



Midwest Climate Hub
U.S. DEPARTMENT OF AGRICULTURE

North Central US Climate- Drought Outlook 16 November 2023

Dr. Dennis Todey – Review/Impacts
Director – USDA Midwest Climate Hub
National Laboratory for Agriculture
and the Environment (ARS)
Ames, IA

dennis.todey@usda.gov
515-294-2013



United States Department of Agriculture
Midwest Climate Hub

General Information

- **Providing climate services to the North Central US**
 - Collaboration Activity Among:
 - NOAA NCEI/NWS/OAR/NIDIS/
 - USDA Climate Hubs
 - American Association of State Climatologists
 - Midwest and High Plains Regional Climate Centers
 - National Drought Mitigation Center
 - National Integrated Drought Information System (NIDIS)
- **Next Regular Climate/Drought Outlook Webinar**
 - December 21, 2023 (1 PM CDT) Steve Vavrus– Wisconsin State Climatologist – University of Wisconsin-Madison
- **Access to Future Climate Webinars and Information**
- <http://www.drought.gov/drought/content/regional-programs/regional-drought-webinars>
 - <https://mrcc.purdue.edu/multimedia/webinars.jsp>
 - <https://hprcc.unl.edu/webinars.php>
- **Open for questions at the end (enter them along the way).**

Agenda

- **Current Conditions/Review**
- **Impacts**
 - Issues/Events
 - Hydro
 - Ag
 - Fire
 - Other
- **Outlooks (Kluck)**
 - El Niño winter
 - Drought
 - Winter



November 2022

Photo:
Cheryl Todey Ames, IA
October 2023

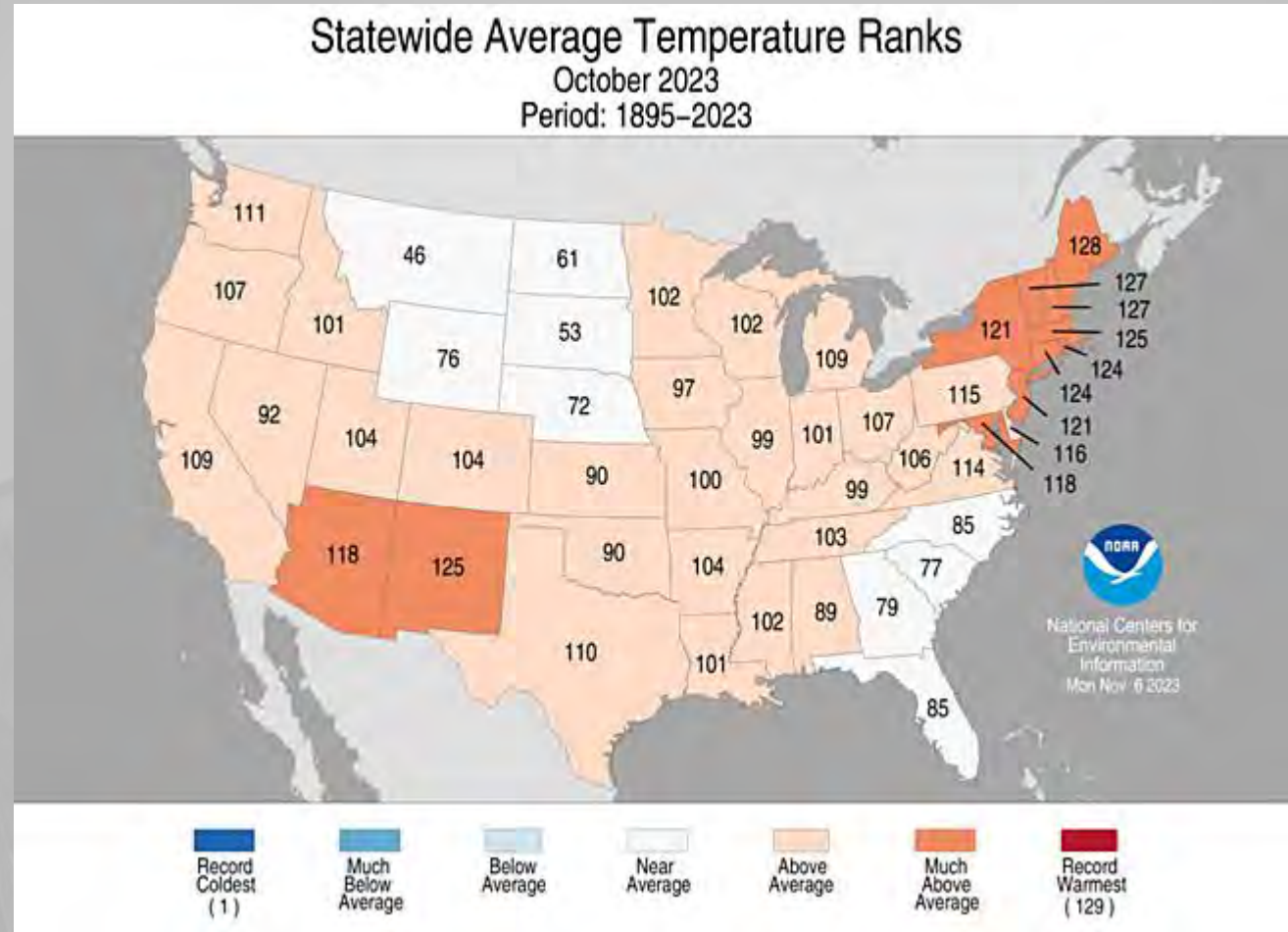
REVIEW/CURRENT CONDITIONS



October Temperature Recap

Largely warmer than average.
Affected by late month cool.

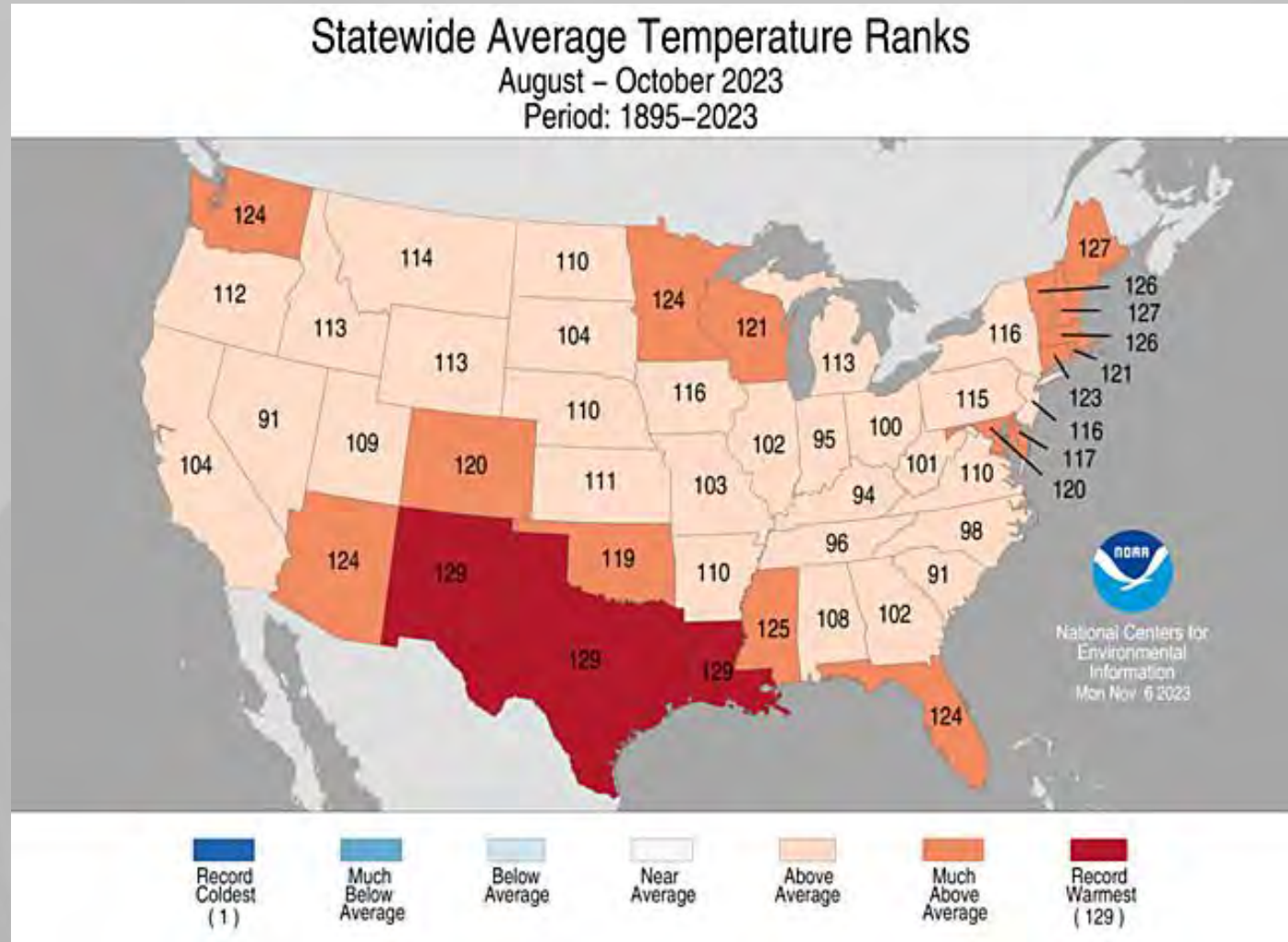
Plains highs would be cooler than average (not pictured)



August-October Temperature Recap

Very warm regionally.

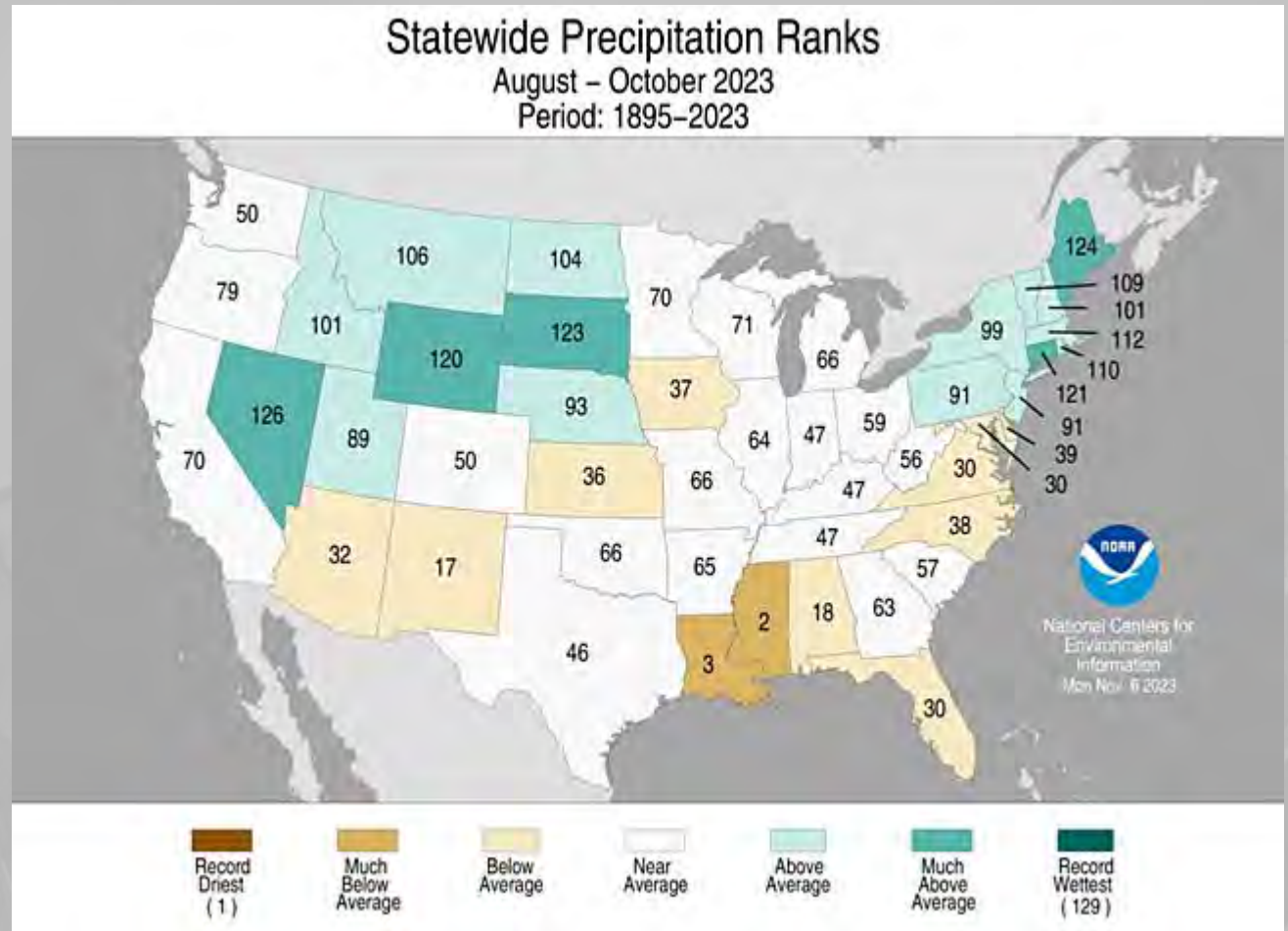
Top 10 MN, WI, CO



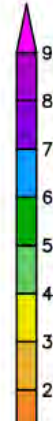
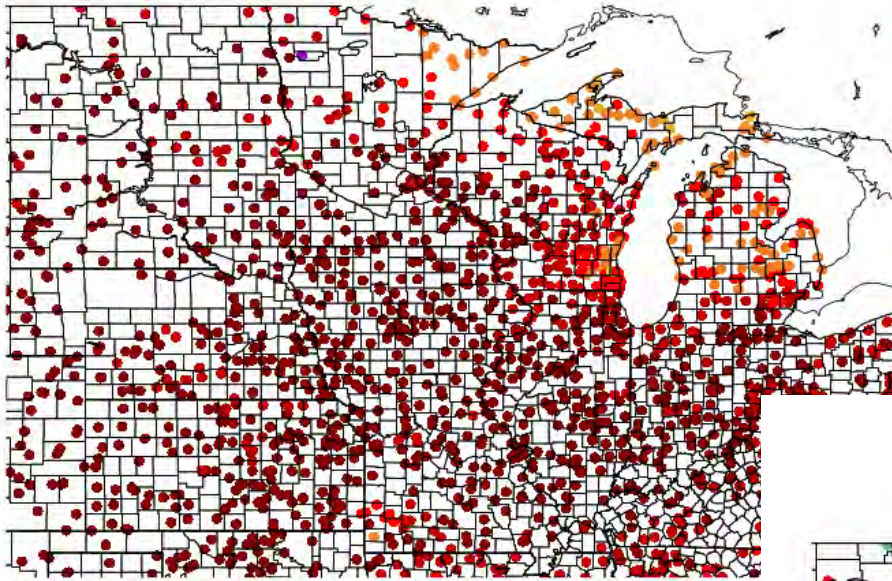
August-October Precipitation Recap

Precipitation amounts larger in Plains. Drier in IA/KS. Moderate elsewhere.

