

North Central U.S. Climate Summary & Outlook

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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

- **Access to Past Climate Webinars**

- 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

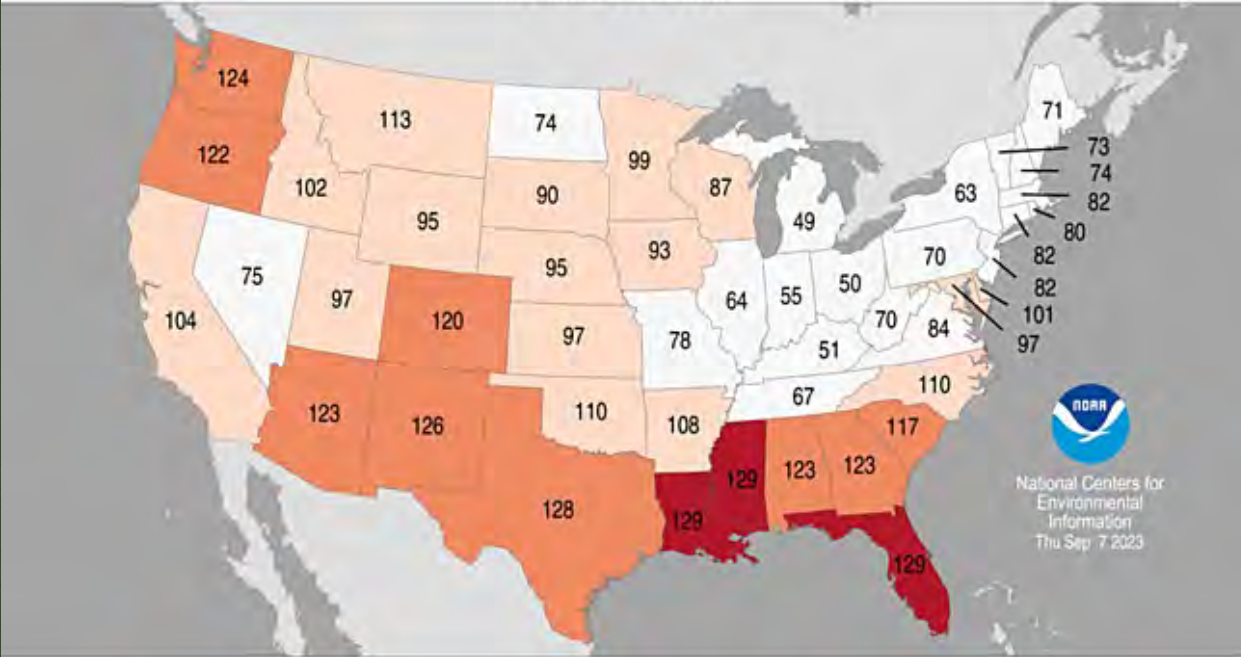


Photo by Matt Sittel: Manhattan, KS on 8/19/23

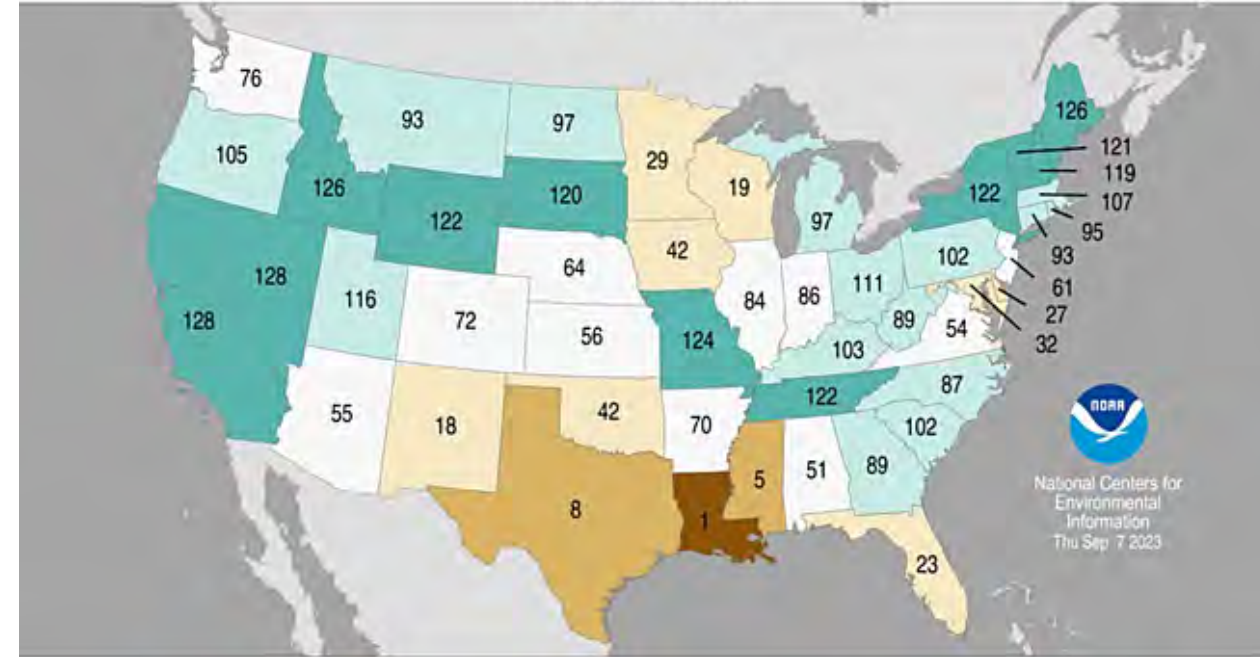


August Climatology from the National Centers for Environmental Information

Statewide Average Temperature Ranks
August 2023
Period: 1895–2023



Statewide Precipitation Ranks
August 2023
Period: 1895–2023



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)



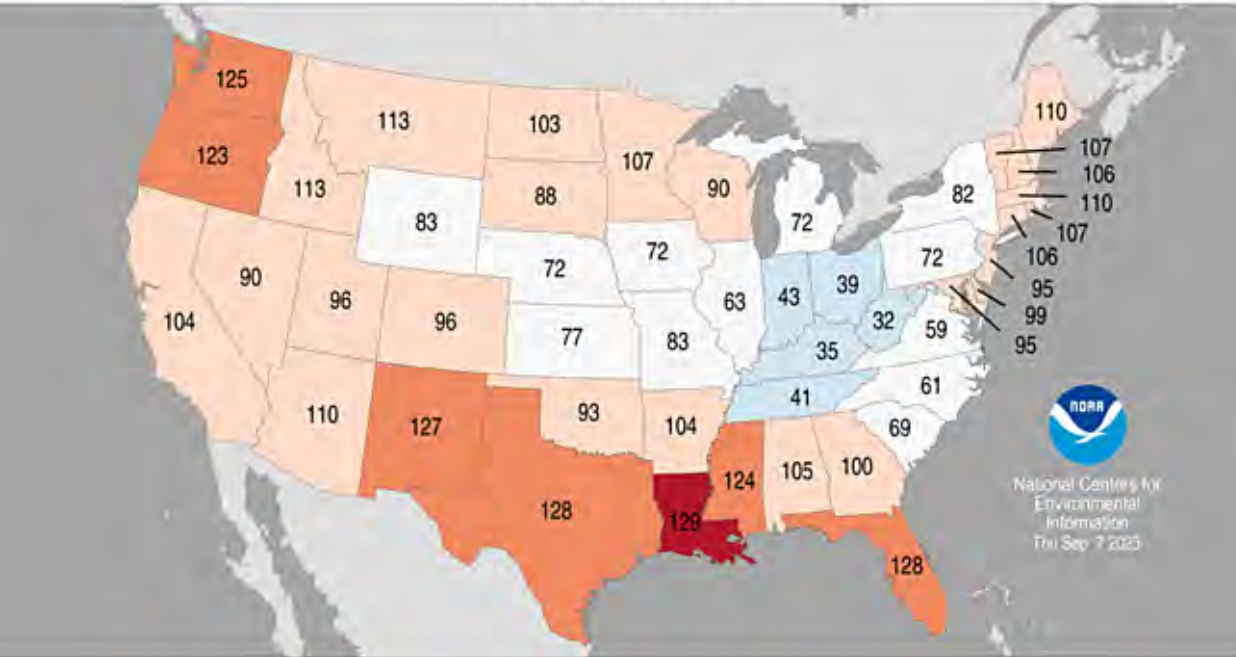
<https://www.ncdc.noaa.gov/sotc/>

NATIONAL DROUGHT MITIGATION CENTER

3-month Climatology from the National Centers for Environmental Information

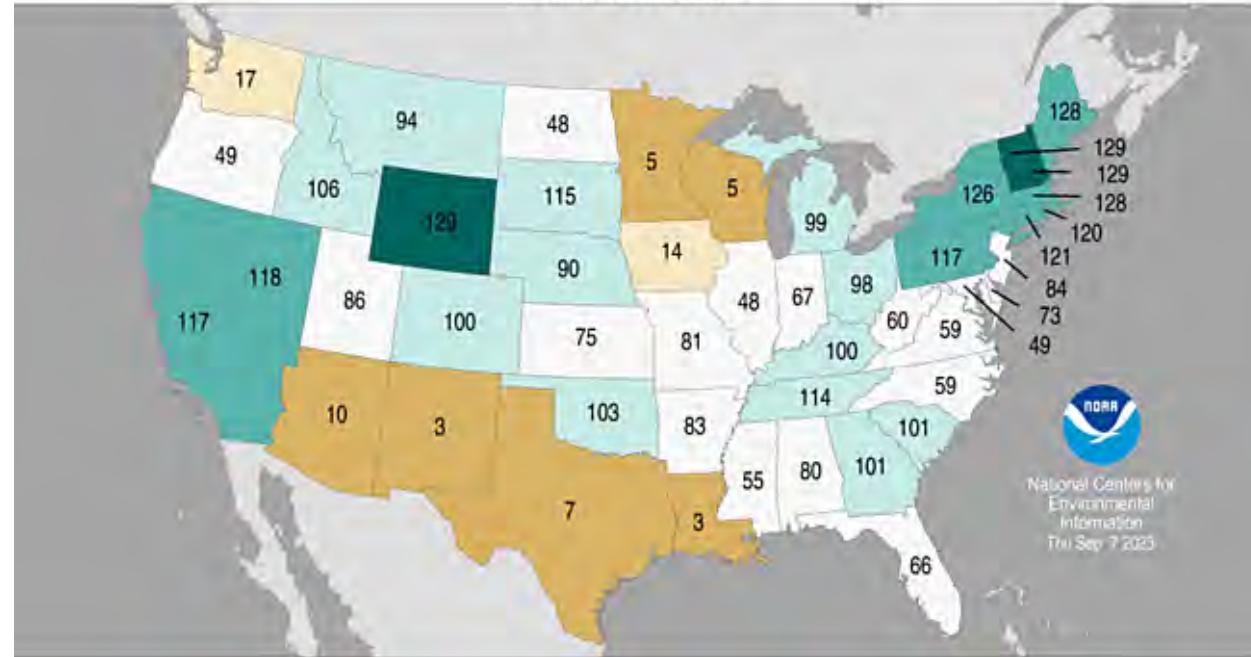
Statewide Average Temperature Ranks

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/>

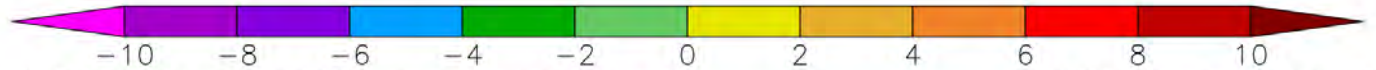
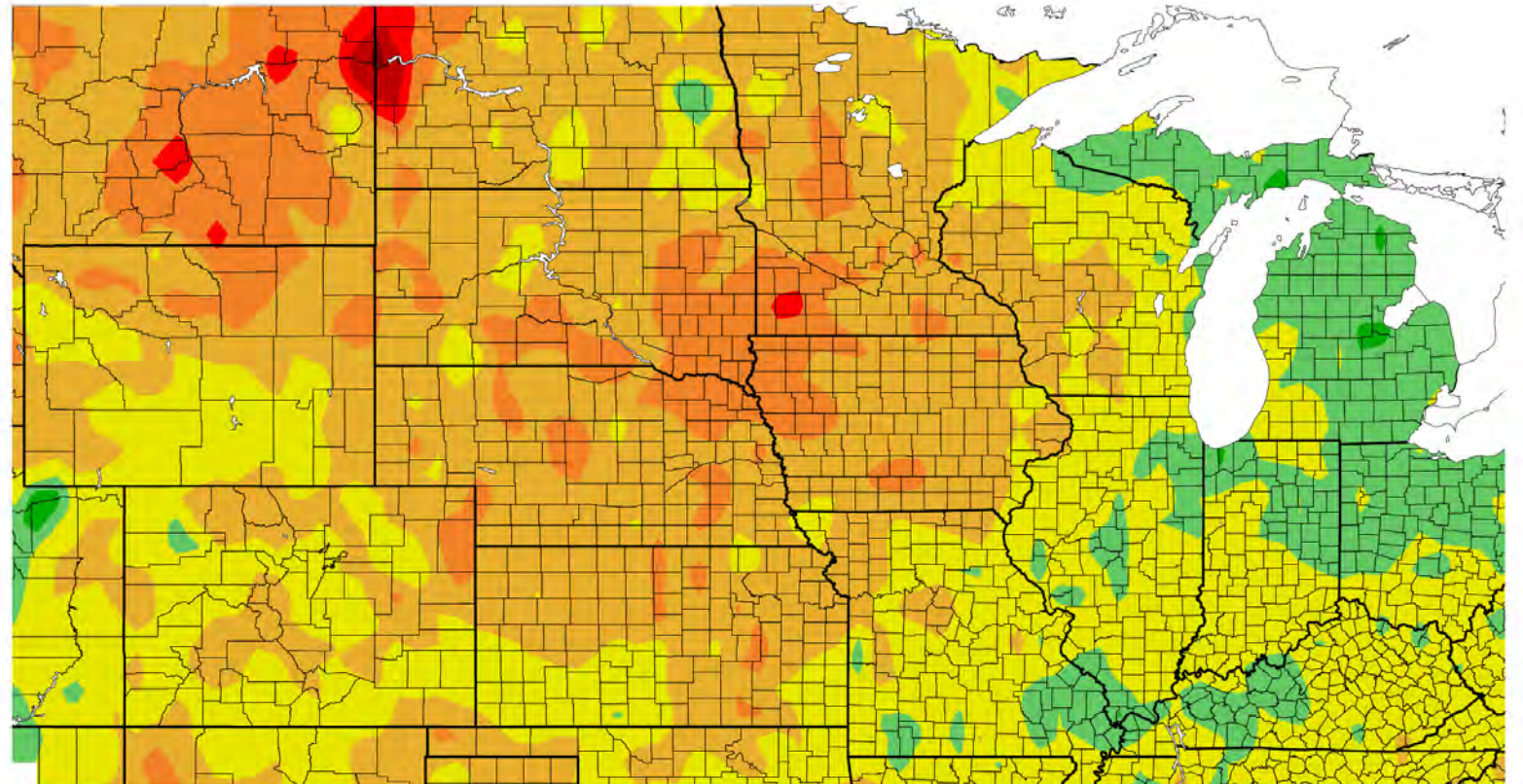
NATIONAL DROUGHT MITIGATION CENTER

Temperature departures over the last 30 Days

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



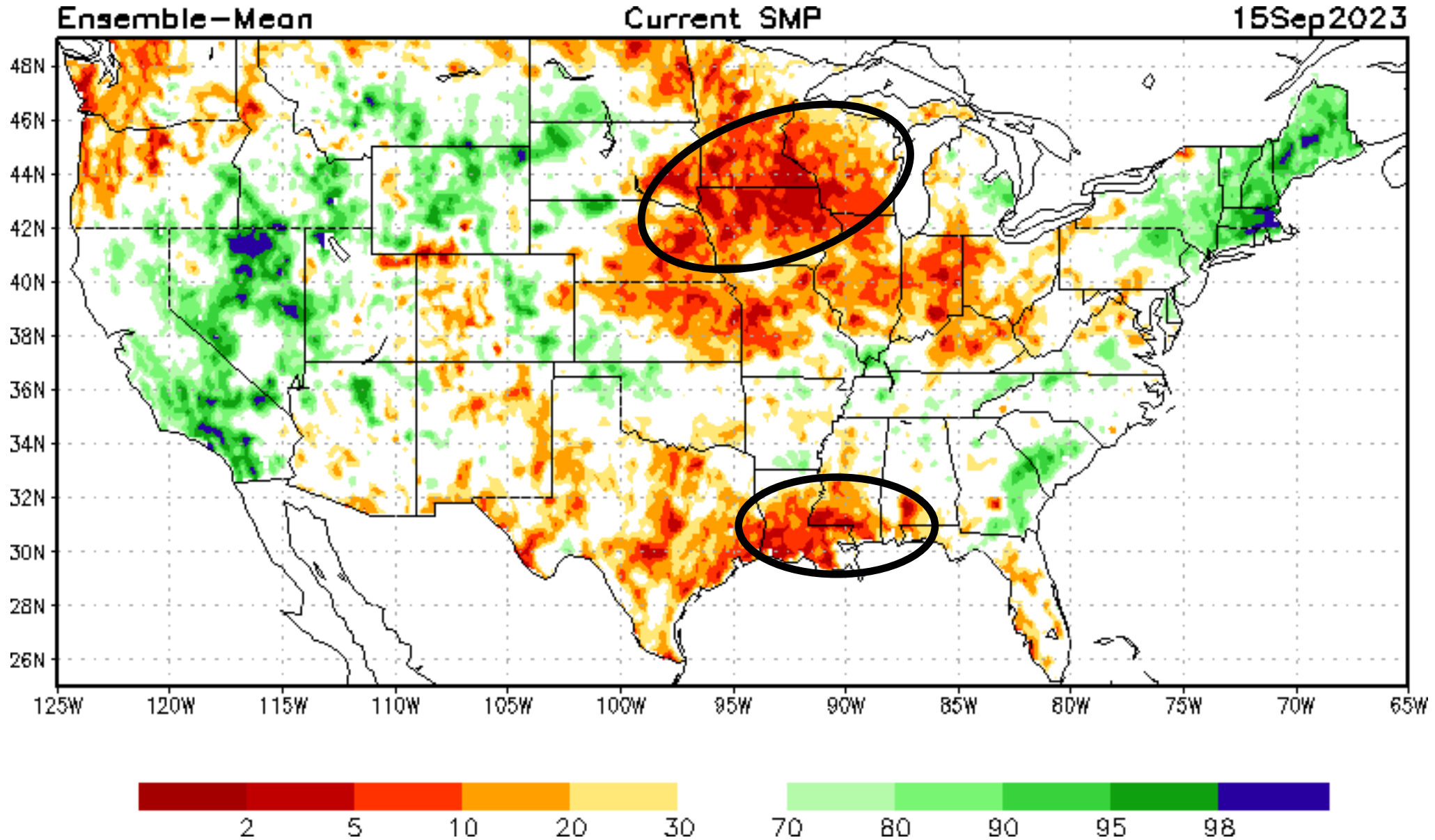
Departure from Normal Temperature (F)
8/22/2023 – 9/20/2023



