

# North Central U.S. Climate Summary & Outlook

Brian Fuchs  
National Drought Mitigation Center  
University of Nebraska-Lincoln  
School of Natural Resources



NATIONAL DROUGHT  
MITIGATION CENTER  
*UNIVERSITY OF NEBRASKA*

September 21, 2023

# General Information

- **Providing climate services to the Central Region**

- Collaboration Activity Between:
  - NOAA NCEI/NWS/OAR/NIDIS/CPC
  - USDA Climate Hubs
  - American Association of State Climatologists
  - Midwest and High Plains Regional Climate Centers
  - National Drought Mitigation Center



Colorado Clouds, Becky Bolinger

- **Next Regular Climate/Drought Outlook Webinar**

- October 19, 2023(1 PM CST) with Laura Edwards, South Dakota State Climatologist and USDA's Brad Rippey

- **Access to Future Climate Webinars and Related Information**

- [www.drought.gov/drought/content/regional-programs/regional-drought-webinars](http://www.drought.gov/drought/content/regional-programs/regional-drought-webinars)

- **Access to Past Climate Webinars**

- [www.hprcc.unl.edu/webinars.php](http://www.hprcc.unl.edu/webinars.php)

- <https://mrcc.purdue.edu/webinars>



United States Department of Agriculture  
Midwest Climate Hub



# Agenda

- **Current/Recent Past Conditions**
- **Regional Impacts**
  - **General**
  - **Hydrological**
  - **Agricultural**
- **Outlooks**
- **Questions**



Minnesota Corn Field via CMOR report



# Heat and Drought Dominate the Region



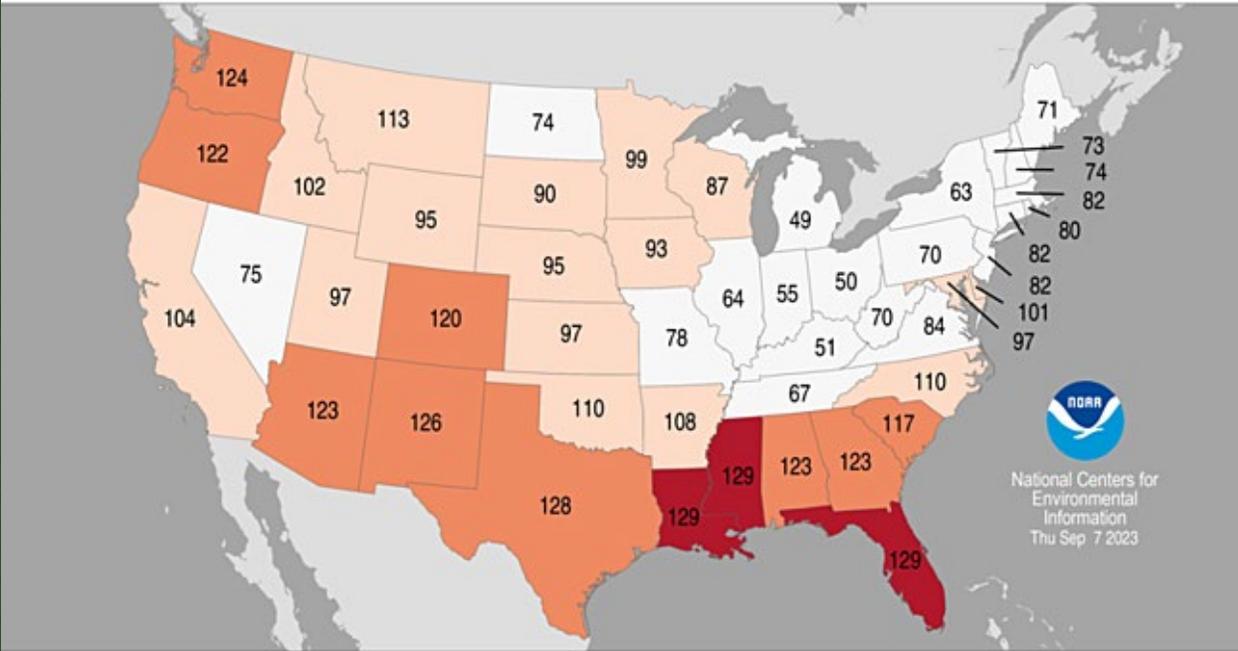
Photo by Matt Sittel: Manhattan, KS on 8/19/23



# August Climatology from the National Centers for Environmental Information

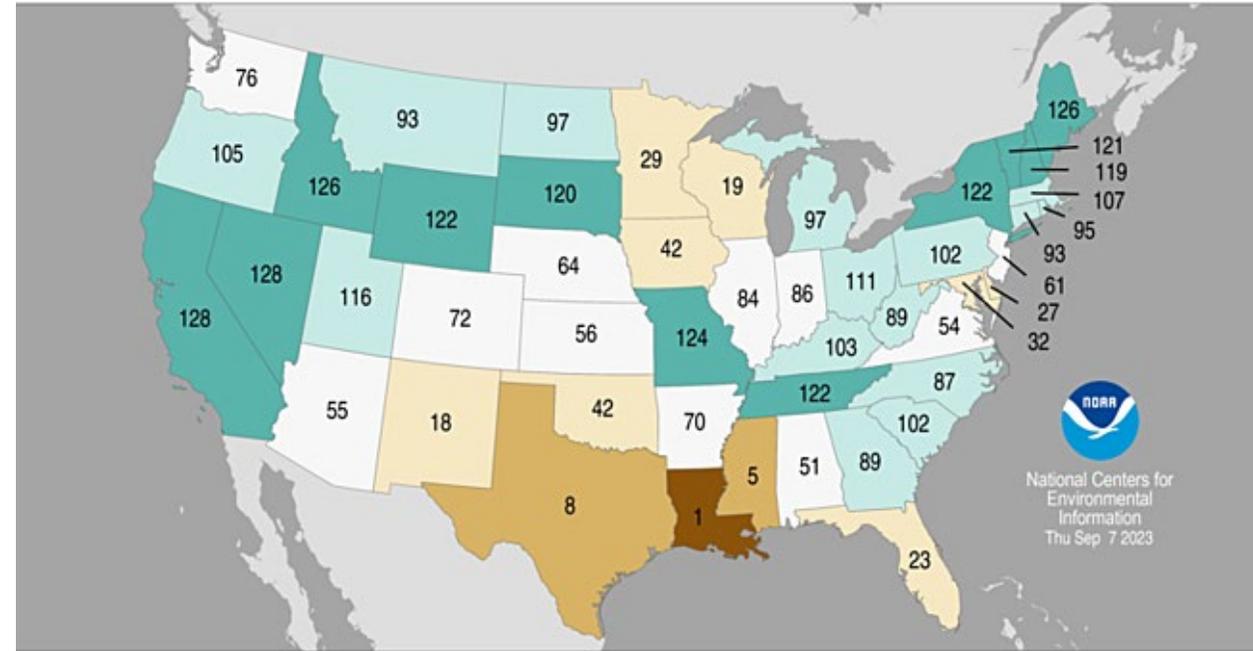
## Statewide Average Temperature Ranks

August 2023  
Period: 1895–2023



## Statewide Precipitation Ranks

August 2023  
Period: 1895–2023



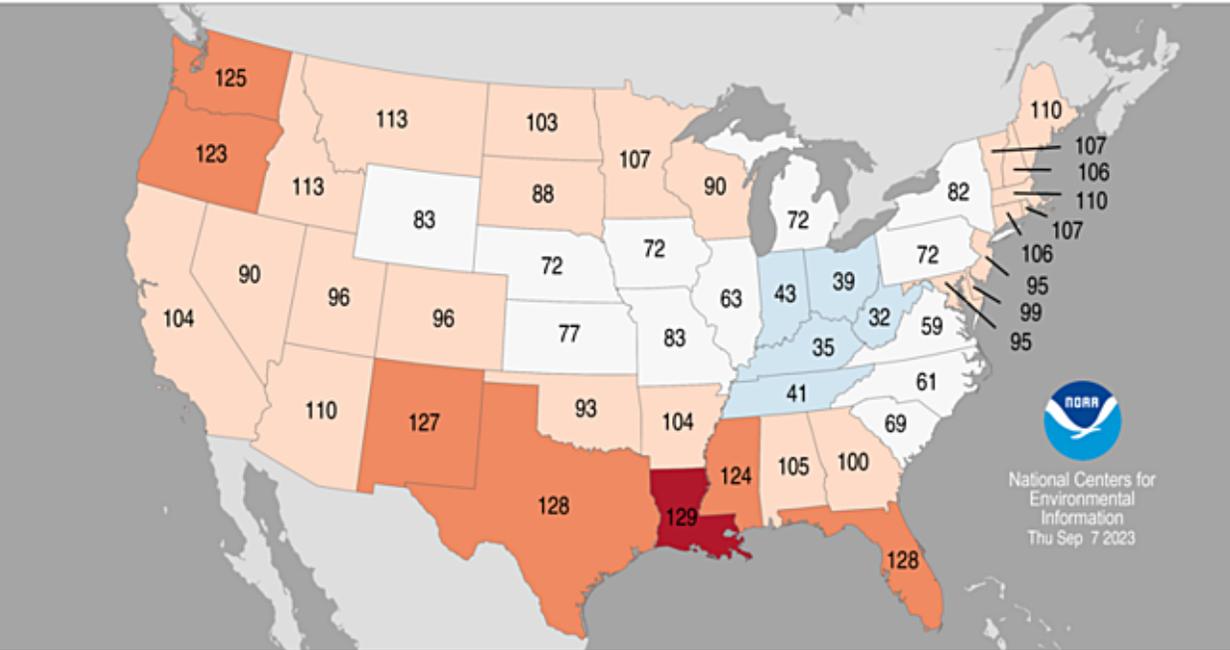
<https://www.ncdc.noaa.gov/sotc/>

NATIONAL DROUGHT MITIGATION CENTER

# 3-month Climatology from the National Centers for Environmental Information

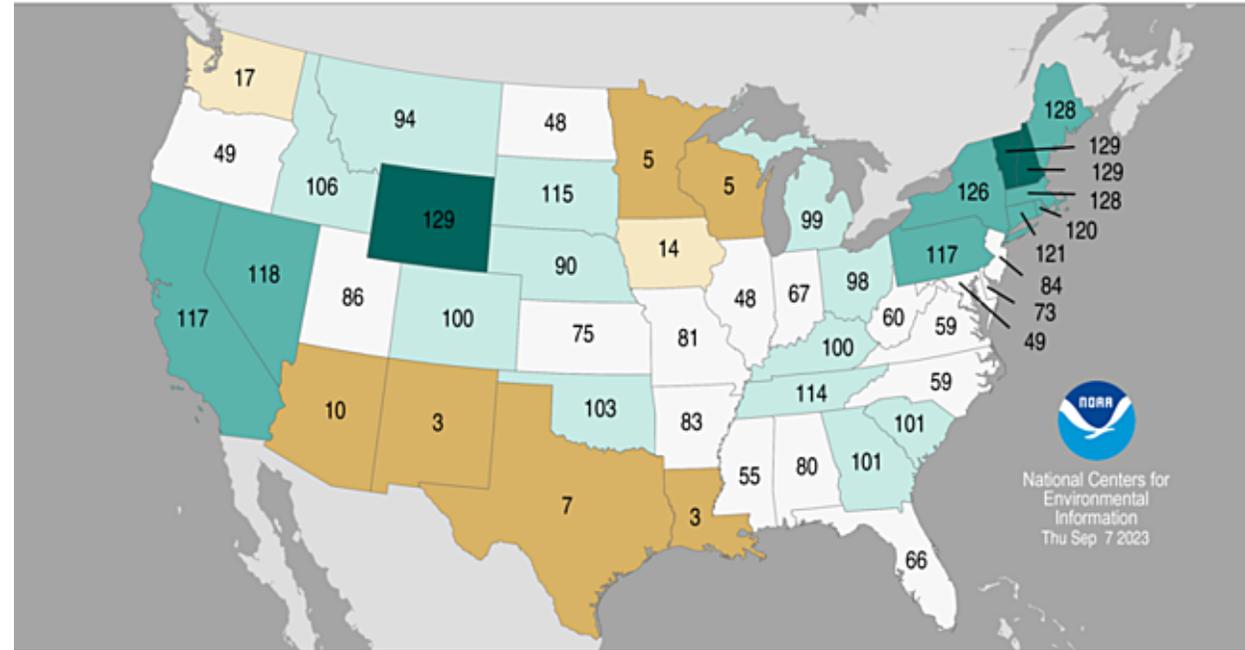
## Statewide Average Temperature Ranks

June – August 2023  
Period: 1895–2023



## Statewide Precipitation Ranks

June – August 2023  
Period: 1895–2023



Record Coldest (1)    Much Below Average    Below Average    Near Average    Above Average    Much Above Average    Record Warmest (129)

Record Driest (1)    Much Below Average    Below Average    Near Average    Above Average    Much Above Average    Record Wettest (129)



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

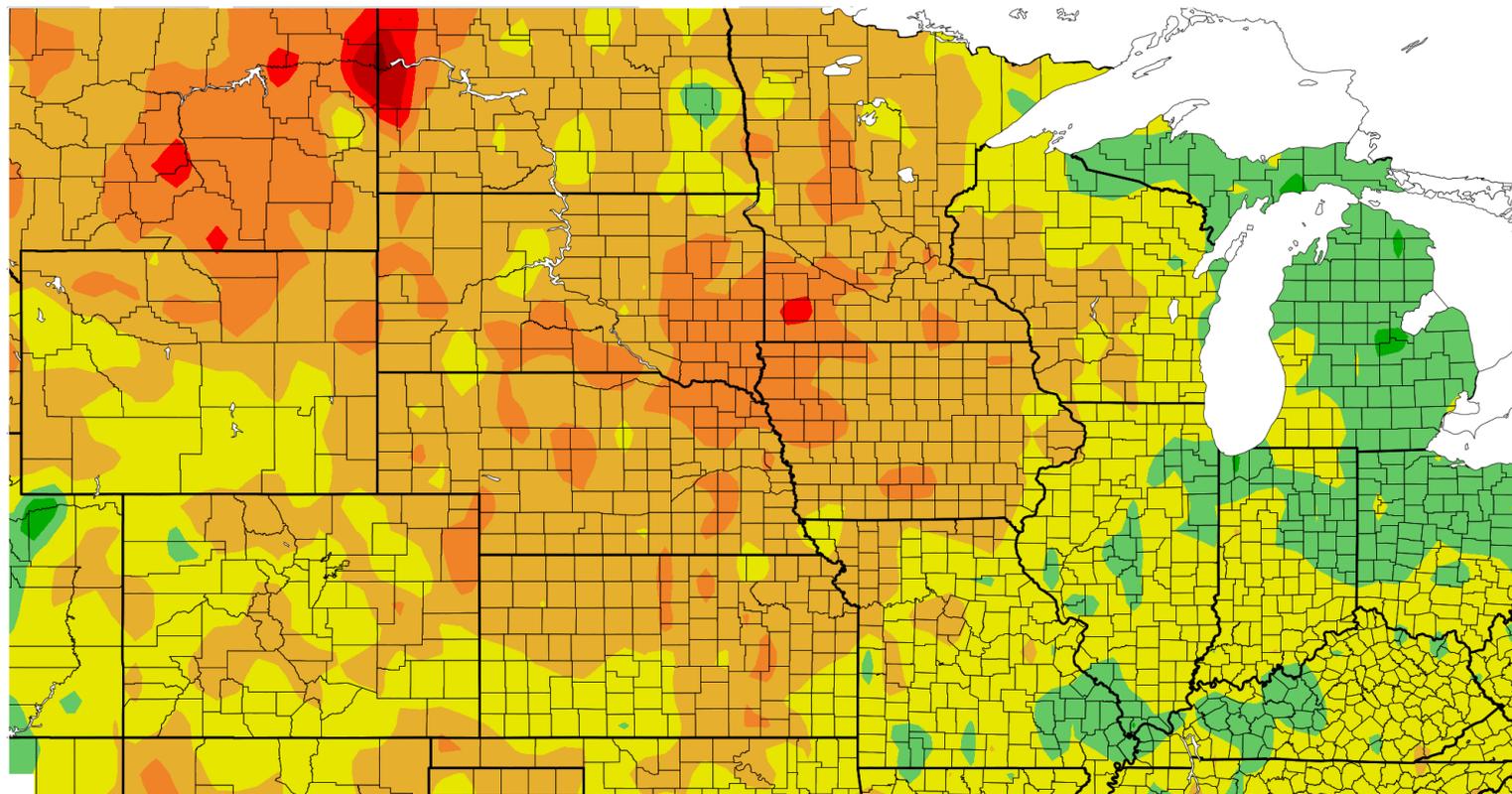
NATIONAL DROUGHT MITIGATION CENTER

# Temperature departures over the last 30 Days

<http://www.hprcc.unl.edu/maps/current/>



Departure from Normal Temperature (F)  
8/22/2023 – 9/20/2023

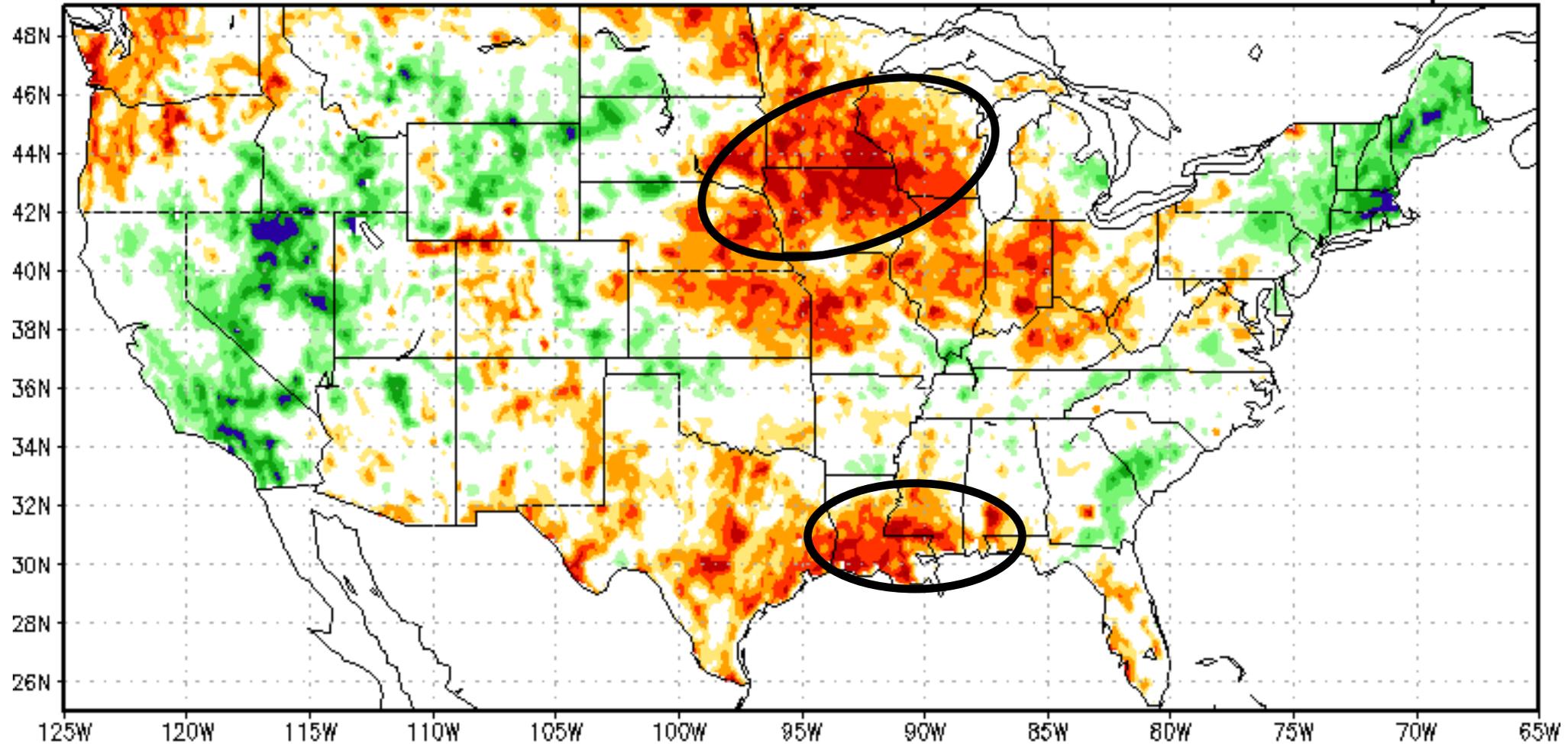


Generated 9/21/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

# Current Soil Moisture Percentiles

Ensemble-Mean Current SMP 15Sep2023

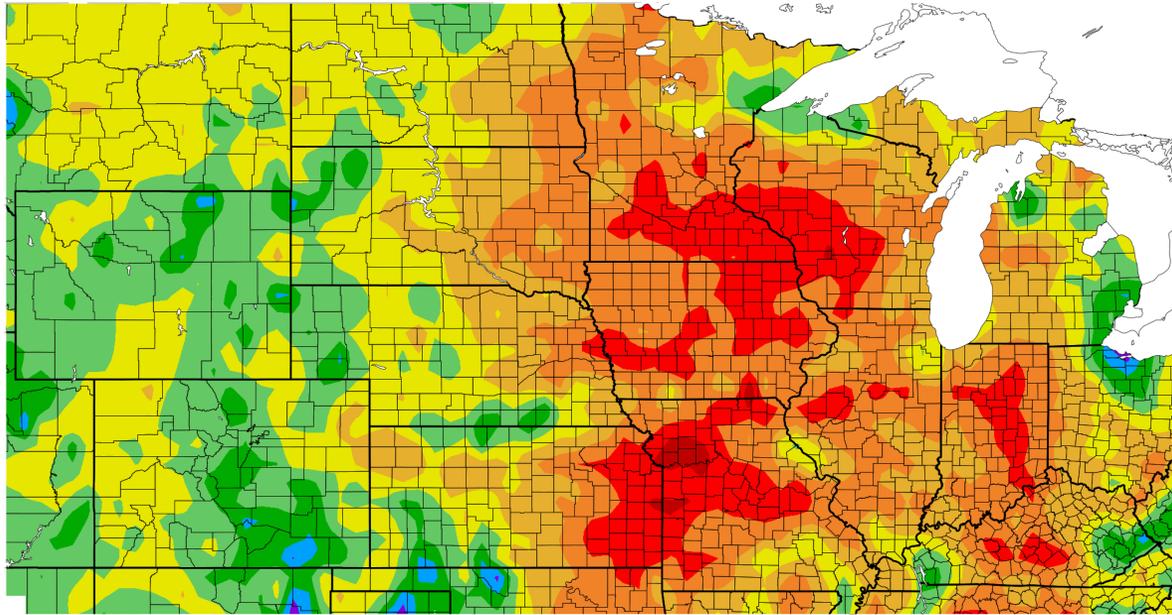


[https://www.cpc.ncep.noaa.gov/products/Drought/Monitoring/smp\\_new.shtml#](https://www.cpc.ncep.noaa.gov/products/Drought/Monitoring/smp_new.shtml#)

