



Midwest Climate Hub
U.S. DEPARTMENT OF AGRICULTURE

North Central US Climate- Drought Outlook 17 November 2022

Dr. Dennis Todey – Review/Impacts
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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 15, 2022 (1 PM CDT) Justin Glisan– State Climatologist-Iowa (Iowa Department of Agriculture and Land Stewardship)
- **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**
- **Impacts**
 - Issues/Events
 - Hydro
 - Ag (freeze, planting)
 - Fire
 - Other
- **Outlooks (Kluck)**
 - La Niña continues
 - Drought
 - Winter



Photo:
Dennis Todey Ames, IA
November 2022



Photo:
Dennis Todey Ames, IA
November 2022

REVIEW/CURRENT CONDITIONS

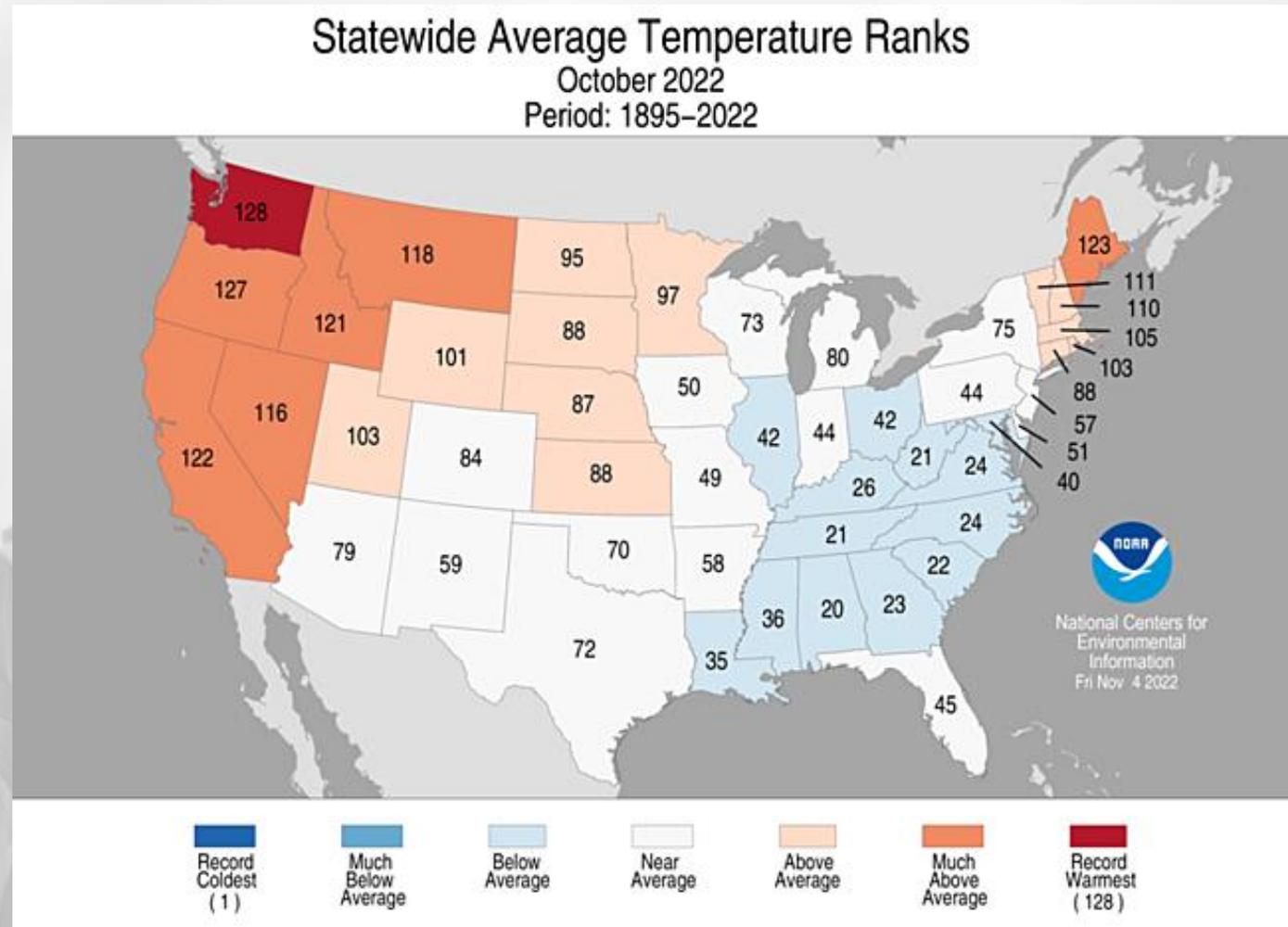


Photo:
Emma Todey Ames, IA
ISU Campus
November 2022

October Temperature Recap

Strong pattern
warmer west –
colder east.

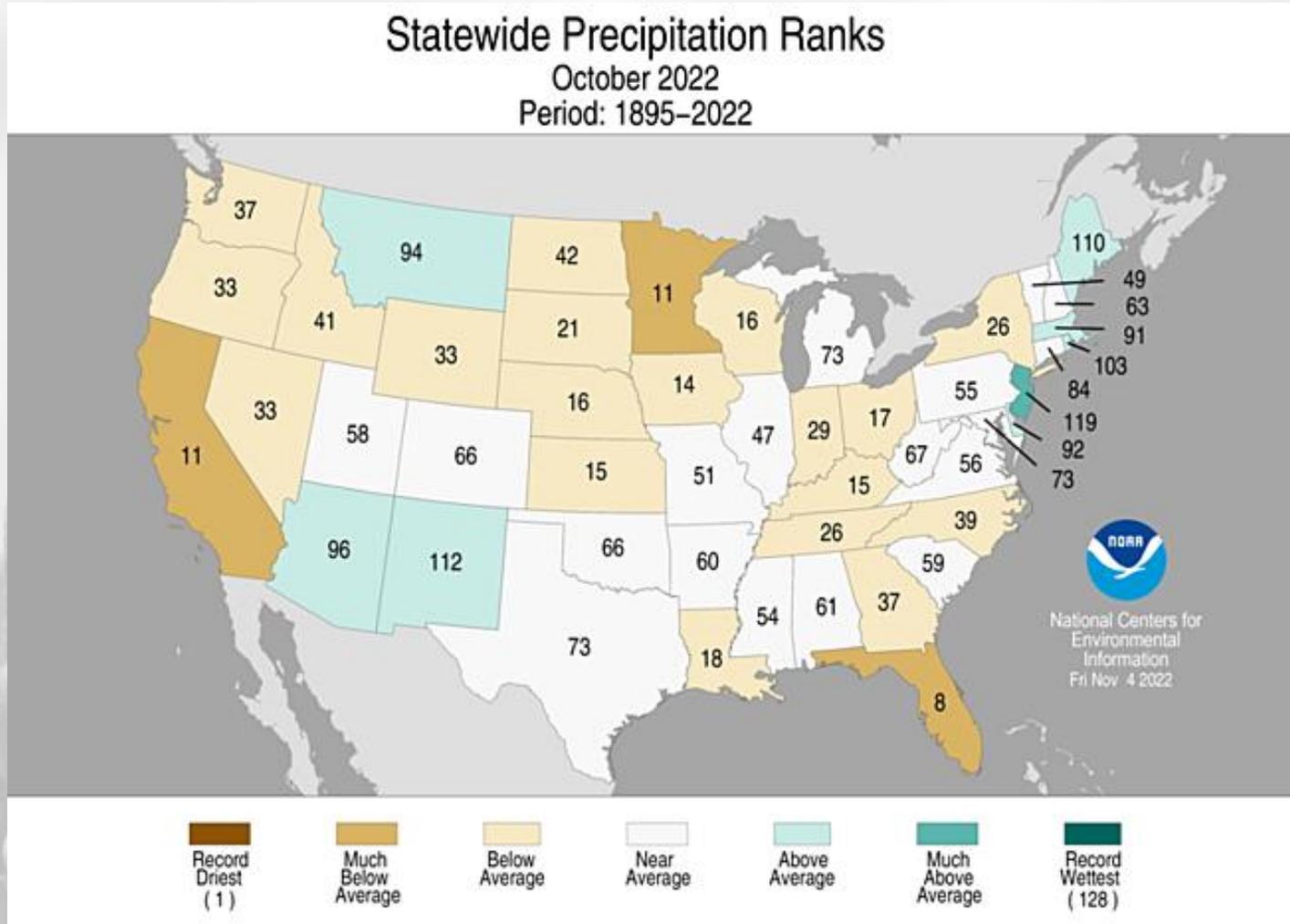
MT 11th warmest.
KY 26th coolest.



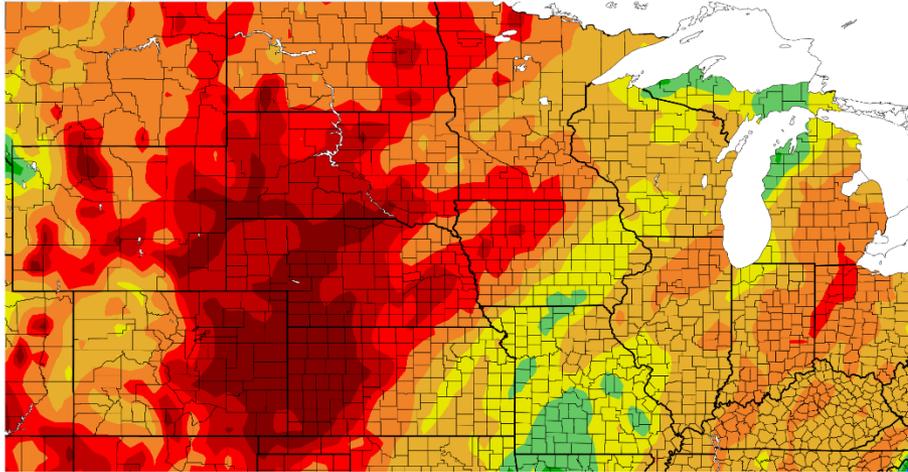
October Precipitation Recap

Mostly dry – very dry. MT outlier.

Top 15 driest MN-WI-IA-KS.

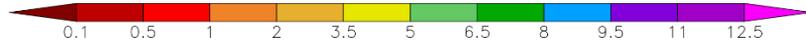


Precipitation (in)
10/17/2022 – 11/15/2022



Last 30 days Precipitation

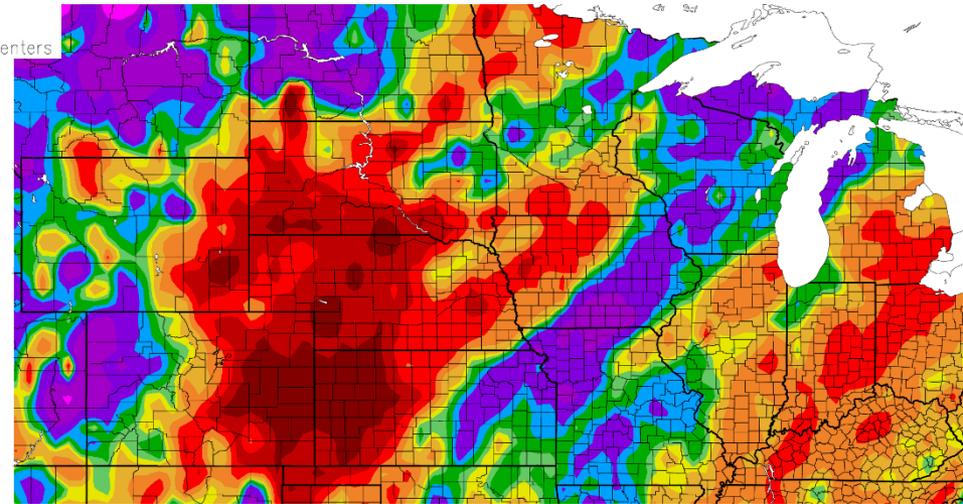
Percent of Normal Precipitation (%)
10/17/2022 – 11/15/2022



Generated 11/16/2022 at HPRCC using provisional data.

NOAA Regional Climate Centers

- Very dry in Plains and eastern Corn Belt.
- A couple systems brought rain central Midwest and northern Plains.



Generated 11/16/2022 at HPRCC using provisional data.

NOAA Regional Climate Centers

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

Departure from Normal Temperature (F)

10/17/2022 – 11/15/2022

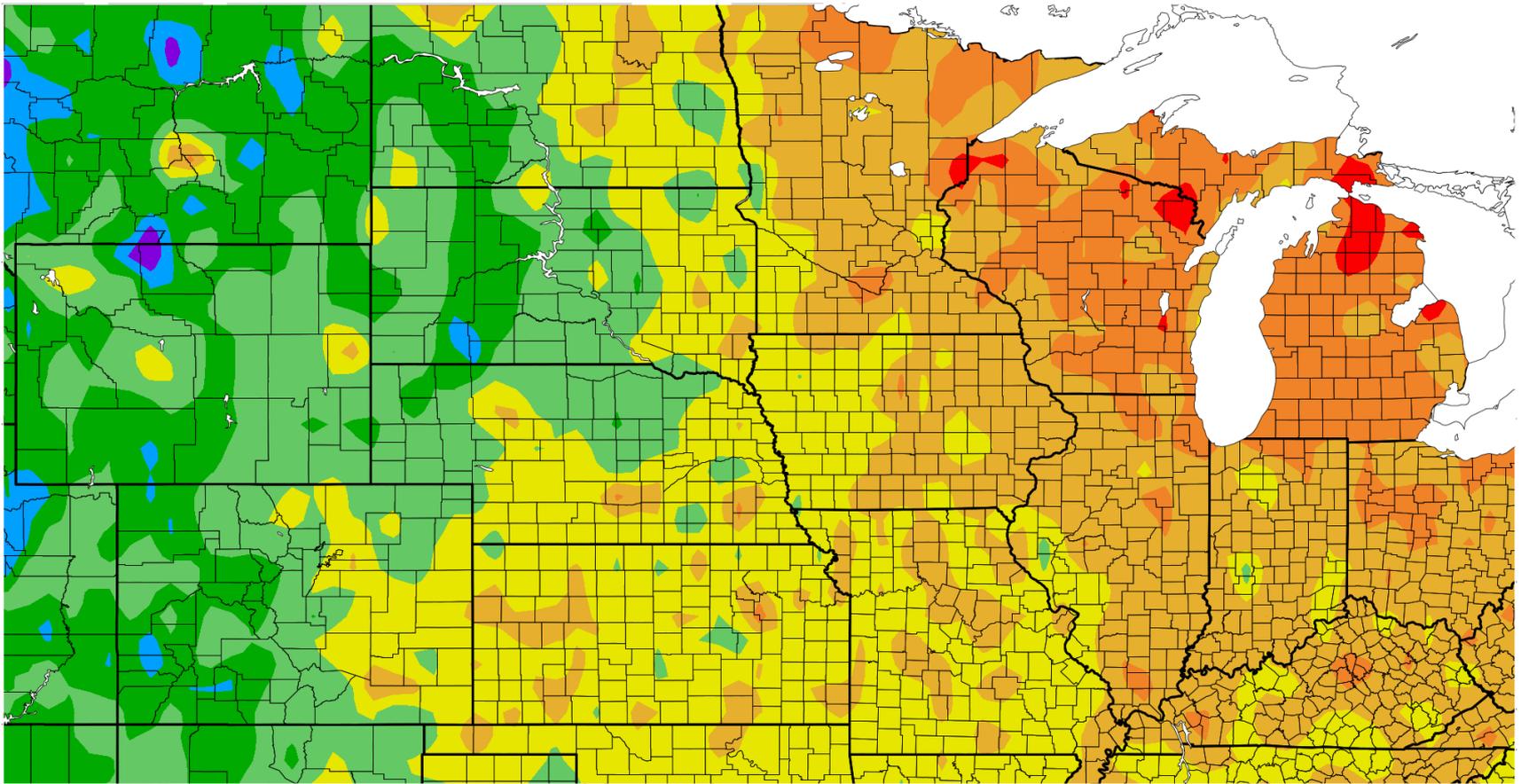


Photo:
Ice coated tree from freezing rain north of
Westport.
Courtesy of Chris Goldade)
NWS Aberdeen