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

NOAA Regional Climate Centers

Current Soil Moisture Percentiles

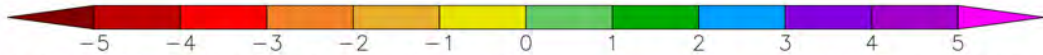
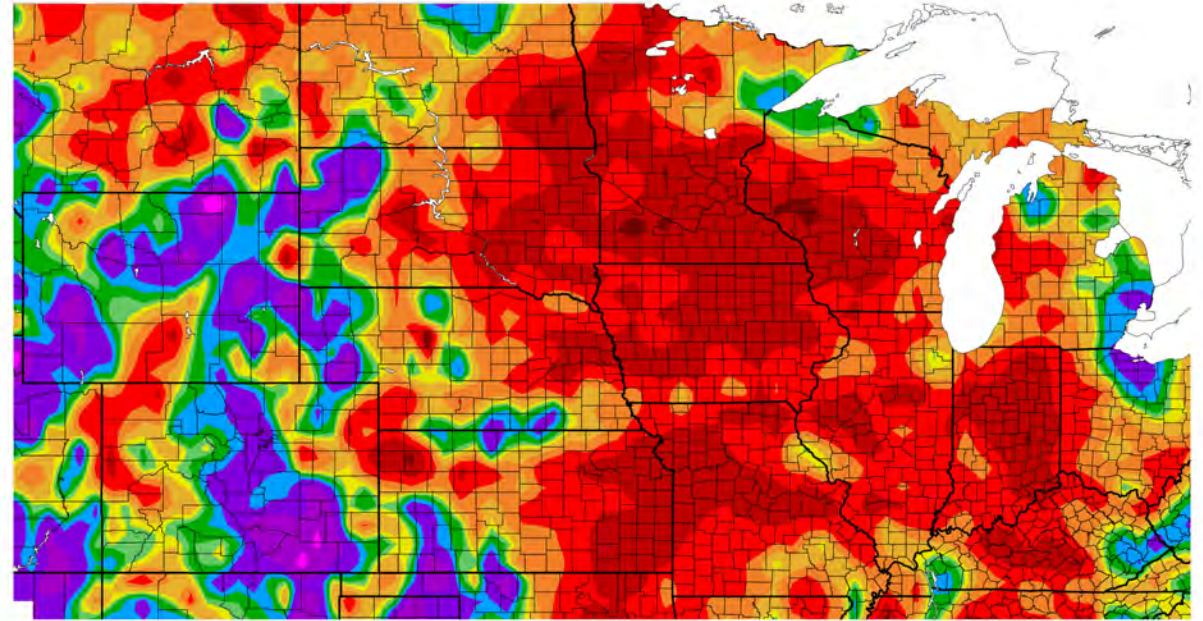
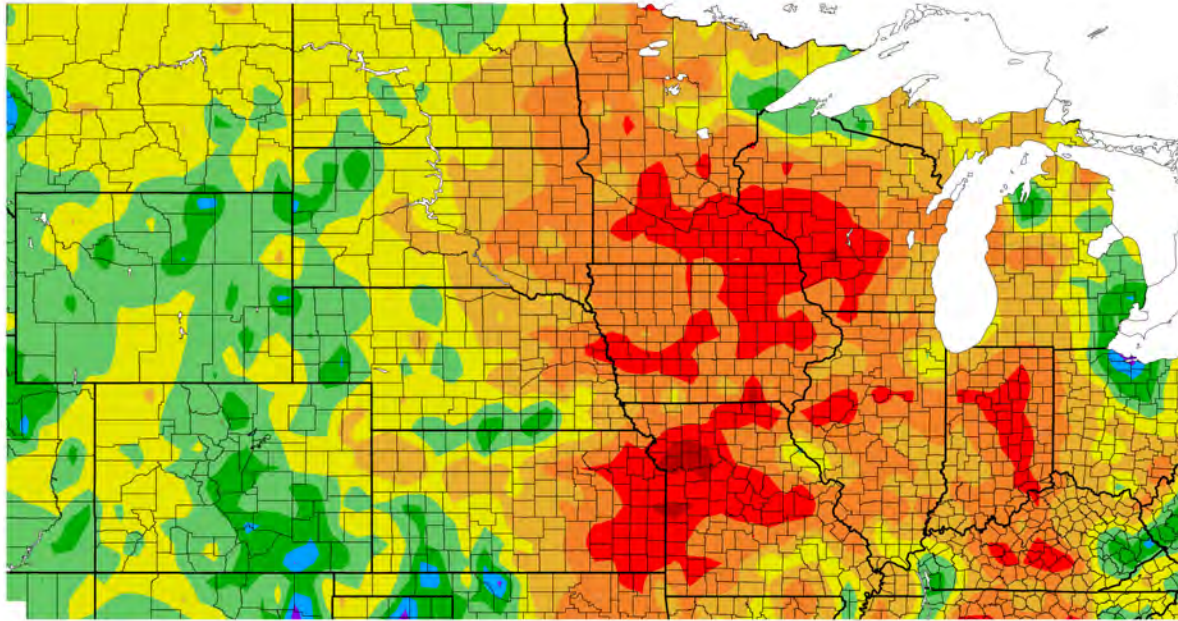


https://www.cpc.ncep.noaa.gov/products/Drought/Monitoring/smp_new.shtml#

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



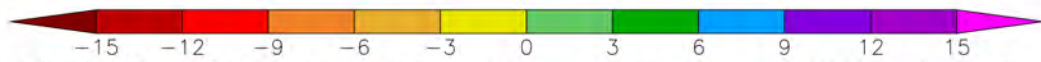
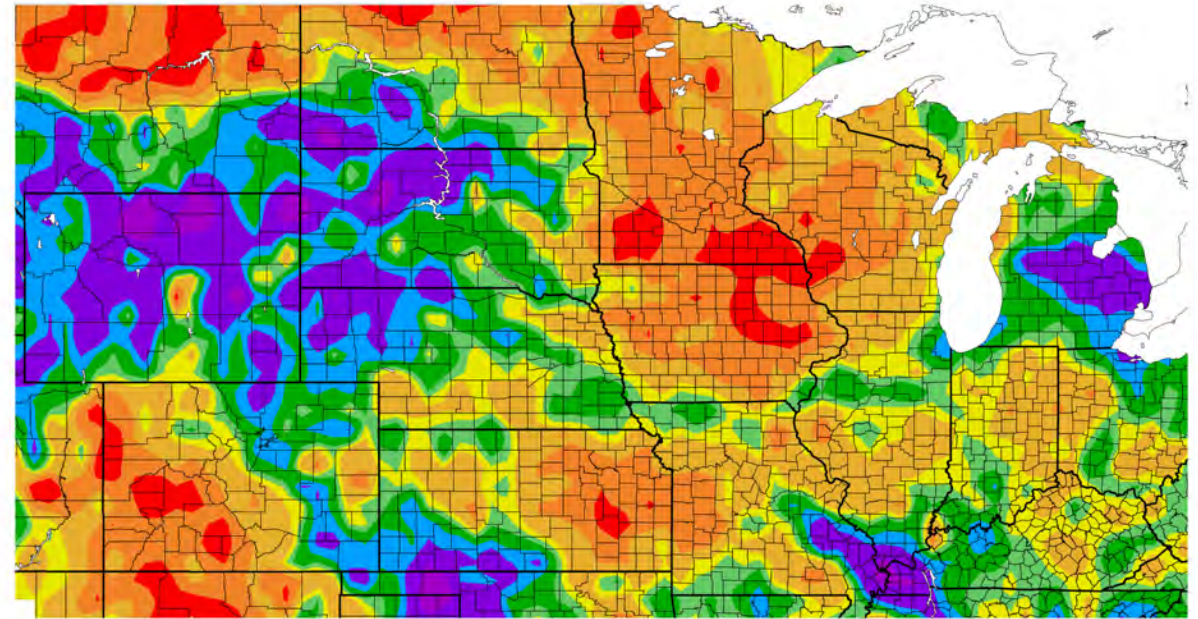
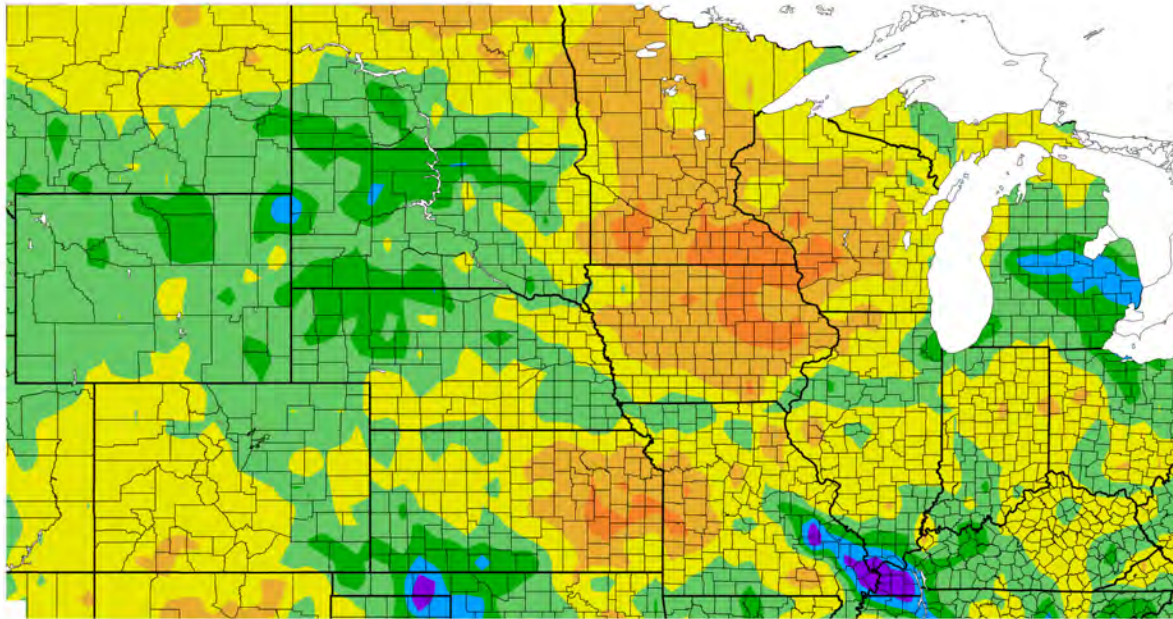
<http://www.hprcc.unl.edu/maps/current/>

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



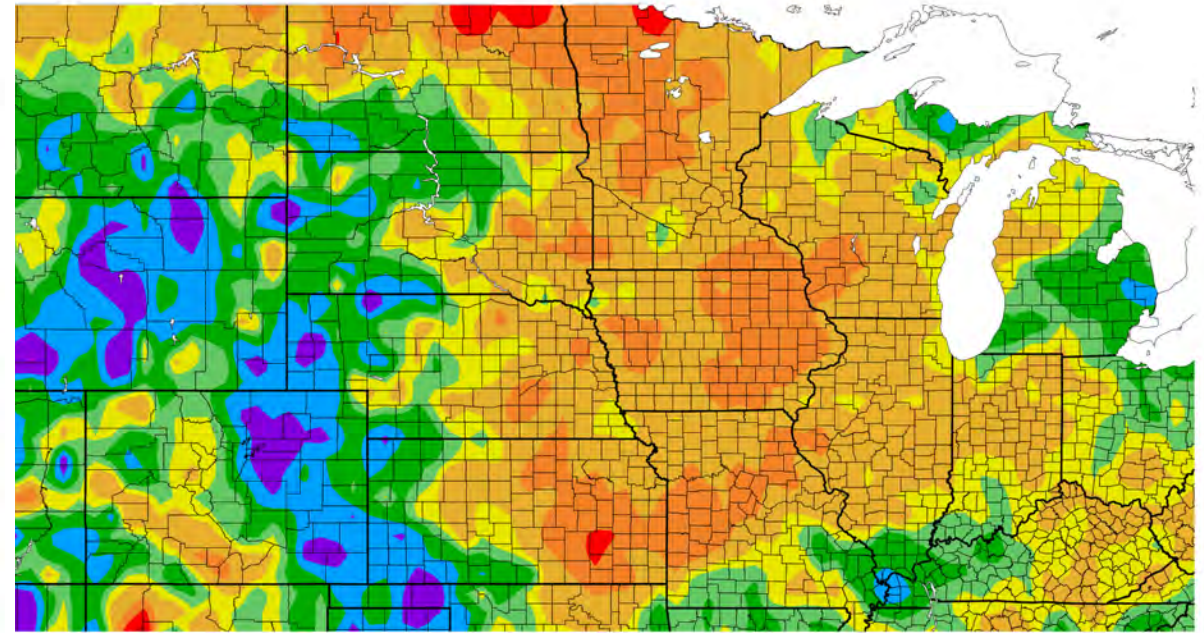
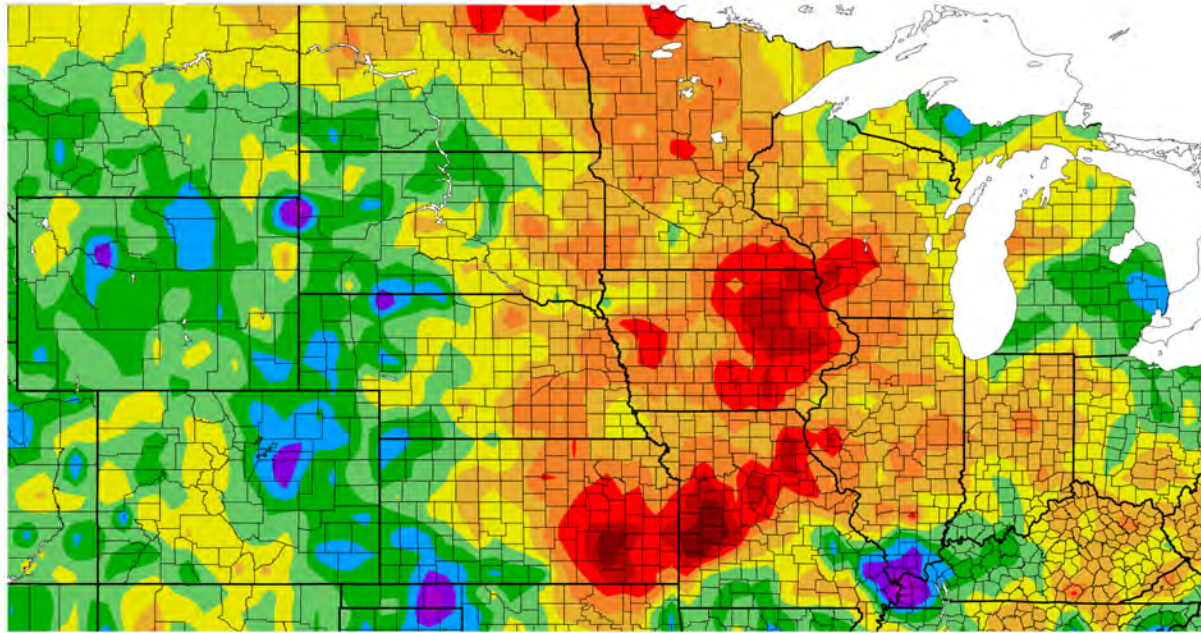
<http://www.hprcc.unl.edu/maps/current/>

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

NOAA Regional Climate Centers

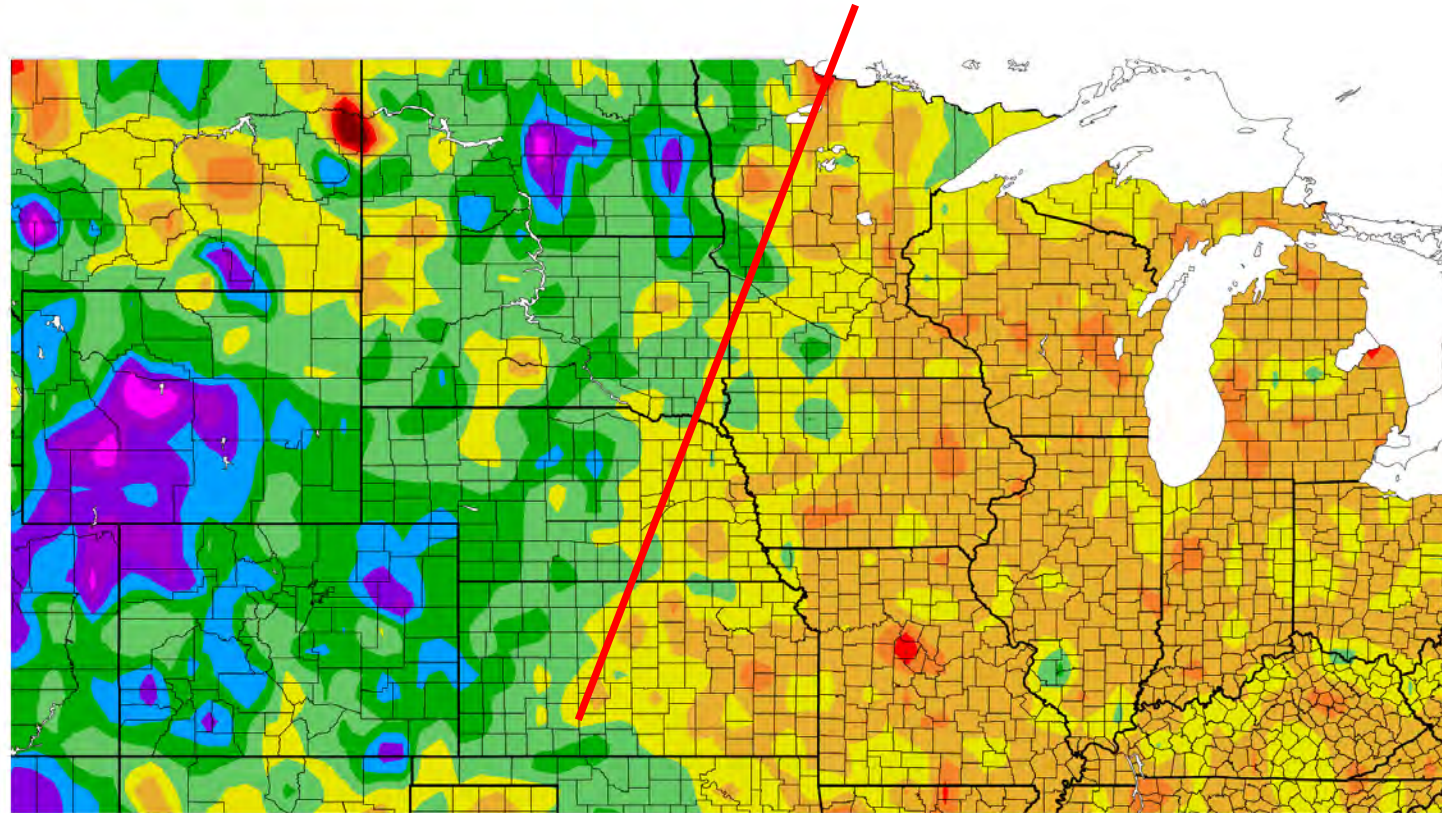


<http://www.hprcc.unl.edu/maps/current/>

NATIONAL DROUGHT MITIGATION CENTER

Calendar Year Temperature Departure from Normal

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



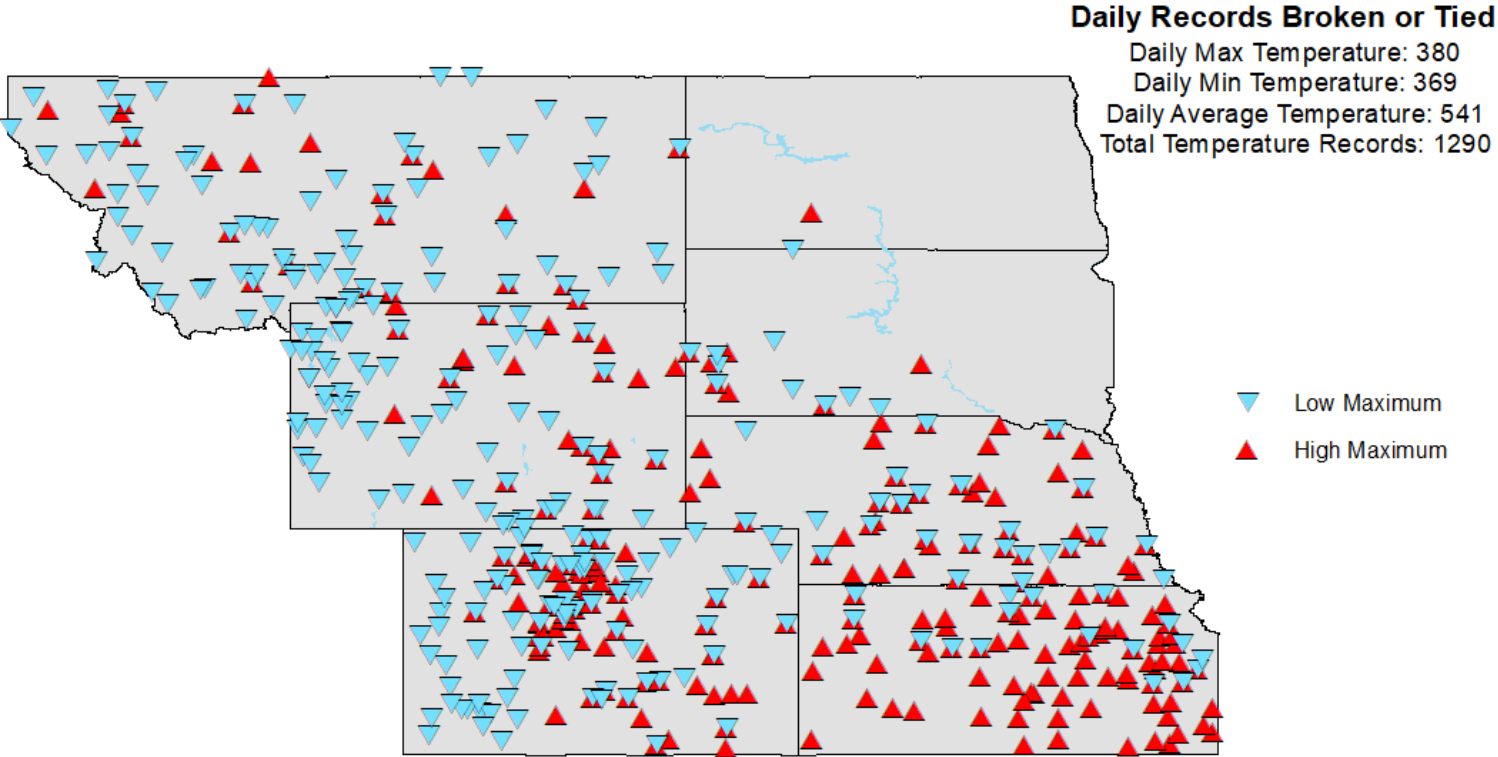
Generated 9/20/2023 at

<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.