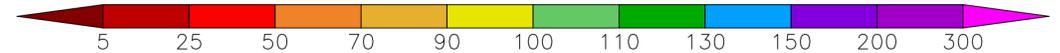
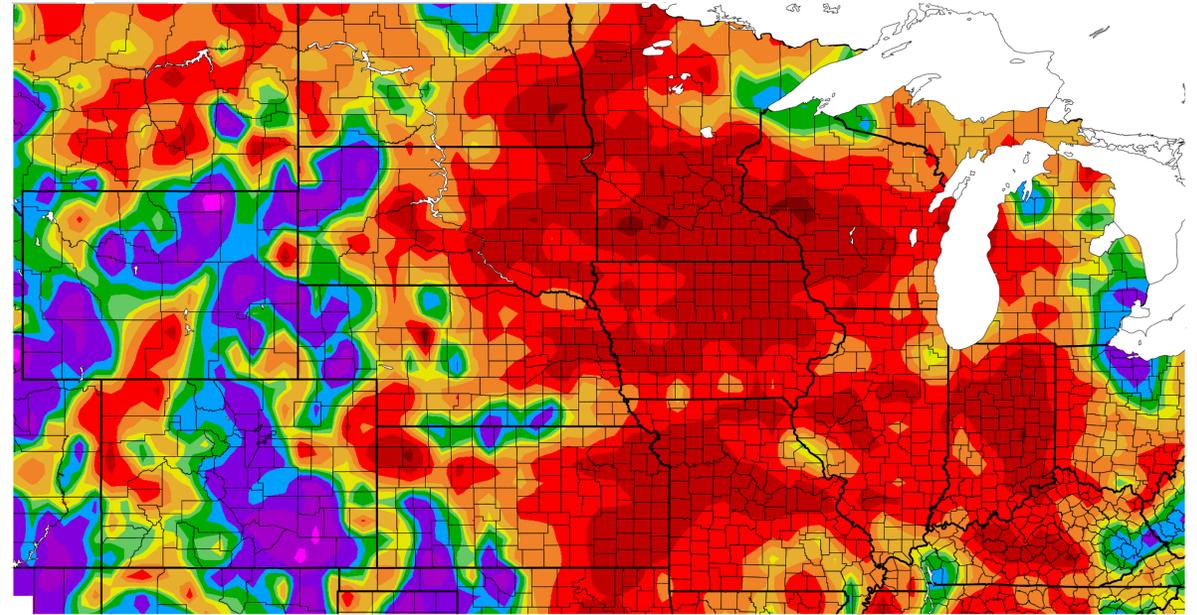


# Precipitation over the last 30 Days

Departure from Normal Precipitation (in)  
8/21/2023 – 9/19/2023



Percent of Normal Precipitation (%)  
8/21/2023 – 9/19/2023



Generated 9/20/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers nerated 9/20/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

<http://www.hprcc.unl.edu/maps/current/>

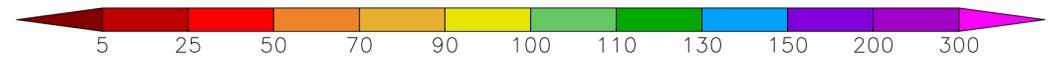
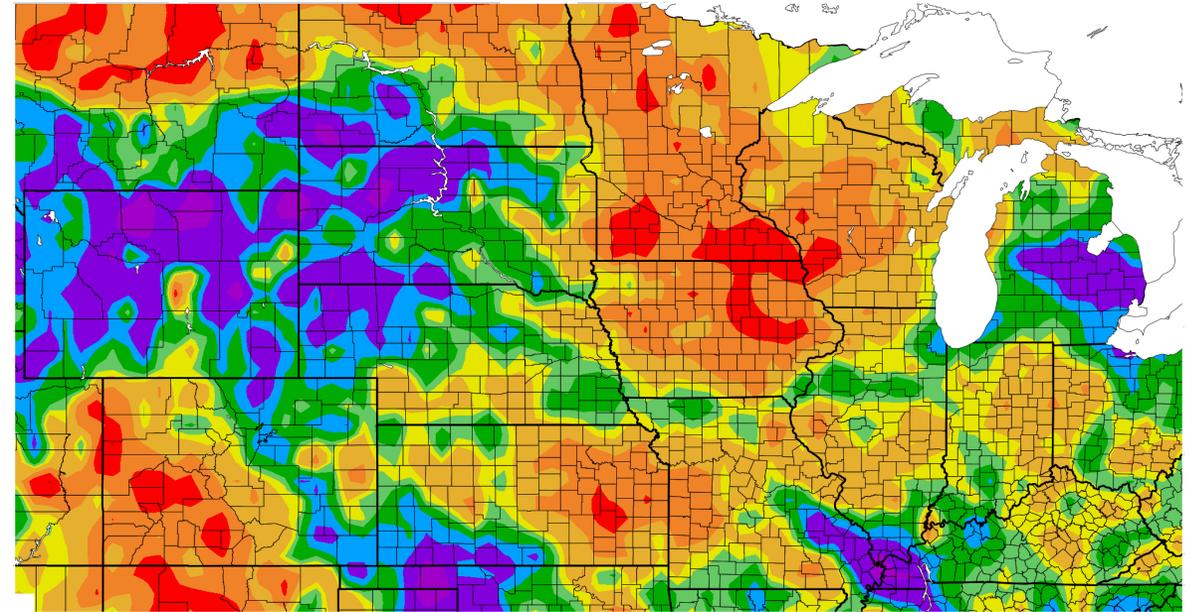
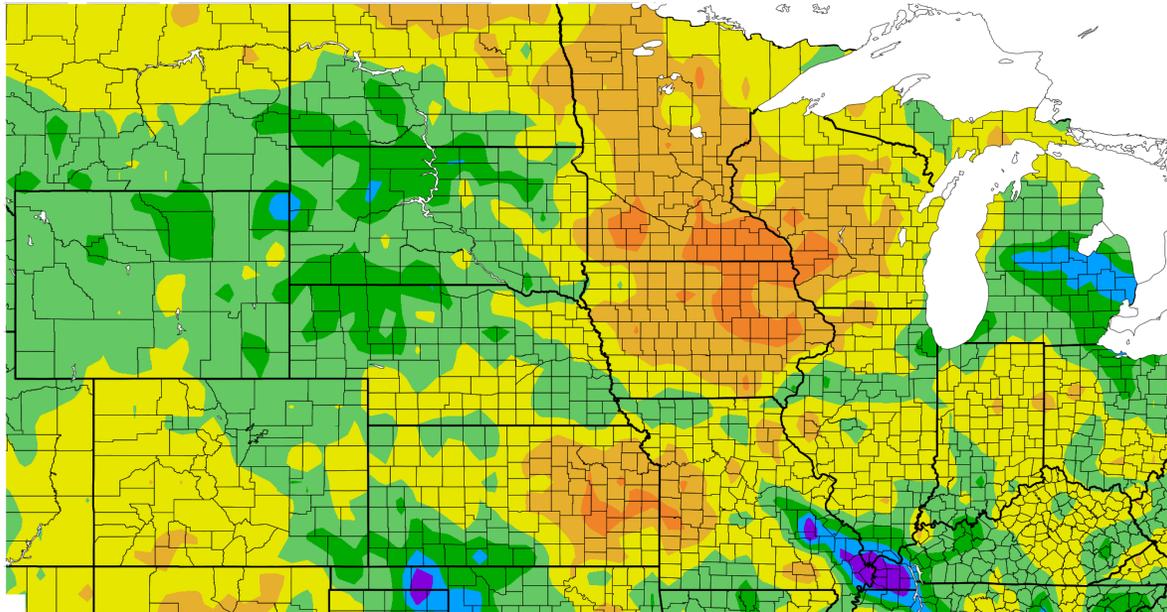
NATIONAL DROUGHT MITIGATION CENTER



# Precipitation over the last 90 Days

Departure from Normal Precipitation (in)  
6/22/2023 - 9/19/2023

Percent of Normal Precipitation (%)  
6/22/2023 - 9/19/2023



Generated 9/20/2023 at HPRCC using provisional data.

NOAA Regional Climate Center Generated 9/20/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

<http://www.hprcc.unl.edu/maps/current/>

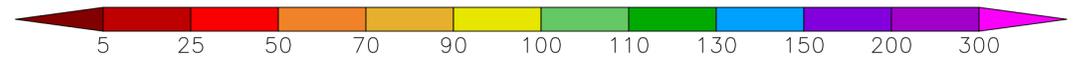
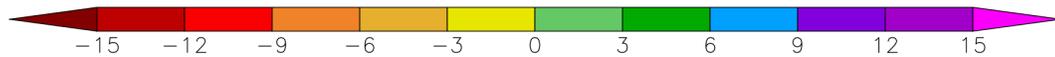
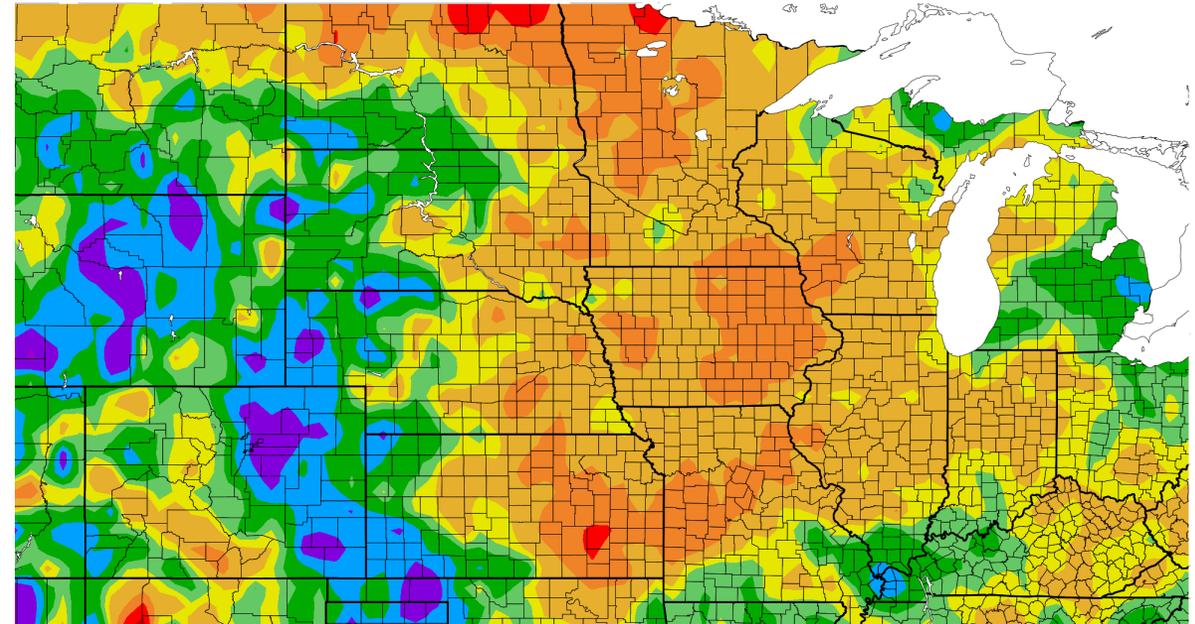
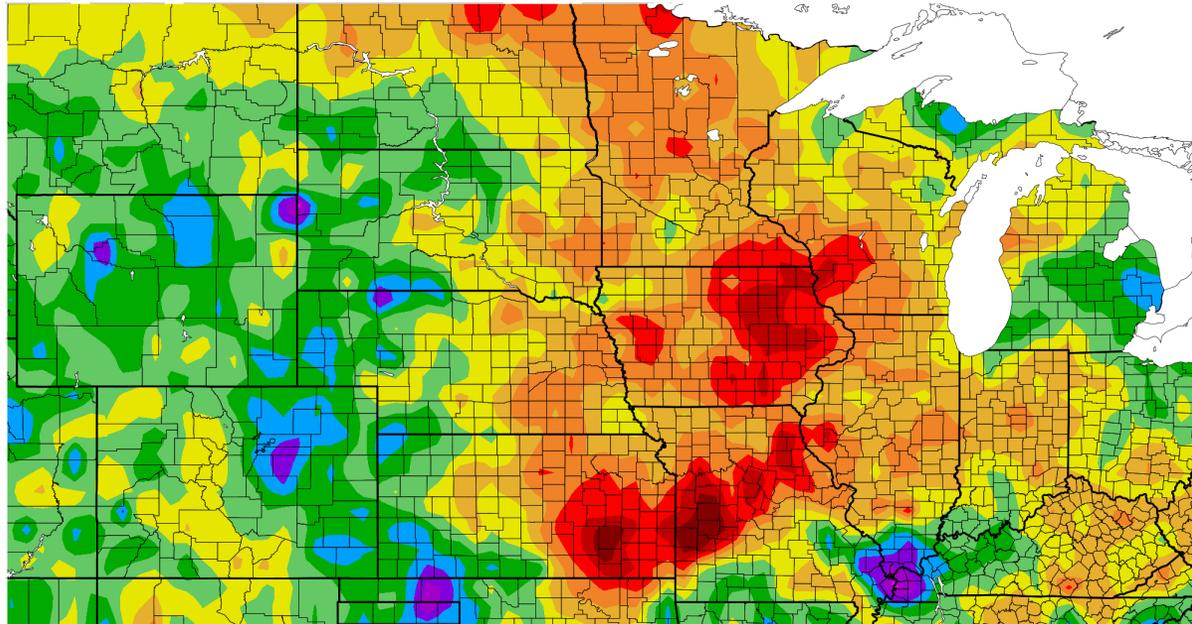
NATIONAL DROUGHT MITIGATION CENTER



# Calendar Year Precipitation

Departure from Normal Precipitation (in)  
1/1/2023 - 9/19/2023

Percent of Normal Precipitation (%)  
1/1/2023 - 9/19/2023



Generated 9/20/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers ated 9/20/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

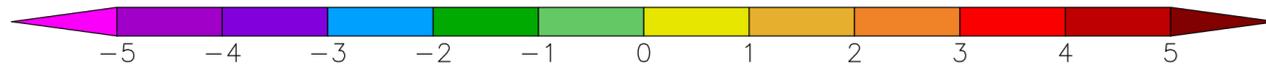
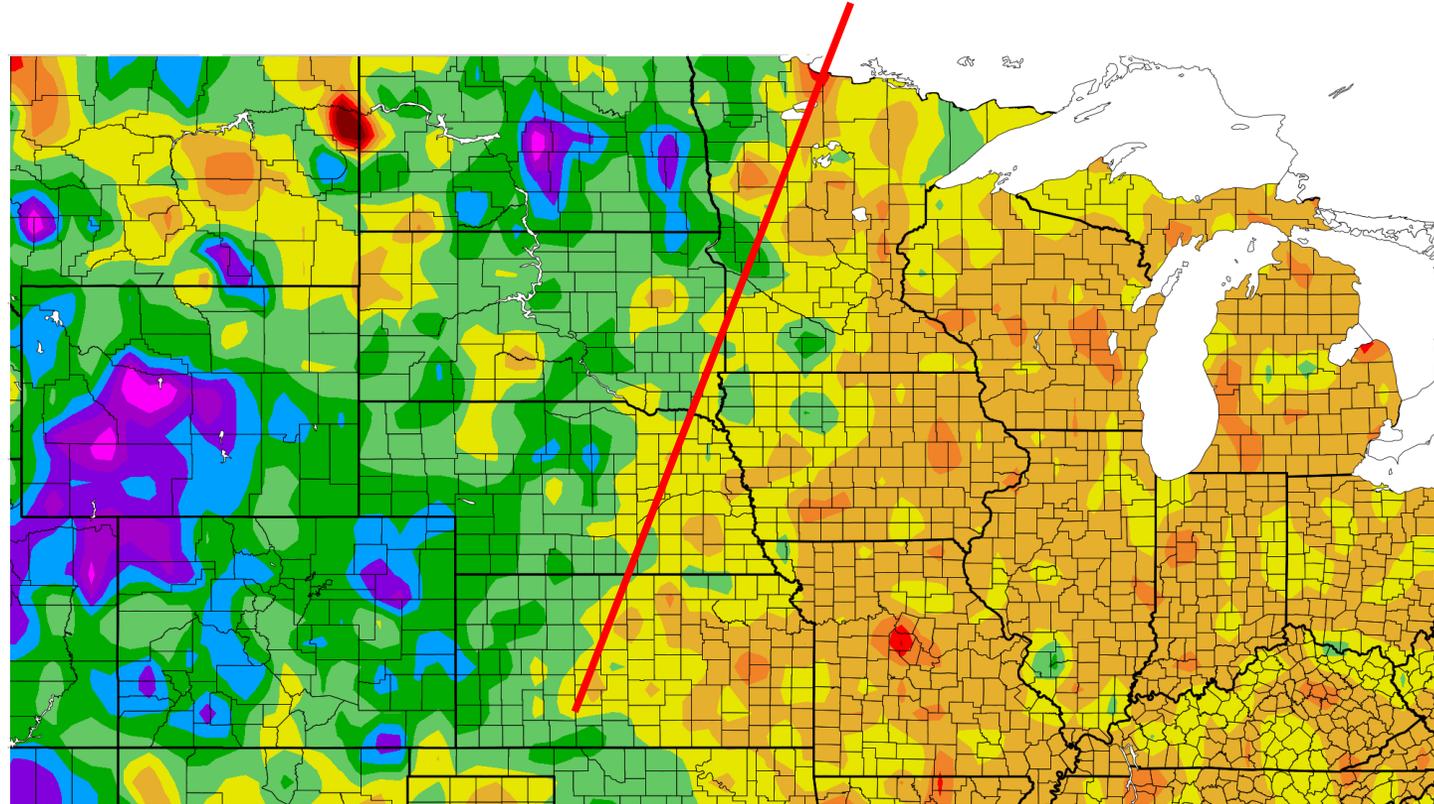