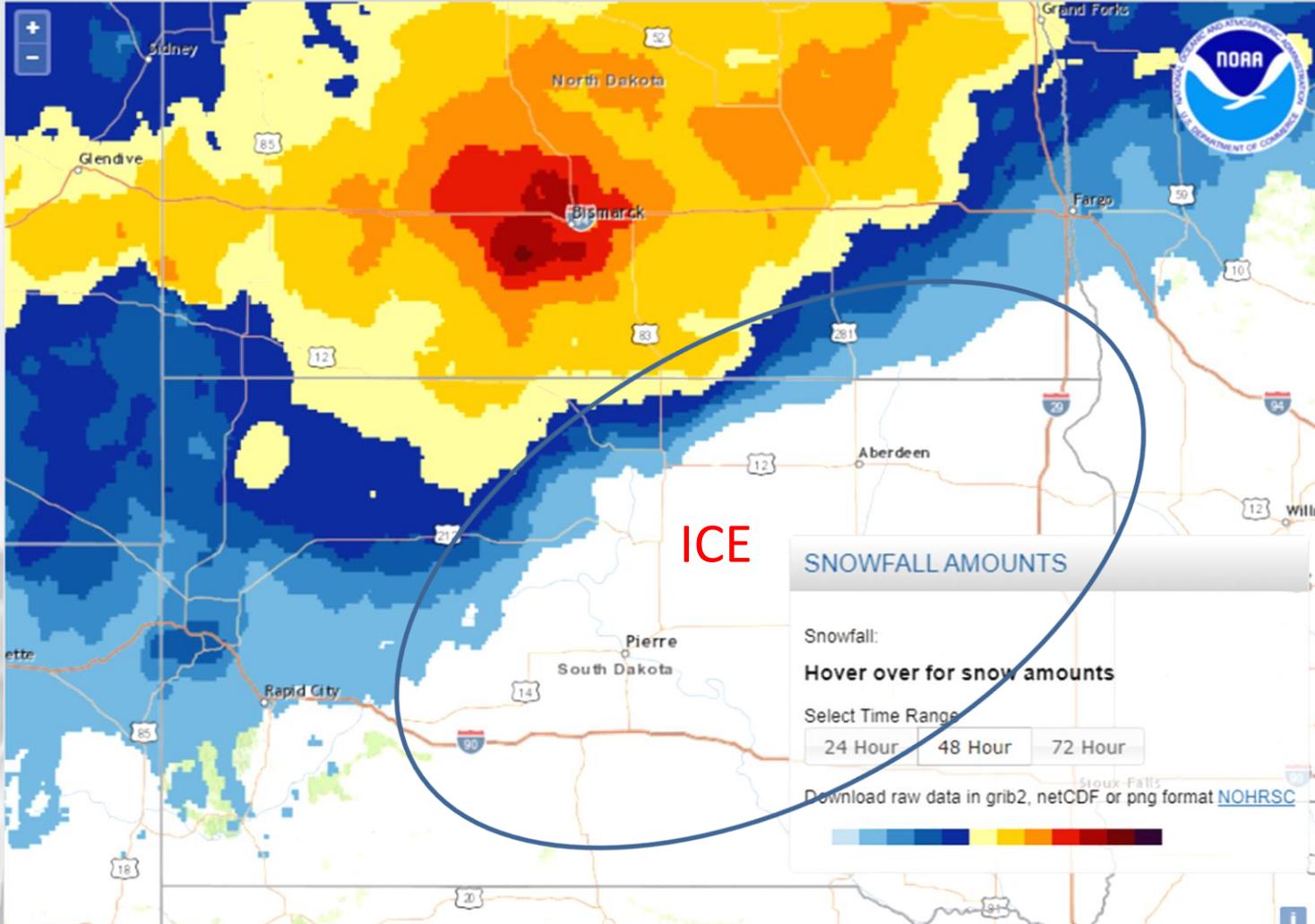
ISSUES/EVENTS



Plains Blizzard/Ice Storm

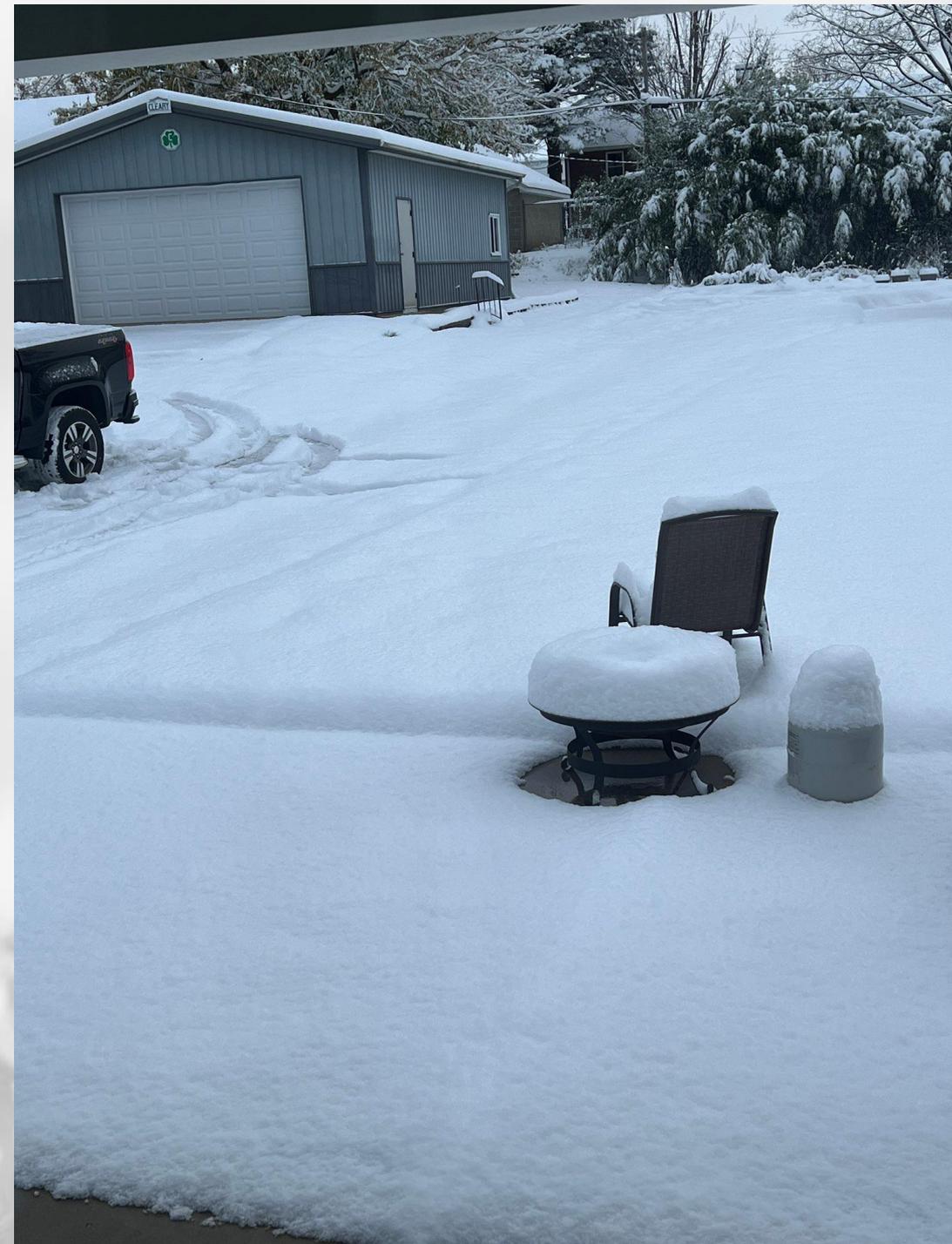
9-11 Nov.

SNOWFALL ANALYSIS FROM THE LAST 48 HOURS ENDING: 6 AM CST FRIDAY NOVEMBER 11TH, 2022



Early Snow in southern Midwest

- 3rd Earliest snow Paducah, KY



Snow – Waterloo, IL (near
St. Louis.

Photo: Eric Phillips

Other Events

- Lake Effect snows (IN, MI) – warm water
- Wind gusts over 100 mph (WY) – even locals called it “windy” (Nov. 5).

Ice– near Aberdeen, SD
Photo: Laura Edwards (SDSU
Ext./State Climatologist)





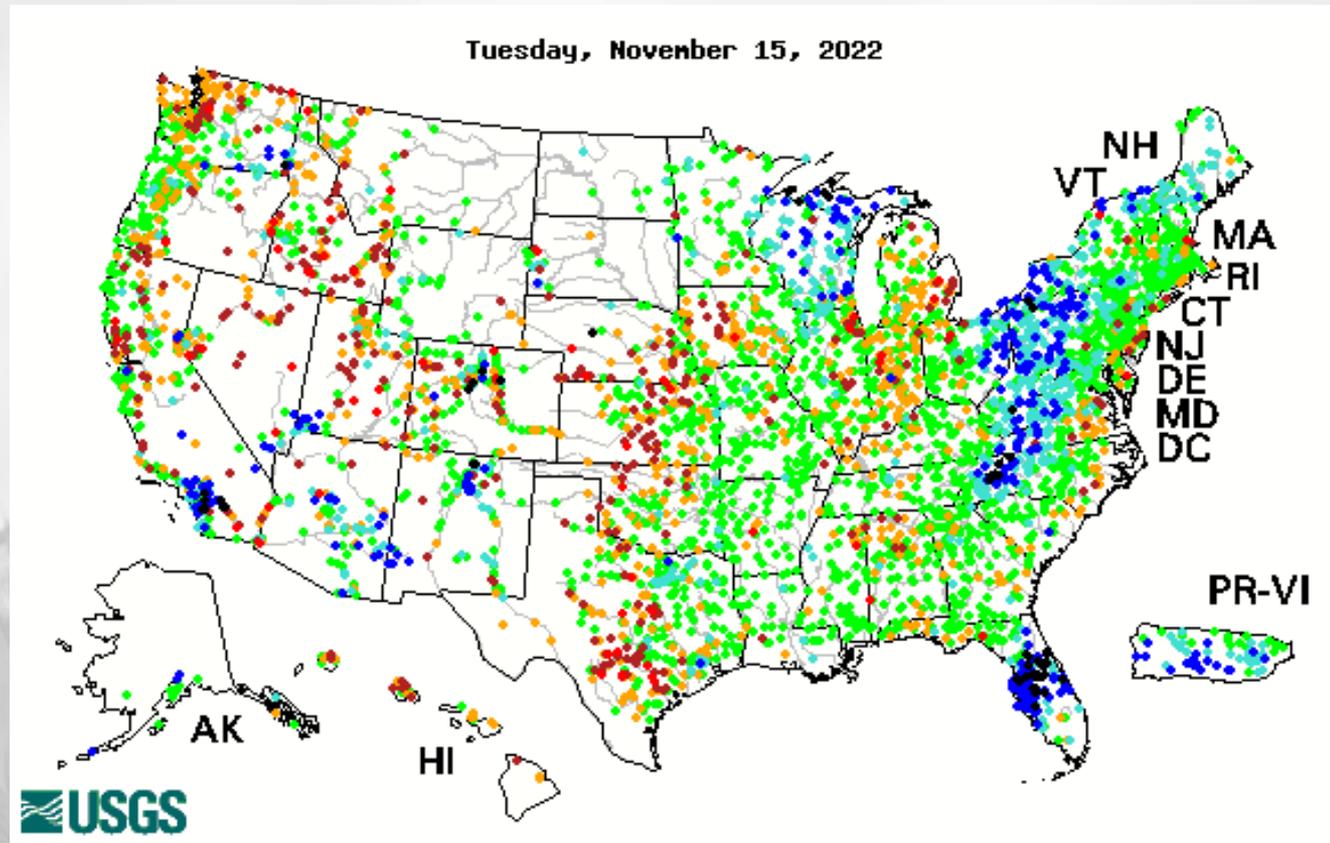
HYDROLOGIC IMPACTS

Photo:
CMOR
Jackson County, KS

7-Day Average Streamflow

Wednesday, 16 November
2022

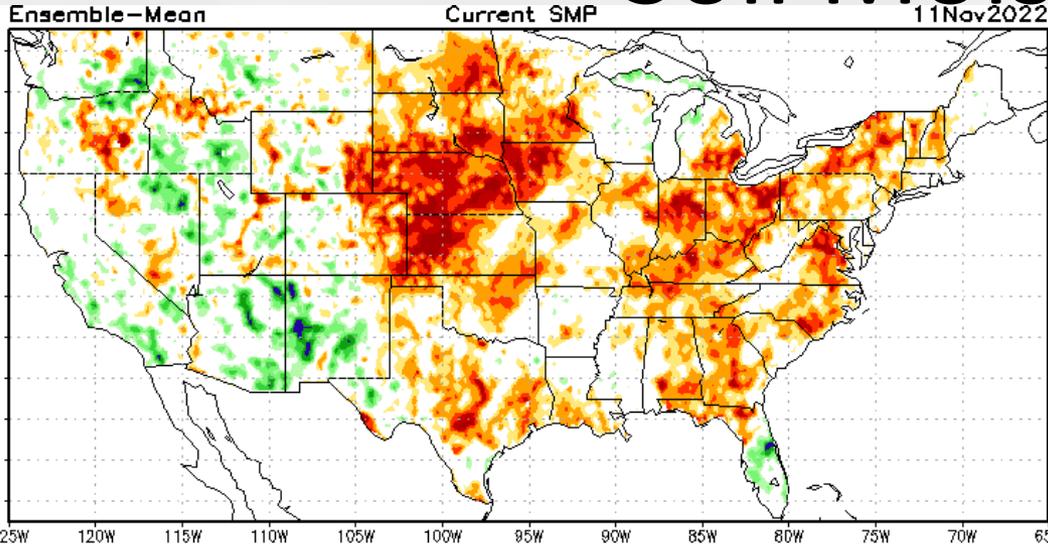
- Widespread low streamflows Plains and Great Lakes/Ohio Valley
- Above average stream flows WI and far eastern Ohio.
- Recent rains have pulled parts of Midwest back to near-normal (note that can still be low this time of year).



