



SOUTH DAKOTA STATE
UNIVERSITY EXTENSION

North Central U.S. Climate & Drought Outlook

October 2023

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Moose near Aberdeen, SD
Photo by Laura Edwards



United States Department of Agriculture
Midwest Climate Hub



Further Information & Partners

- Today's and Past Recorded Presentations:

<https://mrcc.purdue.edu/multimedia/webinars.jsp>

<https://hprcc.unl.edu/webinars.php>

Next webinar: November 16, 2023

- NOAA's Climate Prediction Center: www.cpc.ncep.noaa.gov
- NOAA Climate Portal: www.climate.gov
- U.S. Drought Portal: www.drought.gov
- National Drought Mitigation Center: <http://drought.unl.edu/>
- State climatologists
 - <http://www.stateclimate.org>
- Regional climate centers
 - Midwest: <https://mrcc.purdue.edu/>
 - High Plains: <http://www.hprcc.unl.edu>



Record breaking 2749-pound pumpkin from Minnesota.

<https://www.fox9.com/news/minnesota-pumpkin-grower-breaks-world-record>



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Agenda

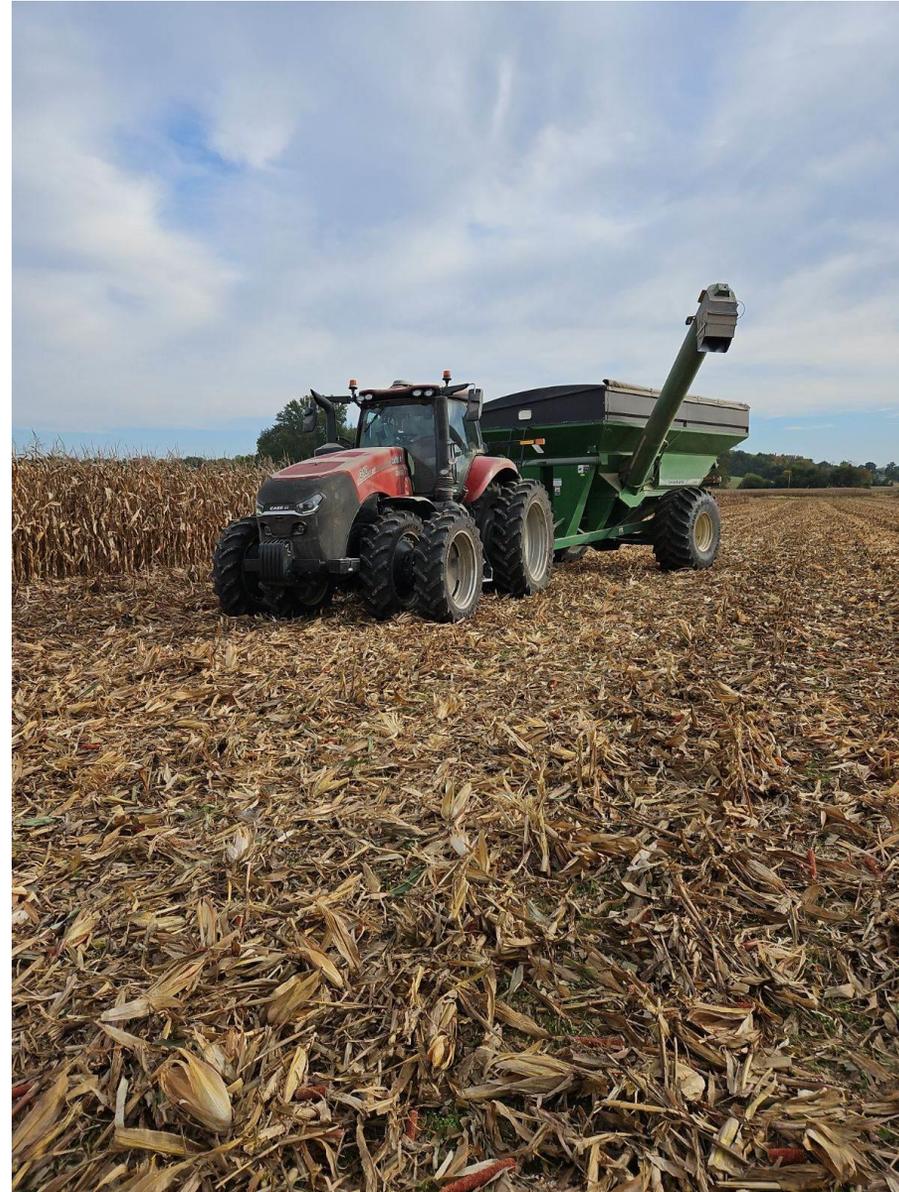
Recent Conditions

Impacts

Outlooks

1-3 months

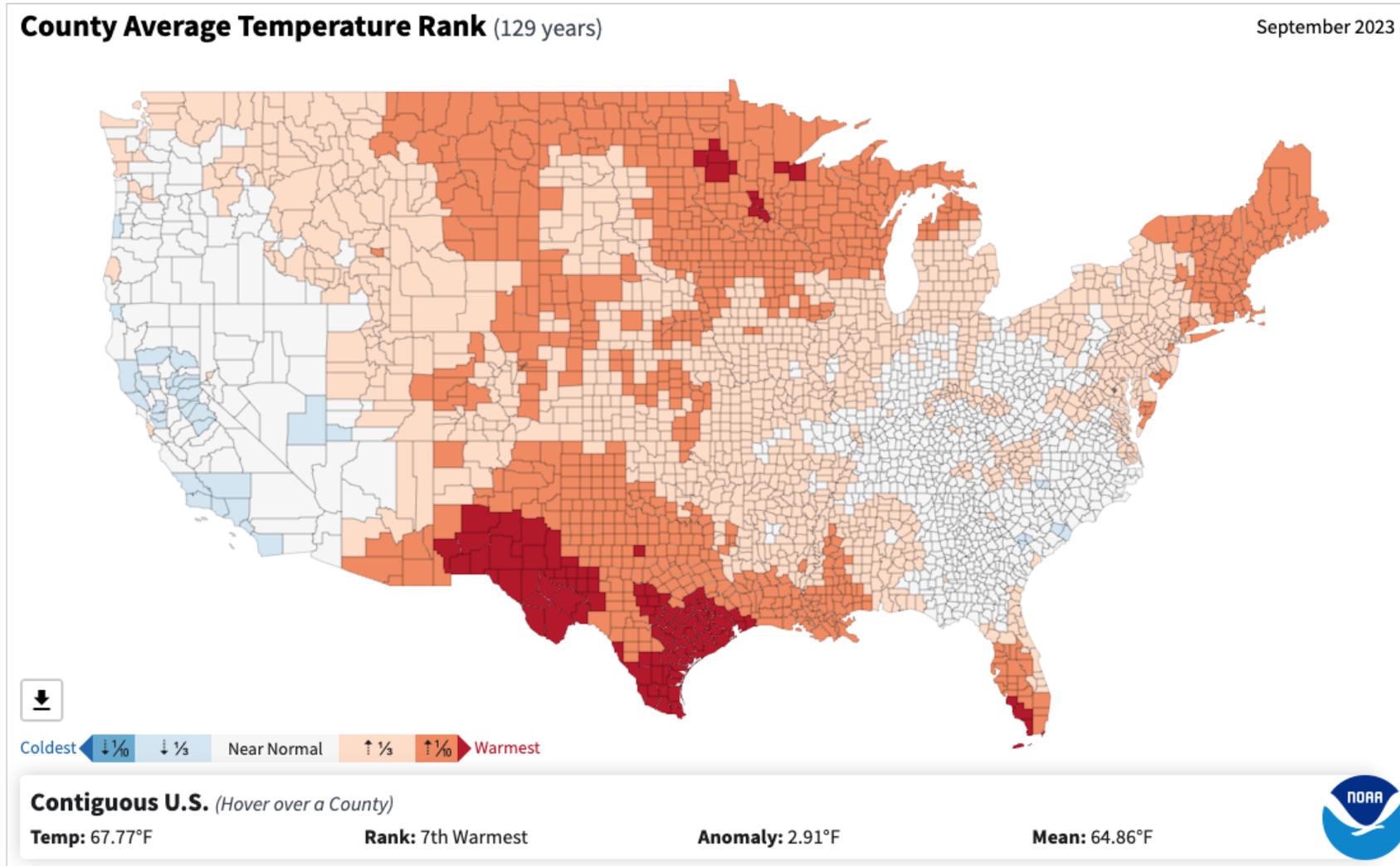
Winter season



Corn harvest in southern Indiana, photo courtesy of Hans Schmitz

September Temperature Rankings

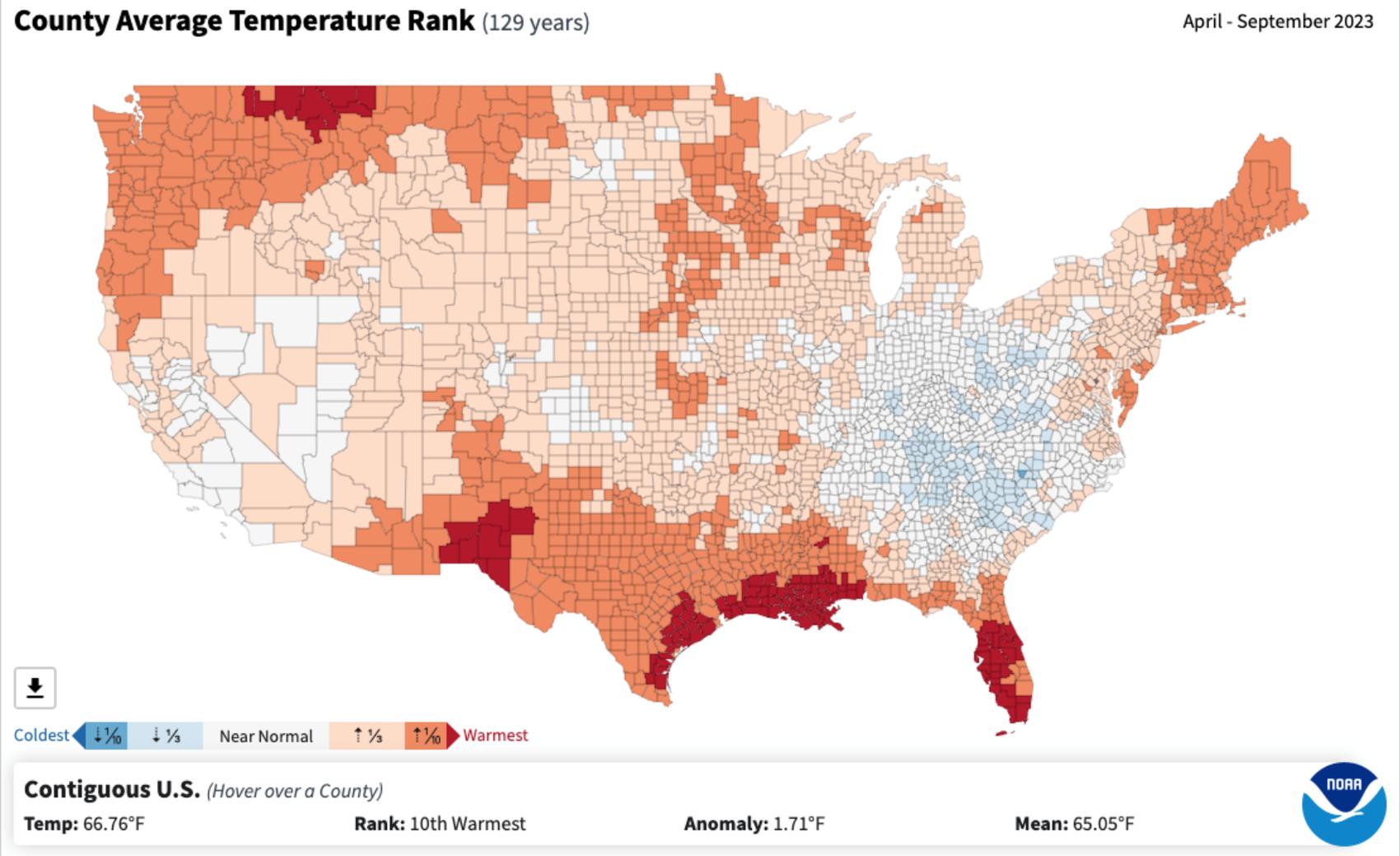
- MN: 2nd warmest Sept on record
- WI: 5th warmest Sept
- ND & WY: 10th warmest Sept



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<https://www.ncdc.noaa.gov/cag/>

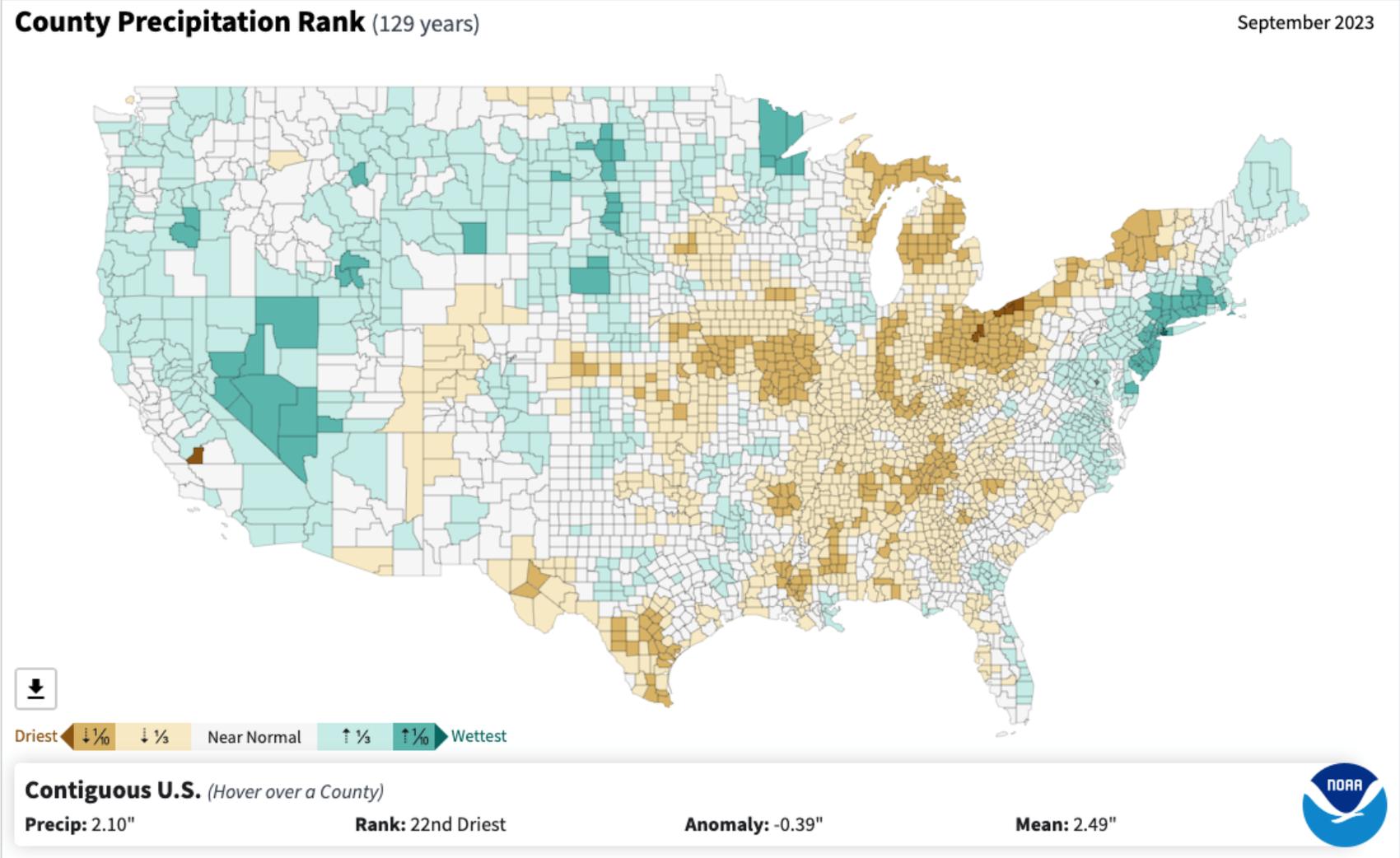
Growing Season Temperature Rankings



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<https://www.ncdc.noaa.gov/cag/>

September Precipitation Rankings



- Northeast OH: driest Sept on record
- South central ND: 13th wettest Sept on record



