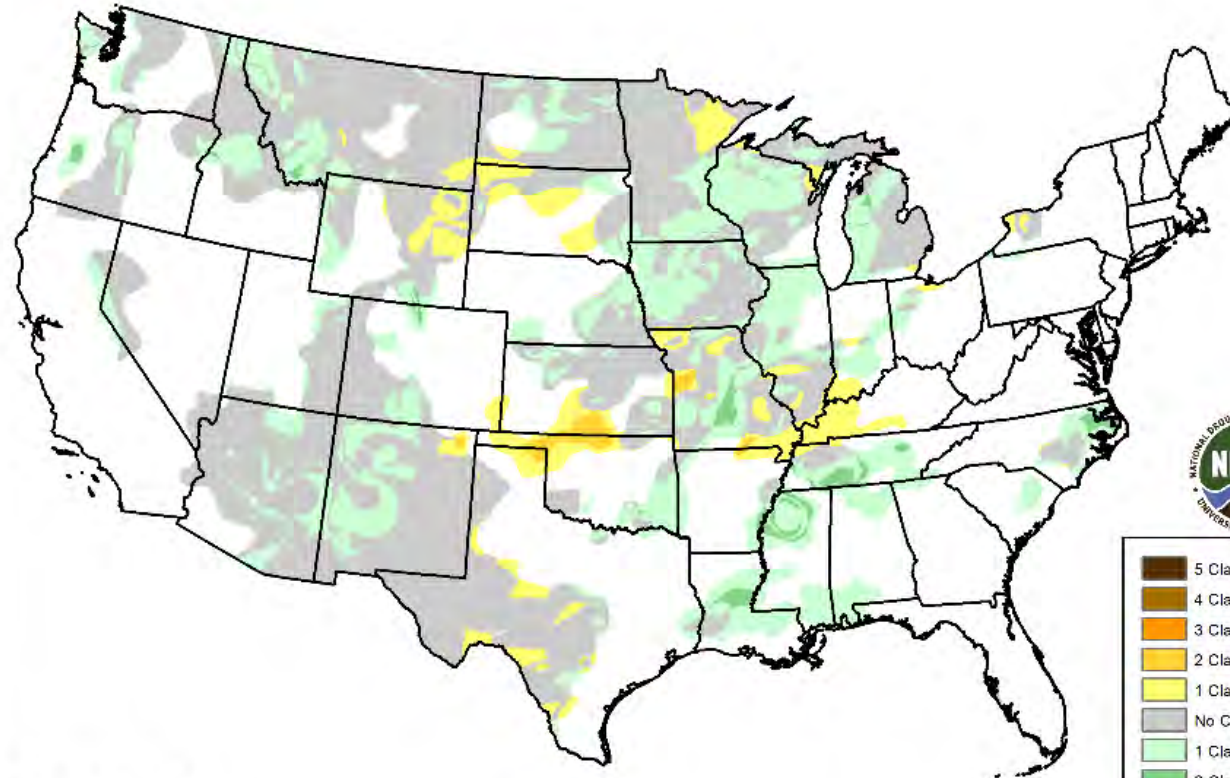


Drought Monitor

U.S. Drought Monitor

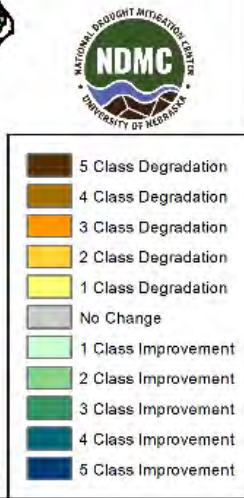


U.S. Drought Monitor Class Change - CONUS 4 Week



March 26, 2024
compared to
February 27, 2024

droughtmonitor.unl.edu



February 6, 2024
(Released Thursday, Feb. 8, 2024)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	48.13	51.87	22.79	8.95	1.43	0.00
Last Week 01-30-2024	47.81	52.19	23.62	9.25	1.45	0.00
3 Months Ago 11-07-2023	43.93	56.07	31.77	15.76	3.79	0.47
Start of Calendar Year 01-02-2024	37.52	62.48	38.54	16.91	3.77	0.02
Start of Water Year 09-26-2023	25.87	74.13	49.98	25.16	7.67	0.73
One Year Ago 02-07-2023	36.16	63.84	44.00	21.55	11.45	5.07

Intensity:



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

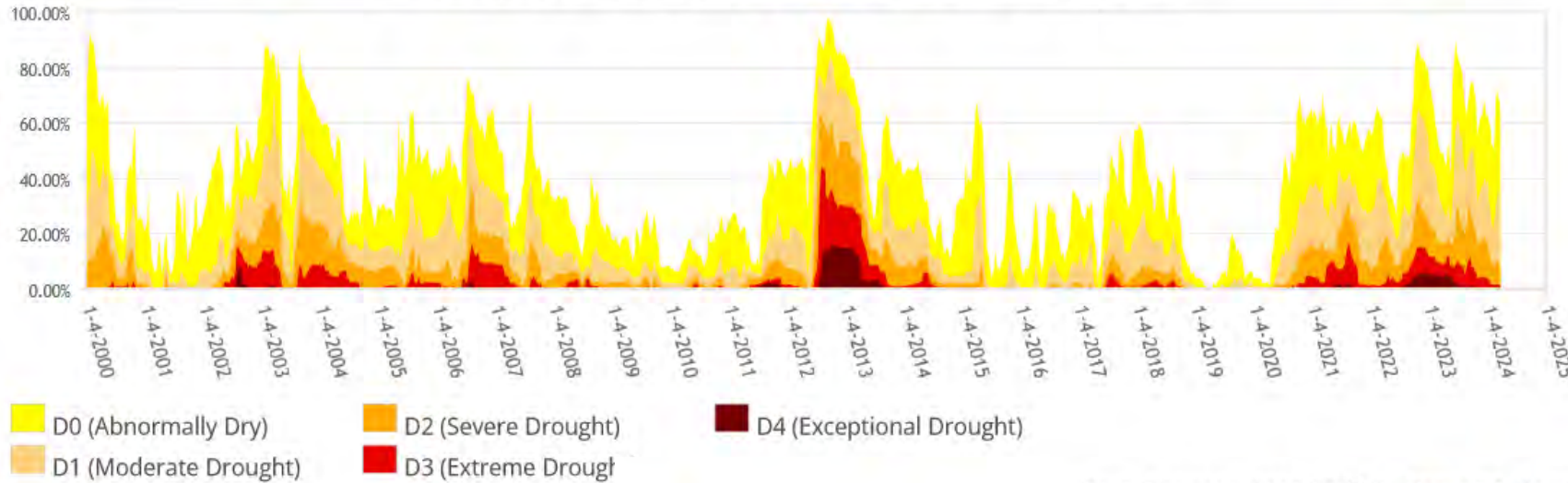
Author:
Deborah Bathke
National Drought Mitigation Center