<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



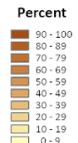
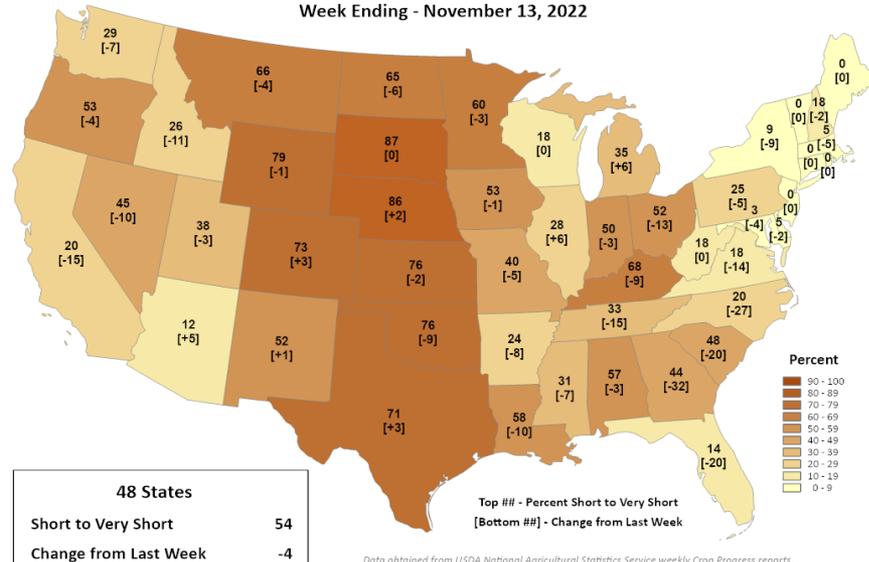
- Large areas of very dry soils – (during a usually drier time of year)
- Some recovery central Midwest
- Parts NW IA (less than 1" water in 5 ft profile – avg. around 4")

—LIS 0–100 cm Soil Moisture percentile valid 16 Nov 2022



USDA United States Department of Agriculture
 This product was prepared by the USDA Office of the Chief Economist (OCE) World Agricultural Outlook Board (WAOB)

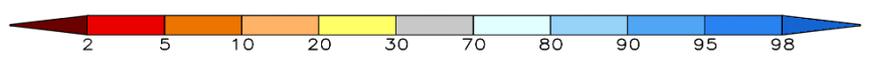
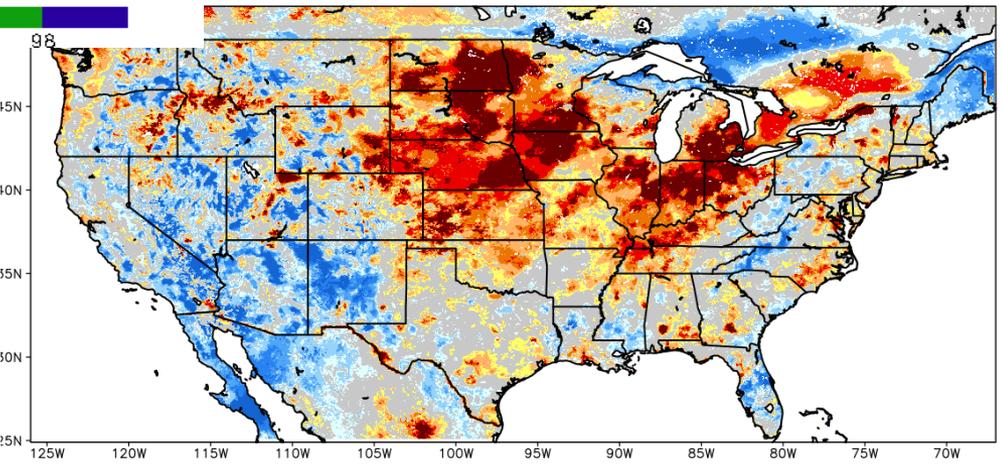
Topsoil Moisture Percent Short to Very Short Week Ending - November 13, 2022



48 States	
Short to Very Short	54
Change from Last Week	-4

Top # - Percent Short to Very Short
 Bottom # - Change from Last Week

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



*NOTE**
 *Experimental**

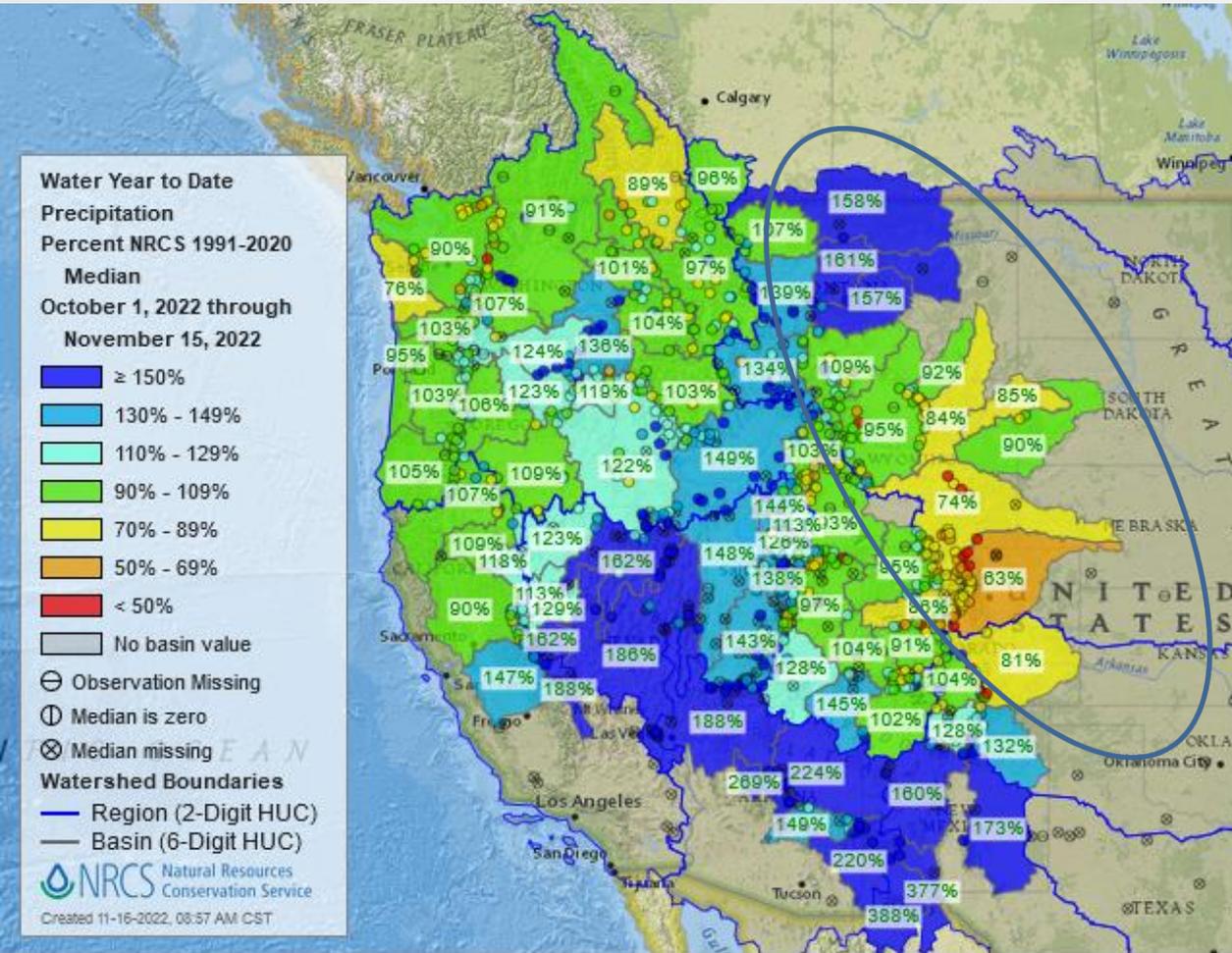
https://weather.msfc.nasa.gov/sport/case_studies/lis_CONUS.html

USDA-NASS data – map courtesy Brad Rippey USDA-OCE

http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml#

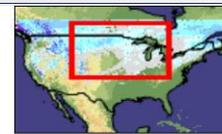
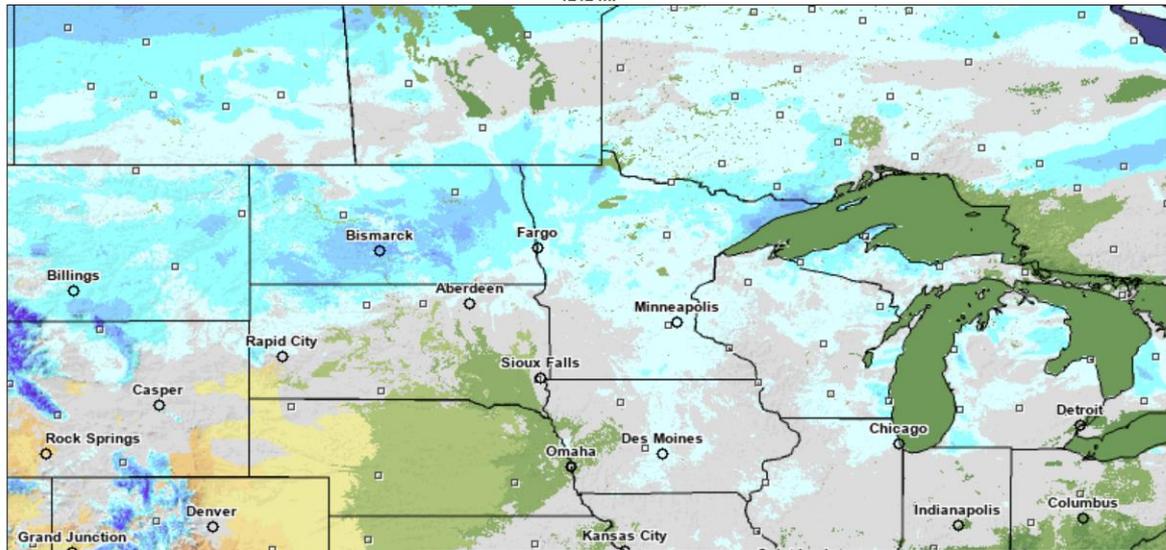
NRCS Snow Water Equivalent

- Still very early
- Wetter far north
- Southern areas – Platte much lower than avg.

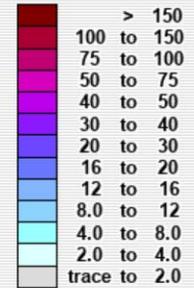


Modeled Snow Depth forecasted for 2022 November 17, 11:00 UTC

1212 mi



Inches of depth



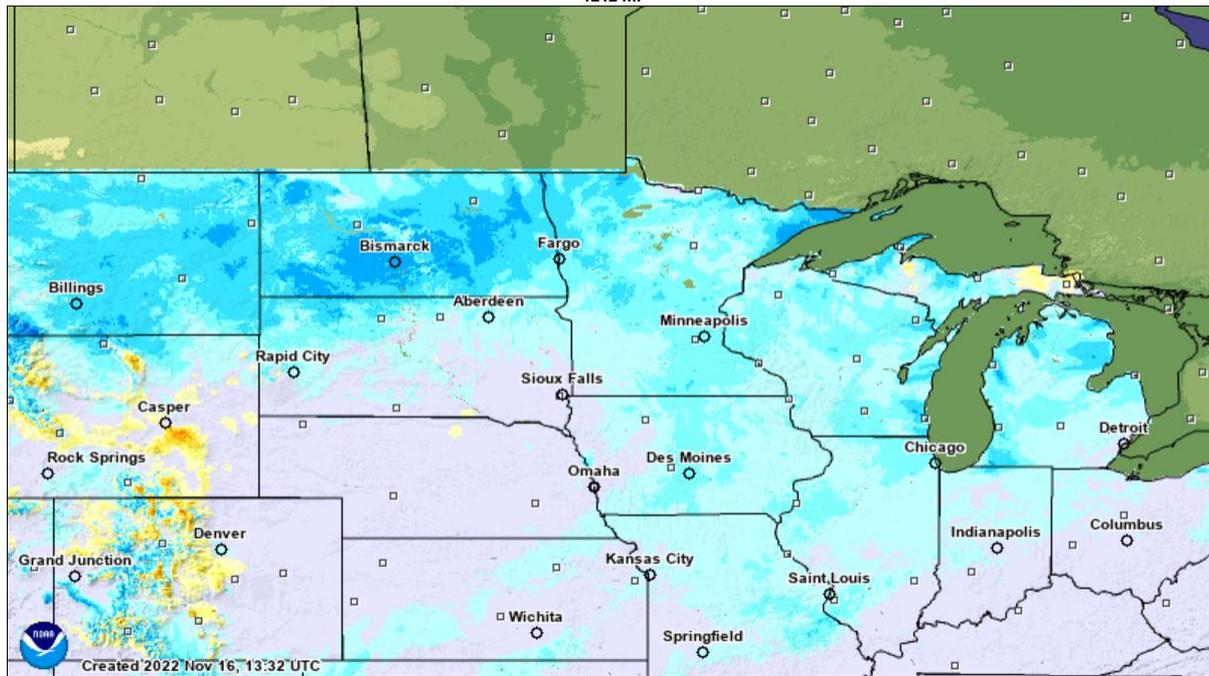
Not Estimated

Elevation in feet

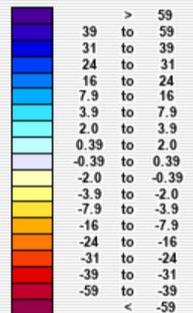
Other Snow

Modeled Snow Depth Departure from Normal (Daily) forecasted for 2022 November 17, 6:00 UTC

1212 mi



Inches of depth



Not Estimated

Elevation in feet



GREAT LAKES SURFACE ENVIRONMENTAL ANALYSIS (GLSEA)