Top 10 wettest WY, SD.

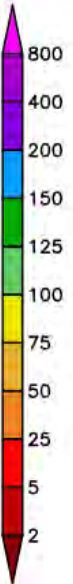
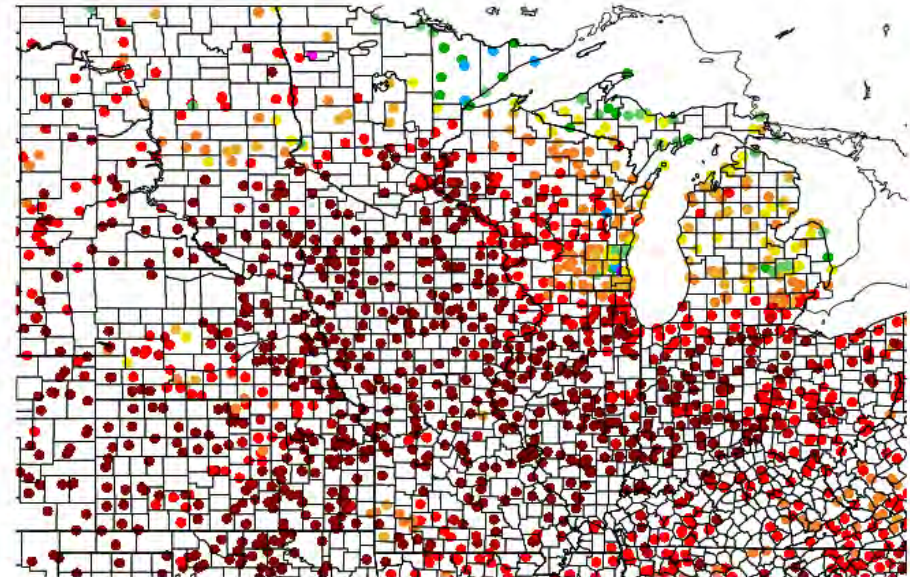


Precipitation (in) 11/1/2023 - 11/15/2023



Last 15 days Precipitation

Percent of Normal Precipitation (%) 11/1/2023 - 11/15/2023



Generated 11/16/2023 at HPRCC using provisional data.

NC

- Very dry over most of the region.
- Overall dry time of year.
- But not much help for drought conditions/worsening.

Generated 11/16/2023 at HPRCC using provisional data.

NOAA Regional Climate Centers

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

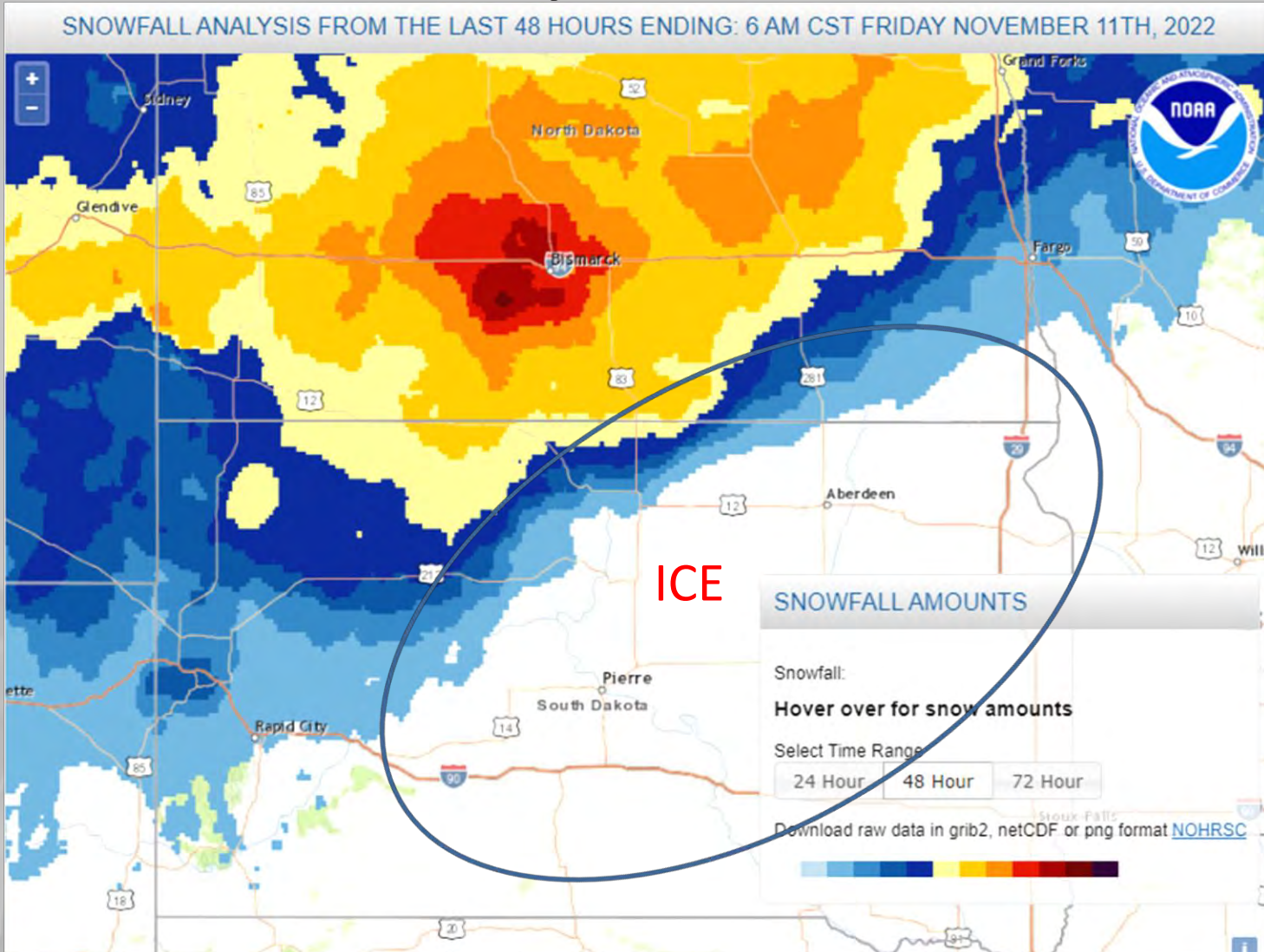


Snow falling and covering the ground near Como Park in St. Paul on the morning of October 31, 2023.

Image credit: Minnesota DNR, State Climatology Office

ISSUES/EVENTS

Main event – cold Halloween/first winter system



Lake Erie Harmful Algal Blooms



- 2023 SI 5.3 – moderately severe
- 2023 2nd earliest start date (4 July) since 2002.
- Cooler temps and winds (Sept.) reduced biomass, continued into Oct.

HYDROLOGIC IMPACTS

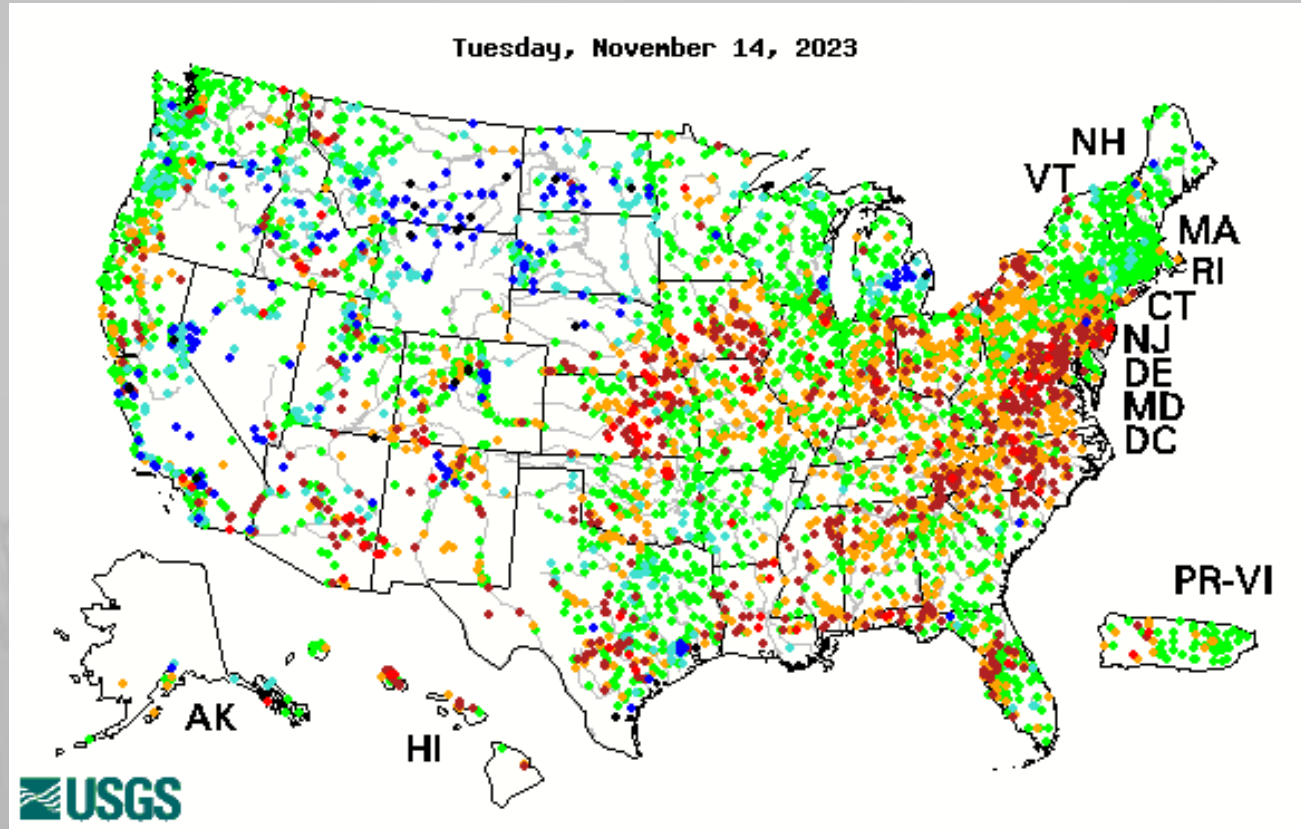


Photo:
Via Matt Sittel
Cottonwood River KS

7-Day Average Streamflow

Tuesday, 14 November 2023

- Widespread low streamflow Plains and Great Lakes/Ohio Valley
- Above average stream flows Northern Plains/MI.
- Recent rains have pulled parts of Midwest back to near-normal (note that can still be low this time of year).

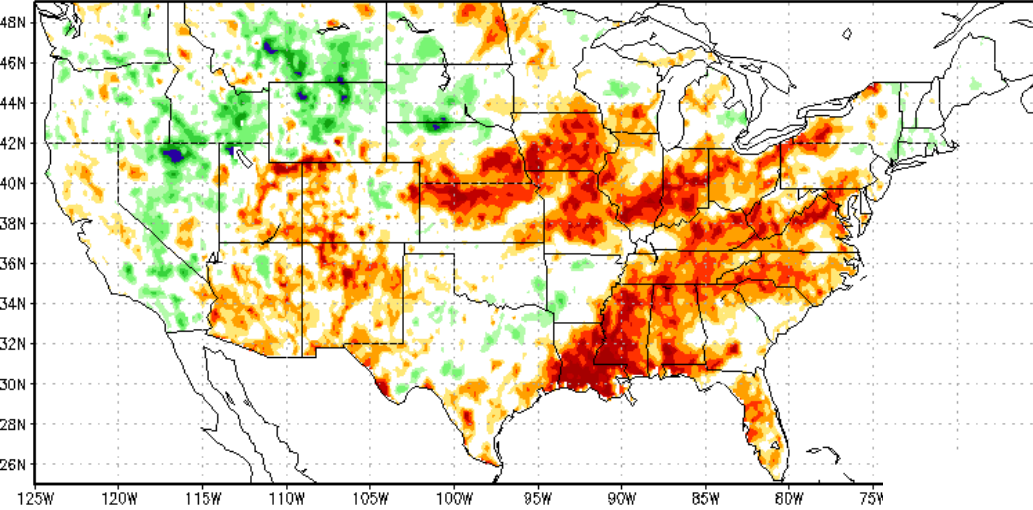


<http://waterwatch.usgs.gov/index.php?id=pa07d>

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

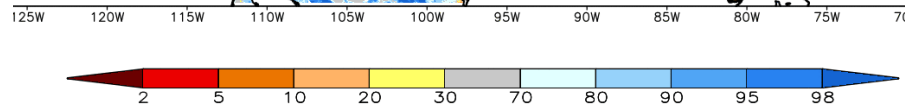
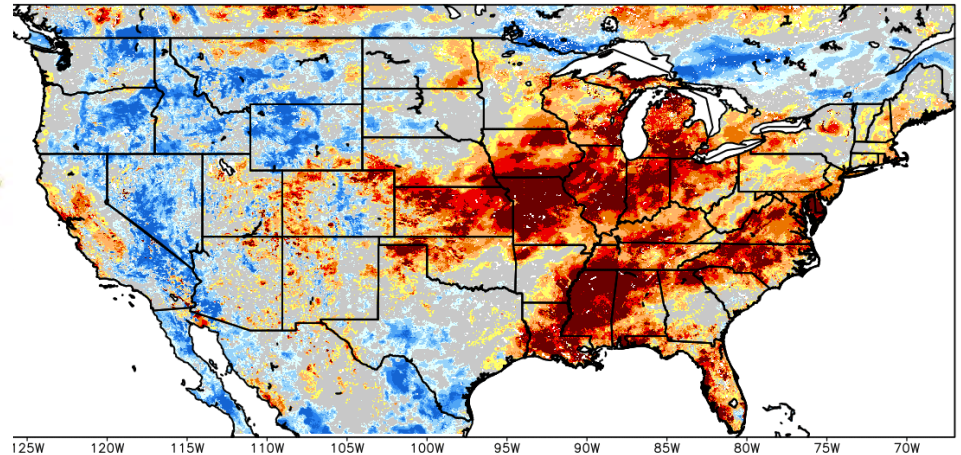
Soil Moisture