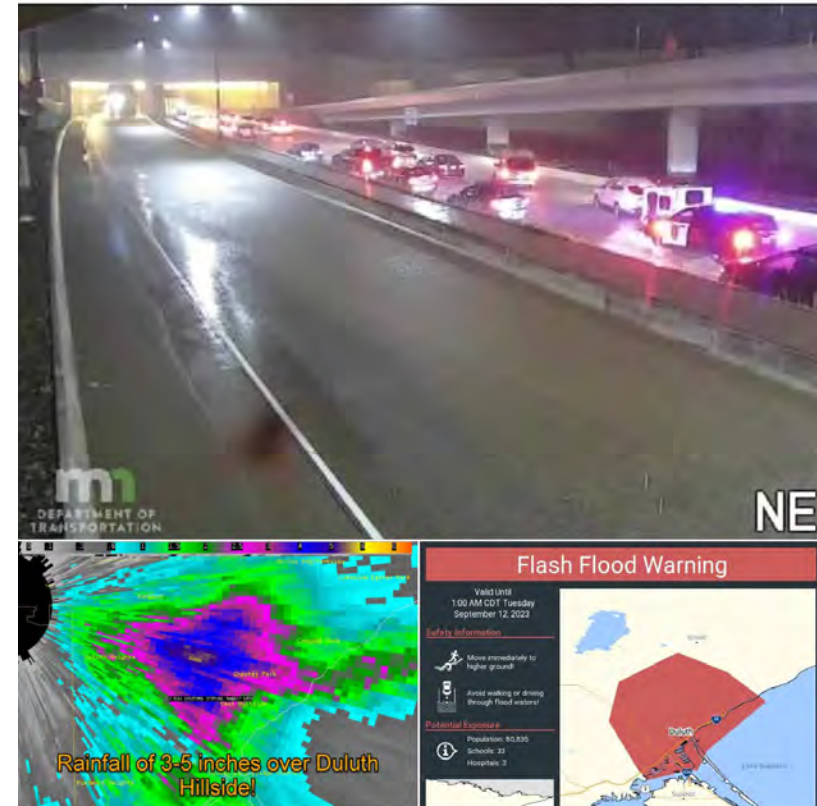
Kansas update

- 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.
- 10th 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



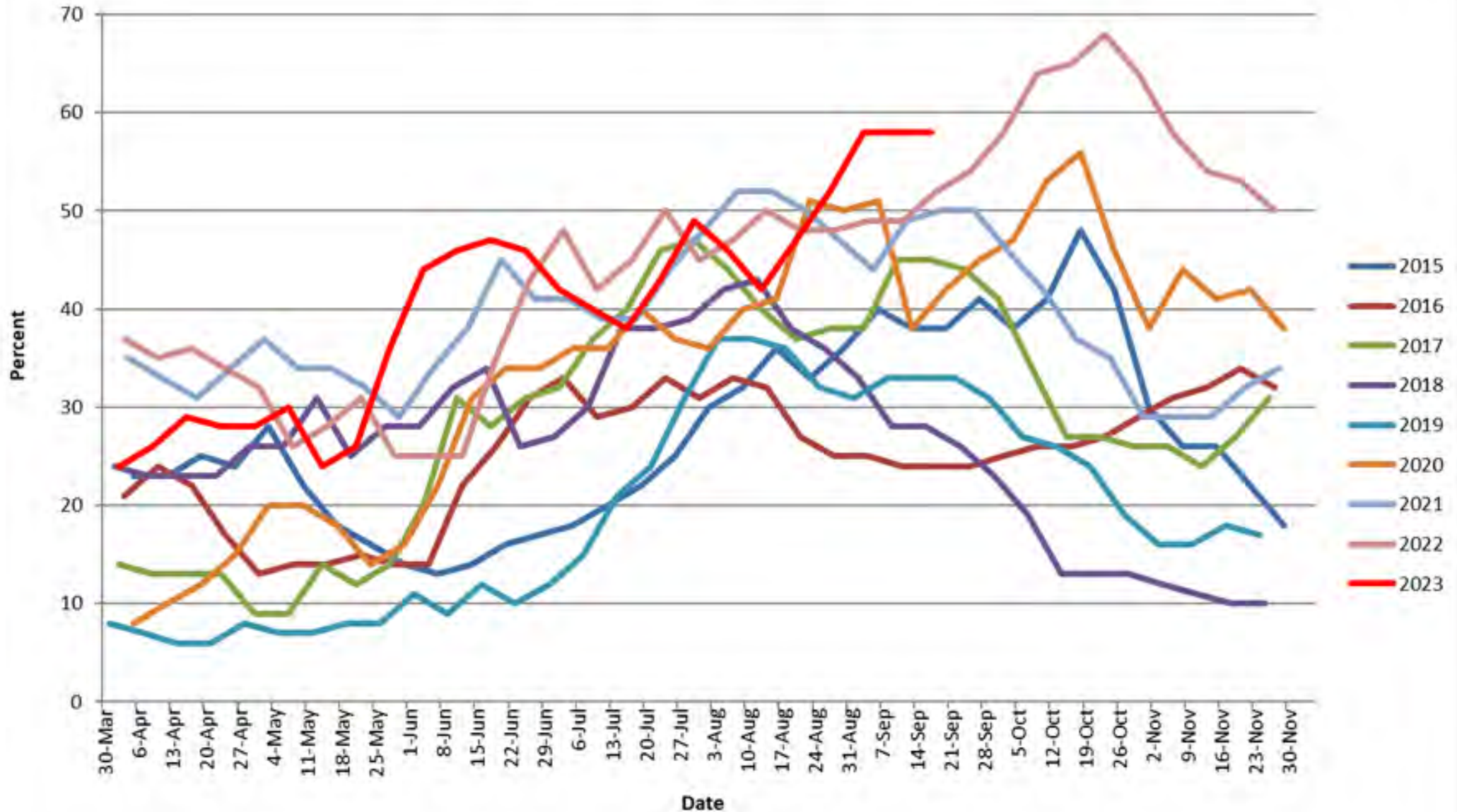
Indiana Update

- 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.
- 3rd 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

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



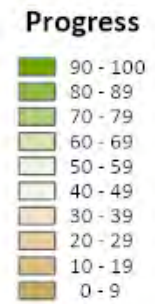
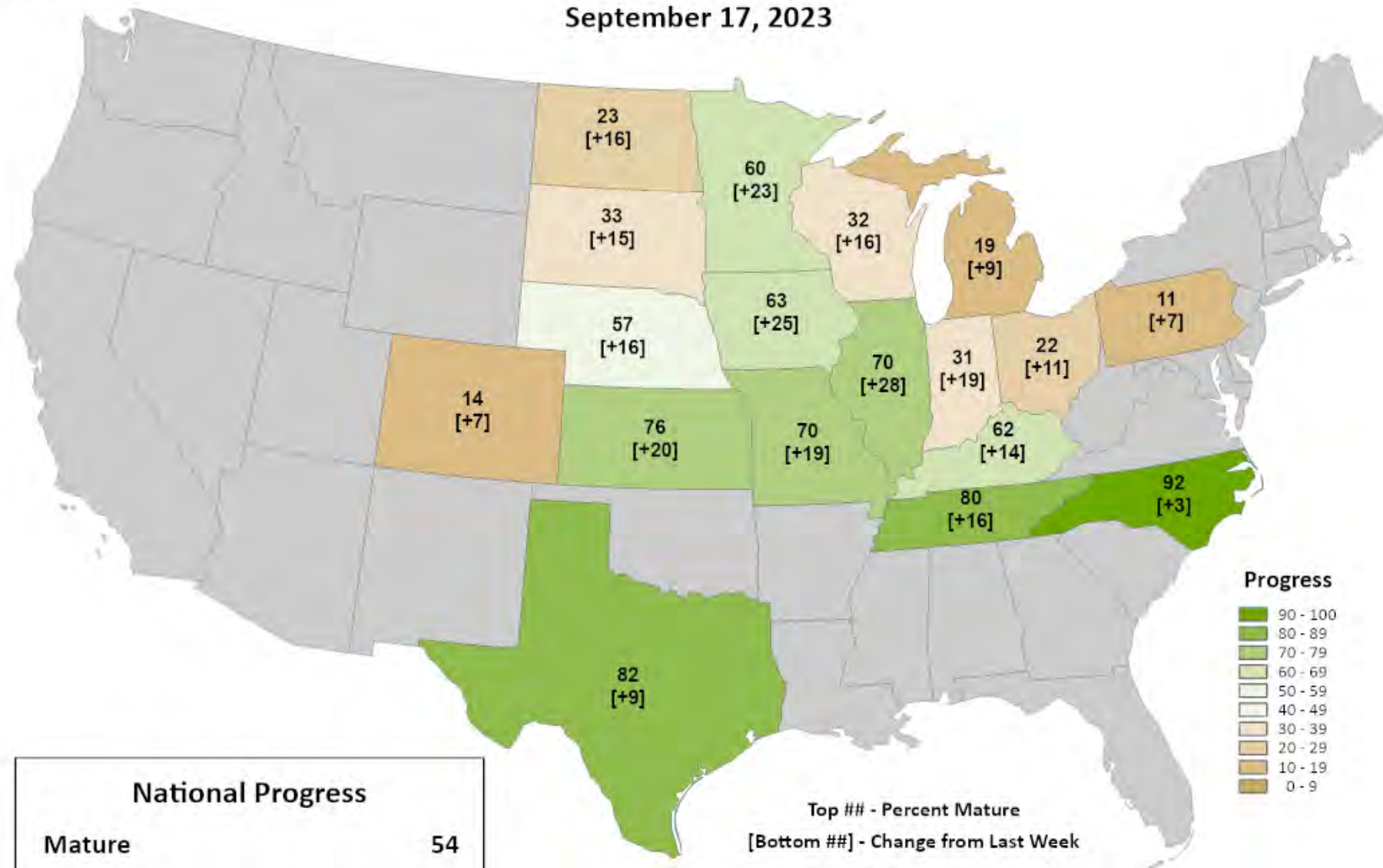
Based on NASS crop progress data.



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.





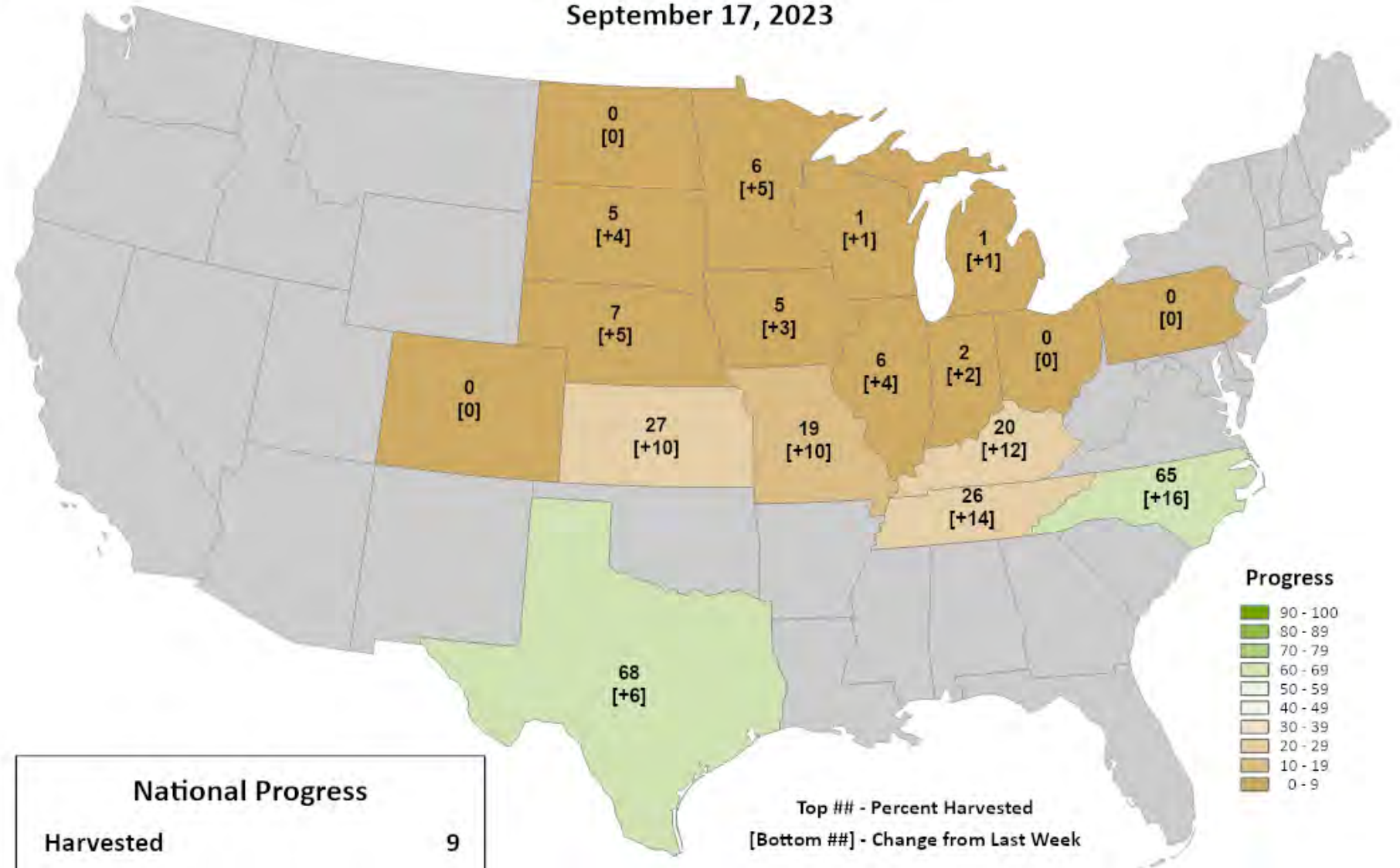
United States
Department of
Agriculture

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

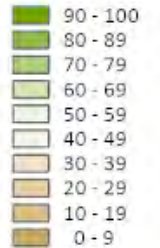
Corn Progress

Percent Harvested

September 17, 2023



Progress



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.





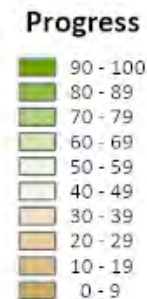
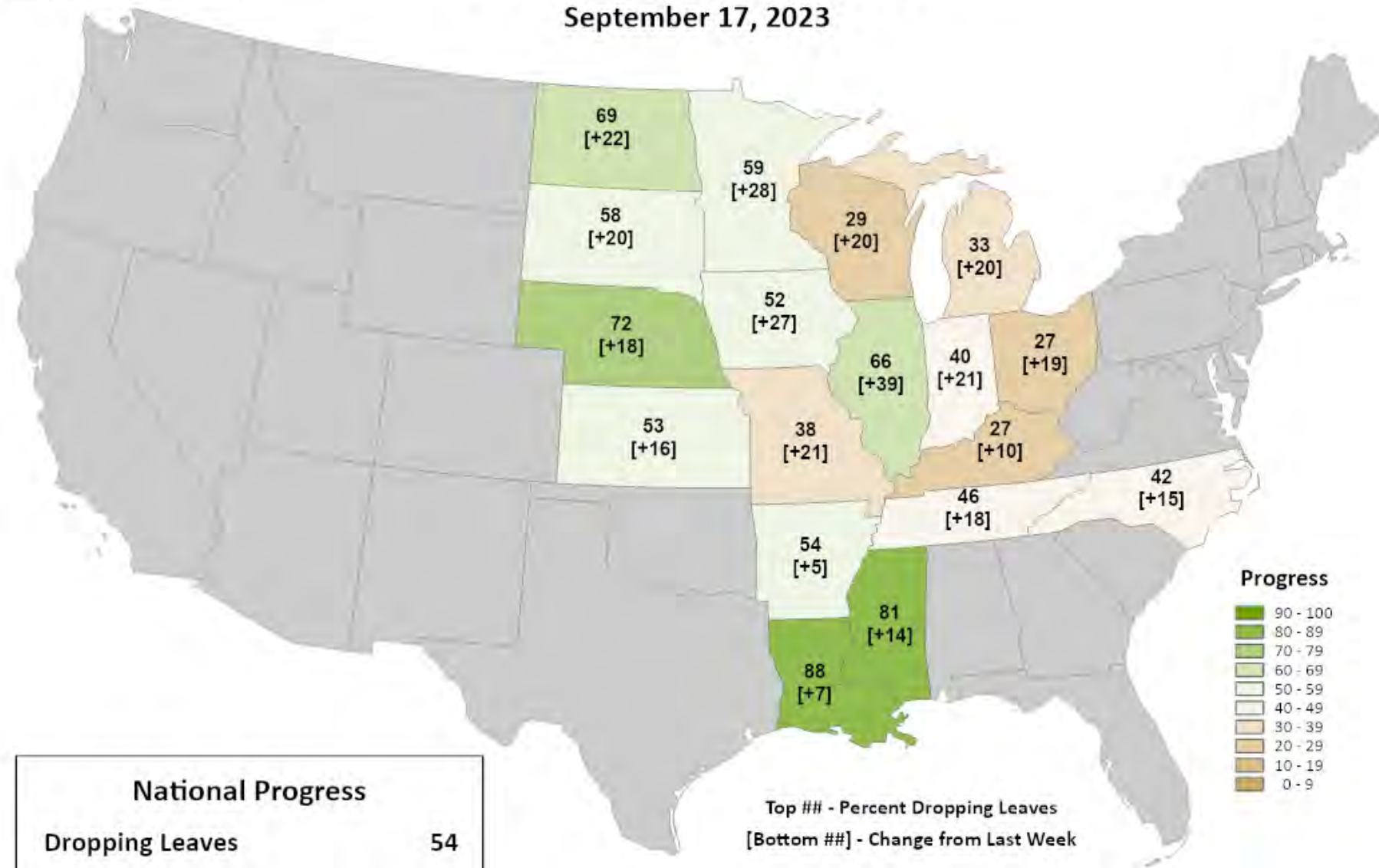
United States
Department of
Agriculture

