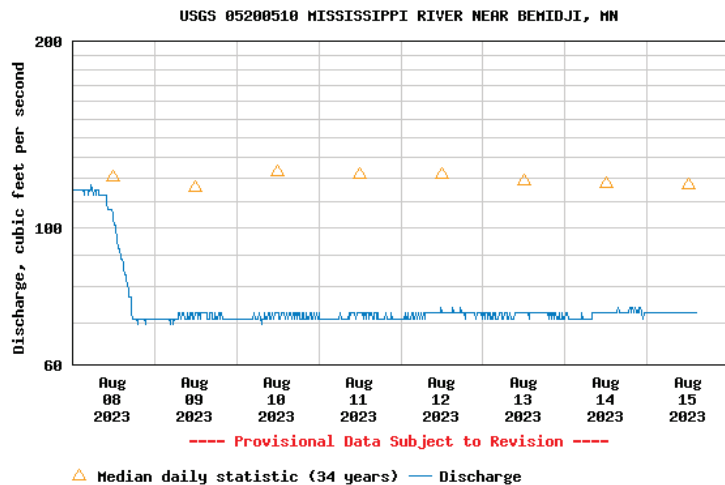


North Central Climate and Drought Outlook



The Mississippi Headwaters at Lake Itasca

August 10, 2023

Courtesy: Pete Boulay

Pete Boulay, MNDNR State Climatology Office

Peter.Boulay@state.mn.us 651-539-2150

General Information

- **Providing climate services to the Central Region**
 - Collaboration Activity Between:
 - State Climatologists/American Association of State Climatologists (AASC)
 - NOAA NCEI/NWS/OAR/NIDIS
 - USDA Climate Hubs
 - Midwest and High Plains Regional Climate Centers
 - National Drought Mitigation Center
- **Next Regular Climate/Drought Outlook Webinar**
 - September 21, 2023 (1 PM CST): Presenter: Brian Fuchs
- **Recordings of Past Webinars**
- <https://mrcc.purdue.edu/webinars>
- <http://www.hprcc.unl.edu/webinars.php>
- **Open for questions at the end**

Presentation Outline

- Recent Conditions
 - Temperature and precipitation ranks
 - 30-day temperature and precipitation
 - Modeled soil moisture
 - Drought
- Impacts
- Outlooks
 - El Niño-Southern Oscillation
 - Short-term
 - Autumn and the '23-24 Winter



Stillwater MN: July 24, 2023

Courtesy: Minnesota DNR State Climatology Office



RECENT CONDITIONS

Soybeans.. And corn?

August 15, 2023

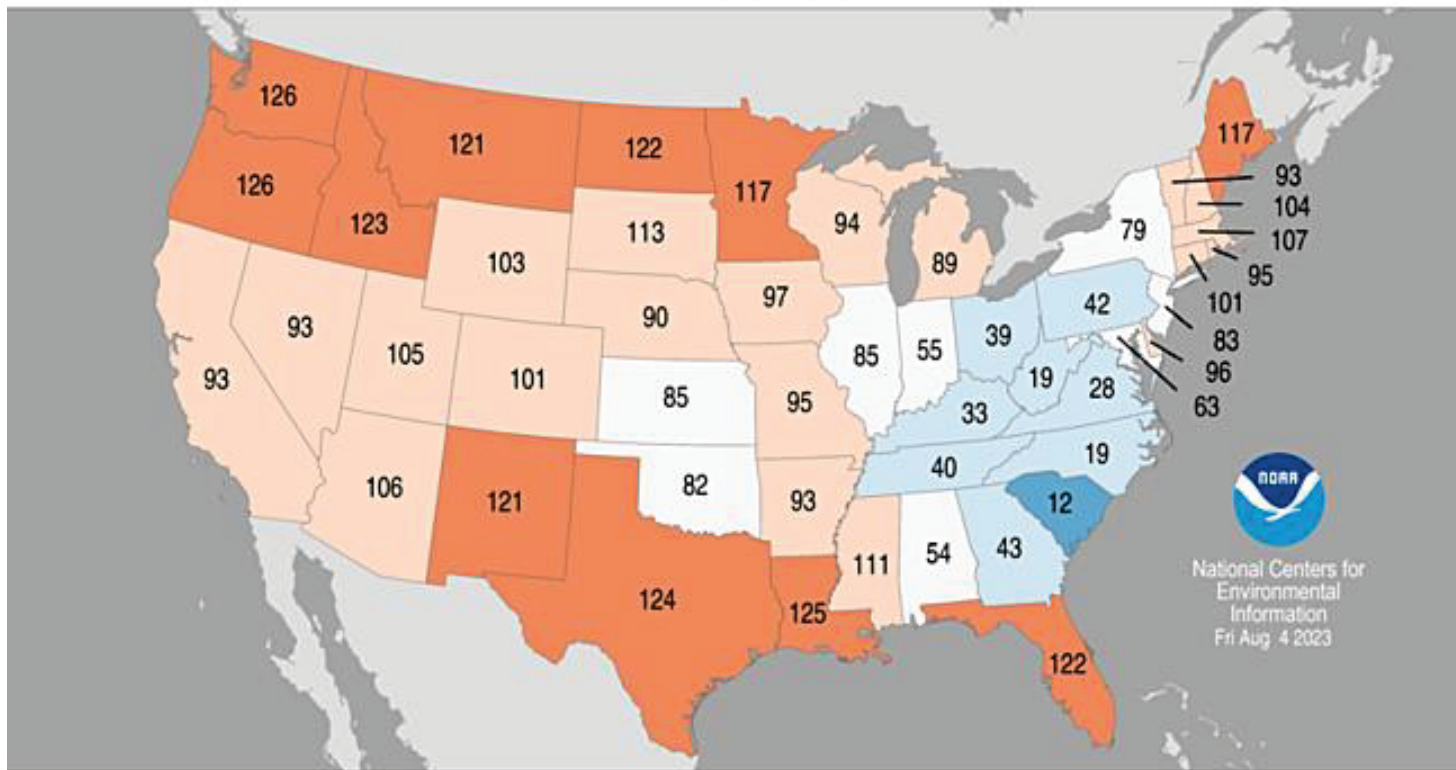
U of M St. Paul, MN

Courtesy: Pete Boulay

2023 May-July Temperature Ranks

Statewide Average Temperature Ranks

May - July 2023
Period: 1895-2023



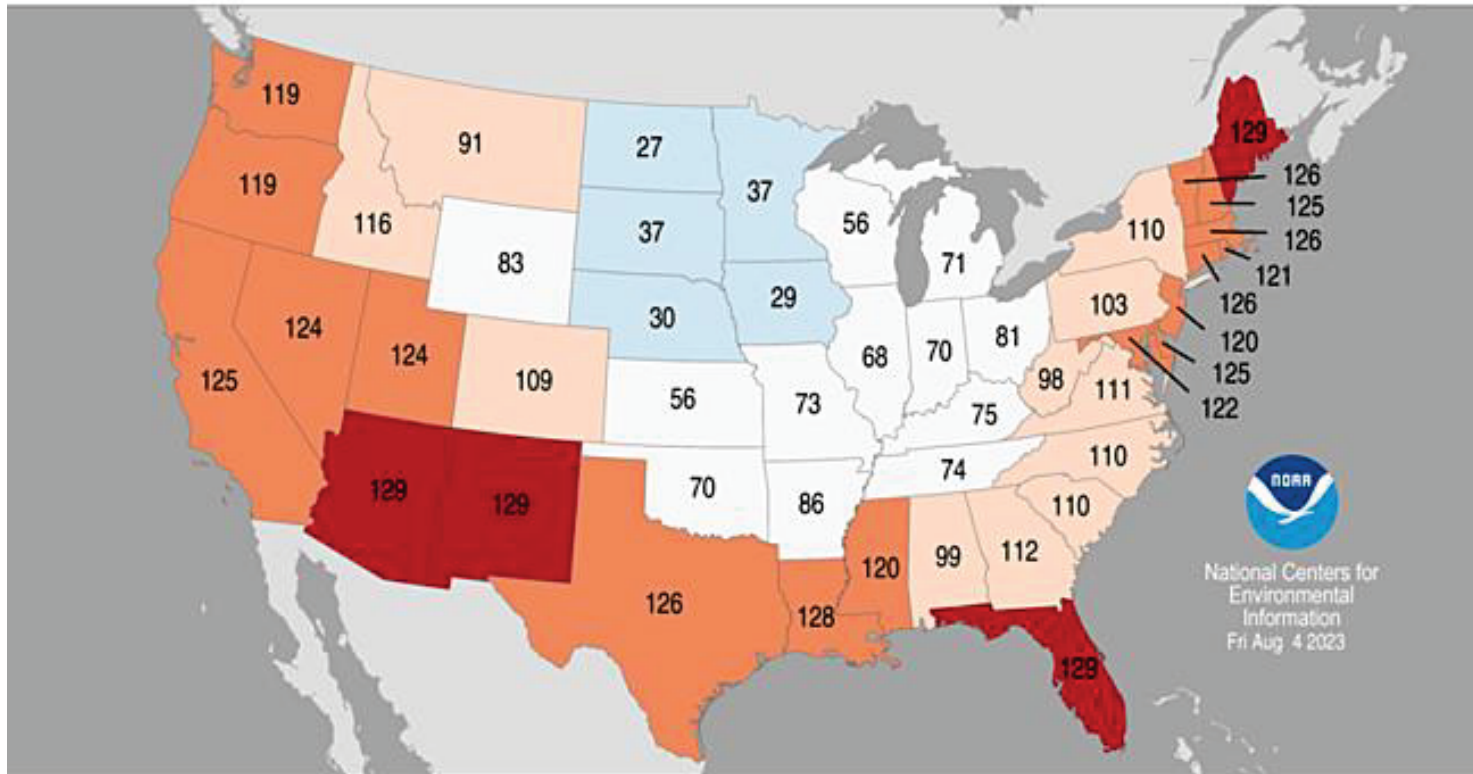
<https://www.ncei.noaa.gov/access/monitoring/us-maps/>