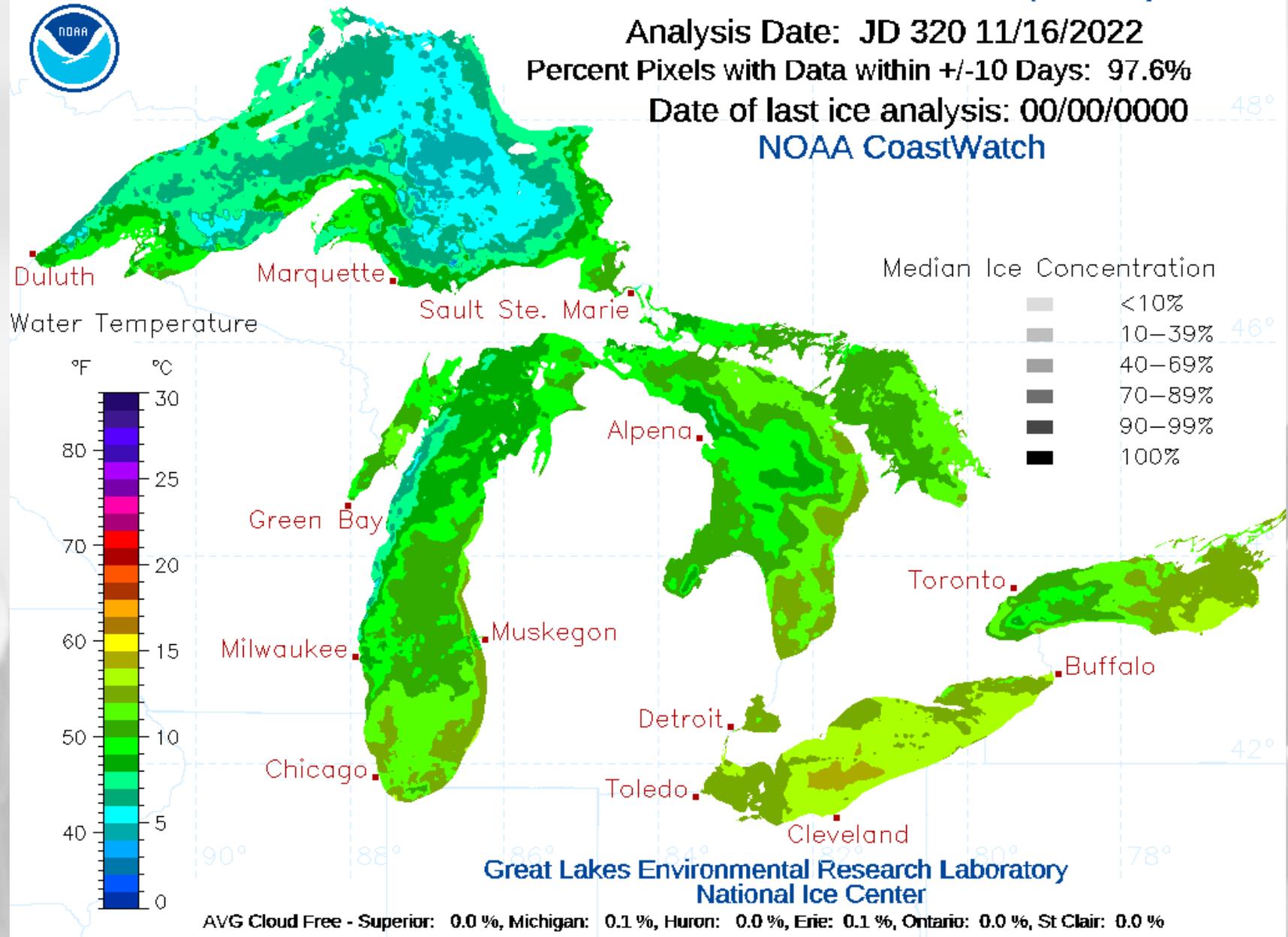


Analysis Date: JD 320 11/16/2022

Percent Pixels with Data within +/-10 Days: 97.6%

Date of last ice analysis: 00/00/0000

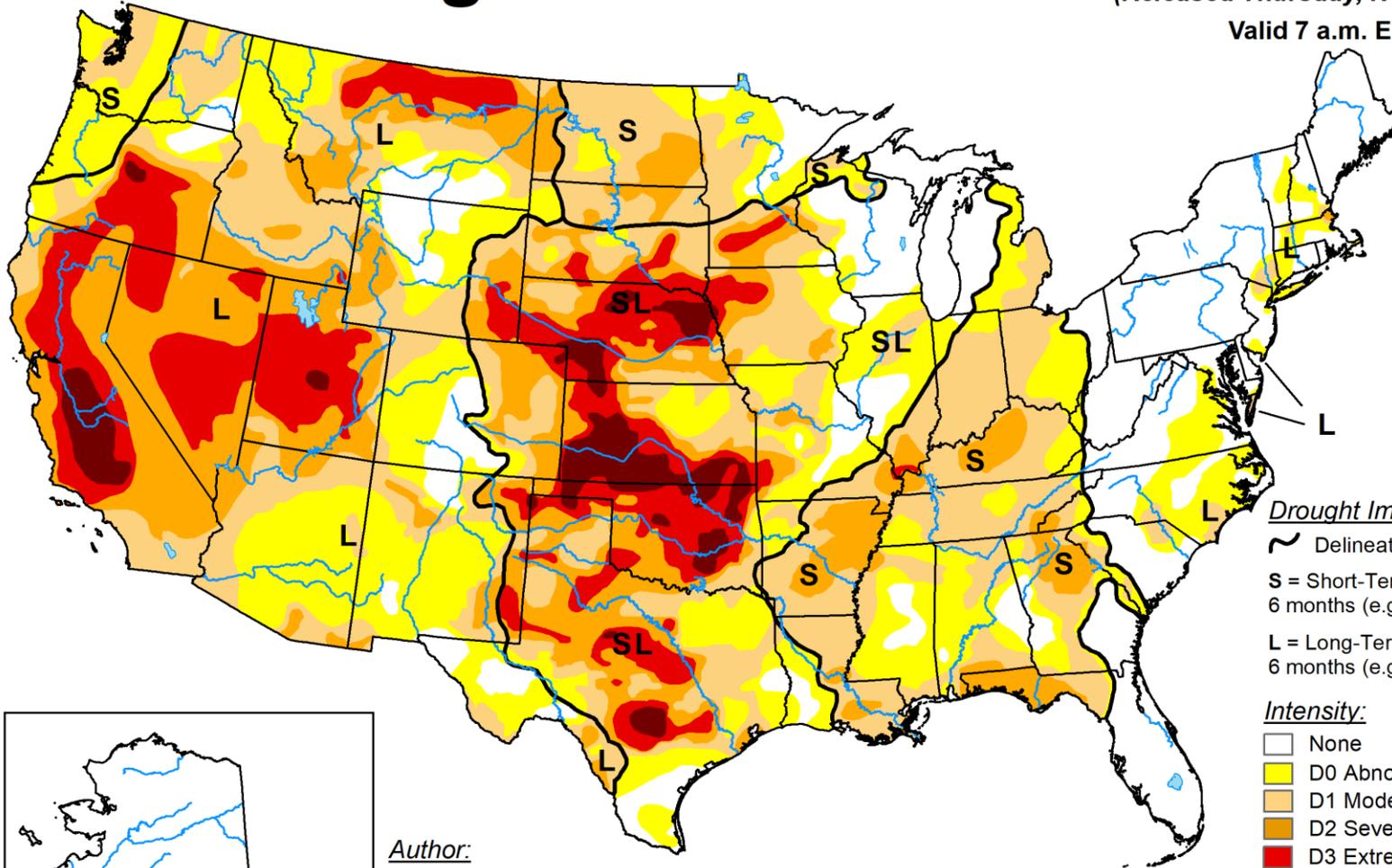
NOAA CoastWatch



U.S. Drought Monitor

November 15, 2022
(Released Thursday, Nov. 17, 2022)

Valid 7 a.m. EST



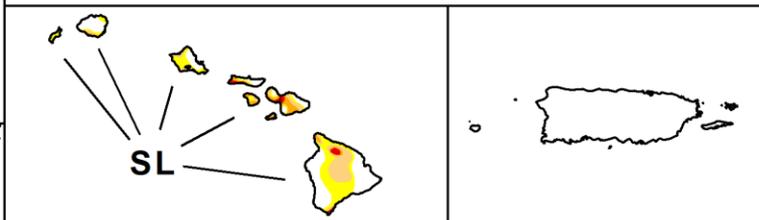
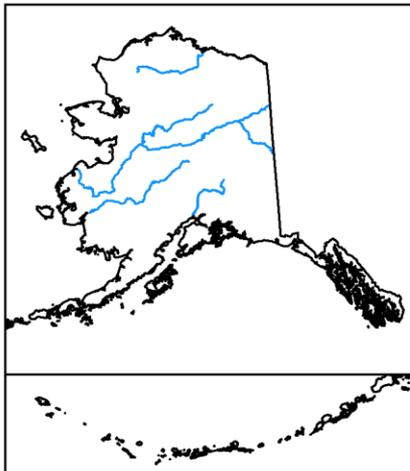
Drought Impact Types:

- ~ 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



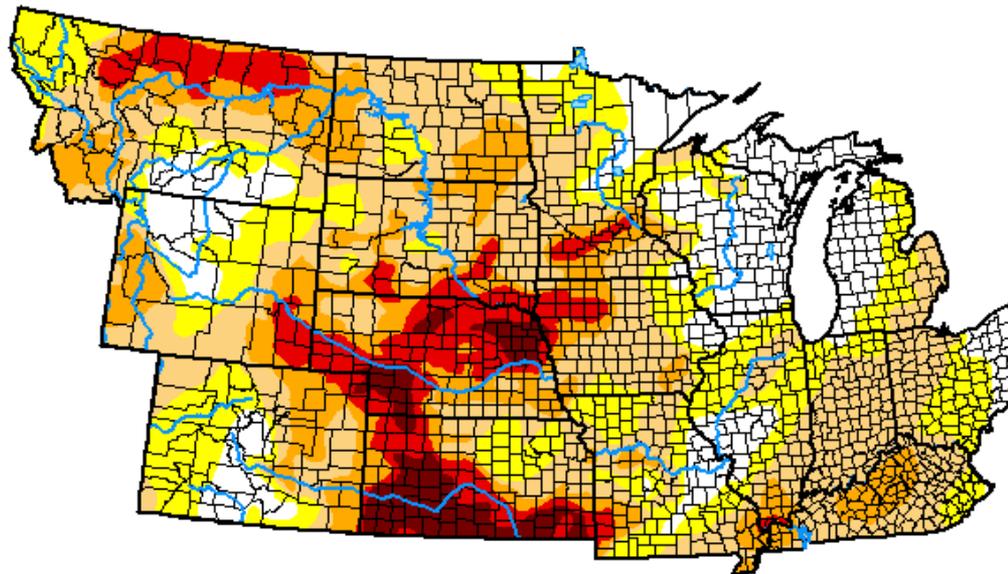
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>



droughtmonitor.unl.edu

U.S. Drought Monitor NWS Central

November 15, 2022
(Released Thursday, Nov. 17, 2022)
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	15.61	84.39	61.79	29.87	12.73	3.70
Last Week <i>11-08-2022</i>	14.09	85.91	63.06	32.37	12.88	3.54
3 Months Ago <i>08-16-2022</i>	43.30	56.70	32.86	16.08	4.88	1.13
Start of Calendar Year <i>01-04-2022</i>	33.94	66.06	46.53	27.27	10.67	1.77
Start of Water Year <i>09-27-2022</i>	27.00	73.00	47.70	23.08	8.80	2.73
One Year Ago <i>11-16-2021</i>	37.58	62.42	46.16	27.16	11.17	2.95

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>

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Brad Rippey
U.S. Department of Agriculture



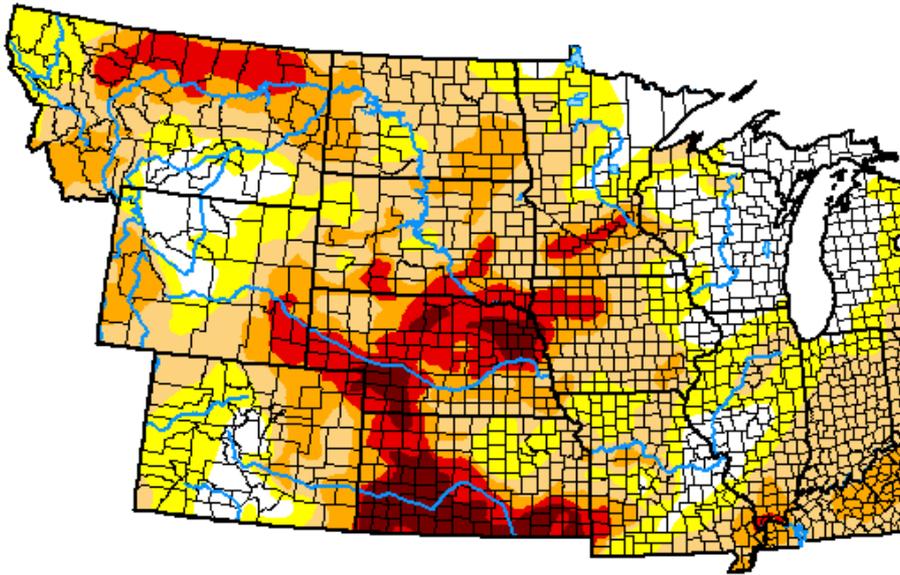
droughtmonitor.unl.edu

U.S. Drought Monitor NWS Central

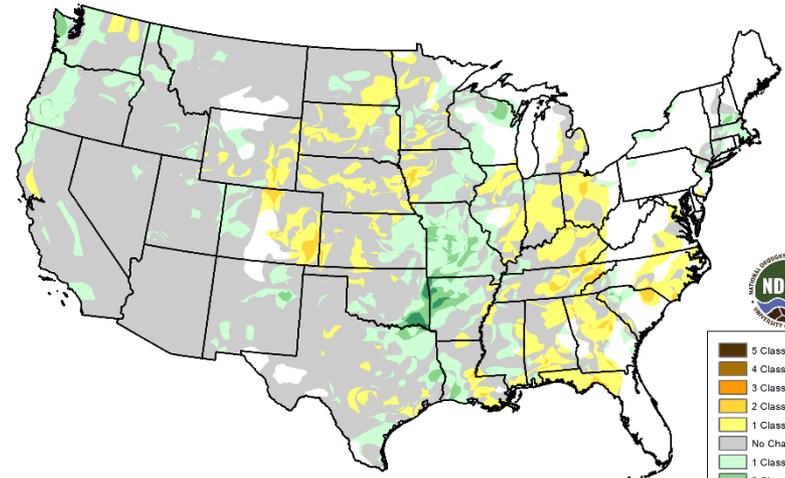
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U.S. Drought Monitor Class Change - CONUS
4 Week



November 15, 2022
compared to
October 18, 2022

droughtmonitor.unl.edu



- 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

AGRICULTURAL IMPACTS



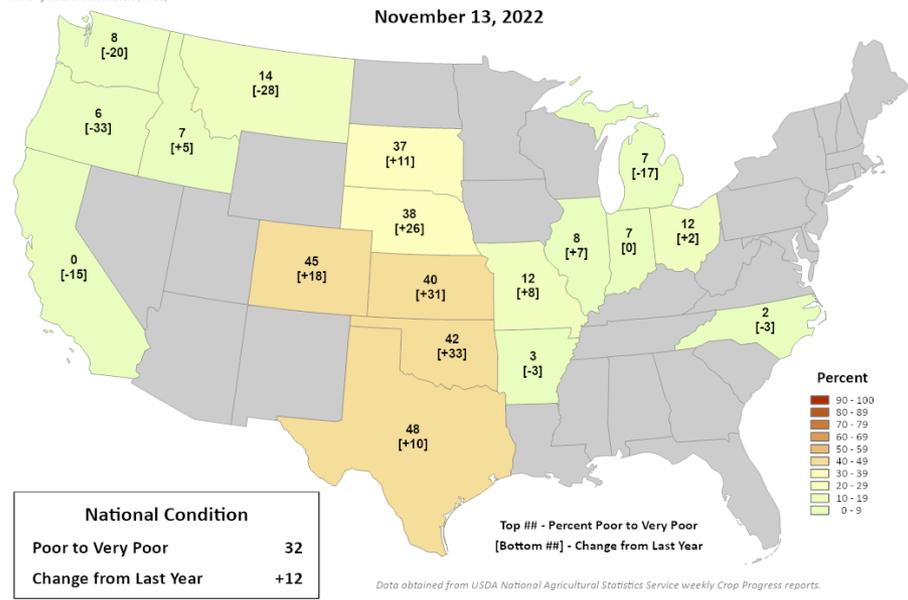
Photo:
Kansas Winter Wheat – Chip Redmond
(Kansas State)

Winter Wheat Conditions

Percent Poor to Very Poor

November 13, 2022

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



USDA NASS Crop Progress Winter Wheat

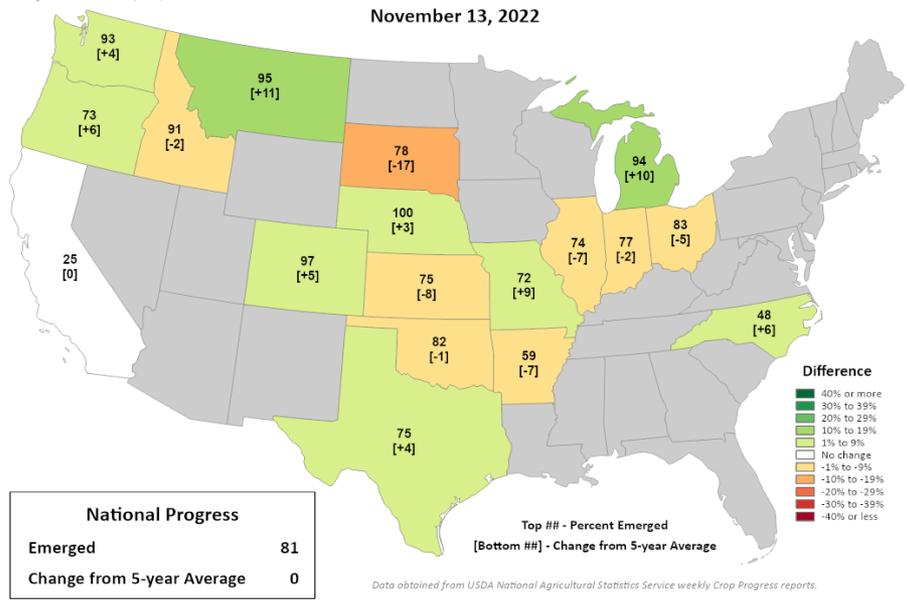
- Very poor conditions nationally
- Worst in Plains