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

Soybeans Progress

Percent Dropping Leaves

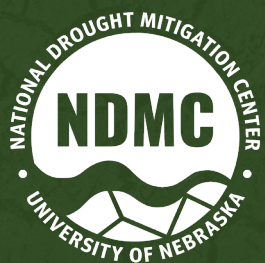
September 17, 2023



National Progress	
Dropping Leaves	54
Change from Last Week	+23

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

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





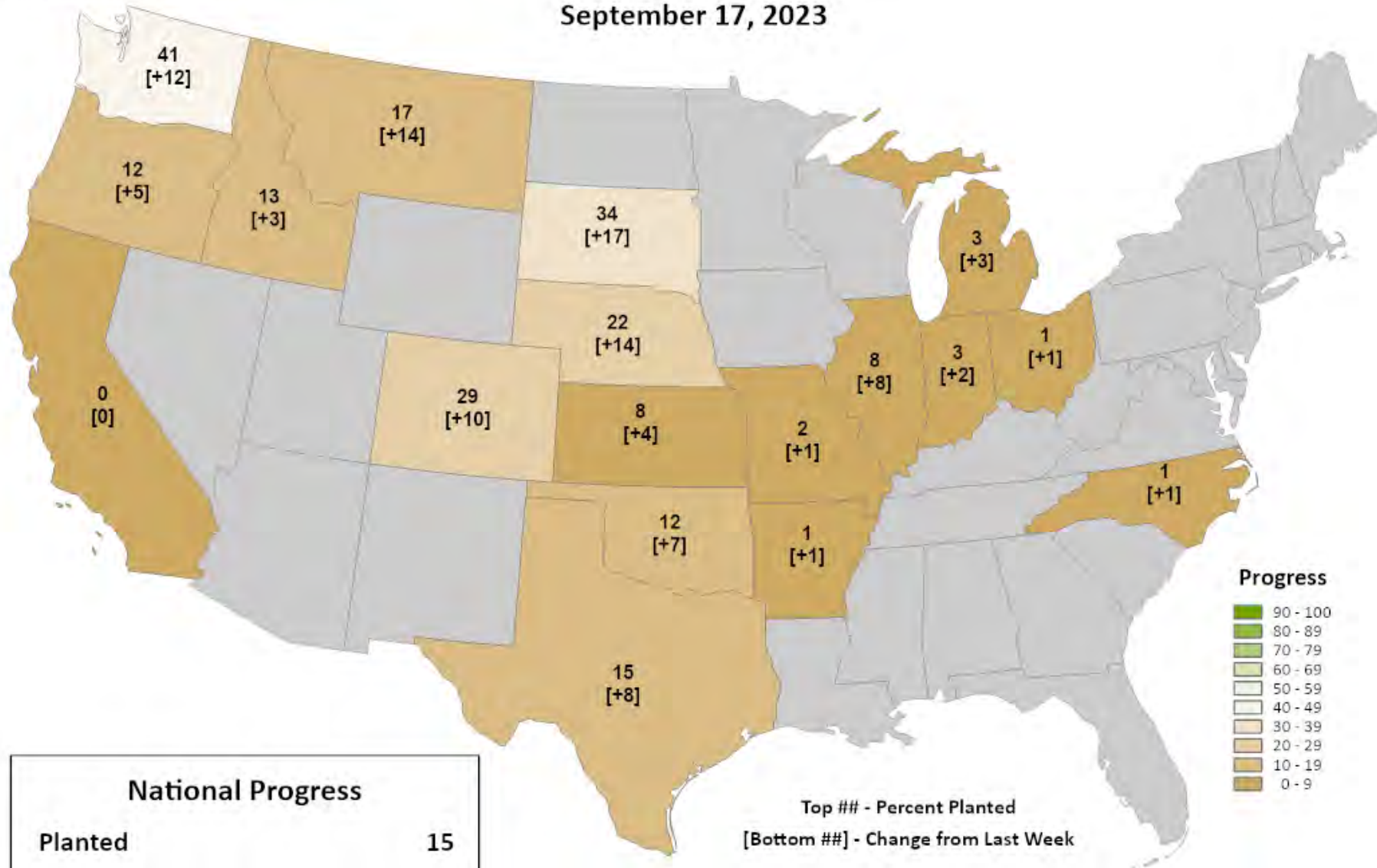
United States
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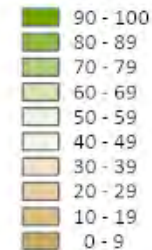
Winter Wheat Progress

Percent Planted

September 17, 2023



Progress



National Progress	
Planted	15
Change from Last Week	+8

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

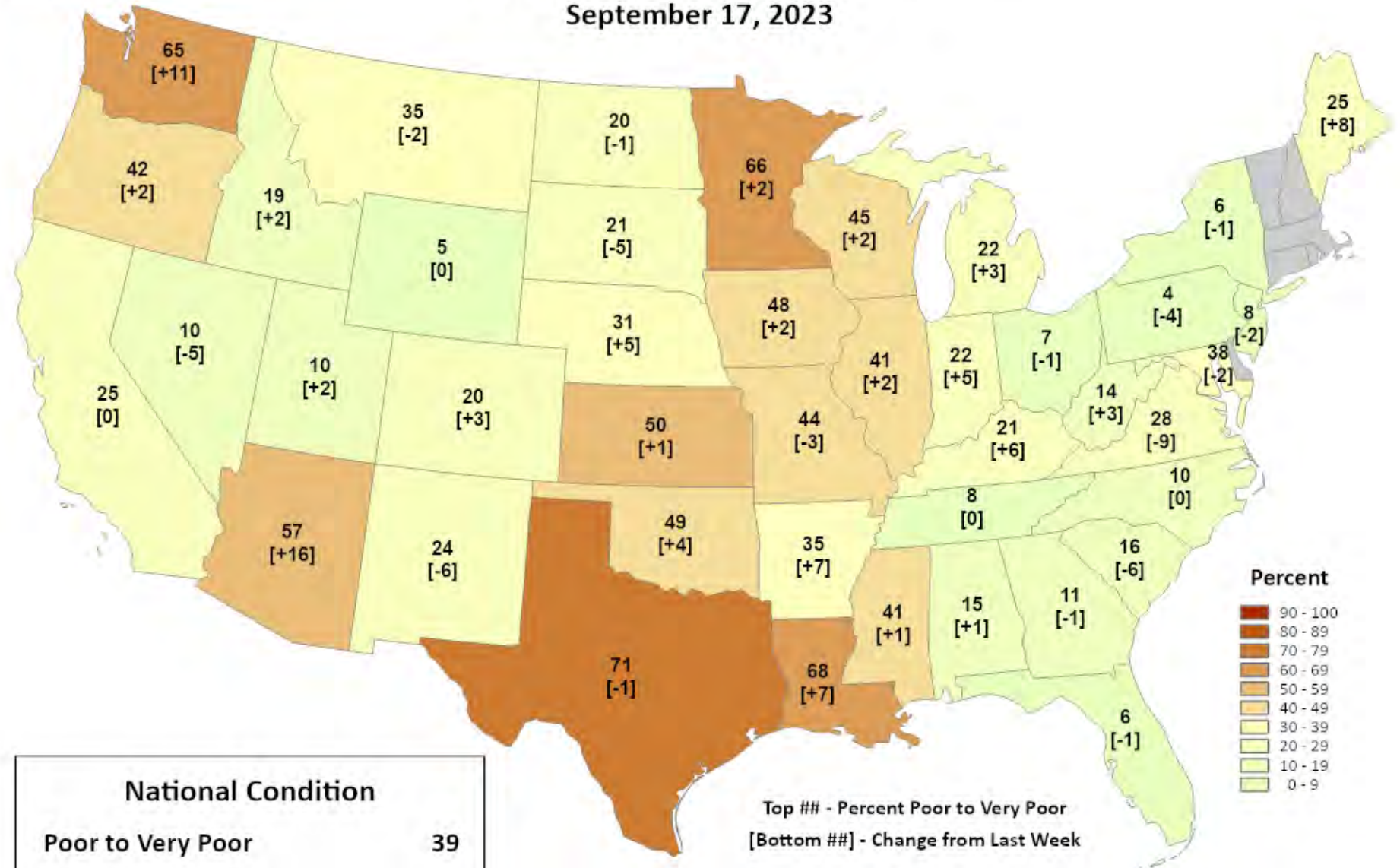
Data obtained from USDA National Agricultural Statistics Service weekly Crop Progress reports.



Pasture and Range Conditions

Percent Poor to Very Poor

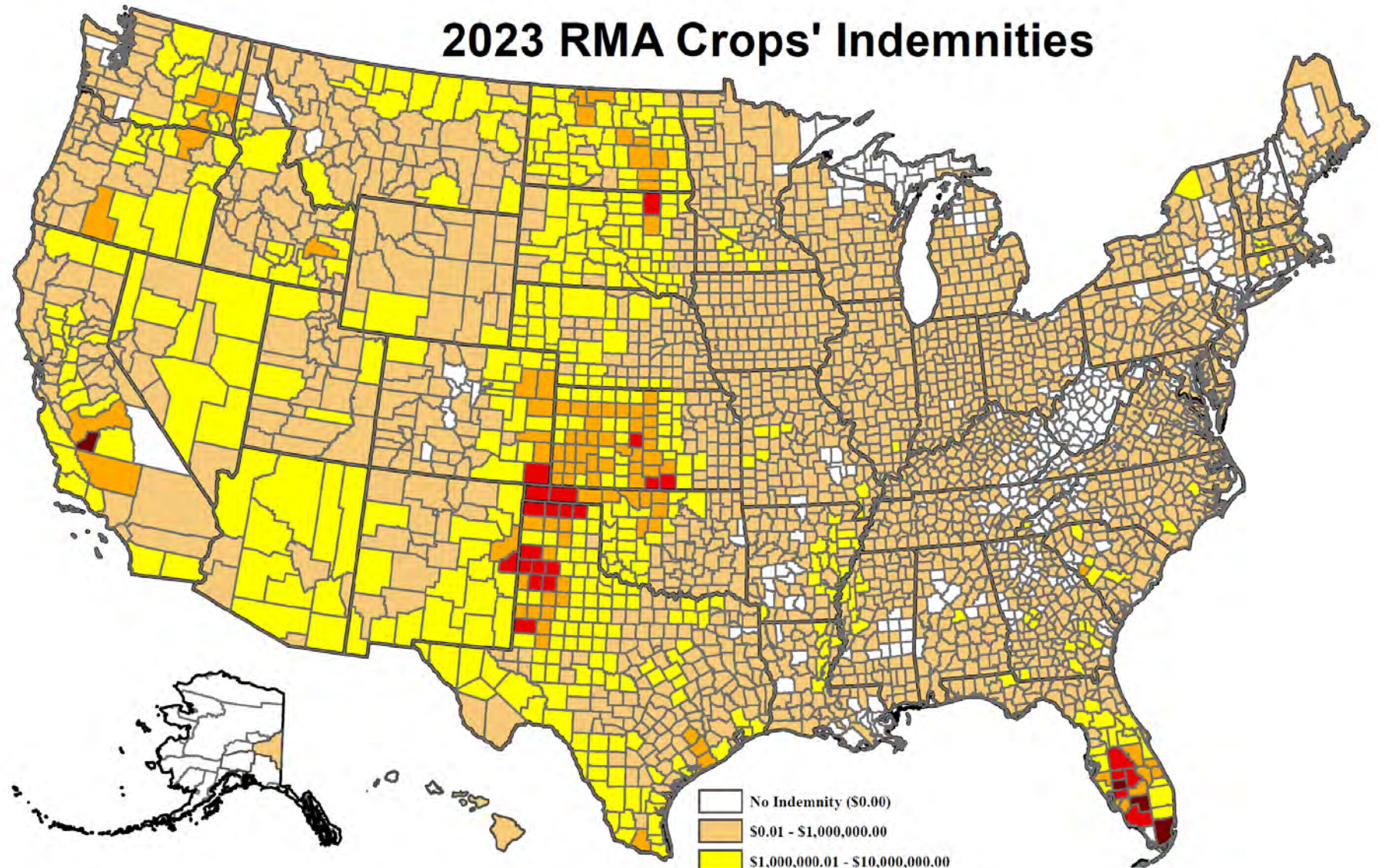
September 17, 2023



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



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

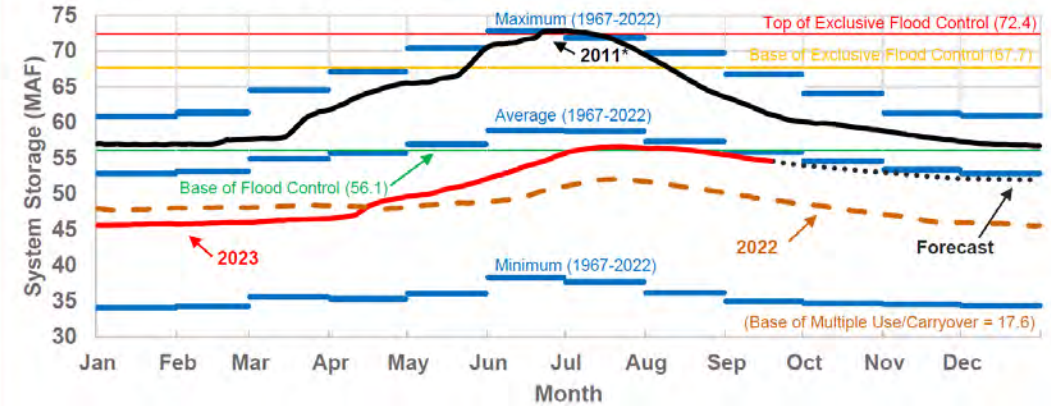
SEPTEMBER 19, 2023



Mainstem Reservoir Status

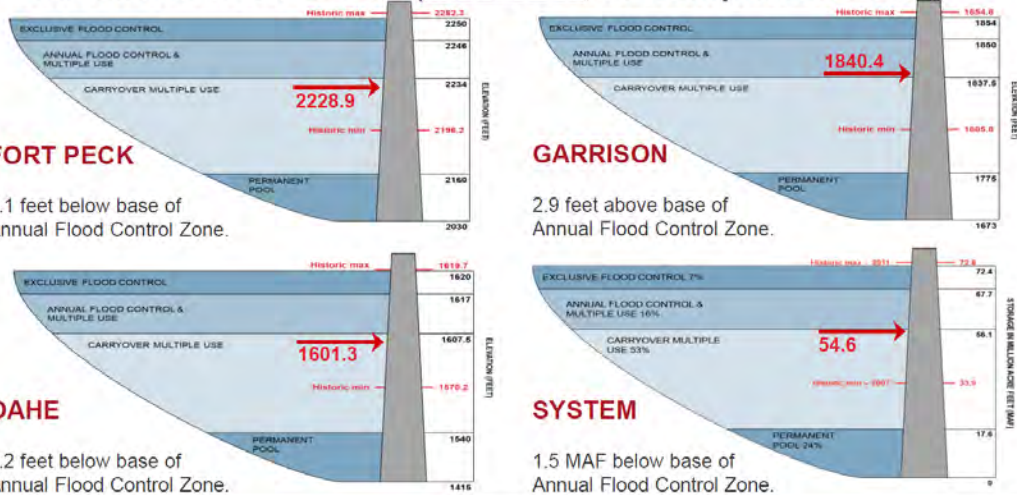
- System storage is 54.6 MAF, 0.3 MAF lower than last week (upper right). For the September monthly study with forecasted pool levels and releases for each mainstem project, [click here](#).
- Gavins Point releases are currently 35,000 cfs. Releases will be adjusted as needed to meet downstream navigation 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

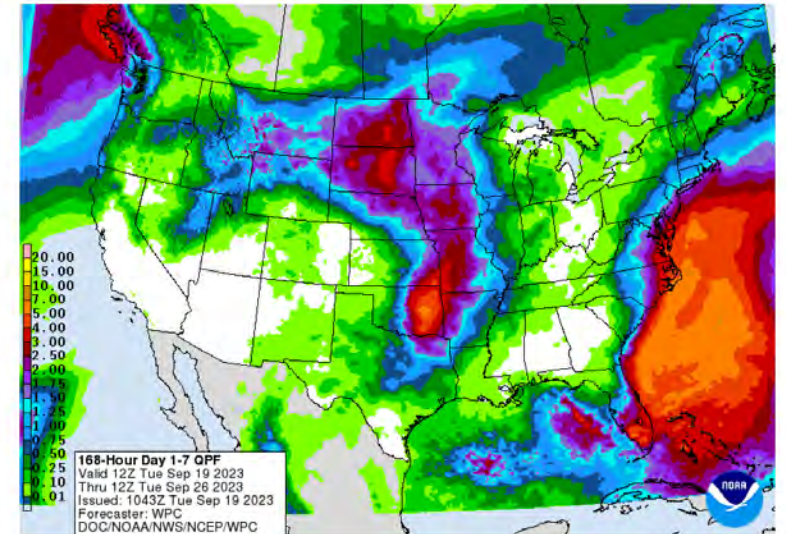


*In January 2011, the Base of Flood Control was 56.8 MAF, and the Top of Exclusive Flood Control was 73.1 MAF

Current Reservoir Levels (Click Here for Comparison Plots)