July 2023 Temperature Ranks

Statewide Average Temperature Ranks

July 2023

Period: 1895–2023

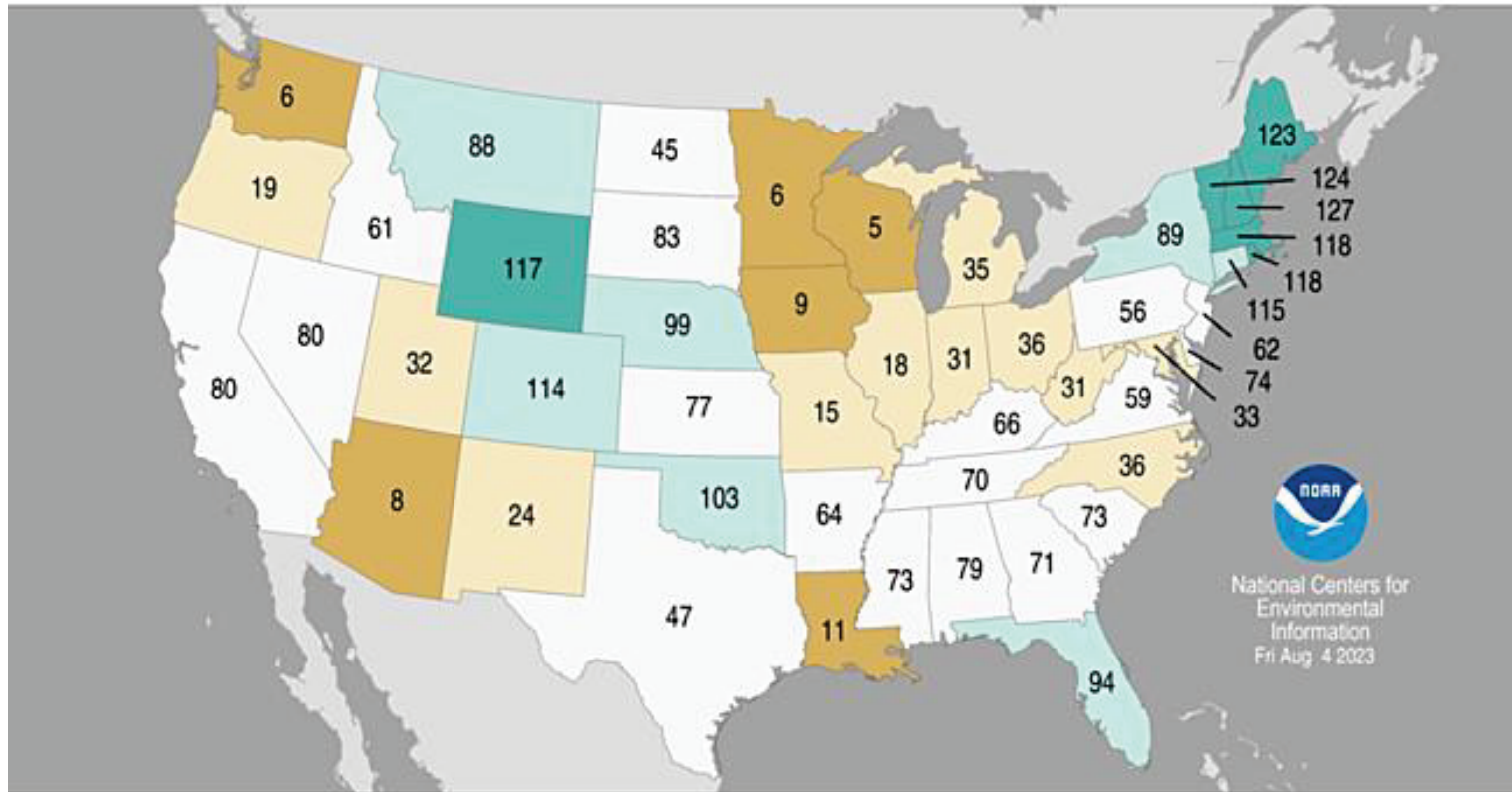


<https://www.ncei.noaa.gov/access/monitoring/us-maps/>

2023 May-July Precipitation Ranks

Statewide Precipitation Ranks

May - July 2023
 Period: 1895-2023



National Centers for
 Environmental
 Information
 Fri Aug 4 2023

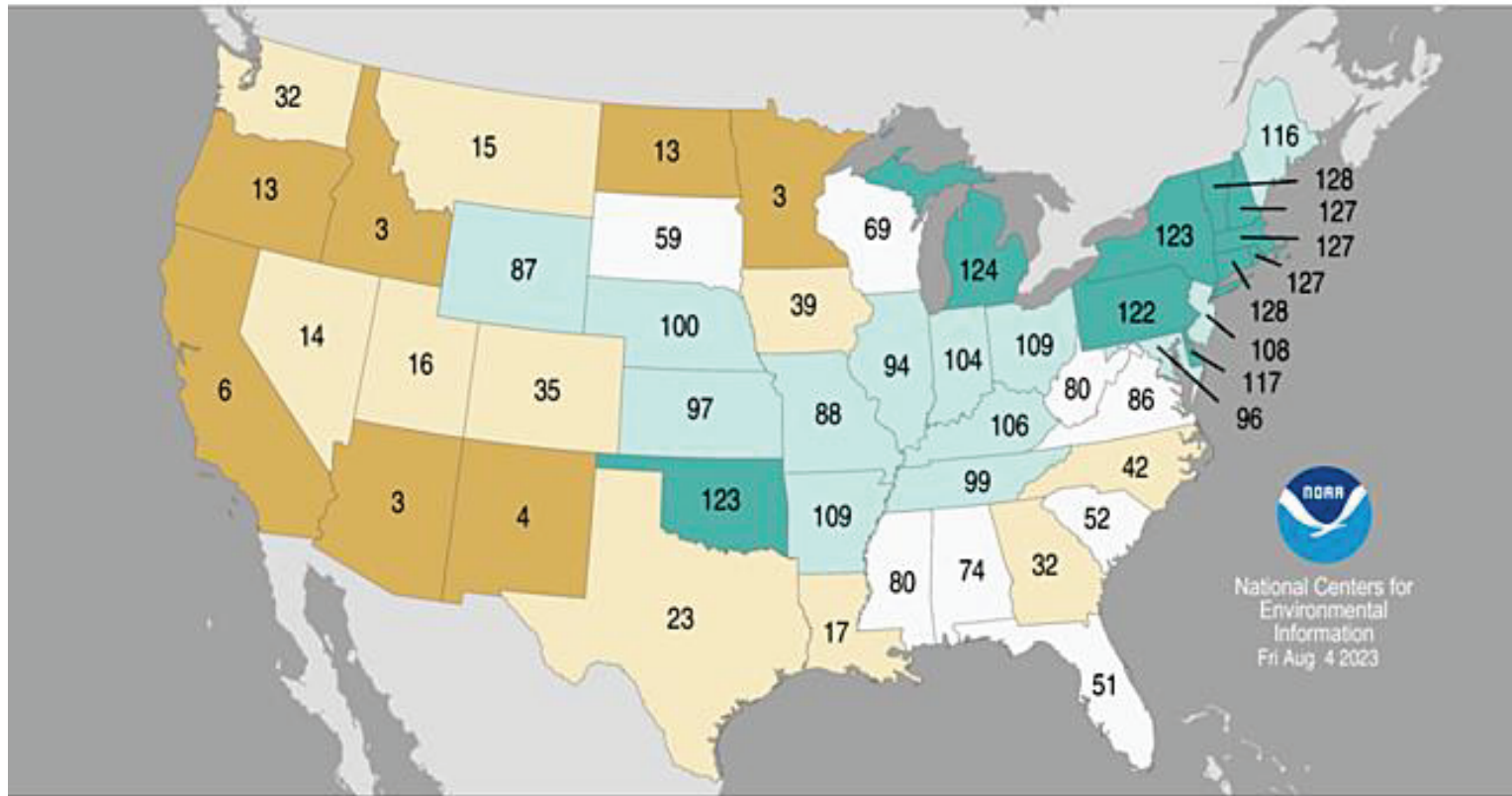


<https://www.ncei.noaa.gov/access/monitoring/us-maps/>

July 2023 Precipitation Ranks

Statewide Precipitation Ranks

July 2023
 Period: 1895–2023





 National Centers for

 Environmental

 Information

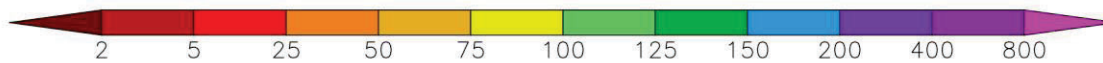
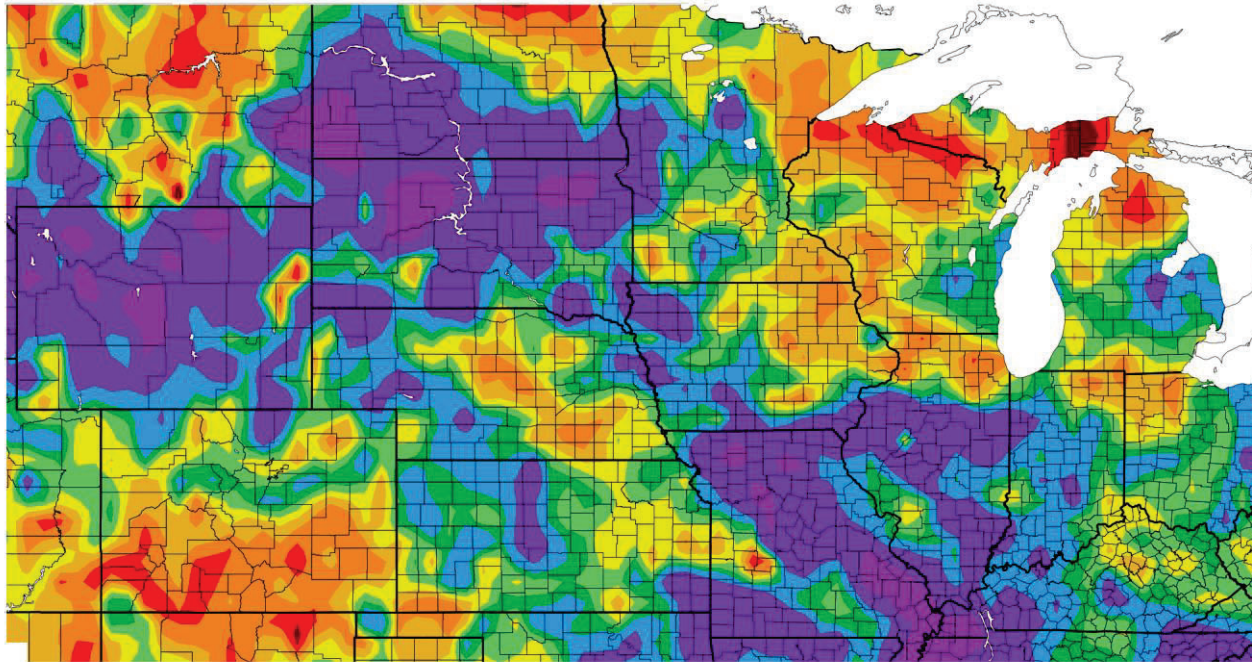
 Fri Aug 4 2023



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

Fairly wet August so far, with exceptions.

Percent of Normal Precipitation (%)
8/1/2023 – 8/16/2023



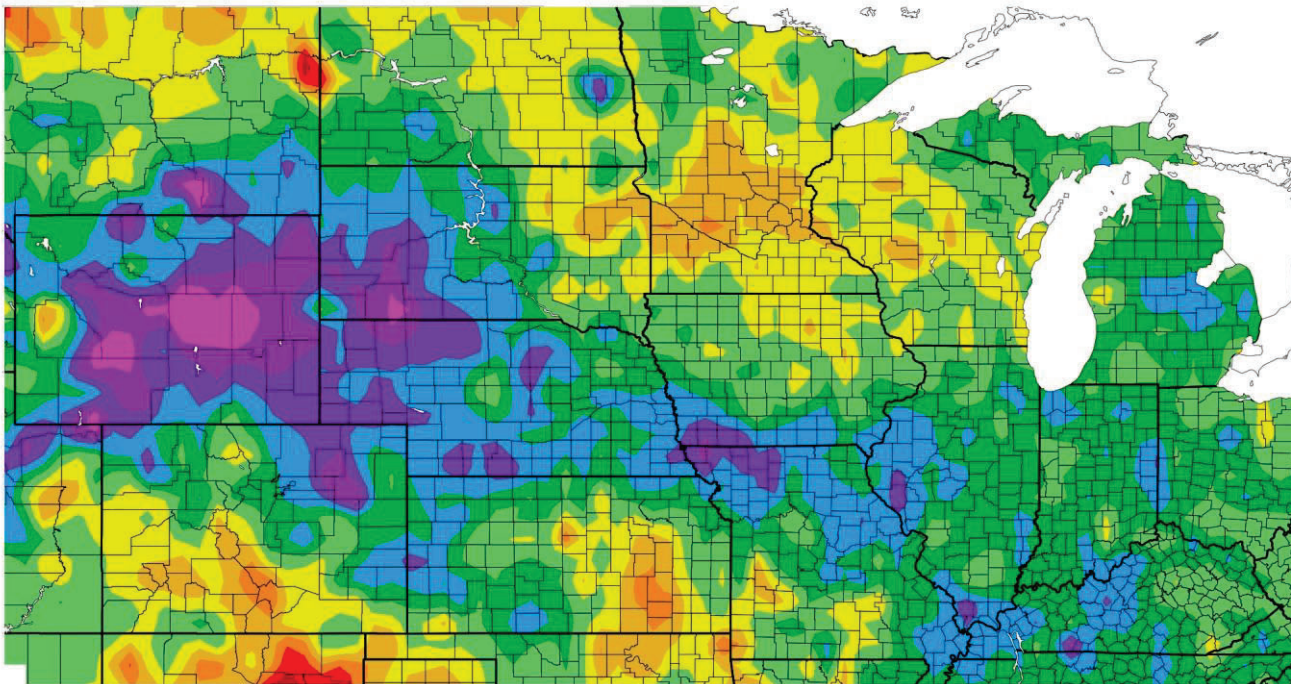
Generated 8/17/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

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

Cool to near normal with some warm pockets.

Departure from Normal Temperature (F)
8/1/2023 – 8/16/2023



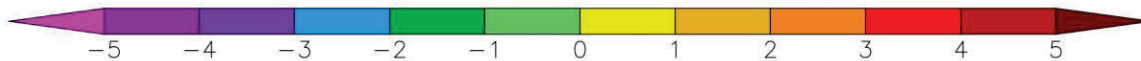
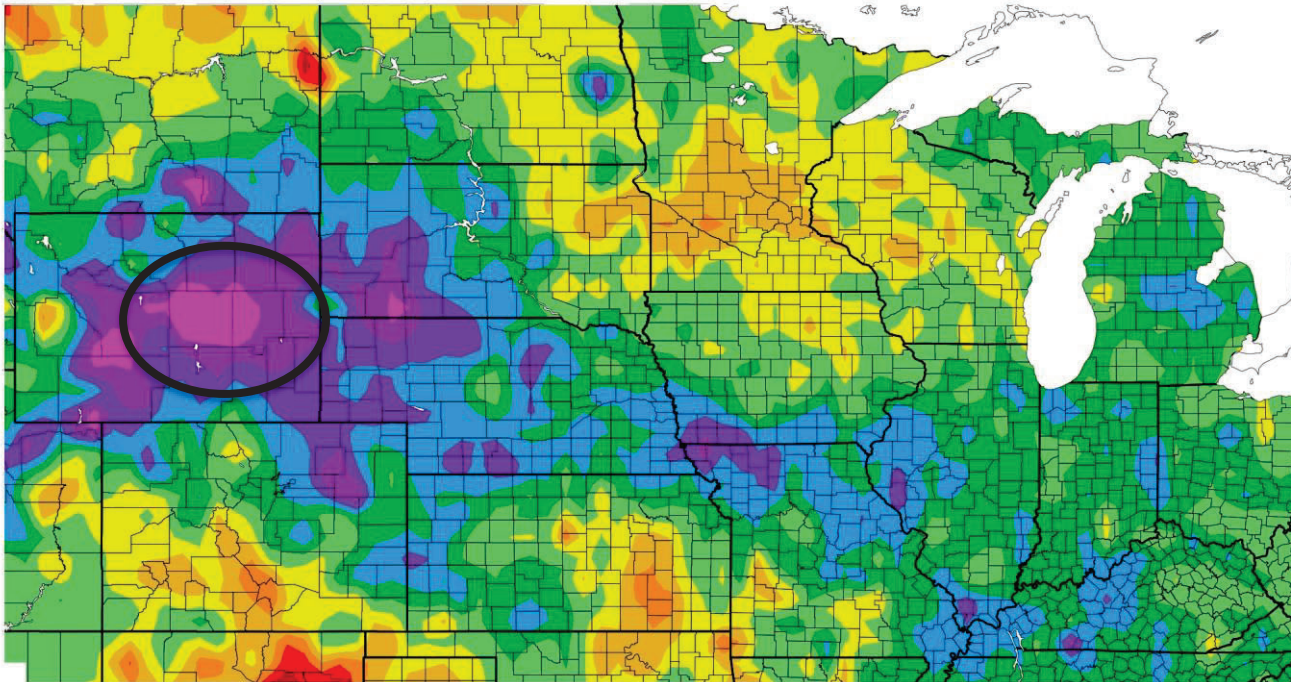
Generated 8/17/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

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

Cool to near normal with some warm pockets.

Departure from Normal Temperature (F)
8/1/2023 – 8/16/2023



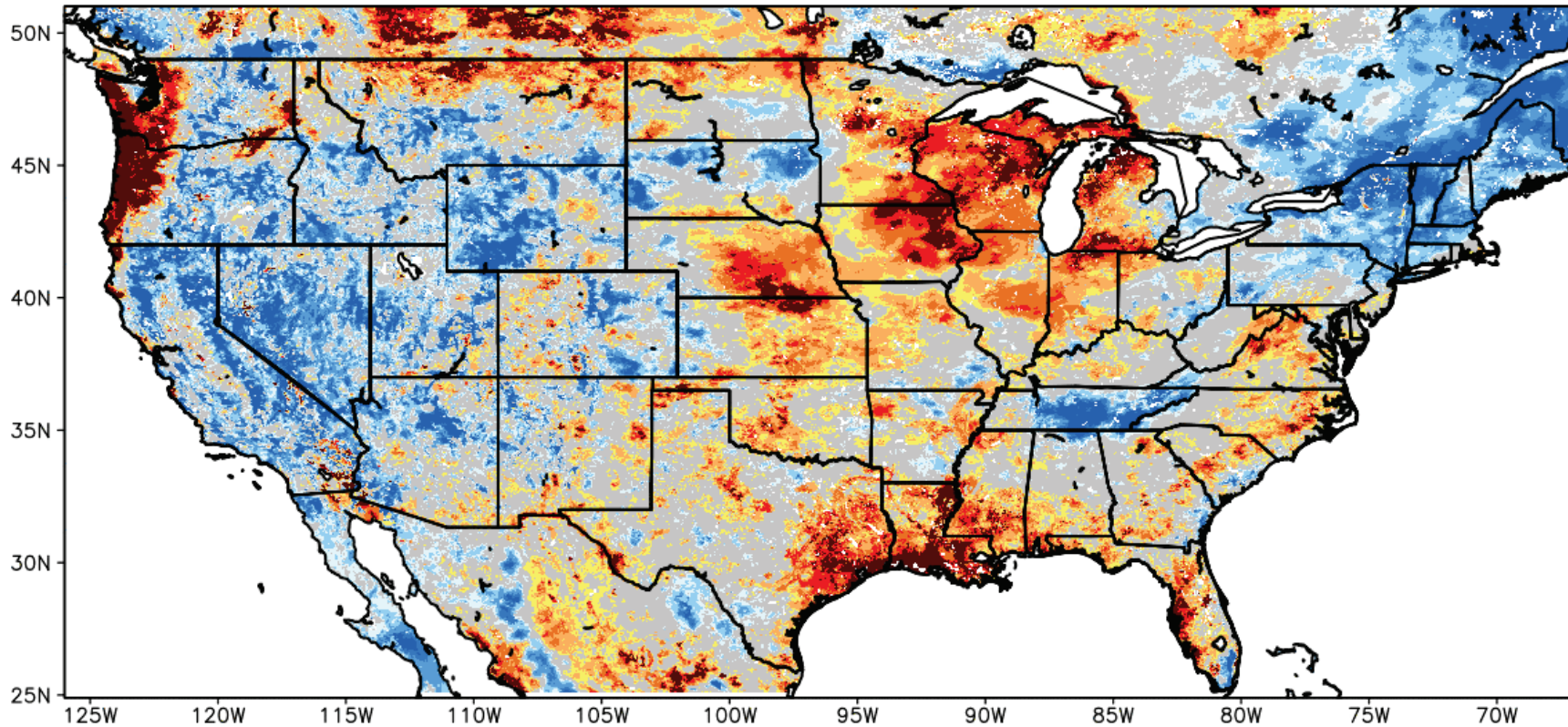
Generated 8/17/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