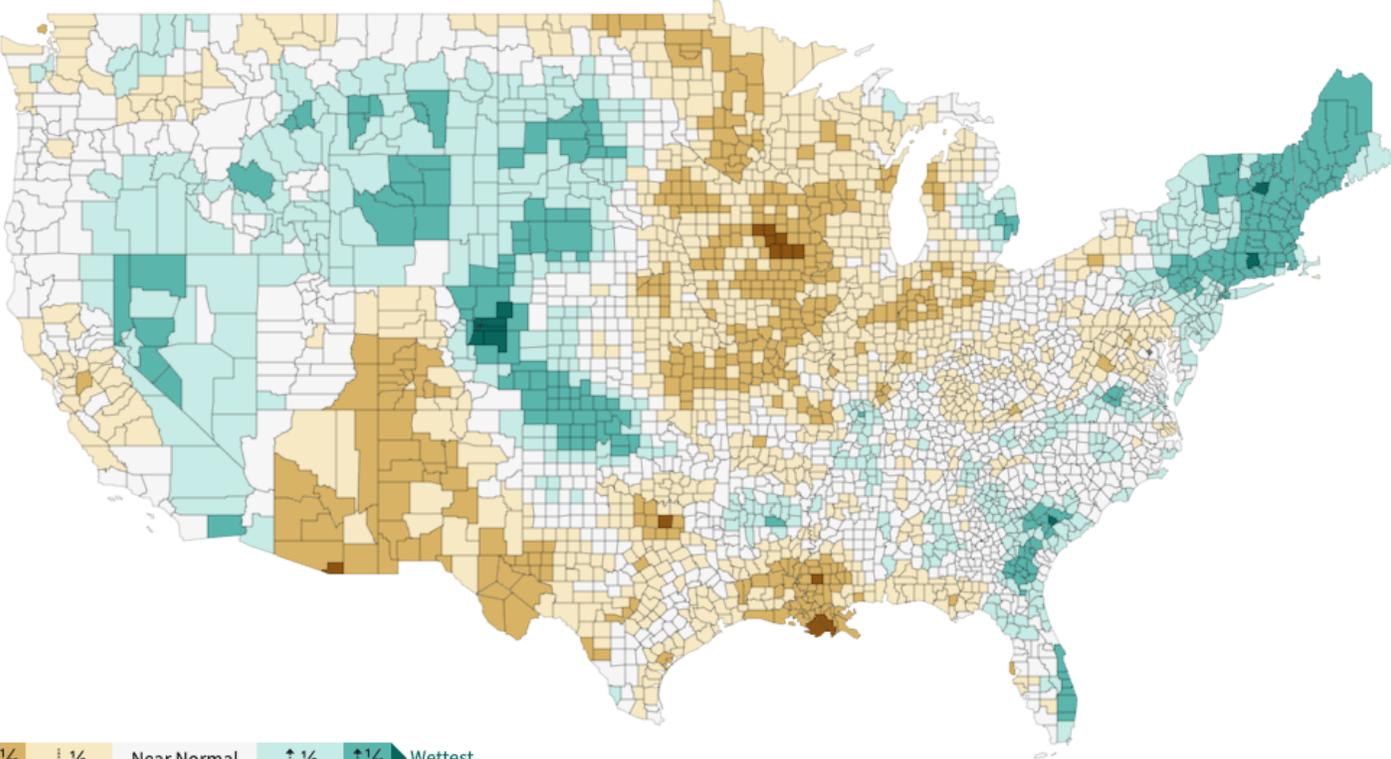
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<https://www.ncdc.noaa.gov/cag/>

Growing Season Precipitation Rankings

County Precipitation Rank (129 years)

April - September 2023



Driest $\leftarrow \frac{1}{10}$ $\frac{1}{2}$ Near Normal $\frac{1}{2}$ $\frac{1}{10}$ \rightarrow

Contiguous U.S. (Hover over a County)

Precip: 15.50"

Rank: 35th Driest

Anomaly: -0.74"

Mean: 16.24"

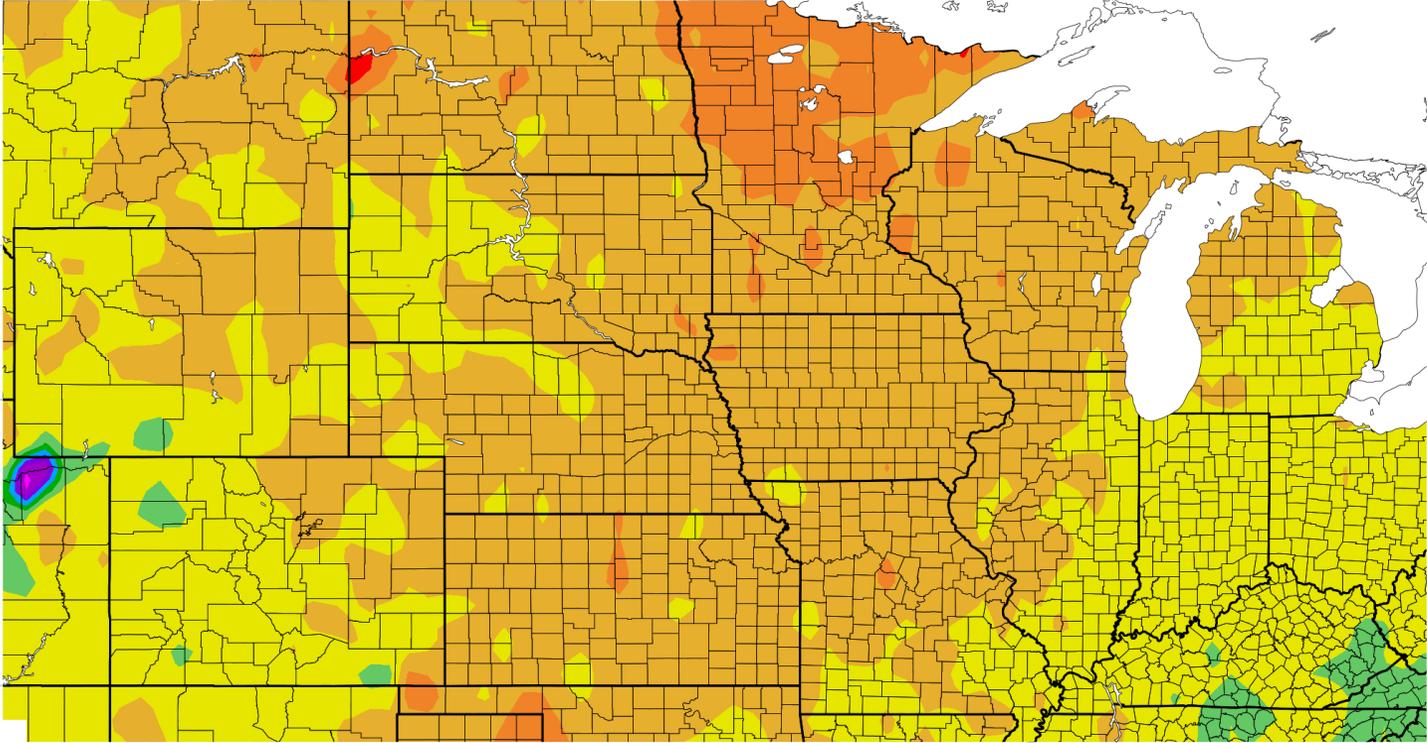


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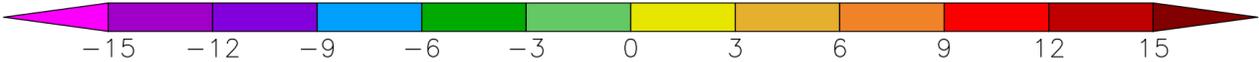
<https://www.ncdc.noaa.gov/cag/>

Last 30 Days

Departure from Normal Temperature (F)
9/19/2023 – 10/18/2023



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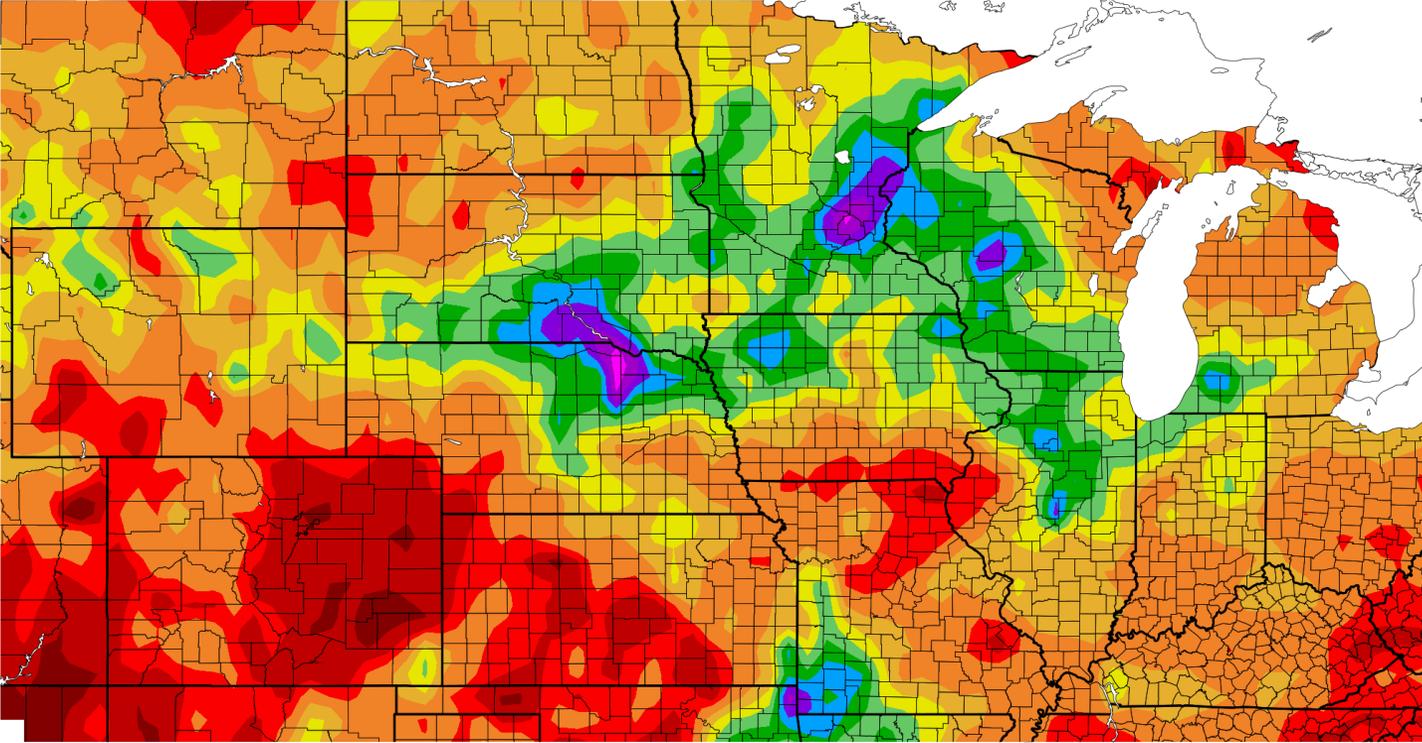


Generated 10/19/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

Last 30 days

Precipitation (in)
9/19/2023 - 10/18/2023



Generated 10/19/2023 at HPRCC using provisional data.

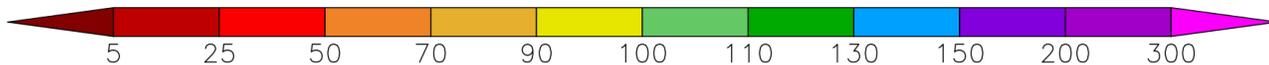
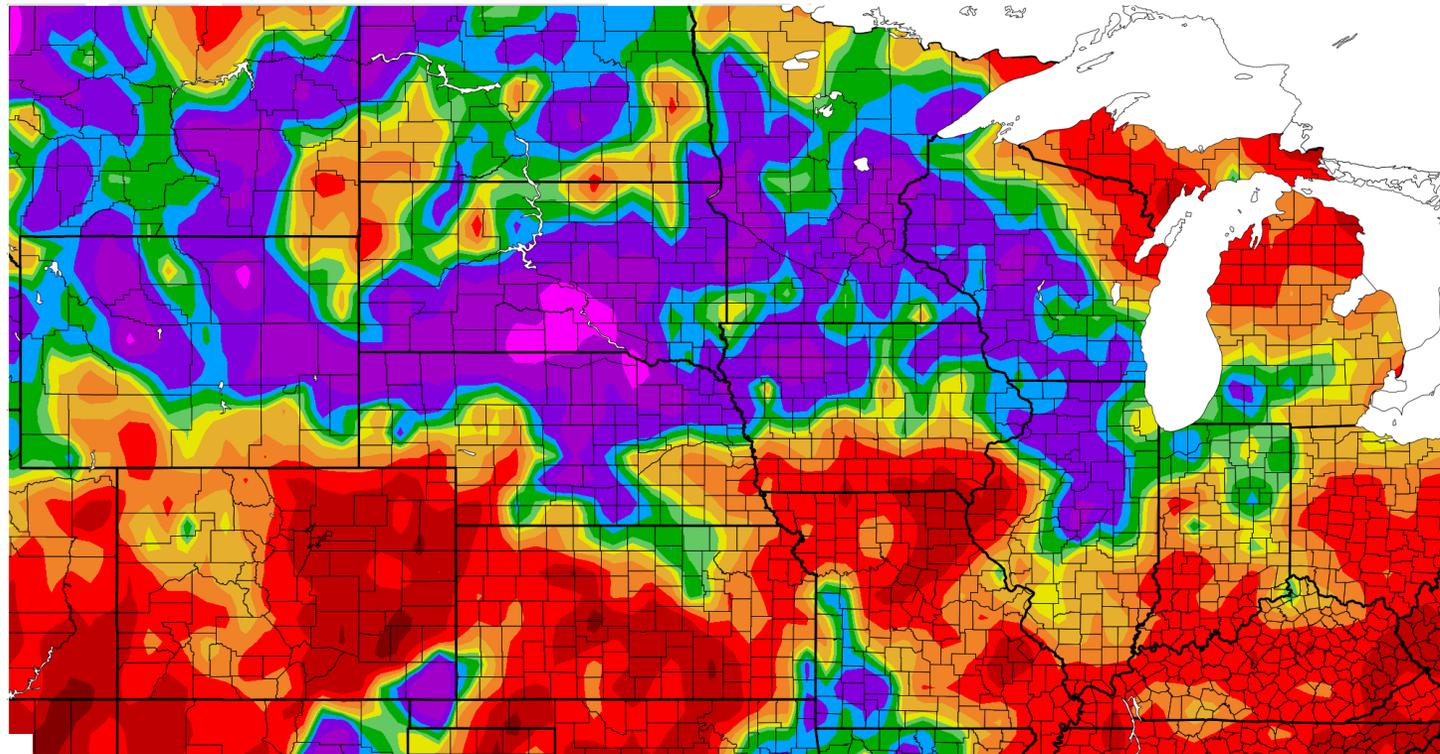
NOAA Regional Climate Centers



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30 day Precipitation, Percent of Normal

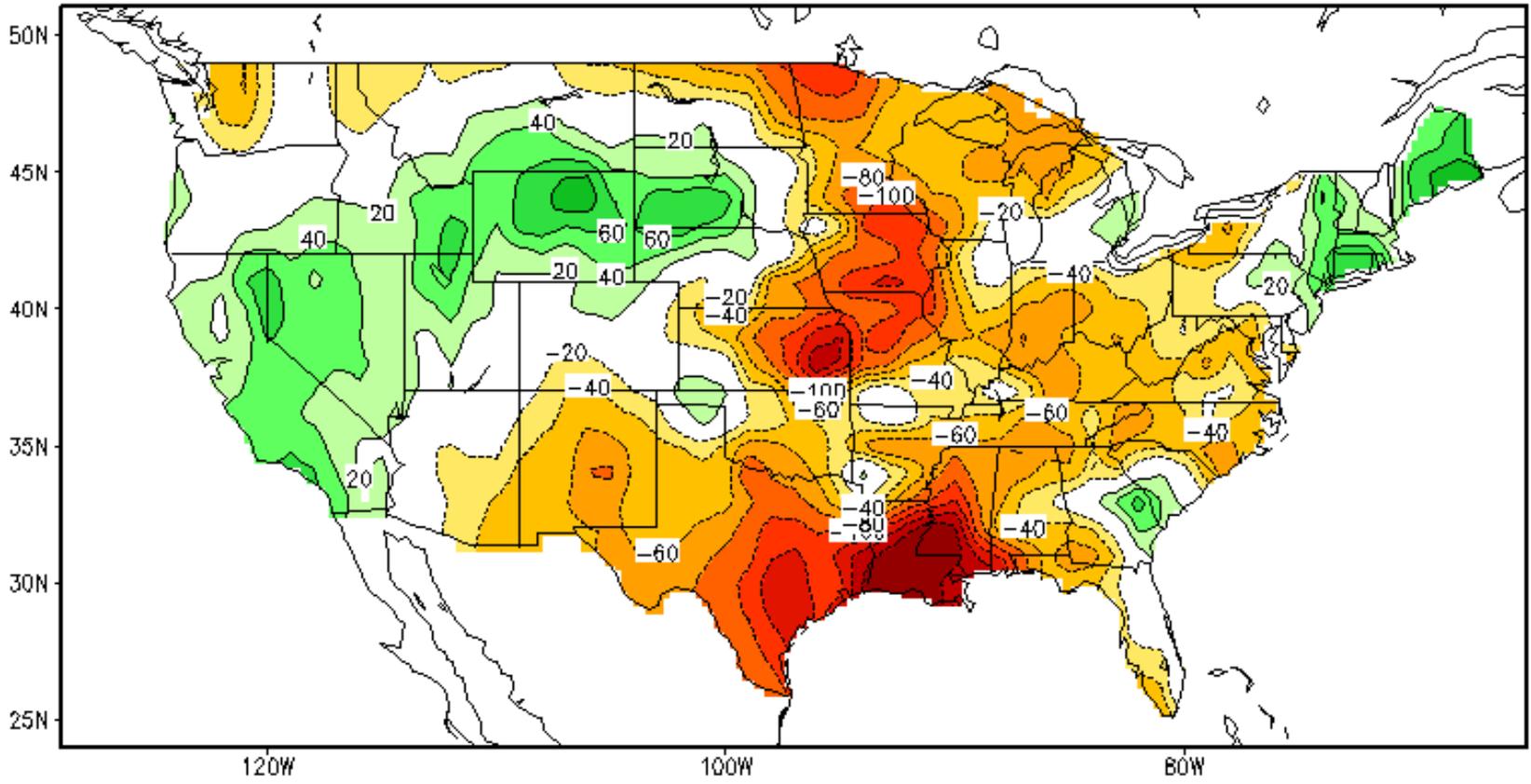
Percent of Normal Precipitation (%)
9/19/2023 – 10/18/2023