Winter Wheat Progress

Percent Emerged

November 13, 2022

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

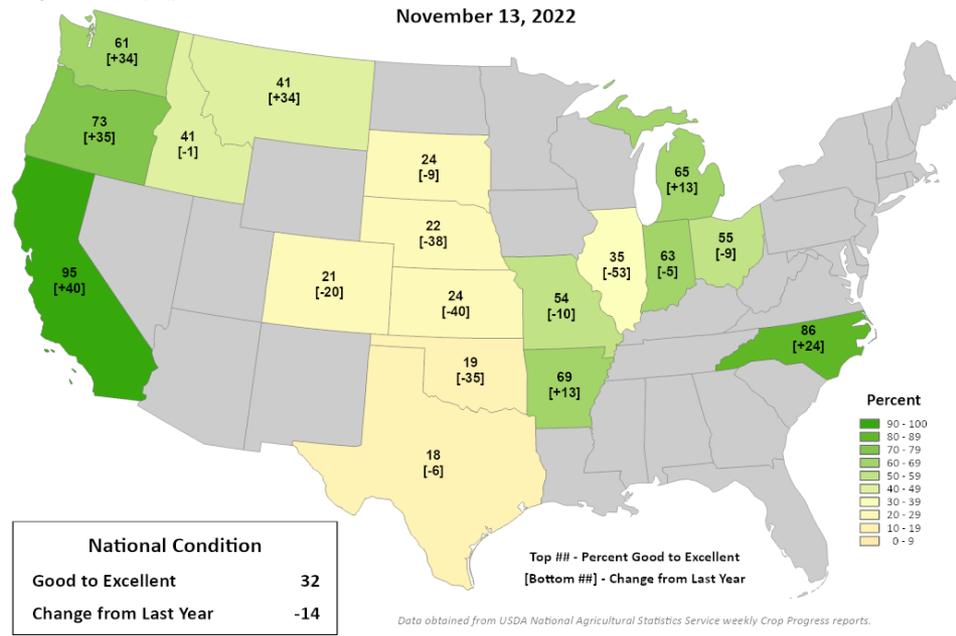


Winter Wheat Conditions

Percent Good to Excellent

November 13, 2022

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

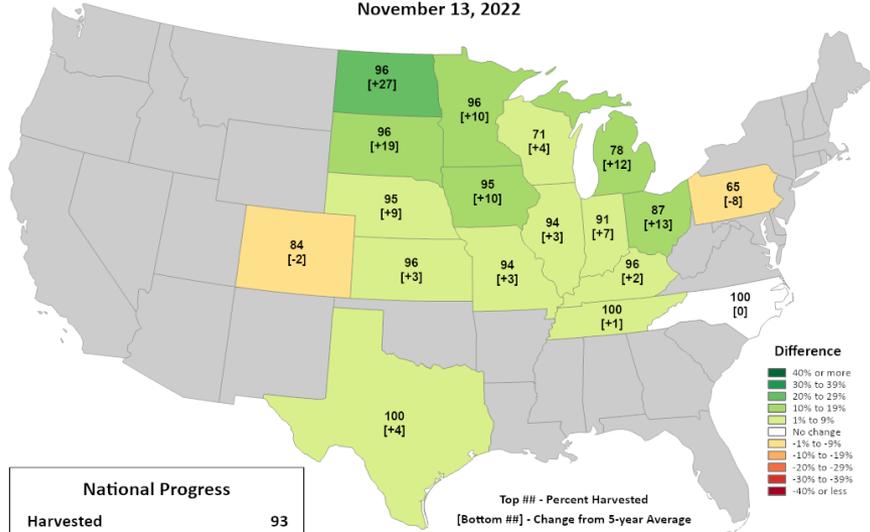


USDA NASS Crop Progress



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

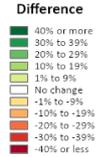
Corn Progress Percent Harvested November 13, 2022



National Progress	
Harvested	93
Change from 5-year Average	+8

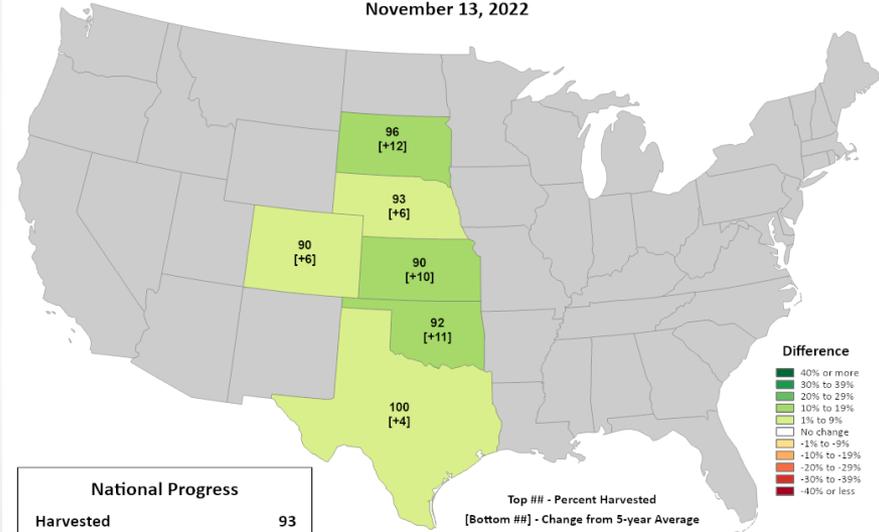
Top ## - Percent Harvested
[Bottom ##] - Change from 5-year Average

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



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

Sorghum Progress Percent Harvested November 13, 2022



National Progress	
Harvested	93
Change from 5-year Average	+7

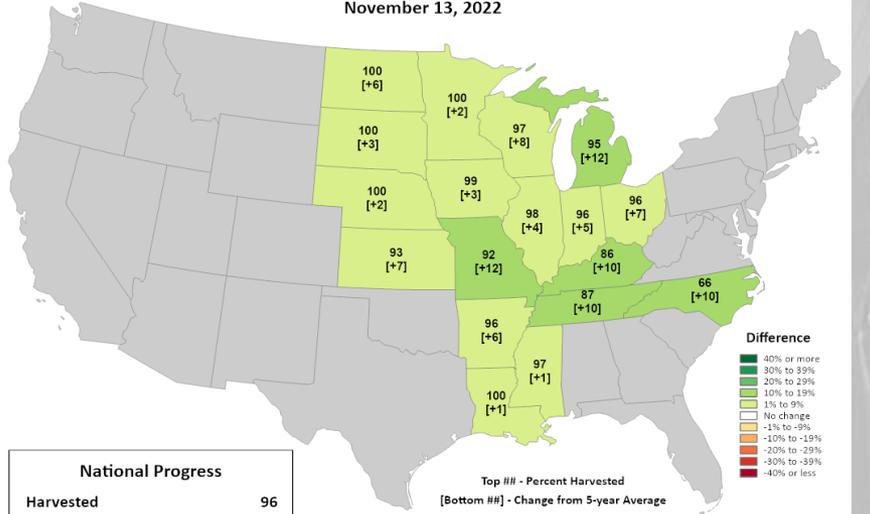
Top ## - Percent Harvested
[Bottom ##] - Change from 5-year Average

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



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

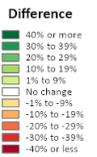
Soybeans Progress Percent Harvested November 13, 2022



National Progress	
Harvested	96
Change from 5-year Average	+5

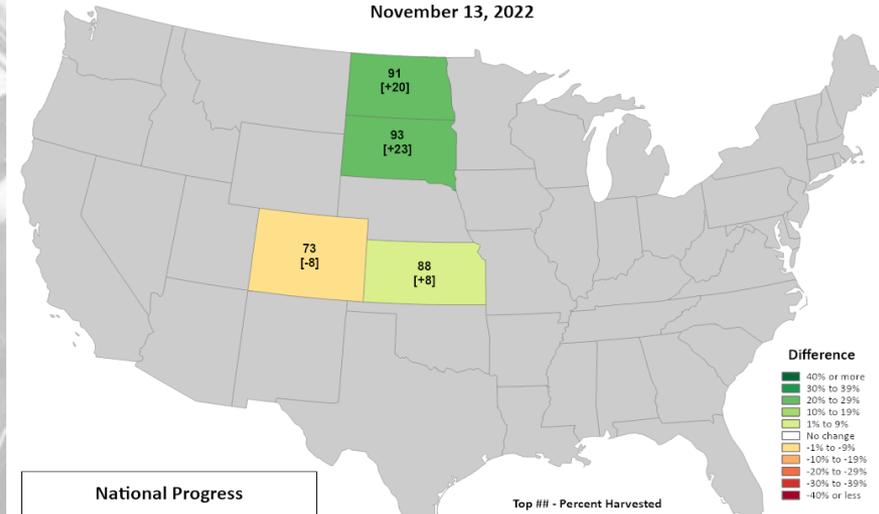
Top ## - Percent Harvested
[Bottom ##] - Change from 5-year Average

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



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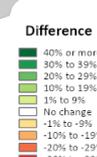
Sunflowers Progress Percent Harvested November 13, 2022



National Progress	
Harvested	91
Change from 5-year Average	+20

Top ## - Percent Harvested
[Bottom ##] - Change from 5-year Average

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



Various ag

- Generally good fall for specialties/agritourism
- Cover crops – came up with little rain, but main have seen less planting
- Fall N application at too warm soil temperatures (should be below 50 F and falling)
- Livestock feed issues in parts of Plains/Missouri
- Winter wheat – drought in Plains, late emergence IL – then cold/snow.
- Frozen soils (4”) in Dakotas/MN/NE.

Fires

- Numerous grass/harvest fires around Midwest continued
- Ohio –ongoing Wayne National Forest

KS Fire
Photo: Chip
Redmond-KSU



Drought/Mississippi River 2022

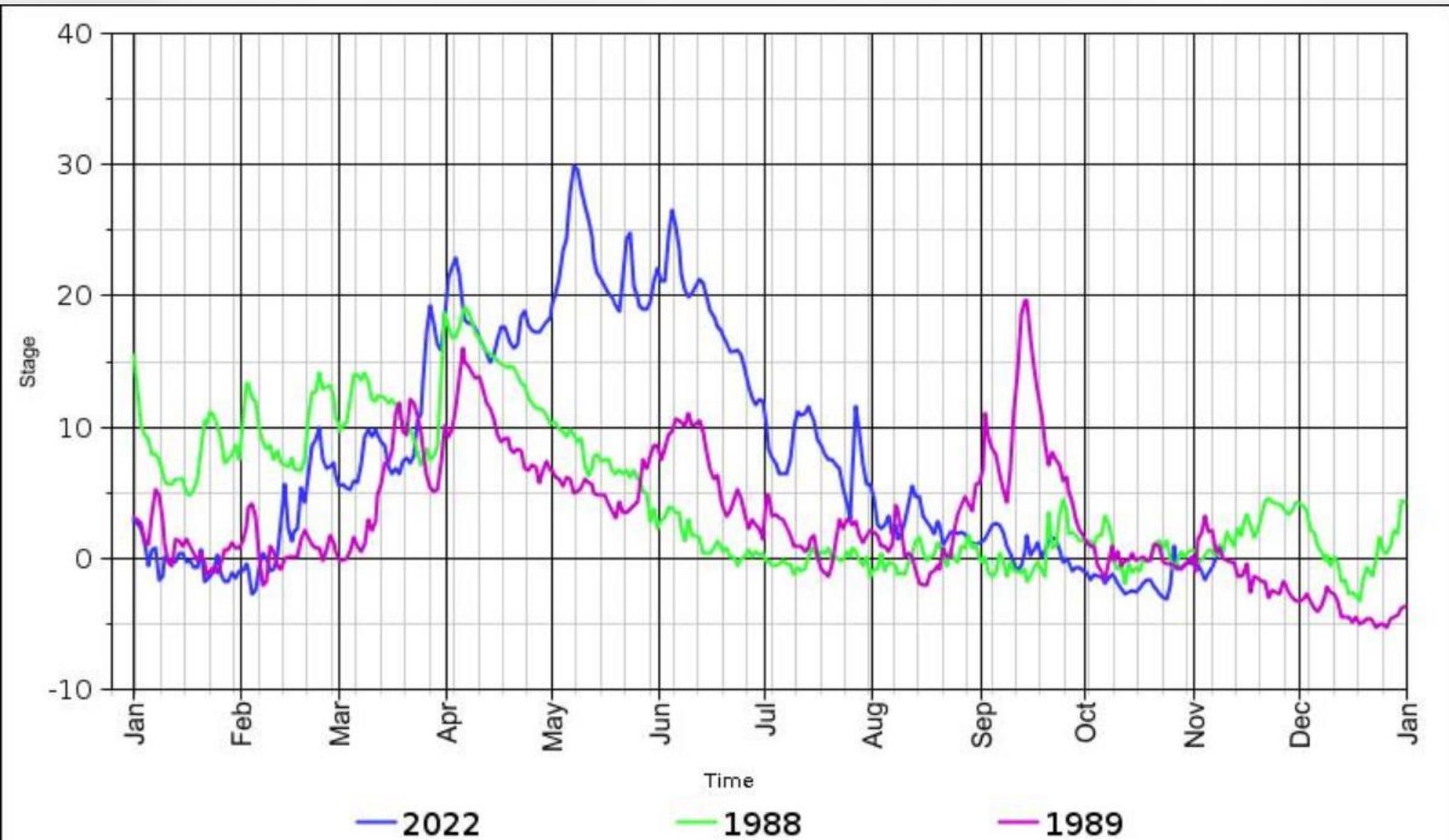
**October broke 10 daily-low records
at St. Louis gage**

Slides from:

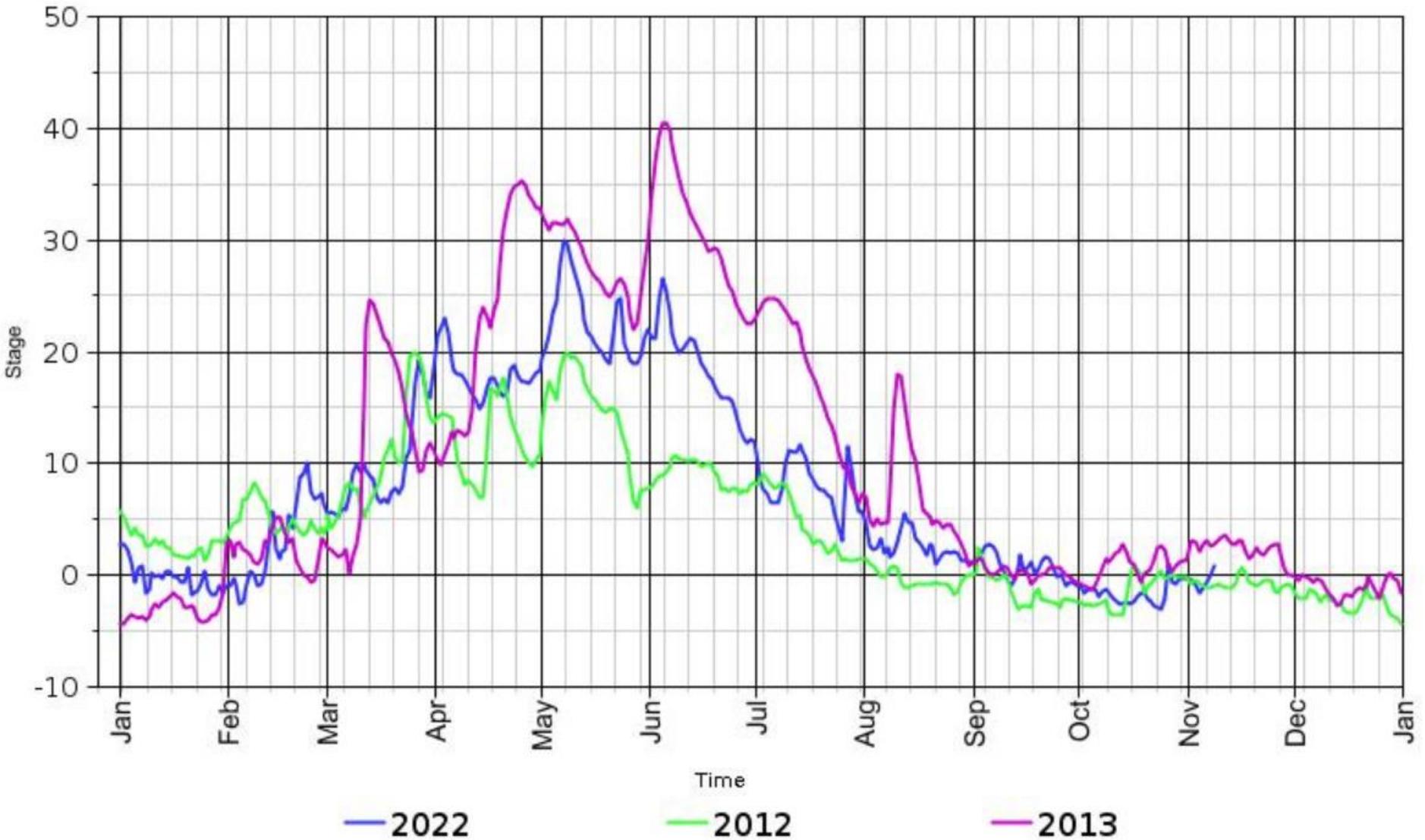
Joan Stemler

**Water Control
St. Louis District**

1988-89 vs. 2022



2012-13 vs. 2022



Extended River Forecast

- **11-16-2022 - St. Louis 2.9 ft ~ 28 Days -5.4 ft.**
- **Upper Mississippi River Flow Forecast**
 - Currently ~ 68,000 cfs
 - 28 days ~ 30,000 cfs (-38,000 cfs)
- **Missouri River Flow Forecast**
 - Currently ~ 45,000 cfs
 - 28 days ~ 21,000 cfs (-24,000 cfs)
- **Illinois River Flow Forecast**
 - Currently ~ 7,000 cfs
 - 28 days ~ 2,500 cfs (-4,500 cfs)

Long-Range Forecast

St. Louis, 2022

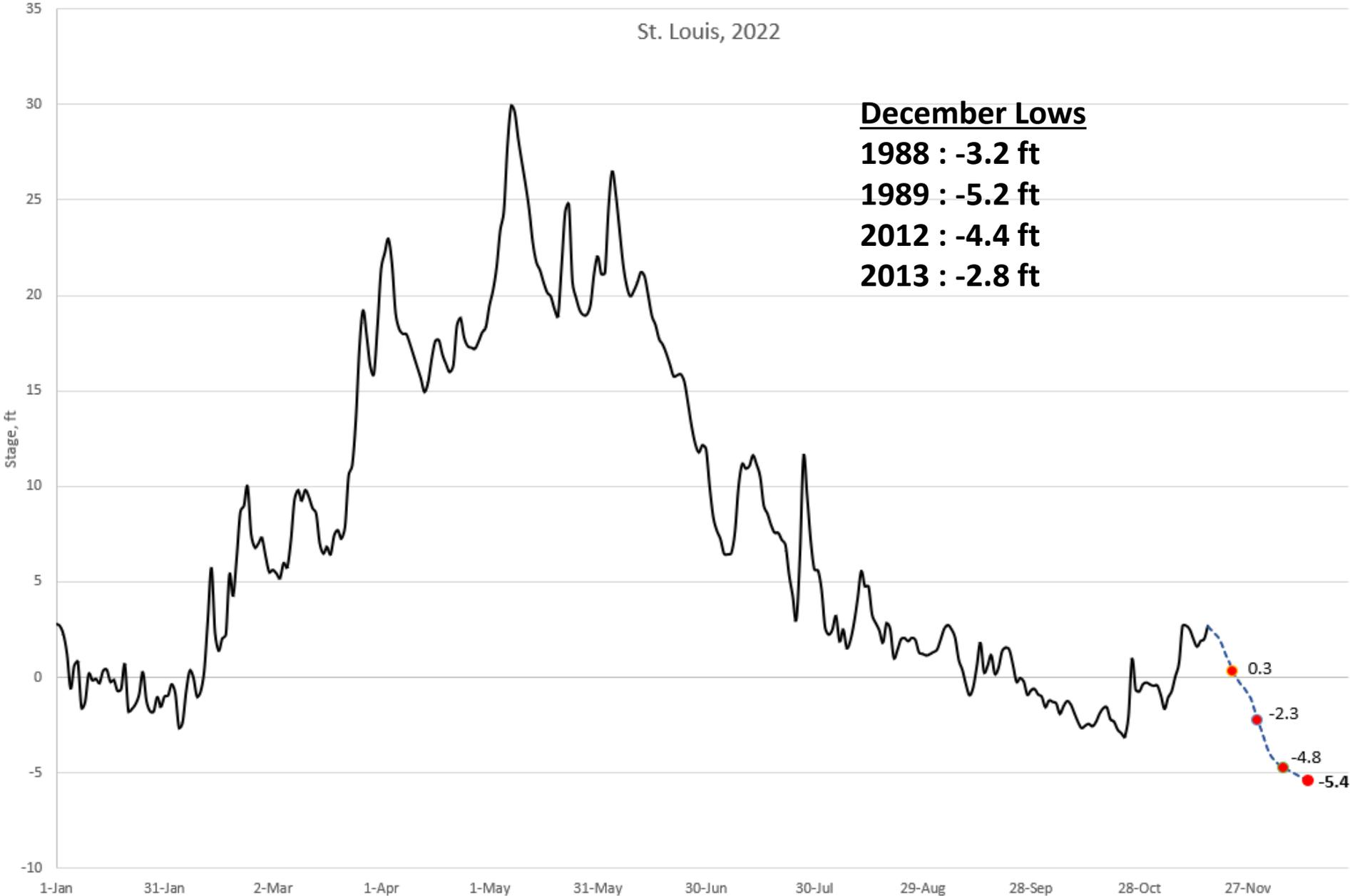
December Lows

1988 : -3.2 ft

1989 : -5.2 ft

2012 : -4.4 ft

2013 : -2.8 ft



Mississippi River Impacts

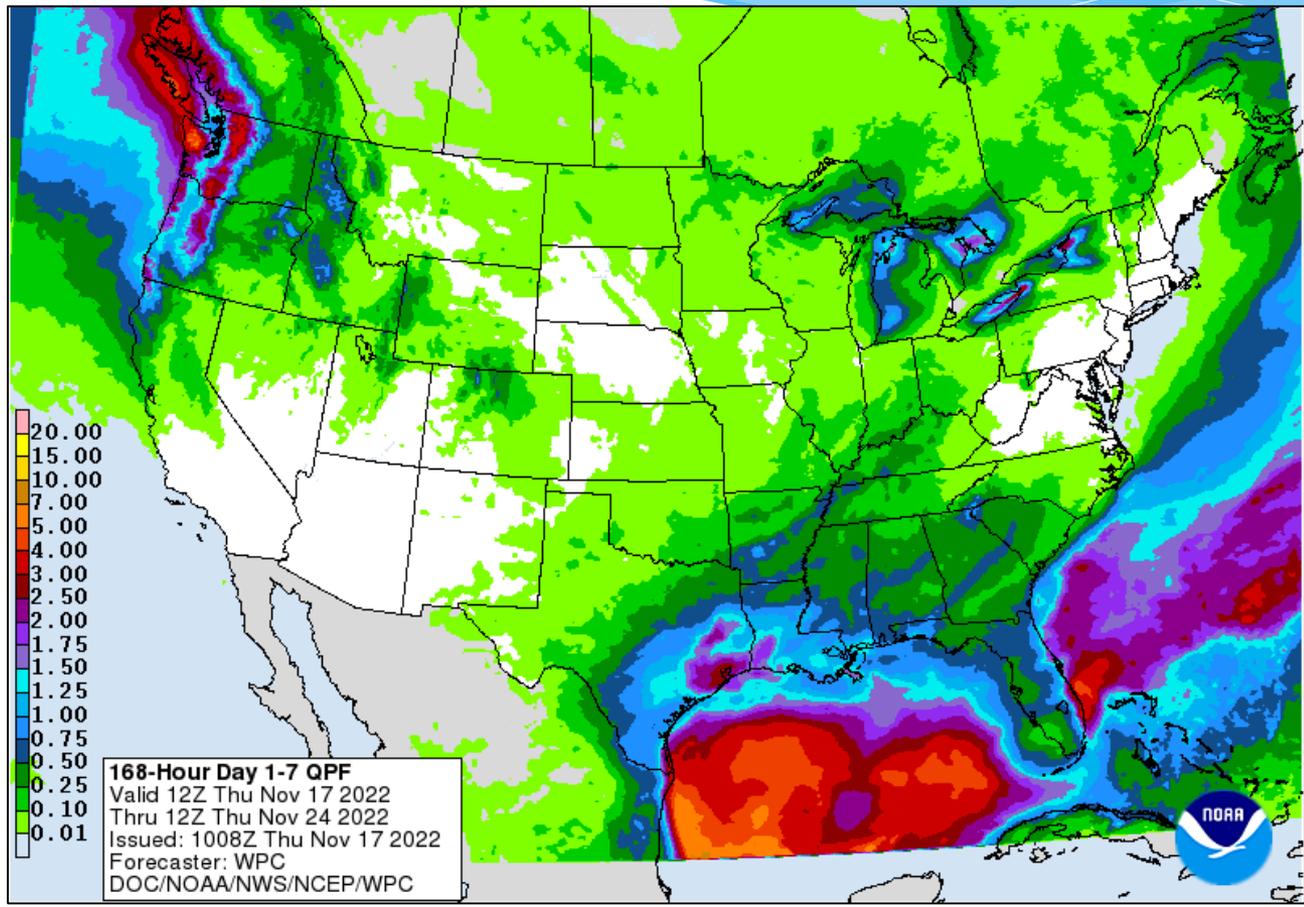
- Reduced shipping (grain out – fertilizers in –and others)
- Grain losses (profitability)
- Reduced cruse activity
- See Friday webinar for additional details.



Outlooks... Current Conditions

- * **Still broadly dry**
- * **Fall/winter are a recharge seasons... important to build soil moisture before freeze up**
- * **Soils are thirsty (2-3 year drought) = runoff likely lower than normal (unless frozen ground)**
- * **Fall into Winter relatively dry time of year (not including higher elevations)**
- * **La Niña X 3 is here, will it help? Better than El Nino so perhaps northern states/Great Lakes/Ohio basin**
- * **How much precipitation to end the drought?**
 - * **Snow in the Mountains, plains and Midwest important for major rivers**
 - * **Really need several widespread major rain/snow events across the region**
 - * **Need above normal precipitation into the spring**

Total Precipitation Outlook Through November 24th³⁸

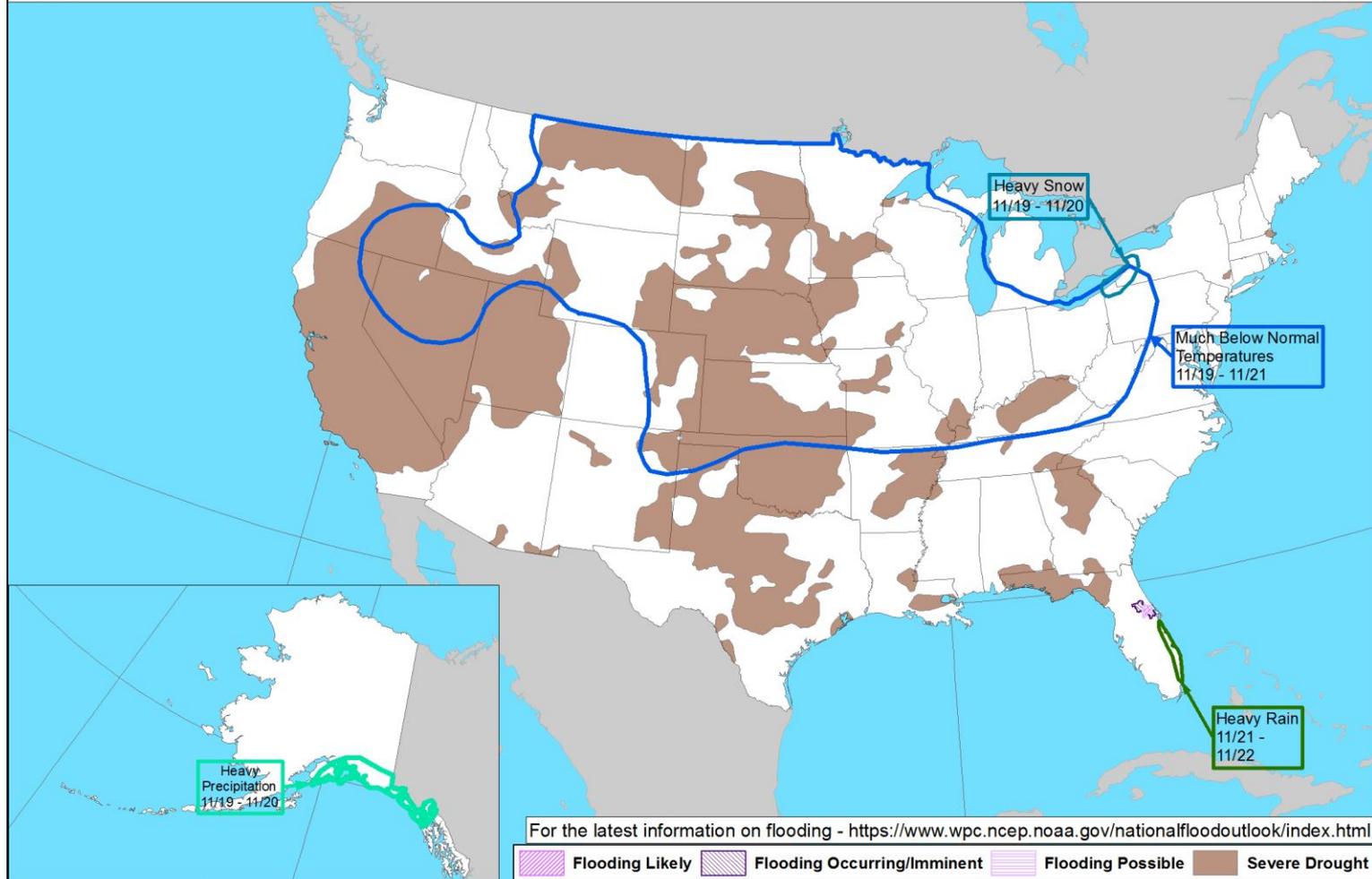


<https://www.wpc.ncep.noaa.gov/qpf/day1-7.shtml>

Hazards – Next few days (Cold)