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

Calculated Soil Moisture Percentiles

SPoRT-LIS 0-100 cm Soil Moisture percentile valid 17 Aug 2023



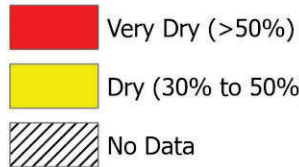
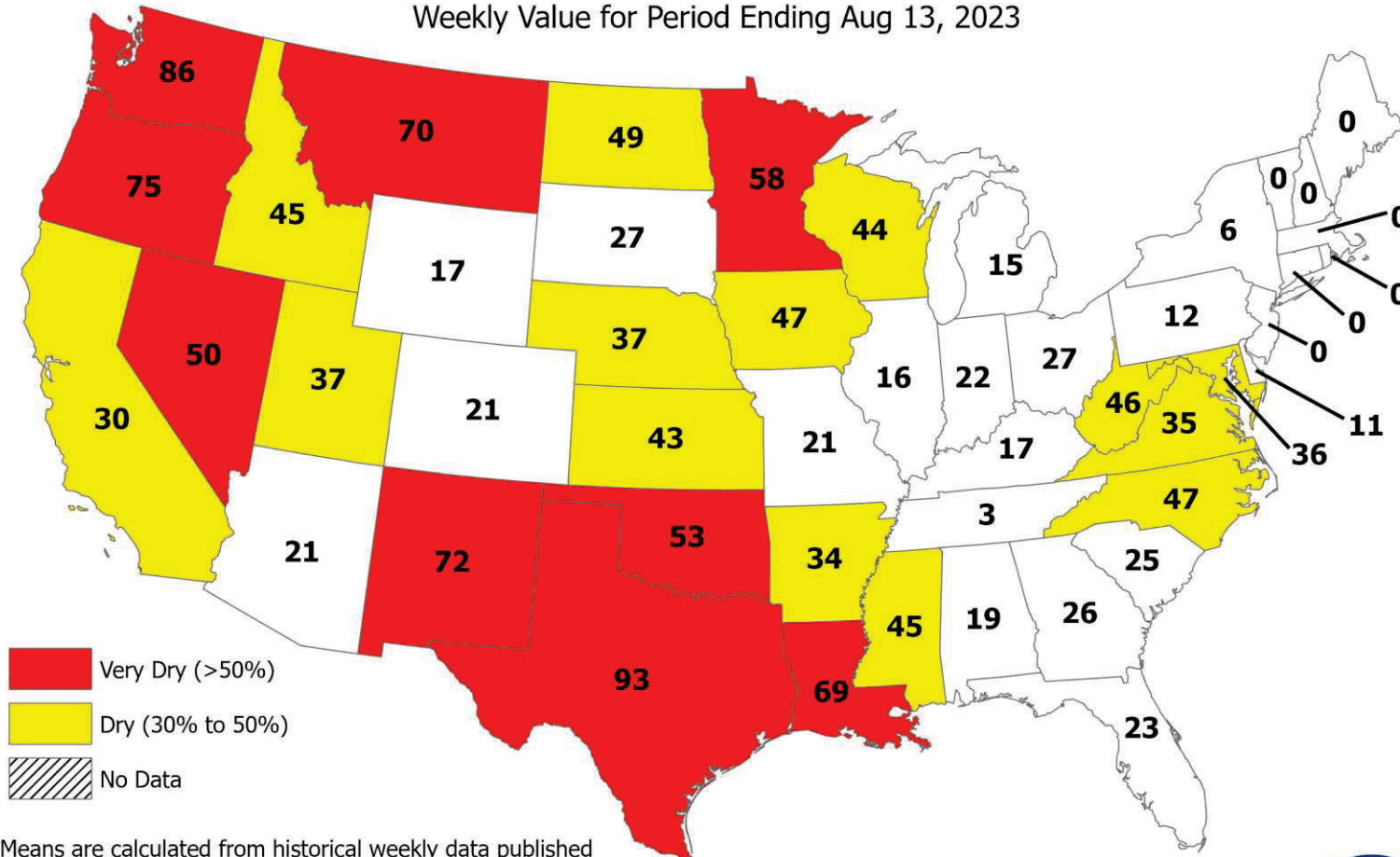
****NOTE****
****Experimental****

https://weather.ndc.nasa.gov/cgi-bin/basicLooper.pl?category=lis_CONUS&initialize=first®ex=vsm0-100percent_20230817

USDA Topsoil Moisture by Short-Very Short

Percent of State Area

Weekly Value for Period Ending Aug 13, 2023



Means are calculated from historical weekly data published by USDA/NASS using the closest date to the equivalent date for this year.

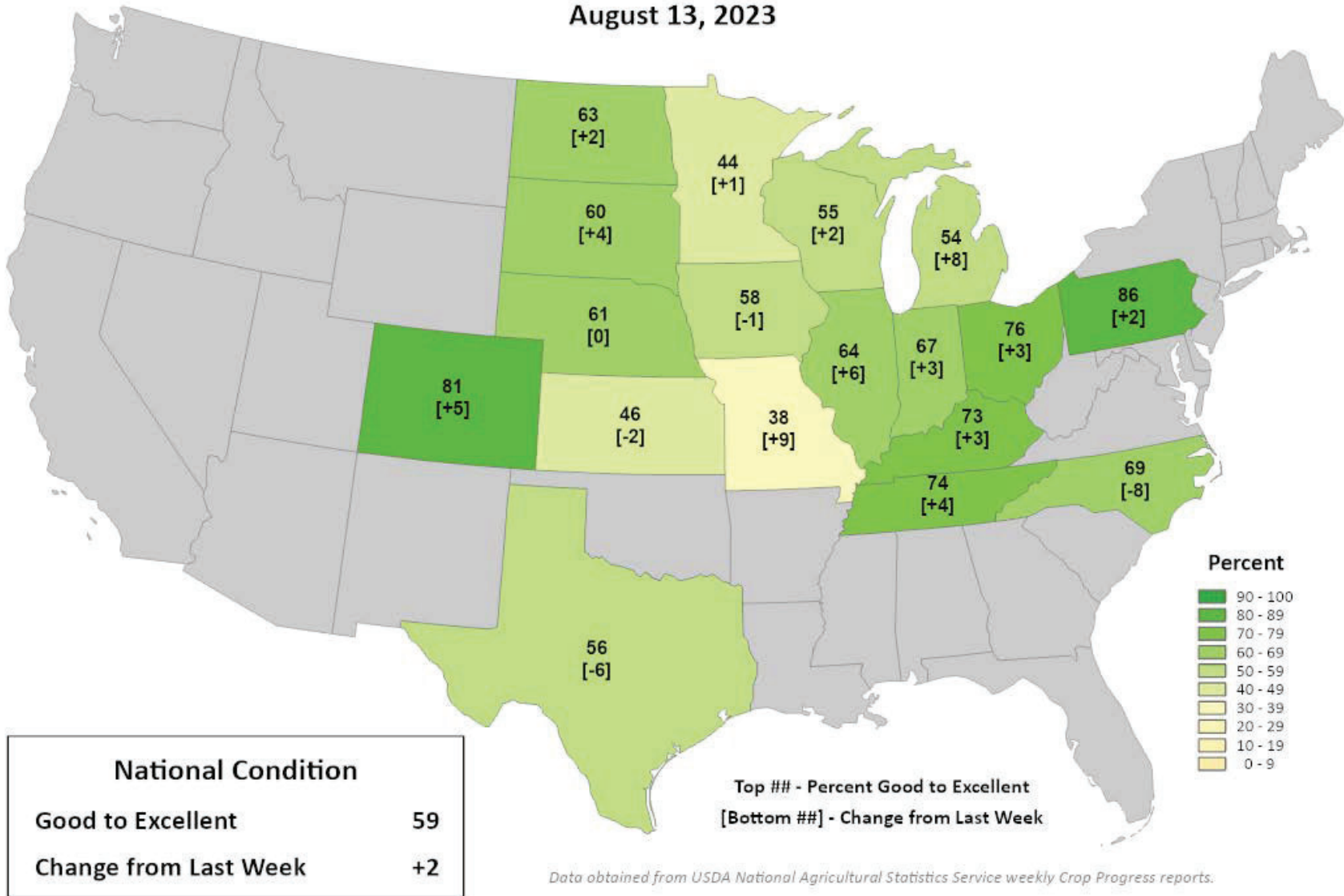
Results are based on the short and very short percentages of topsoil moisture (upper 6 inches) reported by the USDA. Reports are based on subjective observations.