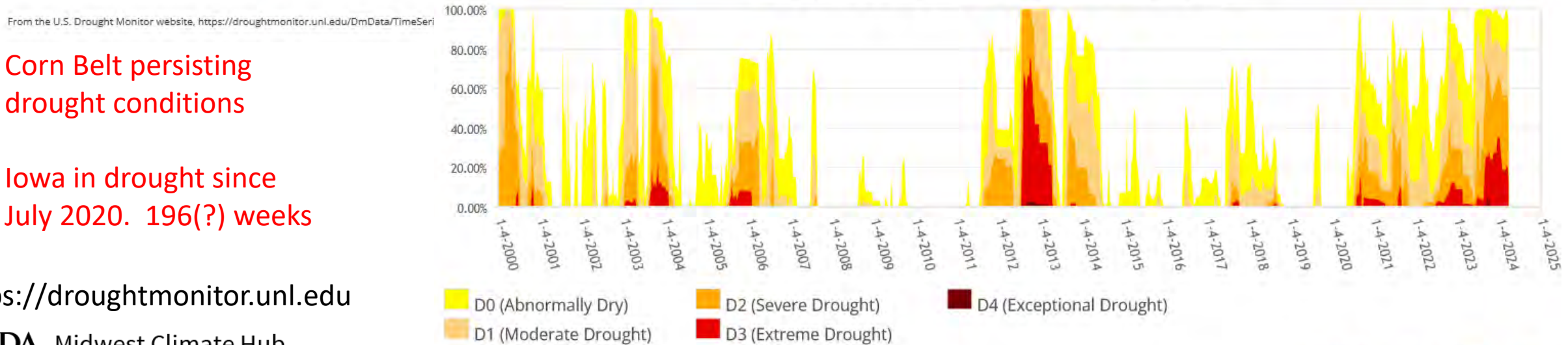
droughtmonitor.unl.edu

Drought-context

North Central Percent Area in U.S. Drought Monitor Categories



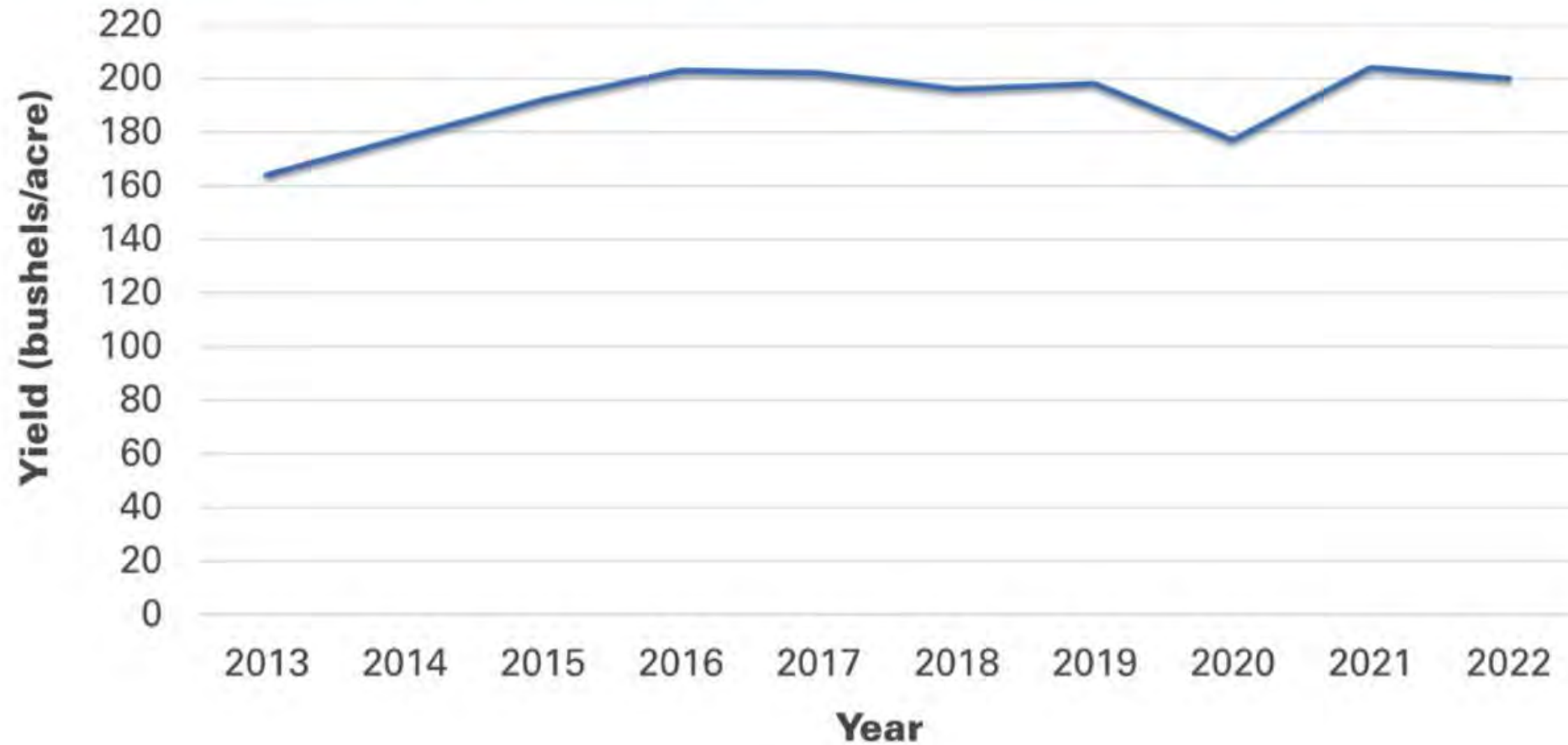
Iowa Percent Area in U.S. Drought Monitor Categories



<https://droughtmonitor.unl.edu>

Climate/Drought – Yield Impacts?

Figure 2. Iowa average corn yields, 2013-2022



Things you can do - reporting

Drought Impacts Toolkit

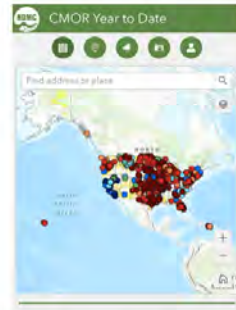
Home Tools Emerging Impacts Impact Assessments

CMOR Desktop and Mobile Options



CMOR Reports Dashboard for desktop
(Includes reports 2018-present and more filter options)

Map of Reports Submit a Report



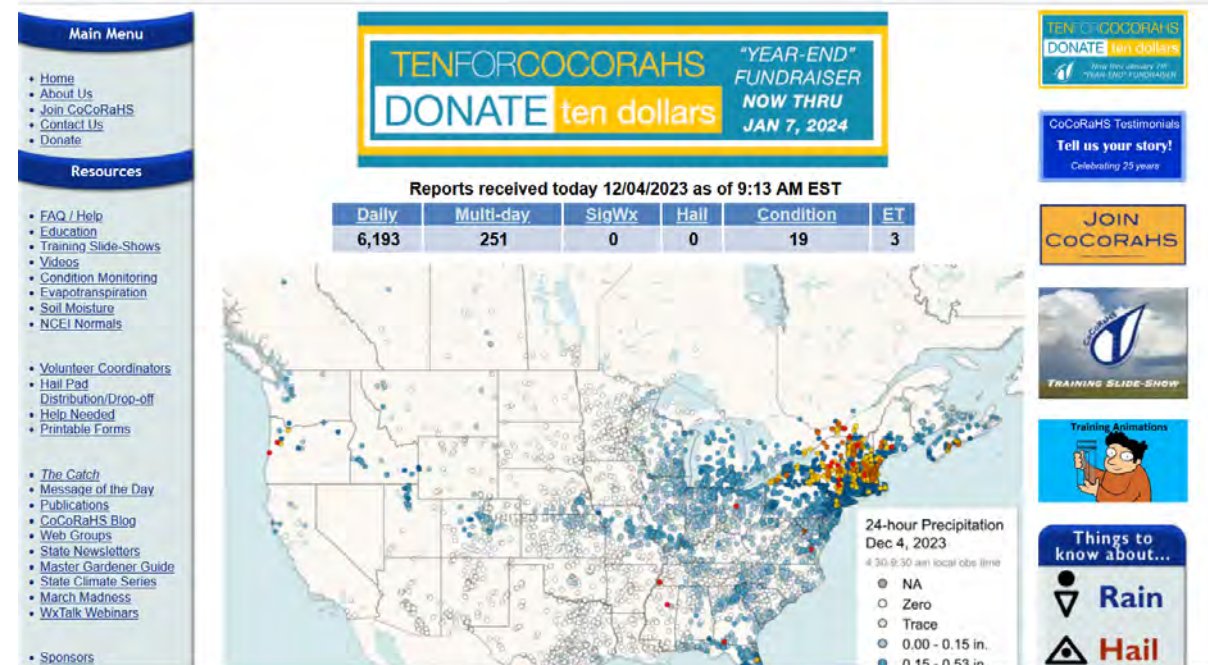
CMOR Reports Map for mobile
(Includes year-to-date reports and fewer filter options)

Map of Reports Submit on Mobile

Other Resources



- [Frequently asked questions](#)
- Factsheet on how to submit and view reports:
[In English](#) | [En Español](#)
- [Video on how to submit and view reports](#)
- [Help Recruit CMOR Participants \(sample press rele](#)
- [Social Media Resources for people to submit obser](#)
- [Related publications](#)



TENFORCOCORAHS "YEAR-END" FUNDRAISER
DONATE ten dollars NOW THRU JAN 7, 2024

Reports received today 12/04/2023 as of 9:13 AM EST

Daily	Multi-day	SigWx	Hail	Condition	ET
6,193	251	0	0	19	3

24-hour Precipitation Dec 4, 2023
4:30-9:50 am local obs time

- NA
- Zero
- Trace
- 0.00 - 0.15 in.
- 0.15 - 0.53 in.

Rain
Hail

JOIN CoCoRaHS

TRAINING SLIDE SHOW

Training Animations

Things to know about...

Main Menu

- Home
- About Us
- Join CoCoRaHS
- Contact Us
- Donate

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- [Soil Moisture](#)
- [NCEI Normals](#)

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Sponsors

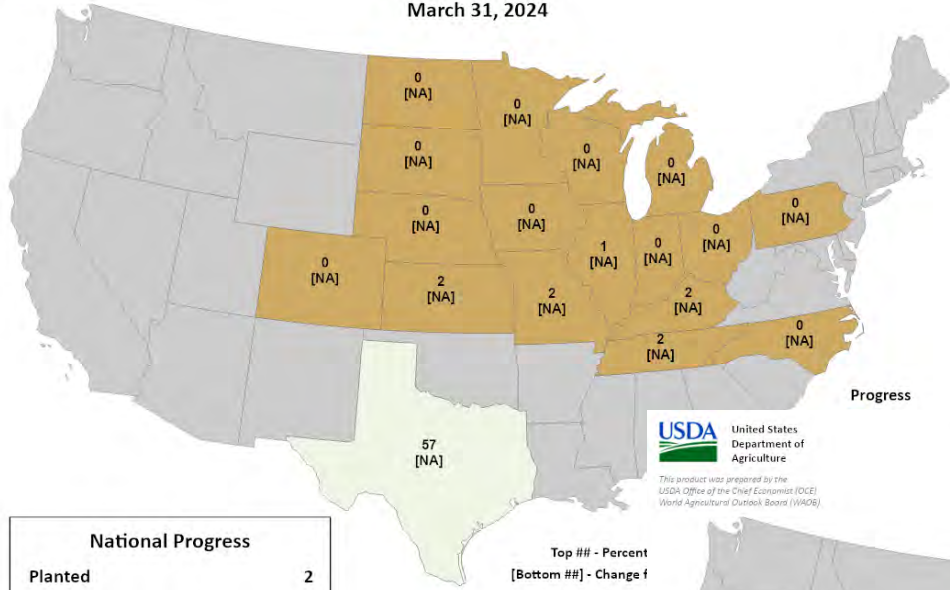
Crop Planted (NASS)