Ensemble-Mean Current SMP 11 Nov 2023

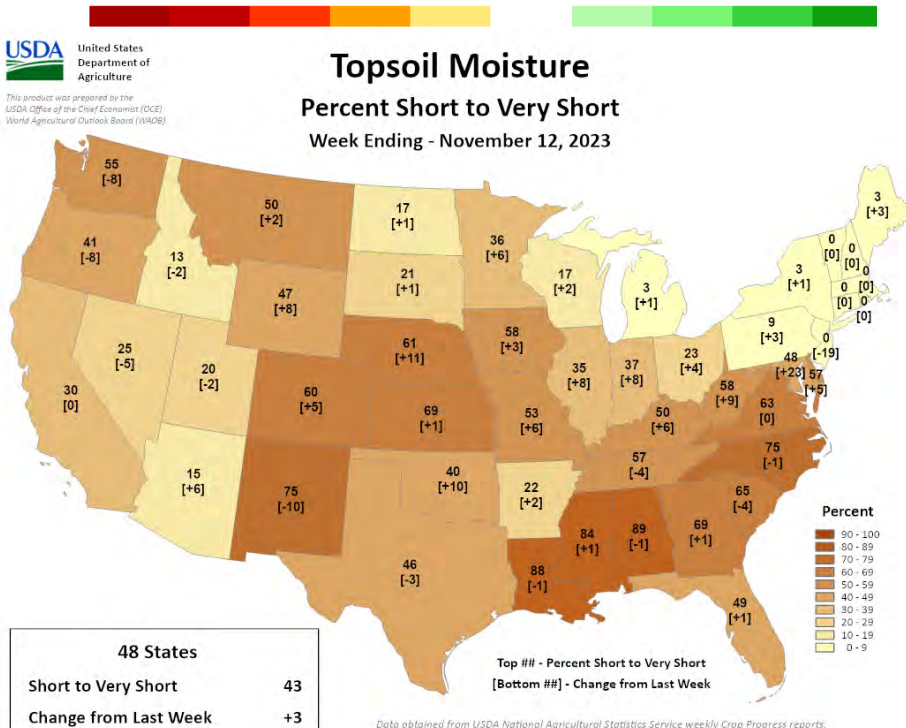


- Large areas of very dry soils – (during a usually drier time of year)
- Some recovery nrn Plains

SPoRT-LIS 0-100 cm Soil Moisture percentile valid 15 Nov 2023



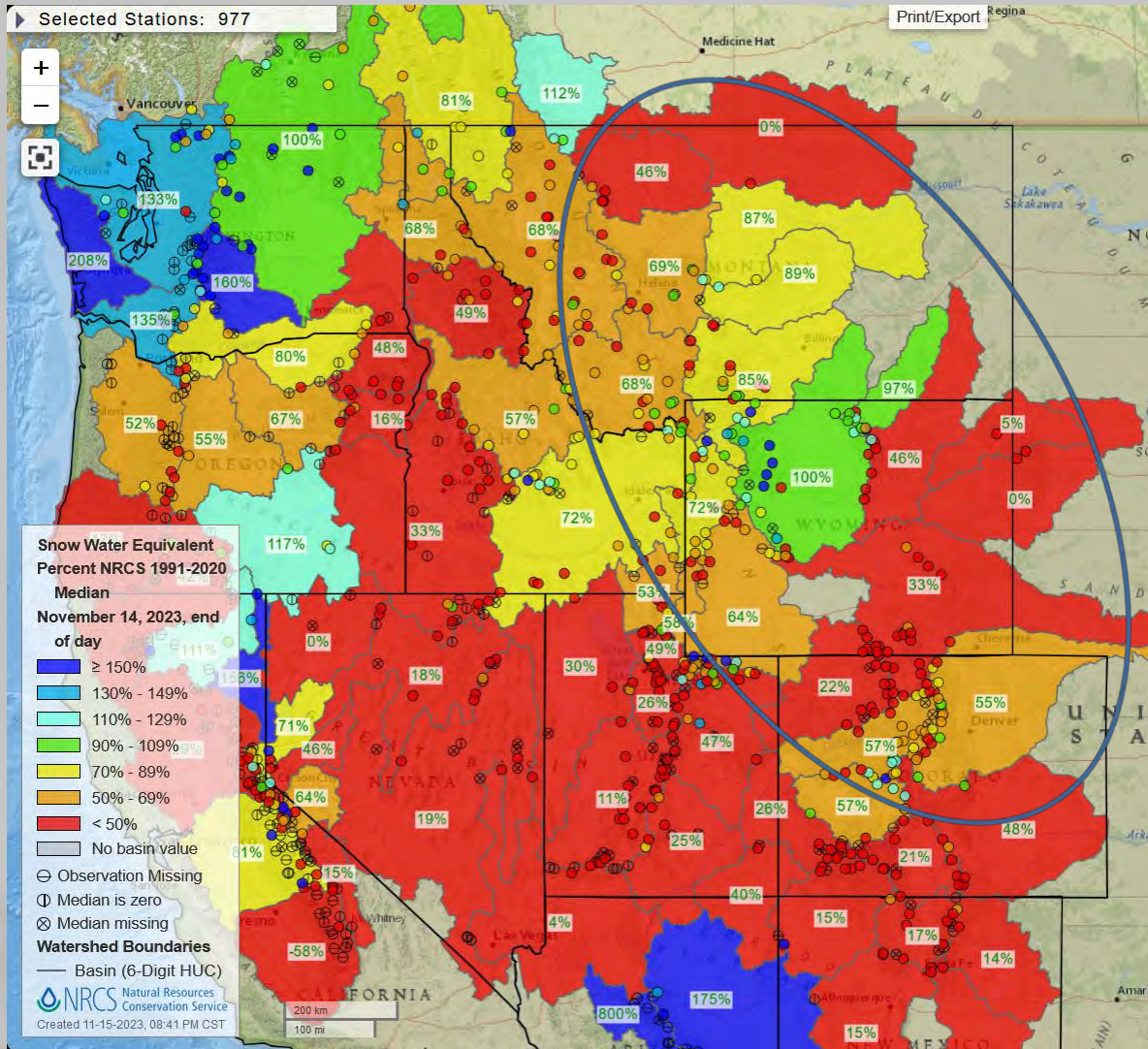
E**
rimental**



https://weather.msfc.nasa.gov/sport/case_studies/lis_CONUS.html
USDA-NASS data – map courtesy Brad Rippey USDA-OCE
c.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml#

NRCS Snow Water Equivalent

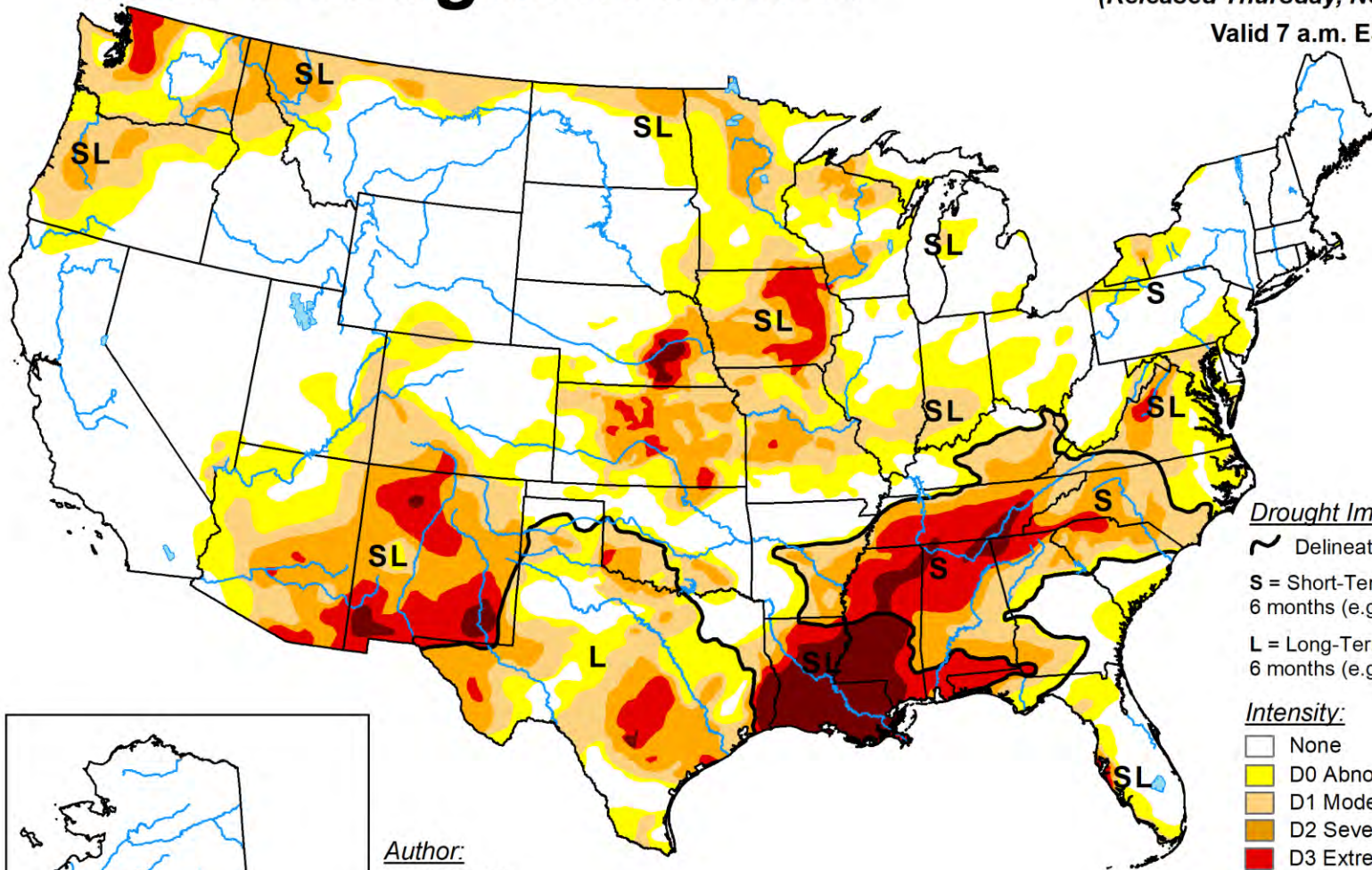
- Still very early
- Most basins below average..



U.S. Drought Monitor

November 14, 2023
(Released Thursday, Nov. 16, 2023)

Valid 7 a.m. EST



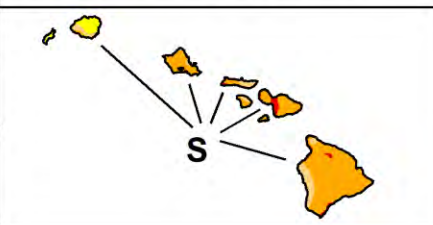
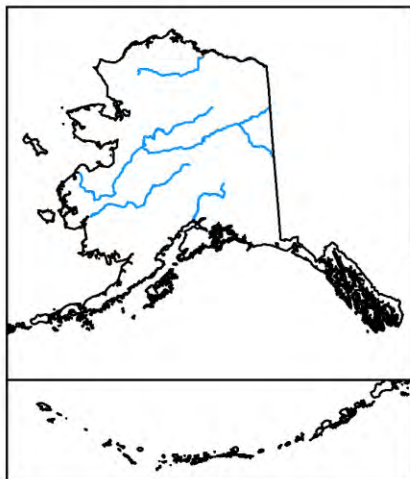
Drought Impact Types:

- ~ 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:
Brad Rippey
U.S. Department of Agriculture



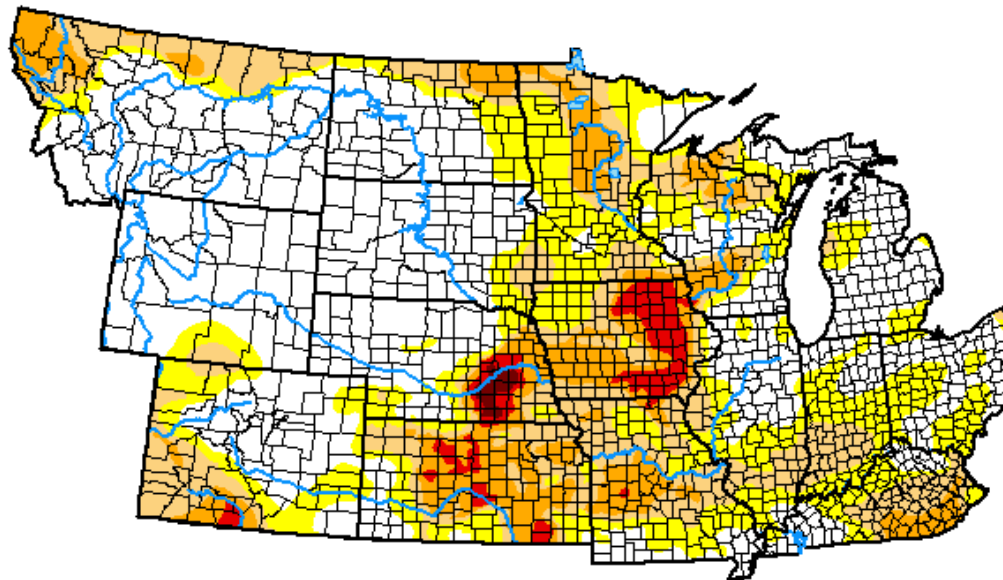
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>



droughtmonitor.unl.edu

U.S. Drought Monitor NWS Central

November 14, 2023
(Released Thursday, Nov. 16, 2023)
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	48.35	51.65	29.89	13.26	2.82	0.31
Last Week <i>11-07-2023</i>	51.62	48.38	28.40	12.61	2.59	0.31
3 Months Ago <i>08-15-2023</i>	46.43	53.57	34.46	14.63	3.37	0.21
Start of Calendar Year <i>01-03-2023</i>	25.76	74.24	48.98	24.27	9.90	3.48
Start of Water Year <i>09-26-2023</i>	39.86	60.14	40.32	19.88	6.29	0.49
One Year Ago <i>11-15-2022</i>	15.61	84.39	61.79	29.87	12.73	3.70

Intensity:



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

Author:

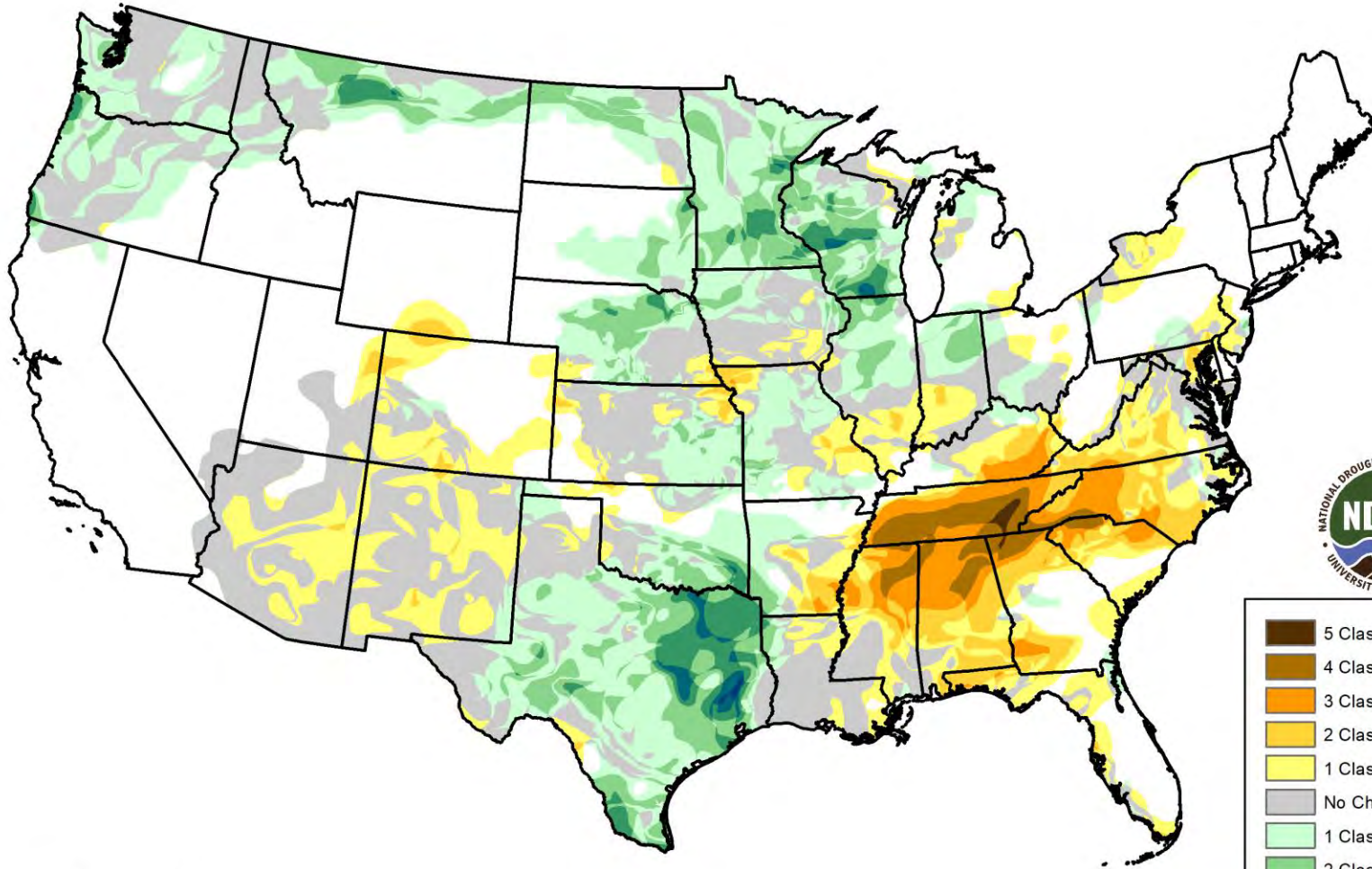
Brad Rippey
U.S. Department of Agriculture














droughtmonitor.unl.edu

U.S. Drought Monitor Class Change - CONUS

8 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

November 14, 2023
compared to
September 19, 2023

droughtmonitor.unl.edu

AGRICULTURAL IMPACTS

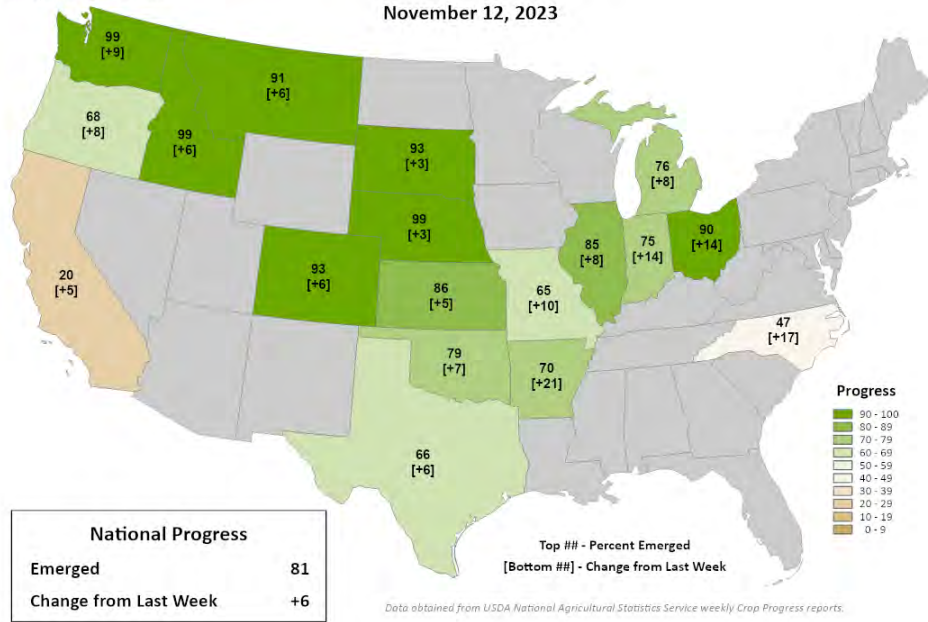


Photo:
Hans Schmitz – Purdue. SW Indiana

Winter Wheat Progress

Percent Emerged

November 12, 2023



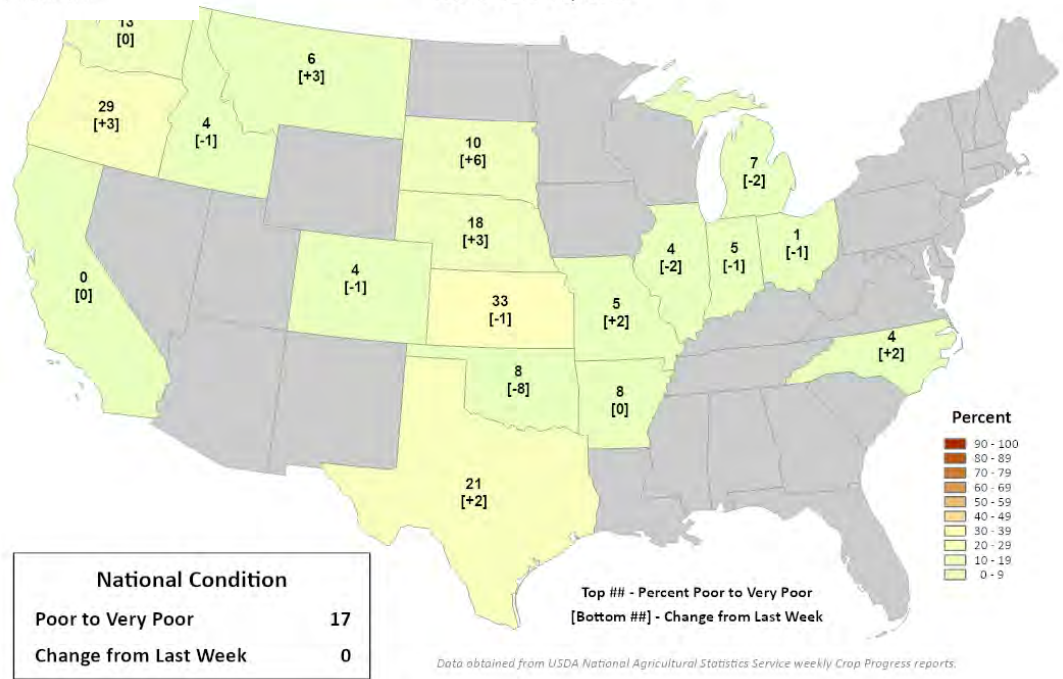
Data obtained from USDA National Agricultural Statistics Service weekly Crop Progress reports.

USDA NASS Crop Progress Winter Wheat

Winter Wheat Conditions

Percent Poor to Very Poor

November 12, 2023



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

- Generally good. A little worse in Plains

USDA NASS Crop Progress

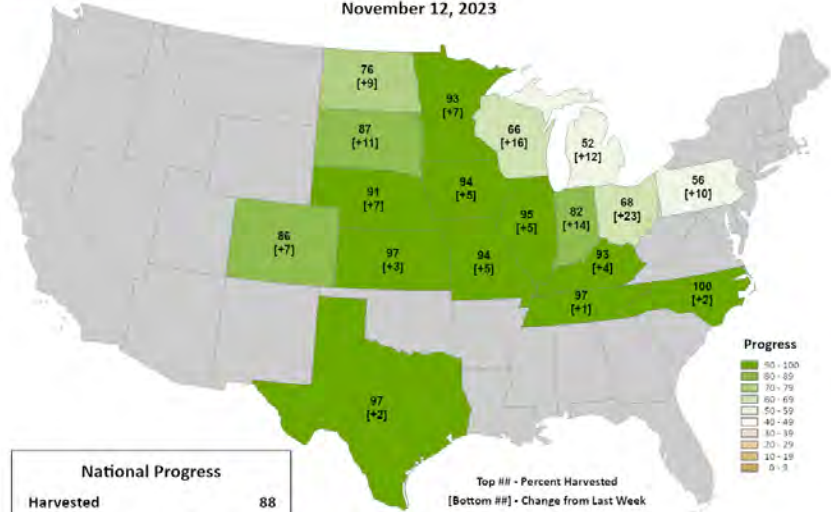


Corn Progress

Percent Harvested

November 12, 2023

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



National Progress	
Harvested	88
Change from Last Week	+7

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

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

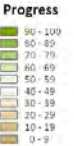
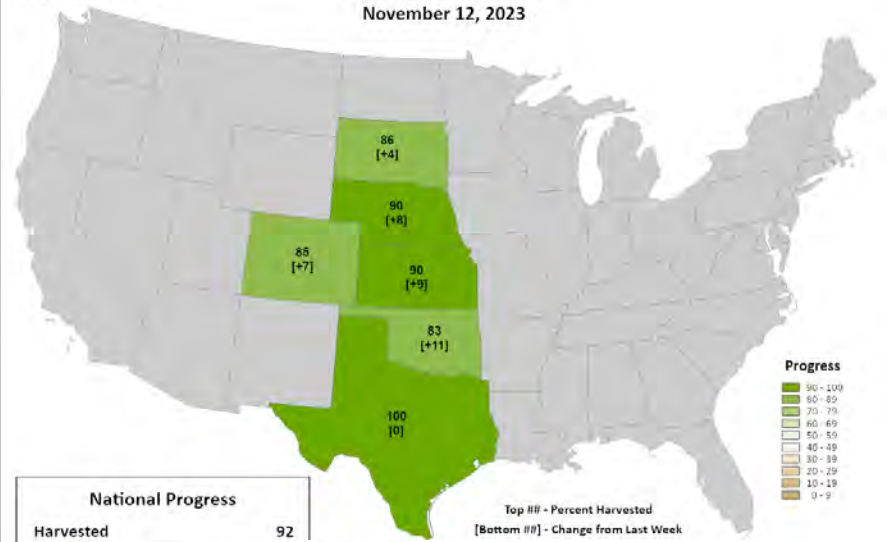


Sorghum Progress

Percent Harvested

November 12, 2023

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



National Progress	
Harvested	92
Change from Last Week	+7

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



Sunflowers Progress

Percent Harvested

November 12, 2023

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



National Progress	
Harvested	68
Change from Last Week	+15

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

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



Soybeans Progress

Percent Harvested

November 12, 2023

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



National Progress	
Harvested	95
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.

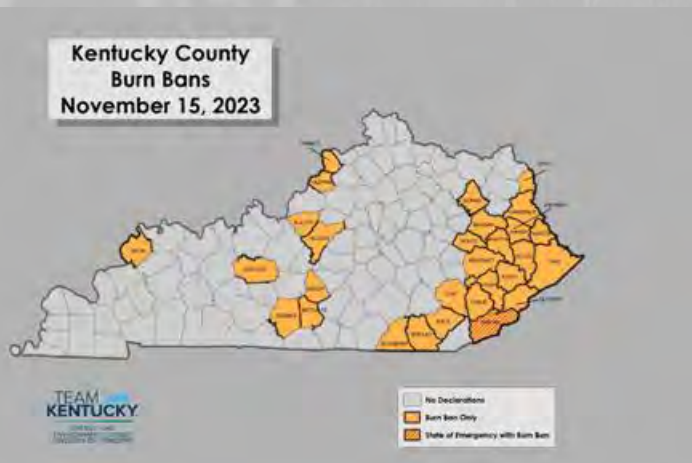
Various ag

- Harvest completed mostly western/central Corn Belt
- Still harvesting east – delayed development slow crop drying.
- Winter wheat generally good
- Some rains helped fall crop establishment
- Pasture/grass concerns in MO/IA/other locations.

Fires

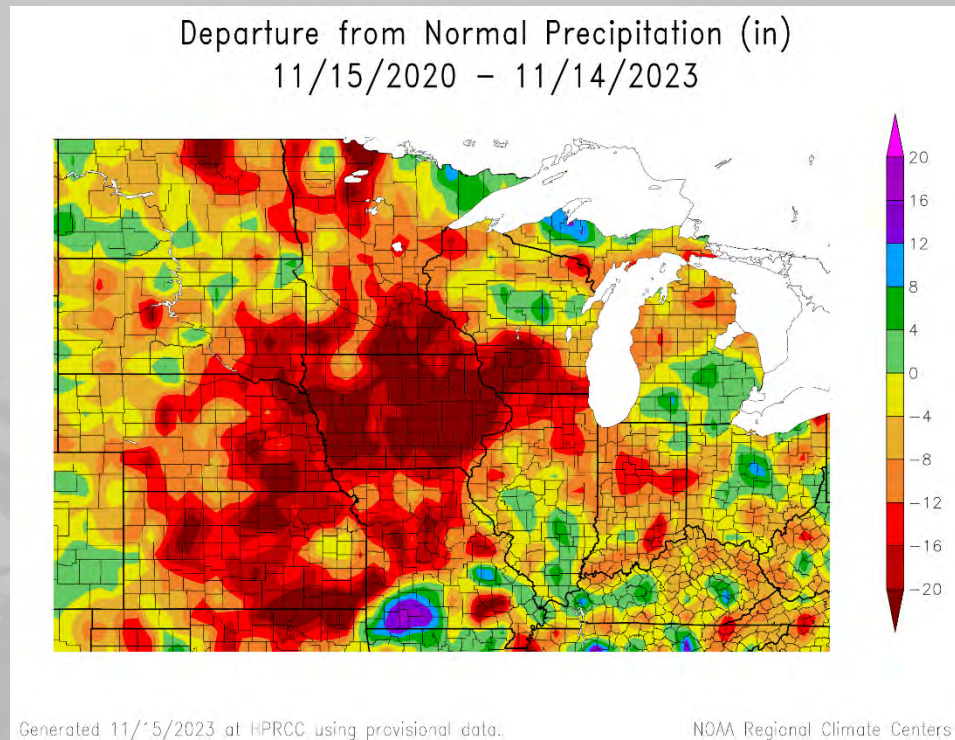
- Recent dryness increasing fire issues
- Burn bans (IN/IL/KY).
- Kentucky worst situation
 - 20,824 acres currently burning as of Nov. 13
 - 7,620 acres burned (contained)

New Hope Tower Fire in Rockcastle Co, KY. Picture from Climax Volunteer Fire Dept Facebook Page



Ground Water/Water Supply

- A number of municipalities (IA/IL/other?) dealing with limited urban supply – Osceola, IA and casino
- Ground water not recovering in IL and other places – concerns about available water 2024.