<http://www.hprcc.unl.edu/maps/current/>

NATIONAL DROUGHT MITIGATION CENTER

# Calendar Year Temperature Departure from Normal

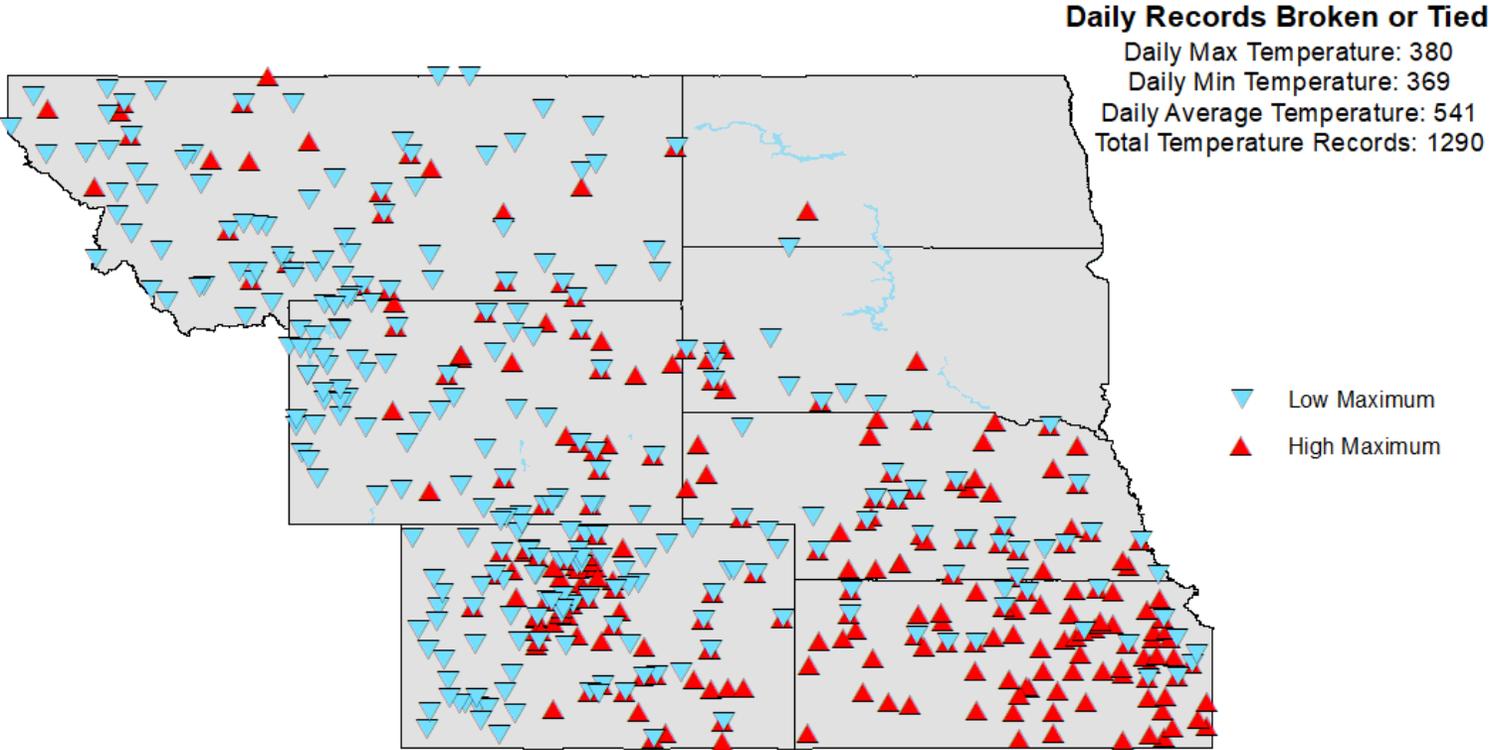
Departure from Normal Temperature (F)  
1/1/2023 - 9/19/2023



Generated 9/20/2023 at <http://www.hprcc.unl.edu/maps/current/> Regional Climate Centers

# Regional Impacts

## August 18-22 Temperature Records Broken or Tied



Minimum of 30 years of data



Lake of the Woods from Pete Boulay

# Regional Impacts: Highlights

- Late August/Early September heat
- West Nile outbreaks
- Hail in the High Plains
- Drought throughout the region
- Low flows on major rivers, especially the Mississippi
- Rapidly maturing crops leading to early harvest activities
- Drought/Flood impact on wildlife habitat



# South Dakota Update

- The James River fell below flood stage on September 7 after being above flood stage since April 12. After 149 days, the full length is now below flood stage.
- Hot Labor Day weekend with 3 days of 100F heat.
- Wet corn being harvested and some early soybeans coming out too.
- No water issues in the state.
- Very quiet severe weather this summer with only 12 tornadoes compared to an average of 30.
- Lots of hail, especially in the Black Hills.

# Wisconsin Update

- Wine and fruit crops have done well as well as cranberries with the dry weather and supplemented with irrigation.
- No water restrictions in place, even with the dryness this summer.
- 1,000's of freshwater clams drying out as water levels drop on rivers. Public is trying to recue them back into the water.
- Drought is still the biggest story with impacts to both corn and soybean yields as well as livestock forage availability.



# Minnesota update

- Drought is the big story.
- 60% of corn is mature and matured rapidly at the end of the growing season.
- Very low soil moisture levels.
- Twin Cities have recorded below normal precipitation every month since March.
- Flooding rains in Duluth on 9/11/23 with 3-6 inches of very localized rain caused flash flooding in the city.

# Kansas update

- Fall turkey season cancelled due to low bird numbers related to loss of habitat due to drought and floods over the last few years.
- August 19-25 heatwave impacted the state with Manhattan, KS recording 115F on 10/19 which was the high for the US and hottest ever for that location back to 1960.
- August 19-25 Concordia, KS had an average temperature of 92.2F which was the hottest since 1936.
- 18 days at or above 100F, the average is 7.
- Heat and dryness still impacting the state.



US National Weather Service Duluth Minnesota

September 11 at 10:26 PM

Wow! A very localized heavy rainfall event is going on right now! A Flash Flood WARNING is in effect for Duluth until 1 AM- Be prepared to move to higher ground! At the airport, we've had 1.09" in the last 3 hours (since 7 PM) However...the Radar estimates that between 3 and 5 inches of rain has fallen over downtown Duluth, and higher amounts are possible! Keep an eye out for flooding, especially if you will be out driving tonight!



# Colorado update

- West Nile impacting the north, southeast, and southwest portions of the state due to the wet summer.
- Northeast Colorado has recorded the wettest water year and summer on record.
- Southern Colorado (Alamosa) had the driest summer on record.
- Pueblo Chili yields are down due to the wet growing conditions.
- 10<sup>th</sup> hottest August on record.
- Hail has impacted much of Colorado with 796 severe hail reports, breaking the old record of 569 from 2018.
- 15 reports of 4+ inch hail setting a new record surpassing 5 in 2005.
- Very little early snow with only a dusting at the highest elevations.



Colorado Landscape, Becky Bolinger



# Indiana Update

- Harvest is underway with corn still at about 30% moisture and soybeans at 14%. Crops matured rapidly.
- Dried out recently across the state.
- Lawns going dormant (no mowing 😊).
- Low populations of Japanese Beetles.
- Hot temperatures dominated the last week of August with heat indices in the 100F range.
- No late rains for soybeans which will impact the top yields.
- 3<sup>rd</sup> dry fall in a row, many are worried about recharge issues and drought into the winter.
- West Nile cases being reported.

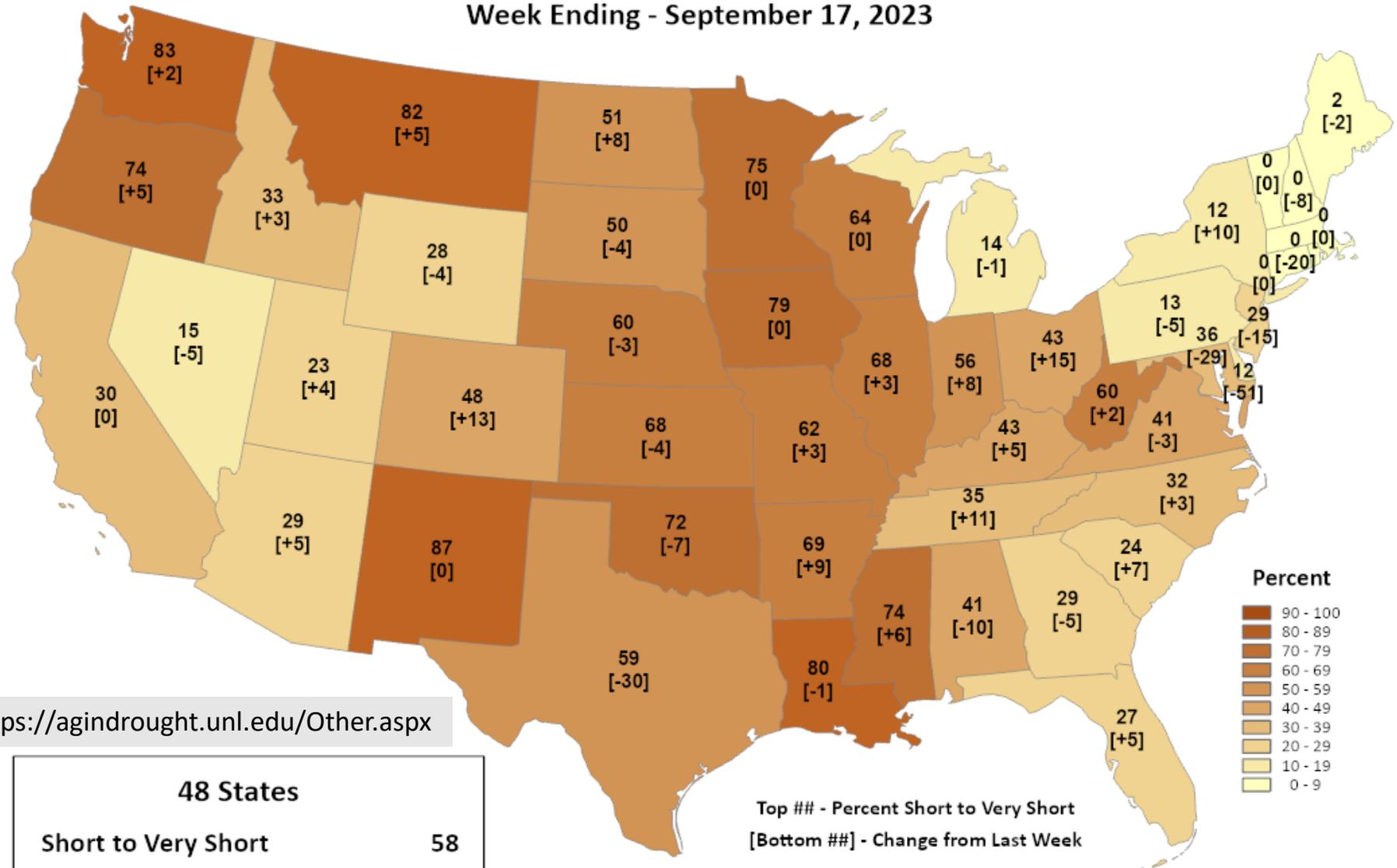


Indiana soybean harvest from Hans Schmitz

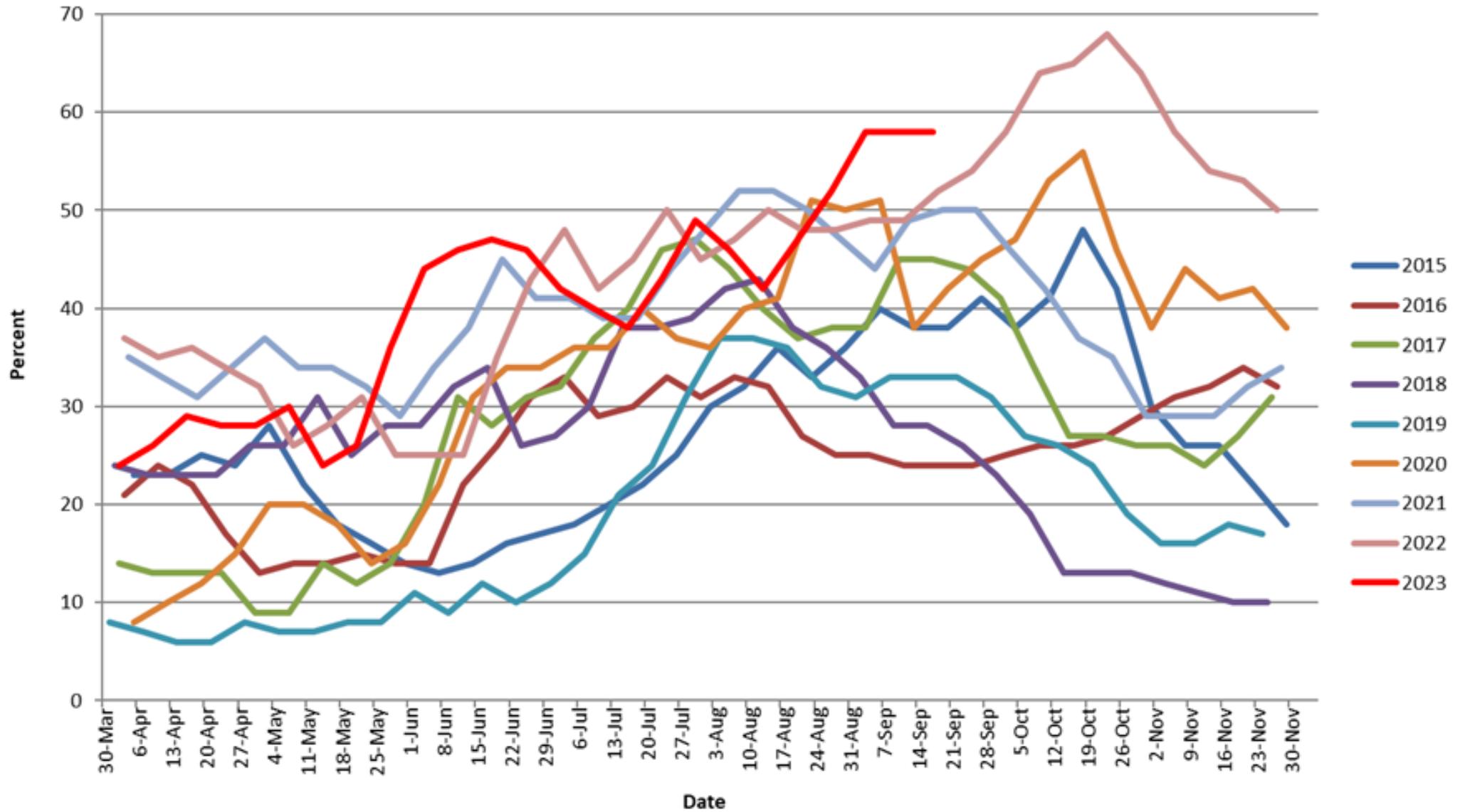
# Topsoil Moisture

## Percent Short to Very Short

### Week Ending - September 17, 2023



# U.S. Topsoil Moisture: Percent Short-Very Short



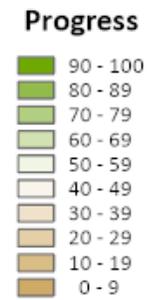
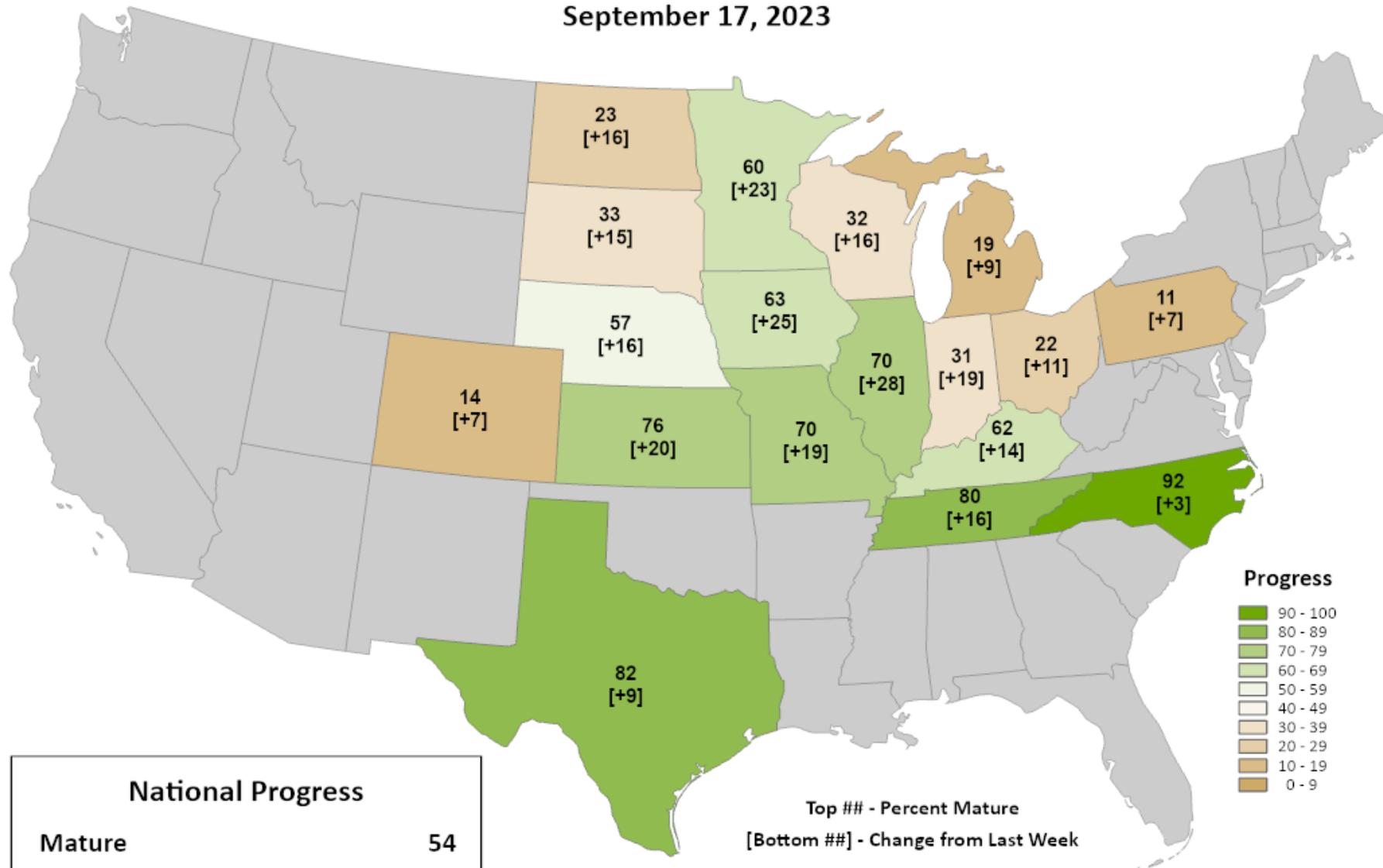
Based on NASS crop progress data.