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Soil Moisture

Calculated Soil Moisture Anomaly (mm)
OCT 18, 2023



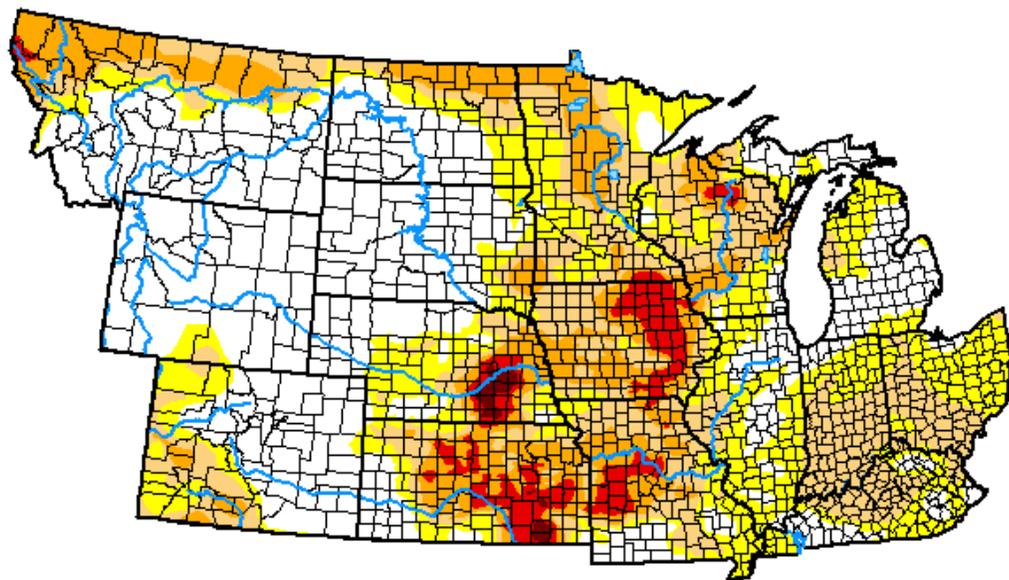
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U.S. Drought Monitor NWS Central

October 17, 2023
(Released Thursday, Oct. 19, 2023)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	41.08	58.92	36.87	17.06	4.30	0.43
Last Week <i>10-10-2023</i>	39.35	60.65	40.76	19.16	5.47	0.58
3 Months Ago <i>07-18-2023</i>	37.97	62.03	38.17	16.24	5.73	0.65
Start of Calendar Year <i>01-03-2023</i>	25.76	74.24	48.98	24.27	9.90	3.48
Start of Water Year <i>09-26-2023</i>	39.86	60.14	40.32	19.88	6.29	0.49
One Year Ago <i>10-18-2022</i>	14.16	85.84	59.67	29.36	12.01	3.19



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>

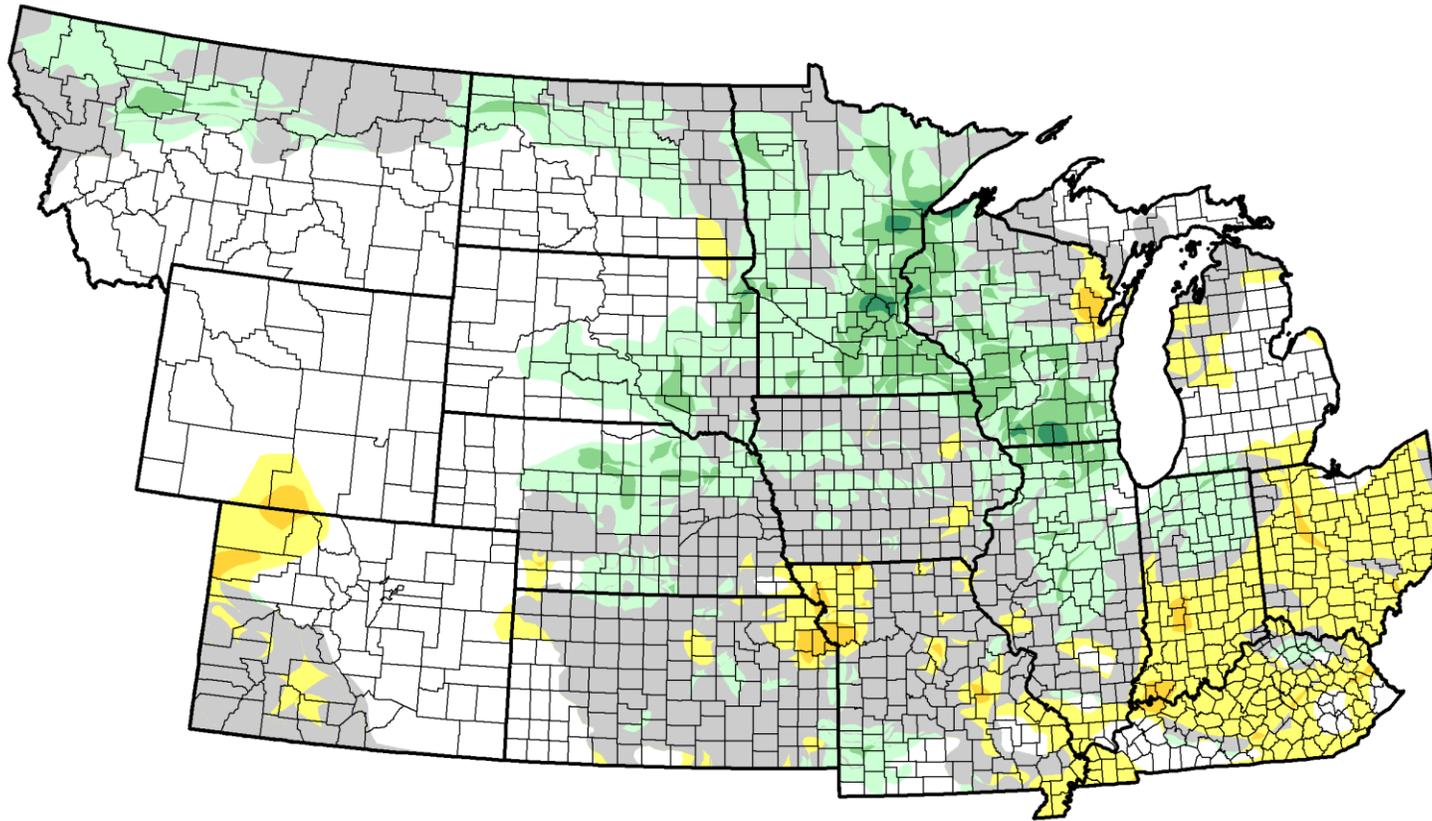
Author:
Rocky Bilotta
NCEI/NOAA



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droughtmonitor.unl.edu

U.S. Drought Monitor Class Change - NWS Central 4 Week



-  5 Class Degradation
-  4 Class Degradation
-  3 Class Degradation
-  2 Class Degradation
-  1 Class Degradation
-  No Change
-  1 Class Improvement
-  2 Class Improvement
-  3 Class Improvement
-  4 Class Improvement
-  5 Class Improvement

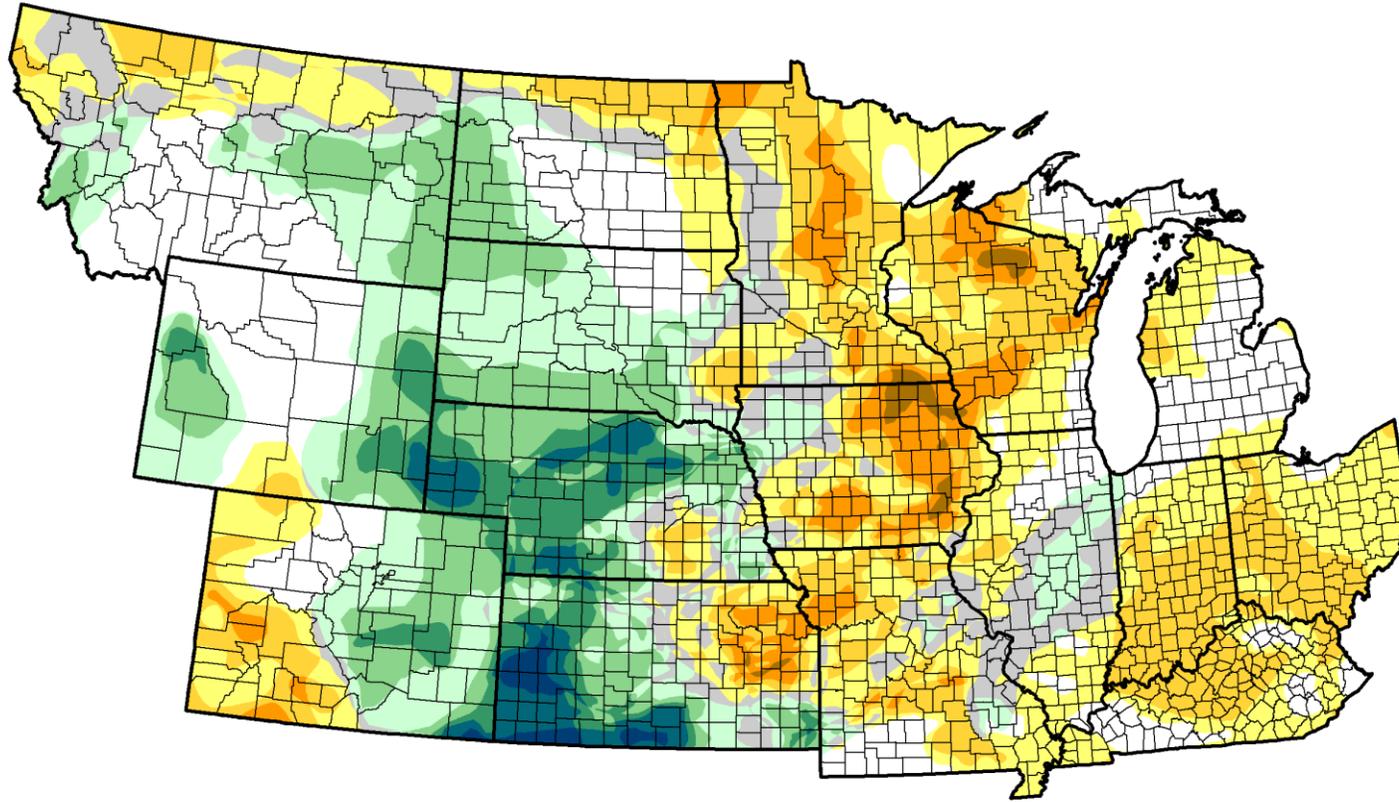
October 17, 2023
compared to
September 19, 2023

droughtmonitor.unl.edu



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U.S. Drought Monitor Class Change - NWS Central 24 Week



-  5 Class Degradation
-  4 Class Degradation
-  3 Class Degradation
-  2 Class Degradation
-  1 Class Degradation
-  No Change
-  1 Class Improvement
-  2 Class Improvement
-  3 Class Improvement
-  4 Class Improvement
-  5 Class Improvement

October 17, 2023
compared to
May 2, 2023

droughtmonitor.unl.edu



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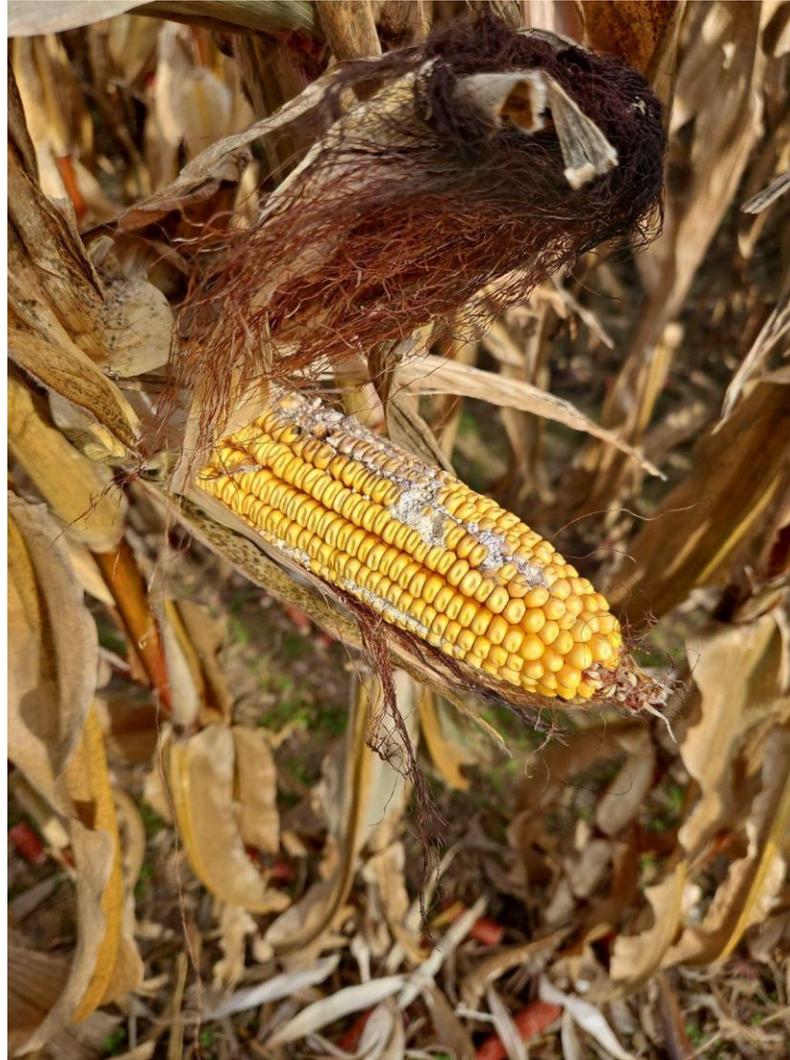


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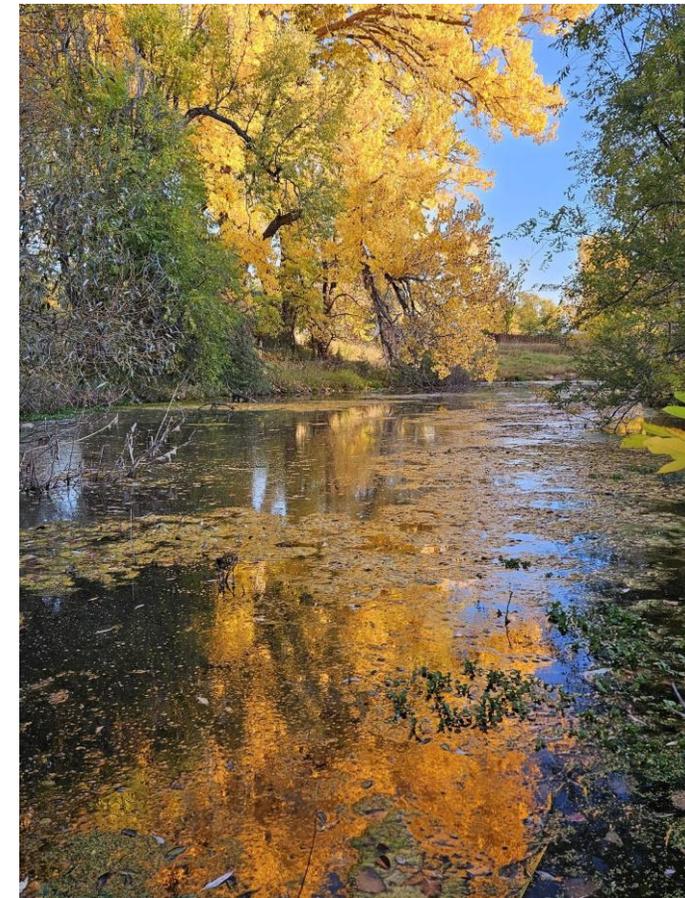
Climate Impacts