Day 3-7 U.S. Hazards Outlook
Valid: 11/19/2022-11/23/2022



Weather Prediction Center

Made: 11/16/2022 3PM EST

Follow us:

www.wpc.ncep.noaa.gov



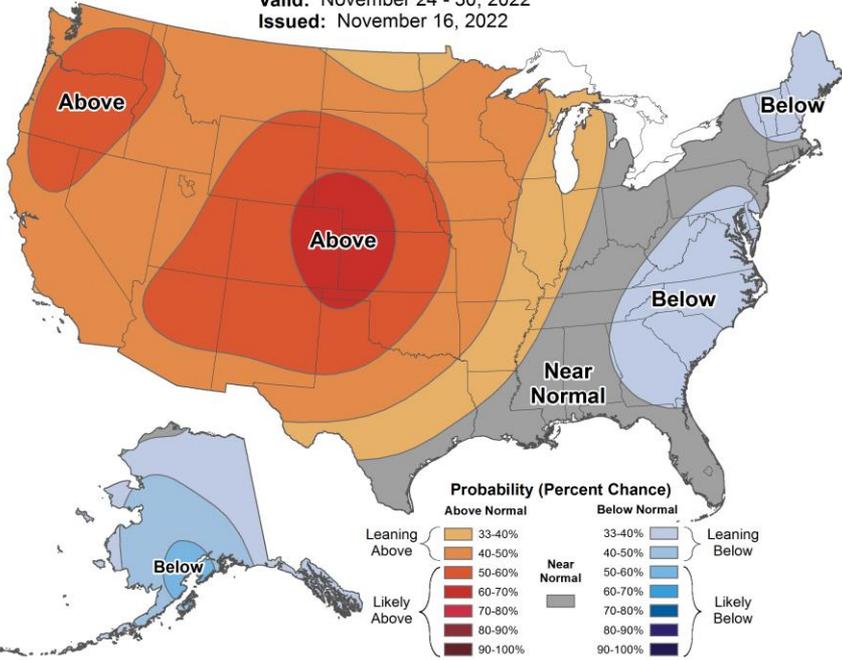
Week 2 Temperature & Precipitation Outlook (November 24 – 30, 2022)



8-14 Day Temperature Outlook



Valid: November 24 - 30, 2022
Issued: November 16, 2022



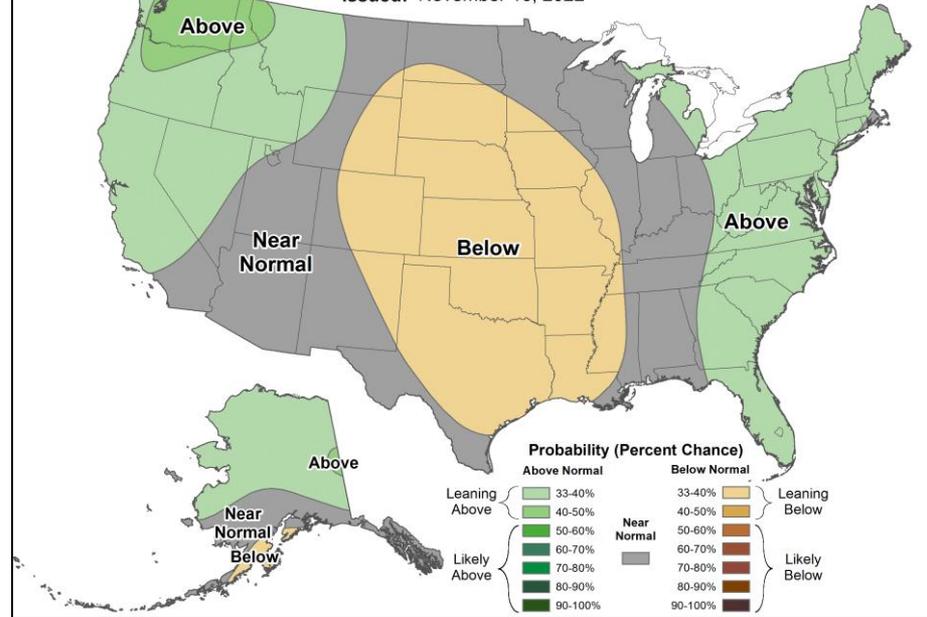
Precipitation



8-14 Day Precipitation Outlook



Valid: November 24 - 30, 2022
Issued: November 16, 2022

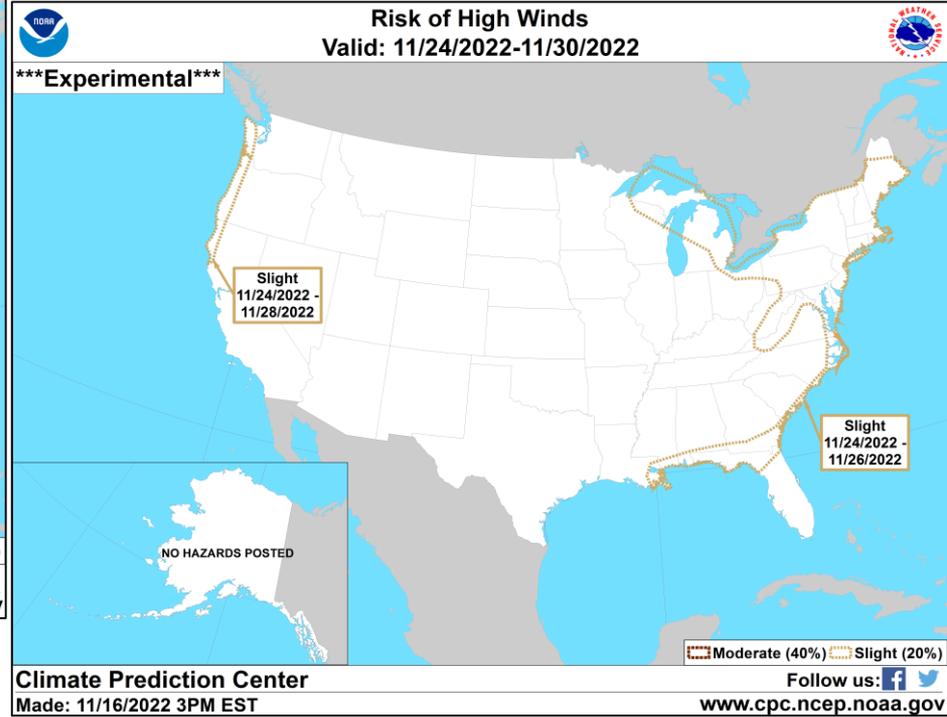
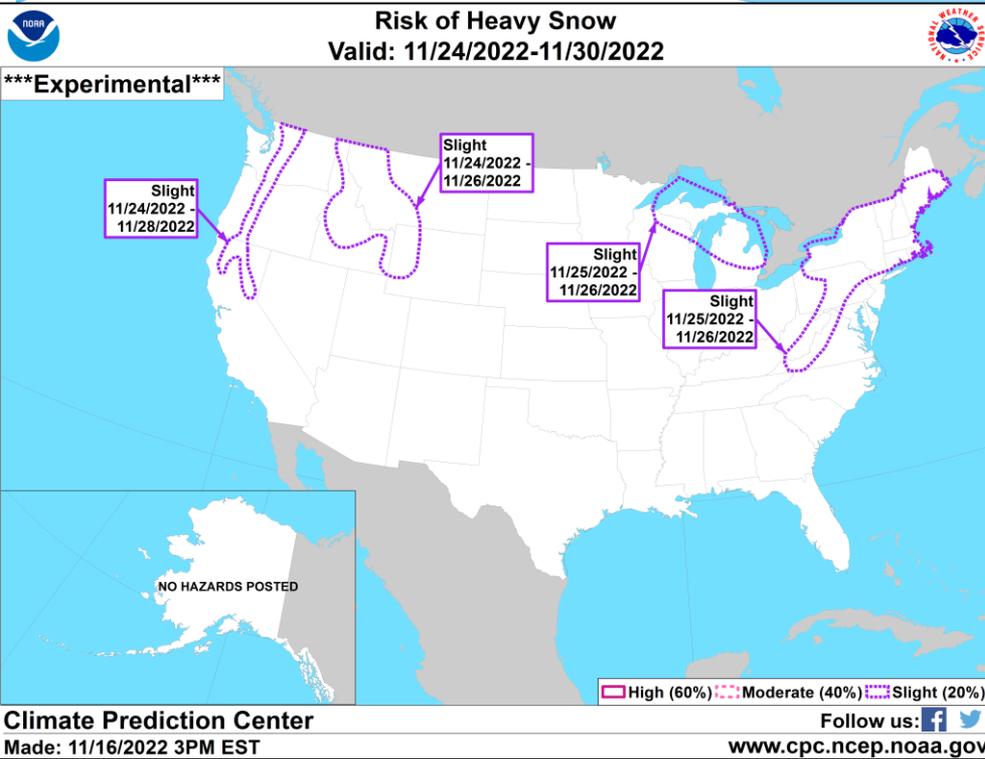


Temperature

<http://www.cpc.noaa.gov/>



Hazards (Week 2) Snow/Wind

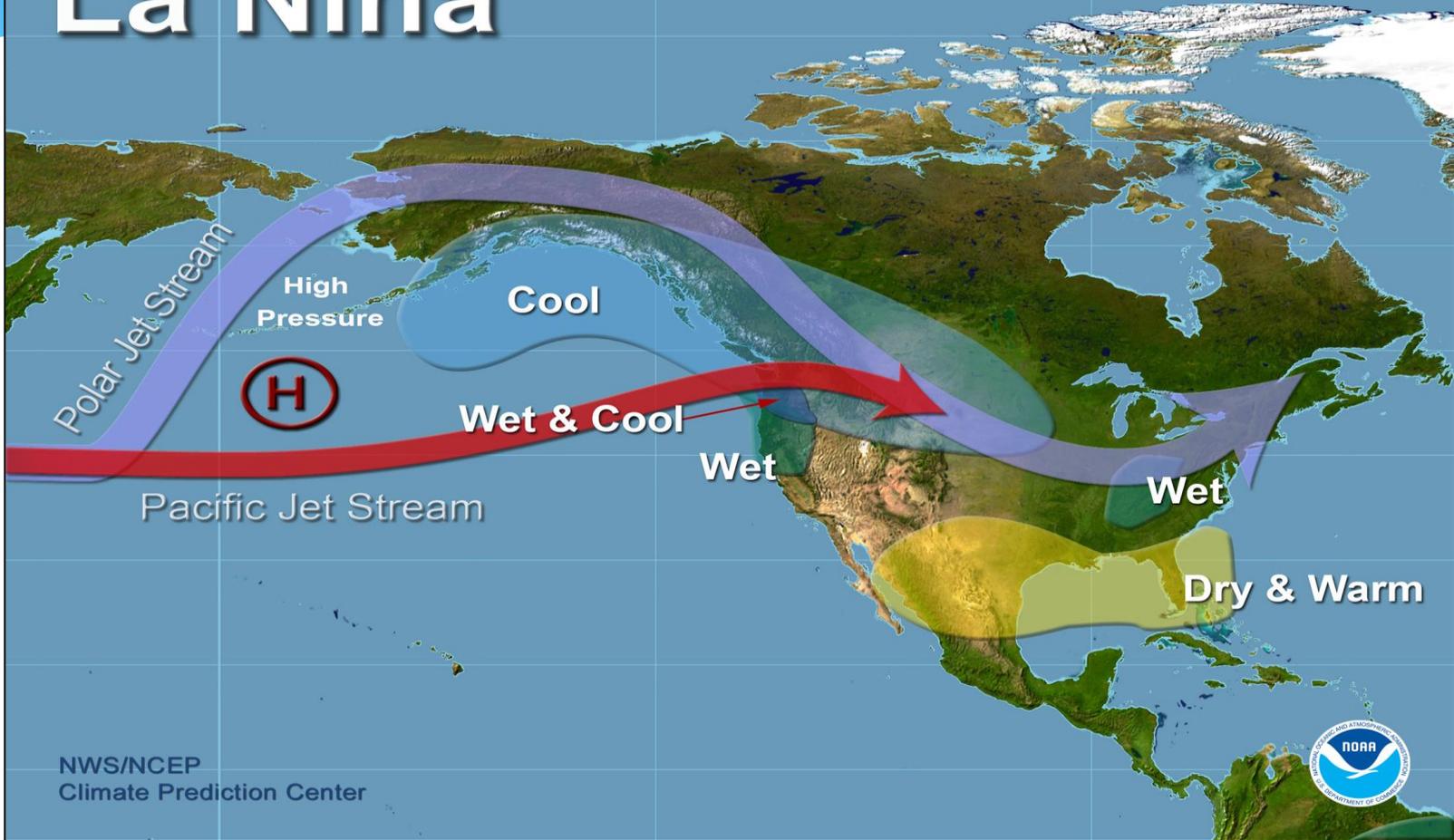


<https://www.cpc.ncep.noaa.gov/>



Typical Wintertime Pattern

La Niña



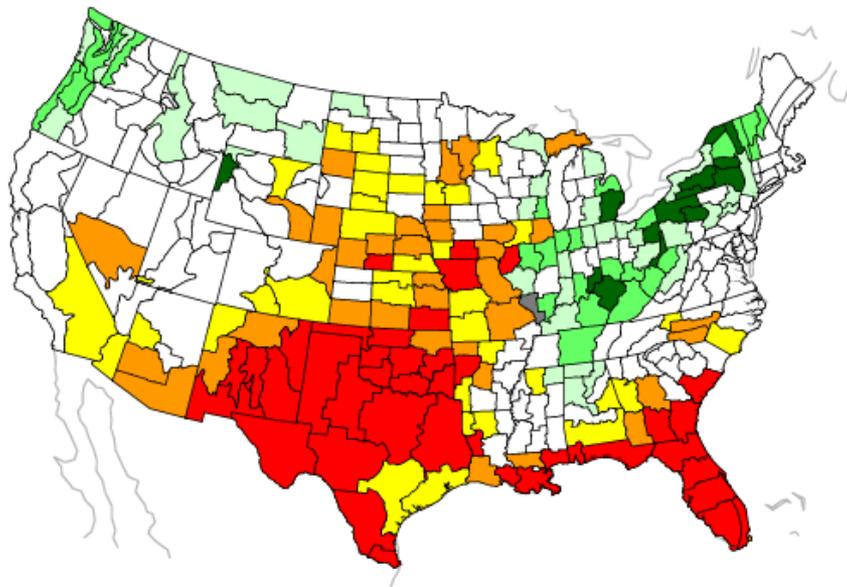
NWS/NCEP
Climate Prediction Center



Potential Risk of Wet/Dry Extremes During La Niña



JFM Precipitation During La Niña
Increased Risk of Wet or Dry Extremes



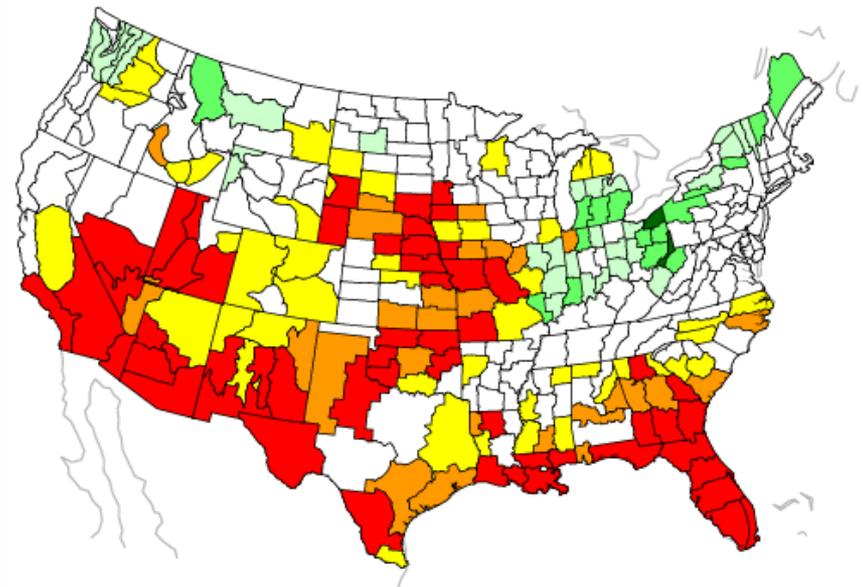
Dry Extreme **Wet Extreme**

+90% +50% +50% +90%

Percent (%) Increase in Risk

NOAA/ESRL/PSD

FMA Precipitation During La Niña
Increased Risk of Wet or Dry Extremes



Dry Extreme **Wet Extreme**

+90% +50% +50% +90%

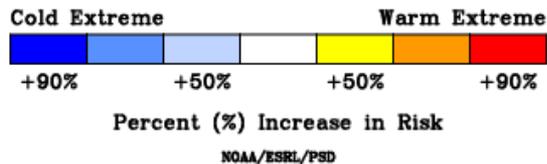
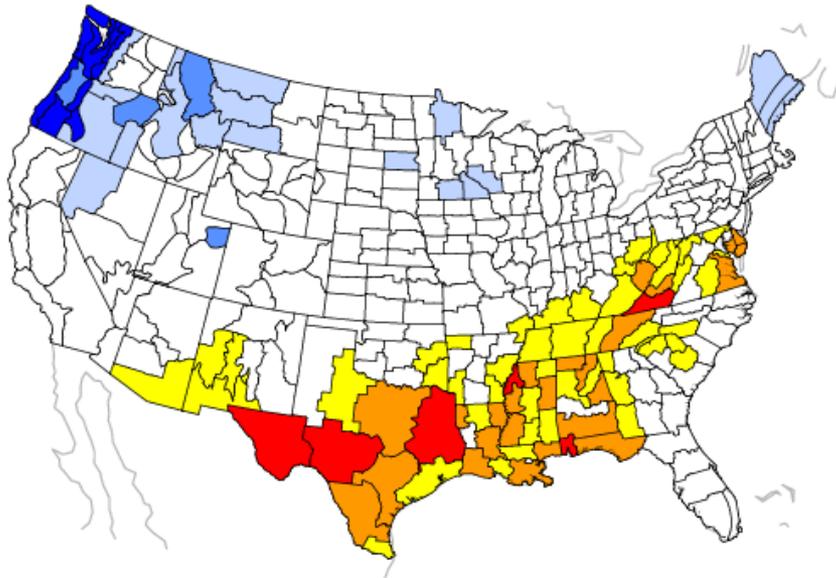
Percent (%) Increase in Risk