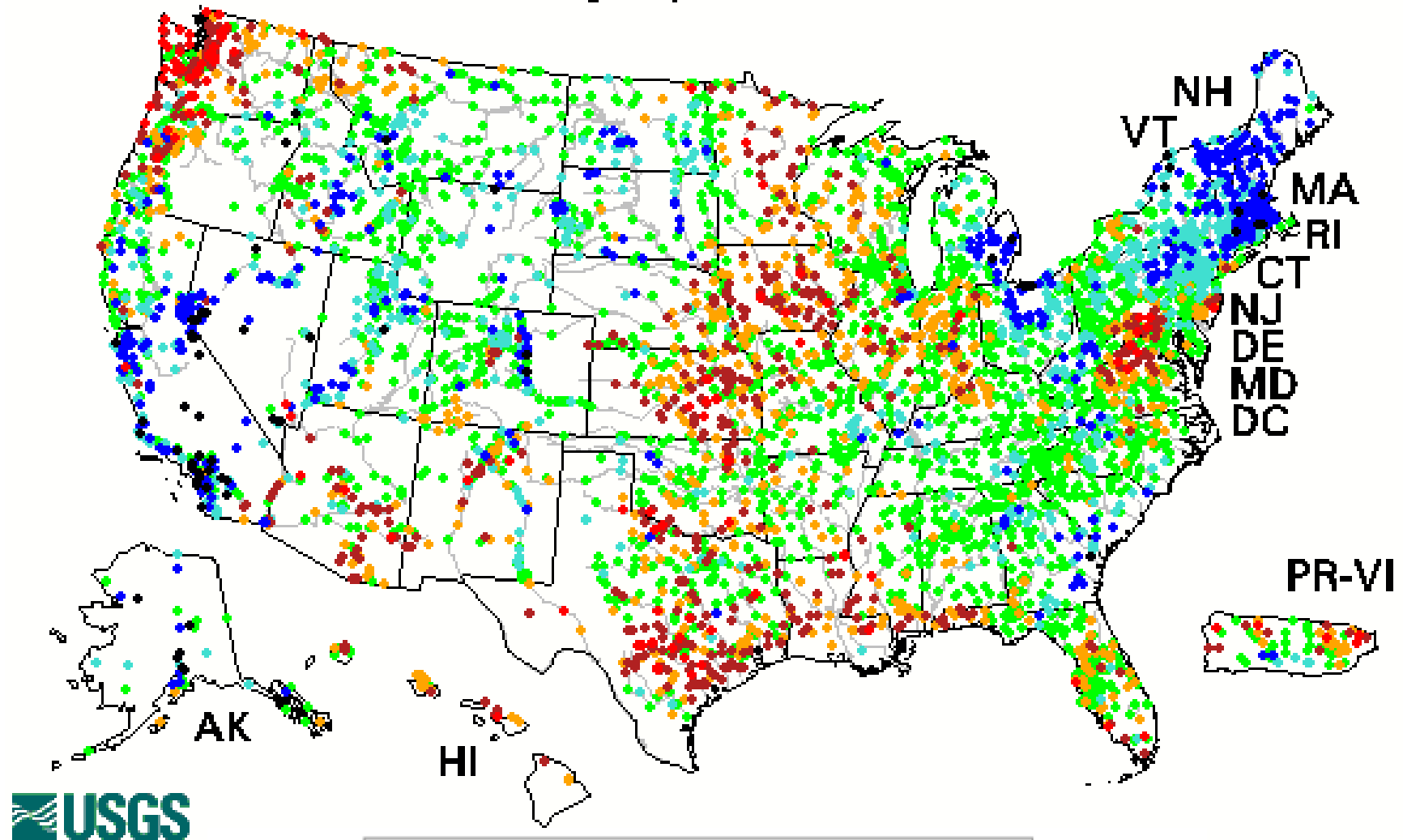


7 Day Total Precipitation Forecast



28-Day Average Streamflow

Tuesday, September 19, 2023



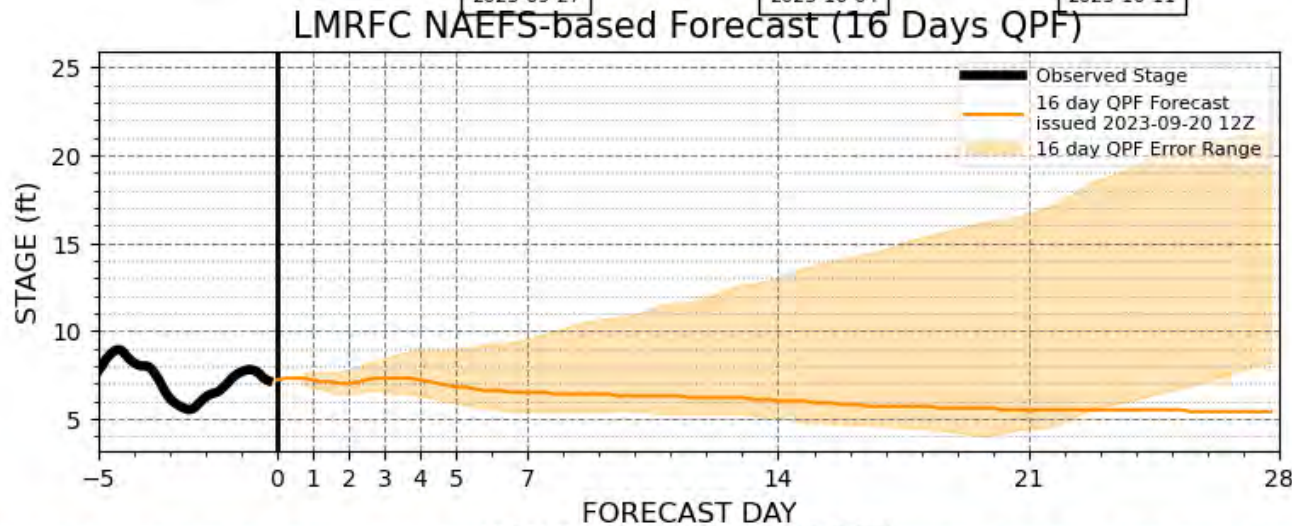
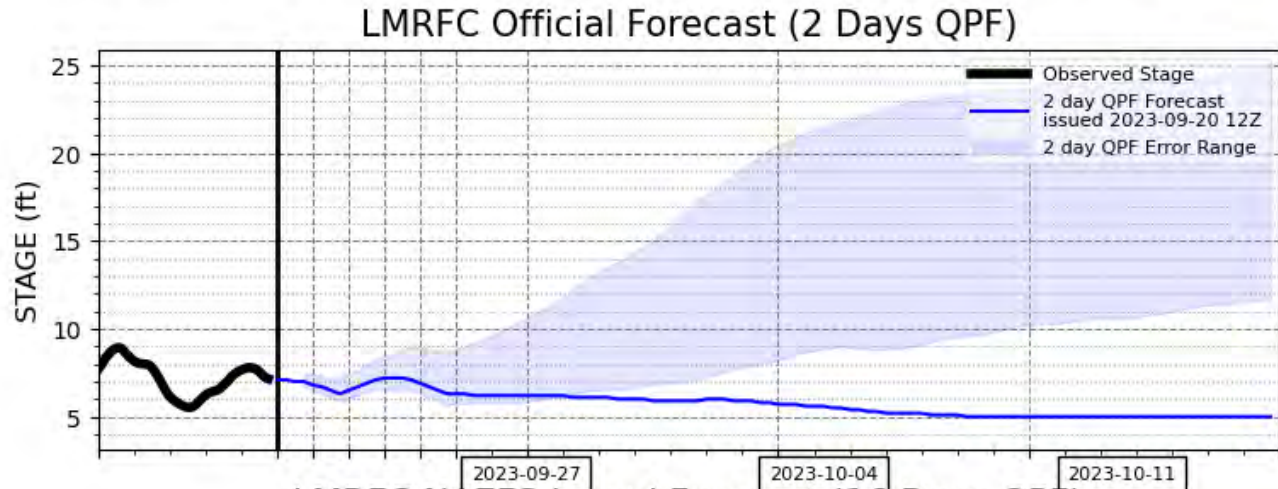
Explanation - Percentile classes						
	●	●	●	●	●	●
	<10	10-24	25-75	76-90	>90	
Low	Much below normal	Below normal	Normal	Above normal	Much above normal	High

<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#

Drought Update



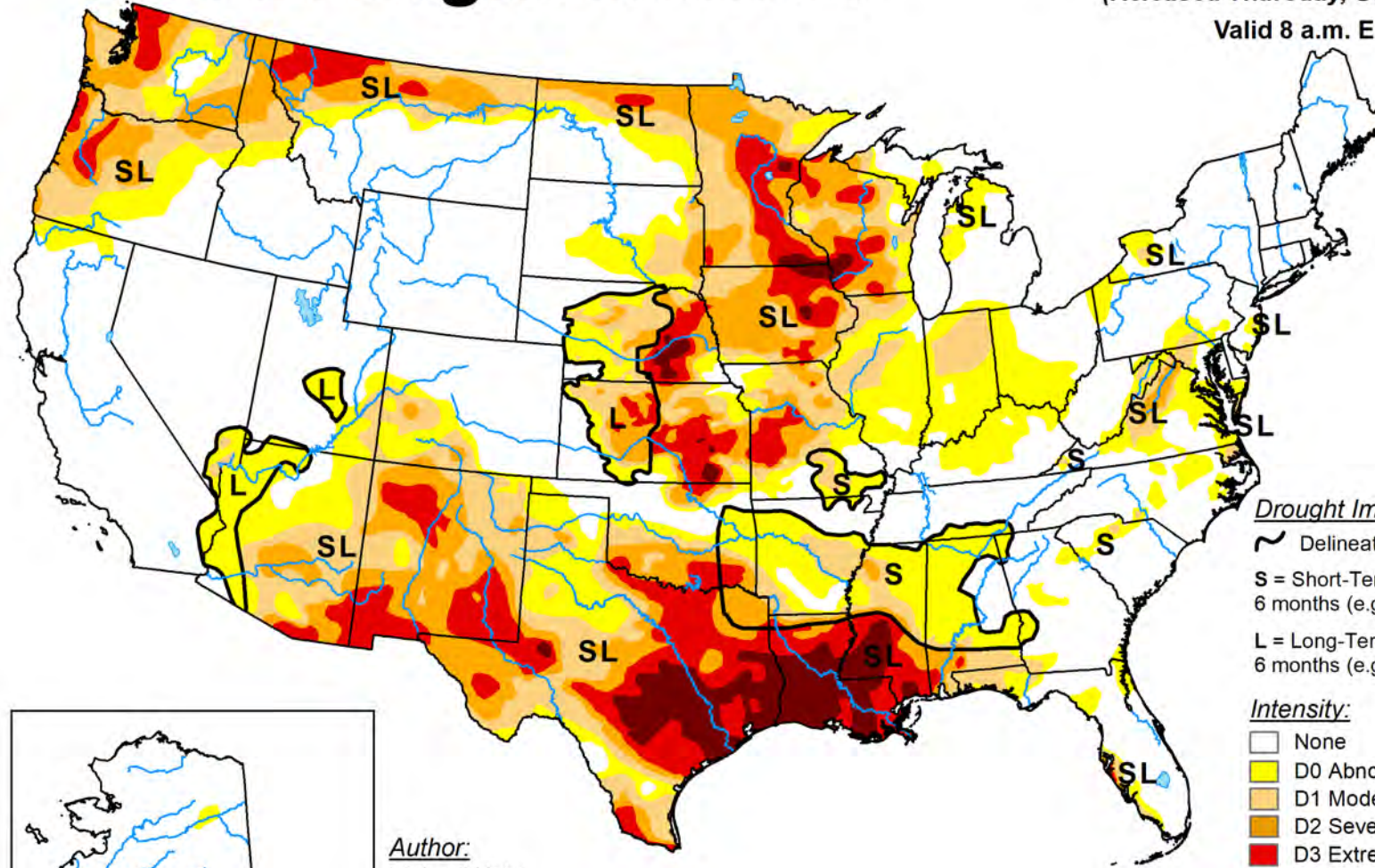
Orange sunset from Doug Kluck



U.S. Drought Monitor

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

Valid 8 a.m. EDT

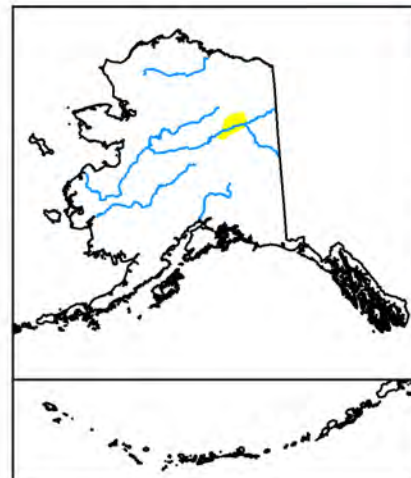


Drought Impact Types:

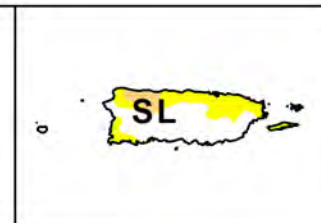
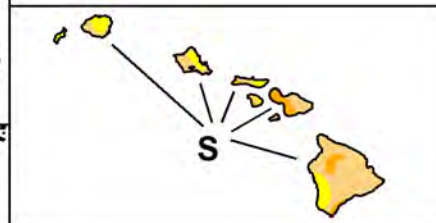
- ~ Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

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

Statistics

Statistics type: Cumulative Percent Area

Export Table

View More Statistics

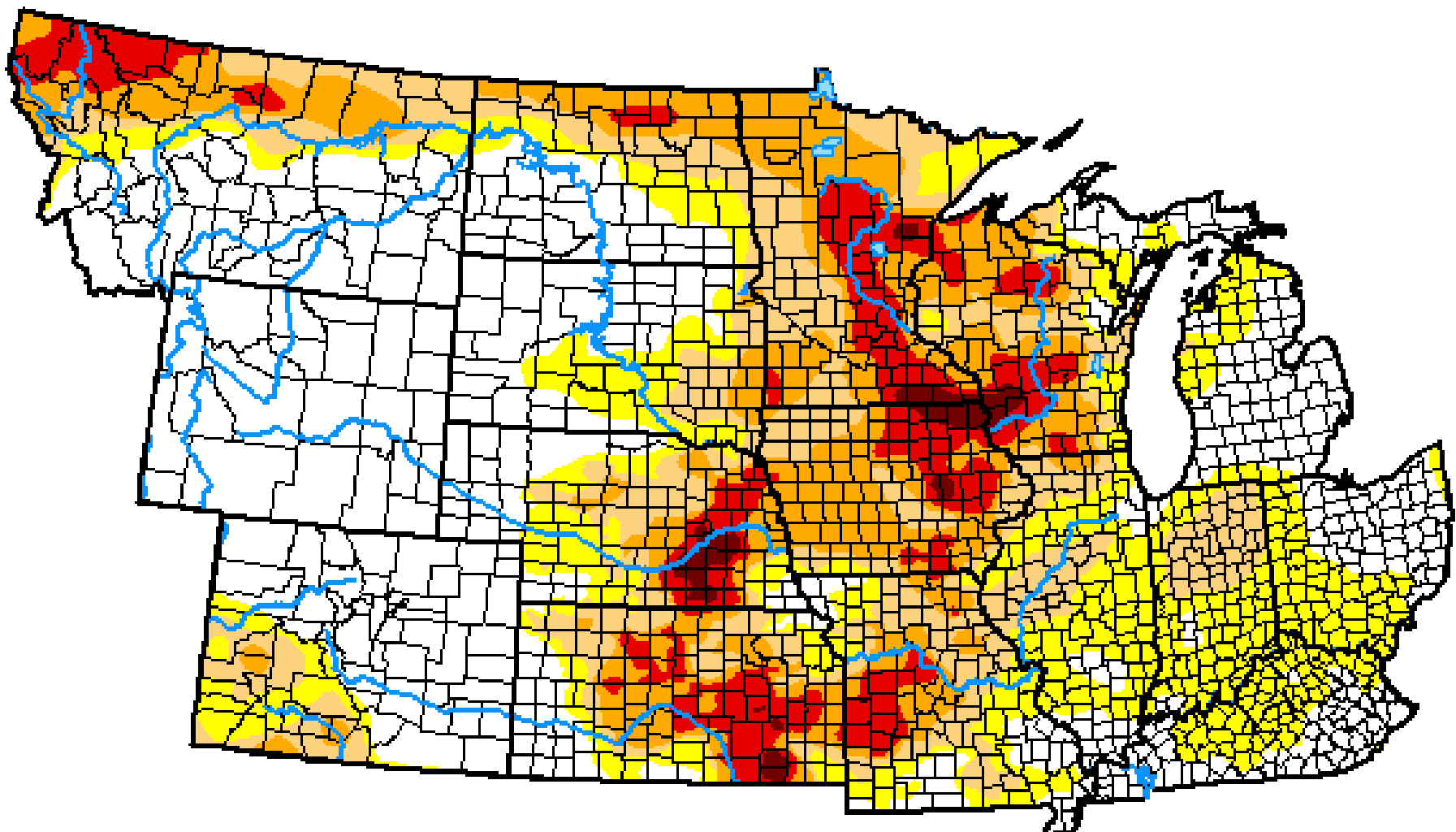
Week	Date	None	D0-D4	D1-D4	D2-D4	D3-D4	D4	DSCI
Current	2023-09-19	53.18	46.82	31.71	19.63	9.44	2.52	110
Last Week to Current	2023-09-12	55.18	44.82	31.10	19.32	8.00	1.98	105
3 Months Ago to Current	2023-06-20	53.06	46.94	22.67	6.69	2.06	0.47	79
Start of Calendar Year to Current	2022-12-27	38.05	61.95	41.50	23.58	8.99	1.96	138
Start of Water Year to Current	2022-09-27	36.92	63.08	42.65	25.36	10.45	2.14	144
One Year Ago to Current	2022-09-20	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
Current	41.23	58.77	39.47	23.31	8.94	1.04
Last Week 09-12-2023	44.65	55.35	38.64	23.10	8.18	0.39
3 Months Ago 06-20-2023	30.29	69.71	42.21	16.52	5.82	1.35
Start of Calendar Year 01-03-2023	25.76	74.24	48.98	24.27	9.90	3.48
Start of Water Year 09-27-2022	27.00	73.00	47.70	23.08	8.80	2.73
One Year Ago 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>

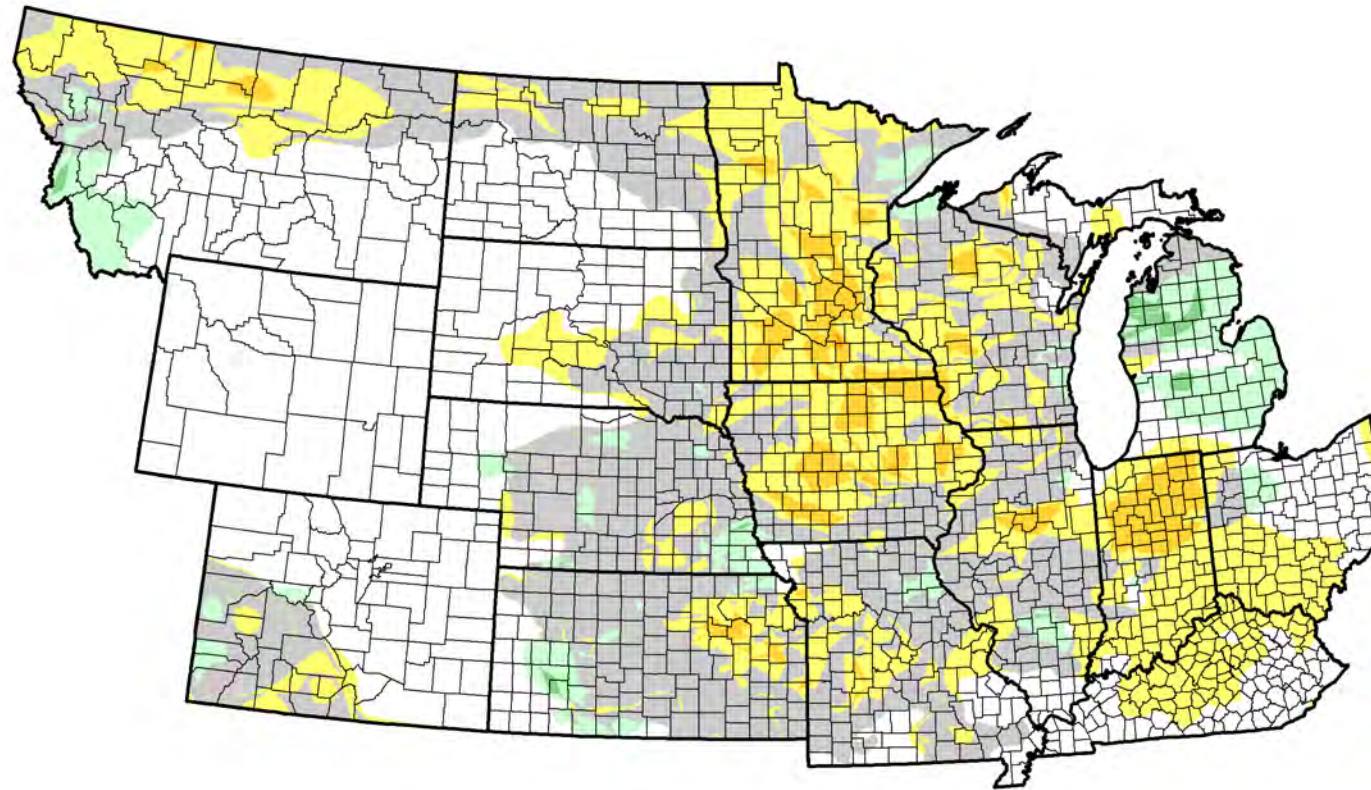
Author:

Richard Heim
NCEI/NOAA



droughtmonitor.unl.edu

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

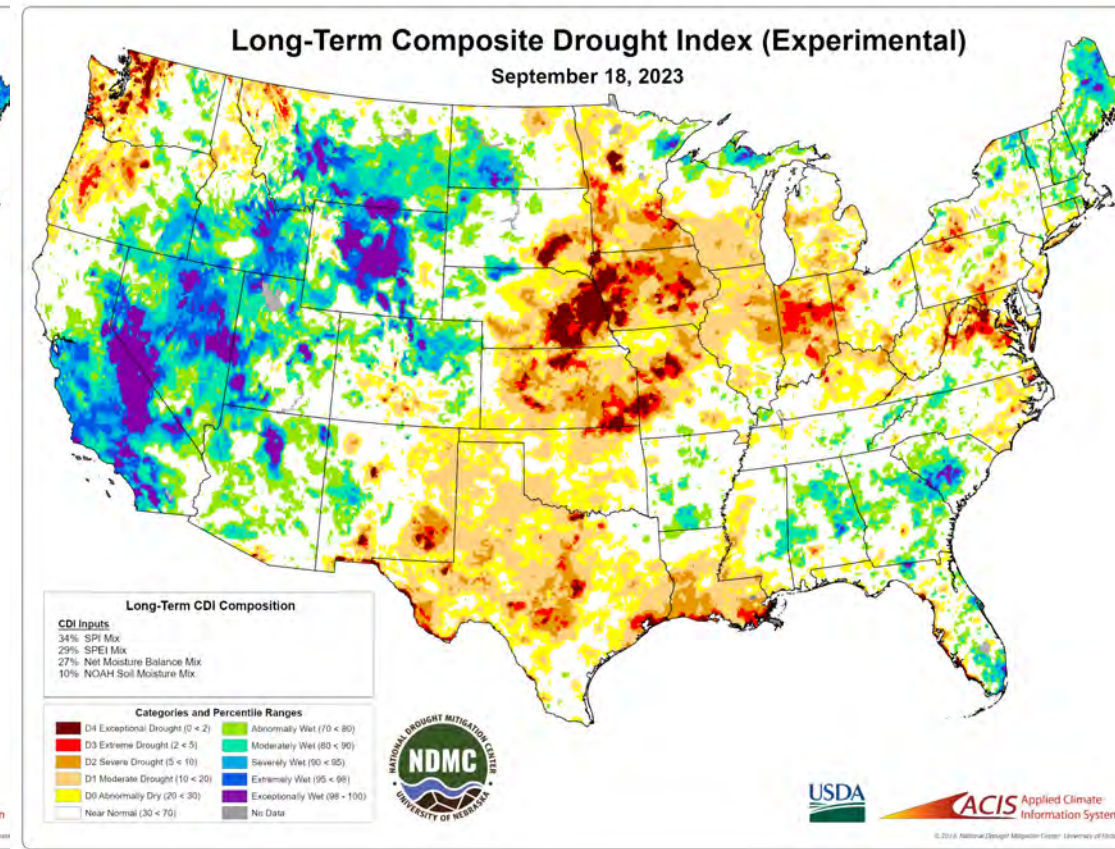
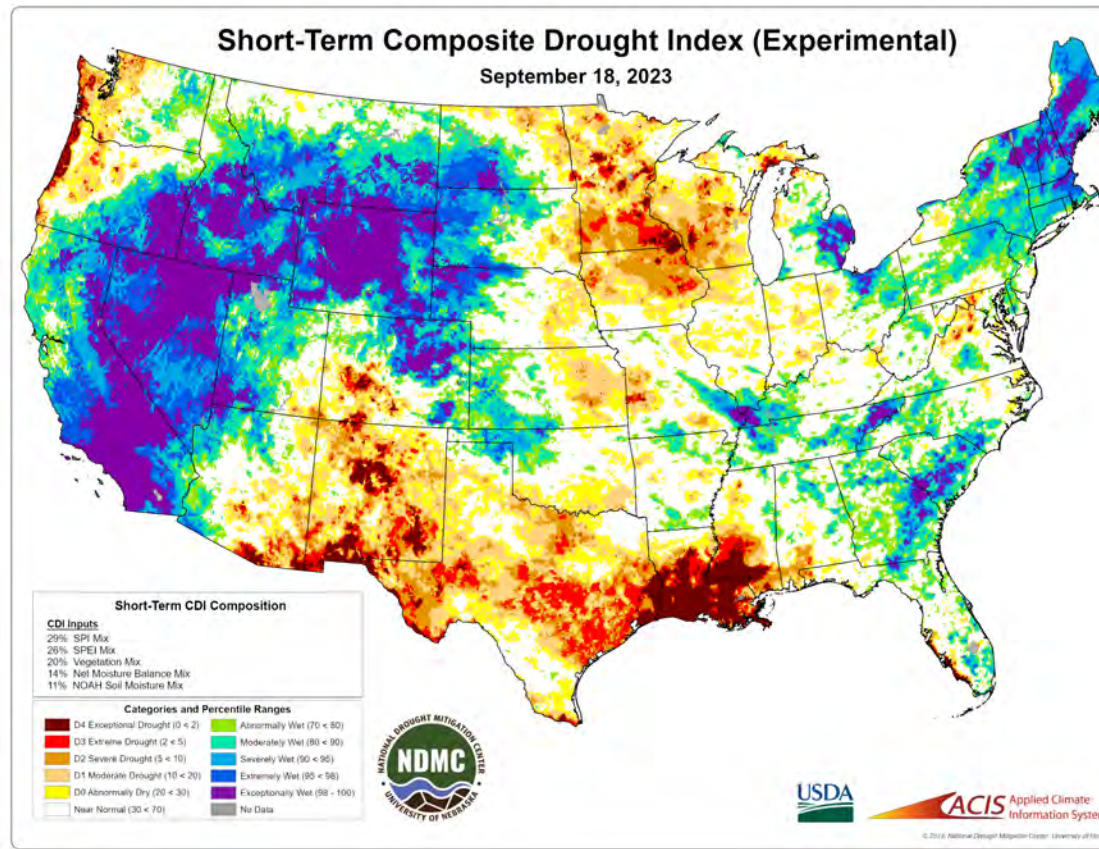
<https://droughtmonitor.unl.edu/Maps/ChangeMaps.aspx>

September 19, 2023
compared to
August 15, 2023

droughtmonitor.unl.edu



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



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

Climate Outlooks

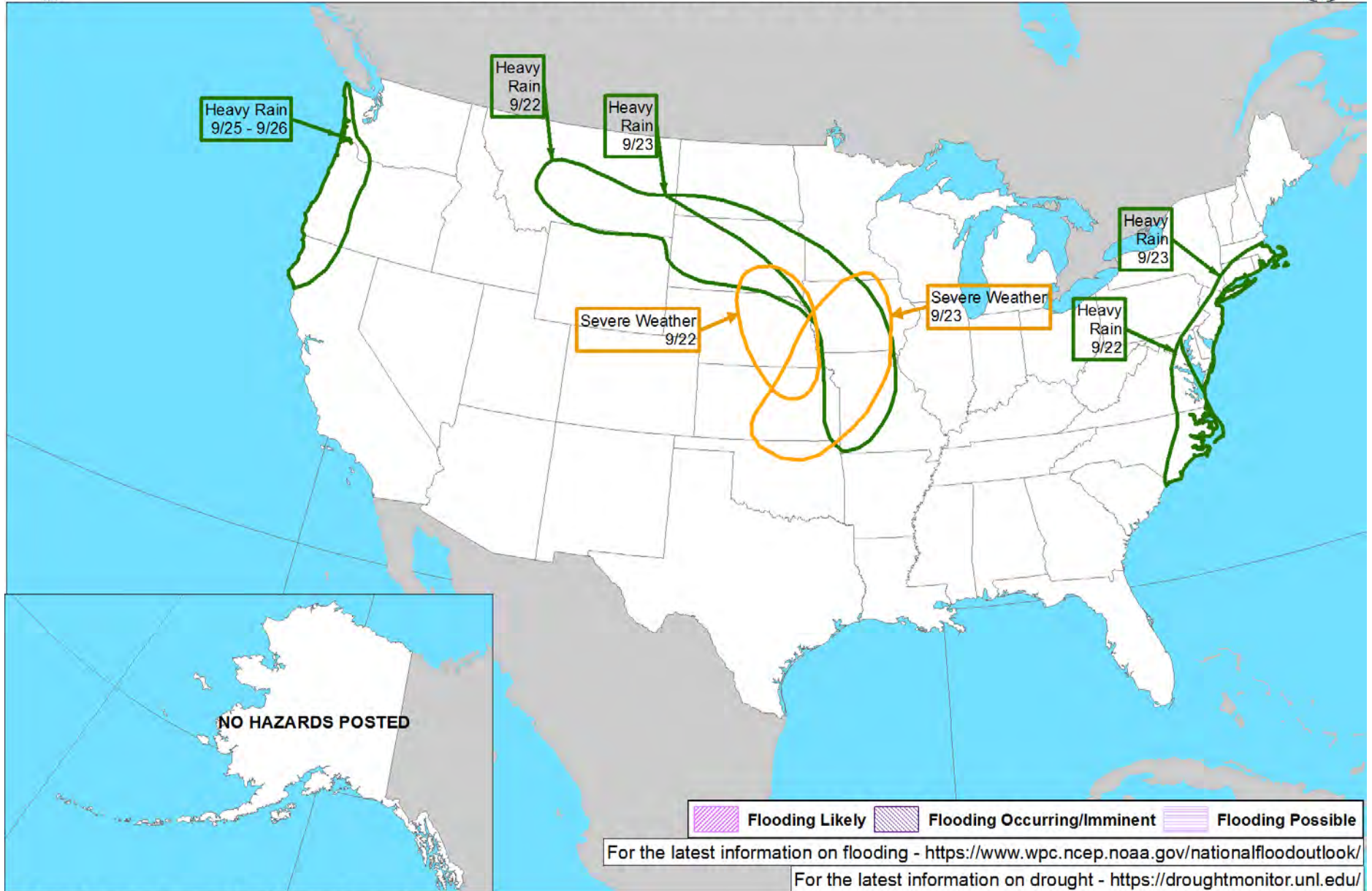
- **7-day precipitation forecast**
- **8-14 day outlook**
- **Monthly Outlook**
- **Autumn Outlook (Sep-Nov)**
- **Winter Outlook (Dec-Feb)**
- **Seasonal Drought Outlook**





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

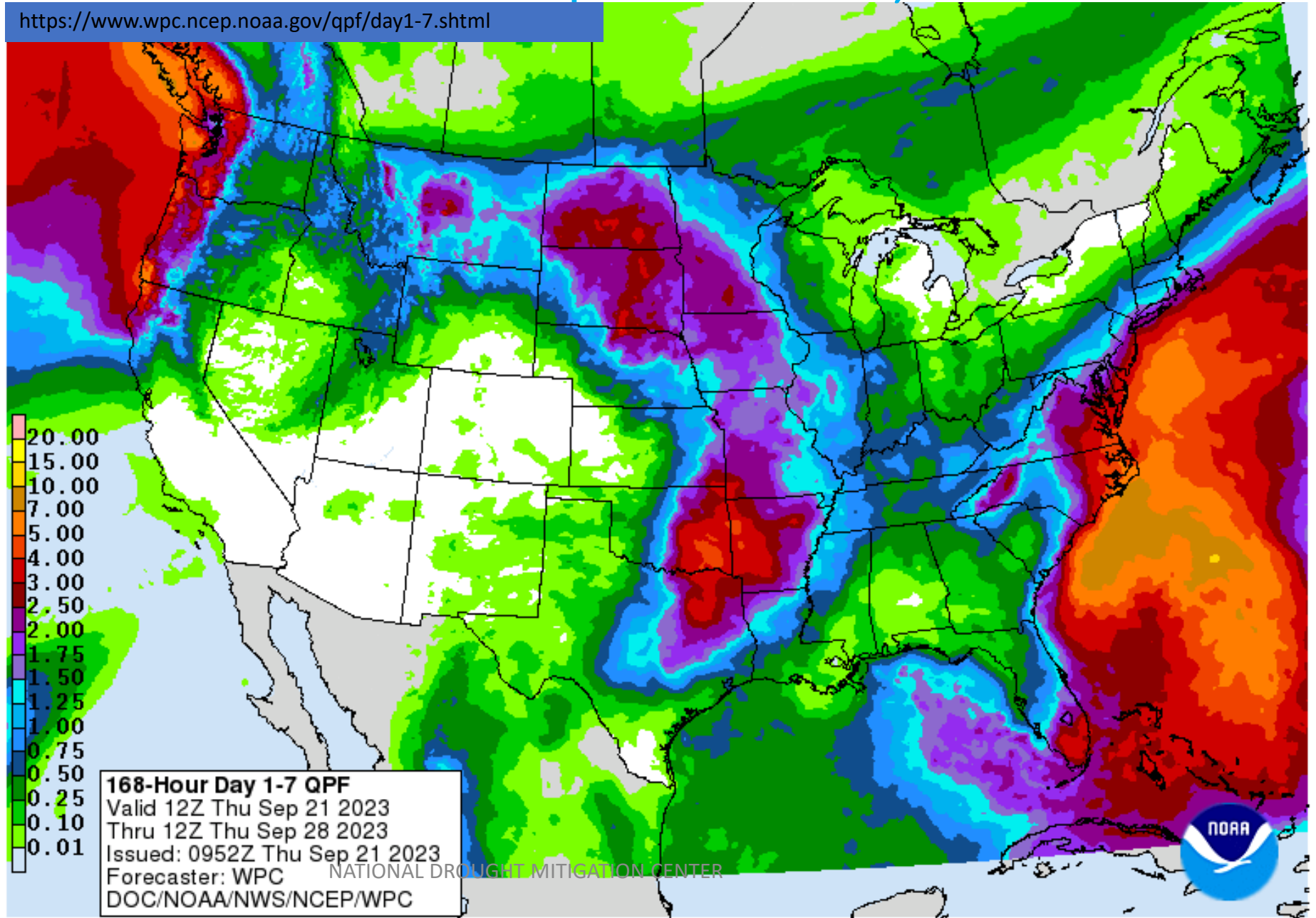
Follow us:

www.wpc.ncep.noaa.gov



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

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



8-14 day outlook for September 28-October 4, 2023

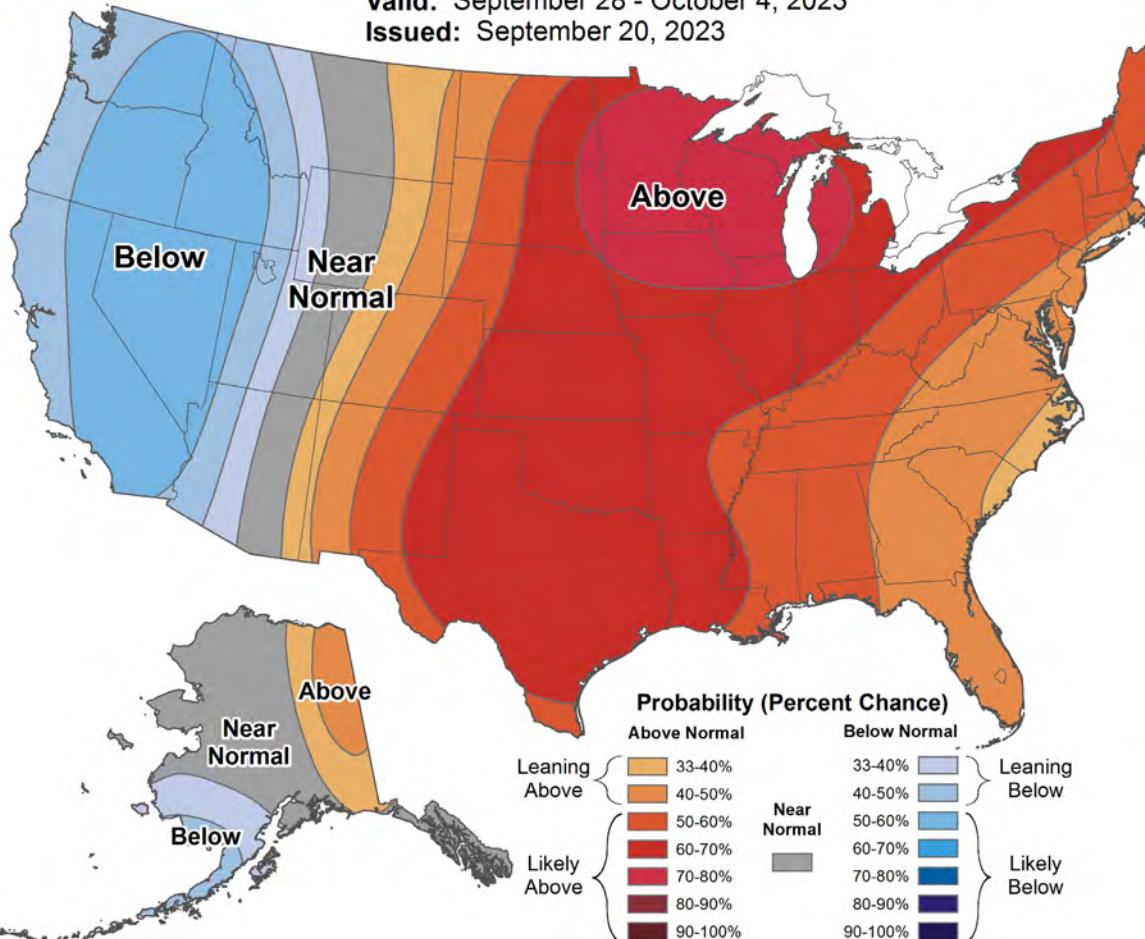
<http://www.cpc.ncep.noaa.gov/products/predictions/814day/>



8-14 Day Temperature Outlook



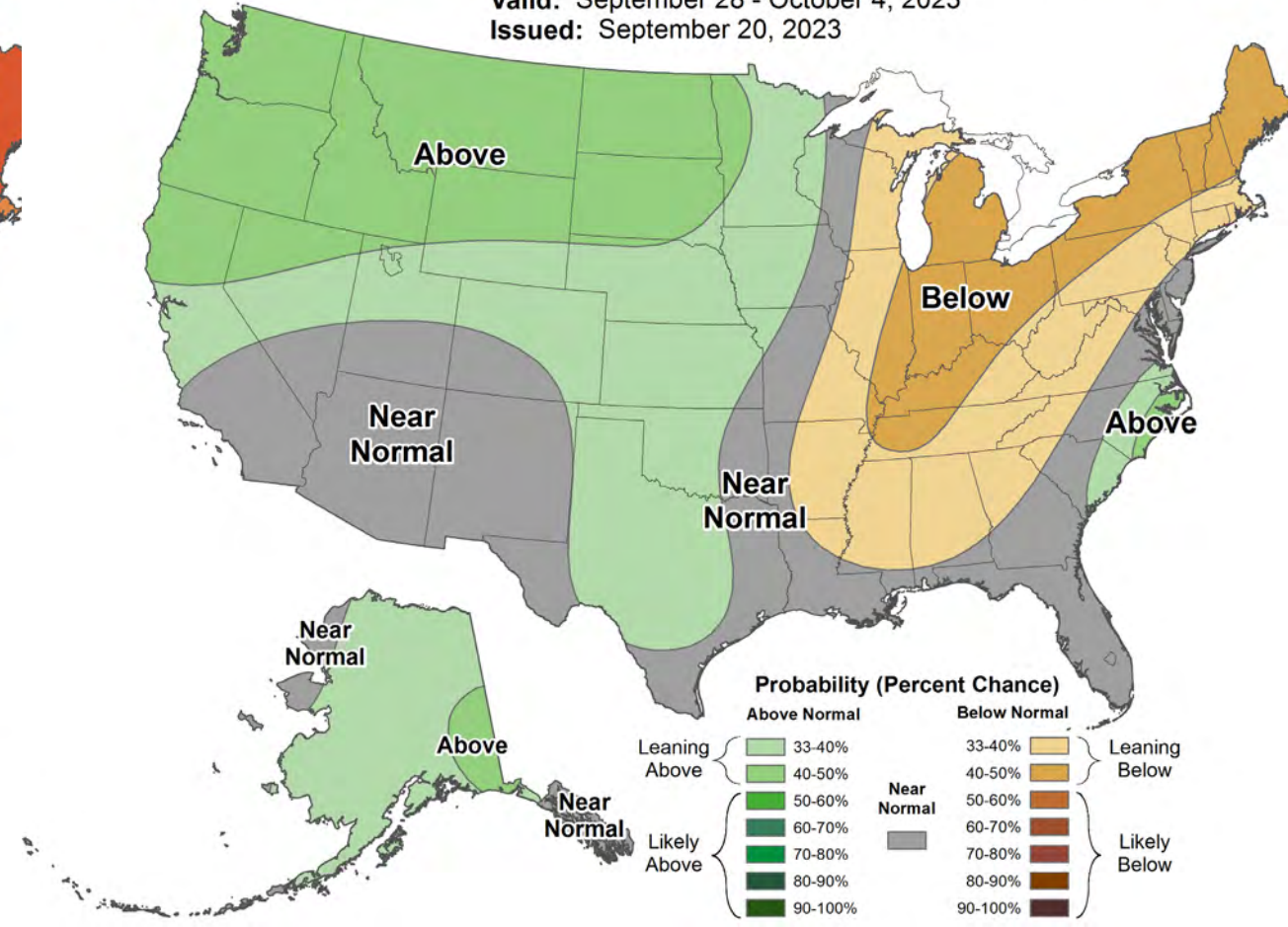
Valid: September 28 - October 4, 2023
Issued: September 20, 2023