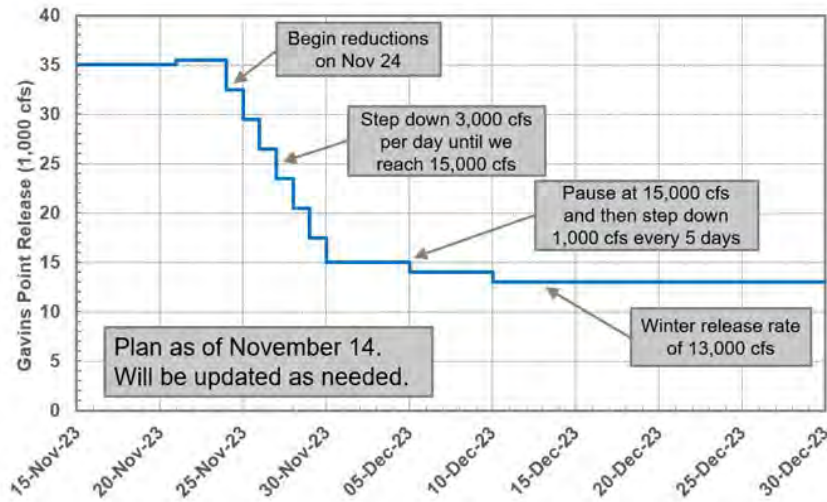
Mississippi/Missouri Rivers



2023 Fall-Winter Gavins Point Dam Release Forecast

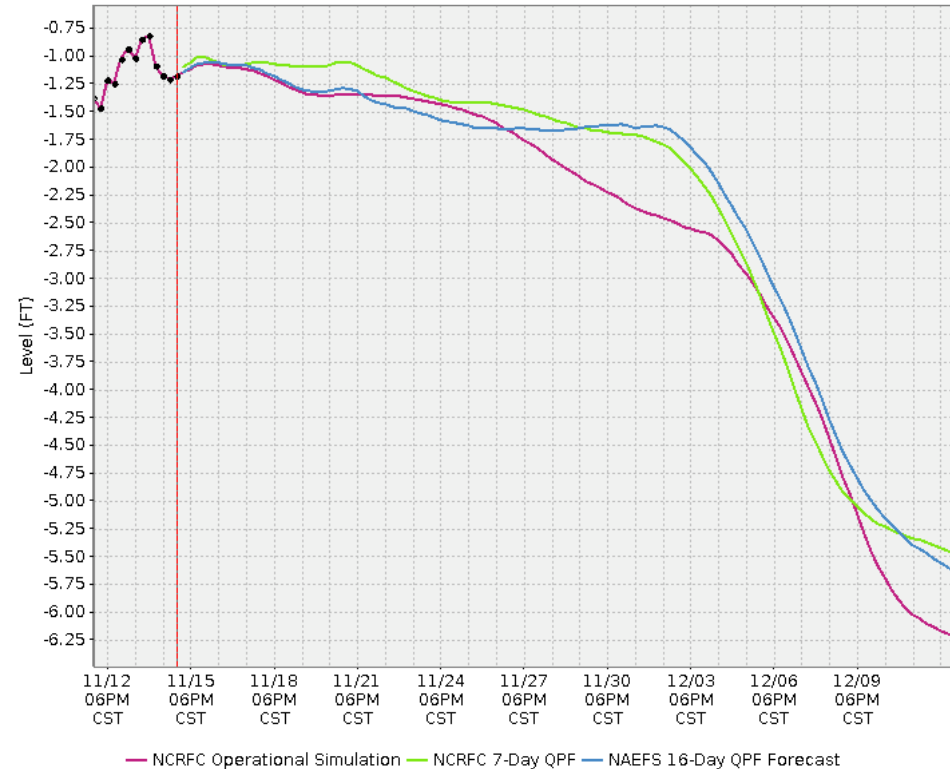


QPF Scenario River Guidance
 North Central River Forecast Center
 Valid Time 11/15/2023 06 AM CST



Preliminary River Model Output - This product has not been reviewed by NWS Forecasters.

Simulated Stage: Mississippi River at St. Louis, MO / EADM7



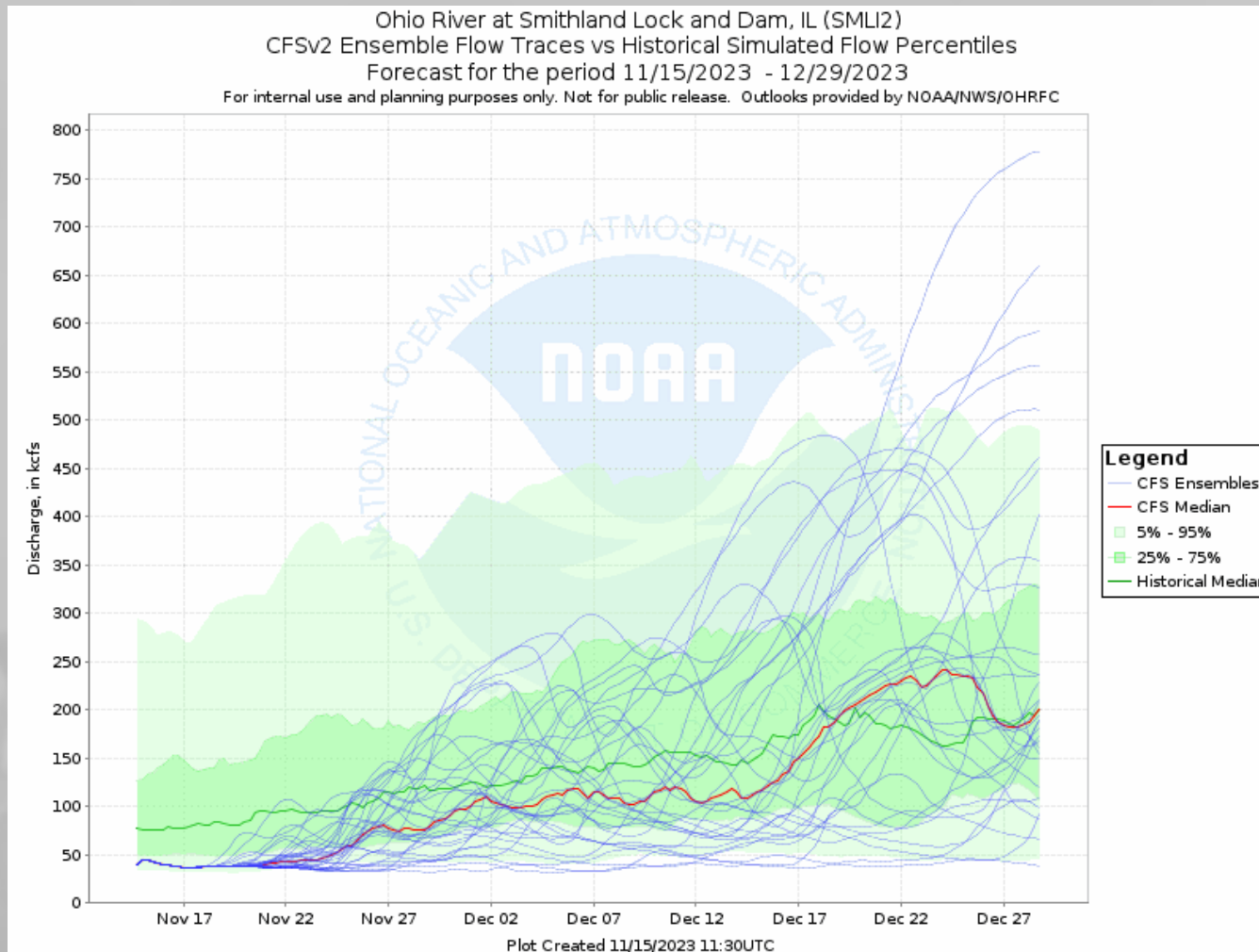
The NCRFC Forecast includes 48 hours of forecast precipitation.

Created by NCRFC on 11/15/2023 08 AM CST

Fairly limited rains and stepped down releases from the Missouri River will contribute to a drop in Mississippi flows

Images from Anna Wolverton NWS/USACE

Ohio River

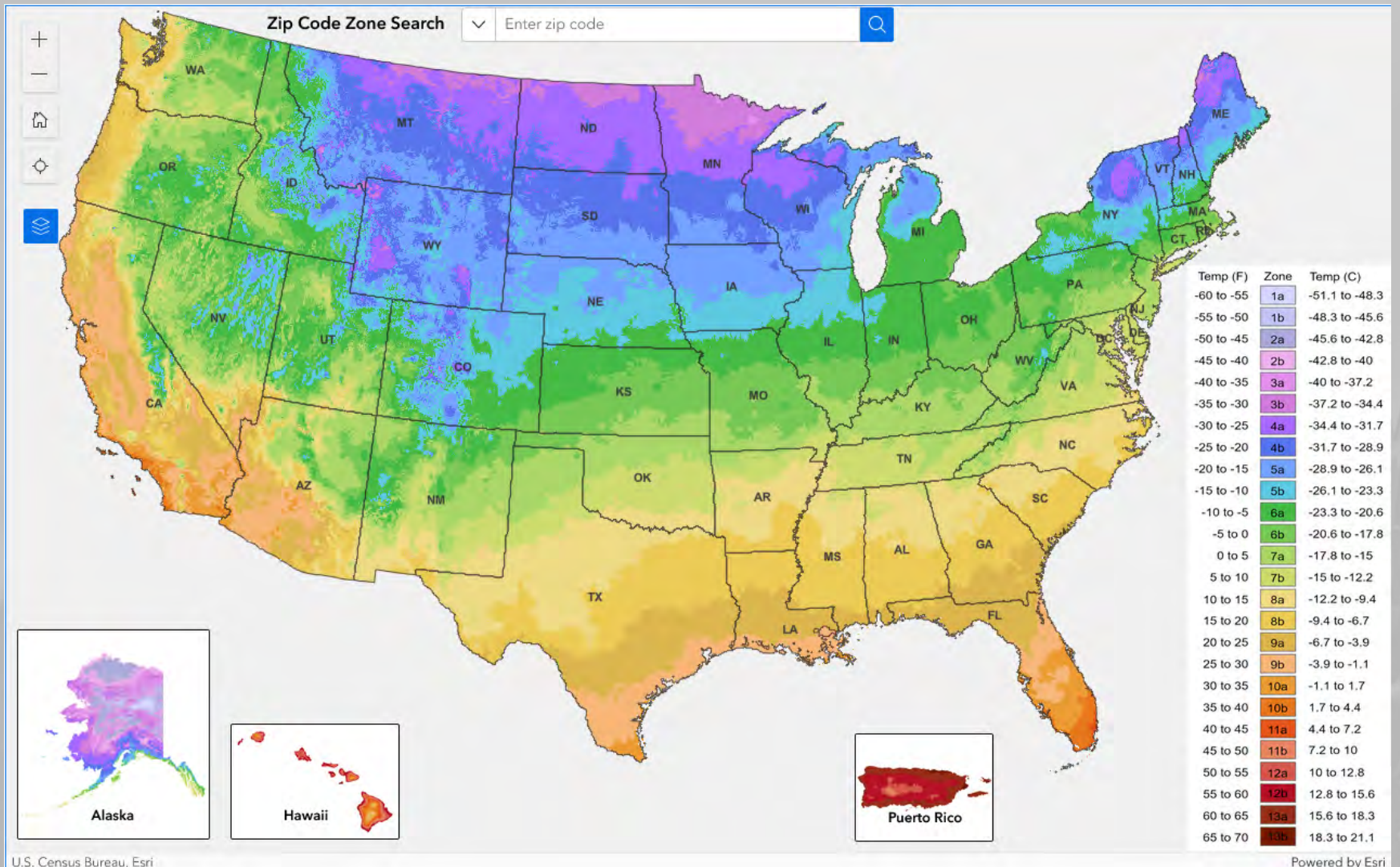


Ohio River flows should recover some into December with some rains and reduced water use.

Mississippi River Impacts

- Reduced shipping (grain out – fertilizers in –and others)
 - Grain losses (profitability)
 - Reduced cruise activity
 - Dredging moving northward toward St. Louis.
-
- Short answer – low flow problems will continue

Plant Hardiness Zone



Updated to 2012 map on plant hardiness zones

<https://planthardiness.ars.usda.gov/>

For More Information



@usdaclimatehubs
@dennistodey



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

Dennis Todey, Director

515-294-2013

Dennis.todey@usda.gov



National Laboratory for Agriculture and the Environment

Attn: Midwest Climate Hub

1015 N University Blvd

Ames, Iowa 50011-3611

Photo:

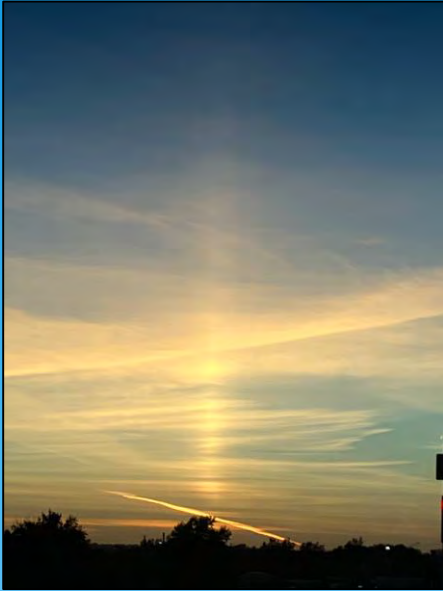
via Patrick Erger

Farm near Haxtun, CO



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U.S. DEPARTMENT OF AGRICULTURE

November 2023 El Niño & Outlooks



Doug Kluck
Doug.kluck@noaa.gov
National Oceanic and Atmospheric Administration
Regional Climate Services Director