First frost in Brookings, SD. Photo by Kristine Lang

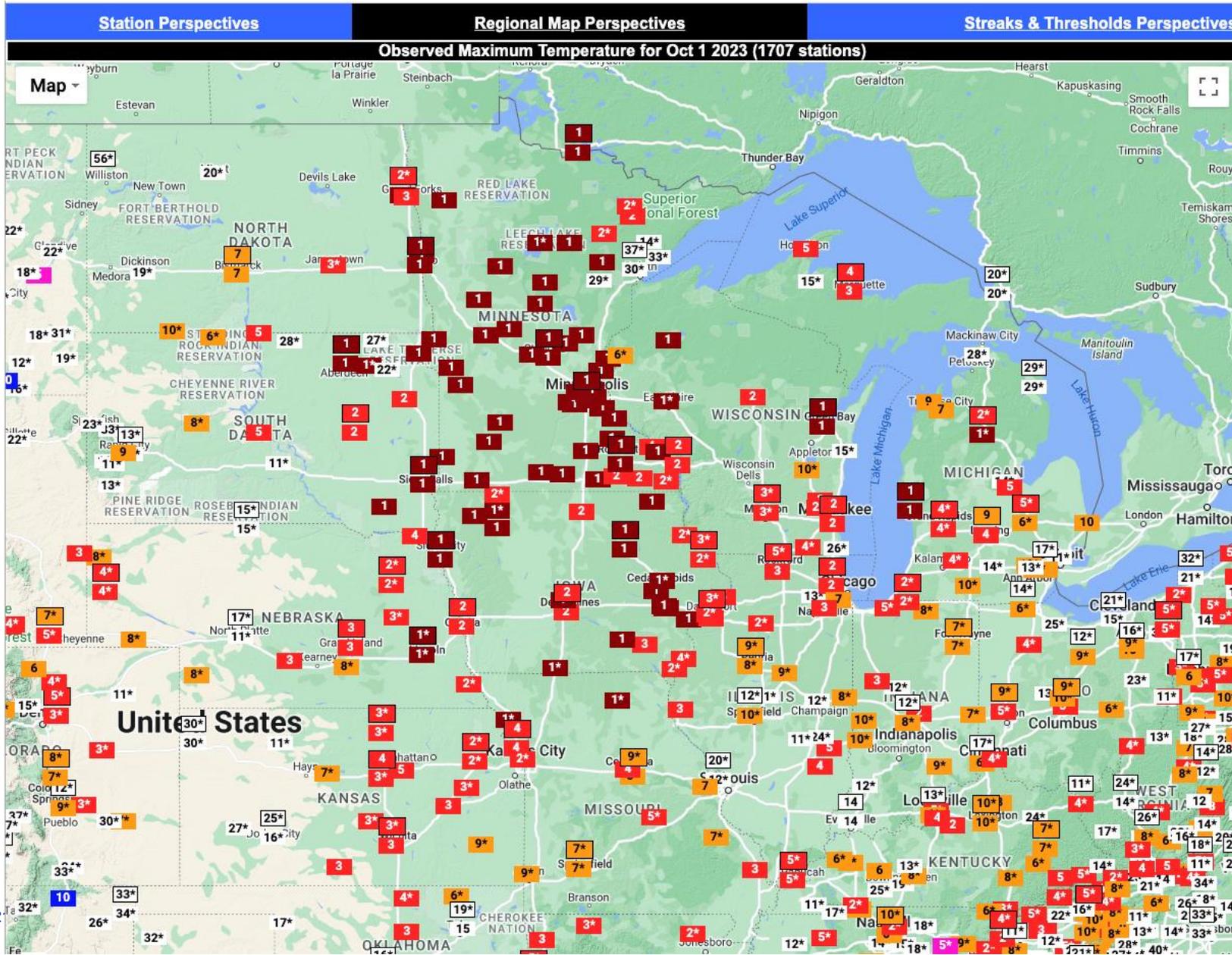


Corn ear at harvest in Indiana. Photo by Hans Schmitz



Fall foliage in Rapid City, SD.
Photo by Kristine Lang

Record high temperatures 10/1/23



Legend Rank

	Highest
	2nd-5th
	6th-10th
	-
	10th-6th
	5th-2nd
	Lowest

* Indicates tied ranking

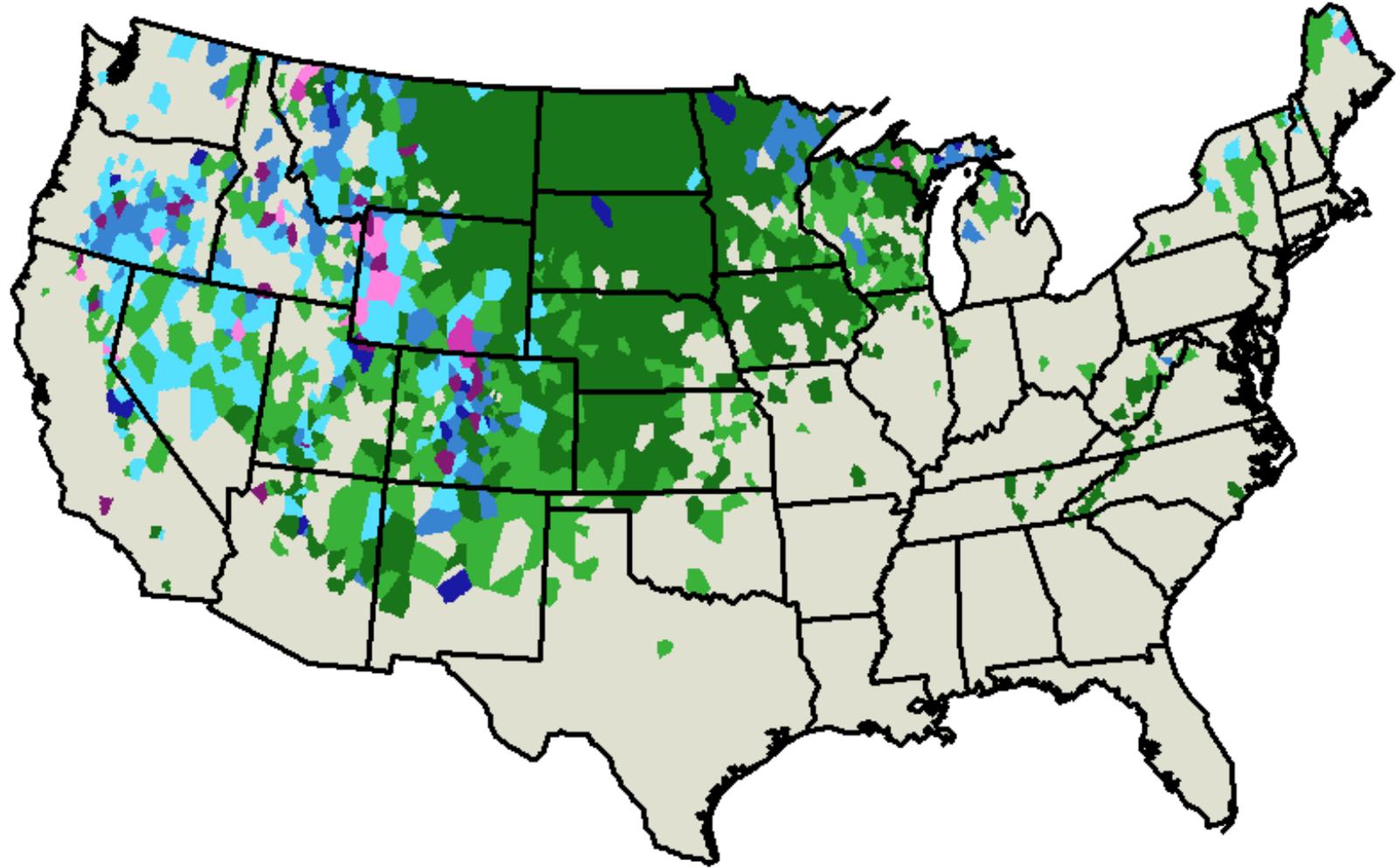
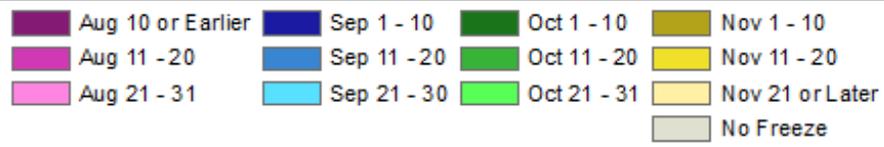
Climate Perspectives

Powered by **ACIS**
NOAA Regional Climate Centers



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Date of First 32°F Freeze for period 7/1/23 to 10/18/23

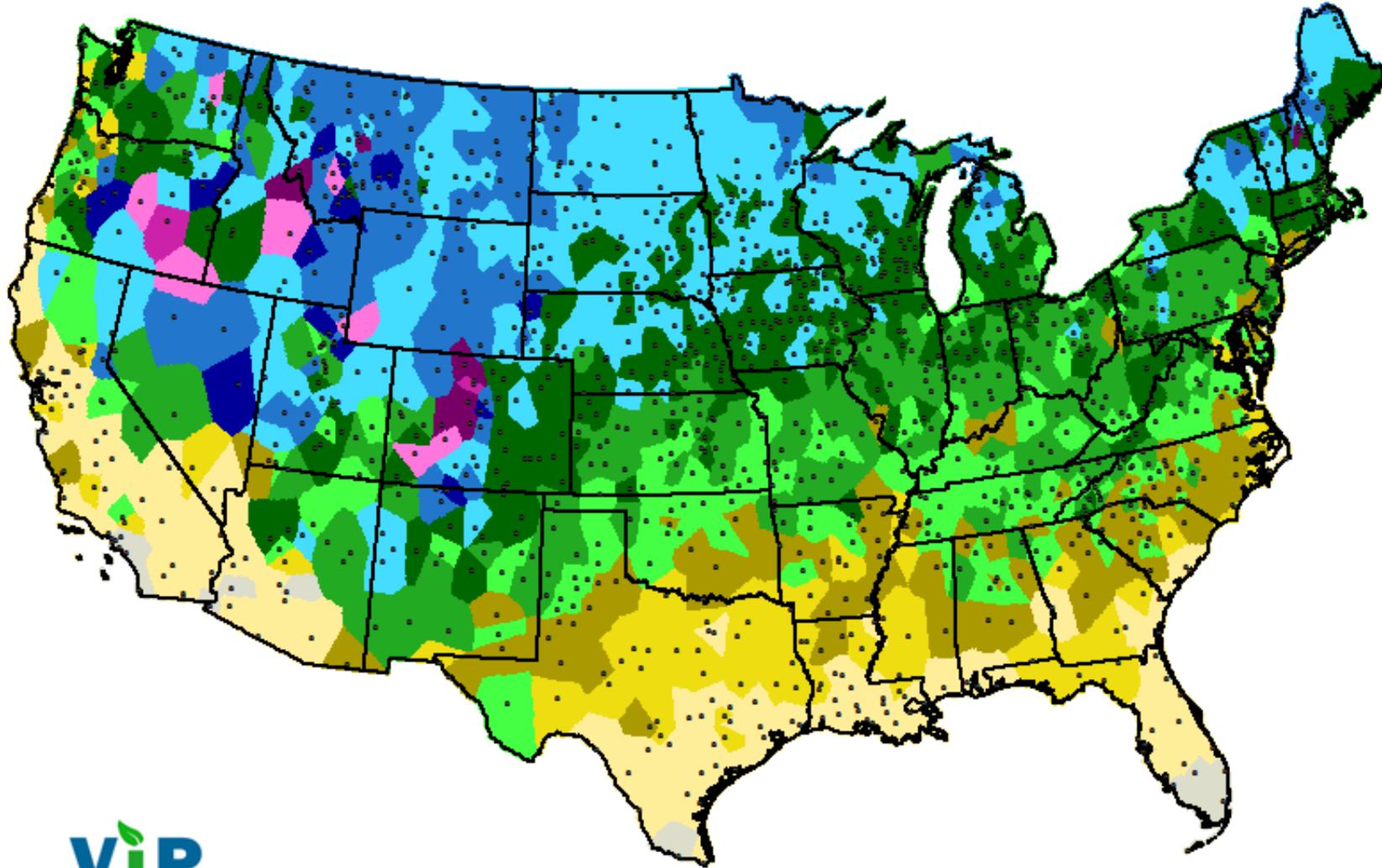
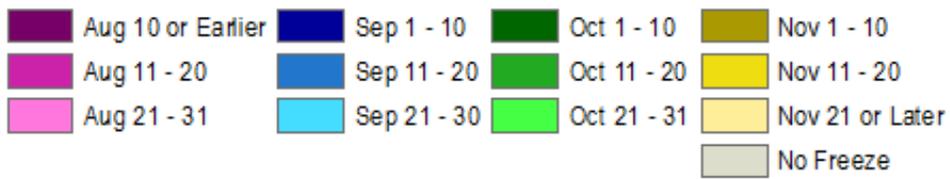


MRCC Experimental Freeze Guidance:
These experimental maps may be utilized as a guide to local and regional
freeze conditions but should NOT be used by themselves for decision processes.



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Climatological Date of Median First 32°F Freeze
For years 1980-81 to 2009-10
Freeze year beginning July 1st
Median defined as the 50th Percentile

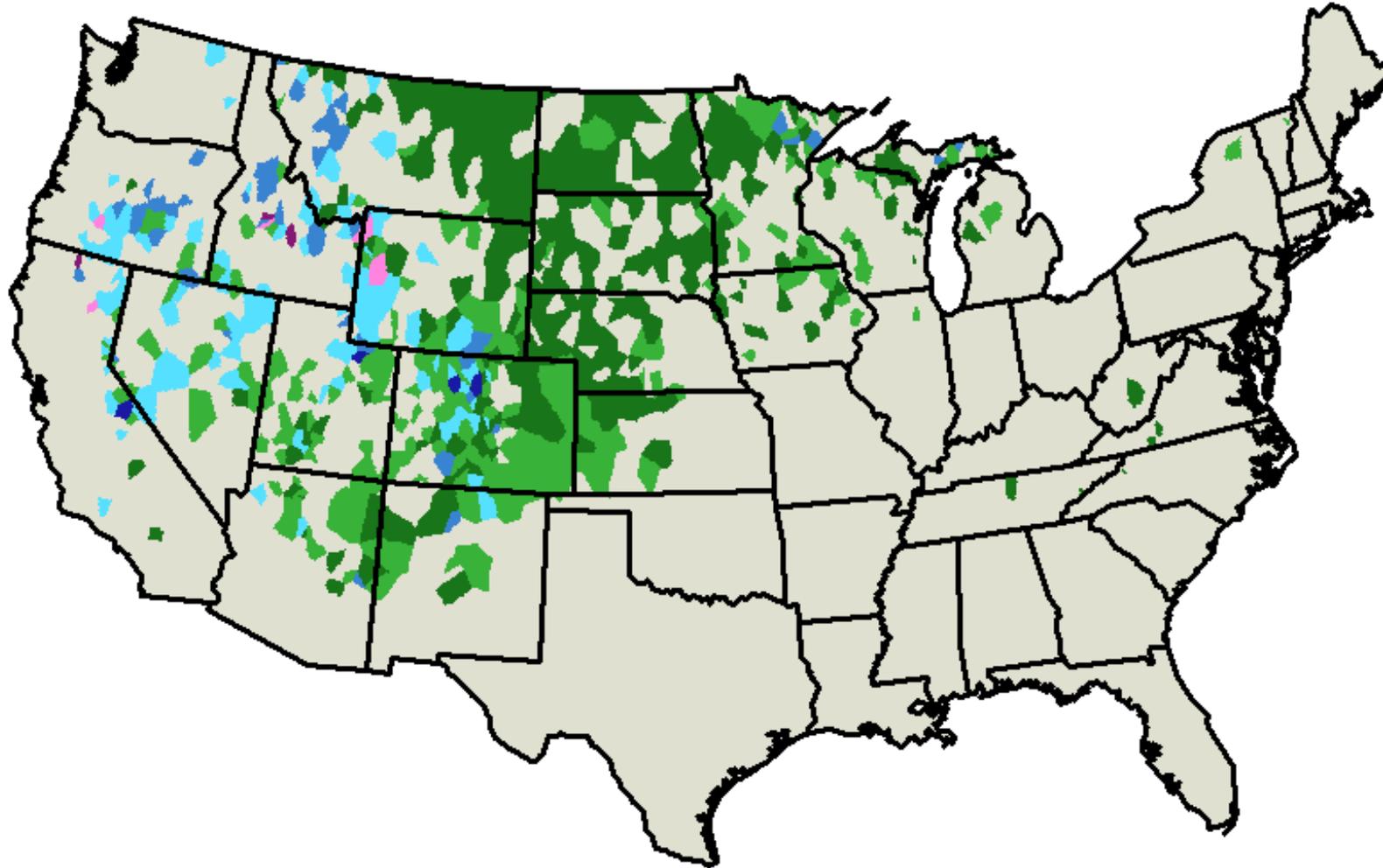
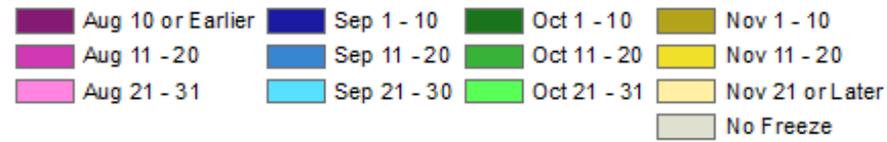


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https://mrcc.illinois.edu/ViP/frz_maps/freeze_maps.html

Date of First 28°F Freeze
for period 7/1/23 to 10/18/23



MRCC Experimental Freeze Guidance:
These experimental maps may be utilized as a guide to local and regional
freeze conditions but should NOT be used by themselves for decision processes.