# Corn Progress

## Percent Mature

September 17, 2023



### National Progress

Mature **54**

Change from Last Week **+20**

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

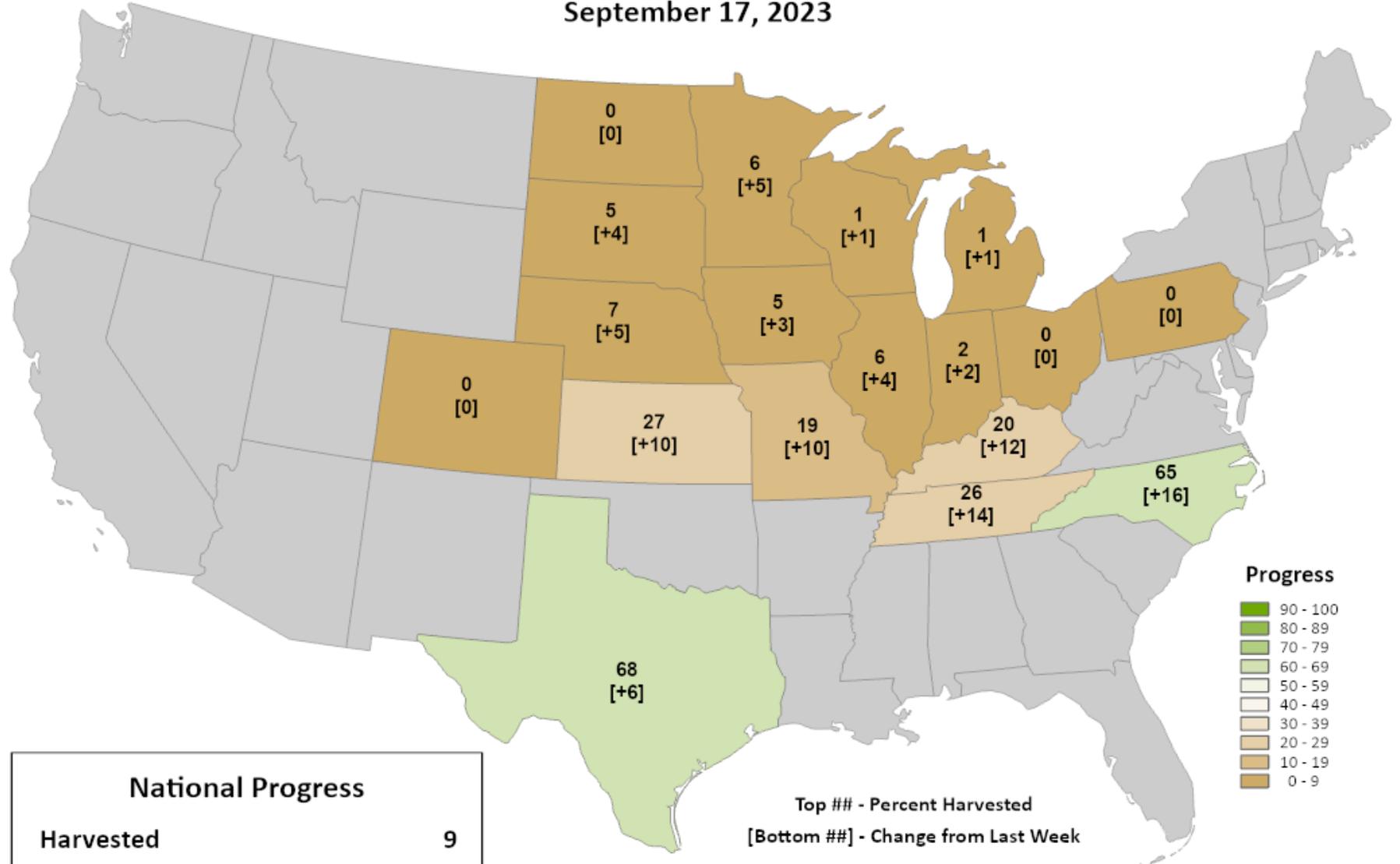
*Data obtained from USDA National Agricultural Statistics Service weekly Crop Progress reports.*



# Corn Progress

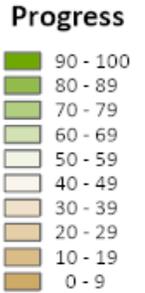
## Percent Harvested

September 17, 2023



National Progress	
Harvested	9
Change from Last Week	+4

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



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





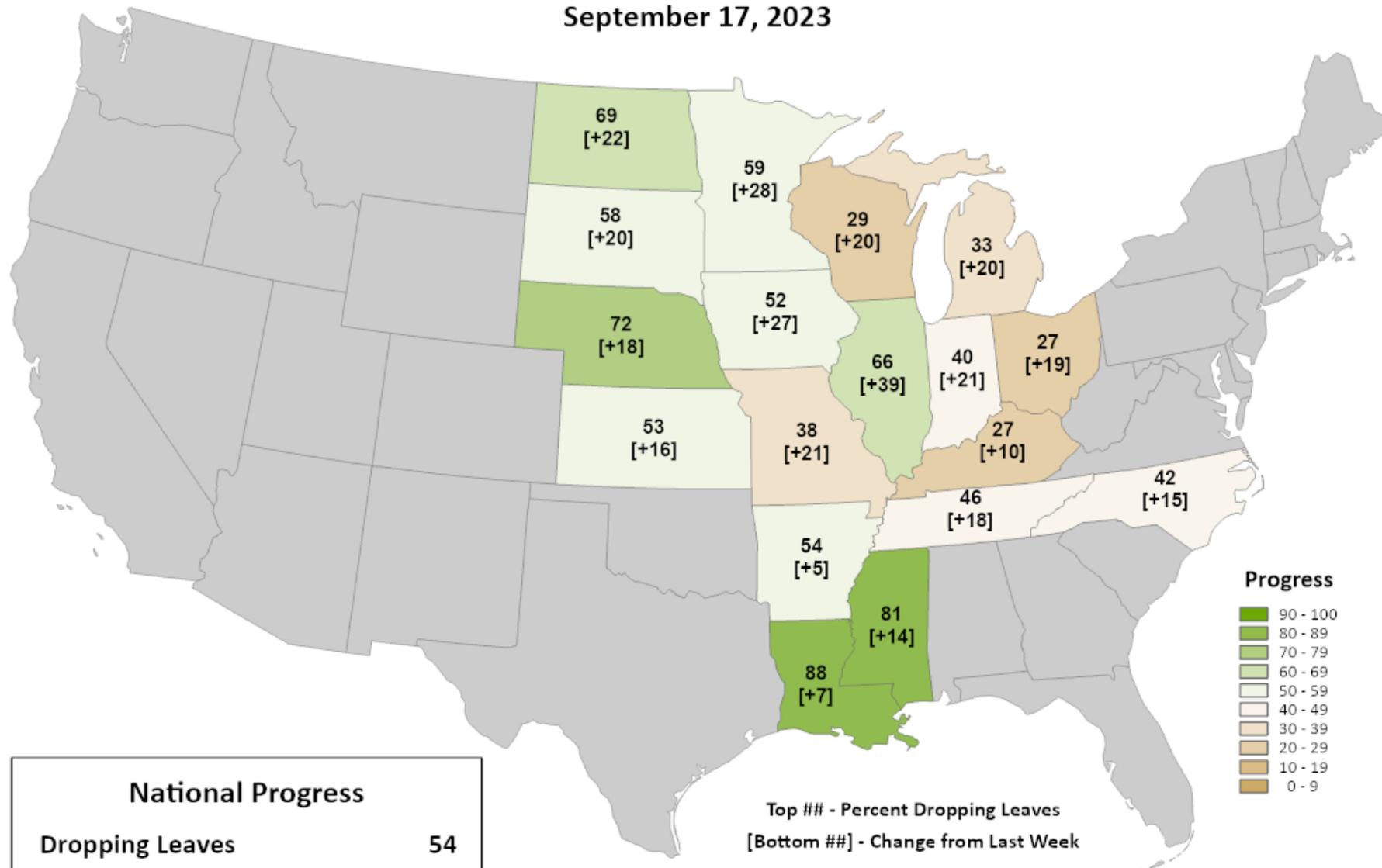
United States  
Department of  
Agriculture

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

# Soybeans Progress

## Percent Dropping Leaves

September 17, 2023



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

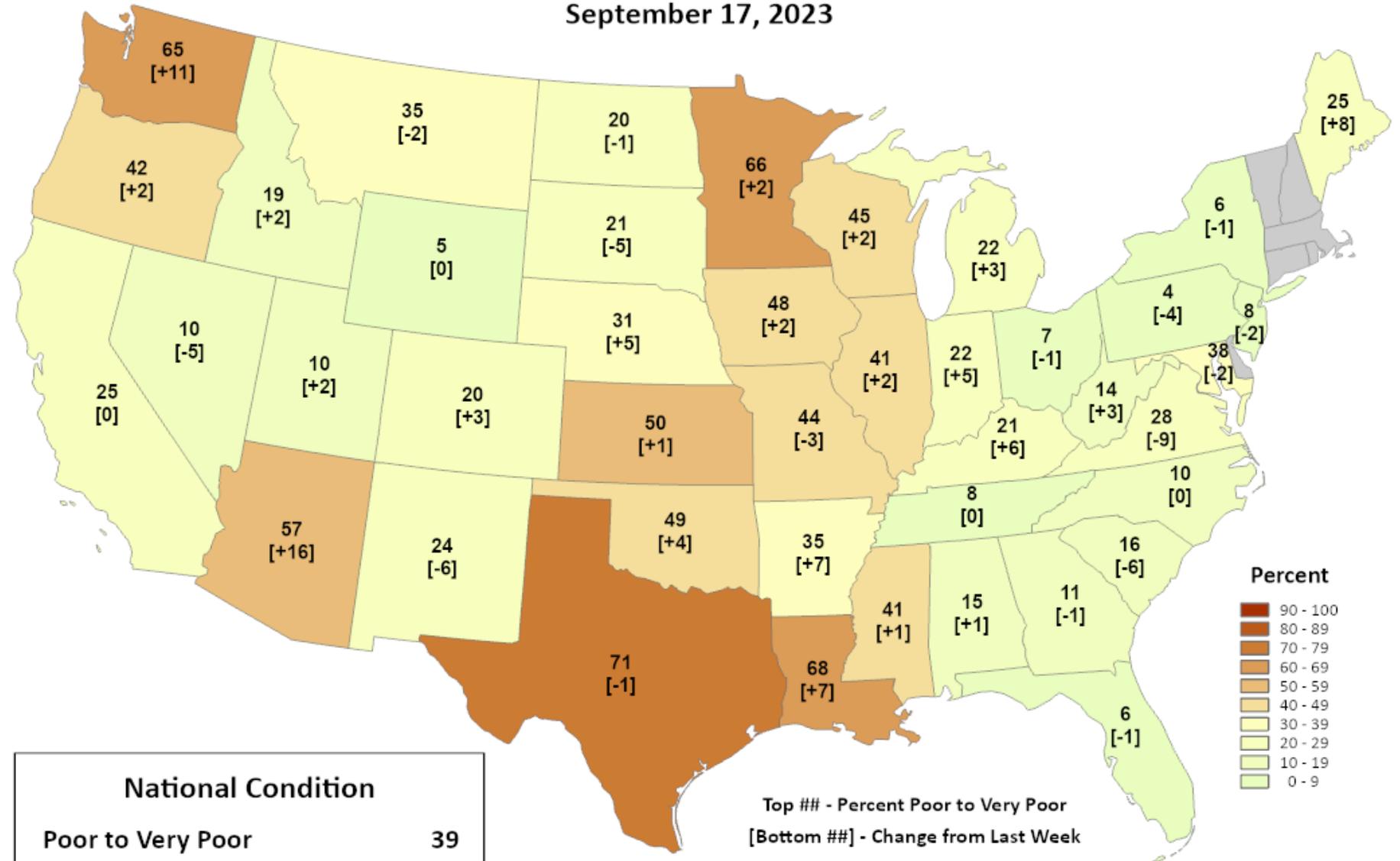




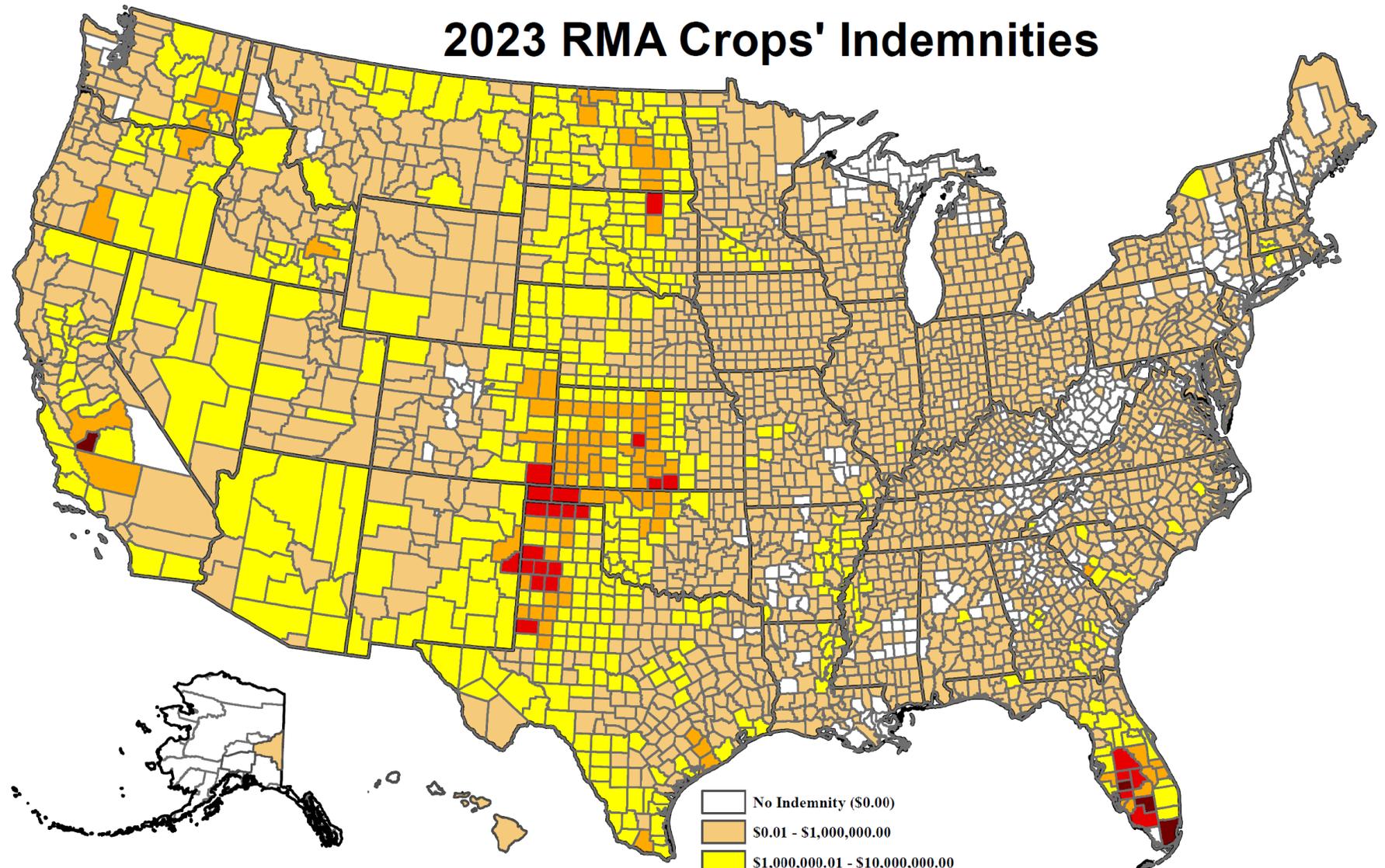
# Pasture and Range Conditions

## Percent Poor to Very Poor

September 17, 2023



# 2023 RMA Crops' Indemnities



- No Indemnity (\$0.00)
- \$0.01 - \$1,000,000.00
- \$1,000,000.01 - \$10,000,000.00
- \$10,000,000.01 - \$25,000,000.00
- \$25,000,000.01 - \$50,000,000.00
- \$50,000,000.01 - \$82,917,249.00

Map Creation Date: September 12, 2023  
Layer Credits: USDA & US Census Bureau  
Source: USDA Risk Management Agency - Summary of Business Data Current Date: September 11, 2023  
Map Projection: USA Contiguous Albers Equal Area Conic

**RMA Risk Management Services Division**



<https://www.rma.usda.gov/en/Information-Tools/Crop-Indemnity-Maps>

This map depicts weekly crop insurance indemnity data by county as of the data current date denoted on the map and is published biweekly.

The information displayed in this map is intended to serve as an aid in displaying data provided or stored by the Risk Management Agency. It does not modify, replace or supersede any USDA published policy provisions or procedures. Maps created by USDA Risk Management Agency are for spatial and visual context for depicting the basic information for "where". Maps are not considered a survey. General Reference Only.

-- Public Information --





U.S. ARMY

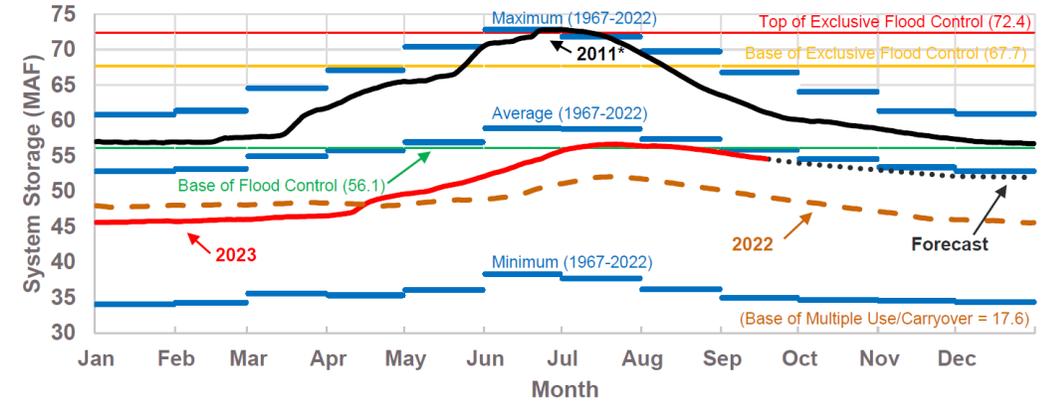
# MISSOURI RIVER BASIN WEEKLY UPDATE SEPTEMBER 19, 2023



## Mainstem Reservoir Status

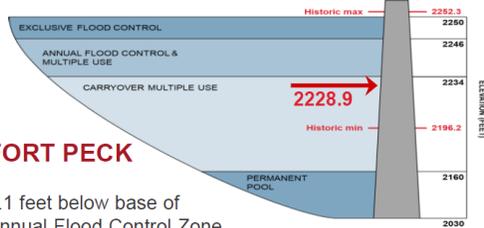
- System storage is 54.6 MAF, 0.3 MAF lower than last week (upper right). For the September monthly study with forecasted pool levels and releases for each mainstem project, [click here](#).
- Gavins Point releases are currently 35,000 cfs. Releases will be adjusted as needed to meet downstream navigation targets. The release schedule for Gavins Point is in our daily forecast ([click here](#)).
- Significant precipitation is forecast across most of the Missouri River Basin over the next week (lower right).
- Refer to the 3-Week Forecast ([click here](#)) for the most up-to-date System information – pool levels, inflows, and releases.

## System Storage Comparison



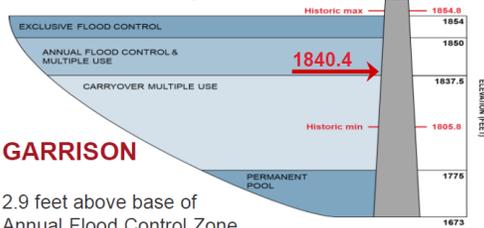
\*In January 2011, the Base of Flood Control was 56.8 MAF, and the Top of Exclusive Flood Control was 73.1 MAF

## Current Reservoir Levels (Click Here for Comparison Plots)



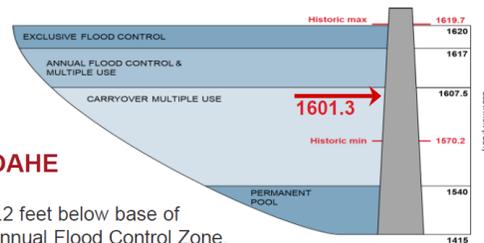
### FORT PECK

5.1 feet below base of Annual Flood Control Zone.



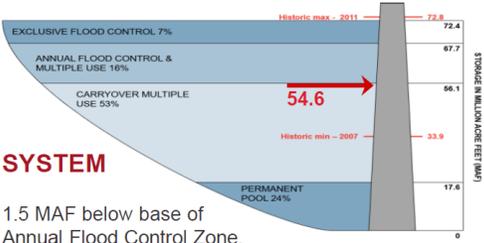
### GARRISON

2.9 feet above base of Annual Flood Control Zone.



### OAHE

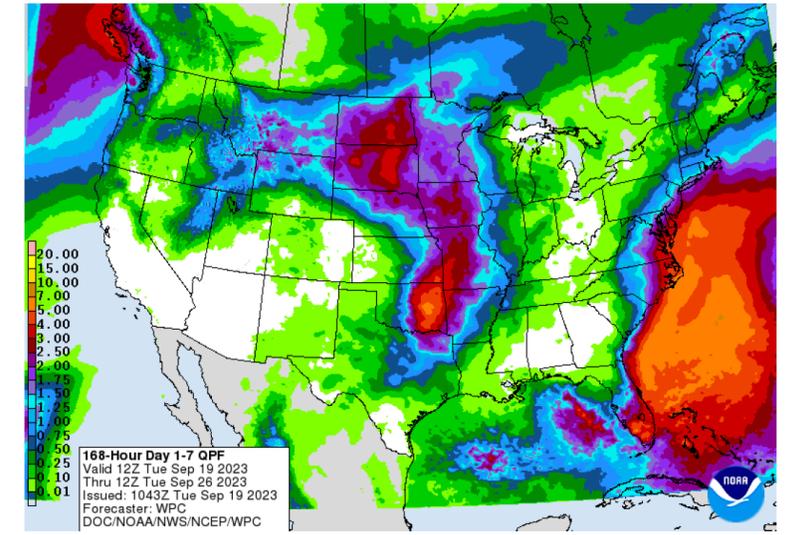
6.2 feet below base of Annual Flood Control Zone.