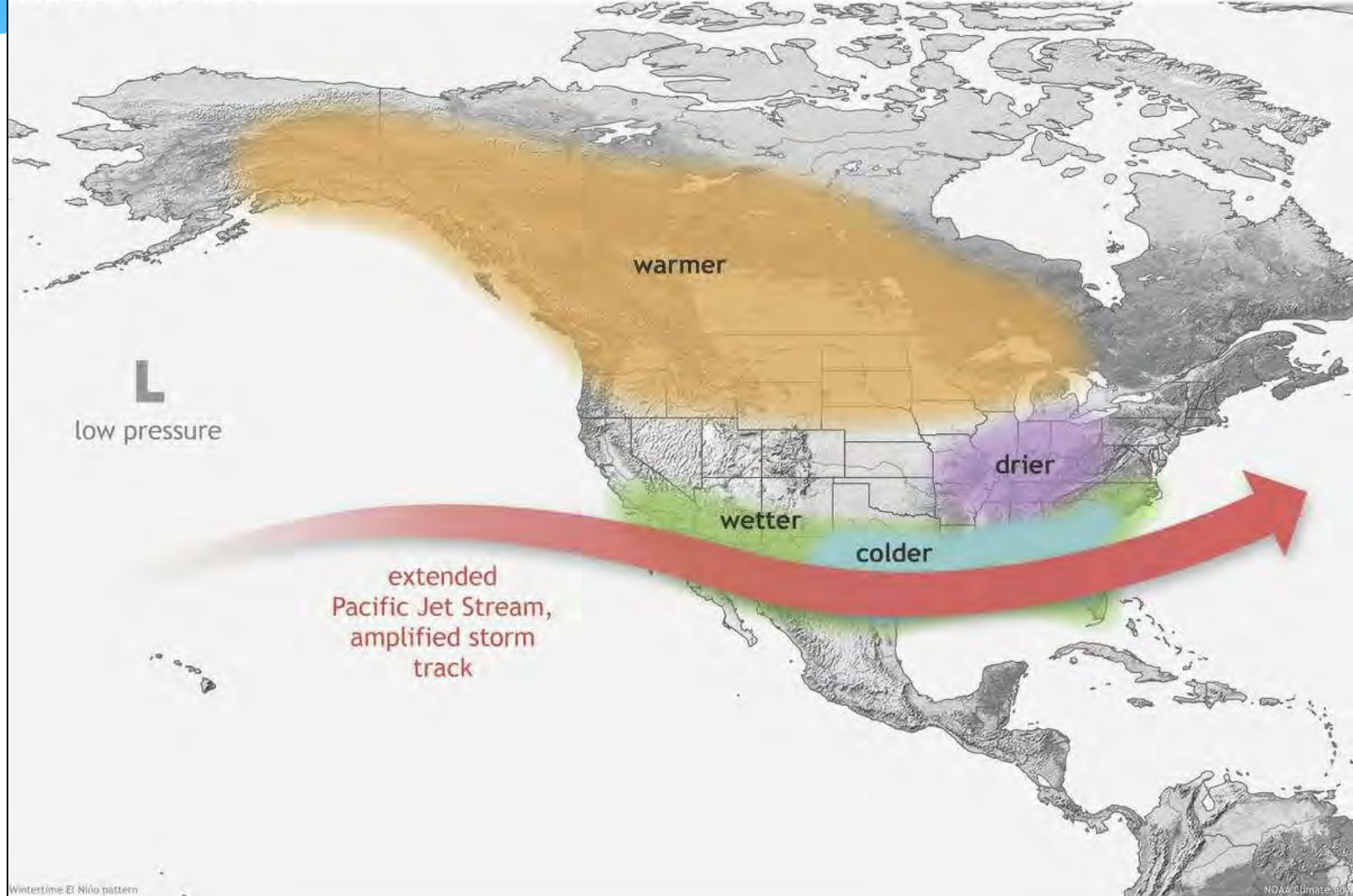
Outlooks... Current Conditions

- * **Still broadly dry**
- * **Fall/winter are a recharge seasons... important to build soil moisture before freeze up**
- * **Soils are thirsty (3-4 year drought) = runoff likely lower than normal (unless frozen ground)**
- * **Fall into Winter relatively dry time of year (not including higher elevations)**
- * **Strong El Niño is here, will it help dryness? Depends on where you are**
 - * **Less likely Ohio River Basin, eastern Midwest, Great Lakes, upper Missouri Basin**
 - * **Better chances of wet central to southern plains**
- * **How much precipitation to end the drought?**
 - * **Really need several widespread major rain/snow events across the region**
 - * **Some recovery is possible**
 - * **Need above normal precipitation into the spring for increasing deep soil moisture**

Typical (?) El Niño Pattern



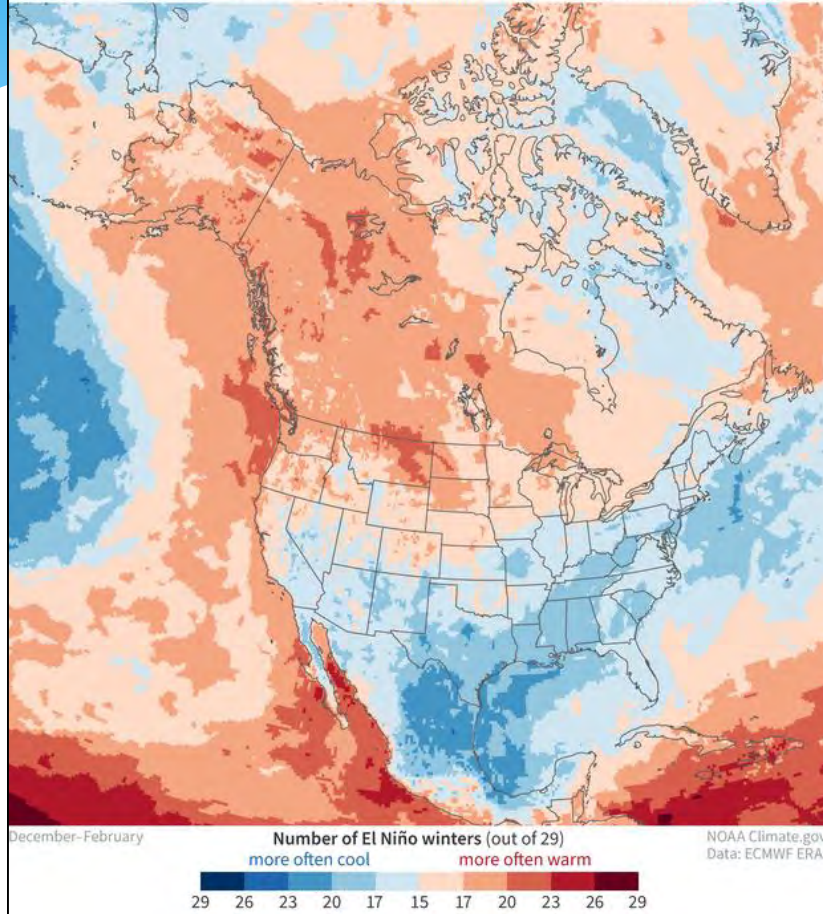
TYPICAL EL NIÑO WINTERS



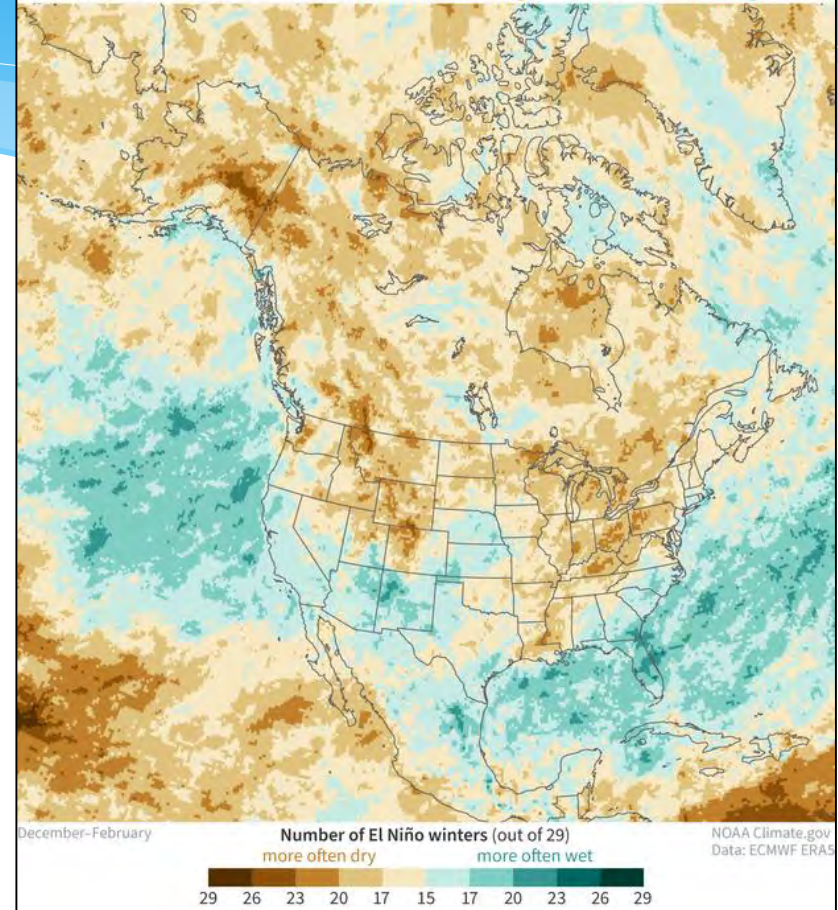


How Often (frequent) are El Niños Warmer/Colder and Drier/Wetter Than Average?

How often have El Niño winters been cooler than average vs. warmer than average?



How often have El Niño winters been drier than average vs. wetter than average?



<https://www.climate.gov/news-features/blogs/enso>



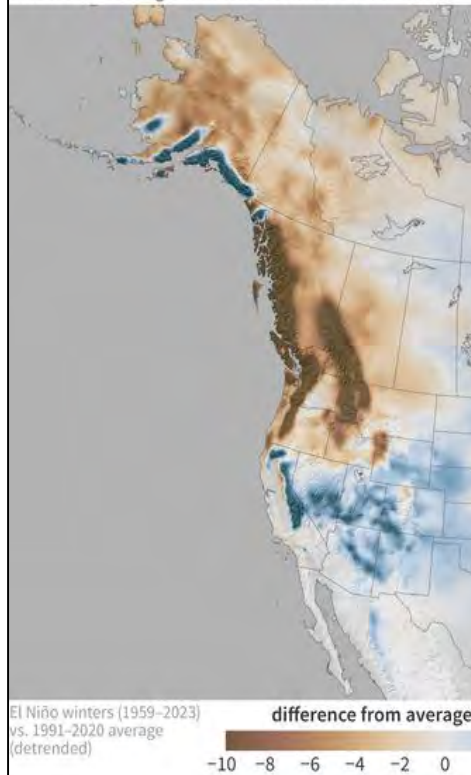
El Niño Snowfall Patterns (Jan – Mar)

All El Niños

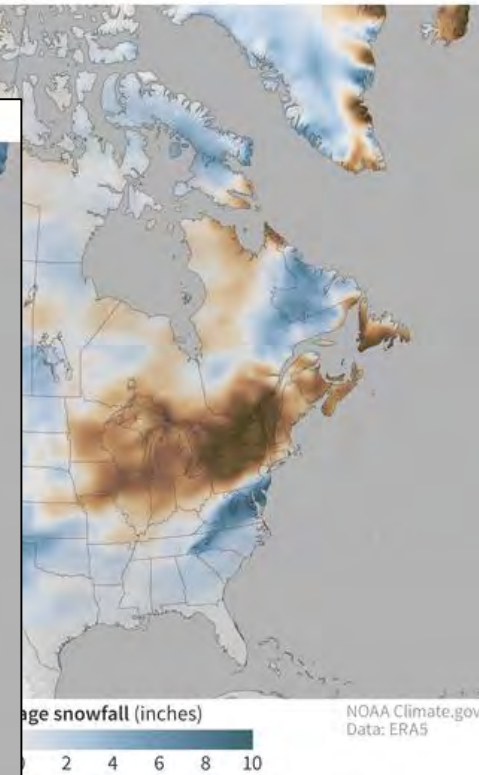
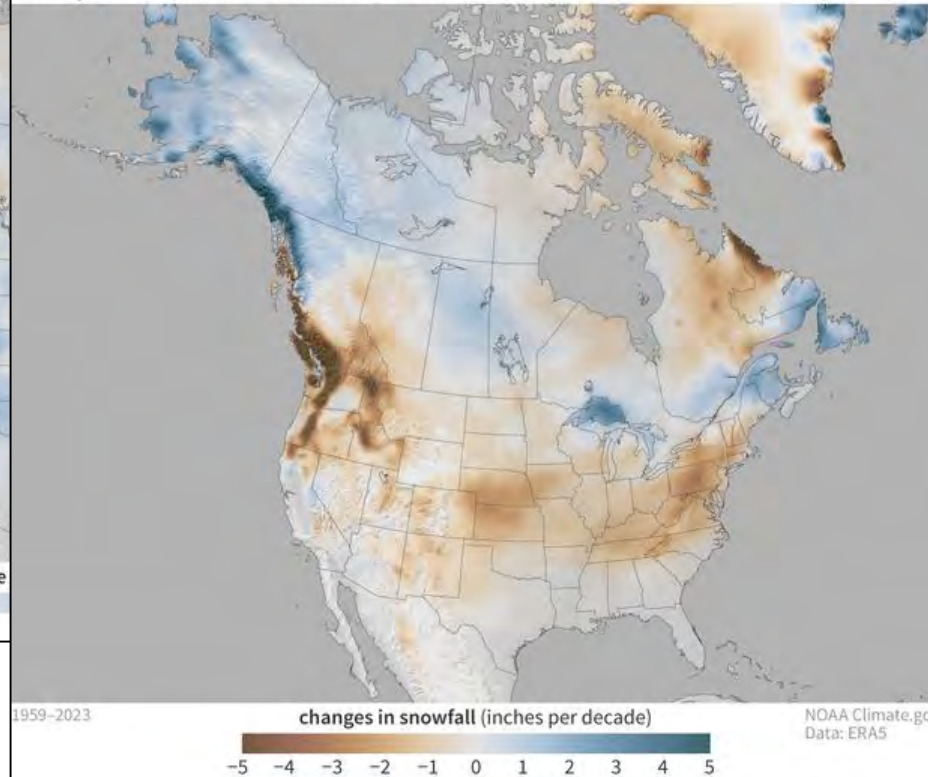
Moderate to Strong El Niños

Snowfall during all El Niño winters (Jan–Mar)

Snowfall during moderate-to-strong El Niño winters (Jan–Mar)



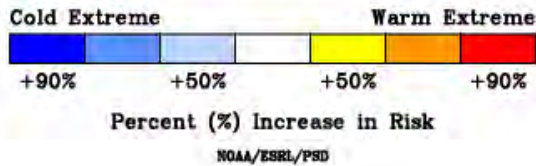
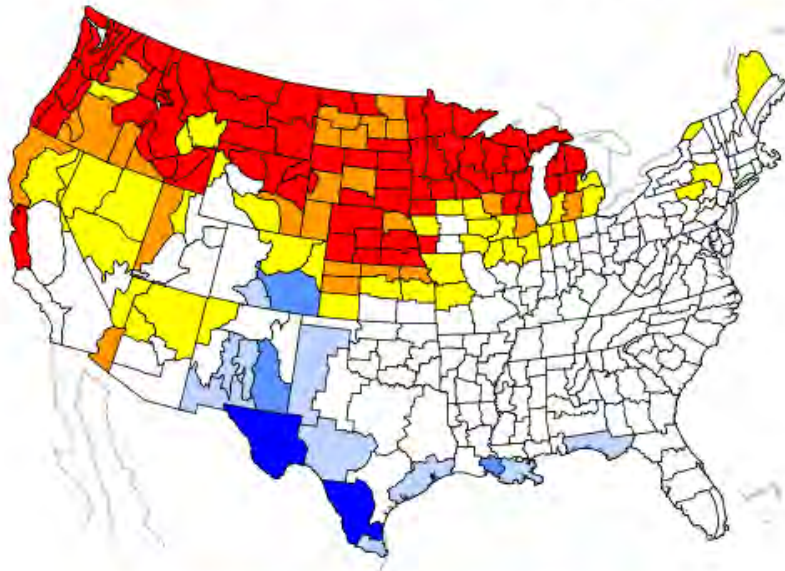
Widespread decline in U.S. winter (Jan–Mar) snowfall