Corn Progress

Percent Planted

March 31, 2024



National Progress	
Planted	2
Change from Last Week	NA

Top ## - Percent
[Bottom ##] - Change from Last Week

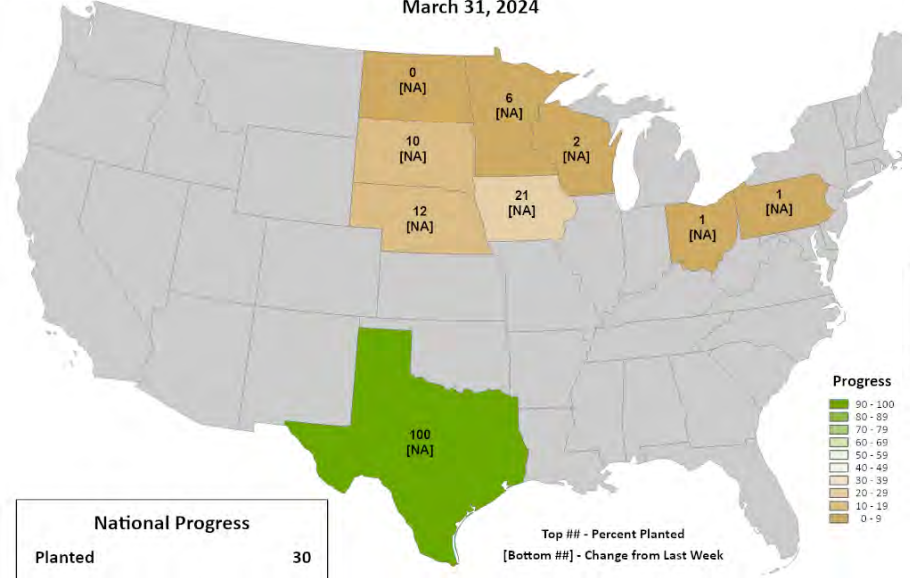
Data obtained from USDA National Agricultural Statistics Service weekly Crop Progress reports.



Oats Progress

Percent Planted

March 31, 2024



National Progress	
Planted	30
Change from Last Week	NA

Top ## - Percent Planted
[Bottom ##] - Change from Last Week

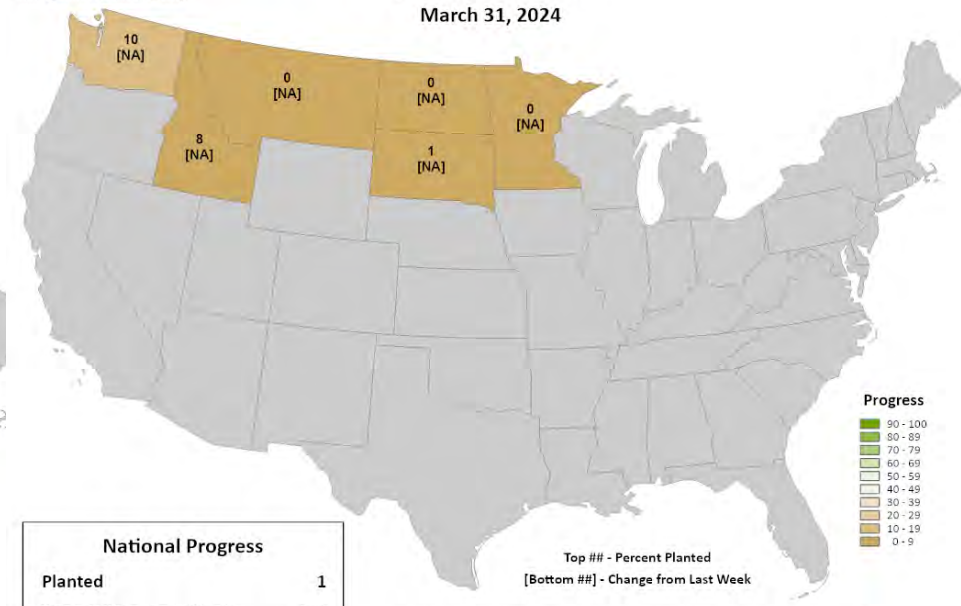
Data obtained from USDA National Agricultural Statistics Service weekly Crop Progress reports.



Spring Wheat Progress

Percent Planted

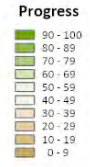
March 31, 2024



National Progress	
Planted	1
Change from Last Week	NA

Top ## - Percent Planted
[Bottom ##] - Change from Last Week

Data obtained from USDA National Agricultural Statistics Service weekly Crop Progress reports.

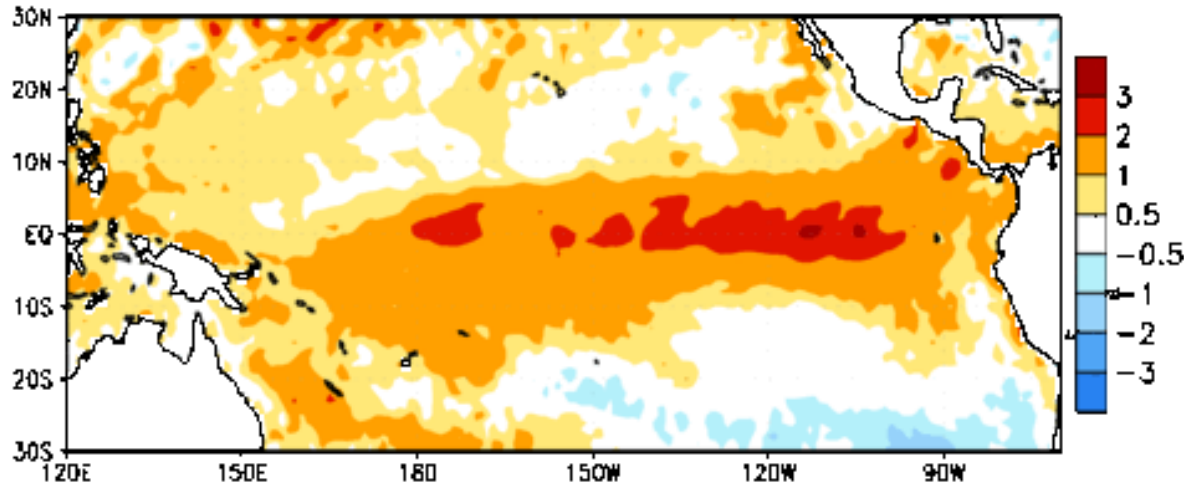


Climate context

EL NIÑO – SO LONG....

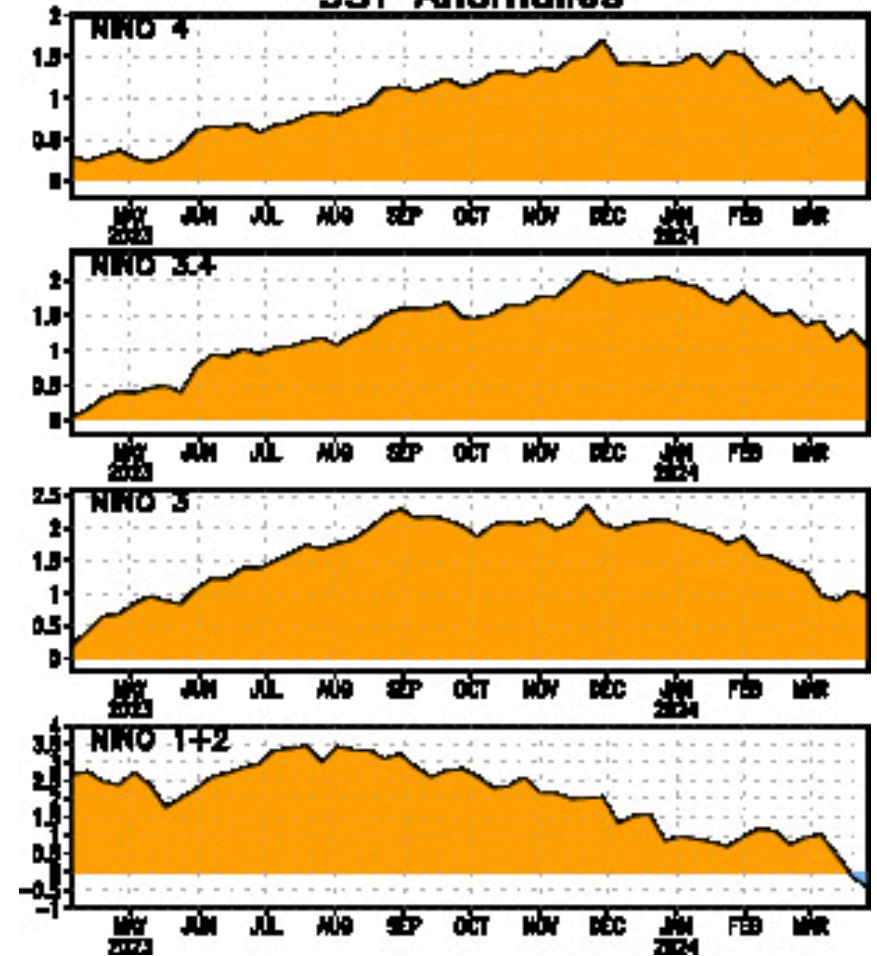
Strong El Niño

Week centered on 10 JAN 2024
SST Anomalies (°C)