### SYSTEM

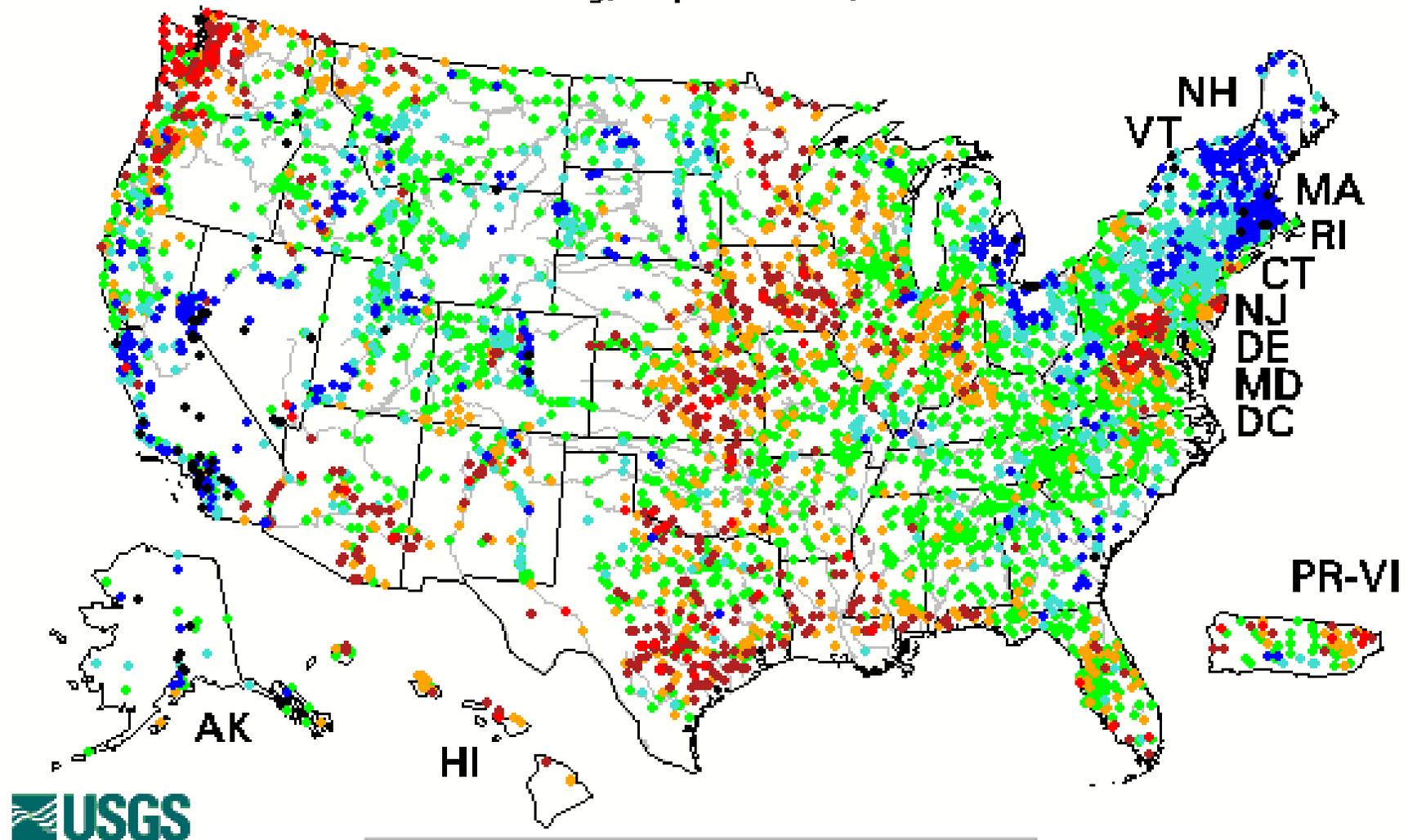
1.5 MAF below base of Annual Flood Control Zone.

## 7 Day Total Precipitation Forecast



# 28-Day Average Streamflow

Tuesday, September 19, 2023



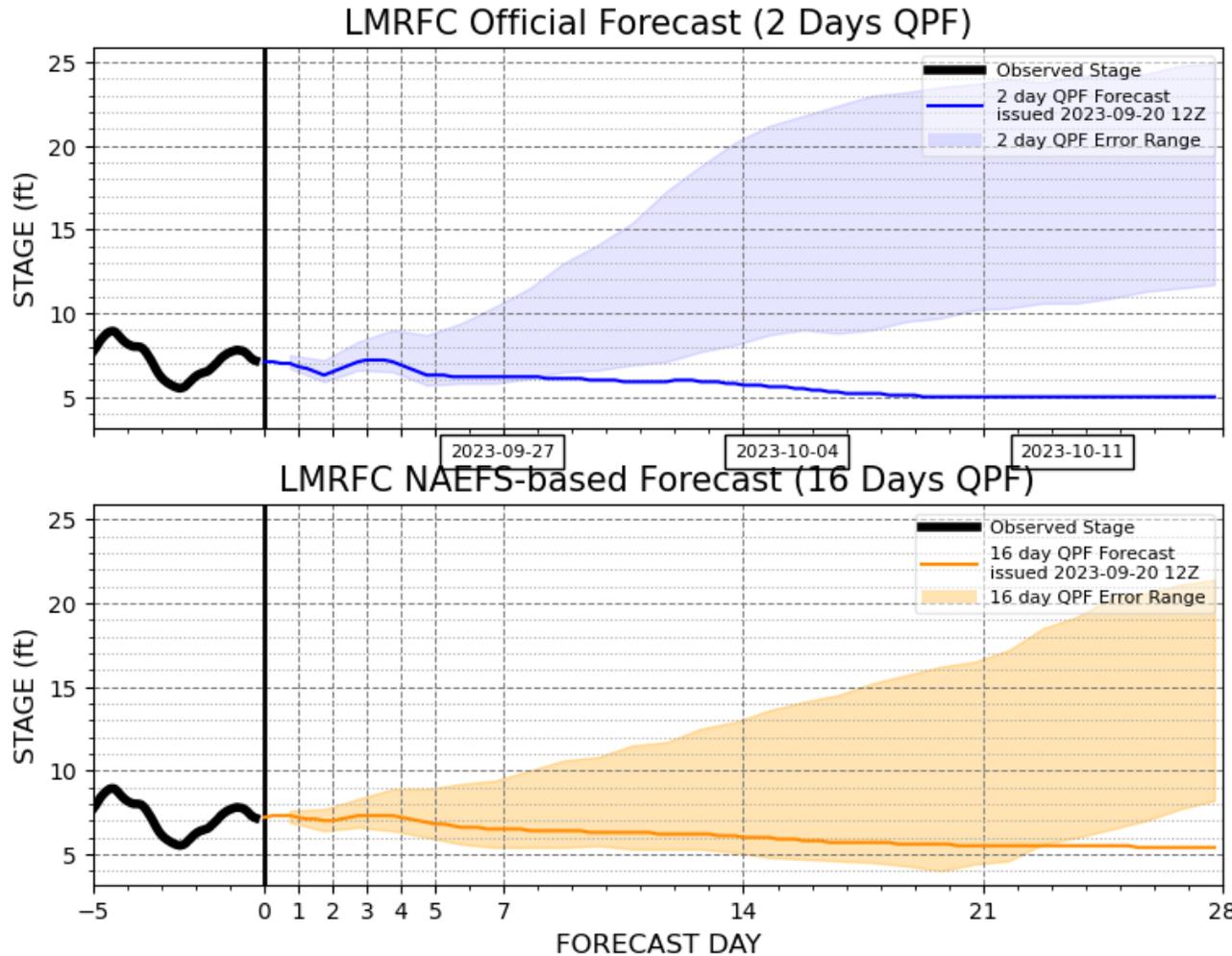
Explanation - Percentile classes						
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

<http://waterwatch.usgs.gov/>



# Mississippi River Forecast for Cairo, IL

## CIRI2 Forecast and Experimental Uncertainty



(DAY 0 = 2023-09-20 17:55Z)  
 The shaded areas show probable future river stage based on the present forecast and past forecast  
 The shaded areas capture 2/3 of past forecast errors, centered on the median error.

Waterway Closure/Restriction UMR=Upper MS River LMR=Lower MS River		
Site	Location	Notes
USCG	UMR 300 to 100	Slow speeds near fleeting areas and heaviest barges in middle
USCG	LMR 953 to 869	No drafts greater than 9.6' Southbound - Barges less than 6 wide Northbound - Barges less than 7 wide
USCG	LMR 869 to 482	No drafts greater than 9.6' Southbound - Barges less than 5 wide Northbound - Bares less than 5 wide, loads no more than 4 wide
USCG	LMR 482 to 303	No drafts greater than 10' Southbound - Barges less than 6 wide Northbound - Barges less than 5 wide, loads no more than 4 wide
Madison Parish Port	LMR 457	5' draft restricting access to port
Lake Providence Harbor	LMR 483	Single barges / light-loaded



[https://www.weather.gov/lmrfc/experimental\\_28day\\_mississippi\\_plot#](https://www.weather.gov/lmrfc/experimental_28day_mississippi_plot#)

# Drought Update



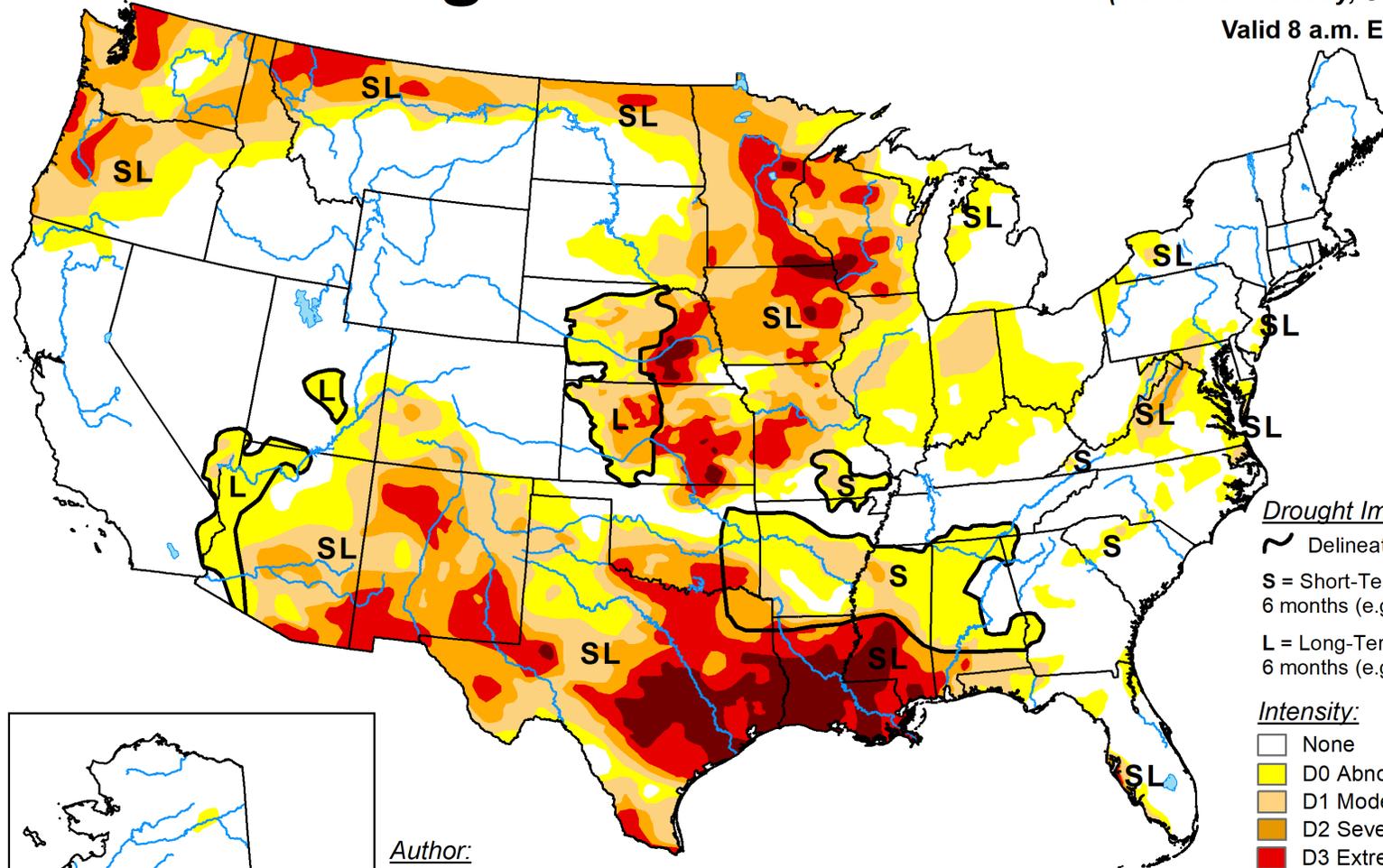
Orange sunset from Doug Kluck



# U.S. Drought Monitor

September 19, 2023  
(Released Thursday, Sep. 21, 2023)

Valid 8 a.m. EDT

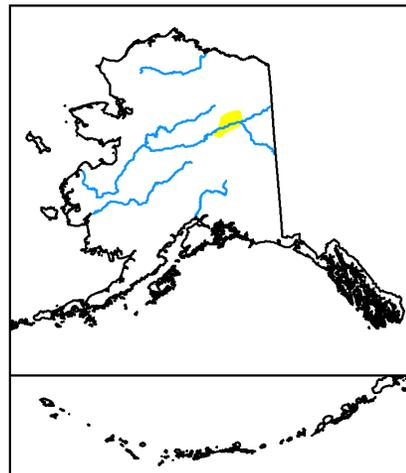


Drought Impact Types:

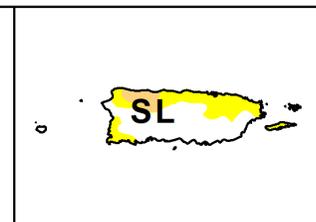
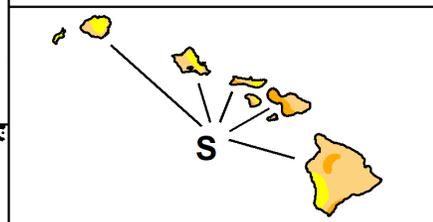
- ~ Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

Intensity:

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



Author:  
Richard Heim  
NCEI/NOAA



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>



[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)

# Statistics

Statistics type: Cumulative Percent Area

Export Table

View More Statistics

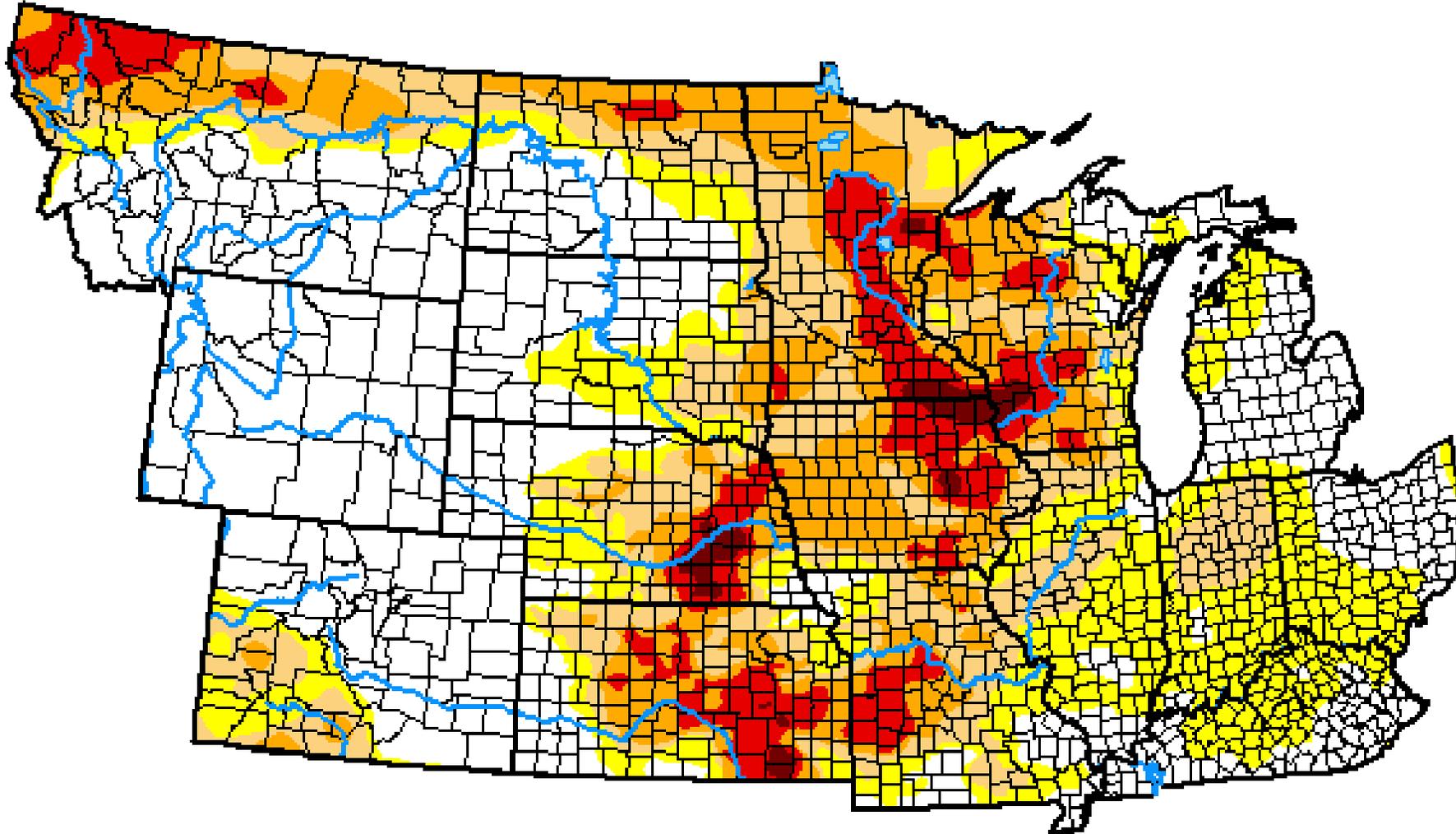
Week	Date	None	D0-D4	D1-D4	D2-D4	D3-D4	D4	DSCI
Current	<a href="#">2023-09-19</a>	53.18	46.82	31.71	19.63	9.44	2.52	110
Last Week to Current	<a href="#">2023-09-12</a>	55.18	44.82	31.10	19.32	8.00	1.98	105
3 Months Ago to Current	<a href="#">2023-06-20</a>	53.06	46.94	22.67	6.69	2.06	0.47	79
Start of Calendar Year to Current	<a href="#">2022-12-27</a>	38.05	61.95	41.50	23.58	8.99	1.96	138
Start of Water Year to Current	<a href="#">2022-09-27</a>	36.92	63.08	42.65	25.36	10.45	2.14	144
One Year Ago to Current	<a href="#">2022-09-20</a>	42.08	57.92	41.02	24.93	9.77	1.87	135

As of 9/19/23 just over **81,500,000** people are being impacted by drought in the United States.



# U.S. Drought Monitor NWS Central

**September 19, 2023**  
(Released Thursday, Sep. 21, 2023)  
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	41.23	58.77	39.47	23.31	8.94	1.04
<b>Last Week</b> 09-12-2023	44.65	55.35	38.64	23.10	8.18	0.39
<b>3 Months Ago</b> 06-20-2023	30.29	69.71	42.21	16.52	5.82	1.35
<b>Start of Calendar Year</b> 01-03-2023	25.76	74.24	48.98	24.27	9.90	3.48
<b>Start of Water Year</b> 09-27-2022	27.00	73.00	47.70	23.08	8.80	2.73
<b>One Year Ago</b> 09-20-2022	31.83	68.17	42.67	21.68	7.50	2.22

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>

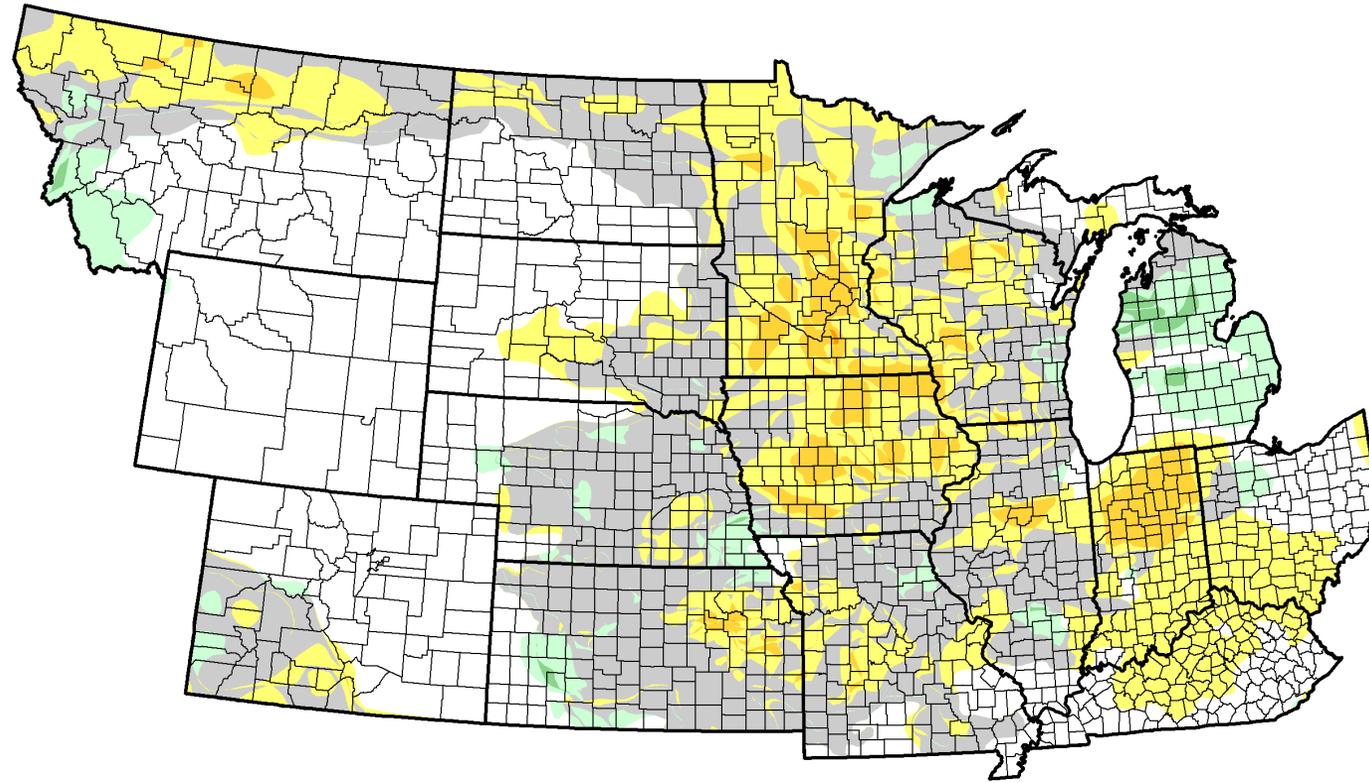
Author:

Richard Heim  
NCEI/NOAA



[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)

# U.S. Drought Monitor Class Change - NWS Central 5 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

<https://droughtmonitor.unl.edu/Maps/ChangeMaps.aspx>

September 19, 2023  
compared to  
August 15, 2023

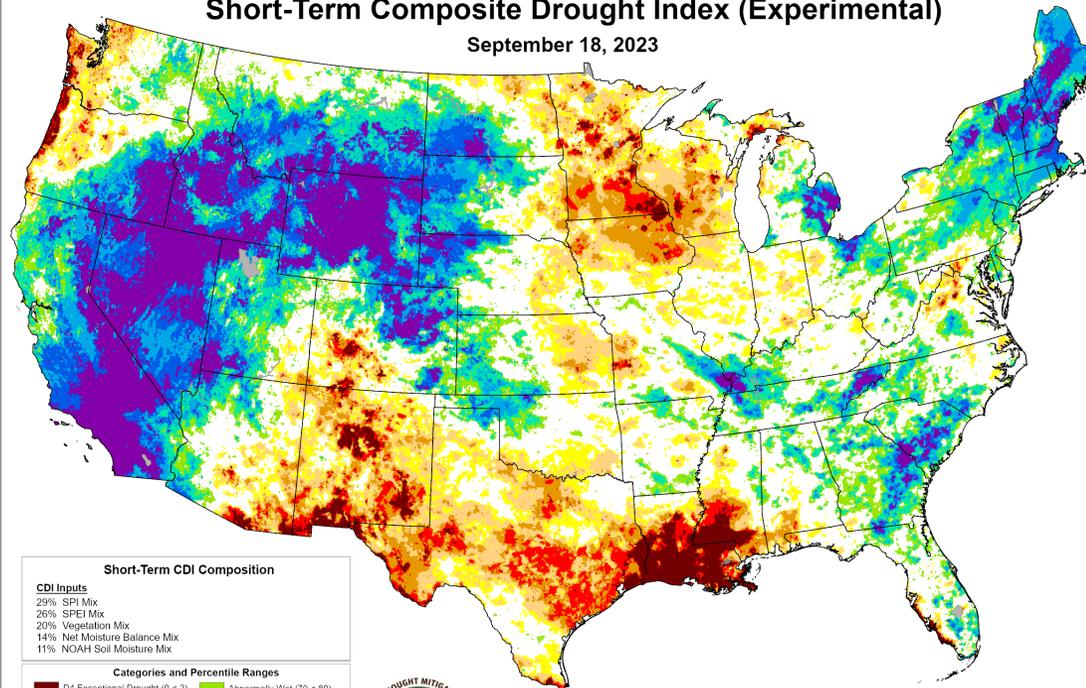
[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)



# NDMC's Short and Long Term Composite Drought Indices (CDI's)

Short-Term Composite Drought Index (Experimental)

September 18, 2023



**Short-Term CDI Composition**

**CDI Inputs**  
 29% SPI Mix  
 28% SPEI Mix  
 20% Vegetation Mix  
 14% Net Moisture Balance Mix  
 11% NOAA Soil Moisture Mix

**Categories and Percentile Ranges**

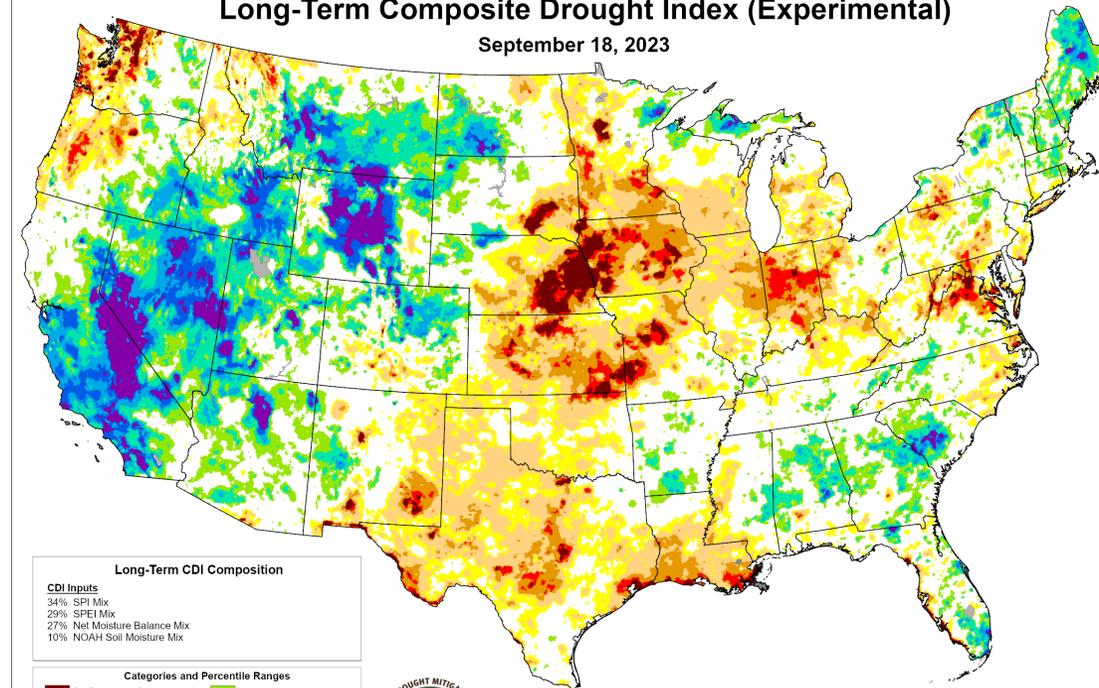
D4 Exceptional Drought (0 < 2)	Abnormally Wet (70 < 80)
D3 Extreme Drought (2 < 5)	Moderately Wet (80 < 90)
D2 Severe Drought (5 < 10)	Severely Wet (90 < 95)
D1 Moderate Drought (10 < 20)	Extremely Wet (95 < 98)
D0 Abnormally Dry (20 < 30)	Exceptionally Wet (98 - 100)
Near Normal (30 < 70)	No Data



© 2023, National Drought Mitigation Center, University of Nebraska

Long-Term Composite Drought Index (Experimental)

September 18, 2023



**Long-Term CDI Composition**

**CDI Inputs**  
 34% SPI Mix  
 29% SPEI Mix  
 27% Net Moisture Balance Mix  
 10% NOAA Soil Moisture Mix

**Categories and Percentile Ranges**

D4 Exceptional Drought (0 < 2)	Abnormally Wet (70 < 80)
D3 Extreme Drought (2 < 5)	Moderately Wet (80 < 90)
D2 Severe Drought (5 < 10)	Severely Wet (90 < 95)
D1 Moderate Drought (10 < 20)	Extremely Wet (95 < 98)
D0 Abnormally Dry (20 < 30)	Exceptionally Wet (98 - 100)
Near Normal (30 < 70)	No Data



© 2023, National Drought Mitigation Center, University of Nebraska



<https://ndmcblends.unl.edu/>

# Climate Outlooks

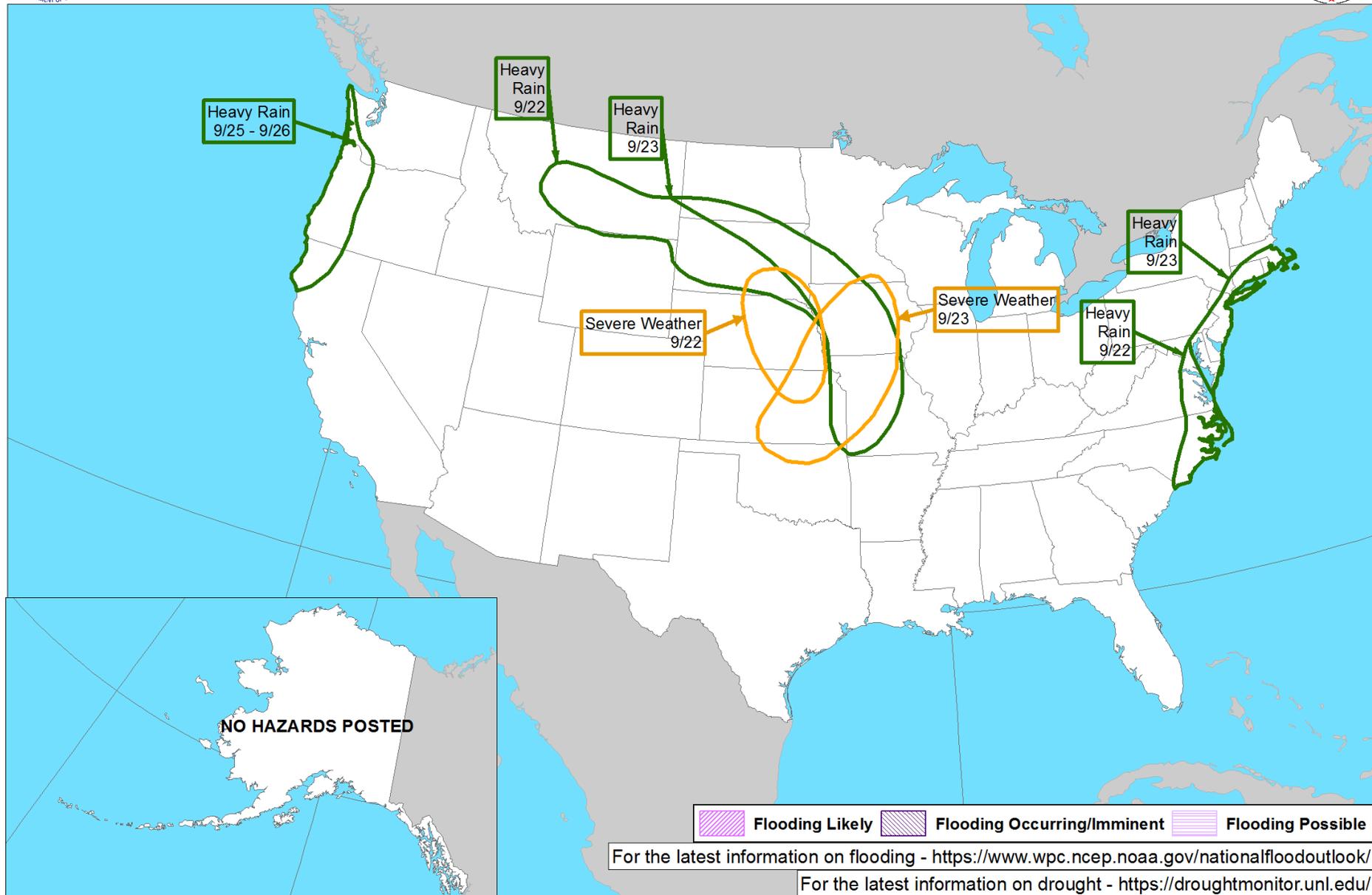
- **7-day precipitation forecast**
- **8-14 day outlook**
- **Monthly Outlook**
- **Autumn Outlook (Sep-Nov)**
- **Winter Outlook (Dec-Feb)**
- **Seasonal Drought Outlook**





# Day 3-7 U.S. Hazards Outlook

Valid: 09/22/2023-09/26/2023



Weather Prediction Center

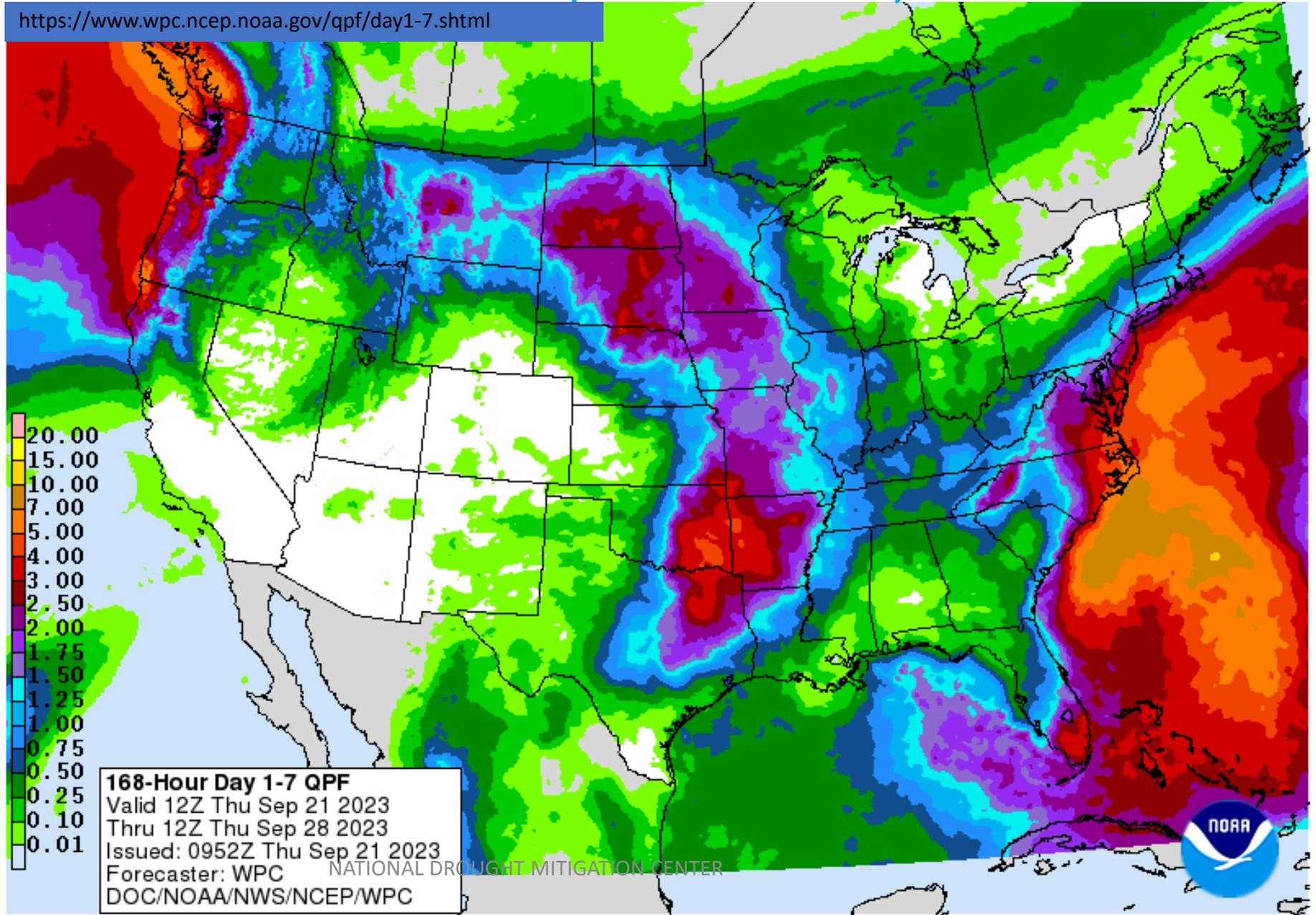
Made: 09/19/2023 04:23 PM EDT

Follow us:

[www.wpc.ncep.noaa.gov](http://www.wpc.ncep.noaa.gov)

# Forecasted rainfall for the next 7-Days valid from September 21-28, 2023

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





# Monthly Outlook for October 2023

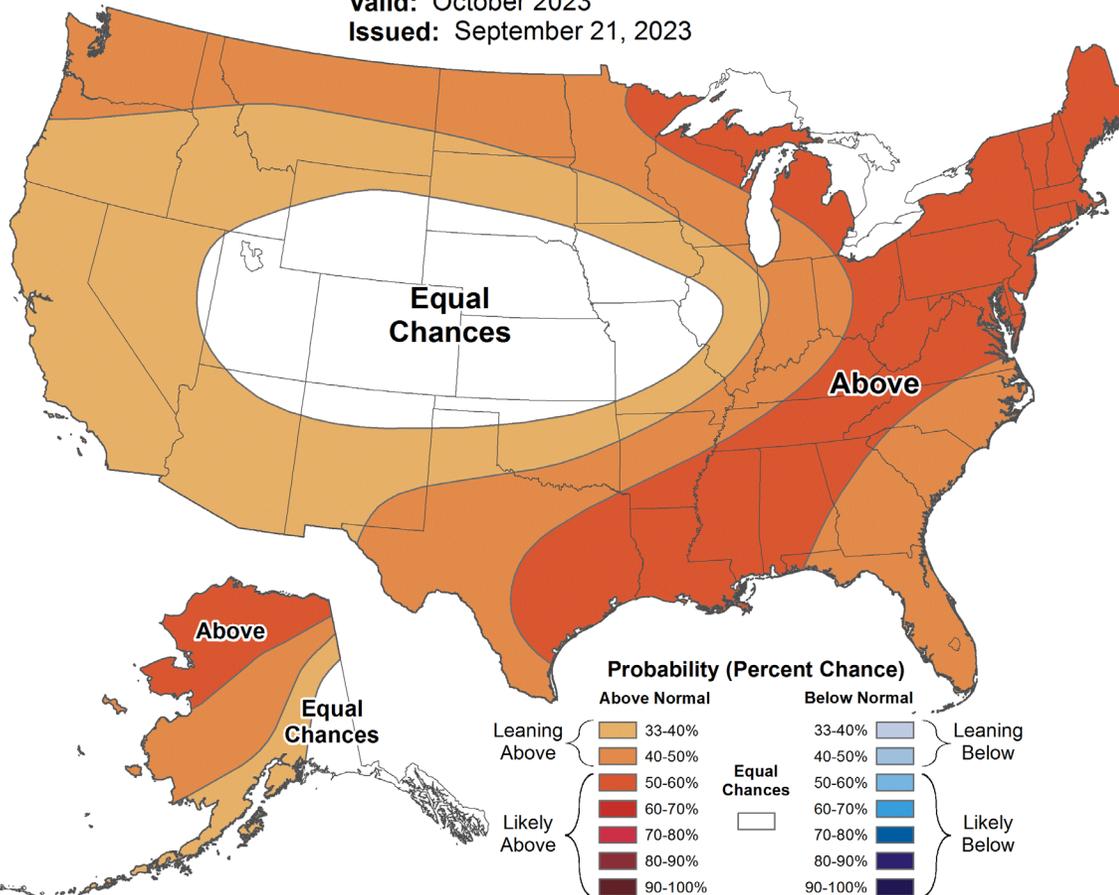
<https://www.cpc.ncep.noaa.gov/products/predictions/30day/>



## Monthly Temperature Outlook



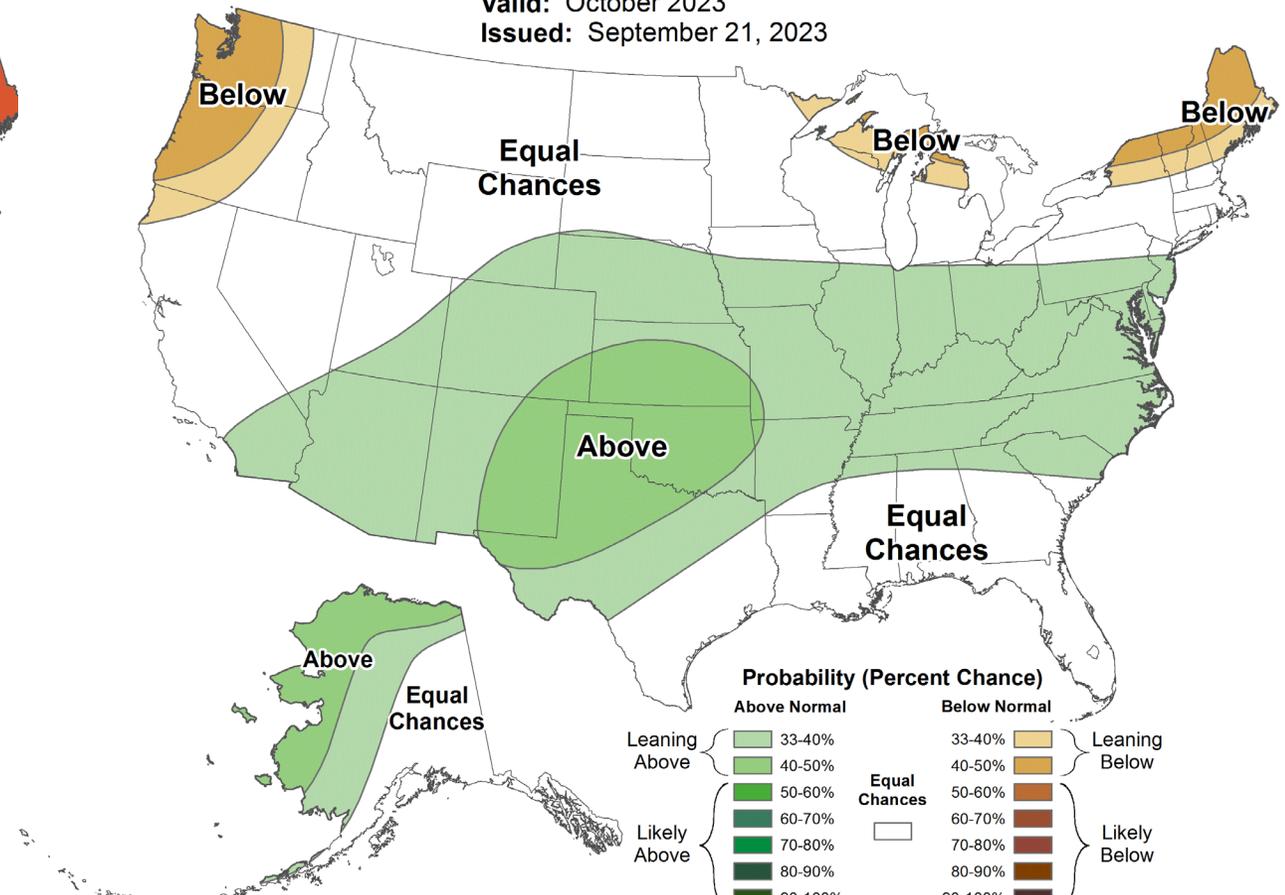
Valid: October 2023  
Issued: September 21, 2023