Corn Conditions

Percent Good to Excellent

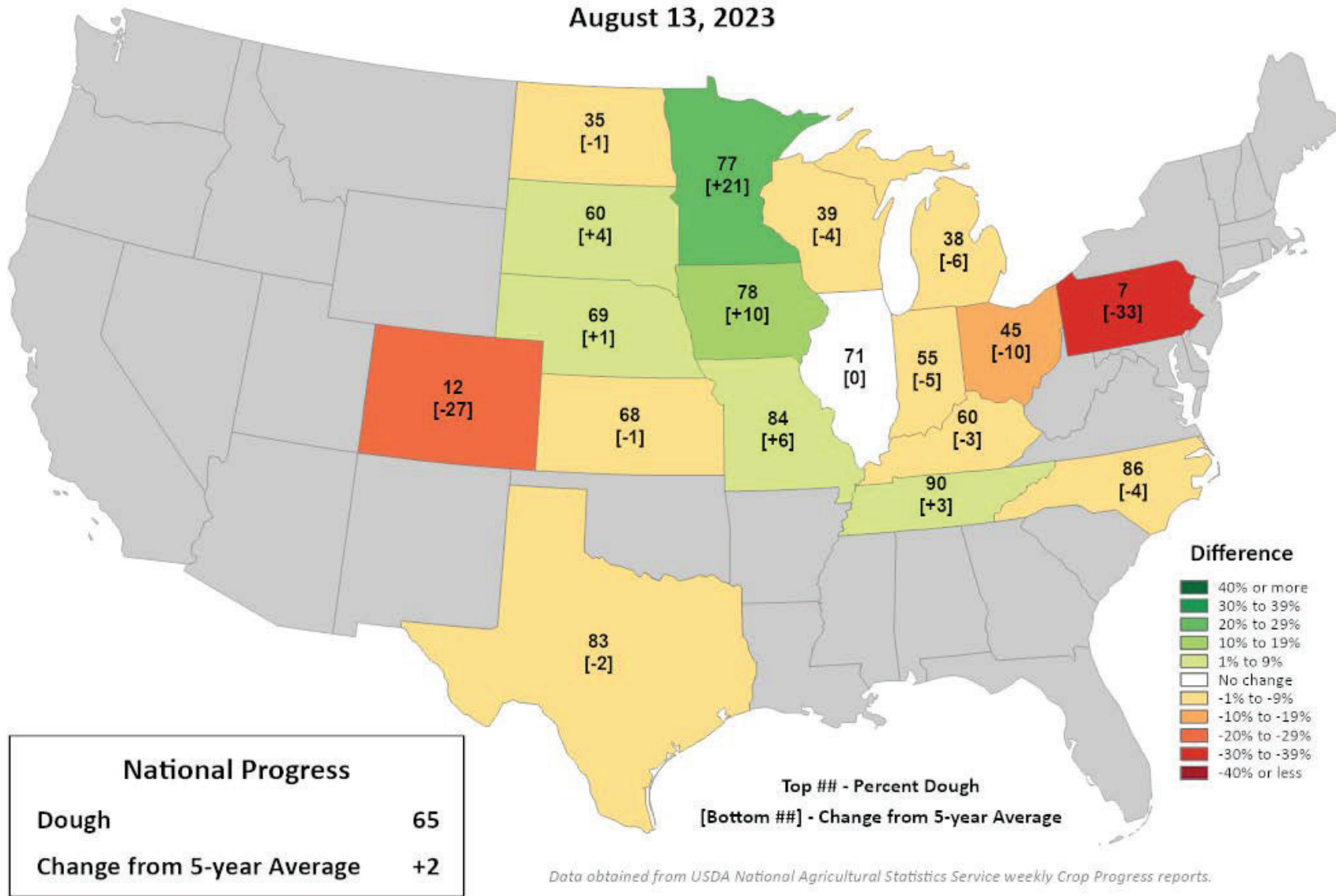
August 13, 2023



Corn Progress

Percent Dough

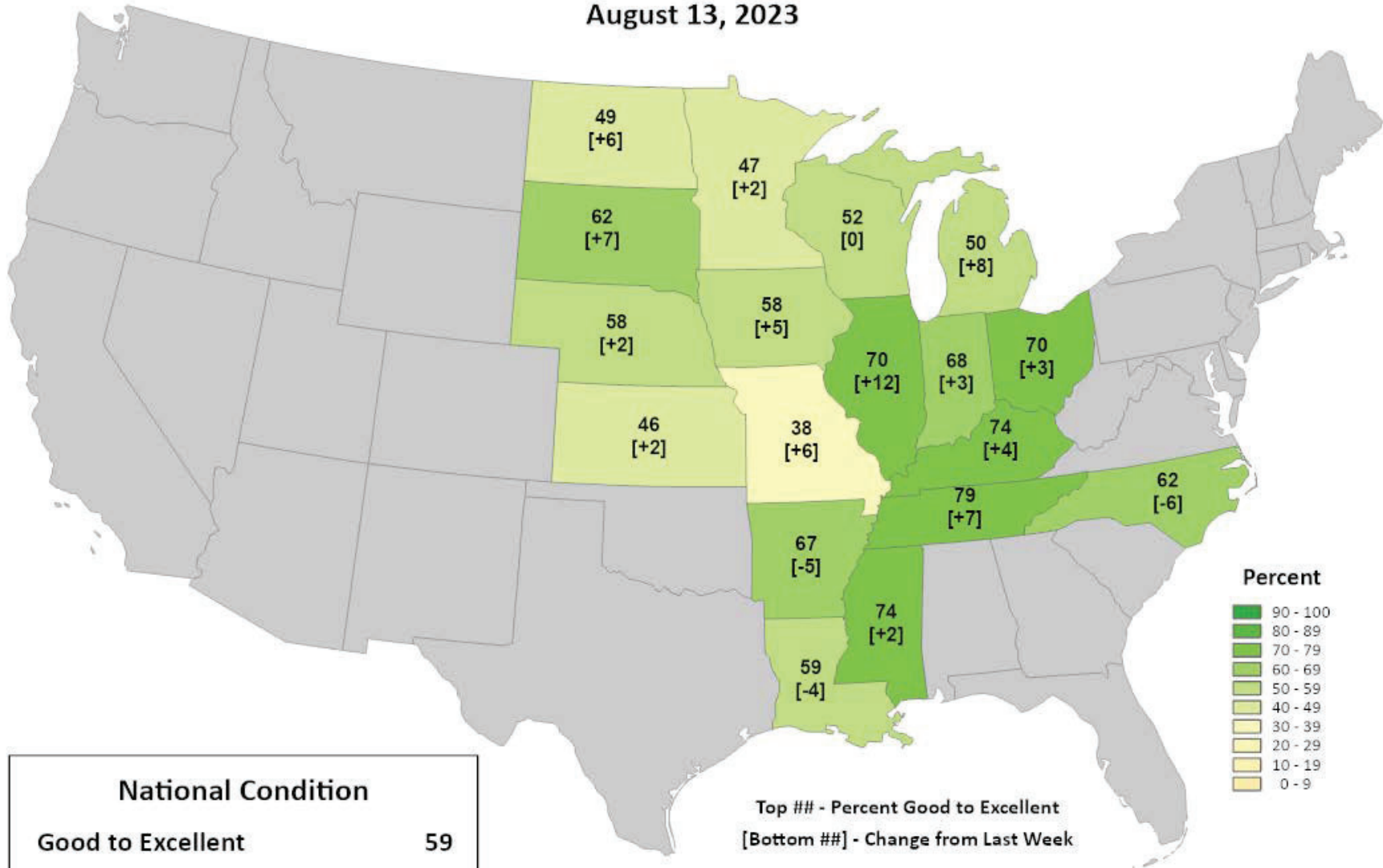
August 13, 2023



Soybean Conditions

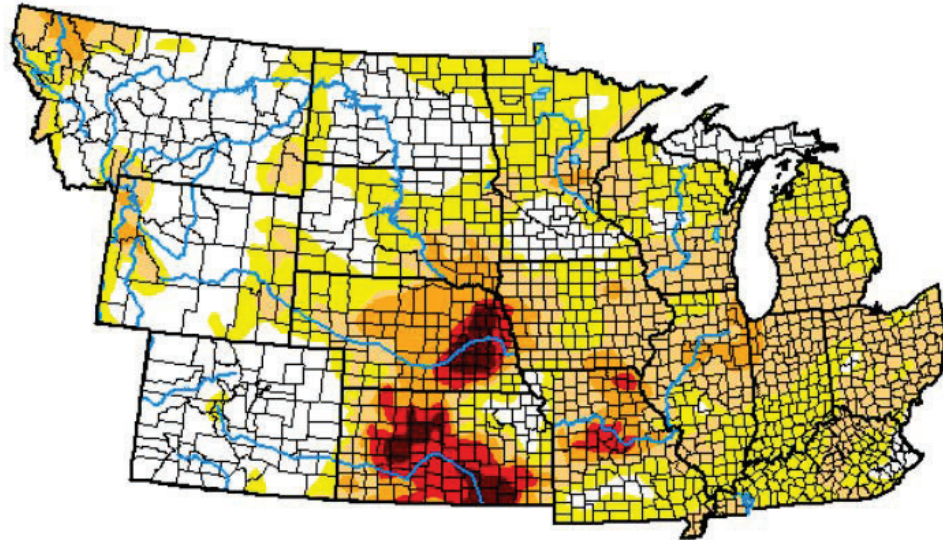
Percent Good to Excellent

August 13, 2023



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

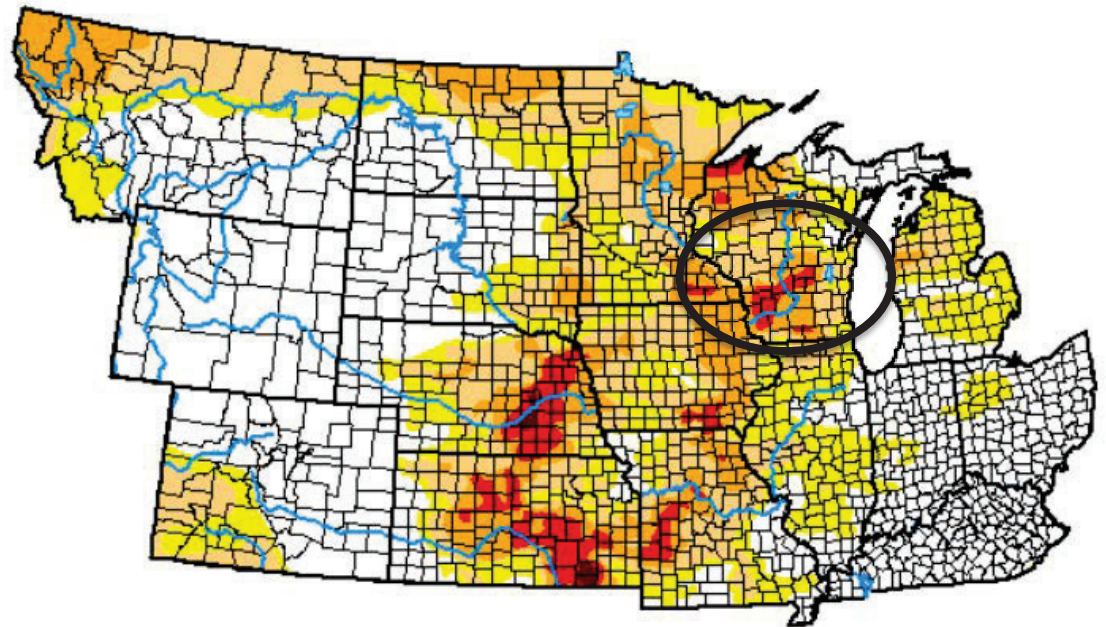
US Drought Monitor... Past Two Months



Minnesota and Wisconsin had a flash drought over the past two months. Heavy rains in August had improvements in NE, KS, MO, IL, MI, IN, KY and OH

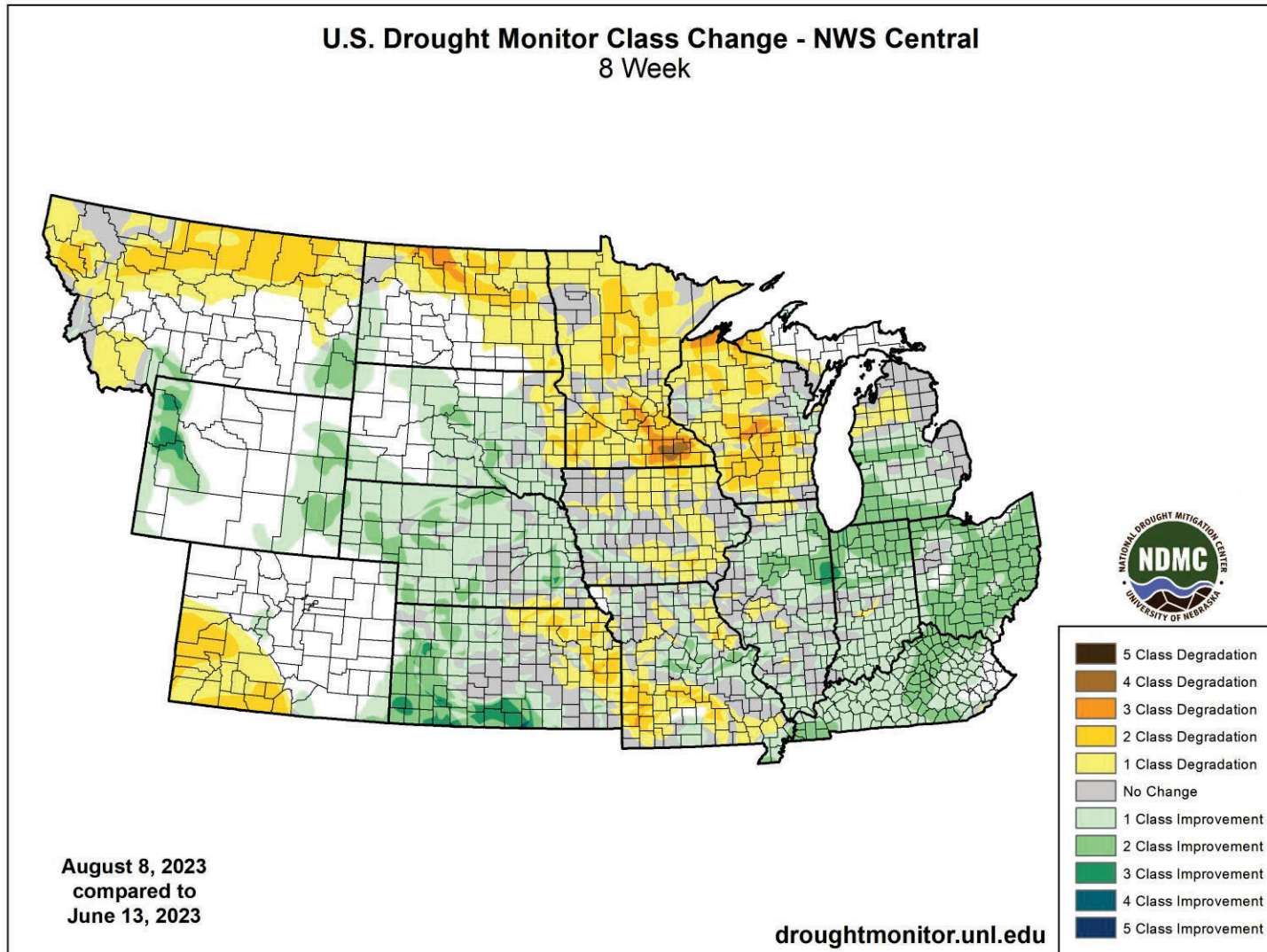
August 15, 2023

June 13, 2023



<http://droughtmonitor.unl.edu>

US Drought Monitor... Past Two Months





Blue Mesa (Colorado's largest reservoir.) Full recovery from the long drought.

August 2023

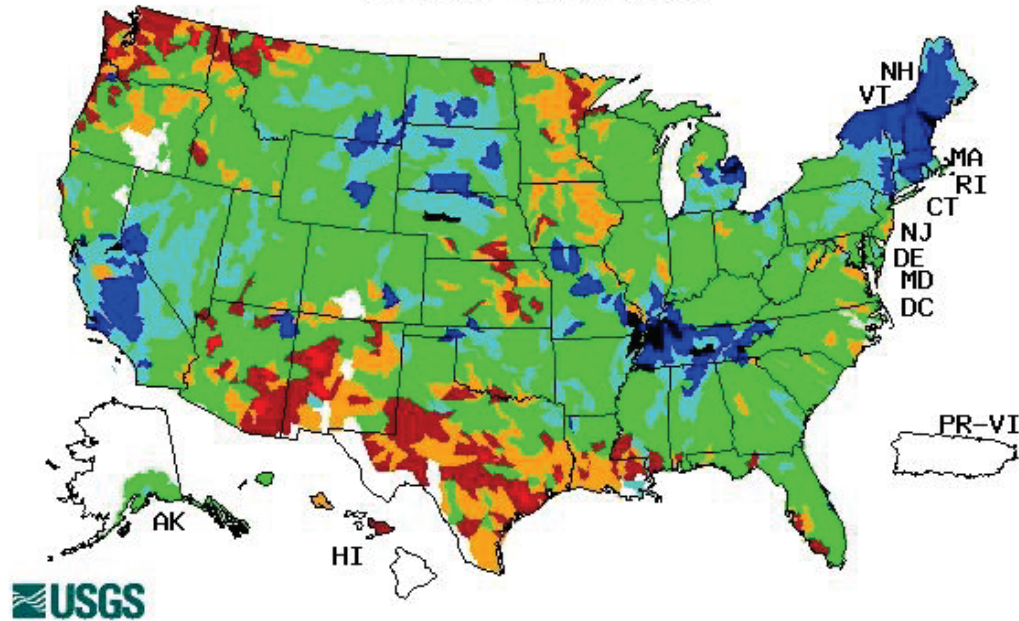
Courtesy: Becky Bollinger

RIVERS AND STREAMS

Map of 28-day average streamflow compared to historical streamflow for the day of the year (United States)

United States ▼ or Water-Resources Regions ▼

Wednesday, August 16, 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		

https://waterwatch.usgs.gov/index.php?id=pa28d&sid=w__map|m__pa28d_nwc&r=us

MISSOURI RIVER BASIN WEEKLY UPDATE

AUGUST 16, 2023

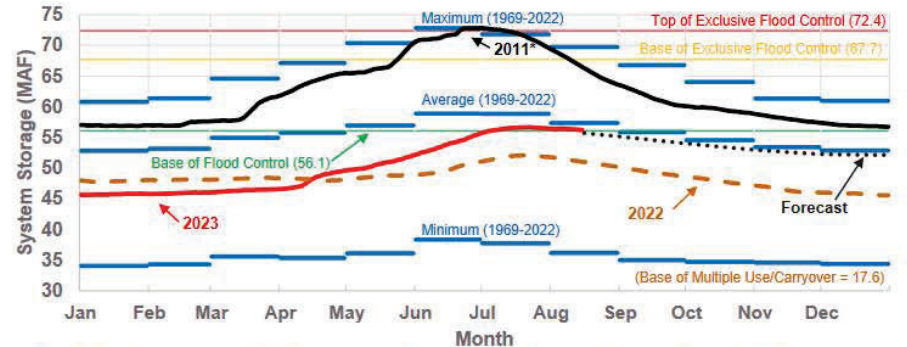


U.S. ARMY

Mainstem Reservoir Status

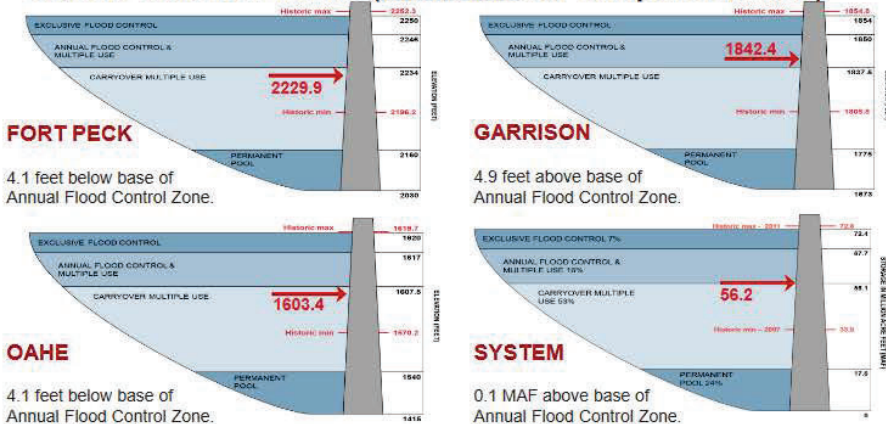
- System storage is 56.2 MAF, 0.1 MAF lower than last week (upper right). For the August monthly study with forecasted pool levels and releases for each mainstem project, [click here](#).
- Gavins Point releases are currently 29,000 cfs. Releases will be adjusted as needed to meet downstream navigation targets. The release schedule for Gavins Point is in our daily forecast ([click here](#)).
- The next 7 days are forecasted to be fairly dry for much of the basin (lower right). Some rain is forecast in Montana and western North Dakota, which would help dry soil conditions in those areas.
- Refer to the 3-Week Forecast ([click here](#)) for the most up-to-date System information – pool levels, inflows, and releases.