- Current status – El Niño
- Weakening in the spring
- Unlikely to affect summer

SST Anomalies



ENSO Probabilistic Forecast

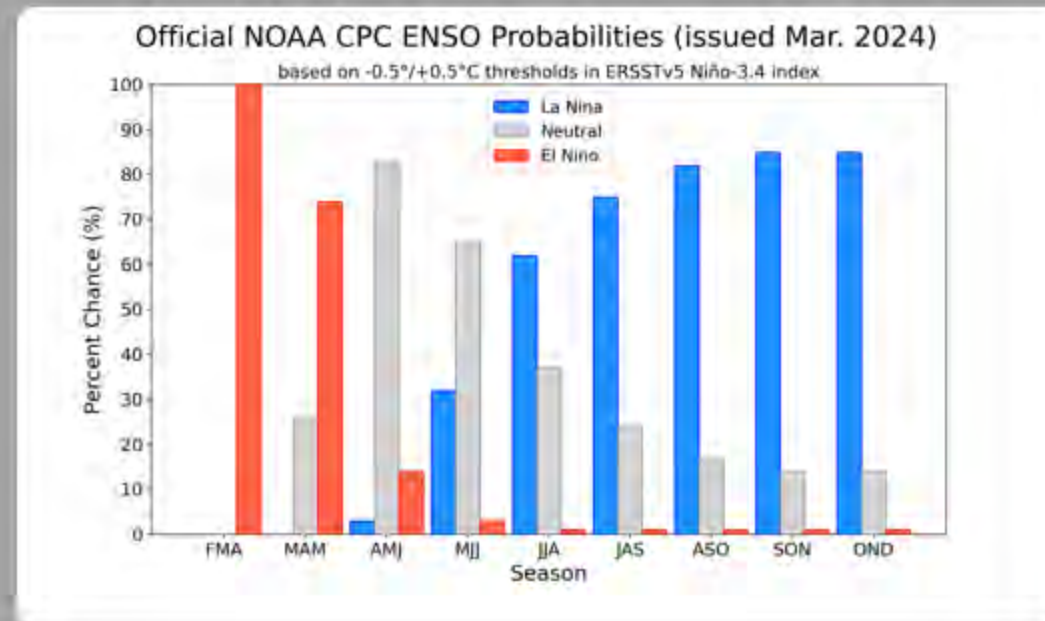
CPC Probabilistic ENSO Outlook

Updated: 14 March 2024

A transition from El Niño to ENSO-neutral is expected by April-June season 2024, with ENSO-neutral persisting through May-July 2024. Thereafter, La Niña is favored in June-August, and chances increase through the October-December season.

- Current status – El Niño
- Weakening through spring
- Neutral into early summer
- La Niña likely by end of summer.

- Recent research hints at these rapid transition summers more likely being warmer than average.



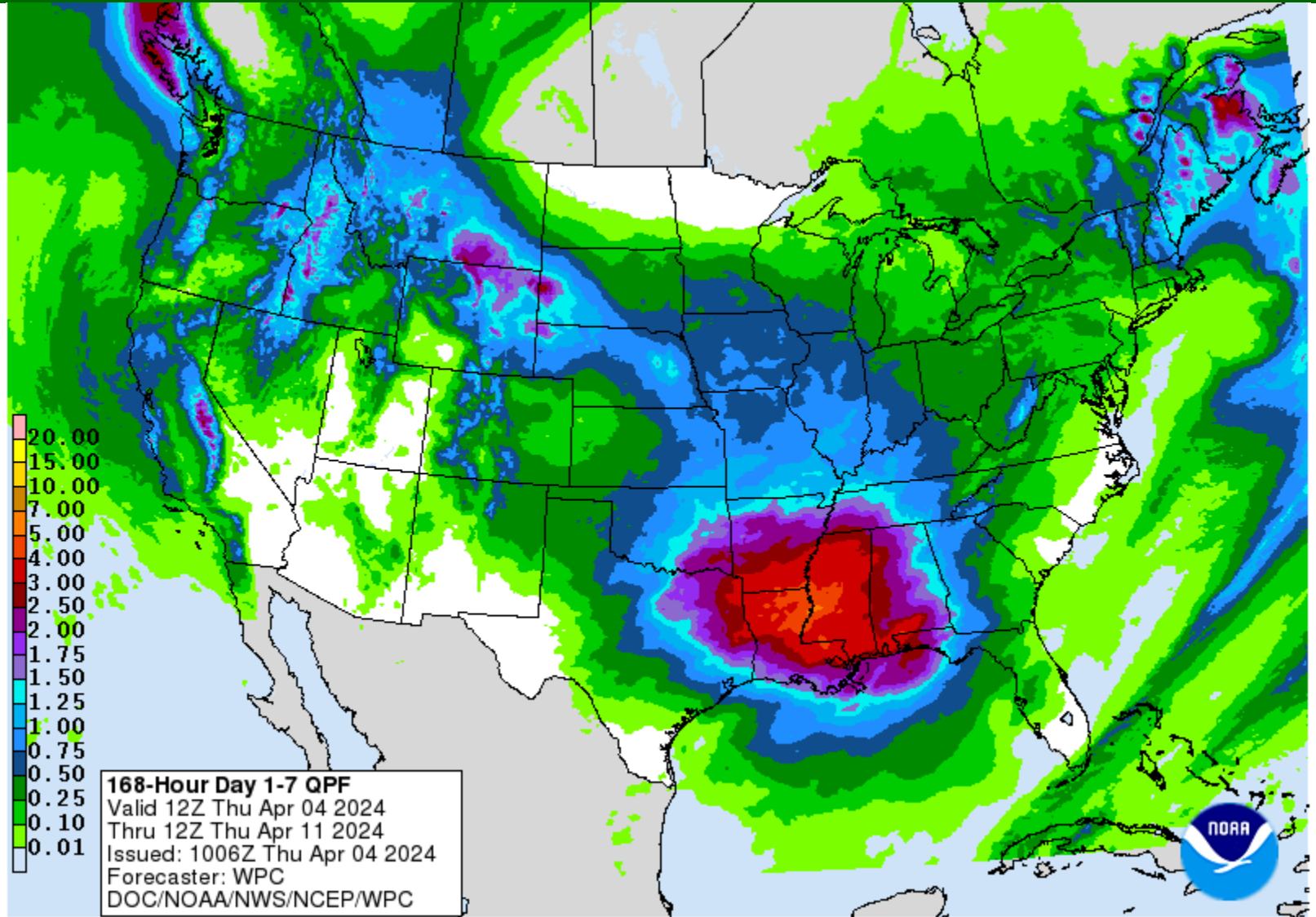
A look ahead

OUTLOOKS

Climate Outlooks

- 6-10 and 8-14 day updated daily
- Monthly updated 2x/month
- Longer range updated monthly
- Based on probabilities
- Good to have ag interpretation
- **Check Midwest Climate Hub website for ag interpretation**