## Monthly Precipitation Outlook



Valid: October 2023  
Issued: September 21, 2023



# 3-month Outlook (October-December 2023)

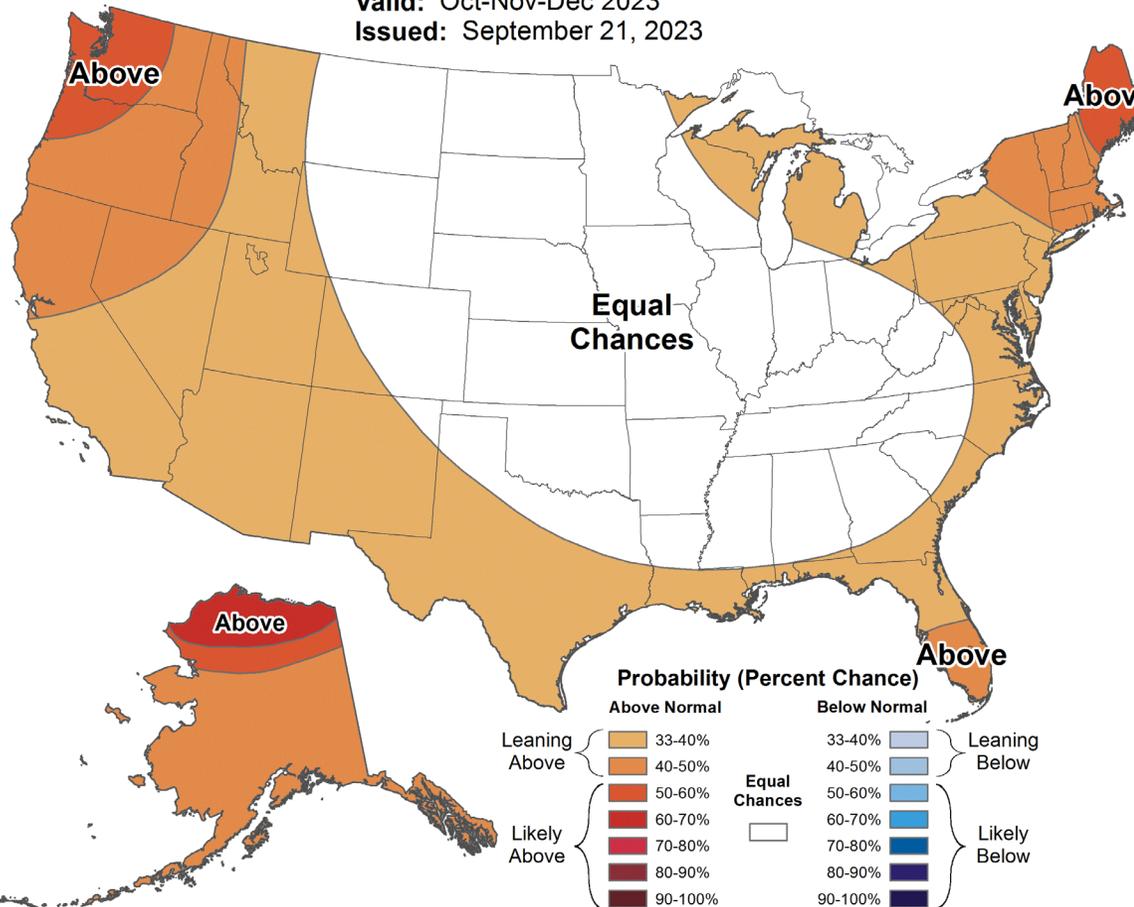
<https://www.cpc.ncep.noaa.gov/products/predictions/90day/>



## Seasonal Temperature Outlook



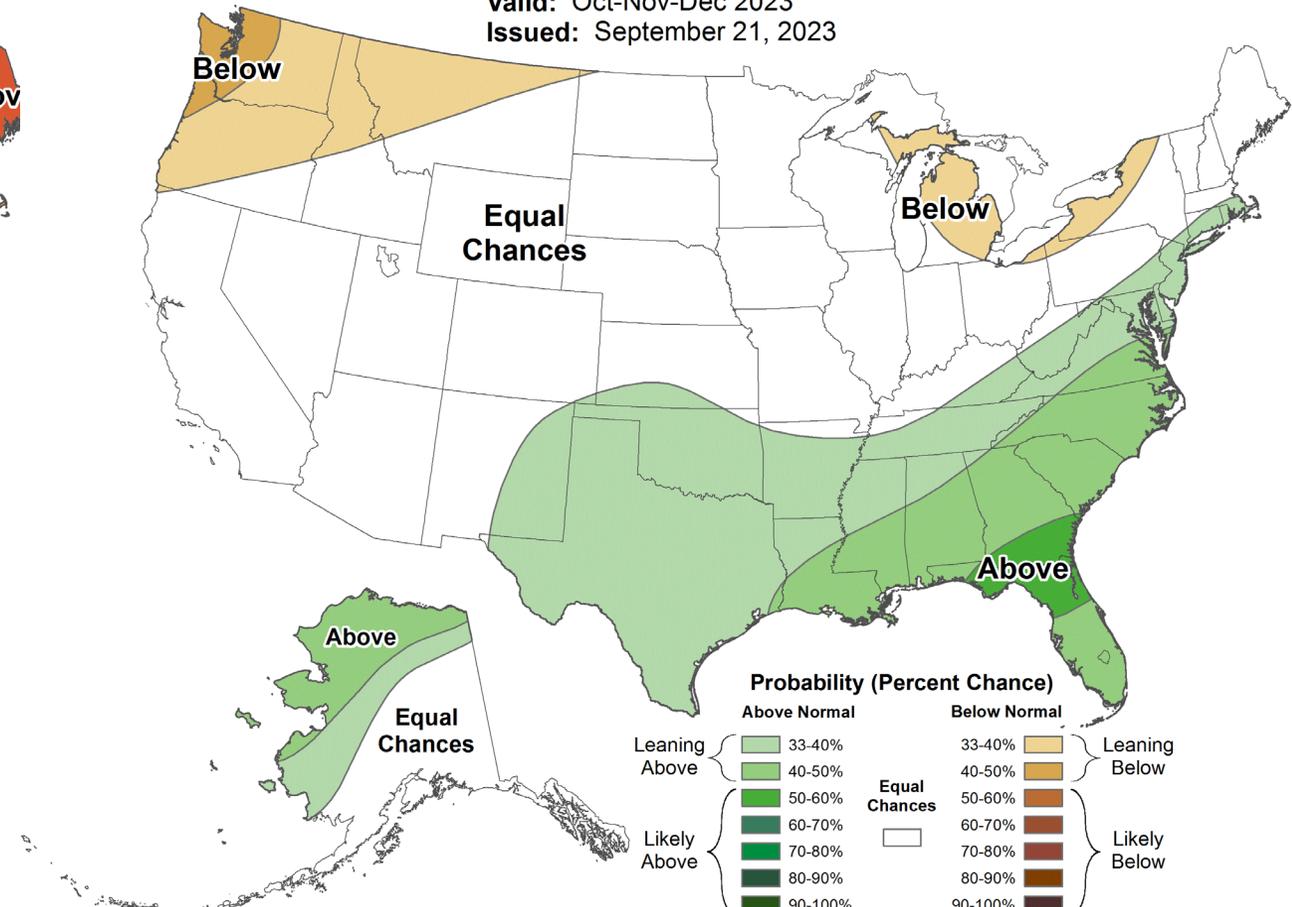
Valid: Oct-Nov-Dec 2023  
Issued: September 21, 2023



## Seasonal Precipitation Outlook



Valid: Oct-Nov-Dec 2023  
Issued: September 21, 2023



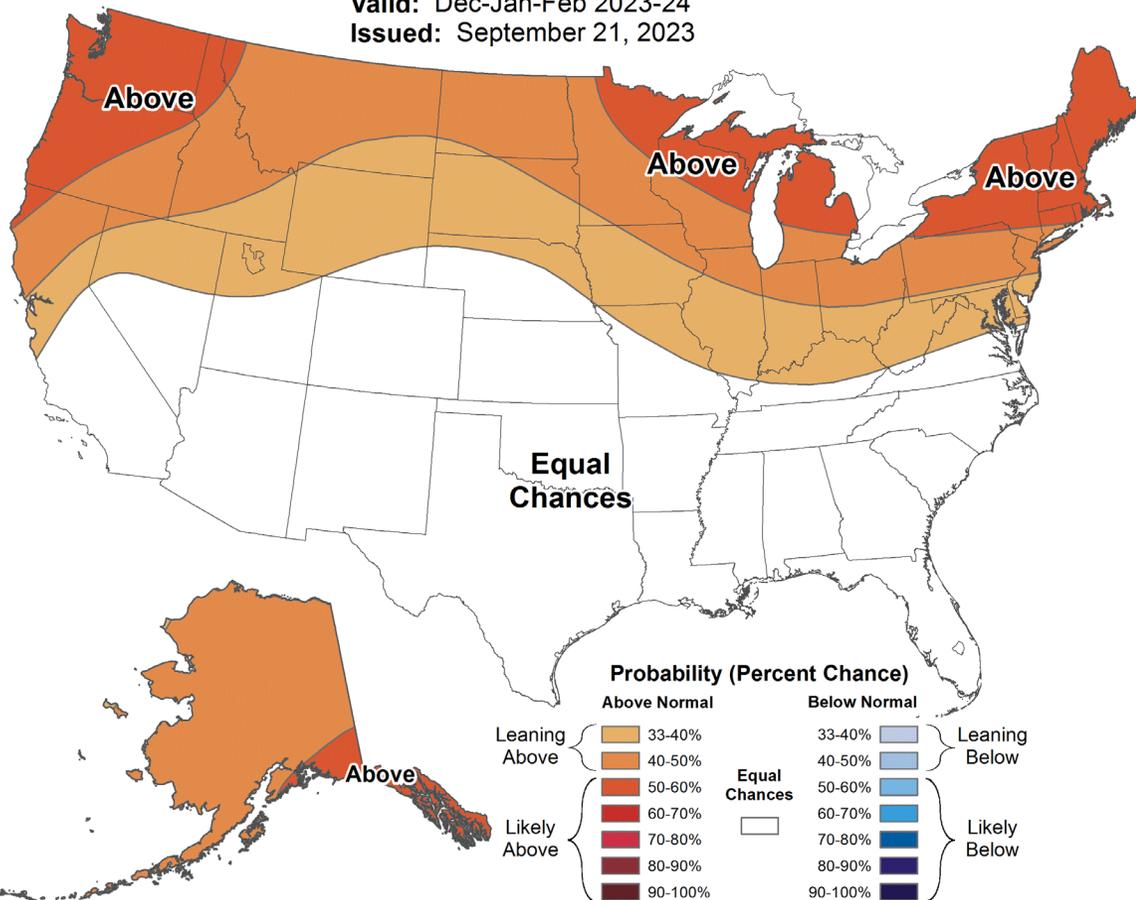
# Winter Outlook

## December 2023 to February 2024



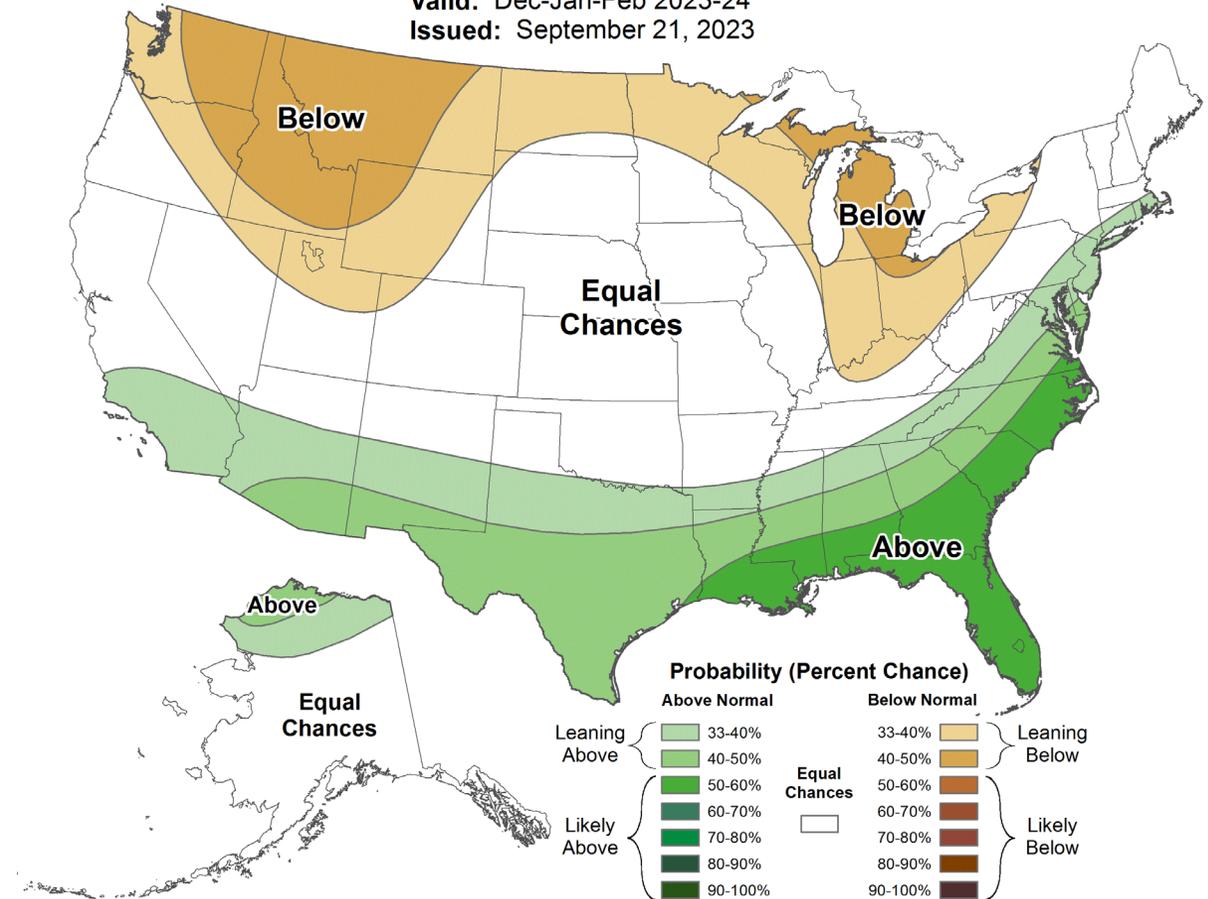
### Seasonal Temperature Outlook

Valid: Dec-Jan-Feb 2023-24  
 Issued: September 21, 2023



### Seasonal Precipitation Outlook

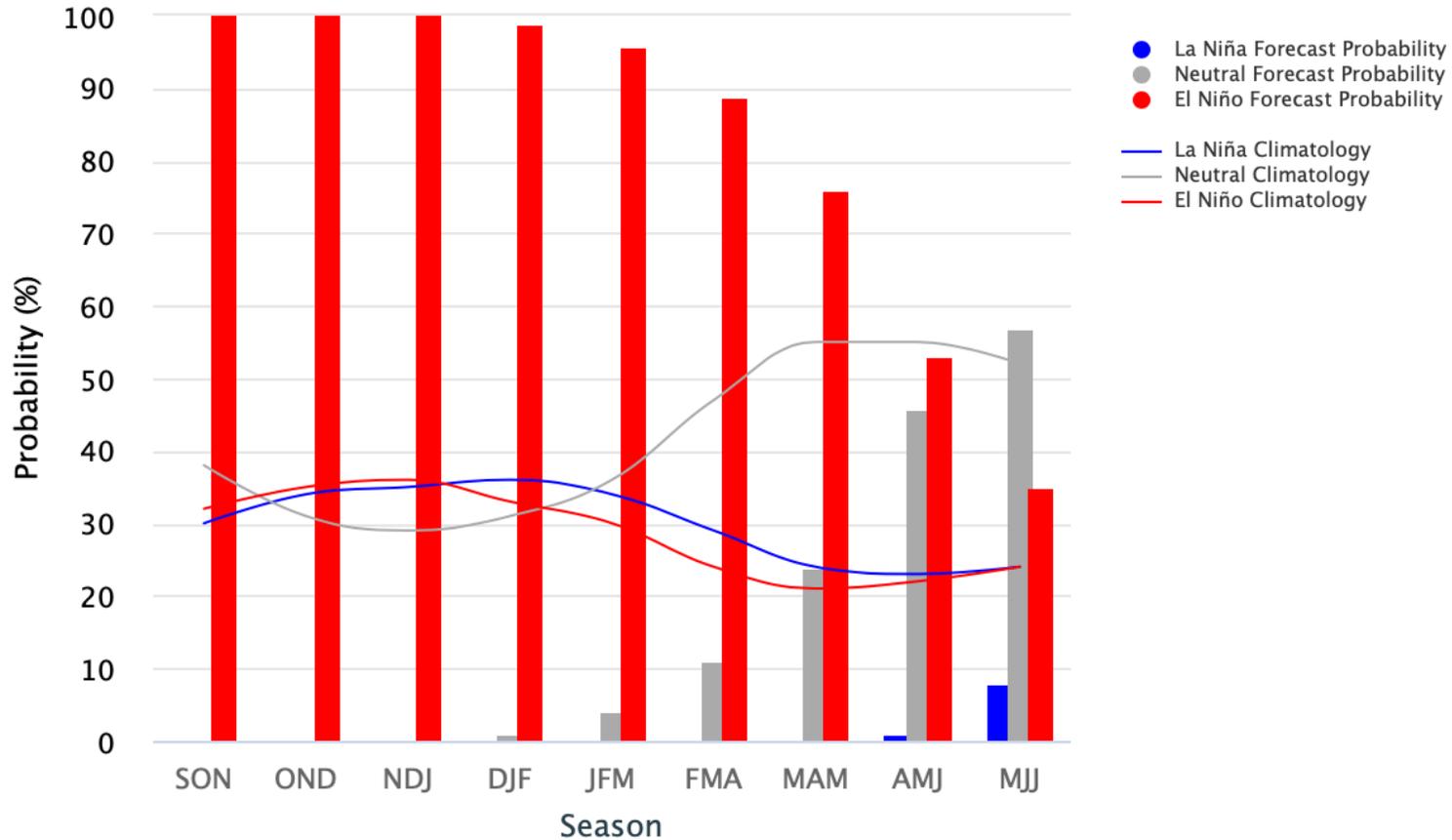
Valid: Dec-Jan-Feb 2023-24  
 Issued: September 21, 2023