8-14 Day Precipitation Outlook



Valid: September 28 - October 4, 2023
Issued: September 20, 2023



Monthly Outlook for October 2023

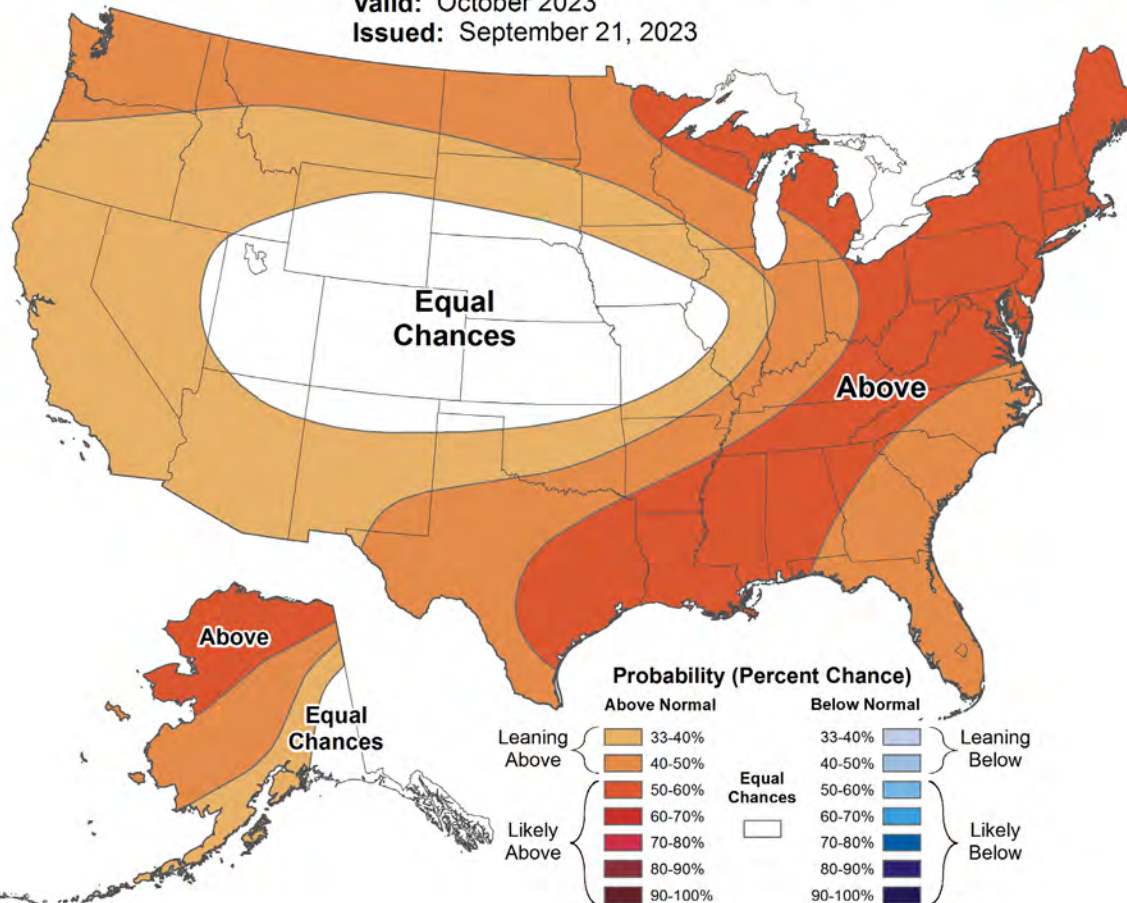
<https://www.cpc.ncep.noaa.gov/products/predictions/30day/>



Monthly Temperature Outlook



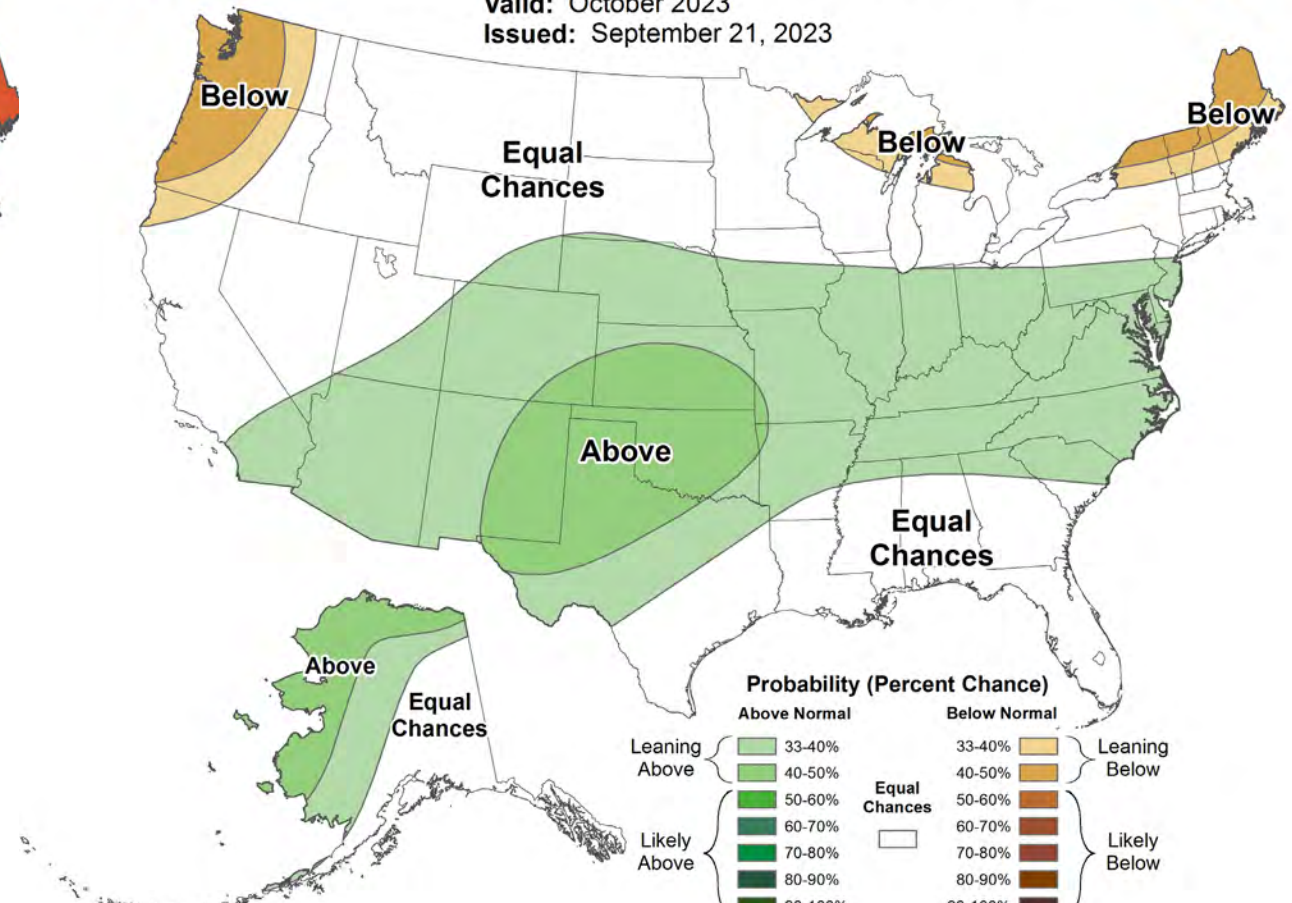
Valid: October 2023
Issued: September 21, 2023



Monthly Precipitation Outlook



Valid: October 2023
Issued: September 21, 2023



3-month Outlook (October-December 2023)

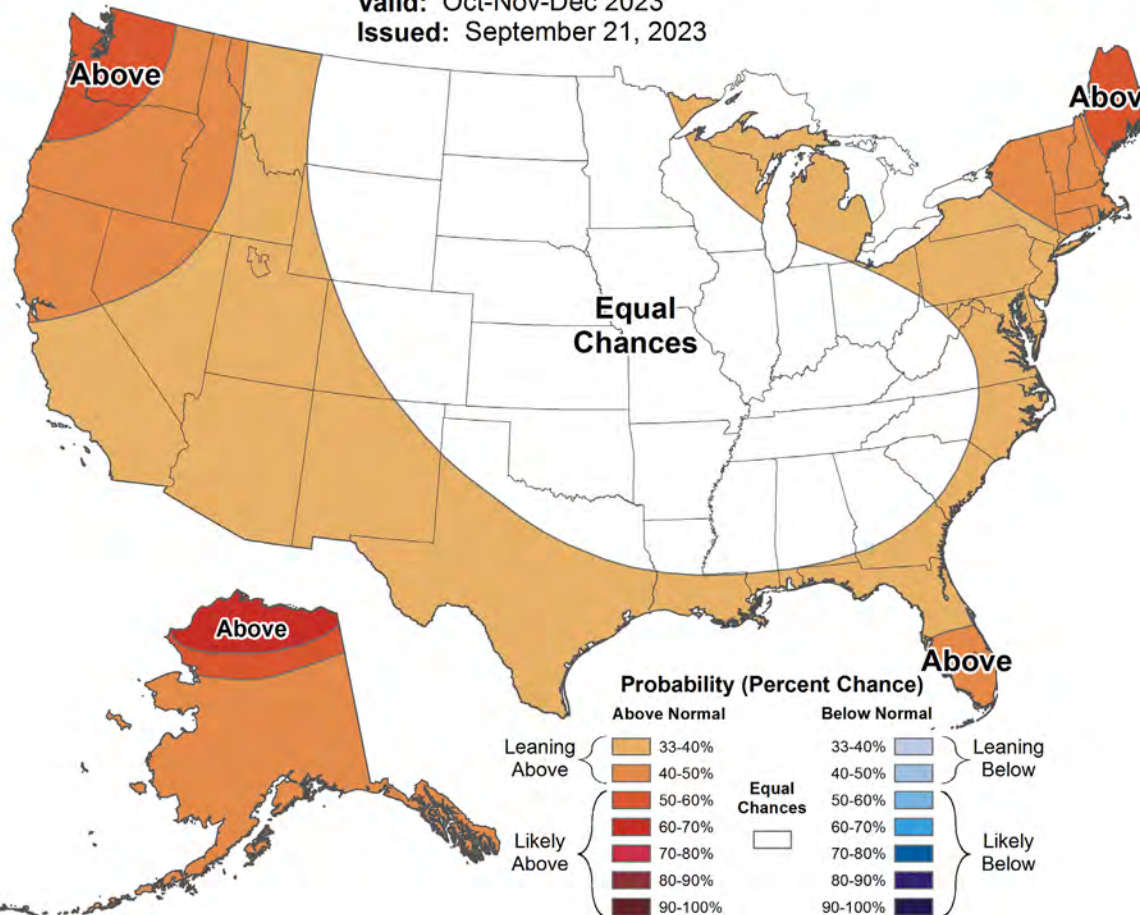
<https://www.cpc.ncep.noaa.gov/products/predictions/90day/>



Seasonal Temperature Outlook



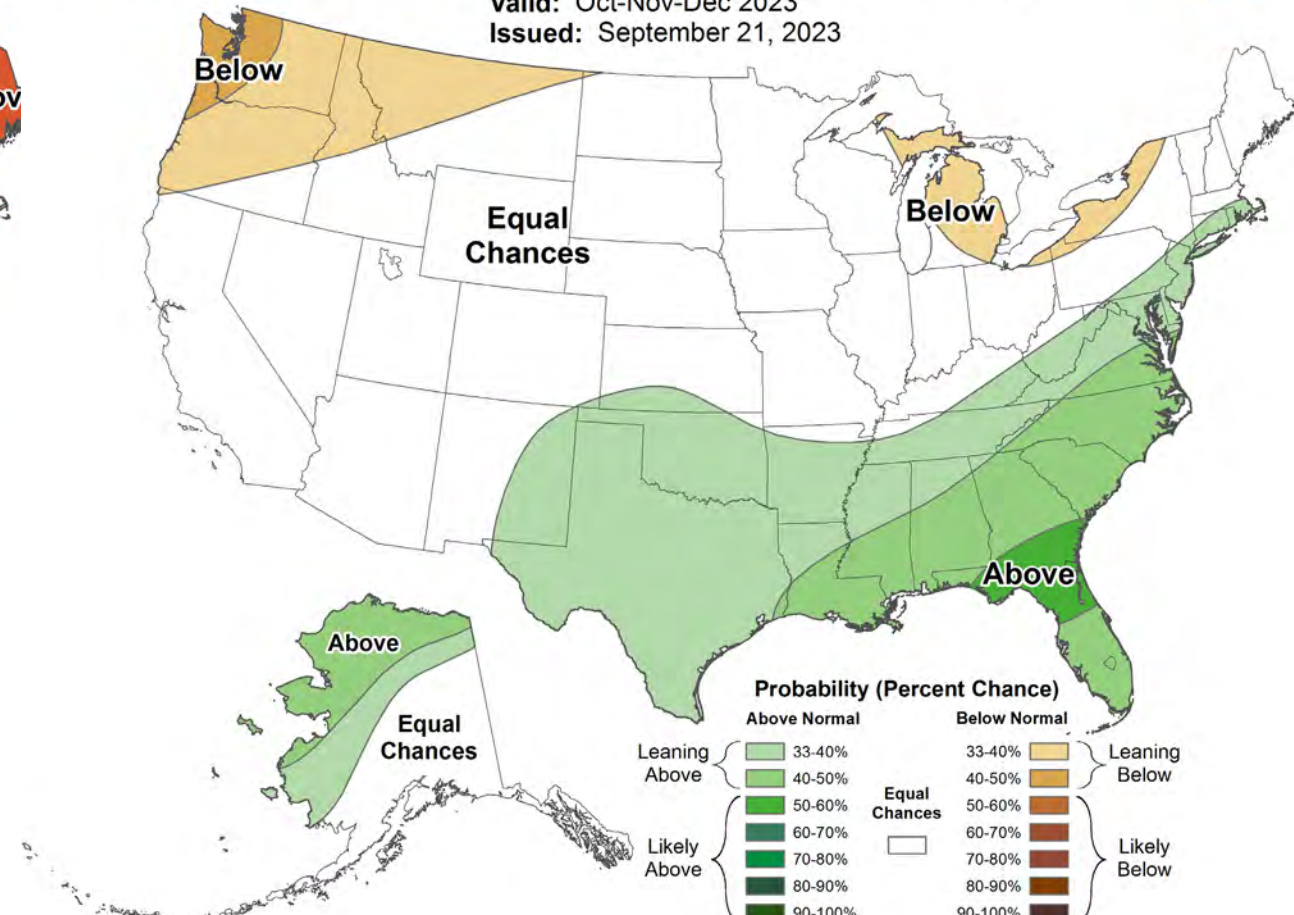
Valid: Oct-Nov-Dec 2023
Issued: September 21, 2023