7-day Quantitative Precipitation Forecast



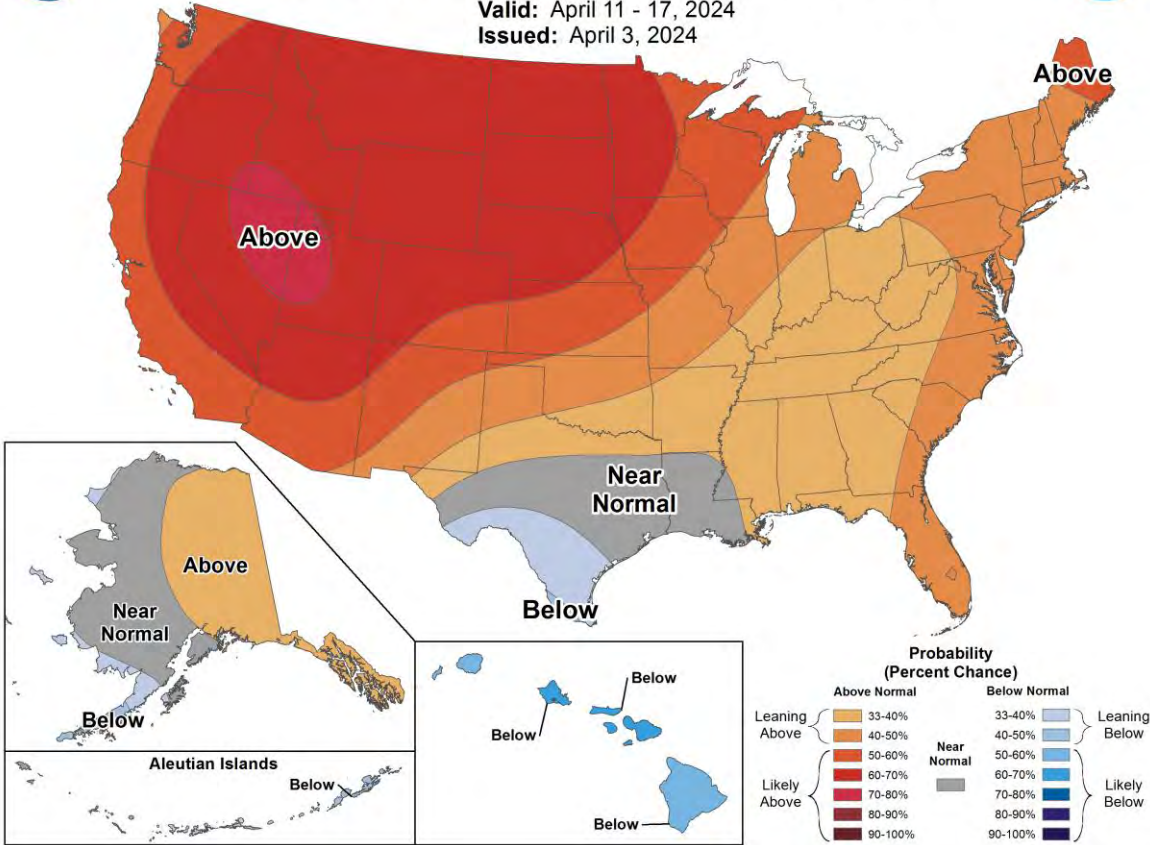
8-14 Day Temp. and Precip. Outlook



8-14 Day Temperature Outlook



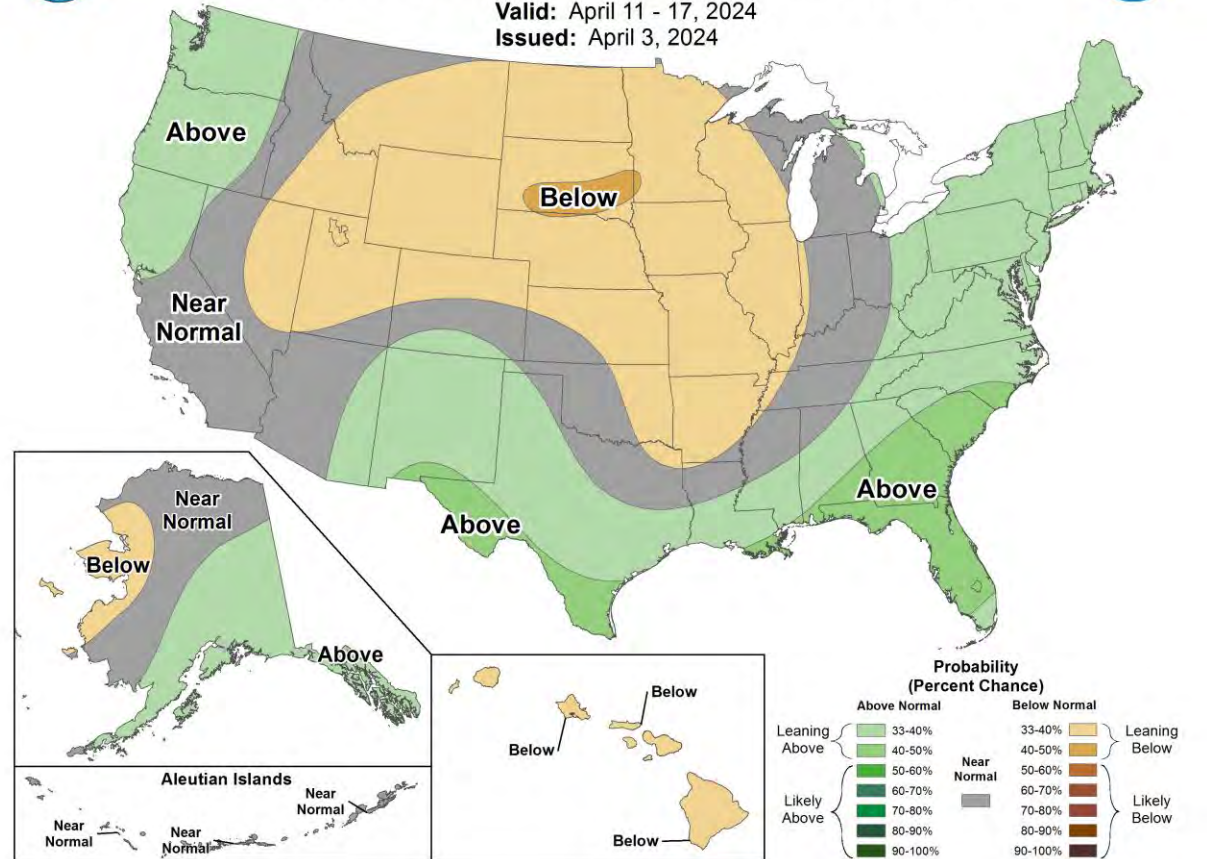
Valid: April 11 - 17, 2024
Issued: April 3, 2024