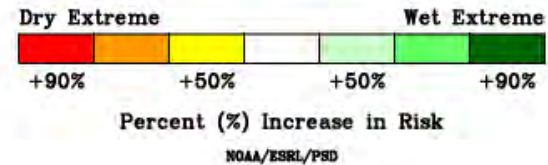
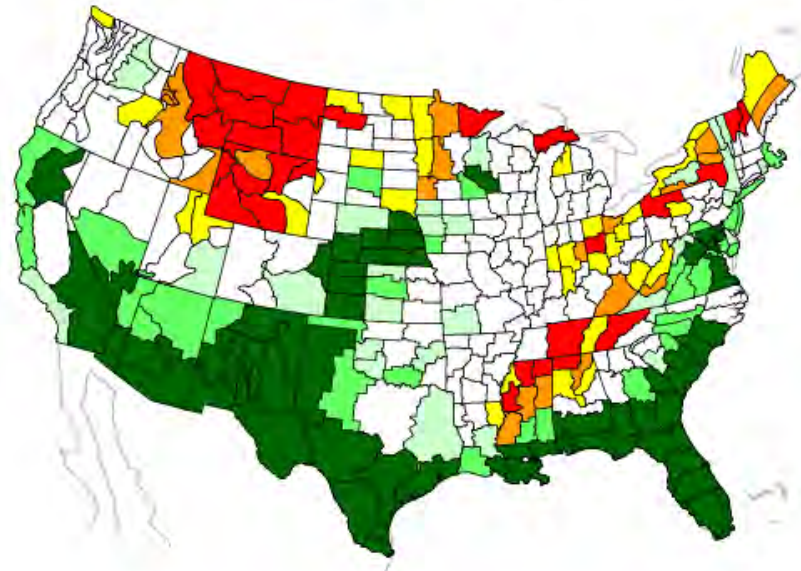
Risk of Extremes During El Niño



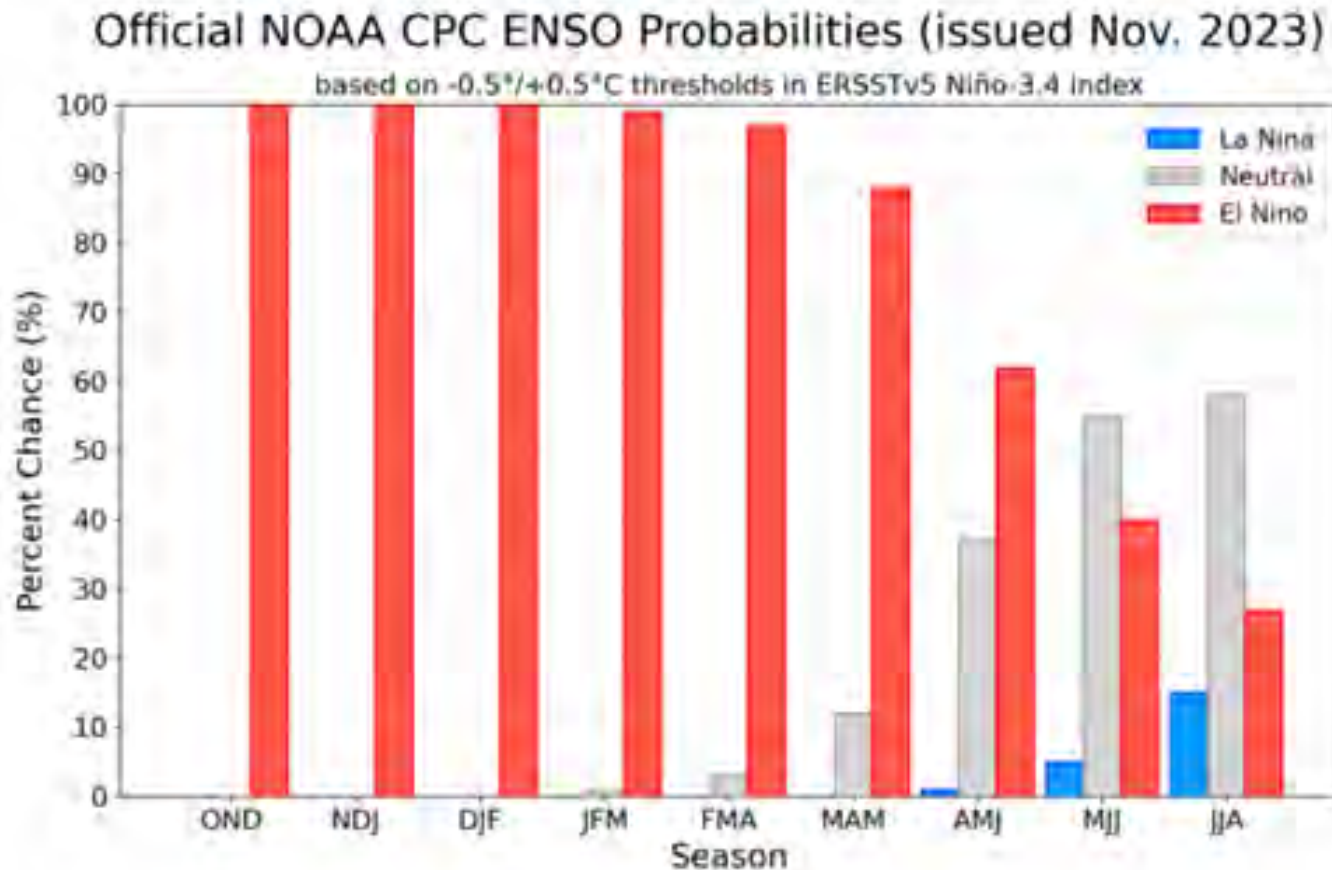
DJF Temperature During El Niño
Increased Risk of Warm or Cold Extremes



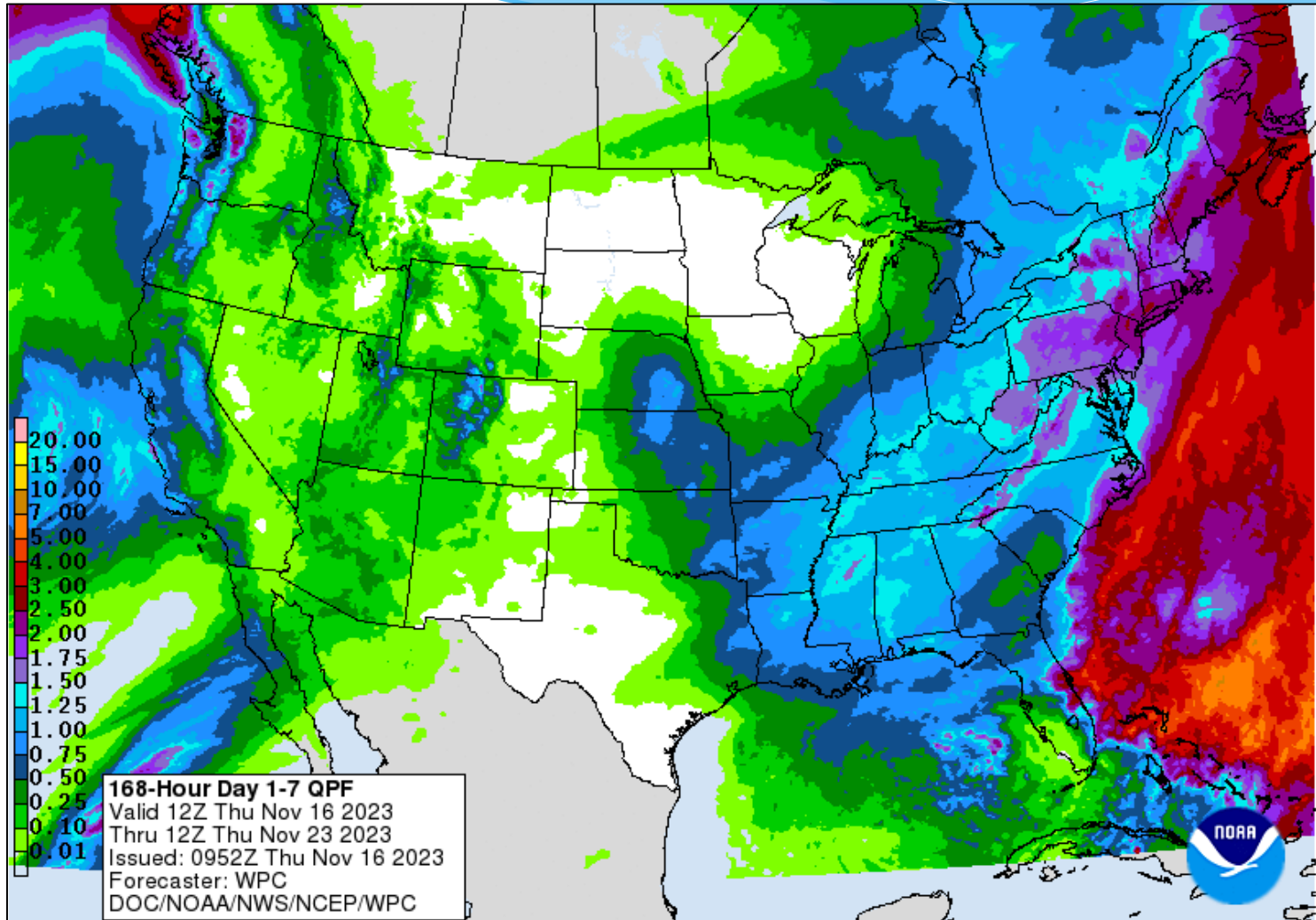
DJF Precipitation During El Niño
Increased Risk of Wet or Dry Extremes



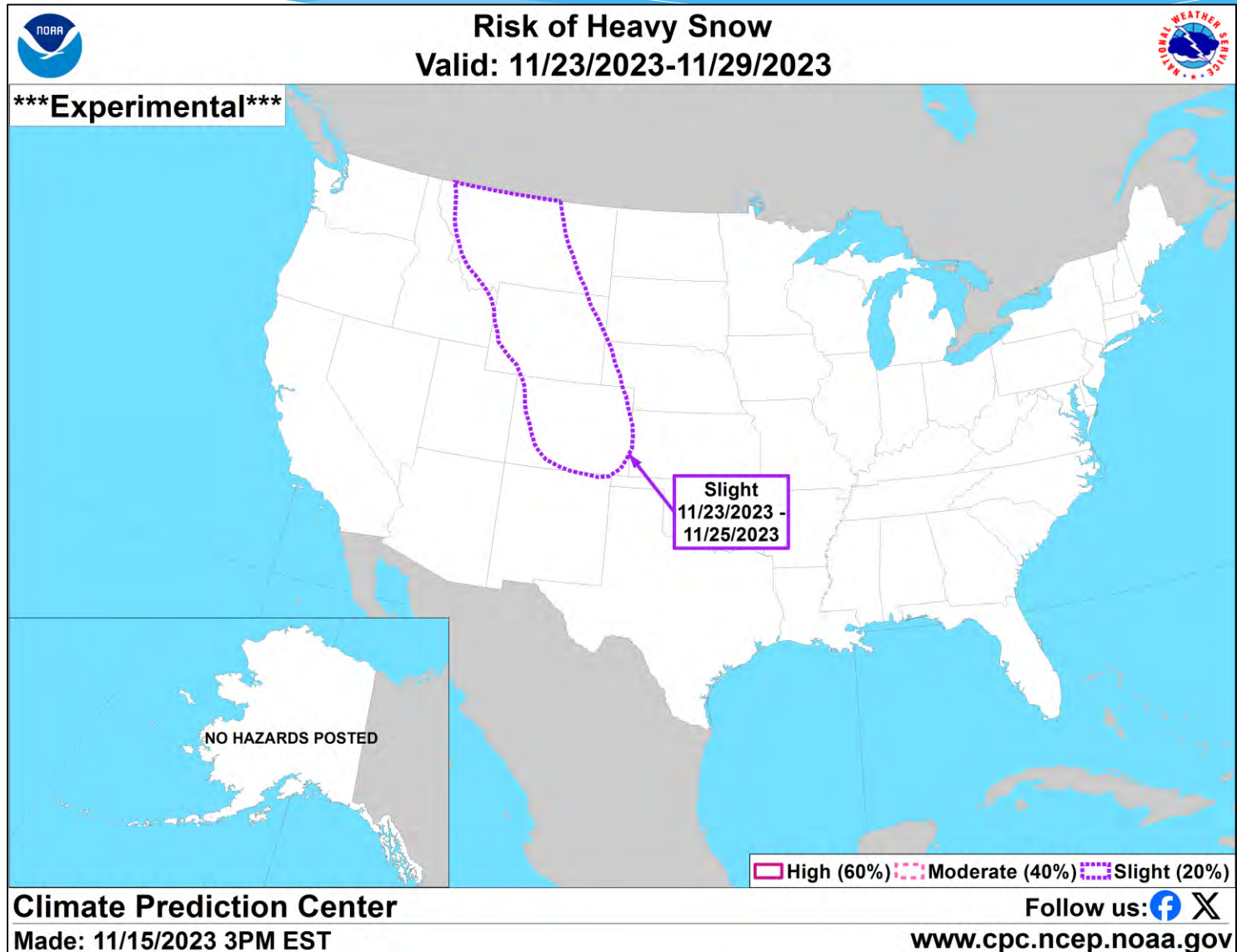
What may happen to the El Niño ?



Total Precipitation Outlook Through November 23rd³⁸



Hazards – Next Week (snow, slight)

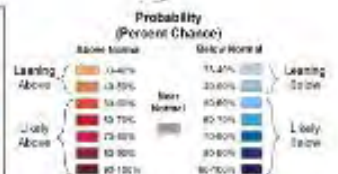
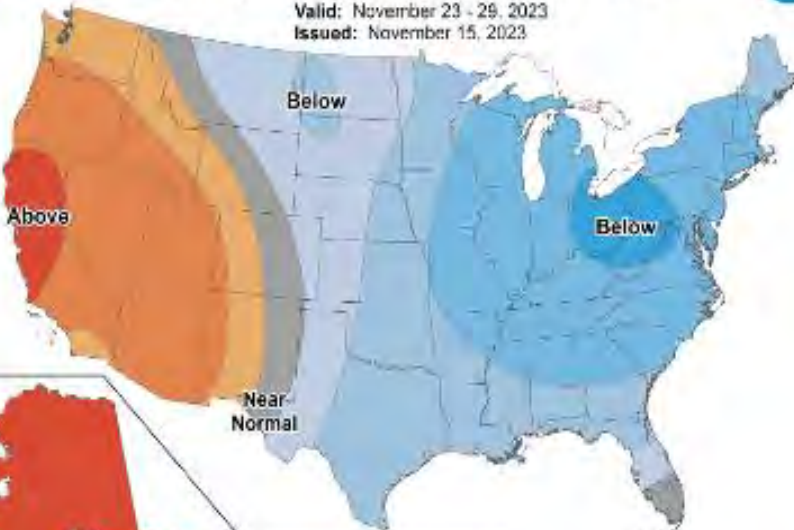




Week 2 Temperature & Precipitation Outlook (November 23 – 29, 2023)