System Storage Comparison

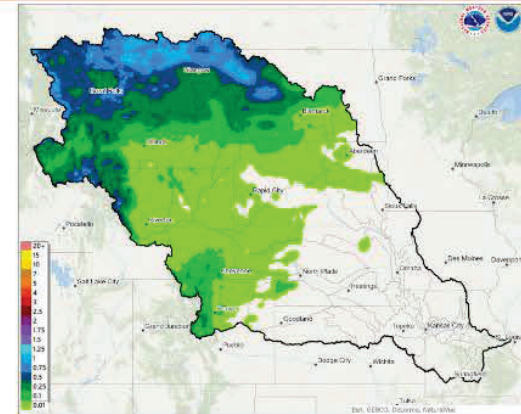


*In January 2011, the Base of Flood Control was 56.8 MAF, and the Top of Exclusive Flood Control was 73.1 MAF

Current Reservoir Levels (Click Here for Comparison Plots)



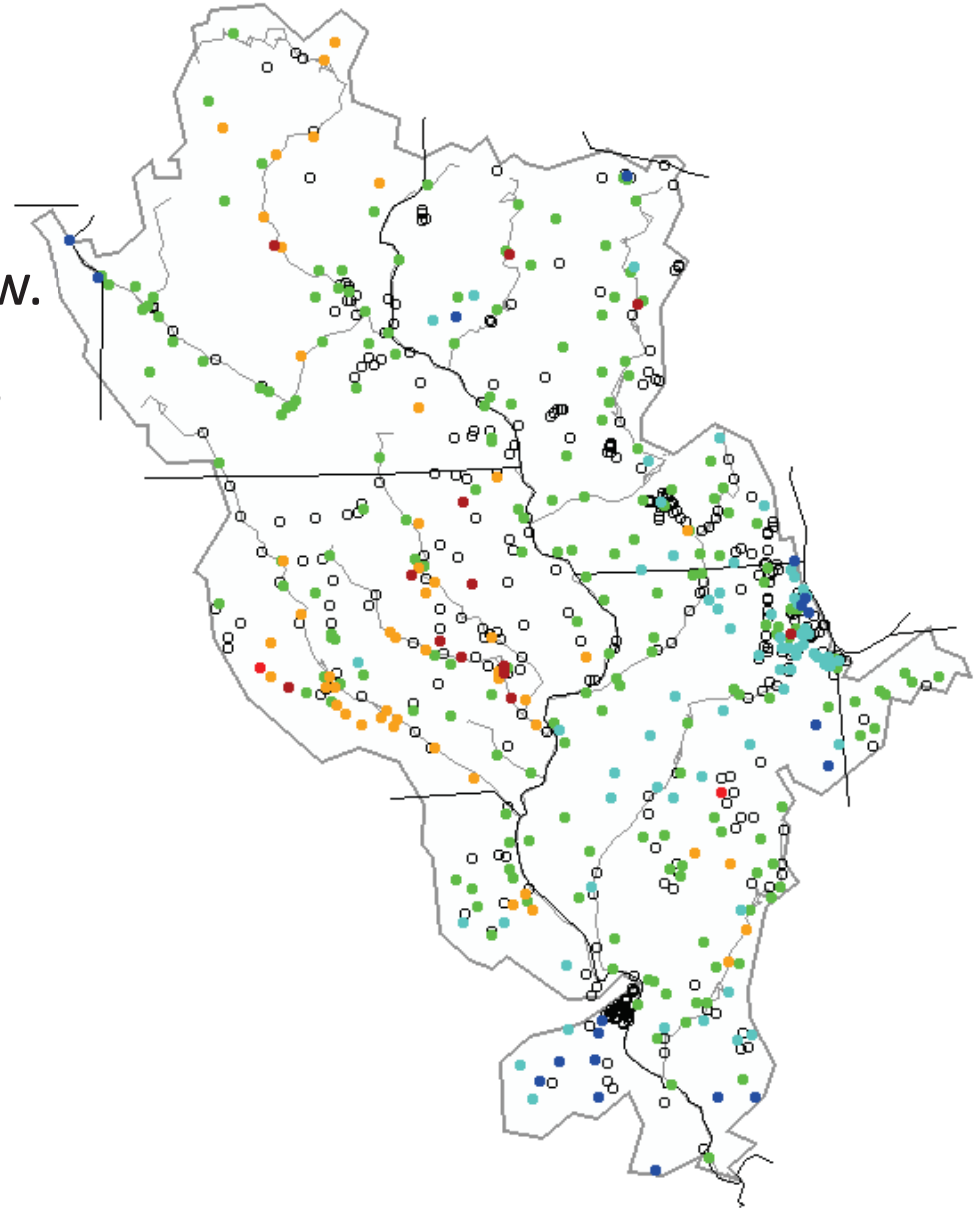
Missouri Basin RFC 7-Day Forecast Precipitation



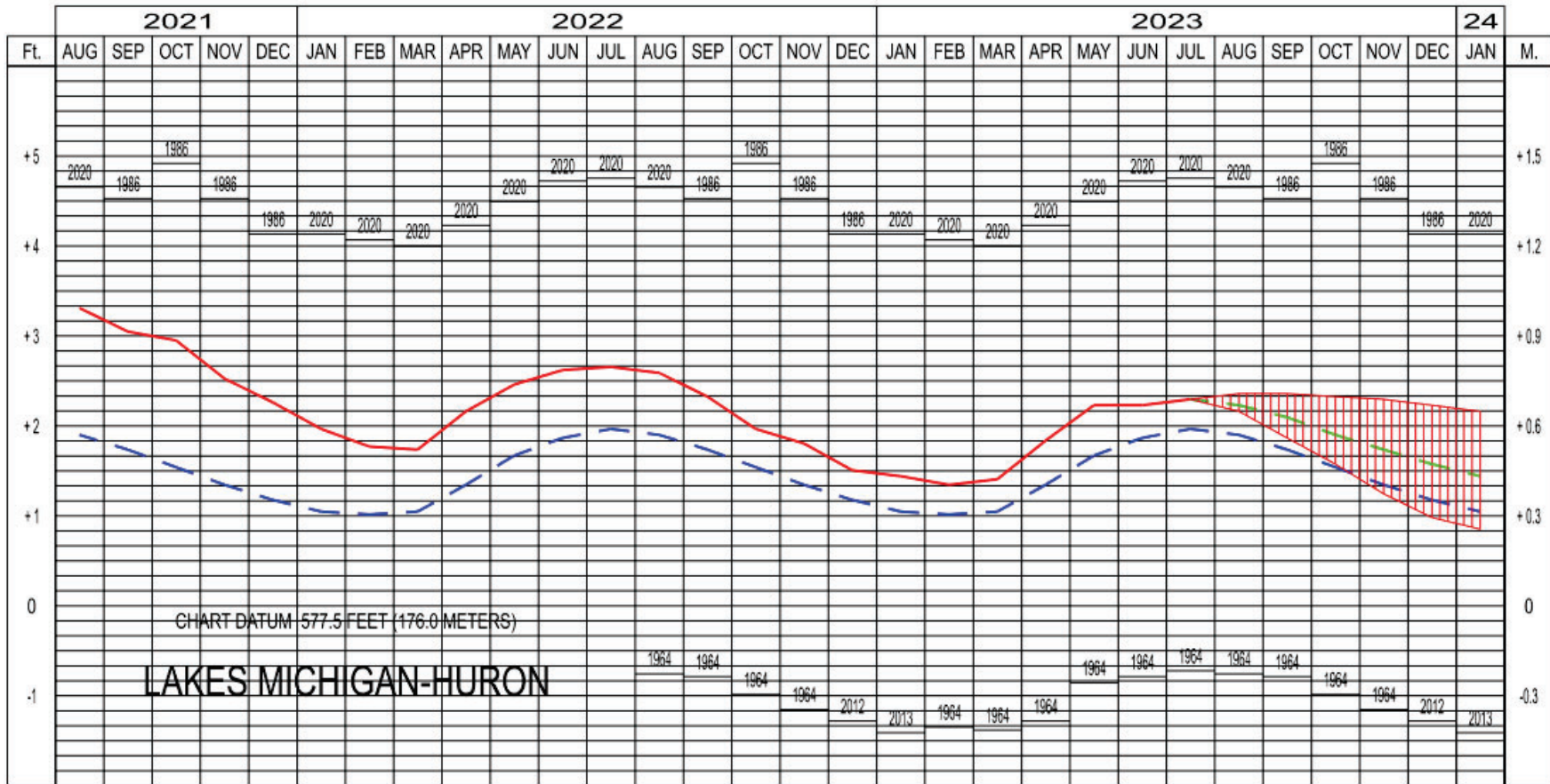
MBRFC 168-Hour Forecast Precipitation
Valid: 12Z 08/16/2023 - 12Z 08/23/2023

Data created: 2023-08-16 11:24Z

- Mississippi River
 - Map of real time streamflow.
 - Mississippi in normal range, except upstream of the Twin Cities.
 - Smaller streams vary from much below normal in Iowa to much above normal in southeast Missouri.



LAKES MICHIGAN-HURON WATER LEVELS - AUGUST 2023



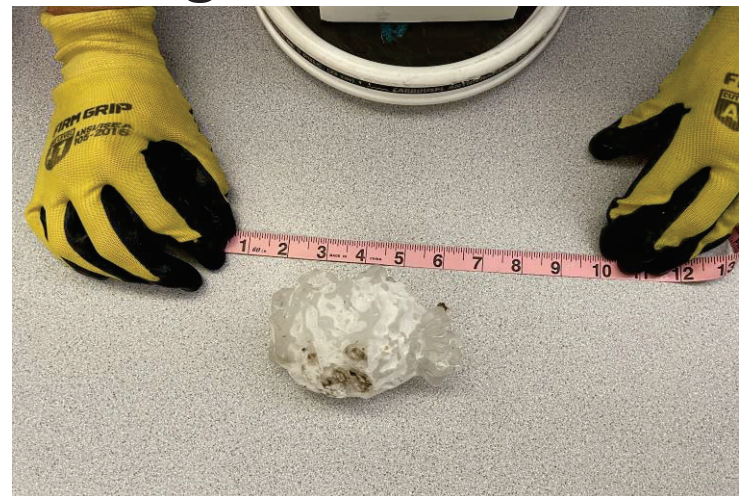
State Impacts



Dissipating storms over north central Iowa: August 16, 2023
-Courtesy Dennis Todey

- Colorado
 - Very warm July Western Colorado, near normal east.
 - Parts of central Colorado has driest July in 129 years. Lack of Summer monsoon.
 - A strong “looping” tornado SW of Yuma and a possible state record hailstone August 8.

Colorado State Record Hailstone? (5.25 inches) that fell between Kirk and Idalia.
Courtesy: Goodland KS NWS



- Nebraska

- Half the state in drought, big improvement since mid-May when 50% of the state was D3-D4.

- Cool July temperatures helped.

- Biggest hydro issues: groundwater in eastern half of state and farm ponds dry.



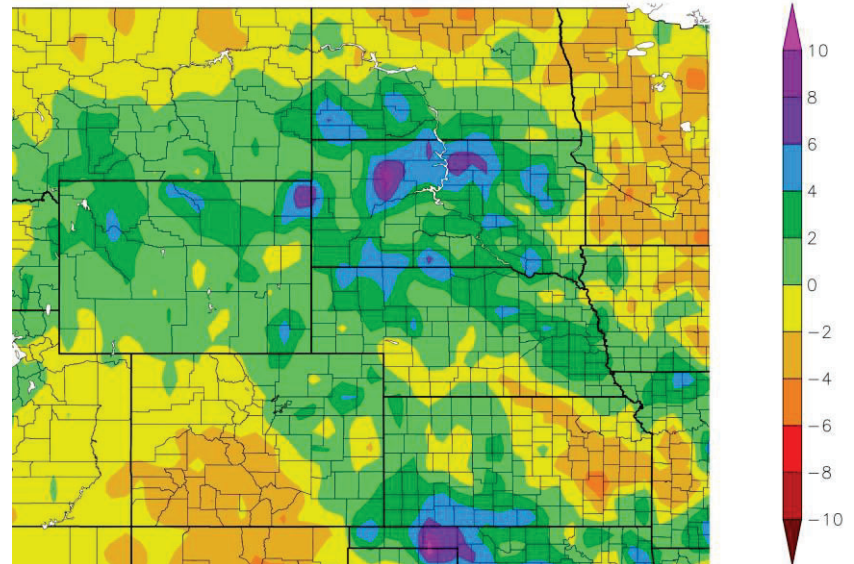
Burnt-up dryland corn

August, 2023

Courtesy: Nebraska Extension

- South and North Dakota
 - North Dakota: Southwest is wetter than normal and there is an anthrax outbreak. North half of the state is in worsening drought.
 - South Dakota has seen general improvement, but still dry in east.

Departure from Normal Precipitation (in)
6/18/2023 – 8/16/2023



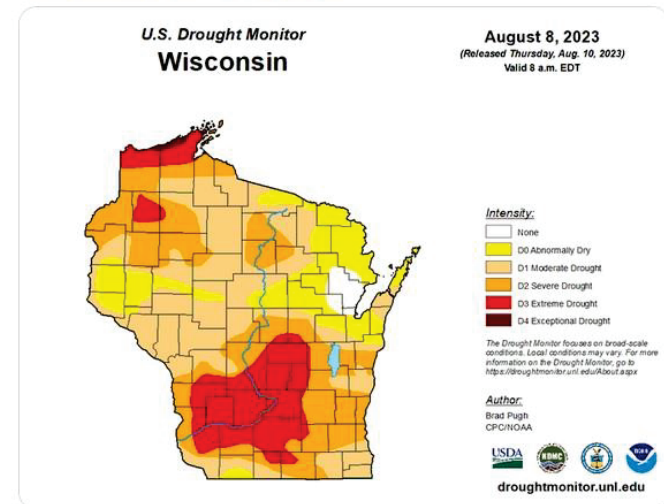
60 -Day departure of normal precipitation

Courtesy: High Plains Regional Climate Center

- Minnesota and Wisconsin
 - Worsening drought conditions until past week.
 - Large variability in crop, pasture conditions.
 - August has been wet in south half of MN, but also came with hail damage to property and crops.
 - First D4 in Wisconsin in 23 years

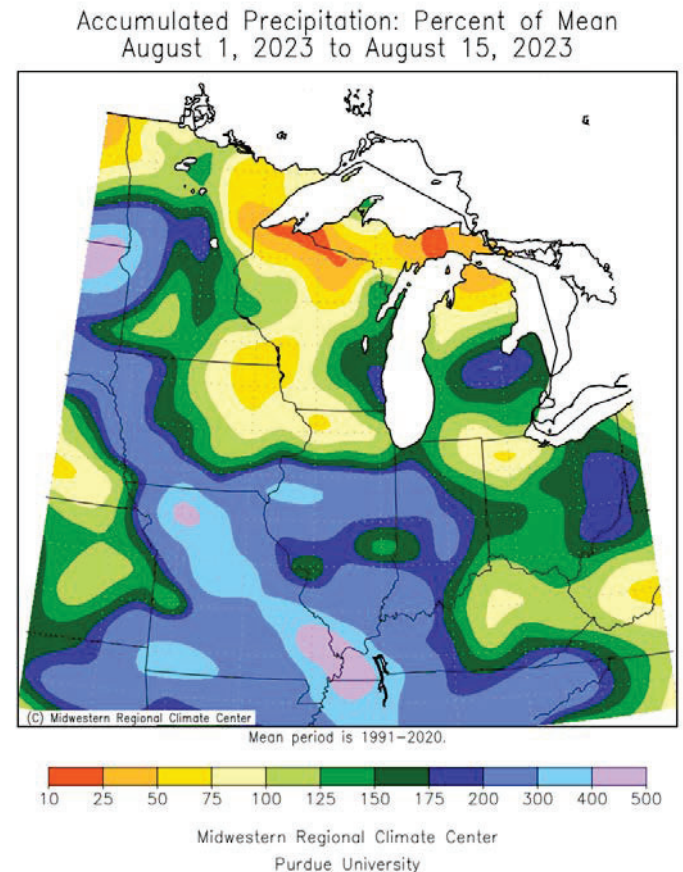
 **Steve Vavrus**
@WI_ClimateSCO

History has been made. . . the first D4 drought designation in Wisconsin since the US Drought Monitor began in 2000. Only a sliver in extreme northwest WI, but that's not much consolation to folks in arid @DouglasCountyWI or @Bayfield_WI.