8-14 Day Precipitation Outlook



Valid: April 11 - 17, 2024
Issued: April 3, 2024



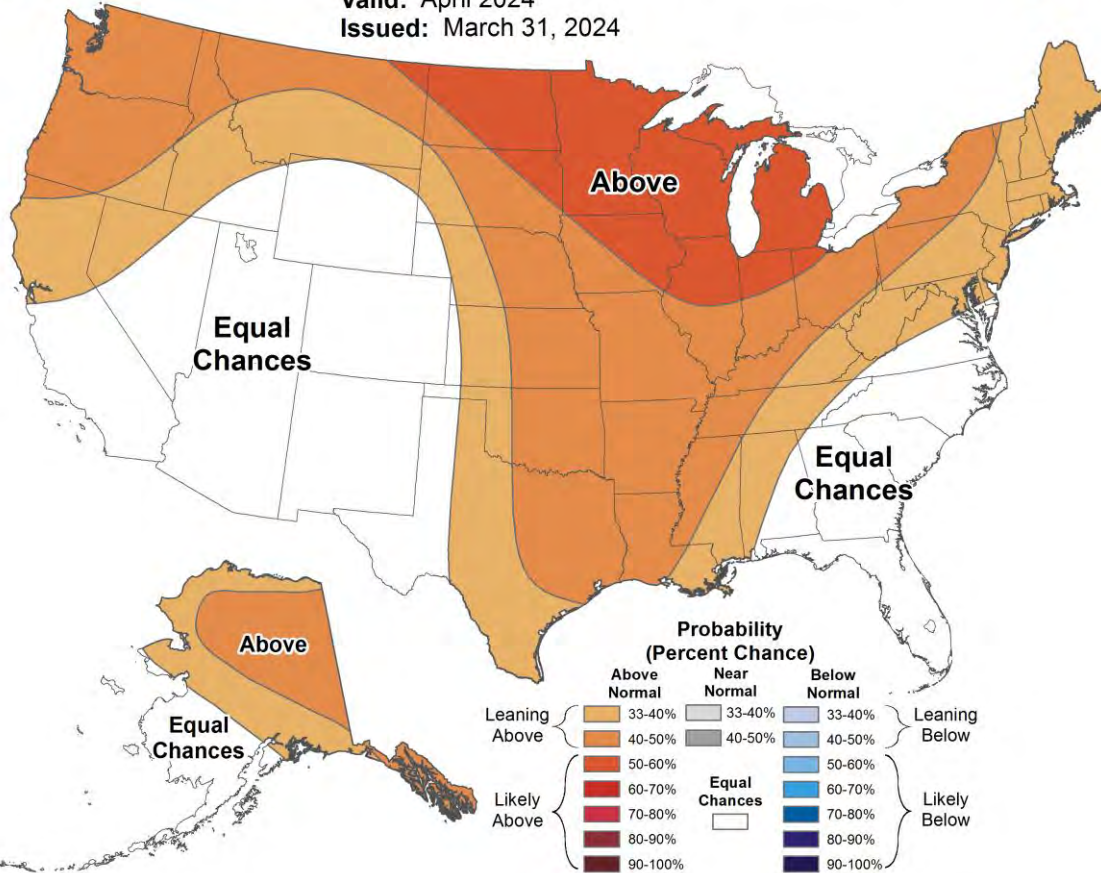
30 Day Temp and Precip. Outlook



Monthly Temperature Outlook



Valid: April 2024
Issued: March 31, 2024



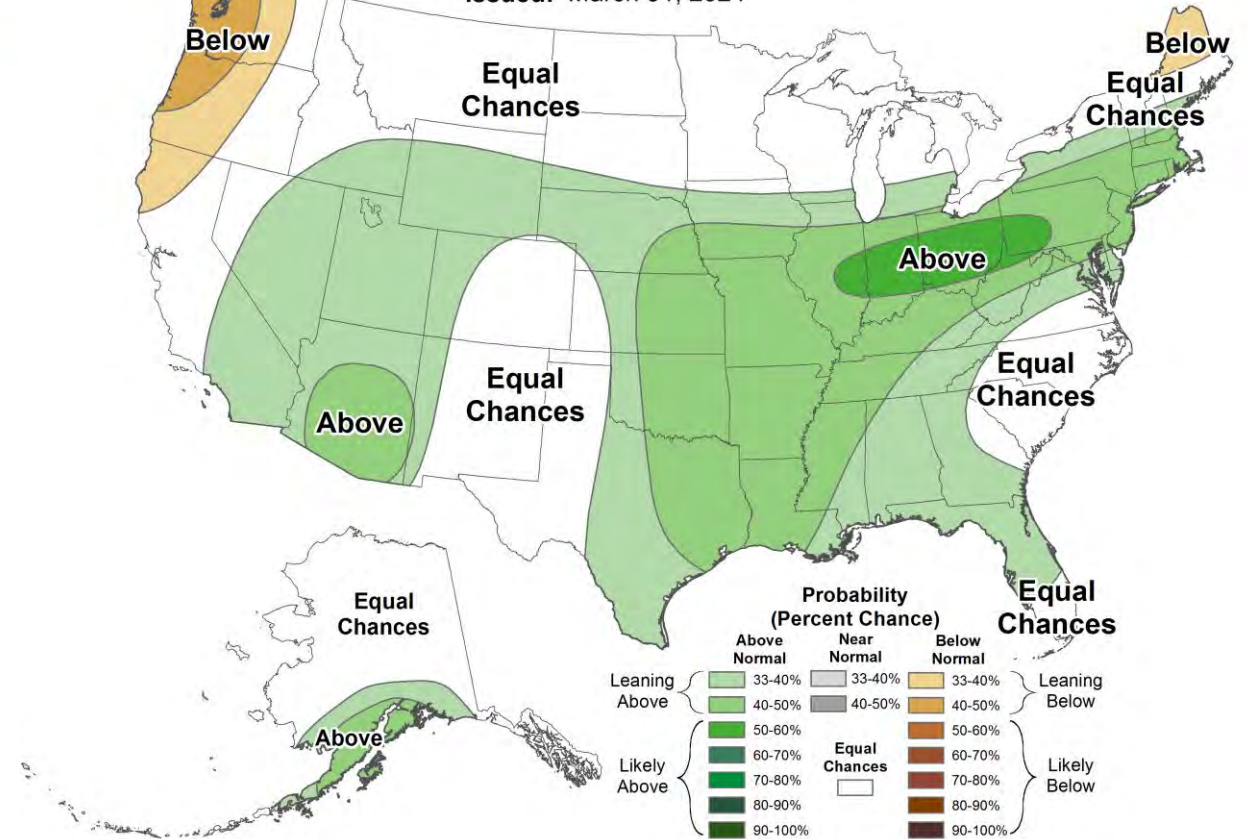
<http://www.cpc.ncep.noaa.gov/>



Monthly Precipitation Outlook



Valid: April 2024
Issued: March 31, 2024



30 day outlook for April – likely warmer again.
Hints toward above average precip.

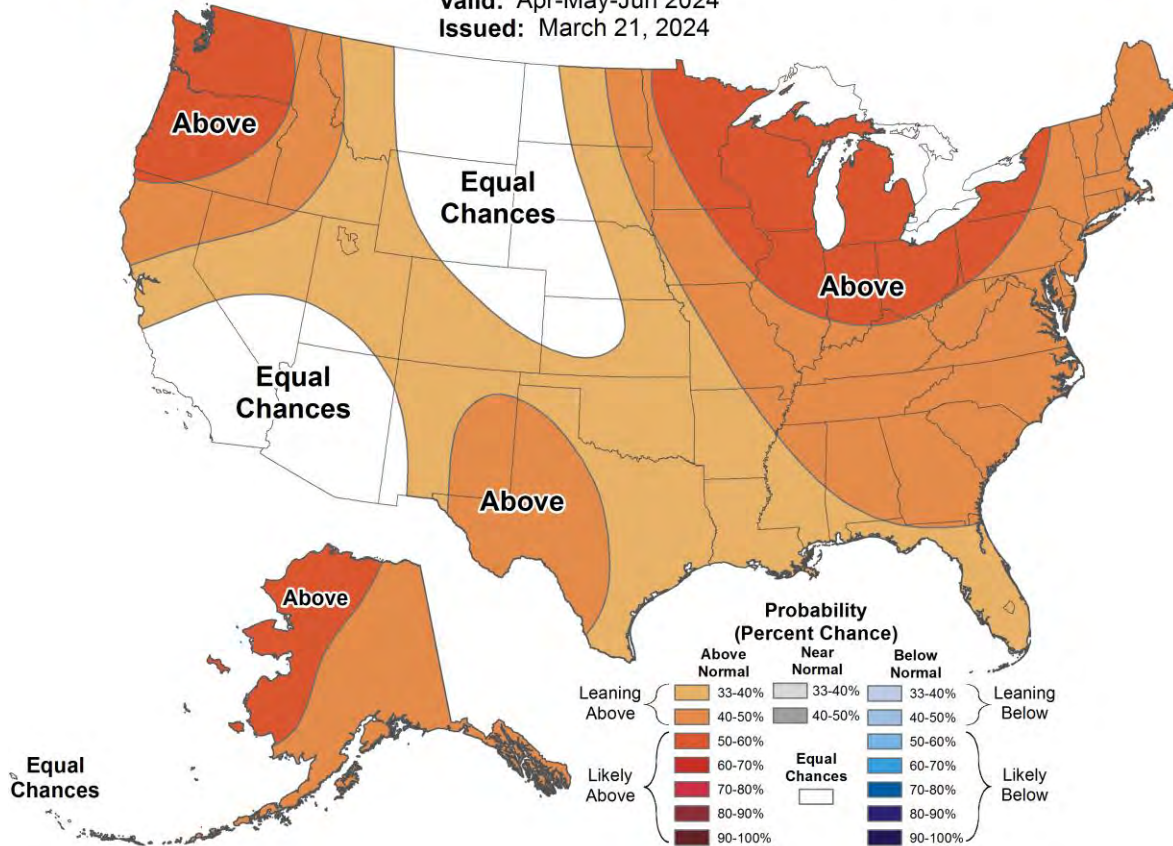
90 Day Temp and Precip. Outlook



Seasonal Temperature Outlook



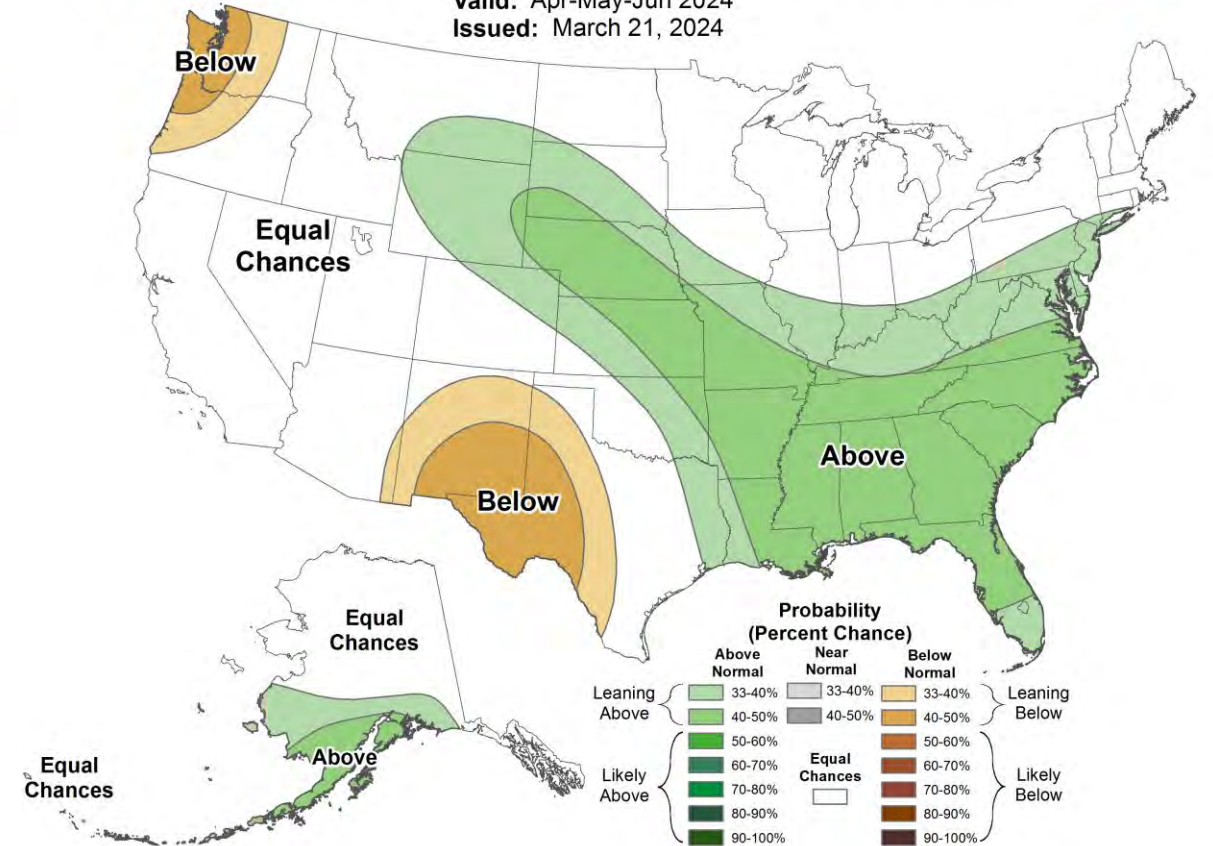
Valid: Apr-May-Jun 2024
Issued: March 21, 2024



Seasonal Precipitation Outlook



Valid: Apr-May-Jun 2024
Issued: March 21, 2024



<http://www.cpc.ncep.noaa.gov/>

El Niño-weakening –. Slightly more likely warm. No indications on precipitation.