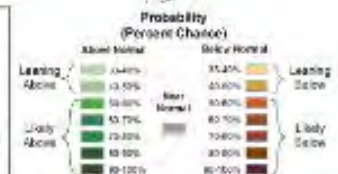
8-14 Day Temperature Outlook

Valid: November 23 - 29, 2023
Issued: November 15, 2023



8-14 Day Precipitation Outlook

Valid: November 23 - 29, 2023
Issued: November 15, 2023

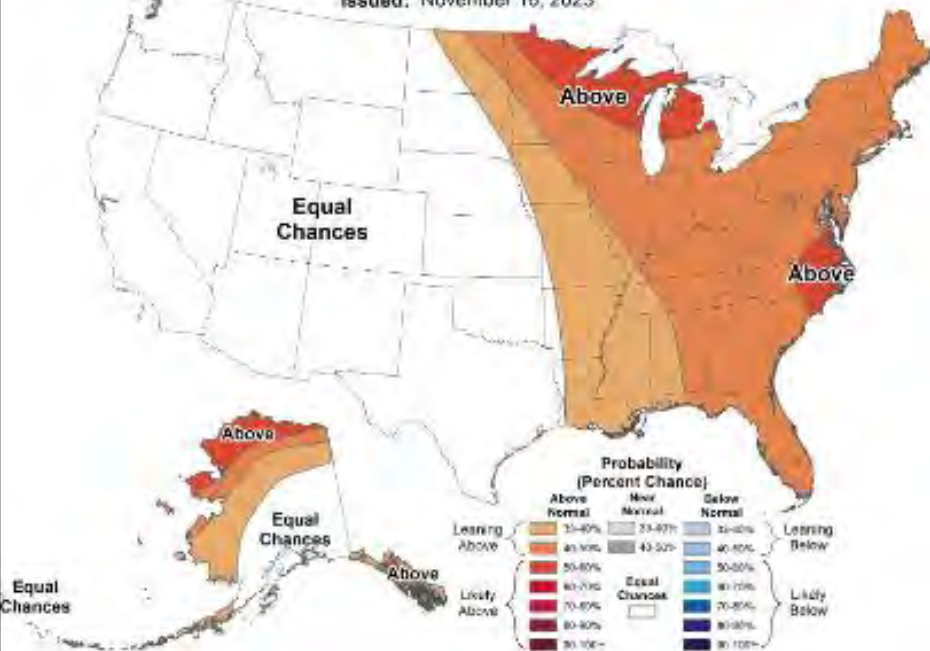


December 2023 Temperature and Precipitation Outlook



Monthly Temperature Outlook

Valid: December 2023
Issued: November 16, 2023



Monthly Precipitation Outlook

Valid: December 2023
Issued: November 16, 2023

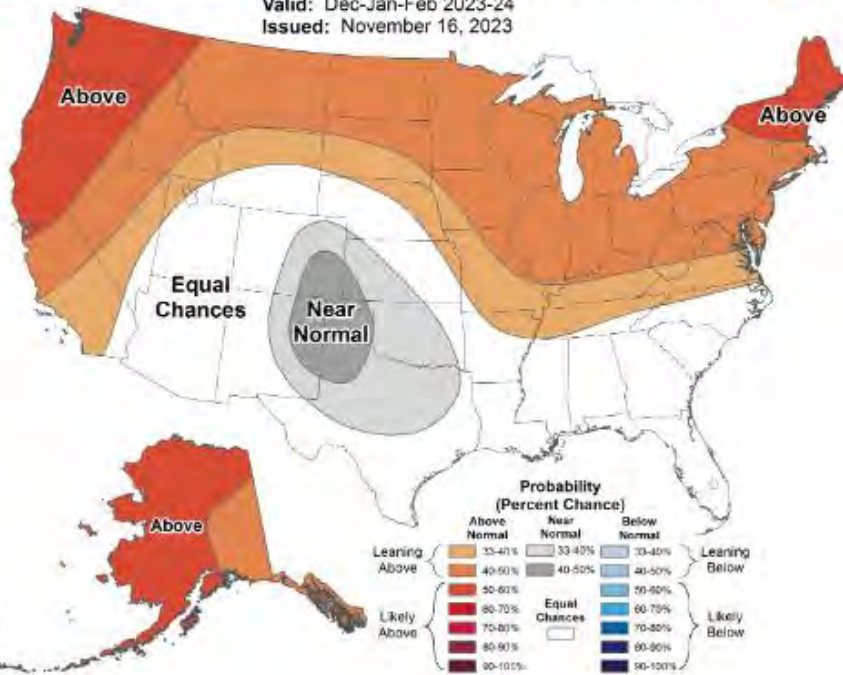




December 2023 – February 2024 Temperature & Precipitation Outlook

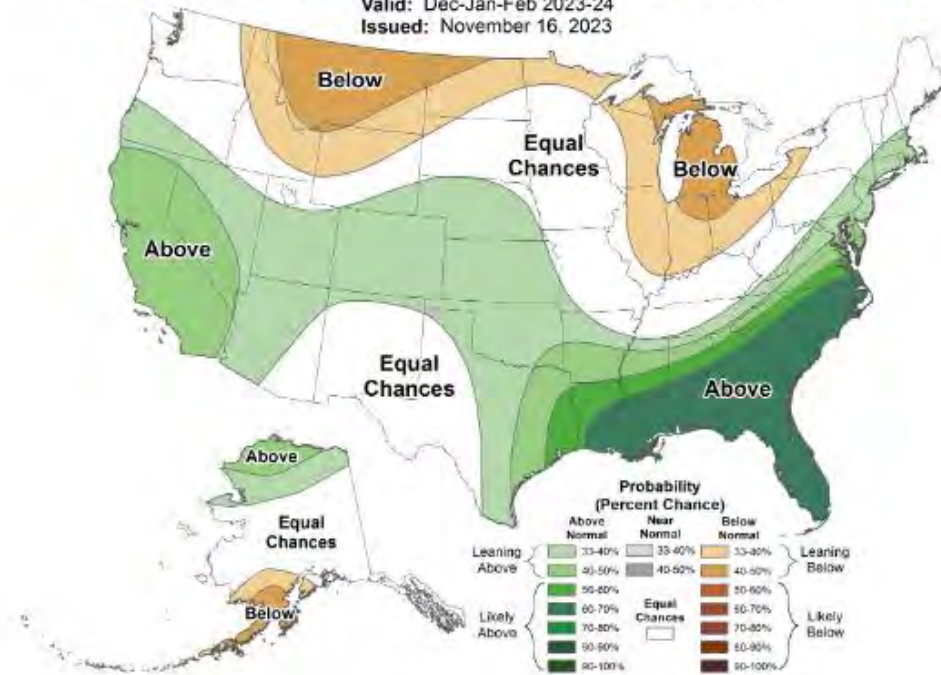
Seasonal Temperature Outlook

Valid: Dec-Jan-Feb 2023-24
Issued: November 16, 2023



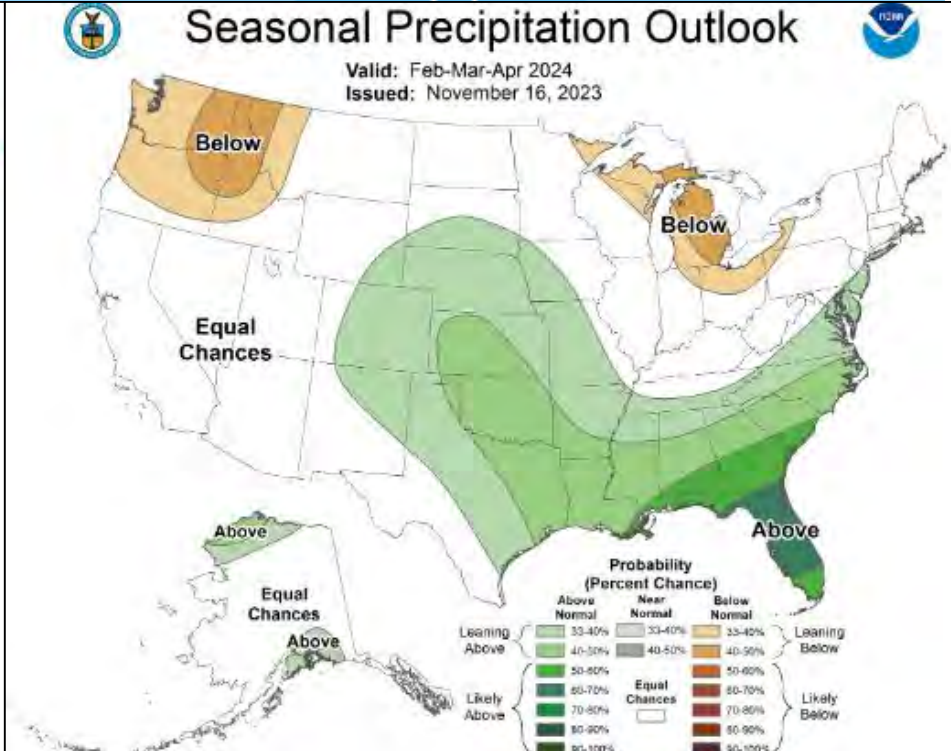
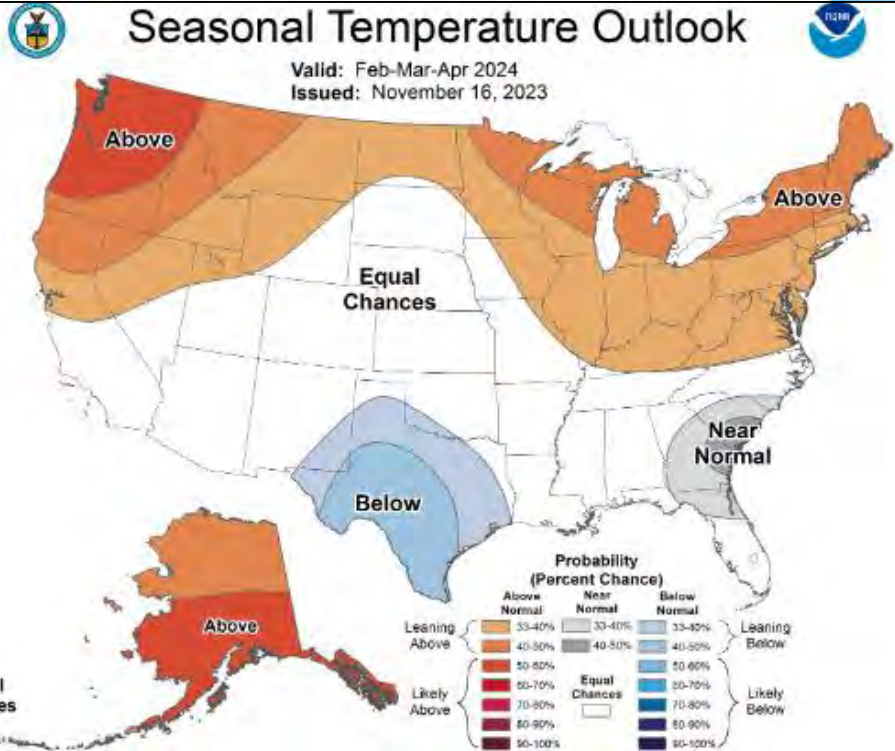
Seasonal Precipitation Outlook

Valid: Dec-Jan-Feb 2023-24
Issued: November 16, 2023



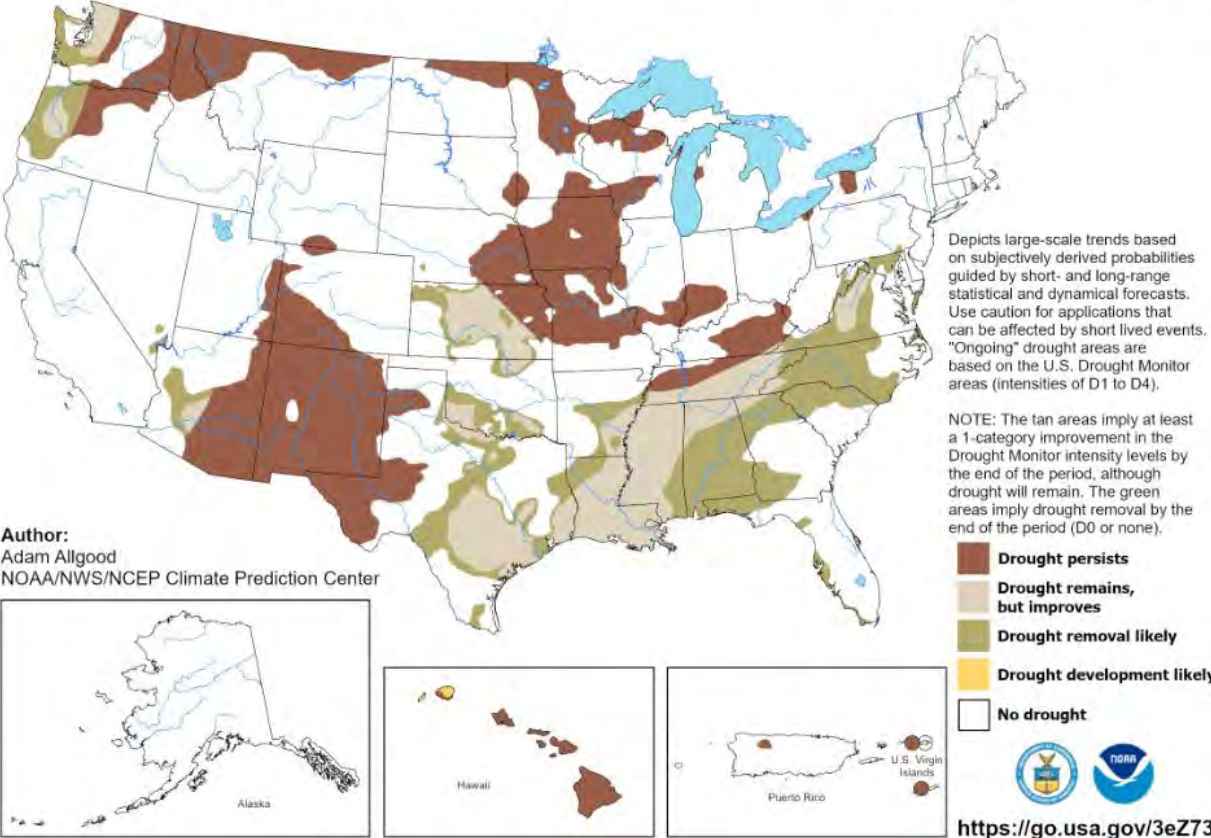


February – April 2024 Temperature & Precipitation Outlook



Drought Outlook through February 2024

U.S. Seasonal Drought Outlook Valid for November 16, 2023 - February 29, 2024 Drought Tendency During the Valid Period Released November 16, 2023



- Continued dry north and Midwest
- Some wetting across Kansas and southern plains



Key Points

* Current Conditions

- * Current ENSO condition – **Under an El Niño Advisory**
- * Dryness continues across much of the North Central U.S.

* Outlook

- * Very short term (7 days): Relatively warm to average and mostly dry
- * Short term (Week 2):
 - * Temperatures: cooler than normal
 - * Precipitation: relatively dry to near average except northern high plains (snow)
- * Long term (monthly and seasonal): Classic **El Niño** pattern
 - * Temperatures: Enhanced chances of above normal to the north
 - * Precipitation: Enhanced likelihood of drier than normal conditions from Montana to the Great Lakes/Ohio basin (especially later winter/early spring)
- * **El Niño** to slow ebb away and transition to neutral conditions by late spring
 - * Will take some time for the atmosphere to reflect those changes



Thank You – Q&A's

- * Dennis Todey: dennis.todey@usda.gov , 515-294-2013
- * Doug Kluck: doug.kluck@noaa.gov, 816-564-2417
- * Weather.gov
- * Climate.gov
- * Heat.gov
- * Drought.gov

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

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

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5th National Climate Assessment now available:
<https://www.globalchange.gov/our-work/fifth-national-climate-assessment>