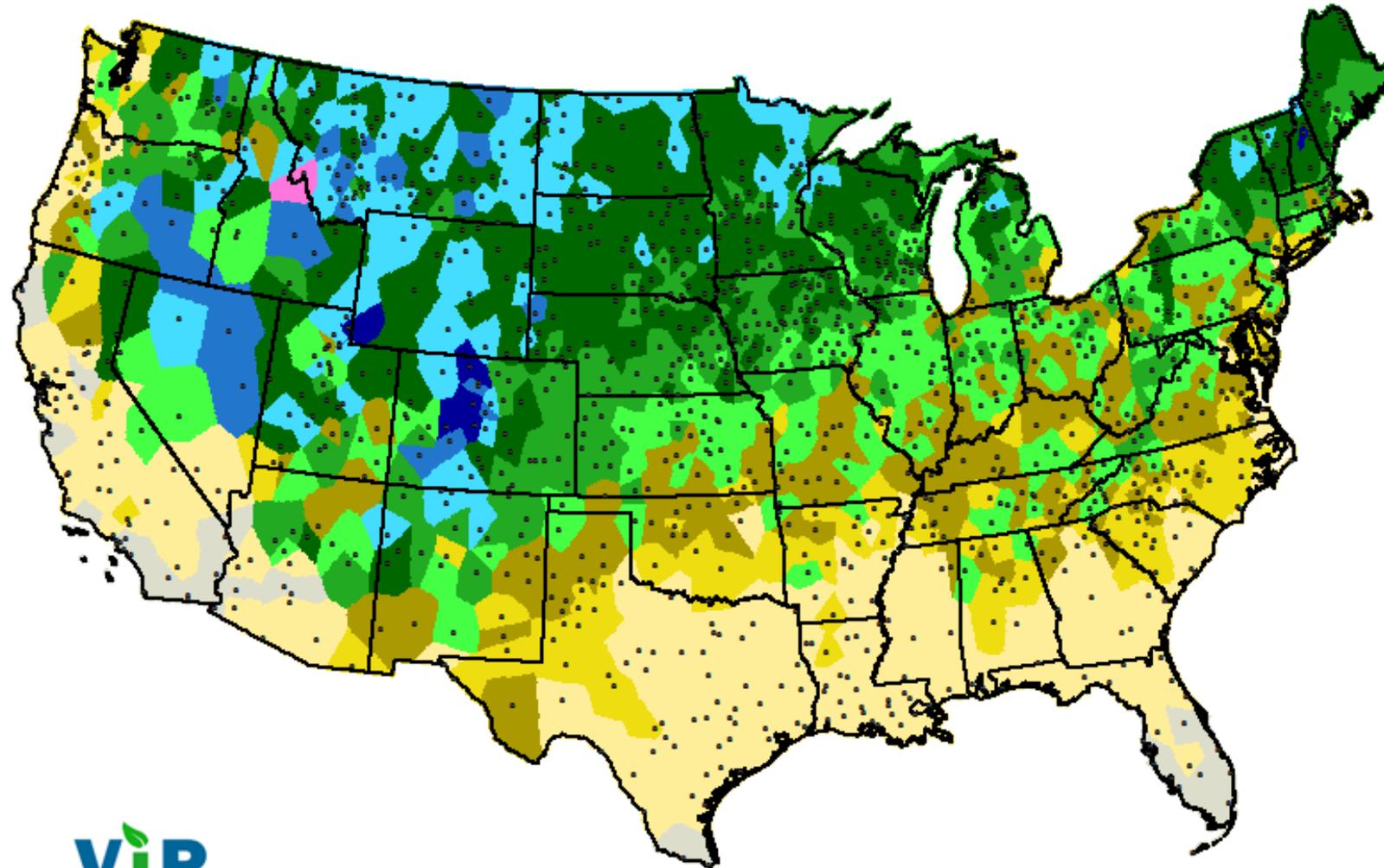
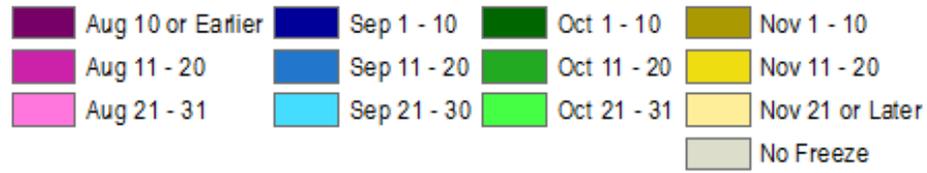
**SOUTH DAKOTA STATE
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Climatological Date of Median First 28°F Freeze

For years 1980-81 to 2009-10

Freeze year beginning July 1st

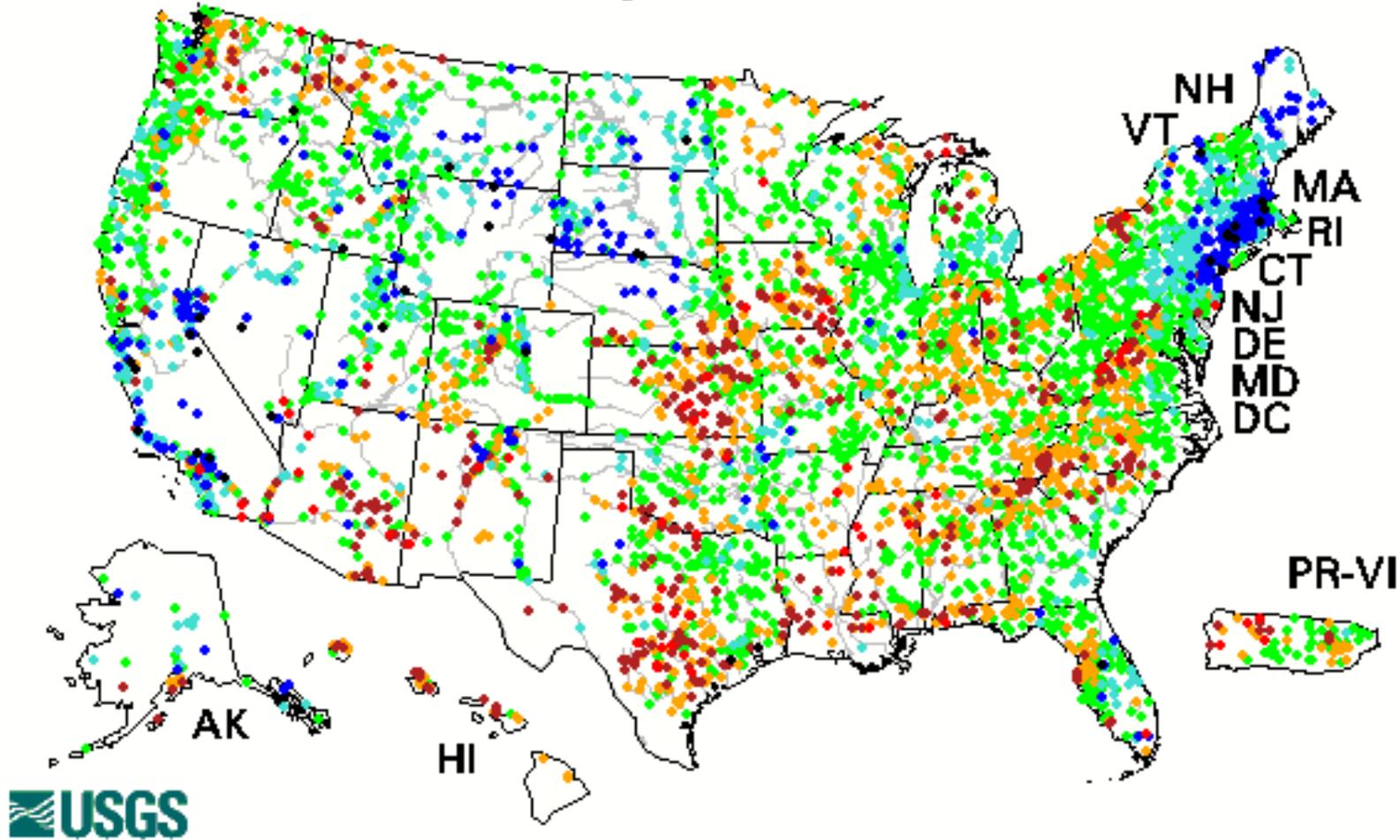
Median defined as the 50th Percentile



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28-day streamflow percentile

Wednesday, October 18, 2023



Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	No Data
	Much below normal	Below normal	Normal	Above normal	Much above normal		



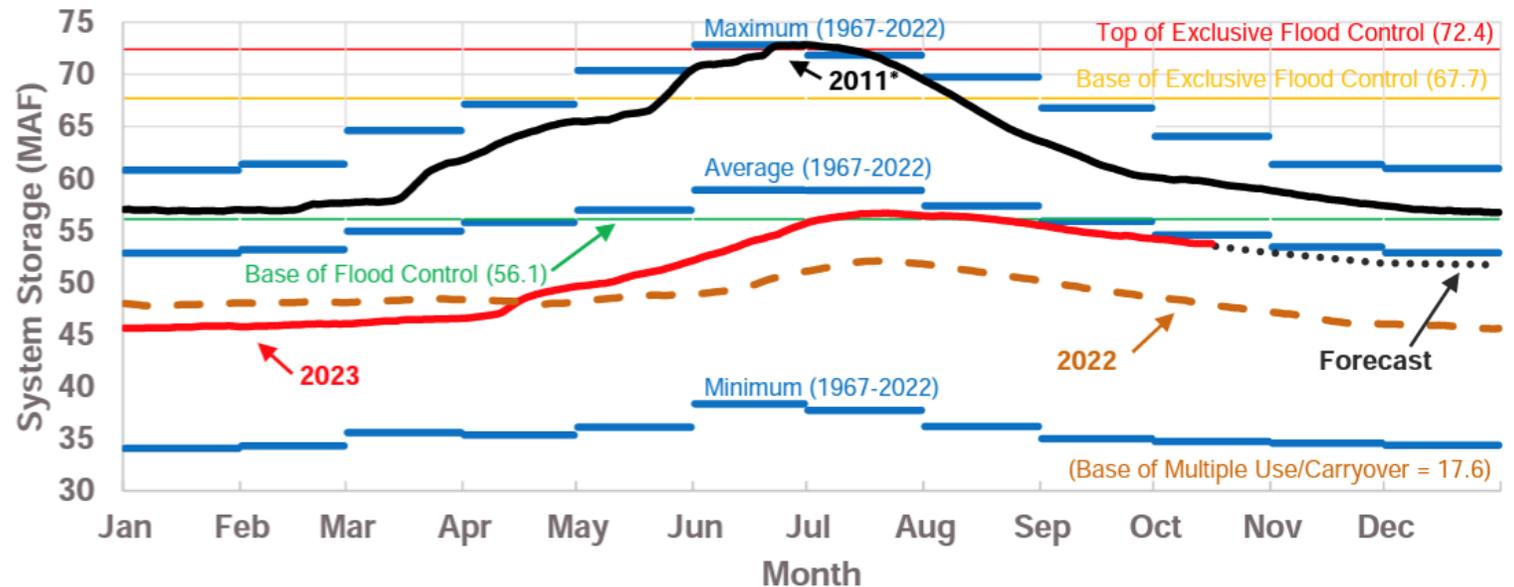
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Missouri River

- Missouri Mainstem Reservoir Status (as of 10/17/23):
- Current system storage is 54.2 million acre-feet, about 6 MAF above this time last year
- September runoff in the Missouri River Basin above Sioux City, Iowa was 1.3 million acre-feet, 109% of the long-term average
- The annual runoff forecast for the upper Missouri River Basin above Sioux City, IA is 29.1 MAF, 113% of average
- Navigation support will be provided for the entire navigation season and will end on Dec. 1 at the mouth of the Missouri River.
- Winter releases from Gavins Point Dam will be at least 13,000 cfs.

System Storage Comparison



*In January 2011, the Base of Flood Control was 56.8 MAF, and the Top of Exclusive Flood Control was 73.1 MAF



Highlights

- Low river levels in Mississippi River
 - Slowing down transportation/barge traffic
- Upcoming storm system could increase fire risk with windy conditions. Also risk of snow, wind and very cold temperatures in Dakotas and Nebraska
- Heavy rains on Oct 13-14 in SD, NE, MN region improved soil moisture, but long term dryness/drought persists
- Some harvested crop yields better than expected, but many states still lower than trends would suggest
- Winter wheat off to a good start in western states
- Cattle moving quickly to grazing cropland in drought areas
- Great Lakes: levels down from September but still above average for October. Water temperature warmer than avg in Lakes Ontario, Michigan & Superior.



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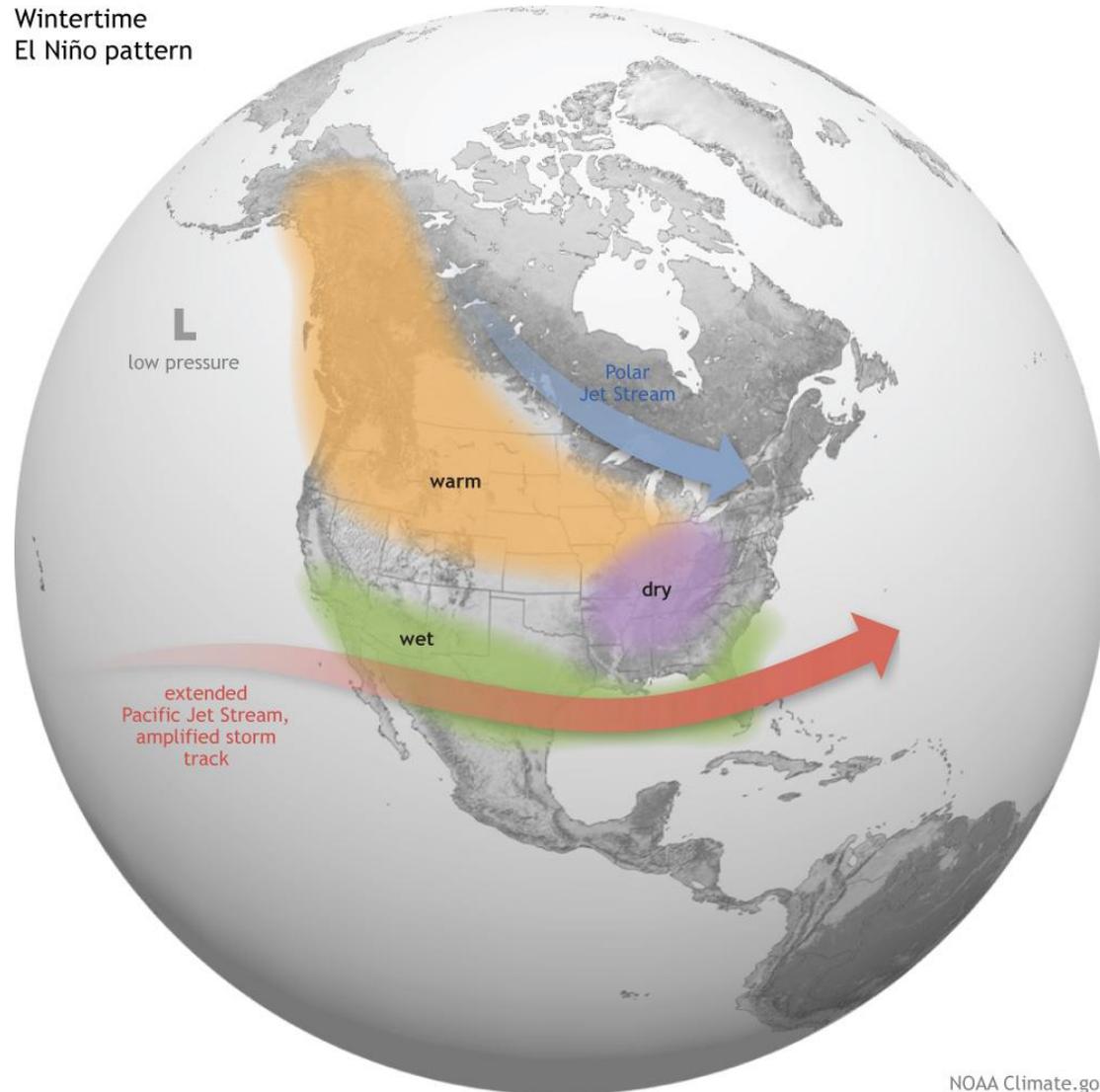
Climate outlooks