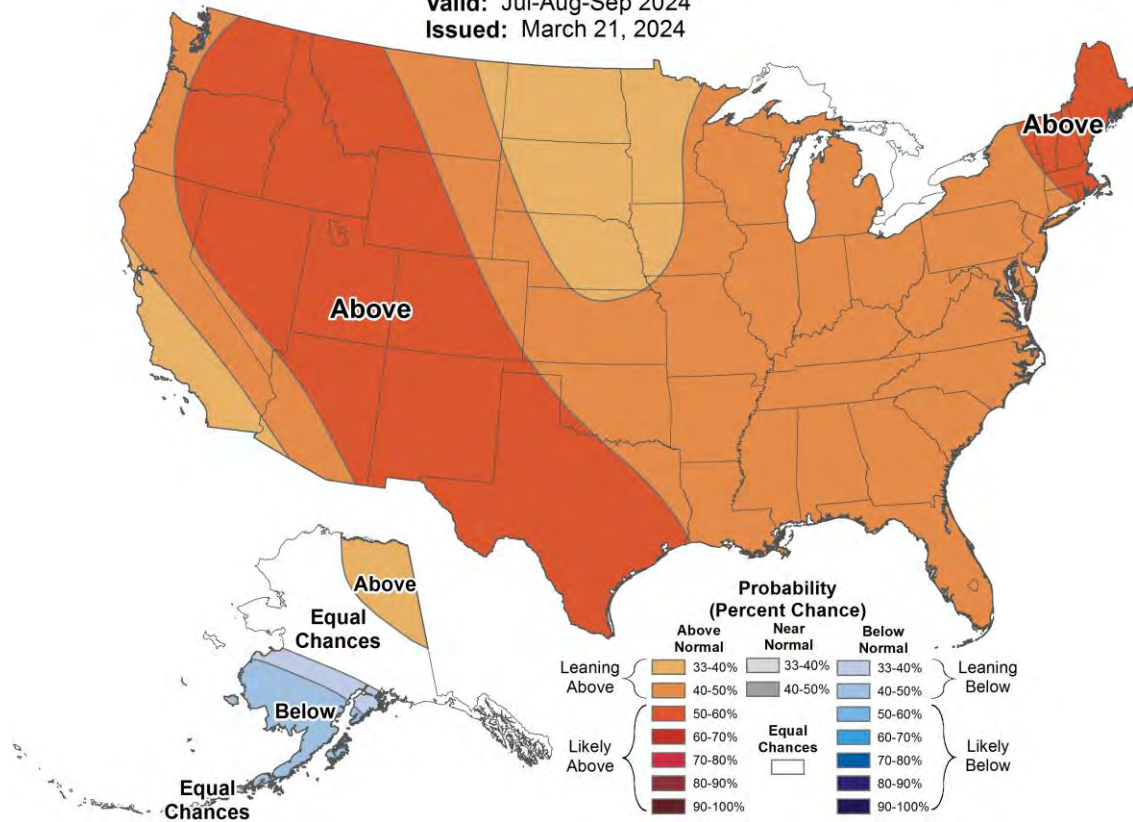
Seasonal Outlook for July-September



Seasonal Temperature Outlook



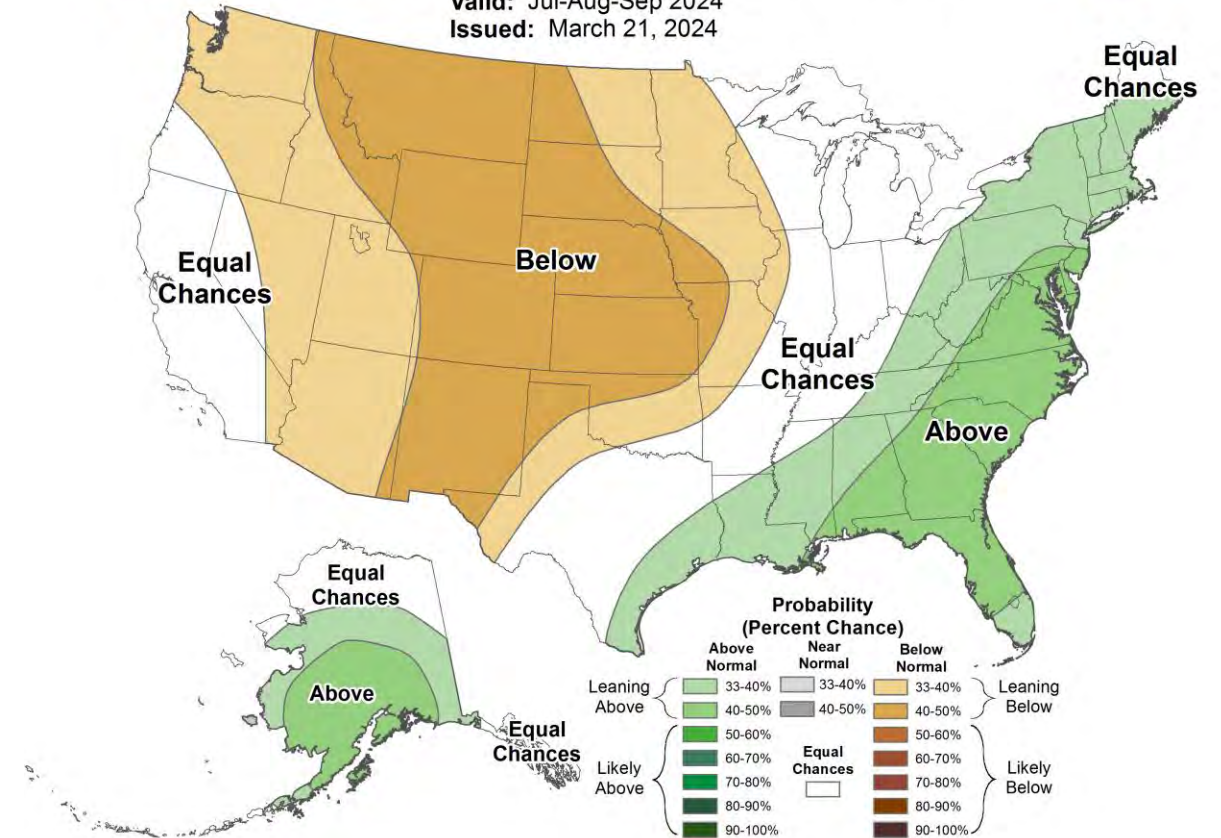
Valid: Jul-Aug-Sep 2024
Issued: March 21, 2024



Seasonal Precipitation Outlook



Valid: Jul-Aug-Sep 2024
Issued: March 21, 2024



- Summer - more likely La Niña.
- How much drought continues? What other develops?

Summary

- *Conditions*
- Drought continues into year 4
- Some recent recovery in places
- Deeper soil profile likely still dry
- El Niño weakening
- *Outlooks*
- El Niño will weaken though spring – likely La Niña by late summer
- Drought recovery (some but marginal)
- Spring planting less likely major wetness slowdowns.
- Increased chance of warmer summer
- Summer precip still in question

Recommendations

- Strongly consider yield goals – fertilizer recommendations (soil moisture recovery could limit)
- Increased chance of heat – increases water use. Increasing risk of crop stress in dry areas.
- Mixed message by location.
- Soil management – tillage loses soil moisture.
- If depending on a water source (irrigation/livestock etc.) – check its level and develop alternate plans

Useful Resources

Historical Climate Data

NOAA NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Home Climate Information Data Access Customer Support Contact About Search

Home > Climate Monitoring > Climate at a Glance October US Release: Tue, 8 Nov 2022, 11:00 AM EST

Climate at a Glance

Global National Regional Statewide Divisional **County** City

Mapping Time Series Rankings Haywood Plots Data Information Background

County Time Series

Choose from the options below and click "Plot" to create a time series graph.
Please note, Degree Days and Palmer Indices are not available for Counties.