# El Nino Impact on the Winter

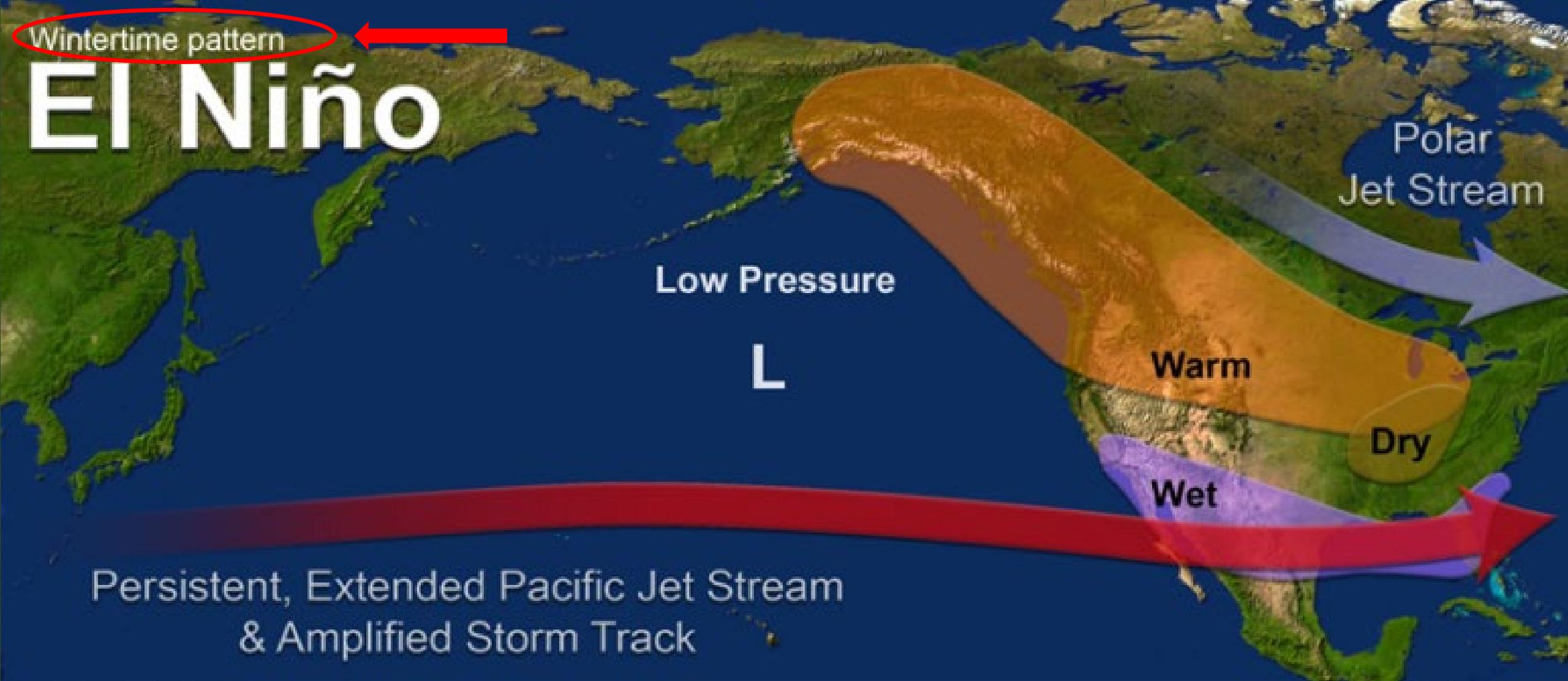
Mid-September 2023 IRI Model-Based Probabilistic ENSO Forecasts

ENSO state based on NINO3.4 SST Anomaly Neutral ENSO:  $-0.5\text{ }^{\circ}\text{C}$  to  $0.5\text{ }^{\circ}\text{C}$



Wintertime pattern

# El Niño

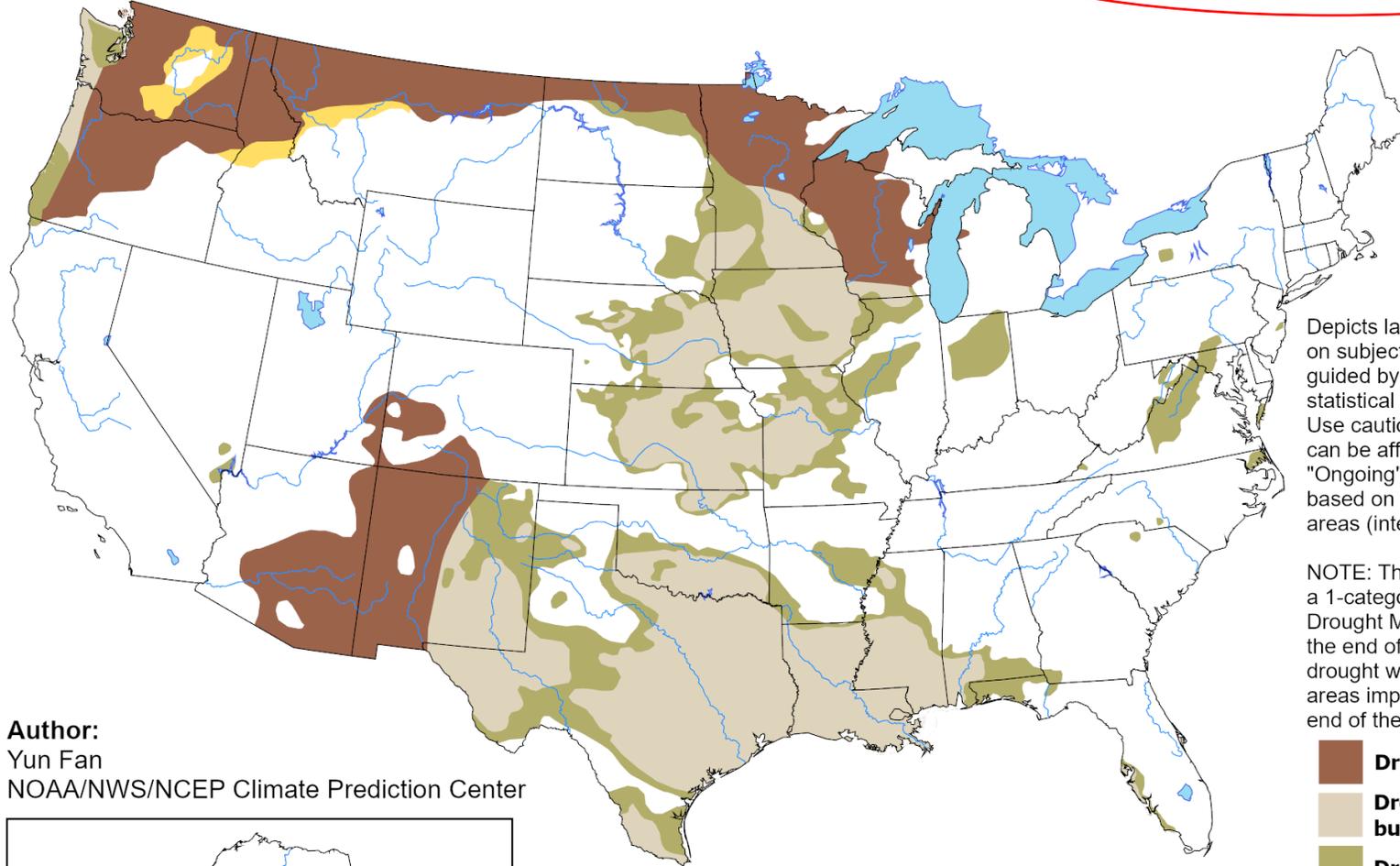


What does a typical El Nino pattern mean?

# U.S. Seasonal Drought Outlook

## Drought Tendency During the Valid Period

Valid for September 21 - December 31, 2023  
Released September 21, 2023

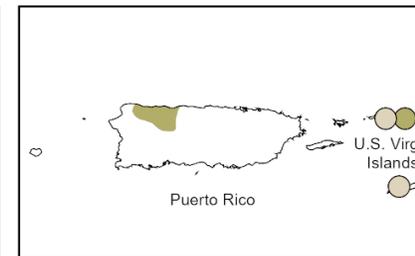
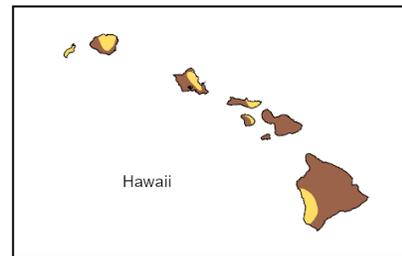


Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

- Drought persists**
- Drought remains, but improves**
- Drought removal likely**
- Drought development likely**
- No drought**

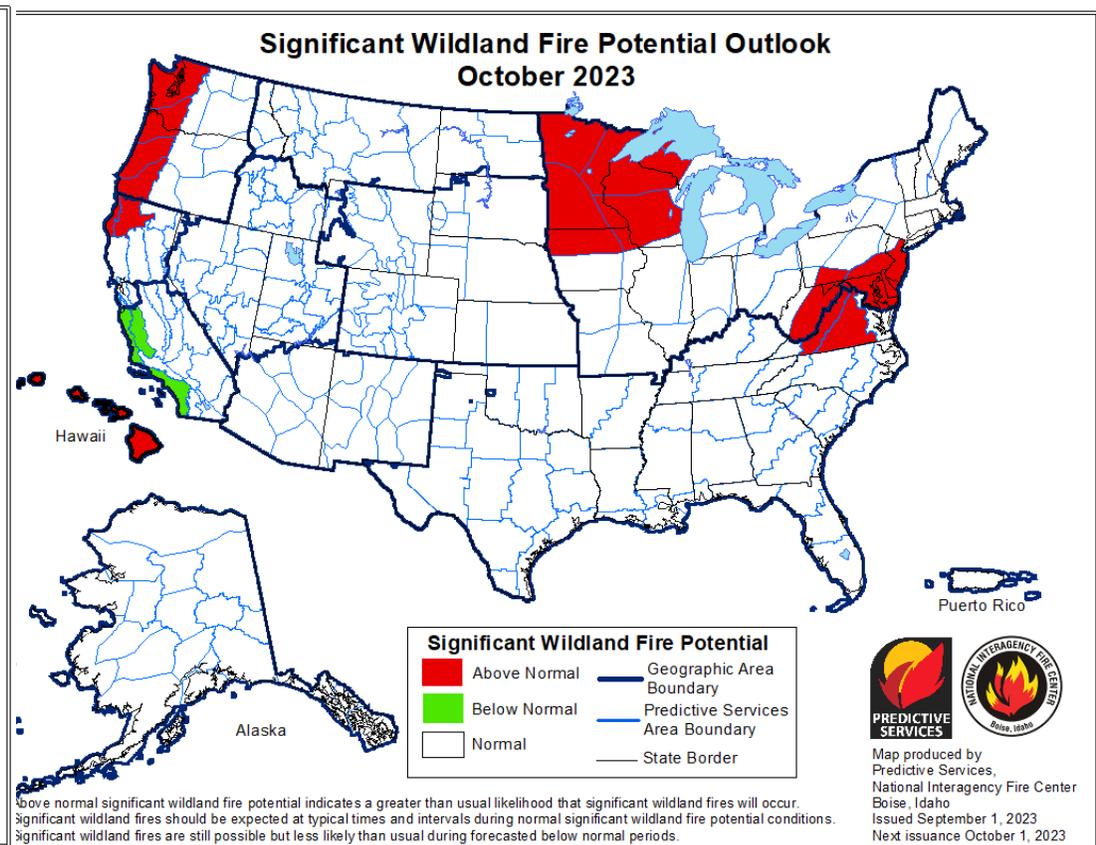
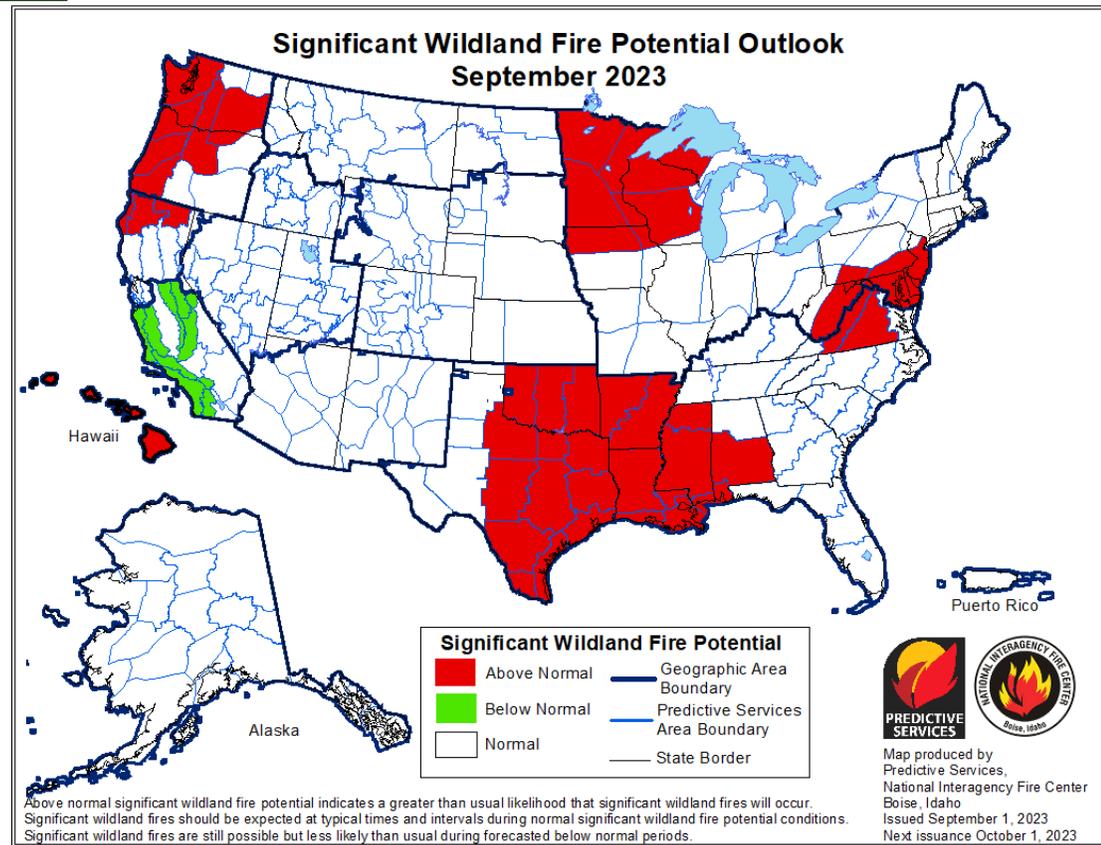
**Author:**  
Yun Fan  
NOAA/NWS/NCEP Climate Prediction Center



<https://go.usa.gov/3eZ73>

# Wildland Fire Potential

[https://www.predictiveservices.nifc.gov/outlooks/month1\\_outlook.png](https://www.predictiveservices.nifc.gov/outlooks/month1_outlook.png)

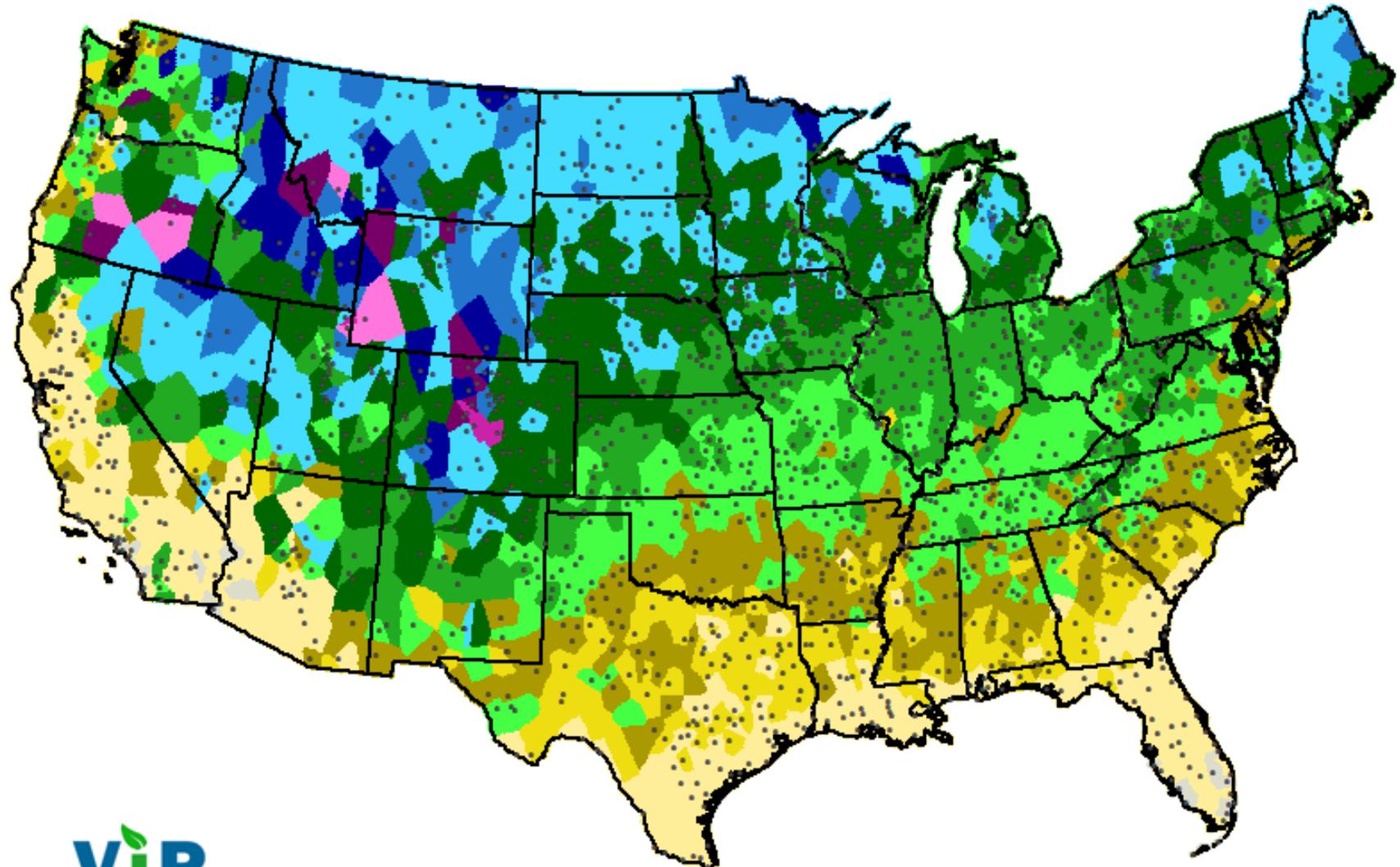
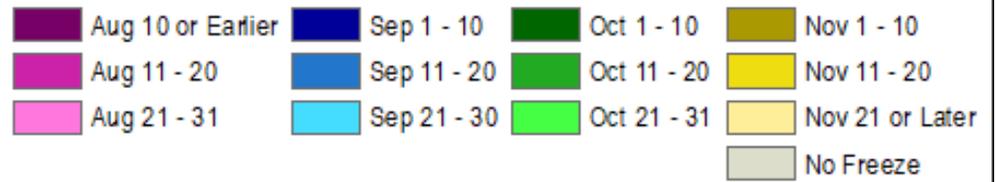


# Climatological Date of Median First 32°F Freeze

For years 1990-91 to 2019-20

Freeze year beginning July 1st

Median defined as the 50th Percentile



[https://mrcc.purdue.edu/VIP/frz\\_maps/freeze\\_maps.html#frzMaps](https://mrcc.purdue.edu/VIP/frz_maps/freeze_maps.html#frzMaps)

# FOR ADDITIONAL INFORMATION

## **Presentations Archive**

<http://www.hprcc.unl.edu>

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

## **NOAA's National Centers for Environmental Information**

[www.ncdc.noaa.gov](http://www.ncdc.noaa.gov)

## **Monthly Climate Reports**

[www.ncdc.noaa.gov/sotc/](http://www.ncdc.noaa.gov/sotc/)

## **NOAA's Climate Prediction Center**

[www.cpc.ncep.noaa.gov](http://www.cpc.ncep.noaa.gov)

## **National Drought Mitigation Center**

[drought.unl.edu](http://drought.unl.edu)

## **U.S. Drought Portal**

[www.drought.gov](http://www.drought.gov)

## **State Climatologists**

[www.stateclimate.org](http://www.stateclimate.org)

## **Regional Climate Centers**

[www.hprcc.unl.edu](http://www.hprcc.unl.edu) and <https://mrcc.purdue.edu/>



# Thank you !

- ❖ Brian Fuchs: [bfuchs2@unl.edu](mailto:bfuchs2@unl.edu), 402 472-6775
- ❖ Dennis Todey: [Dennis.Todey@usda.gov](mailto:Dennis.Todey@usda.gov), 515-294-2013
- ❖ Doug Kluck: [doug.kluck@noaa.gov](mailto:doug.kluck@noaa.gov), 816-564-2417
- ❖ Melissa Widhalm: [mwildhalm@purdue.edu](mailto:mwildhalm@purdue.edu), 765 494 8191
- ❖ Gannon Rush: [grusch@unl.edu](mailto:grusch@unl.edu), 402 472 6764
- ❖ Molly Woloszyn: [molly.woloszyn@noaa.gov](mailto:molly.woloszyn@noaa.gov)
- ❖ Britt Parker: [britt.parker@noaa.gov](mailto:britt.parker@noaa.gov)
- ❖ [crhroc@noaa.gov](mailto:crhroc@noaa.gov)

**Brian Fuchs**

**National Drought Mitigation Center**

**[bfuchs2@unl.edu](mailto:bfuchs2@unl.edu)**

**402-472-6775**