- El Niño
- 7-day precipitation forecast
- 8-14 day outlook
- November temperature and precipitation
- Winter season temperature and precipitation



El Niño

Wintertime
El Niño pattern

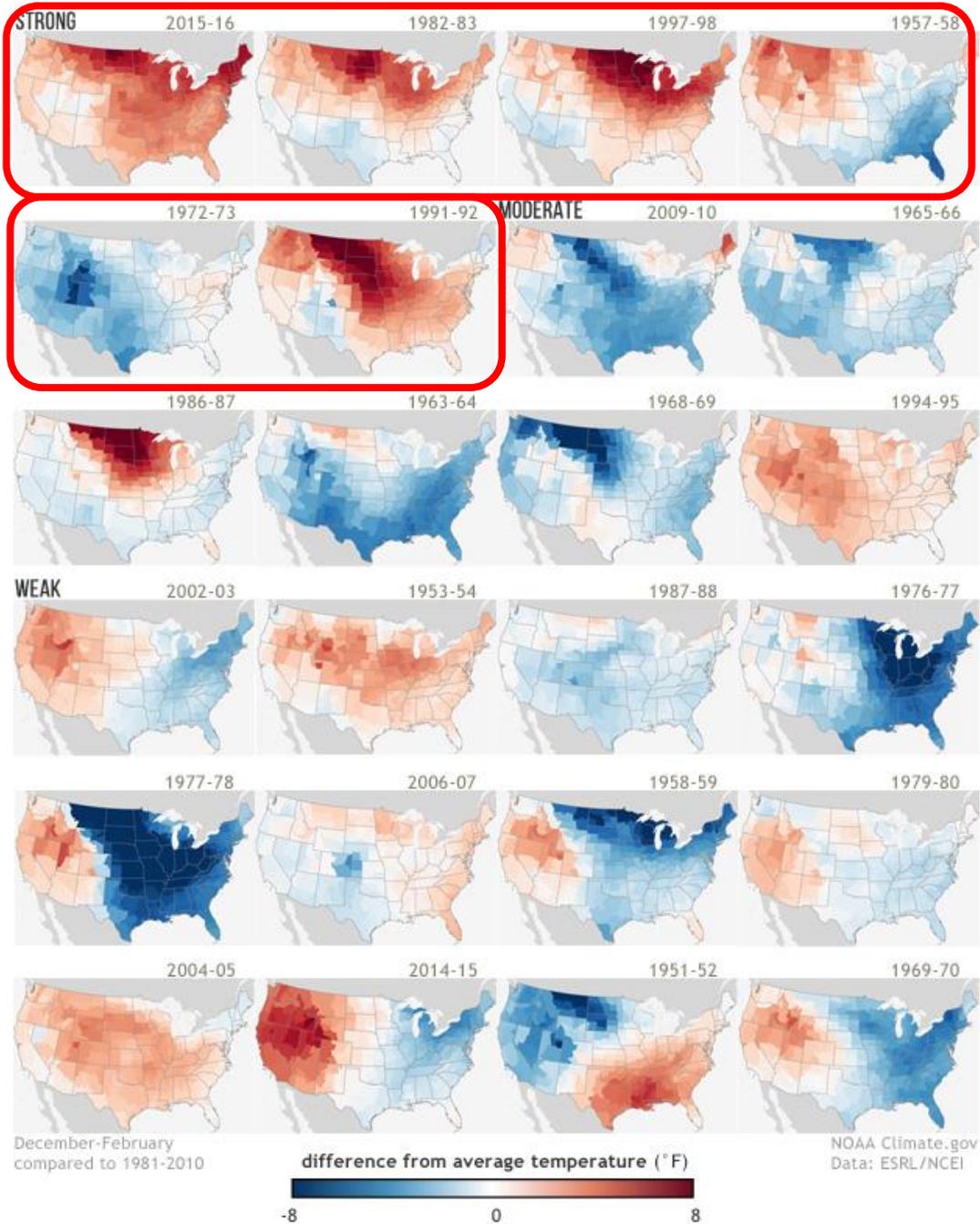


- High confidence to continue into the spring season
- 75-85% chance of becoming a strong event
- 3 in 10 chance of “historically strong” event, 2015-16, 1997-98, 1982-83
- Strong El Niño does not necessarily mean strong impacts



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U.S. winter temperature during every El Niño since 1950

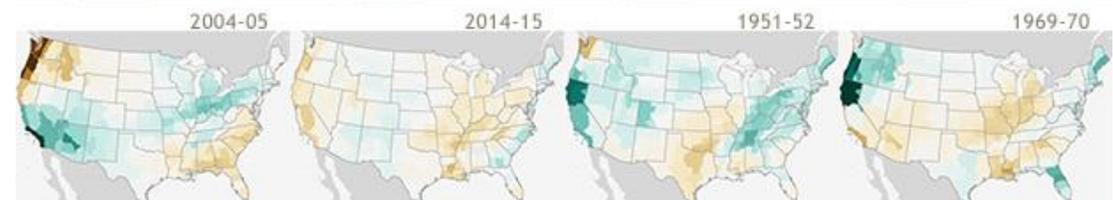
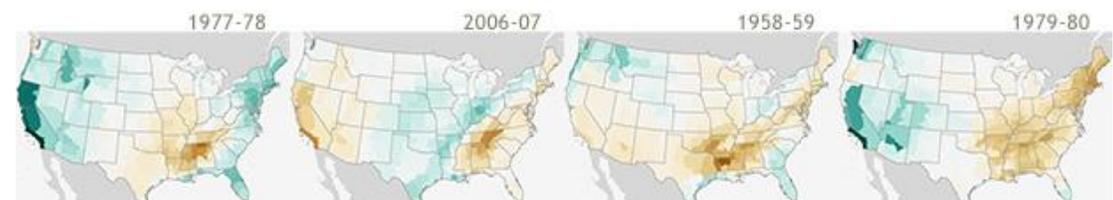
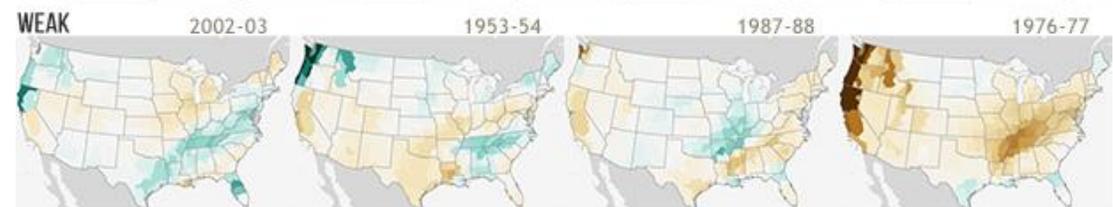
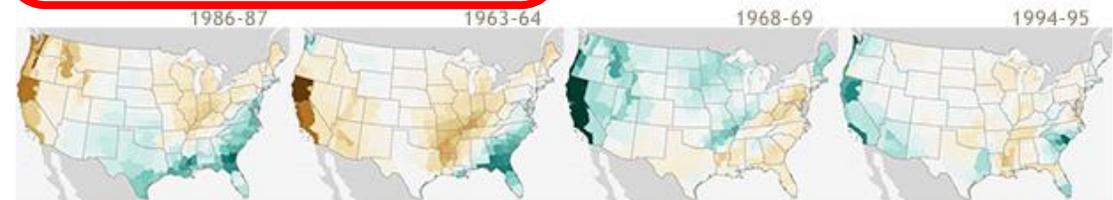
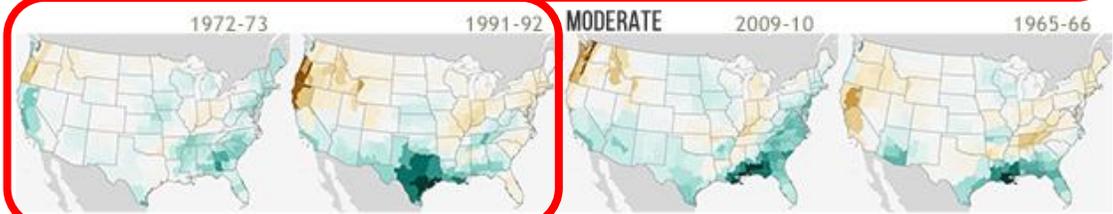
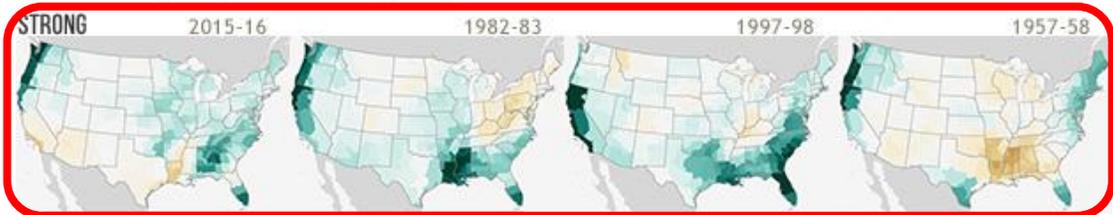


Historical El Niño Winter Temperature

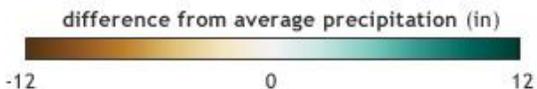


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U.S. winter precipitation during every El Niño since 1950



December-February
compared to 1981-2010



NOAA Climate.gov
Data: ESRL/NCEI

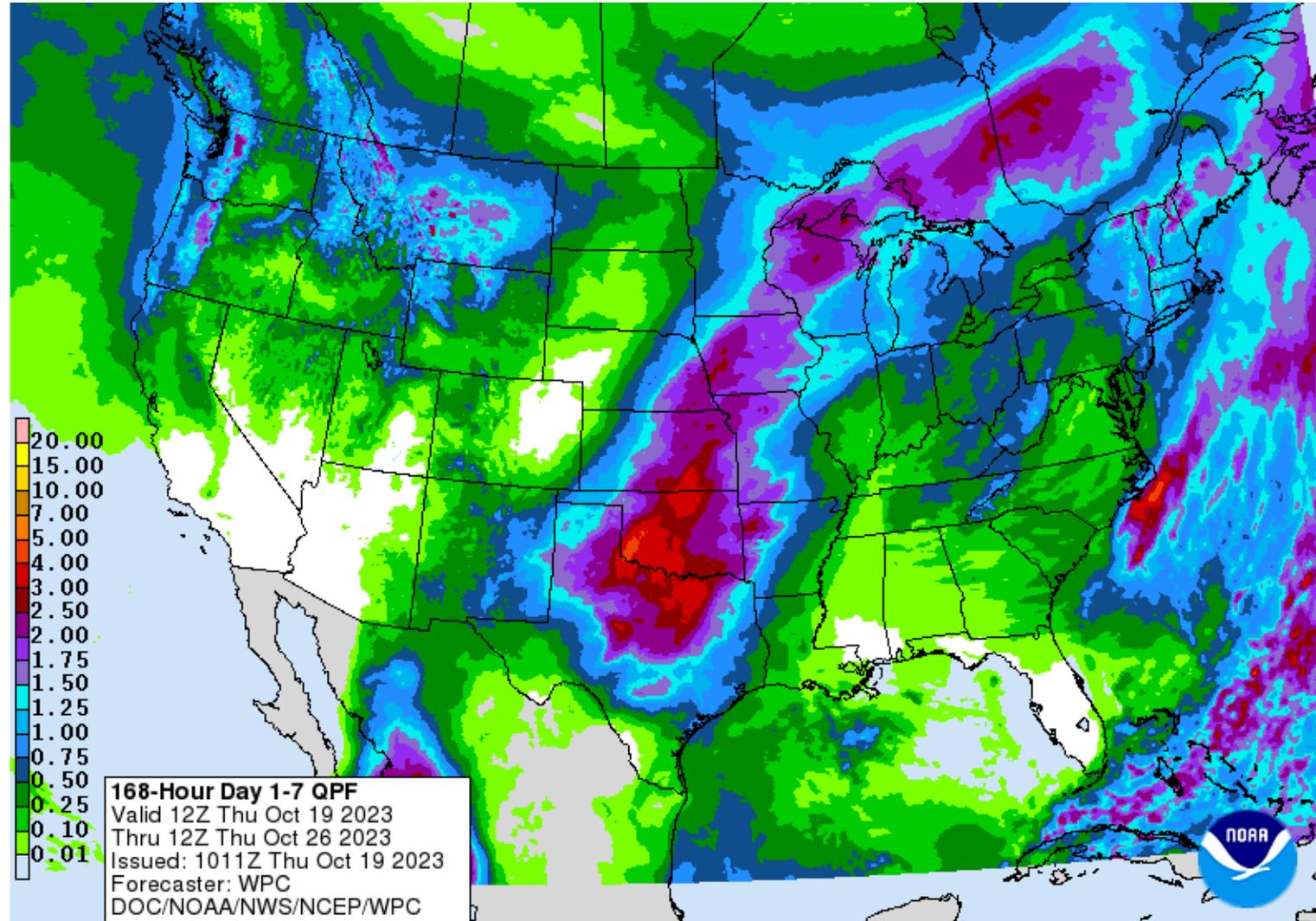
Historical El Niño Winter Precipitation



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7-day Quantitative Precipitation Forecast

Valid: 19 Oct - 26 Oct



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<http://www.wpc.ncep.noaa.gov/qpf/day1-7.shtml>