Parameter: Average Temperature
Time Scale: 1-Month
Month: September
Start Year: 1895
End Year: 2022
State: Alabama
County: Autauga County

Options

Display Base Period
Start: 1901 End: 2000

Display Trend
 per Decade per Century
Start: 1895 End: 2022

Smoothed Time Series
 Binomial Filter LOESS

Plot

Find all links at
tiny.cc/acj1vz



Plus, NRCS Climate Quick Reference Guides (Counties)

<https://webapps.jornada.nmsu.edu/climate-quick-guides/>

NCEI Climate at a Glance

Midwestern Regional Climate Center

Midwestern Regional Climate Center

About Us Data & Services Midwest C

Featured Products

cli-MATE
MRCC APPLICATION TOOLS ENVIRONMENT

Midwest CLIMATE WATCH

[cli-MATE Online Data Portal](#)
Self-service access to climate data, rankings, maps, and more

[Midwest Climate Watch](#)
Monitor recent climate conditions and impacts

Seasonal Tools

Corn Growing Degree Day
Estimate corn maturity by GDDs

Regional Mesonet Project
Monitor soil temperatures

Freeze Date Tool
Explore freeze date trends

VIP Freeze Maps
Monitor 2022-2023 freeze maps

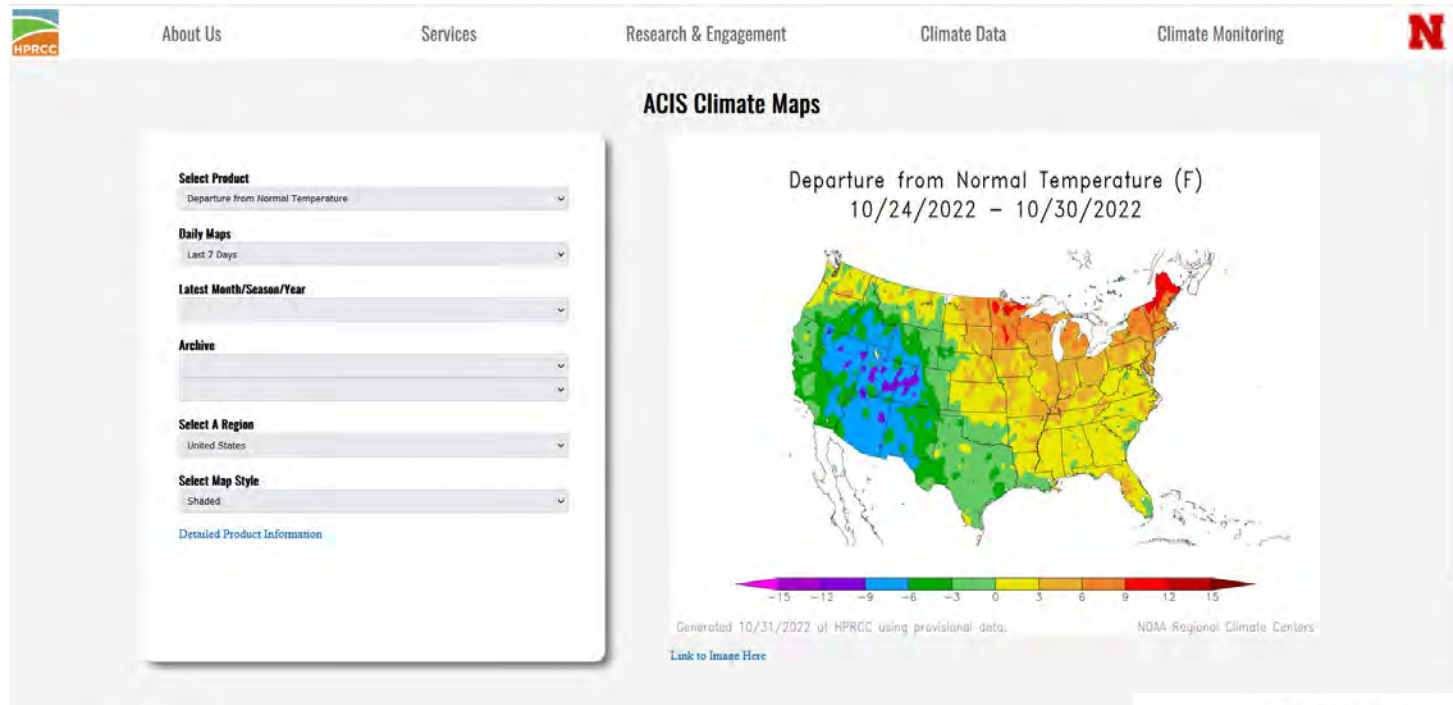
Highlighted Products

VIP Freeze Probabilities

AWSI Winter Index

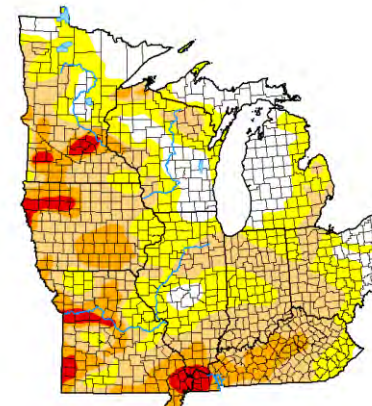
Weather on Your Birthday
What was the weather on your birthday? Printable Certificate

Climate Perspectives Tool



U.S. Drought Monitor
Midwest

October 25, 2022
(Released Thursday, Oct. 27, 2022)
Valid 8 a.m. EDT



Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to: <https://droughtmonitor.unl.edu/About.aspx>

Author:
Adam Hartman
NOAA/NWSNCEP/CPC



Find all links at
tiny.cc/acj1vz

National Weather Service
Climate Prediction Center

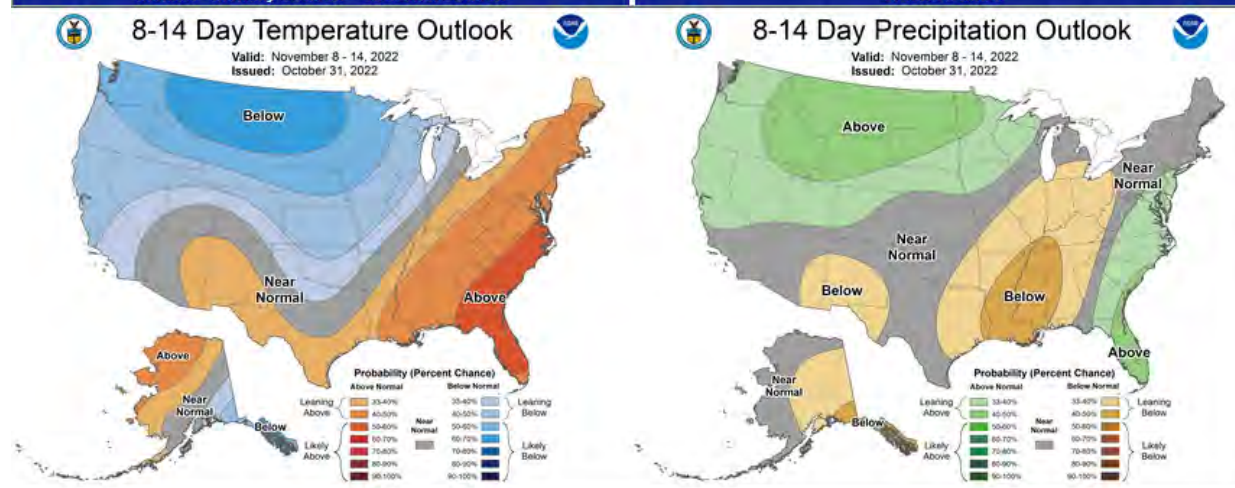
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Climate News

- [NOAA Issues Winter Outlook \(20 Oct 2022\)](#)
- [75% chance of La Niña during Northern Hemisphere winter \(December-February\) 2022-23, with 54% chance for ENSO-neutral in February-April 2023 \(13 Oct 2022\)](#)
- [47th Climate Diagnostics and Prediction Workshop Announcement \(15 Apr 2022\)](#)

Click on product title to go to product page. Move cursor over product parameter name to display the graphic -- click to enlarge. Links to these same products are also available below.

6-10 Day Outlook (Interactive) Temperature Precipitation	One Month Outlook (Interactive) Temperature Precipitation
8-14 Day Outlook (Interactive) Temperature Precipitation	Three Month Outlook (Interactive) Temperature Precipitation
Week 3-4 Outlooks Temperature Exp. Precipitation	8-14 Day U.S. Hazards Outlook Composite Probabilistic: Temp Precip Snow Wind
U.S. Drought Information Monitor Monthly Outlook Seasonal Outlook	Global Tropics Hazards Outlook Weeks 2 and 3



Find all links at
tiny.cc/acj1vz

<https://www.drought.gov/drought/dews/midwest/reports-assessments-and-outlooks>

Midwest and Great Plains Climate-Drought Outlook 15 September 2016



United States Department of Agriculture
Midwest Climate Hub

For More Information



@USDAClimateHubs
@dennistoday



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

<https://www.climatehubs.usda.gov/newsletter-signup>

MidwestClimateHub@usda.gov



Midwest Climate Hub
U.S. DEPARTMENT OF AGRICULTURE

National Laboratory for Agriculture and the Environment

Attn: Midwest Climate Hub
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Ames, Iowa 50011-3611

Contact Laurie to sign up for newsletter and monthly ag outlooks!

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Josh Bendorf – Ag meteorologist

Becca Rooney – Crops/Forestry

Ryan McCoy – Evaluation

Moses Wanyakha – Program Assessment