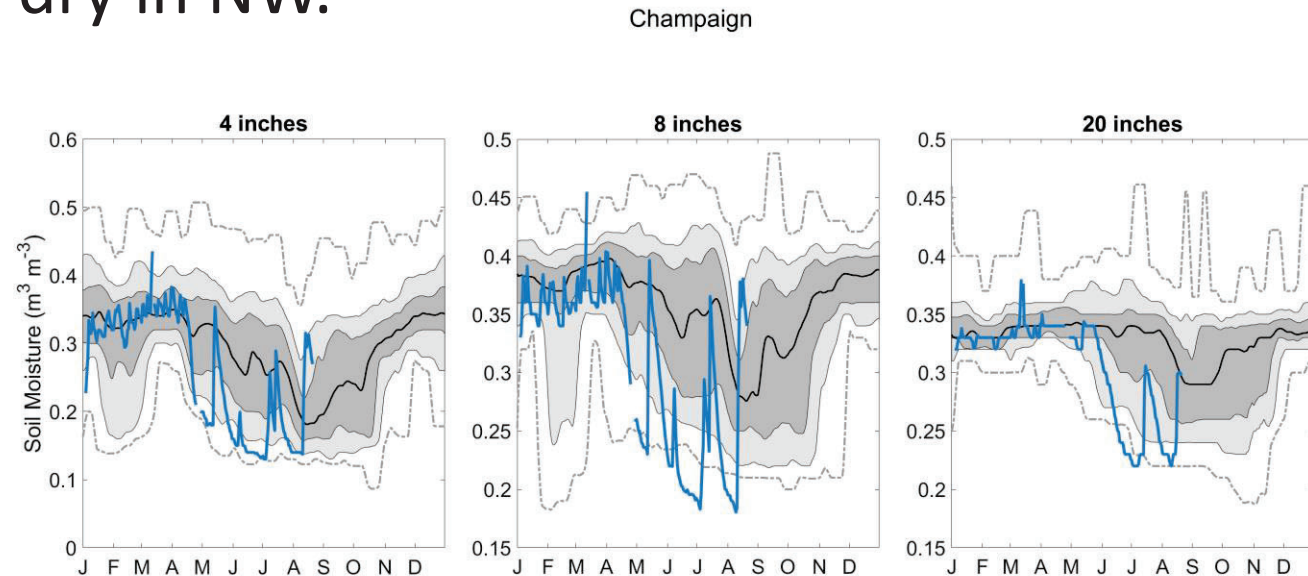
9:48 AM · Aug 10, 2023 · 1,050 Views

- Iowa and Missouri
 - A “cool drought” in Iowa.
 - Crops are looking good in IA, although trending drier in NE.
 - From dry to wet in Missouri.
 - Mississippi County, MO saw a foot of rain.
 - Soil moisture is up, streams and creeks are up and pastures greening up.
 - Long term deficits still present.



- Illinois

- Improvements in soil, stream and crop conditions in central and southern IL.
- Deeper soils are starting to see improvement.
- Still dry in NW.



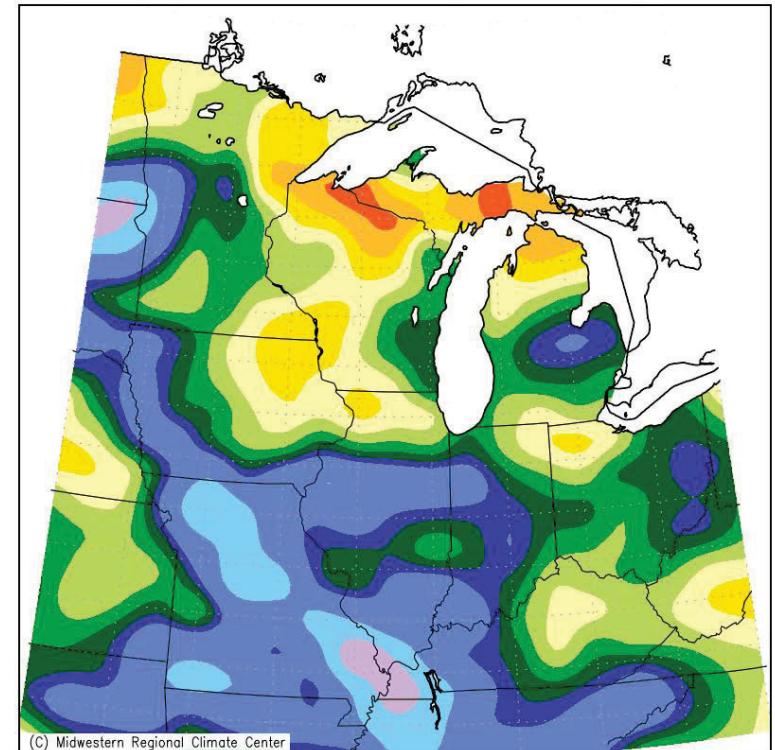
Soil Moisture at Champaign, IL

Courtesy: Trent Ford Illinois State Climatology
 Office



- **Indiana**
 - Receding from drought.
 - Some Sudden Death Syndrome on early planted soybeans in south.
 - Crops otherwise progressing. Pumpkins and watermelon look good.

Accumulated Precipitation: Percent of Mean
August 1, 2023 to August 16, 2023

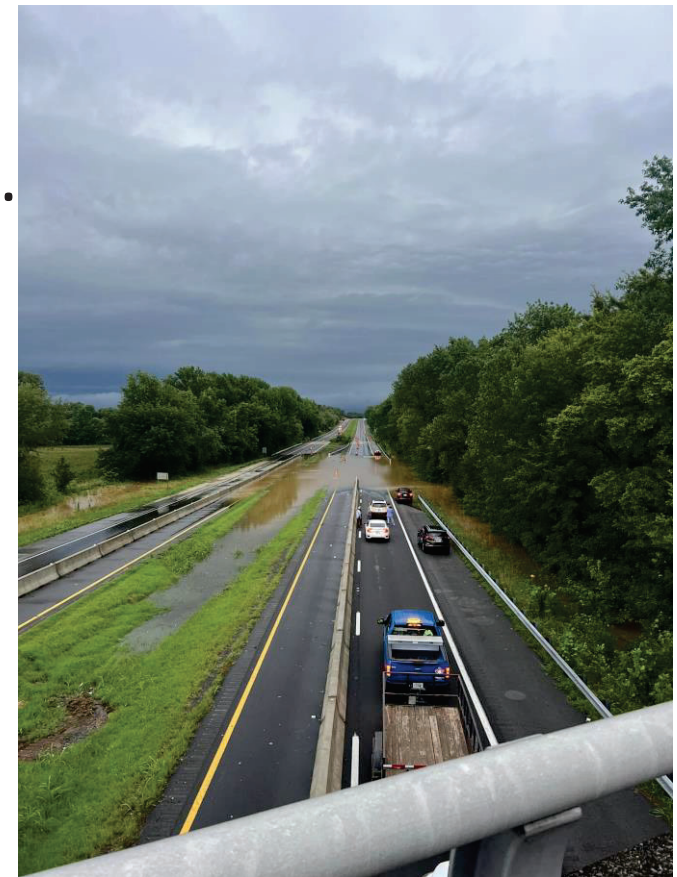
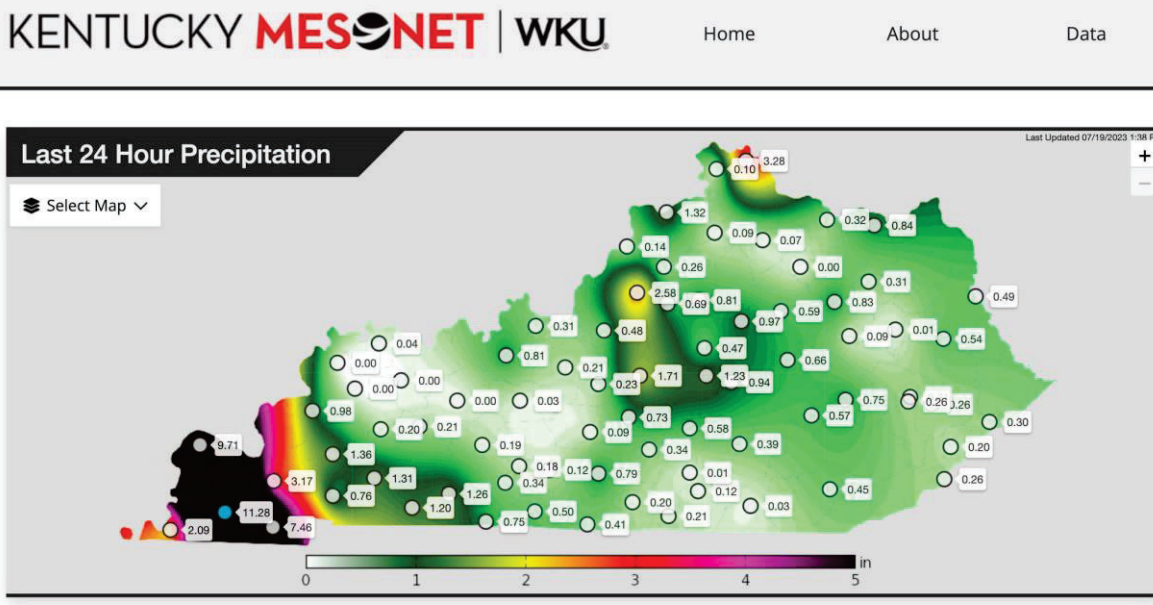


Mean period is 1991–2020.



Midwestern Regional Climate Center
Purdue University

- Kentucky and Ohio
 - Possible Kentucky state record of 11.22 inches of rain in 24 hours at Graves County Mesonet.
 - Active severe wx in Ohio.
 - Algae on western Erie present.



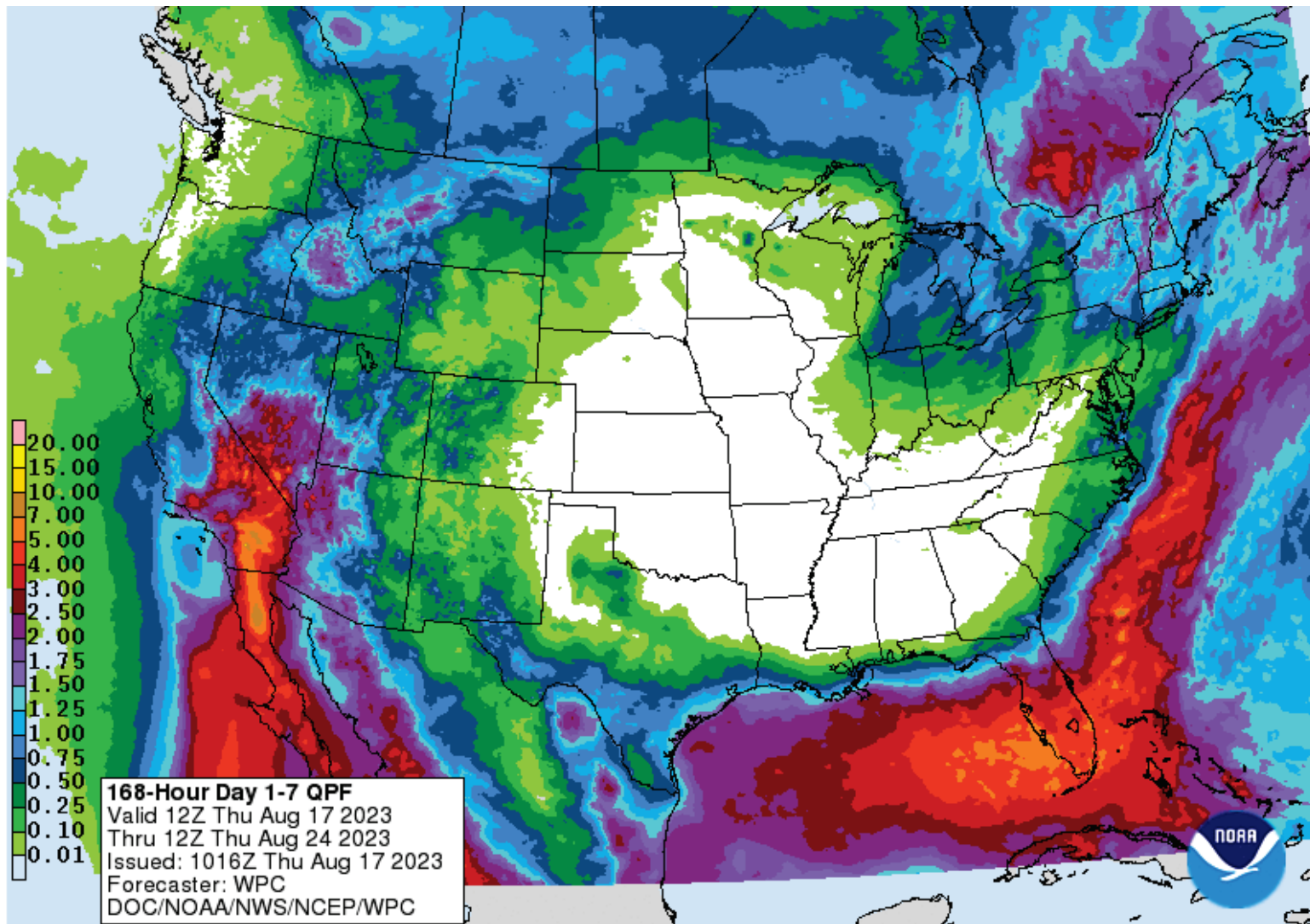
Flooding on I69 near Mayfield July 19, 2023
Courtesy: Jerry Brotzge Kentucky State Climatology Office

Climate Outlooks

- 7-day QPF
- 8-14 day outlook
- September temperature and precipitation
- Sep-Nov temperature and precipitation