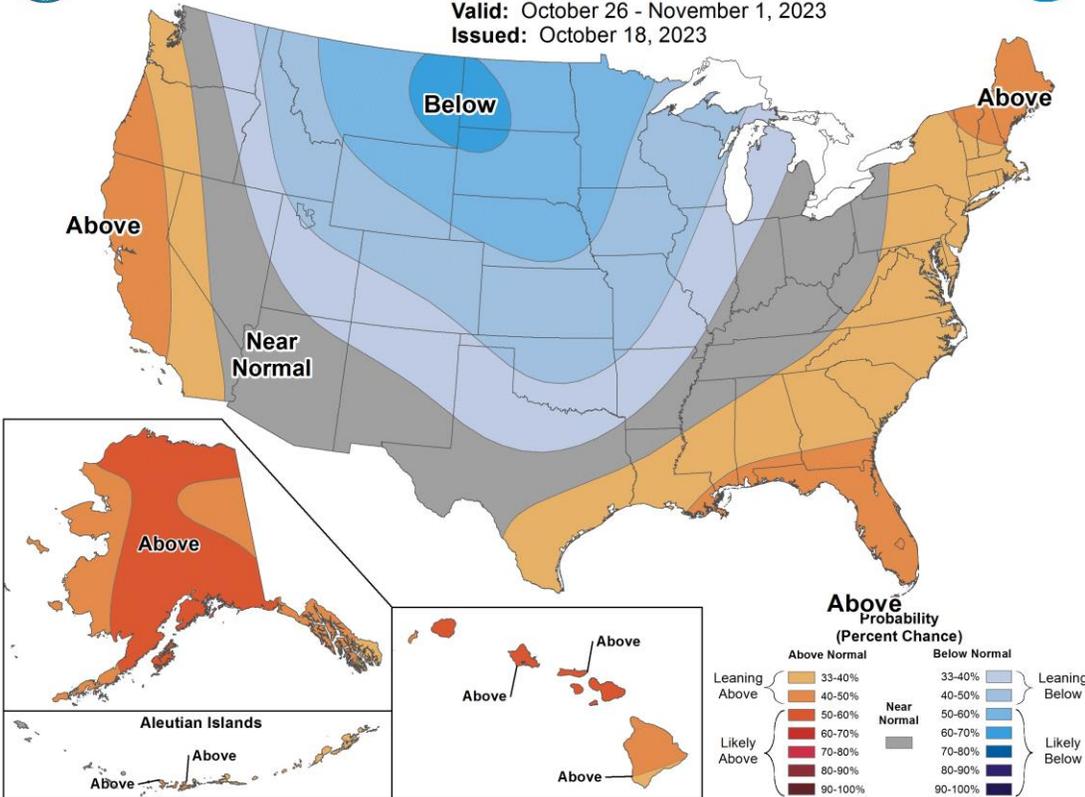


8-14 Day Outlook



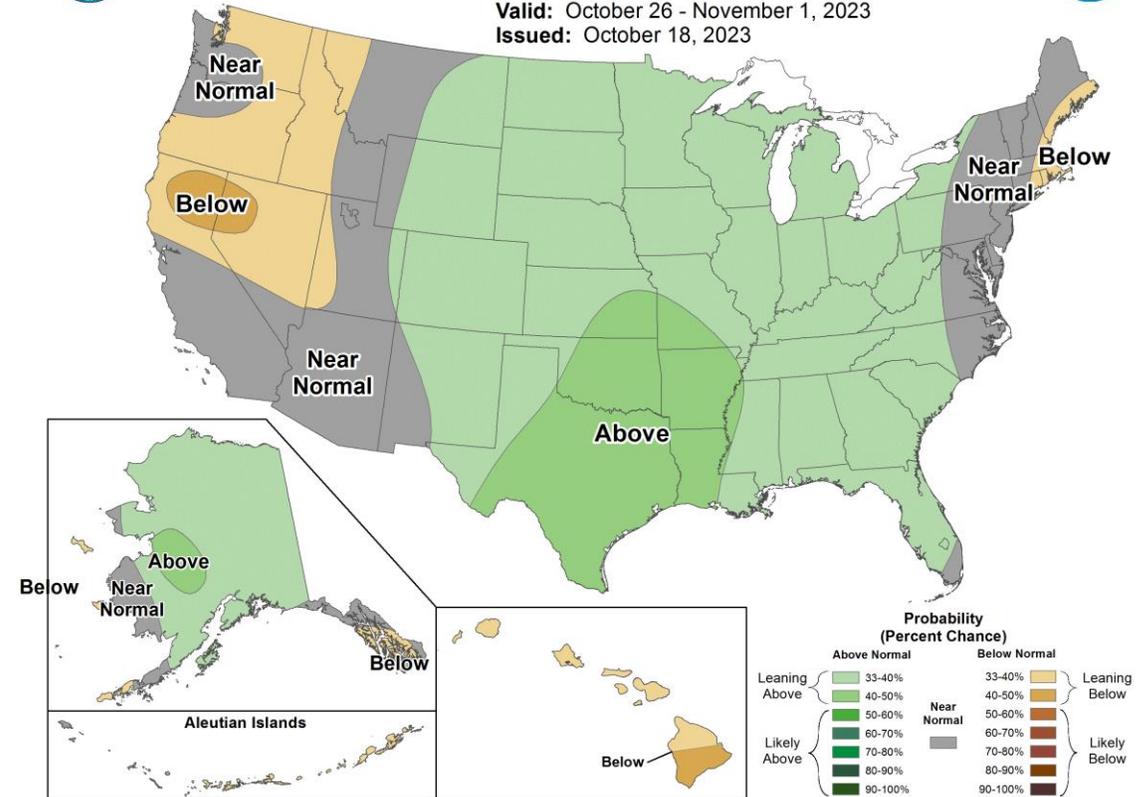
8-14 Day Temperature Outlook

Valid: October 26 - November 1, 2023
Issued: October 18, 2023



8-14 Day Precipitation Outlook

Valid: October 26 - November 1, 2023
Issued: October 18, 2023



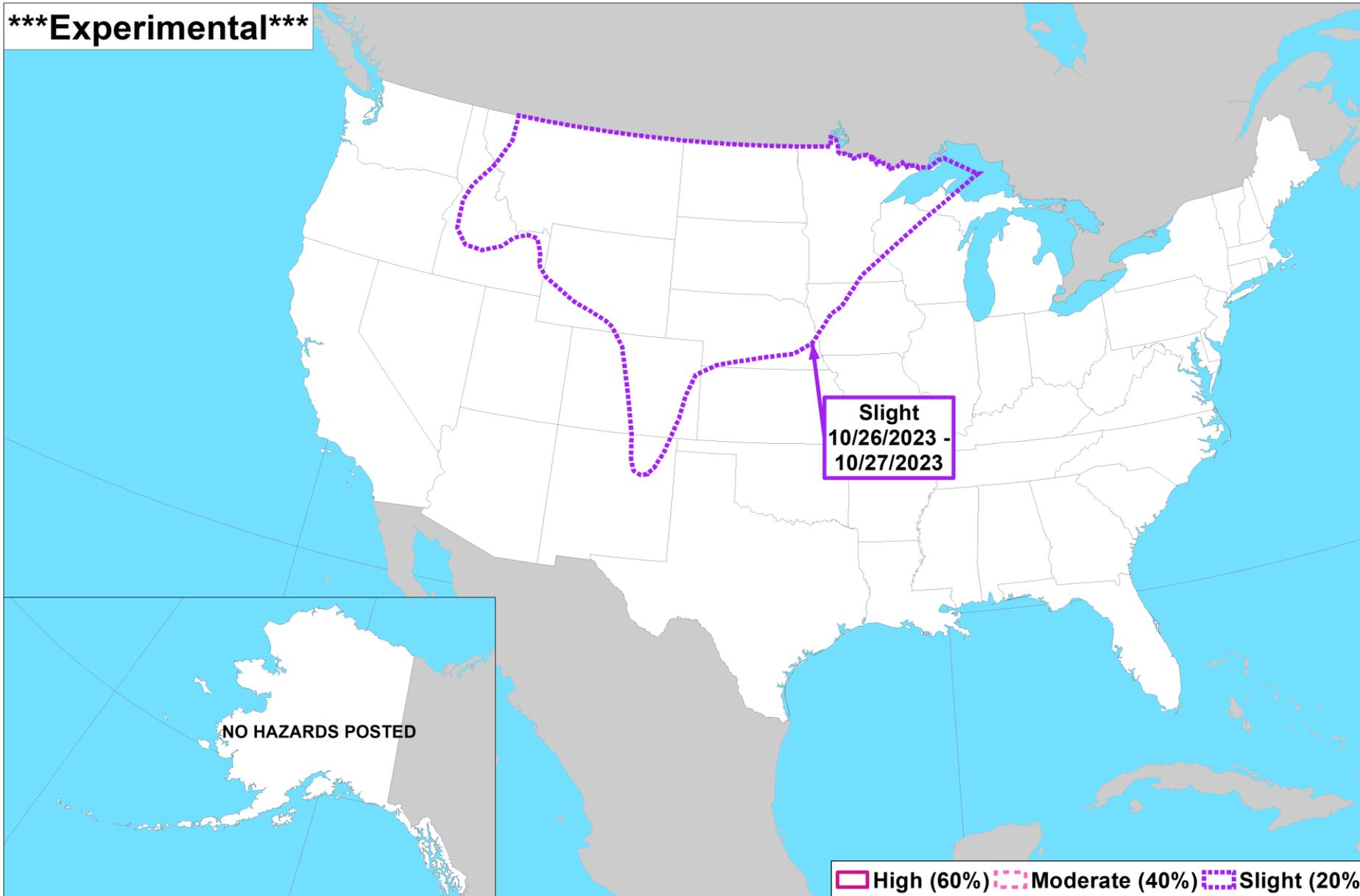


Risk of Heavy Snow

Valid: 10/26/2023-11/01/2023



Experimental



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Climate Prediction Center

Made: 10/18/2023 3PM EDT

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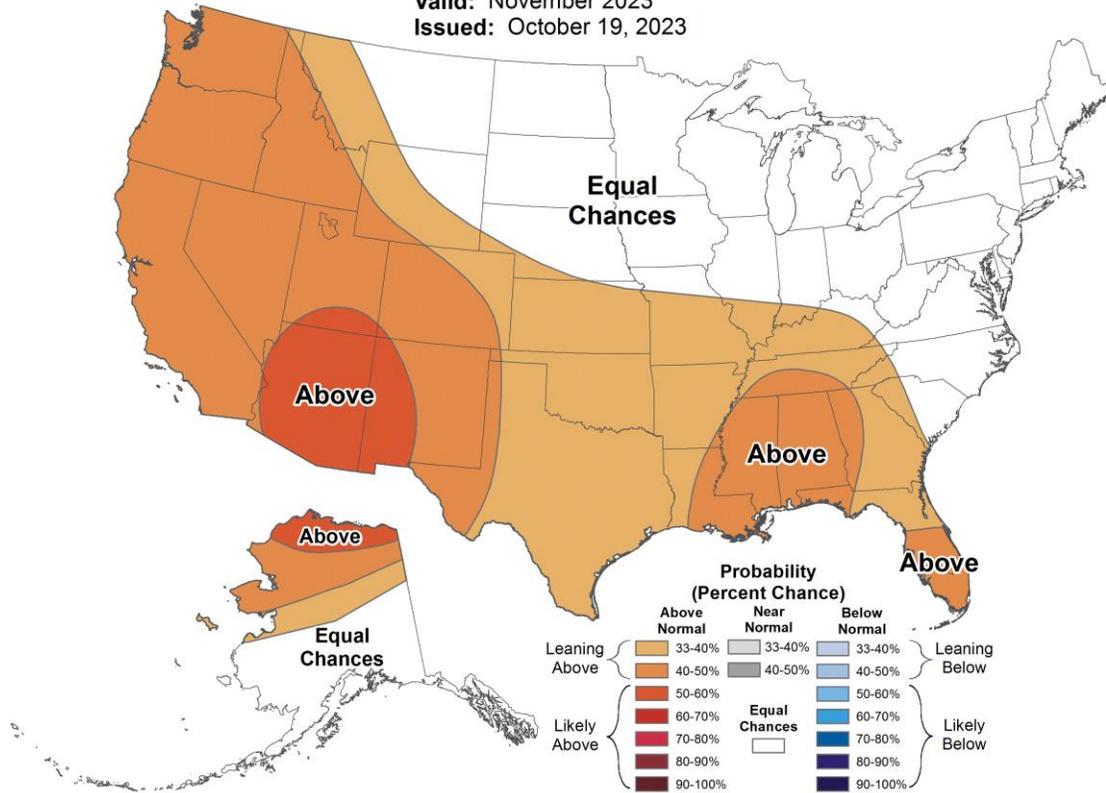


November Outlook



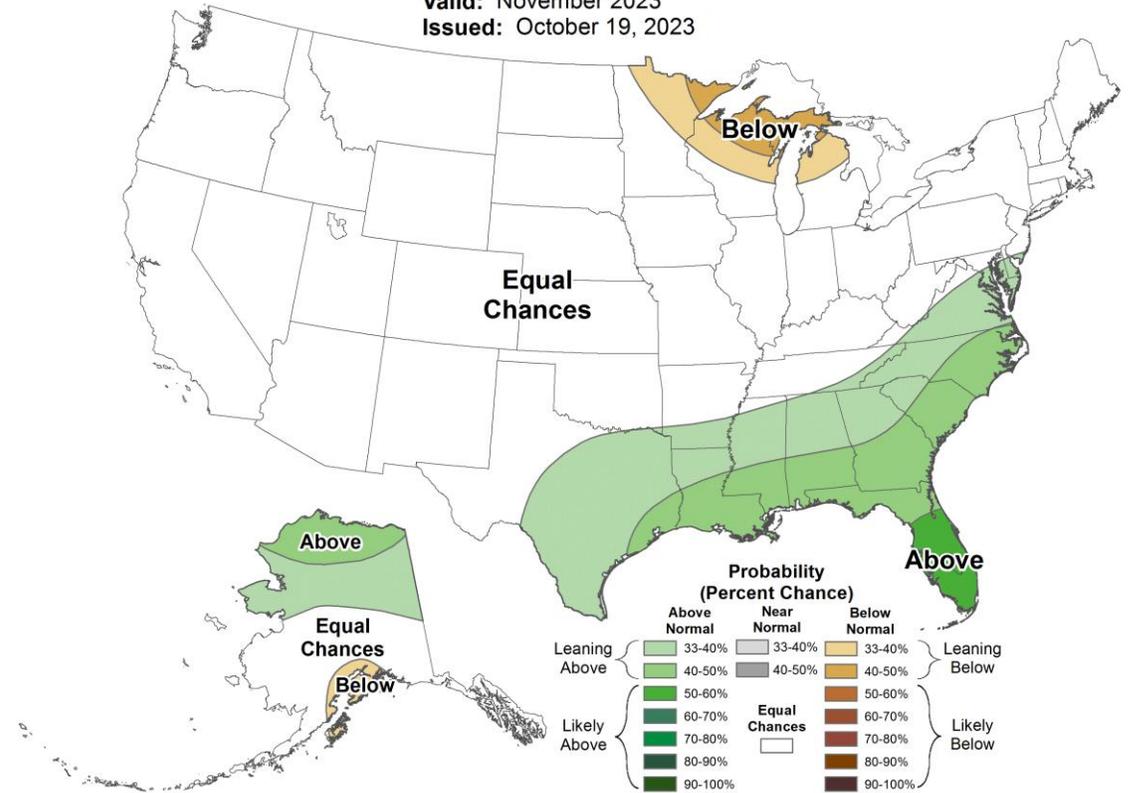
Monthly Temperature Outlook

Valid: November 2023
Issued: October 19, 2023



Monthly Precipitation Outlook

Valid: November 2023
Issued: October 19, 2023





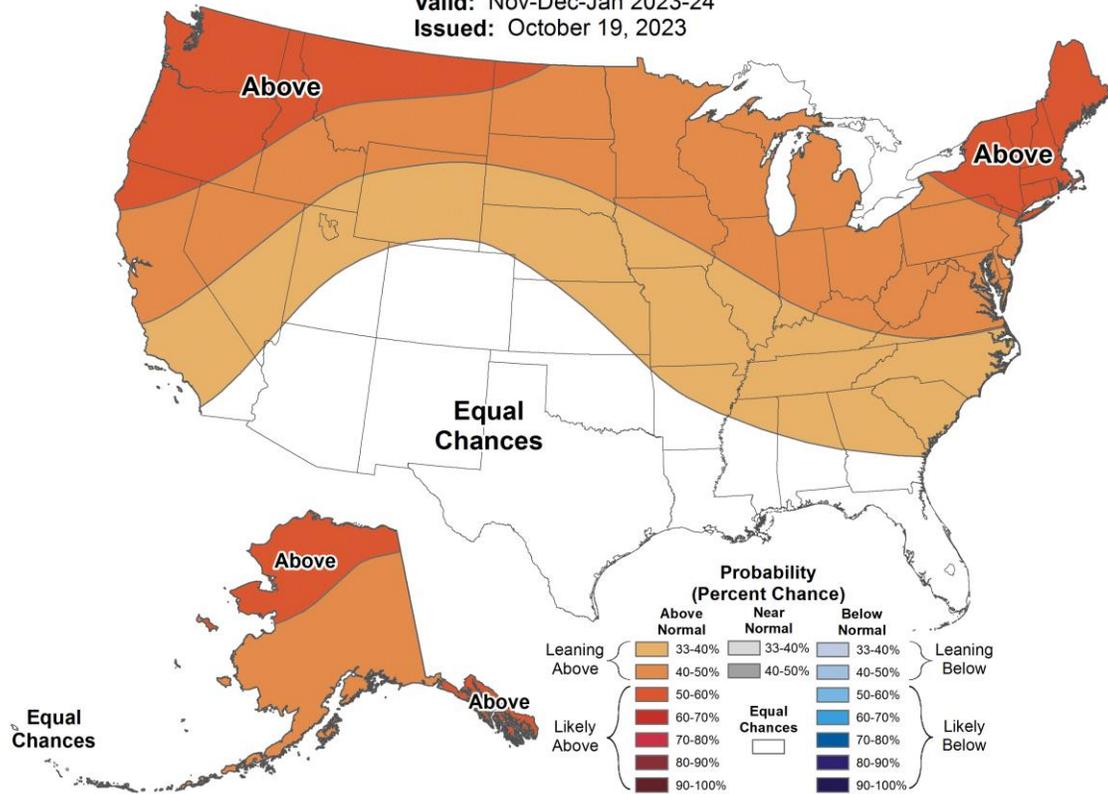
November-January Outlook



Seasonal Temperature Outlook



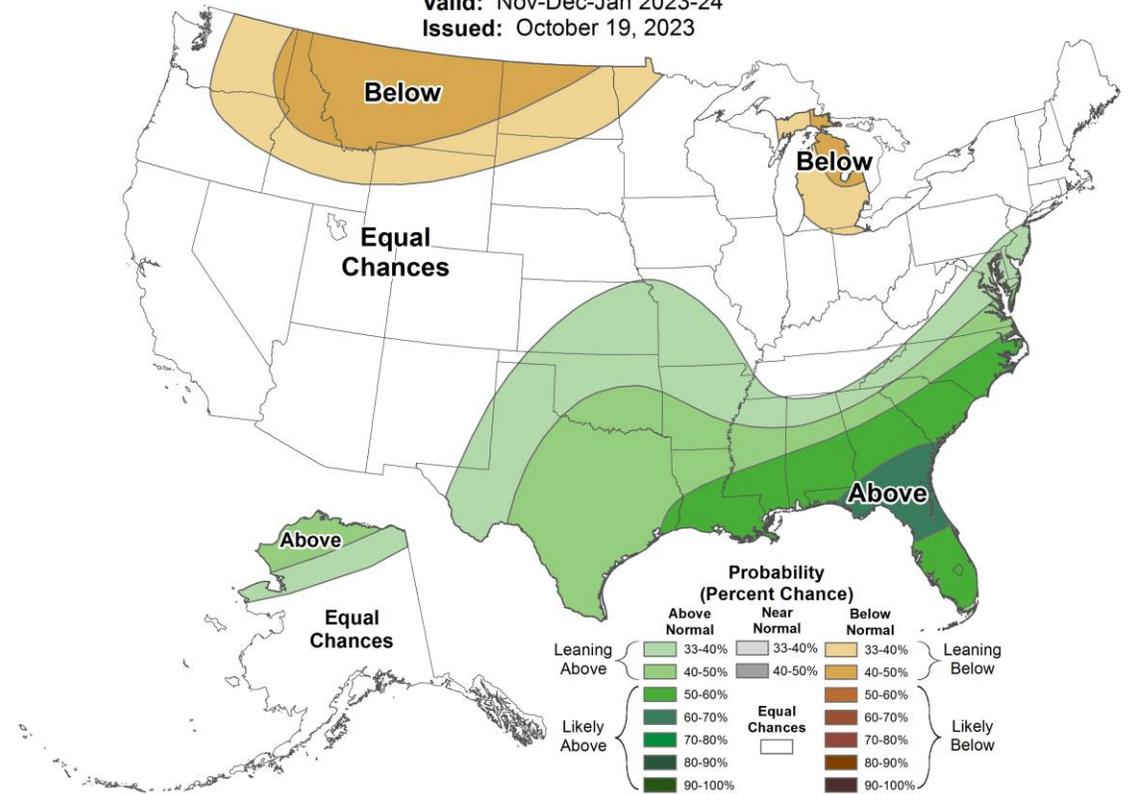
Valid: Nov-Dec-Jan 2023-24
Issued: October 19, 2023