Seasonal Precipitation Outlook



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



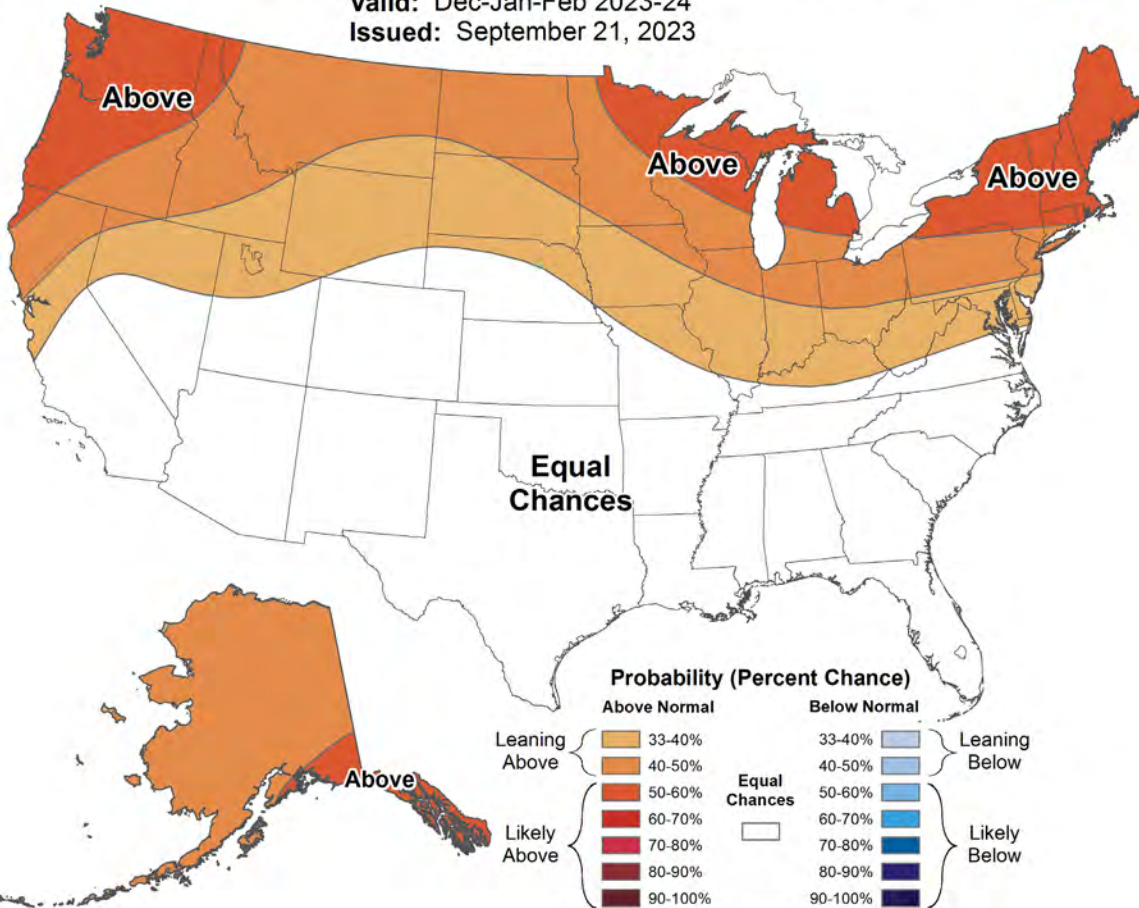
Winter Outlook

December 2023 to February 2024



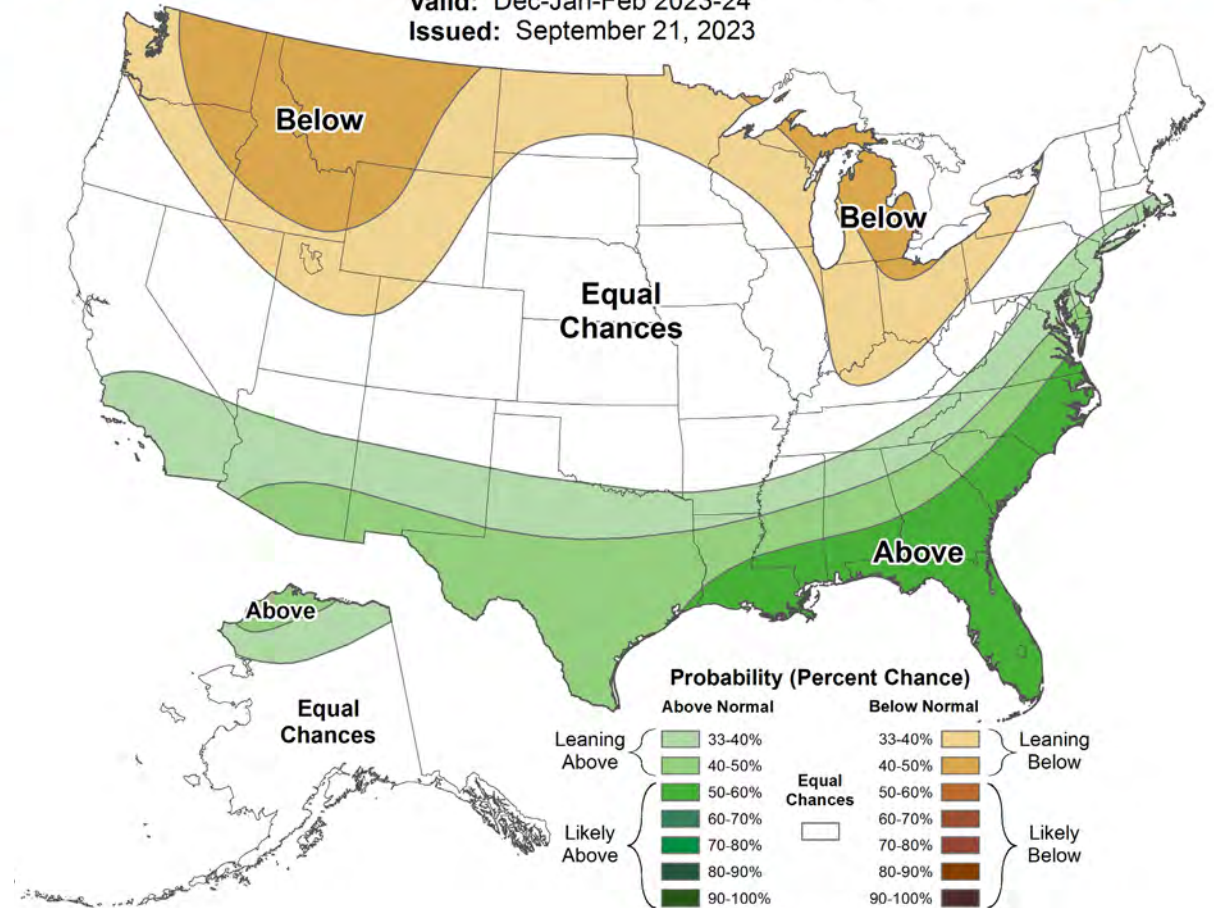
Seasonal Temperature Outlook

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



Seasonal Precipitation Outlook

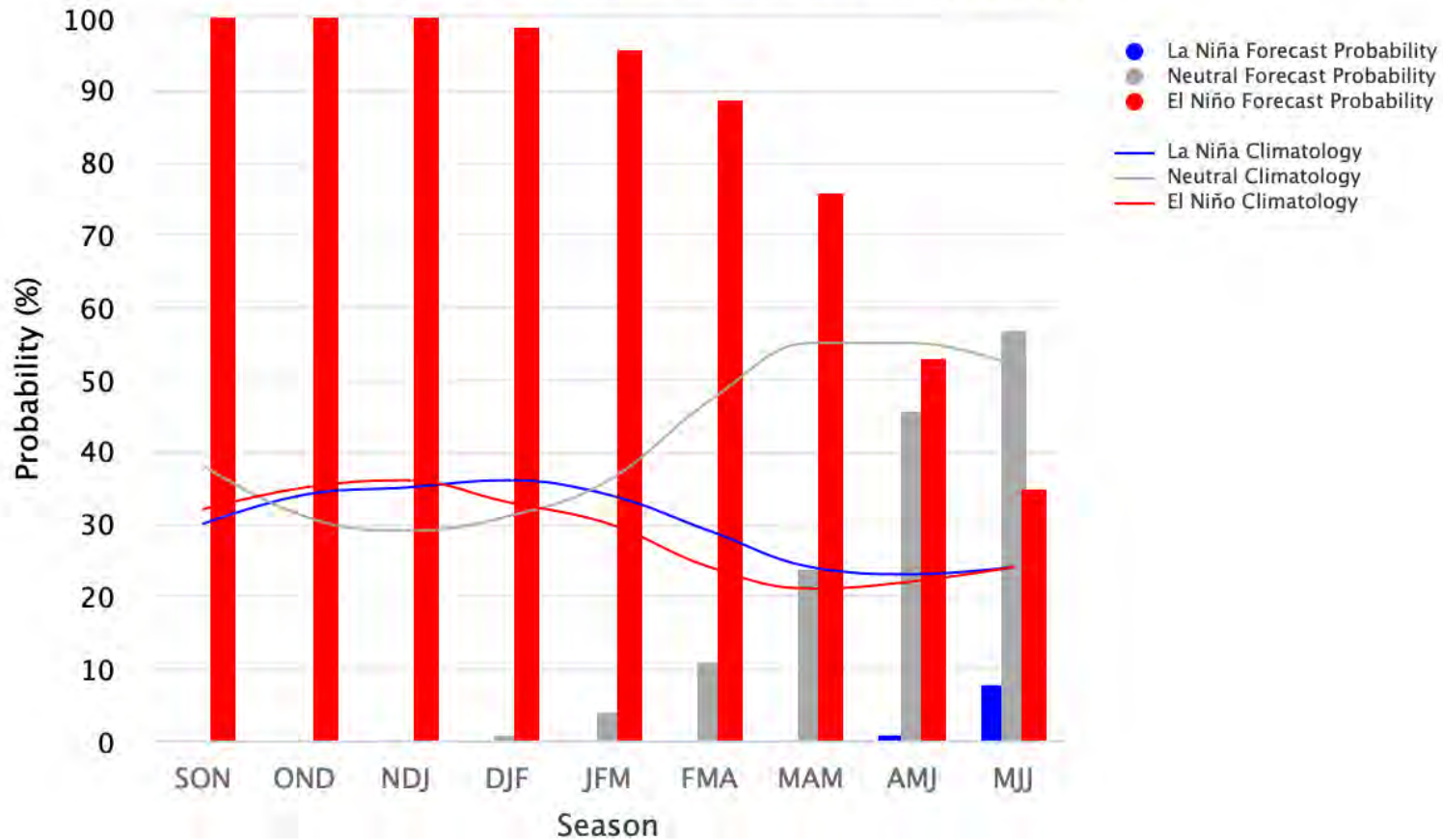
Valid: Dec-Jan-Feb 2023-24
 Issued: September 21, 2023



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

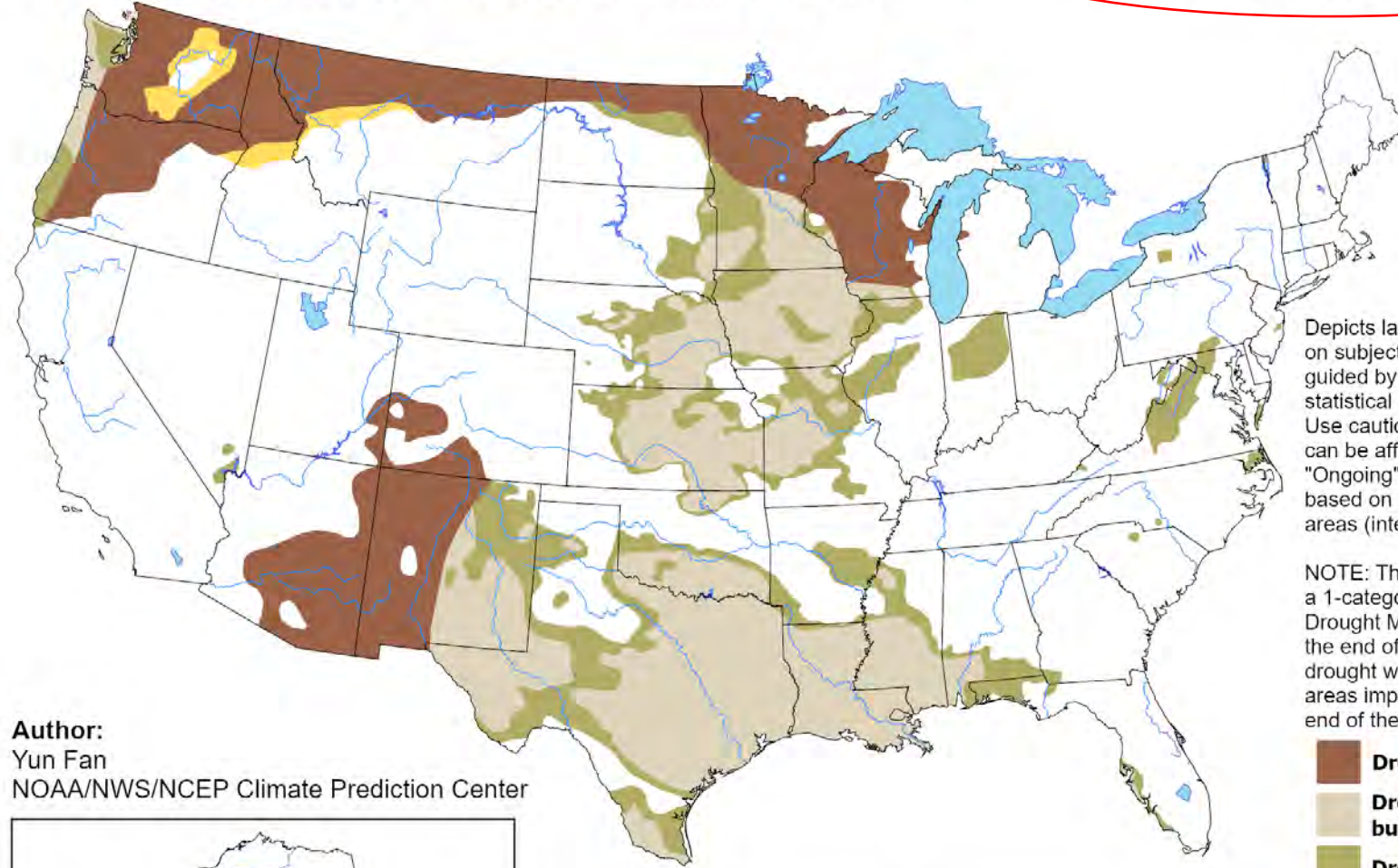


What does a typical El Nino pattern mean?

U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

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

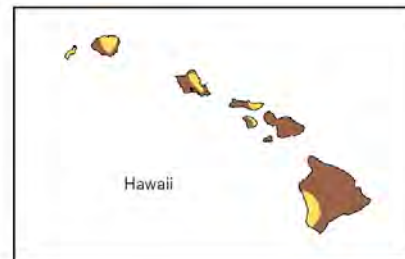


Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to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

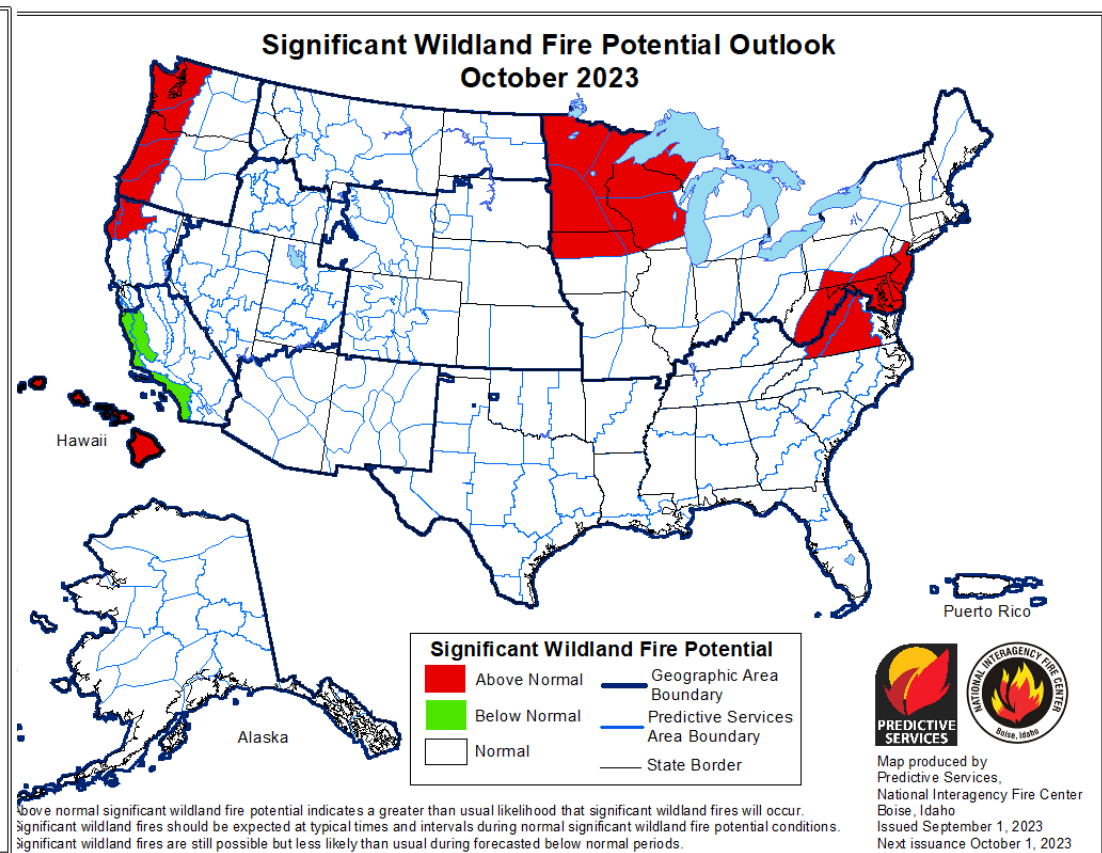
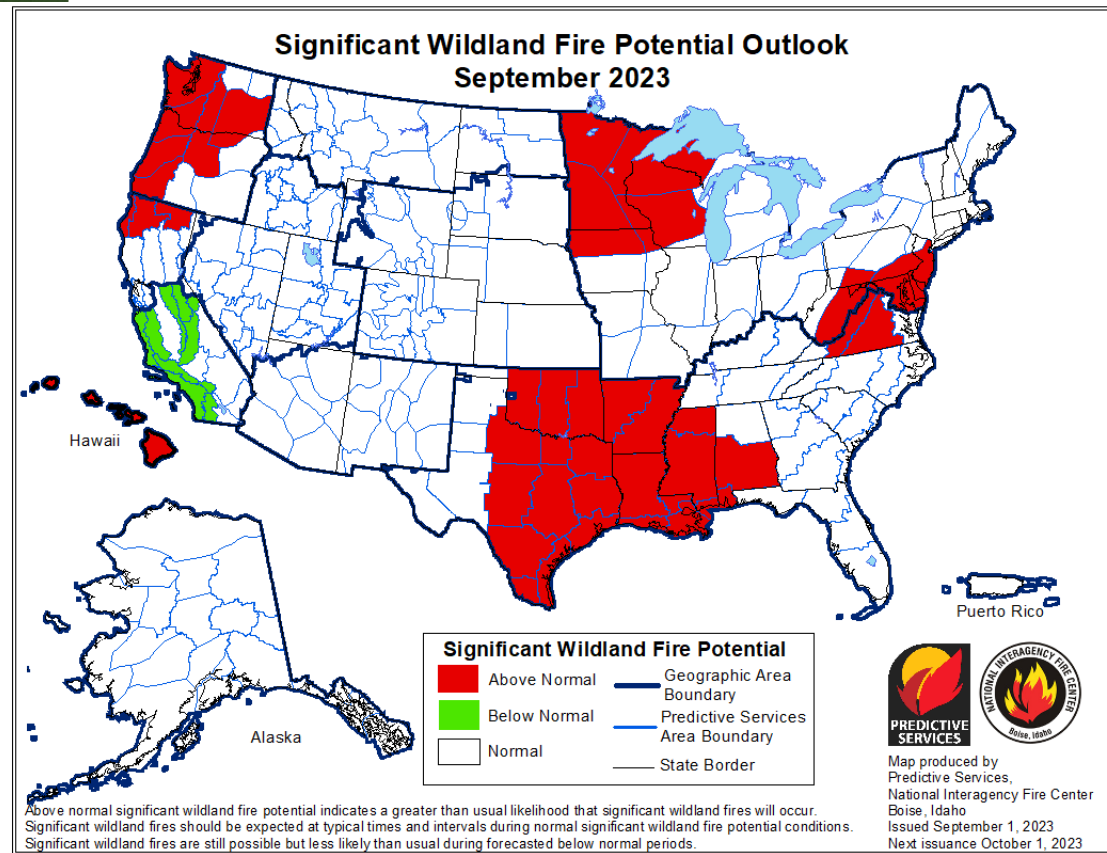
Author:
Yun Fan
NOAA/NWS/NCEP Climate Prediction Center



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

Wildland Fire Potential

https://www.predictiveservices.nifc.gov/outlooks/month1_outlook.png

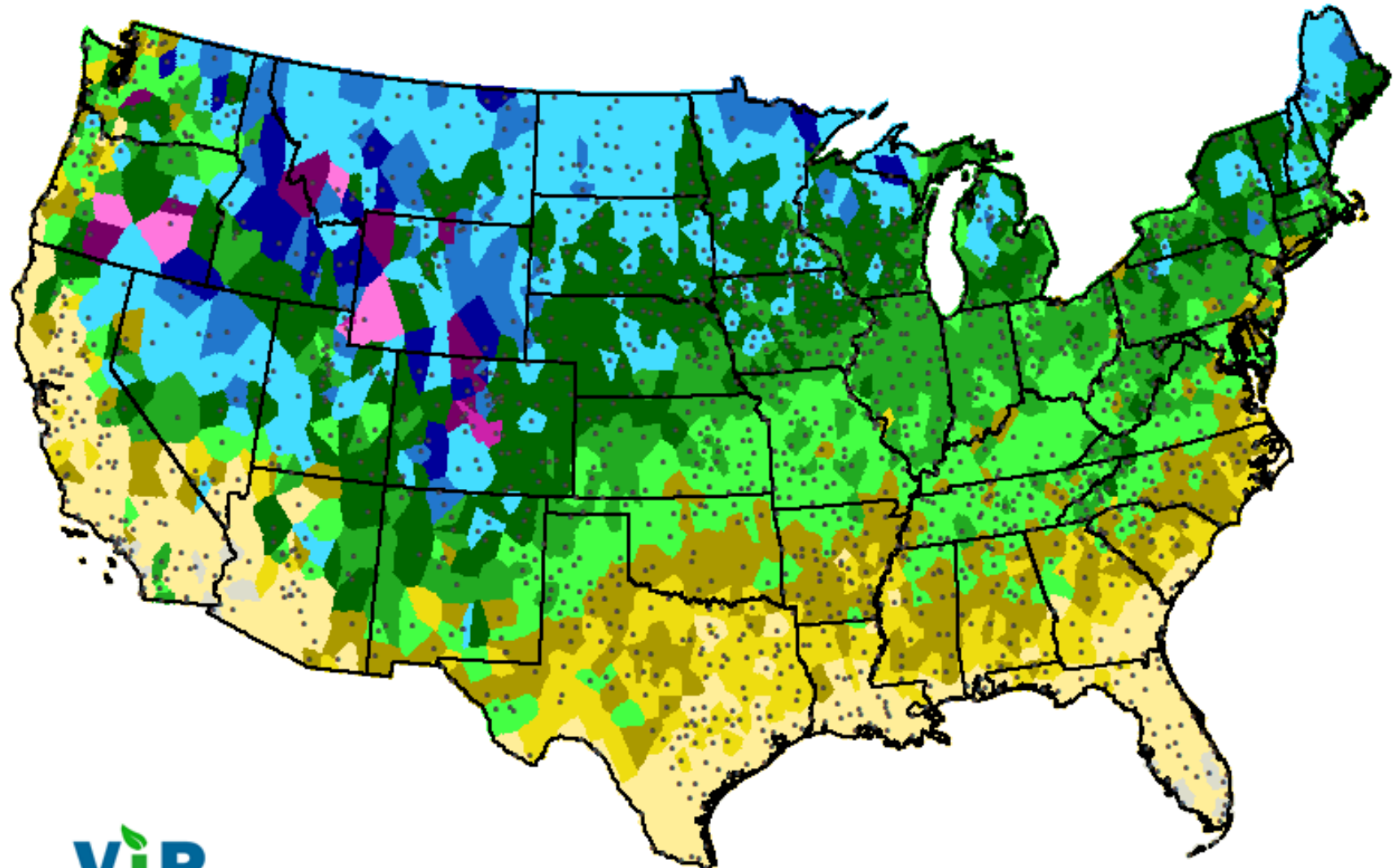
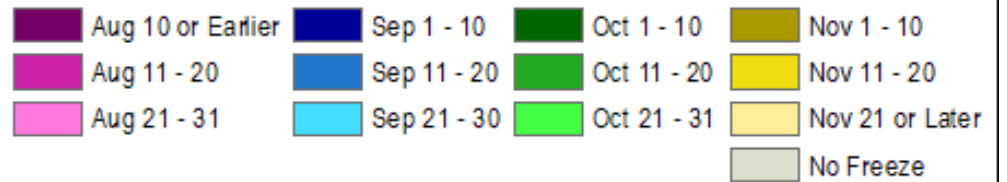


Climatological Date of Median First 32°F Freeze

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

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

Monthly Climate Reports

www.ncdc.noaa.gov/sotc/

NOAA's Climate Prediction Center

www.cpc.ncep.noaa.gov

National Drought Mitigation Center

drought.unl.edu

U.S. Drought Portal

www.drought.gov

State Climatologists

www.stateclimate.org

Regional Climate Centers

www.hprcc.unl.edu and <https://mrcc.purdue.edu/>



Thank you !

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