7-day Quantitative Precipitation Forecast

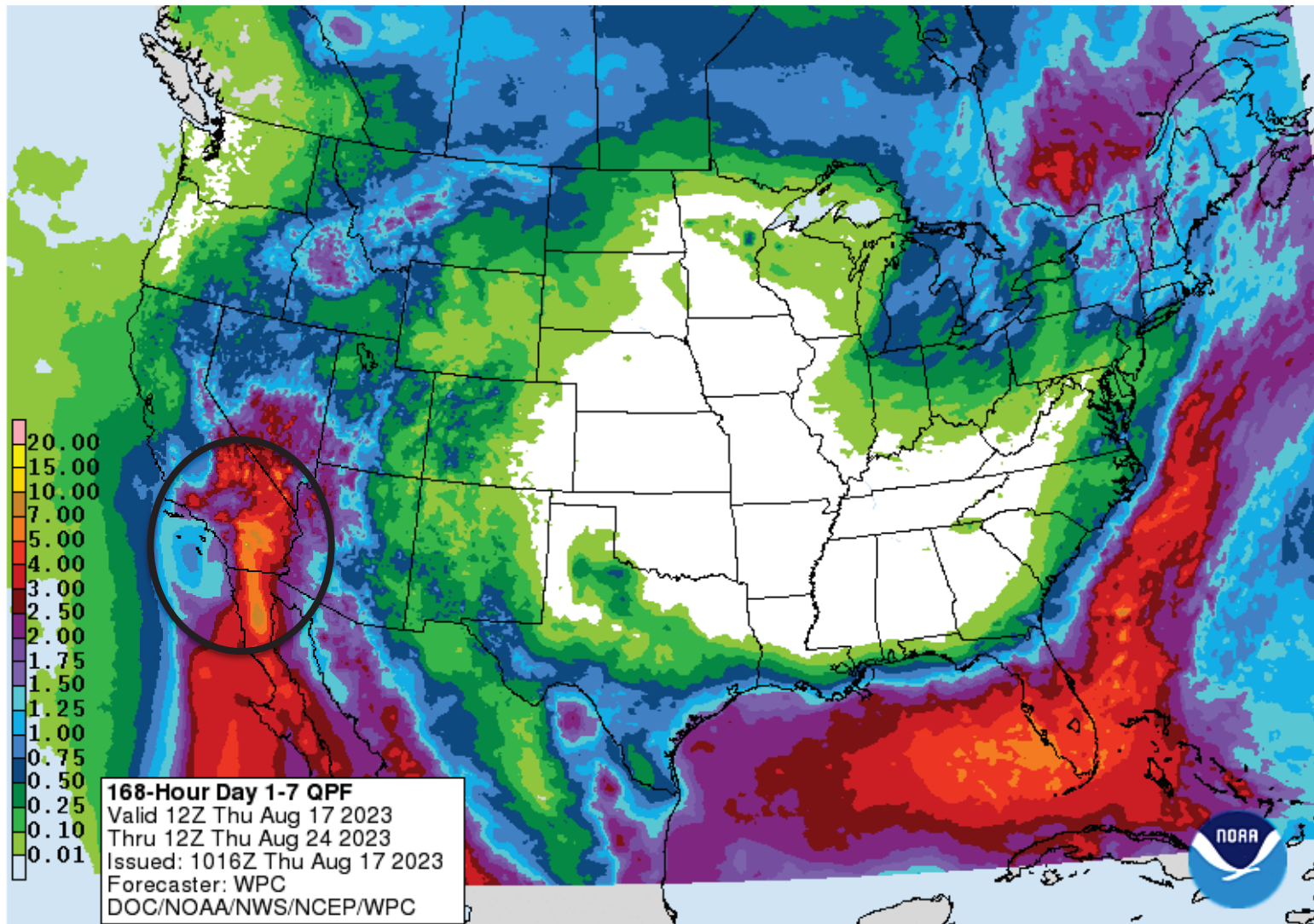
Valid: August 17-24



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

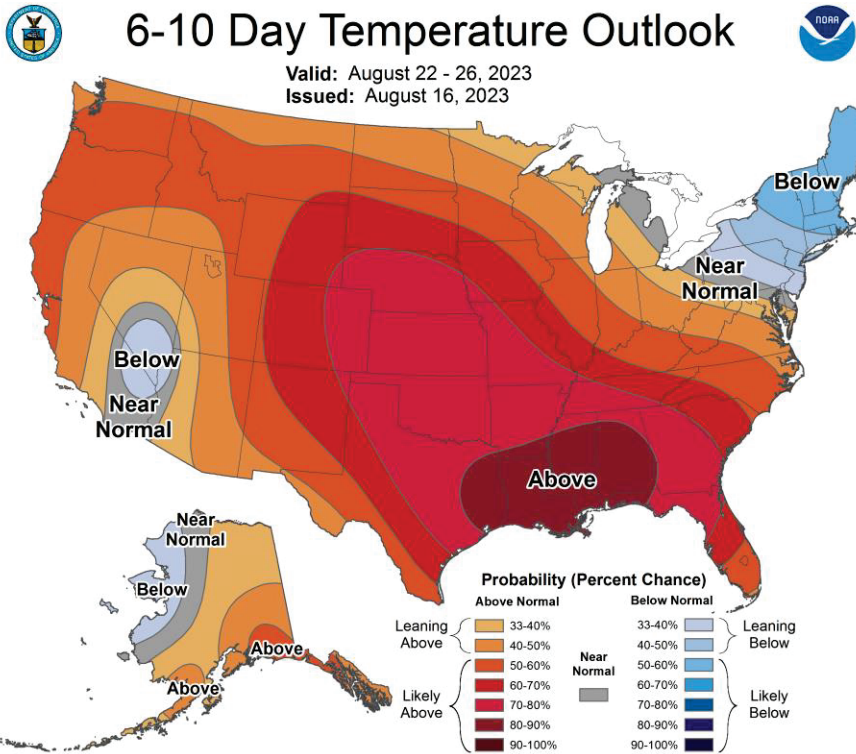
7-day Quantitative Precipitation Forecast

Valid: August 17-24

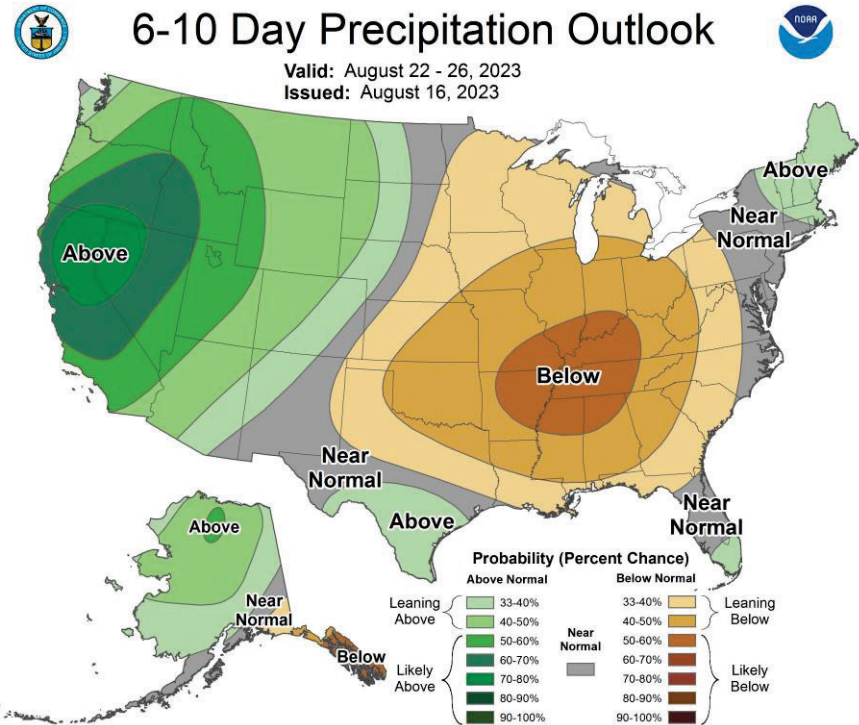


<https://www.wpc.ncep.noaa.gov/qpf/day1-7.shtml>

6-10 Day (August 22-26) Outlook



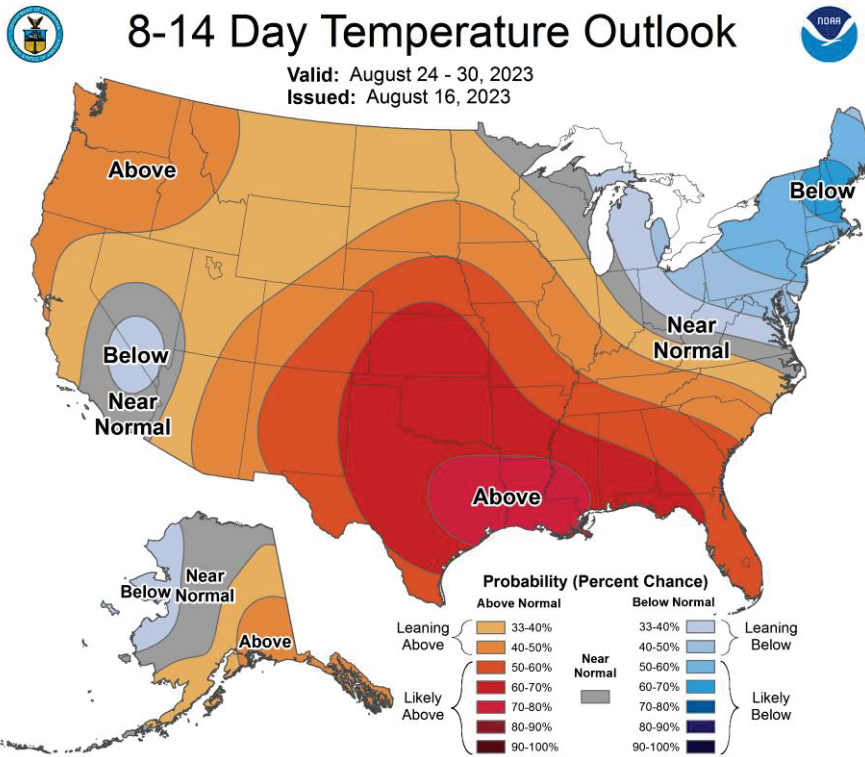
Temperature



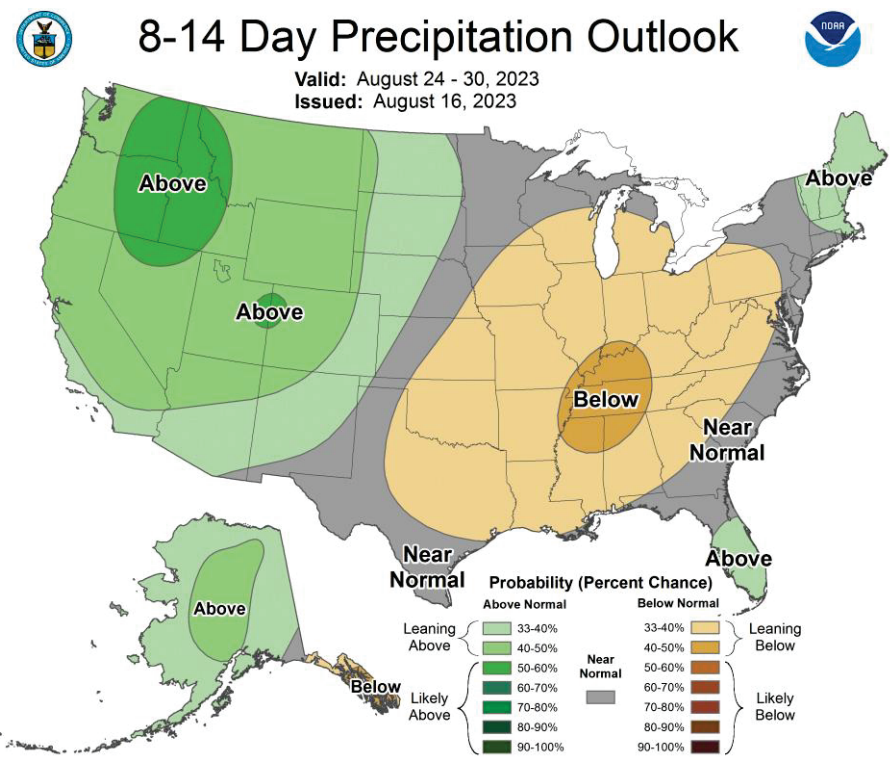
Precipitation

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

8-14 Day (August 24-30) Outlook



Temperature



Precipitation

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



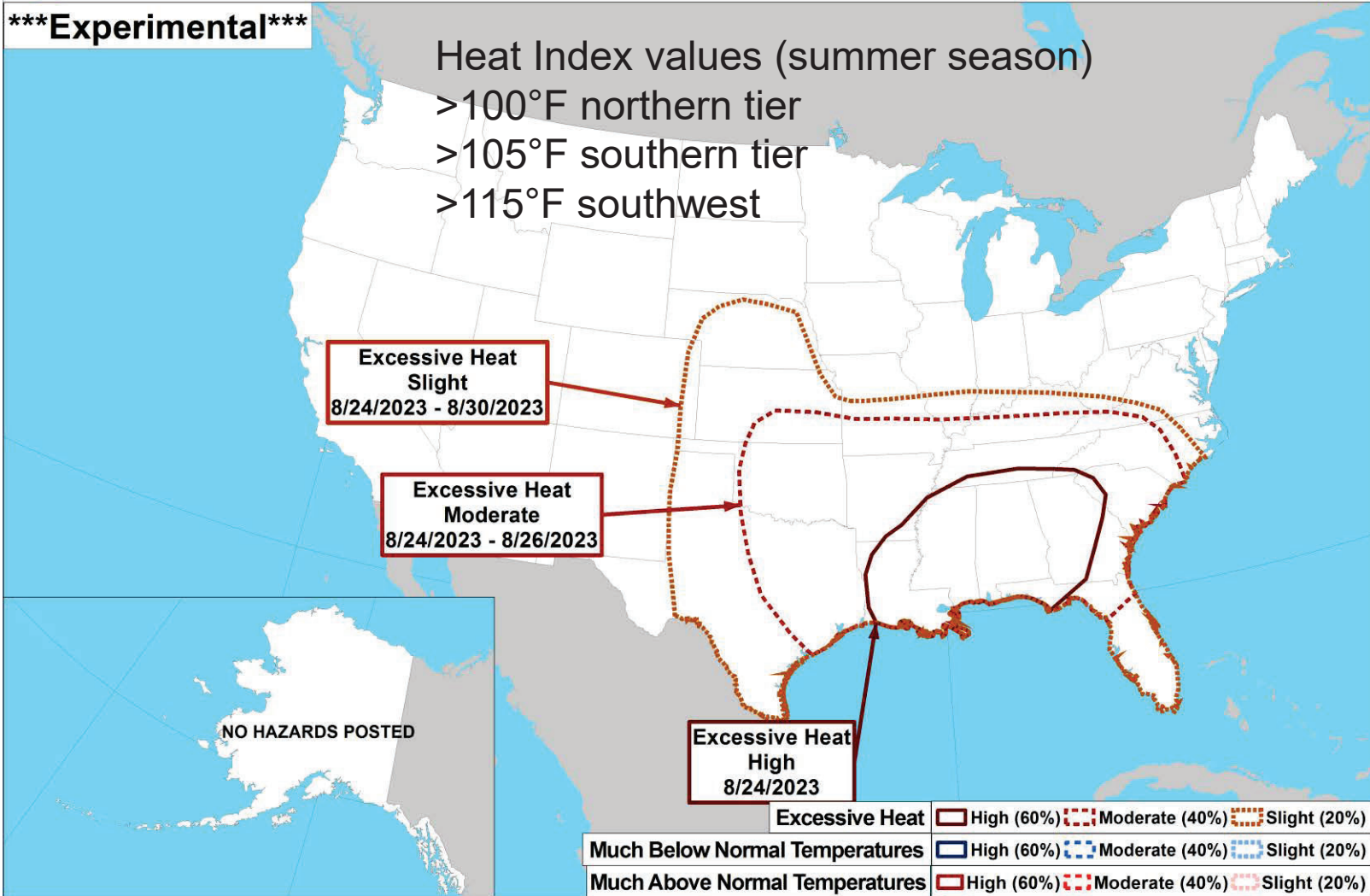
Risk of Hazardous Temperatures

Valid: 08/24/2023-08/30/2023



Experimental

Heat Index values (summer season)
 >100°F northern tier
 >105°F southern tier
 >115°F southwest



Climate Prediction Center

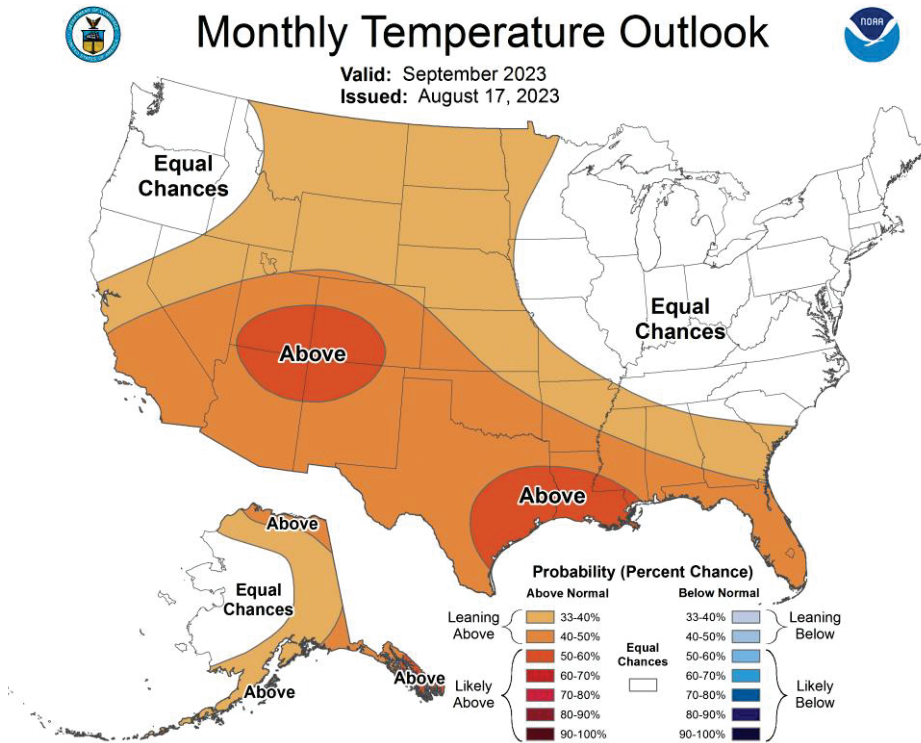
Made: 08/16/2023 3PM EDT

Follow us:

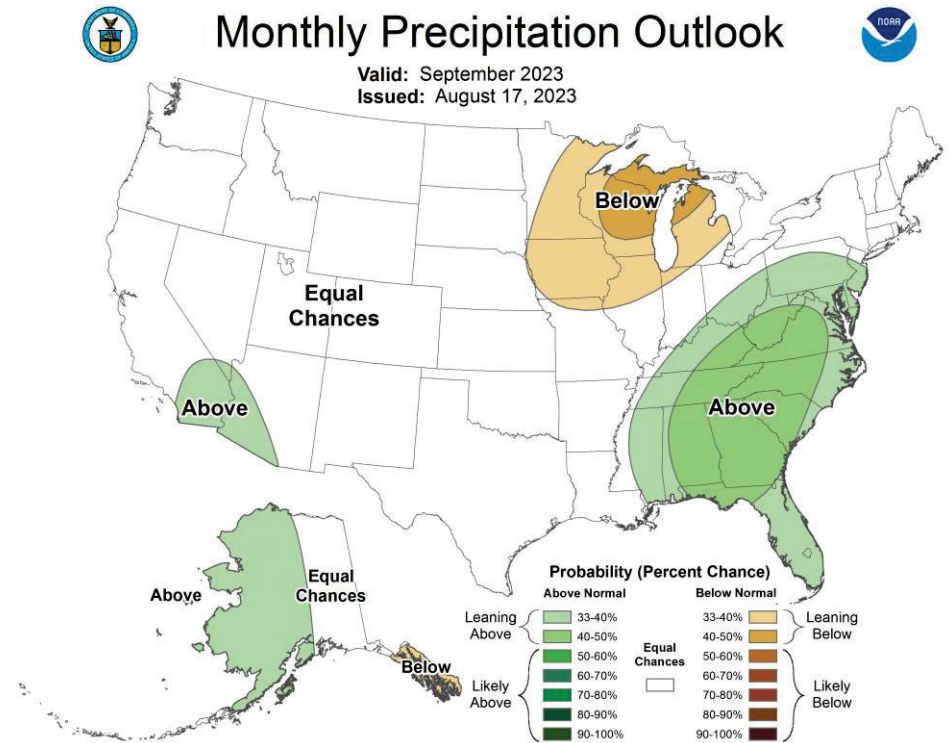
www.cpc.ncep.noaa.gov

https://www.cpc.ncep.noaa.gov/products/predictions/threats/temp_probhazards_d8_14_contours.png

September Outlook

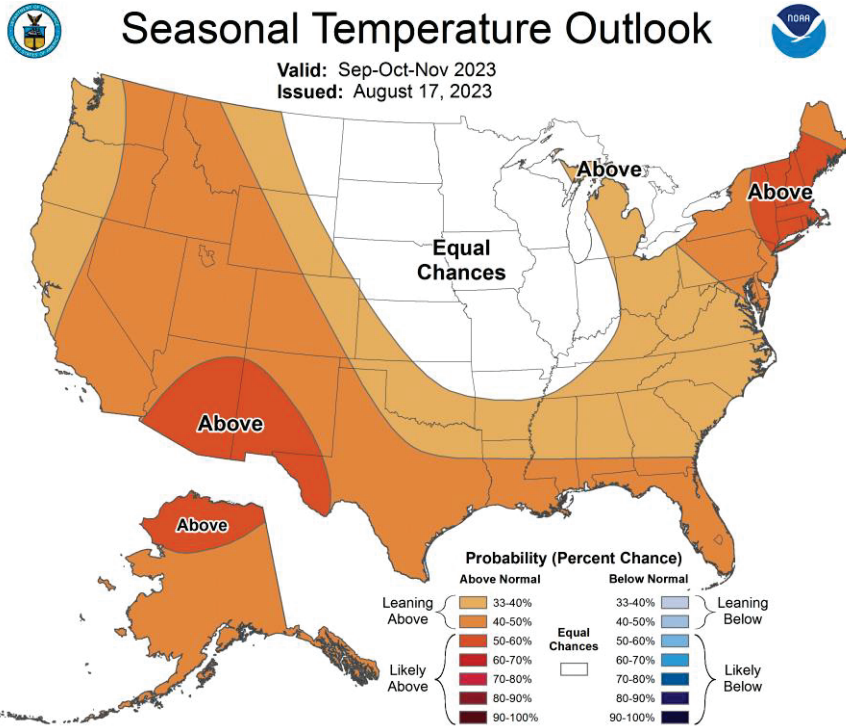


Temperature

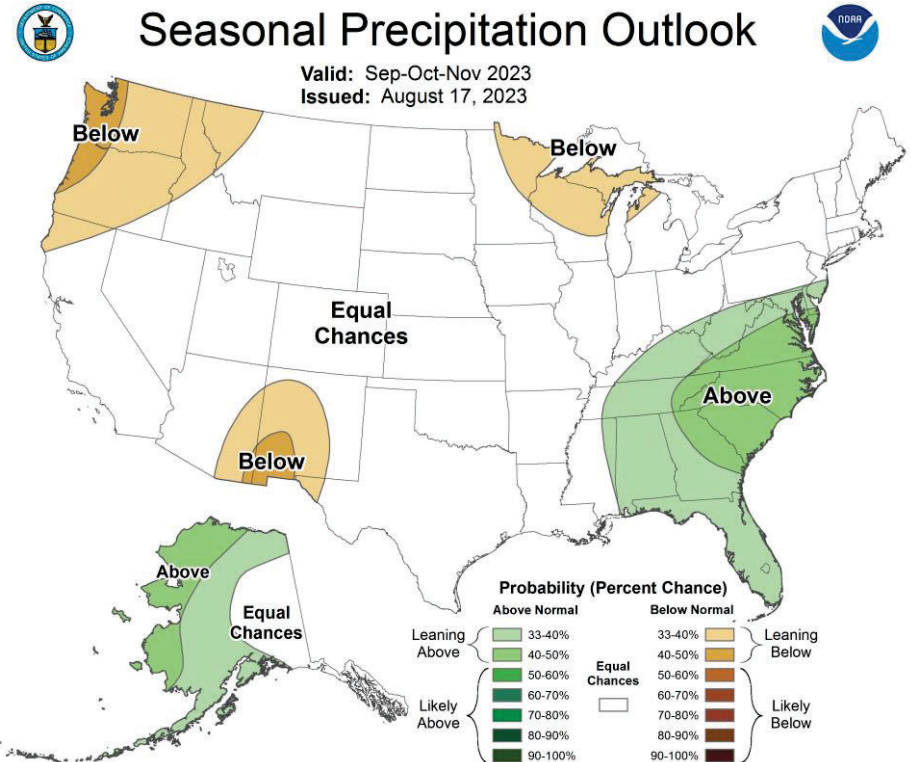


Precipitation

Climate Prediction Center Outlook: Autumn (September-November) 2023



Temperature



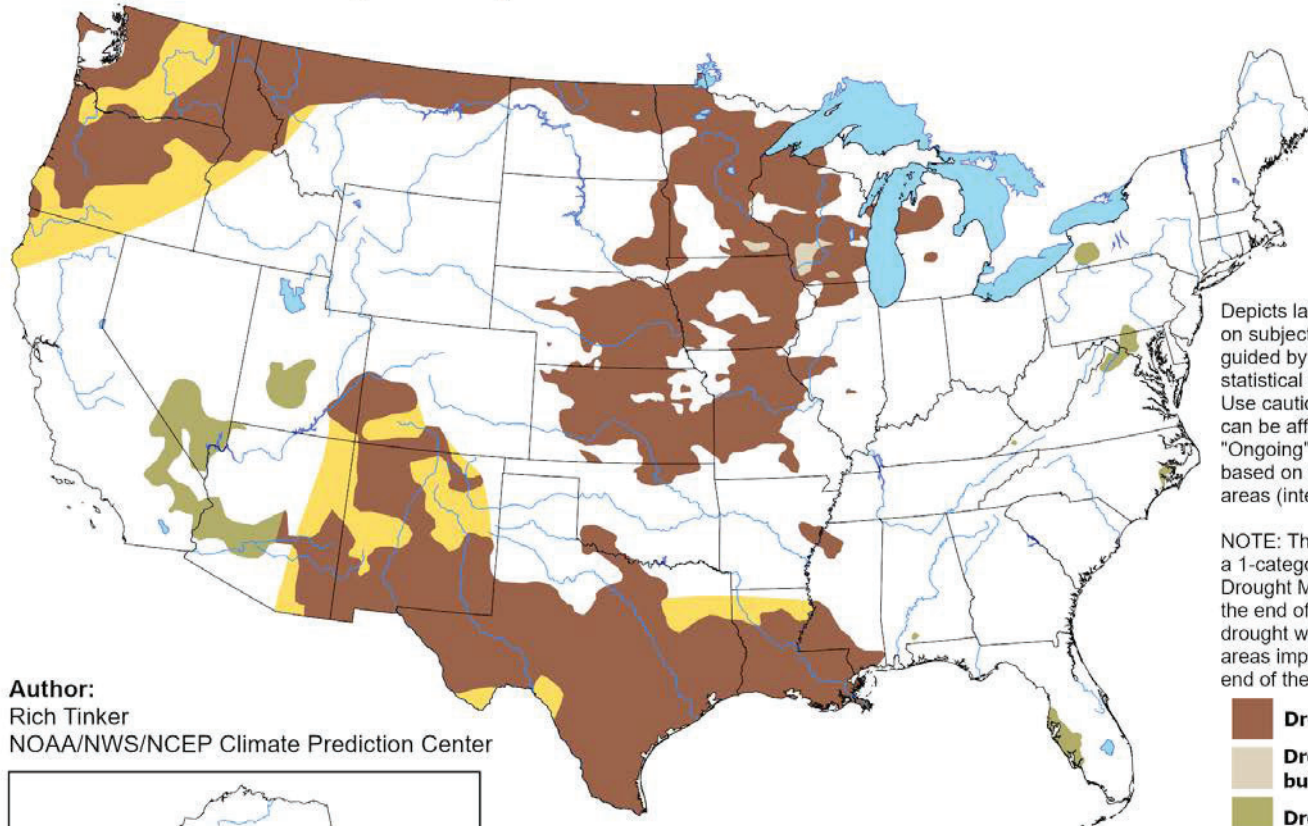
Precipitation

https://www.cpc.ncep.noaa.gov/products/predictions/long_range/lead02

Seasonal Drought Outlook

U.S. Seasonal Drought Outlook Drought Tendency During the Valid Period

Valid for August 17 - November 30, 2023
Released August 17, 2023

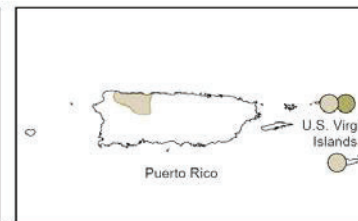
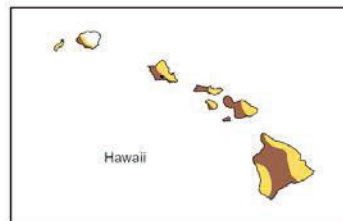


Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to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

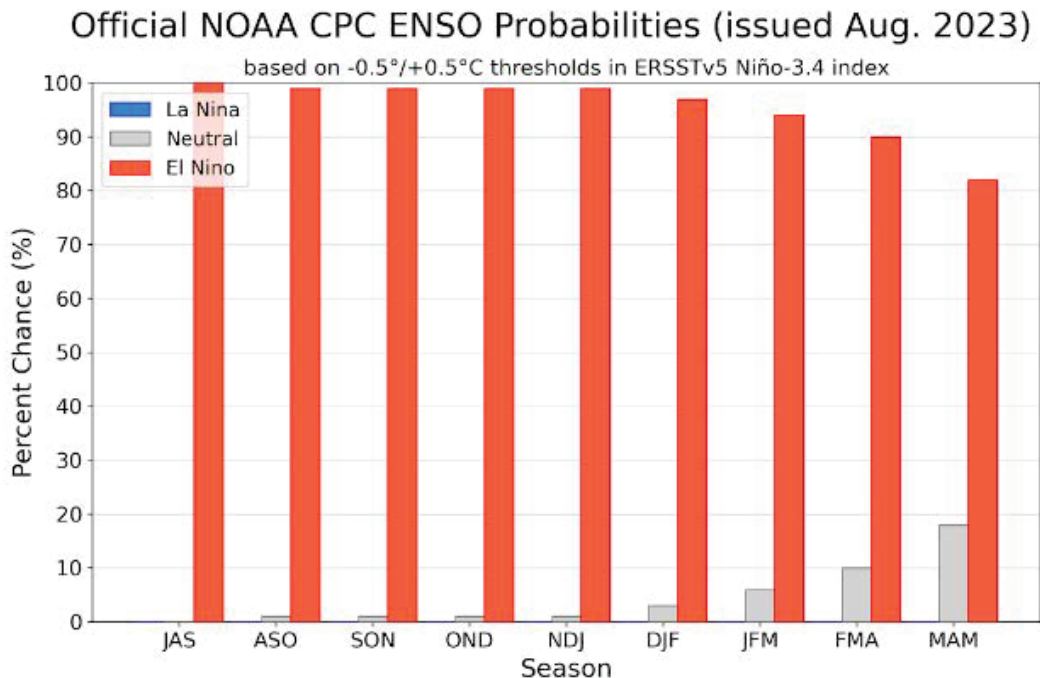


<https://go.usa.gov/3eZ73>

http://www.cpc.ncep.noaa.gov/products/expert_assessment/season_drought.png

EL NIÑO/SOUTHERN OSCILLATION (ENSO)

Under an El Niño advisory. Chances of El Niño persisting into the 2023-24 Winter is greater than 95%. There is a 56% chance of a strong El Niño this winter. (1.5 degrees C) Winter of 2015-16 was the last strong El Niño.



Outlook Summary

- Heat is returning, with scant precipitation other than on the edges of the ridge.
- Equal chances to a tilt to above normal temperatures through the autumn.
- A tendency for below normal precipitation in the Great Lakes region.
- Drought issues are likely to continue, but not universal.

Further Information - Partners

- **Today's and Past Recorded Presentations:**

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

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

NOAA's National Centers for Environmental Information:

<https://www.ncei.noaa.gov/>

- Monthly climate reports (U.S. & Global):

- <https://www.ncei.noaa.gov/access/monitoring/monthly-report/>

- NOAA's Climate Prediction Center: www.cpc.ncep.noaa.gov

- 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

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

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

Thank You and Questions?

- Questions:
 - **Climate:**
 - Pete Boulay: Peter.Boulay@state.mn.us , 651-539-2150
 - Dennis Todey: dennis.todey@ars.usda.gov , 515-294-2013
 - Doug Kluck: doug.kluck@noaa.gov, 816-994-3008
 - Molly Woloszyn: molly.woloszyn@noaa.gov
 - Melissa Widhalm: mwildhalm@purdue.edu; 765-494-8191
 - Gannon Rush: grusch2@unl.edu
 - Brian Fuchs: bfuchs2@unl.edu 402-472-6775

- **Weather:**
- crhroc@noaa.gov

Paul and Babe in
Bemidji MN
Courtesy Pete Boulay