Seasonal Precipitation Outlook



Valid: Nov-Dec-Jan 2023-24
Issued: October 19, 2023





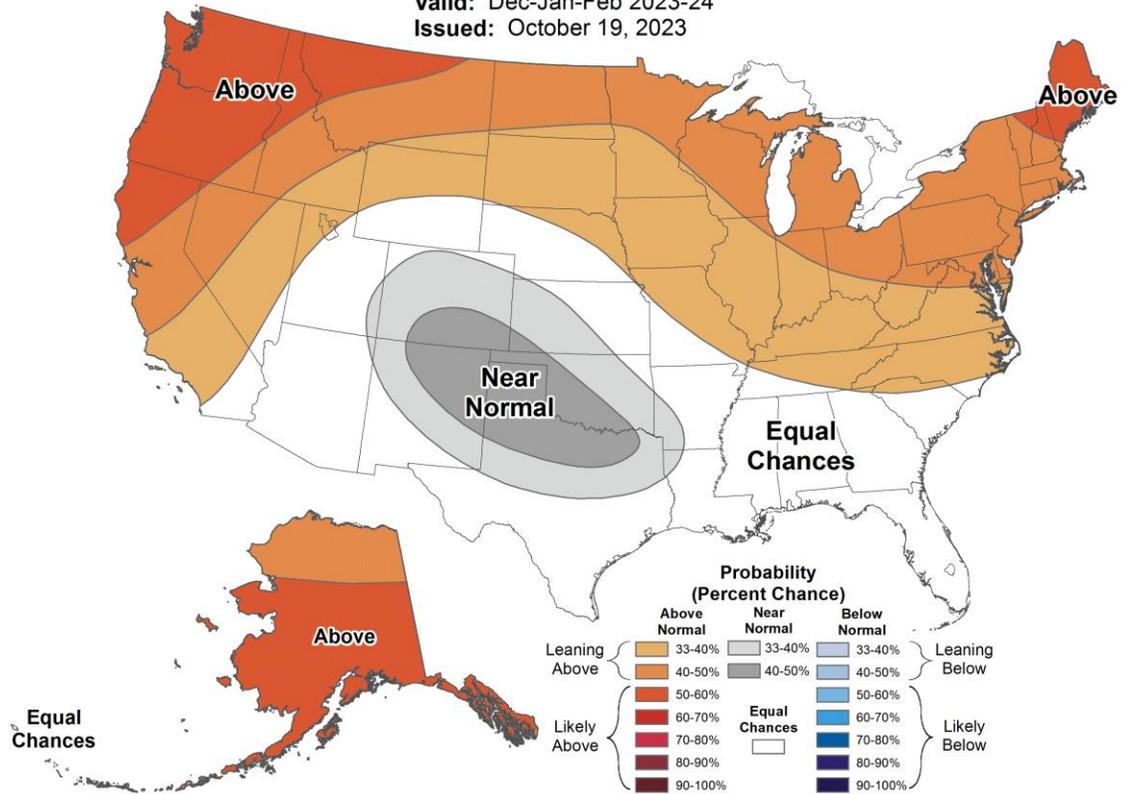
December-February Outlook



Seasonal Temperature Outlook



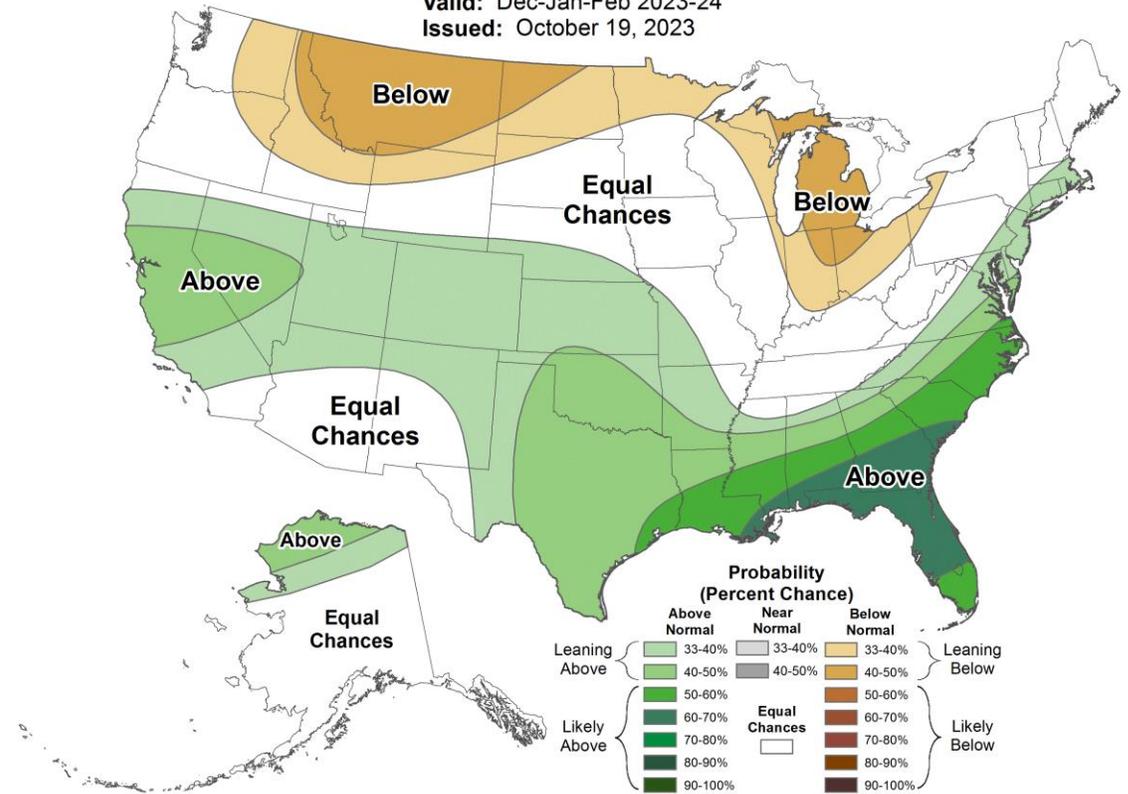
Valid: Dec-Jan-Feb 2023-24
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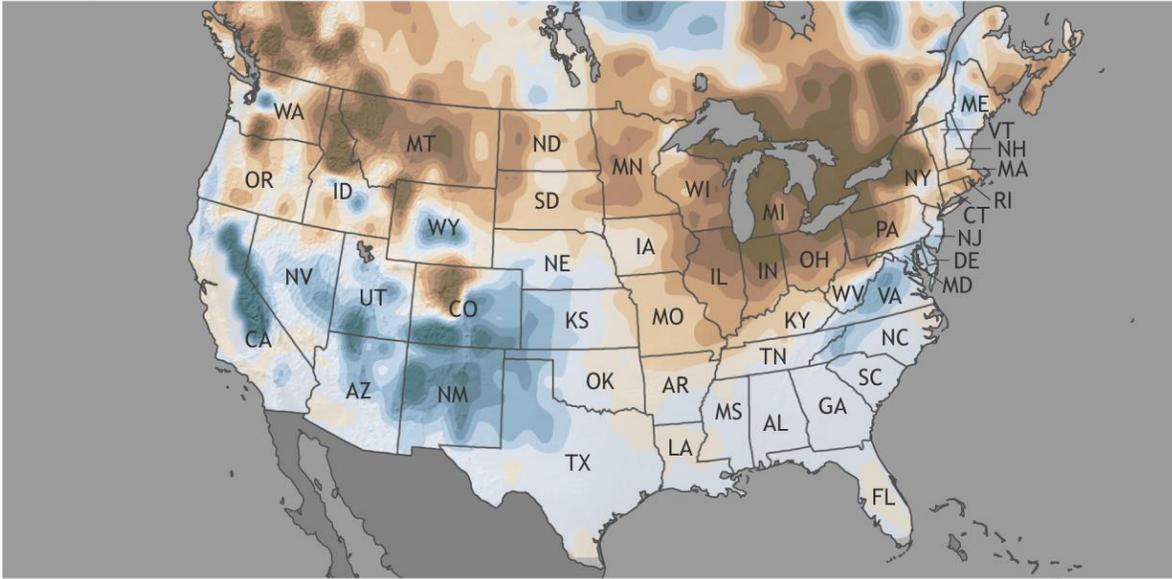


Seasonal Precipitation Outlook

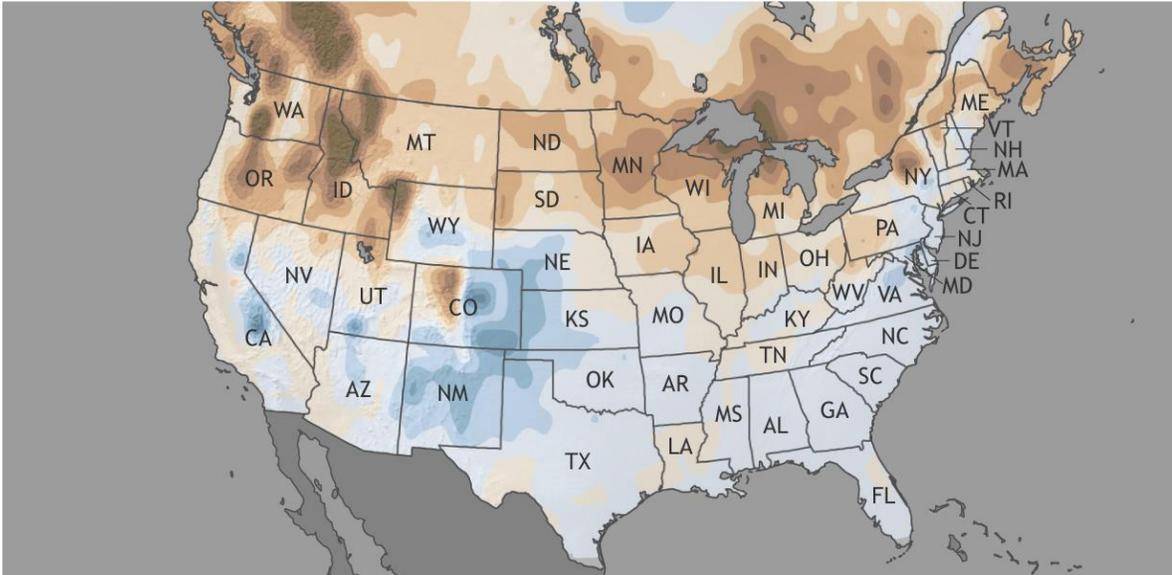


Valid: Dec-Jan-Feb 2023-24
Issued: October 19, 2023

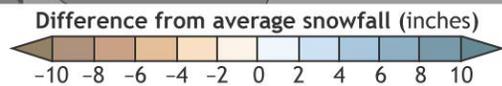




All events



October-April
compared to 1950-2009



NOAA Climate.gov
Data: Rutgers/CPC

El Niño Snowfall 1950-2009



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Key Messages

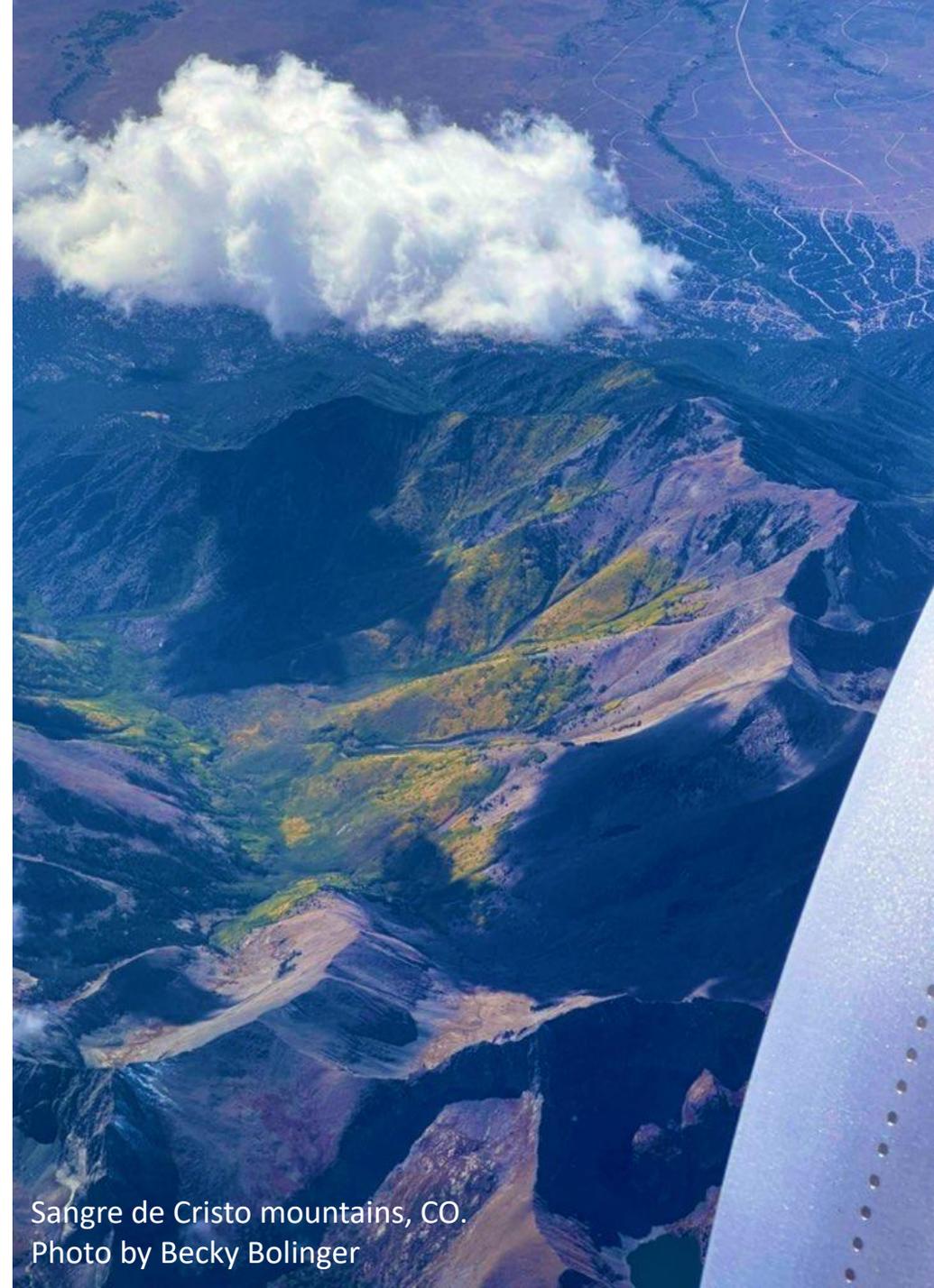
- Drought continuing in central and southern part of our region. Some short relief possible with storm system next week.
- Expecting El Nino to continue through winter season into spring
- Winter outlook details:
<https://www.climate.gov/news-features/understanding-climate/2023-24-us-winter-outlook-wetter-south-warmer-north>



Fall in Minnesota. Photo by Kenny Blumenfeld.

Thank You!

- Questions:
 - **Climate:**
 - Laura Edwards: laura.edwards@sdstate.edu, 605-626-2870
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 - Doug Kluck: doug.kluck@noaa.gov, 816-564-2417
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Sangre de Cristo mountains, CO.
Photo by Becky Bolinger

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