NOAA/ESRL/PSD

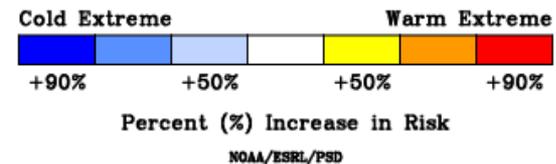
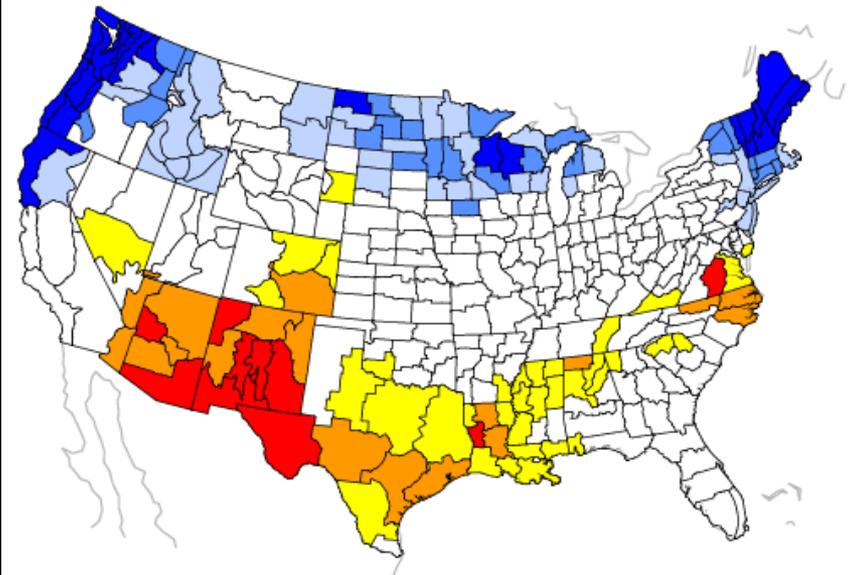
Potential Risk of Warm/Cold Extremes During La Niña



**JFM Temperature During La Niña
Increased Risk of Warm or Cold Extremes**



**FMA Temperature During La Niña
Increased Risk of Warm or Cold Extremes**



What may happen with the La Nina?

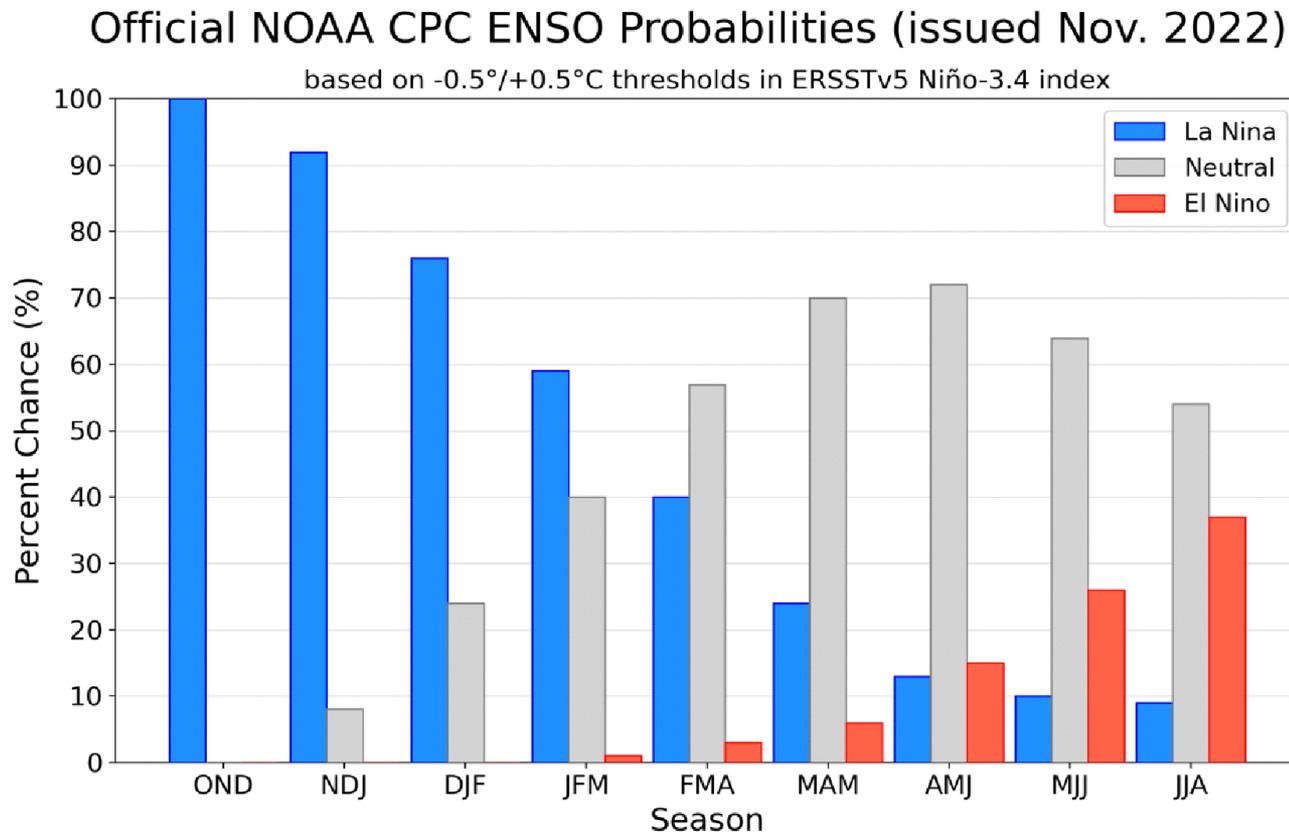


Figure 7. Official ENSO probabilities for the Niño 3.4 sea surface temperature index (5°N - 5°S , 120°W - 170°W). Figure updated 10 November 2022.



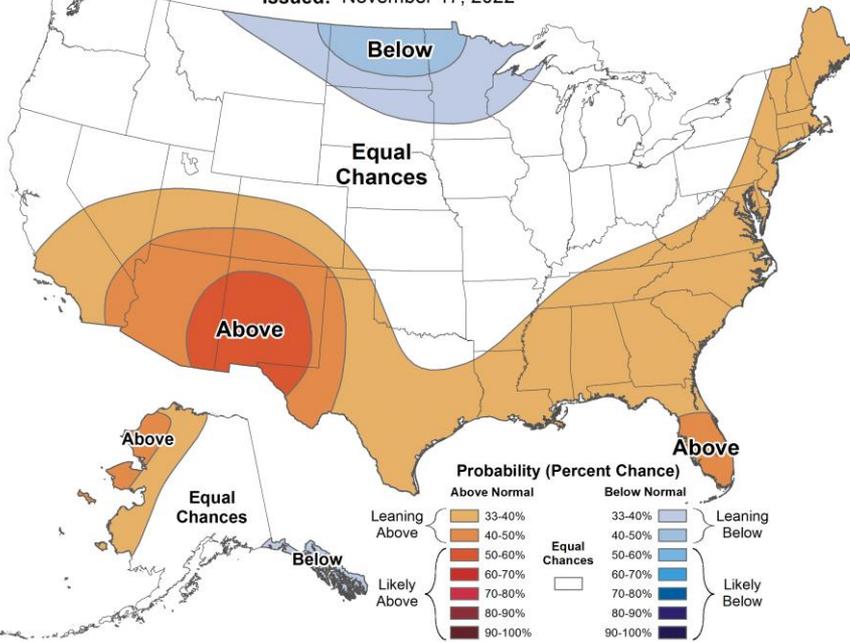
December 2022 Temperature and Precipitation Outlook



Monthly Temperature Outlook



Valid: December 2022
Issued: November 17, 2022



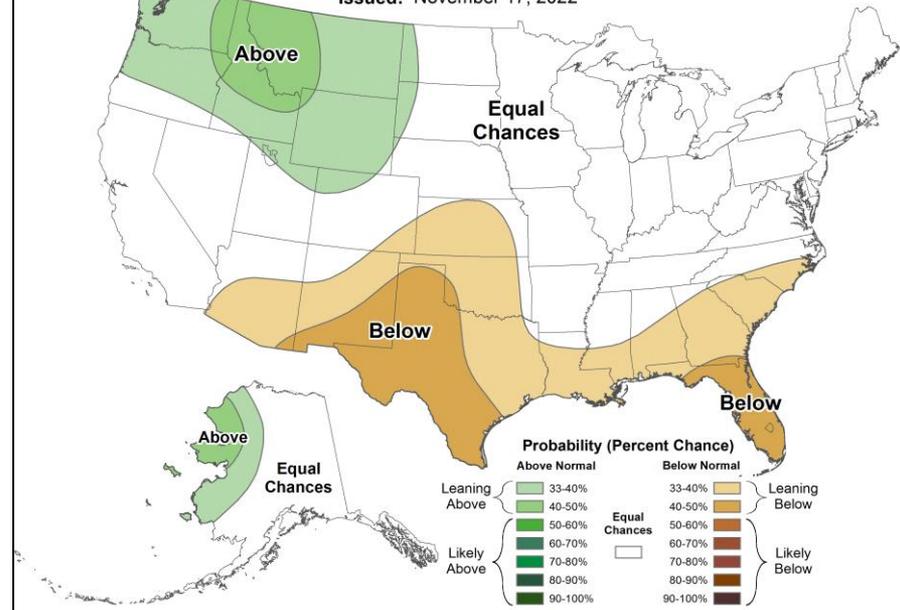
Precipitation



Monthly Precipitation Outlook



Valid: December 2022
Issued: November 17, 2022



Temperature



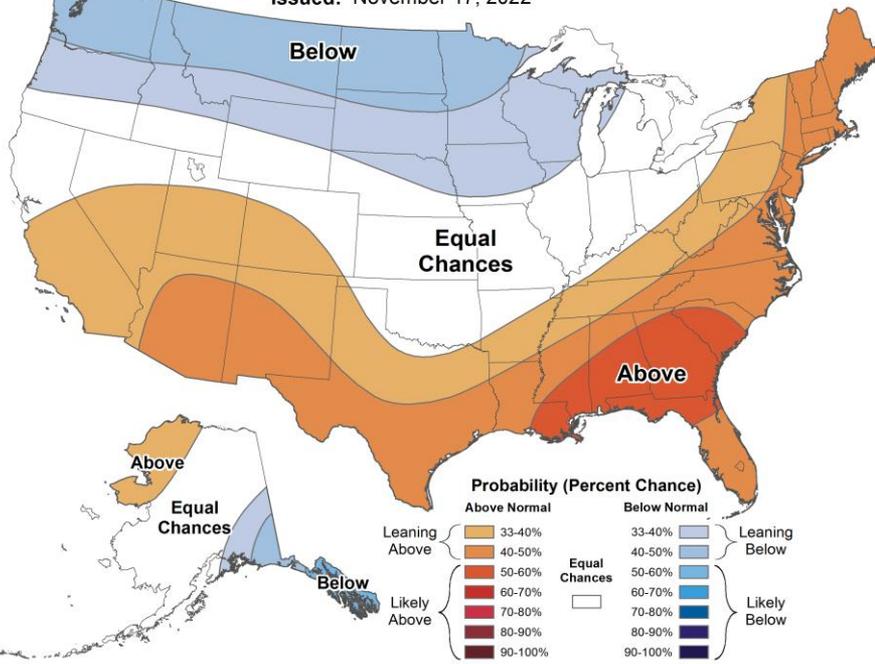
December 2022 – February 2023 Temperature & Precipitation Outlook



Seasonal Temperature Outlook



Valid: Dec-Jan-Feb 2022-23
Issued: November 17, 2022



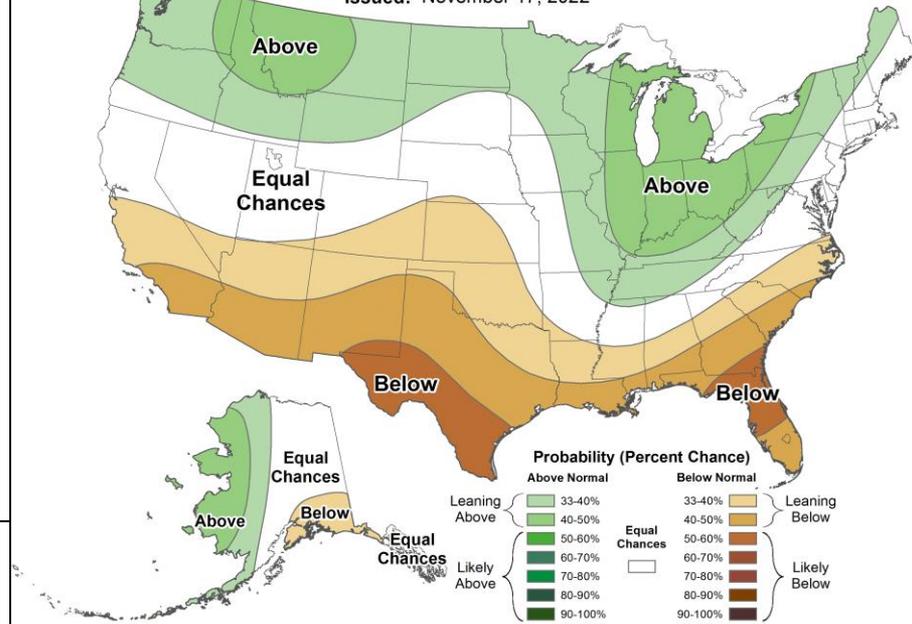
Precipitation



Seasonal Precipitation Outlook



Valid: Dec-Jan-Feb 2022-23
Issued: November 17, 2022



Temperature



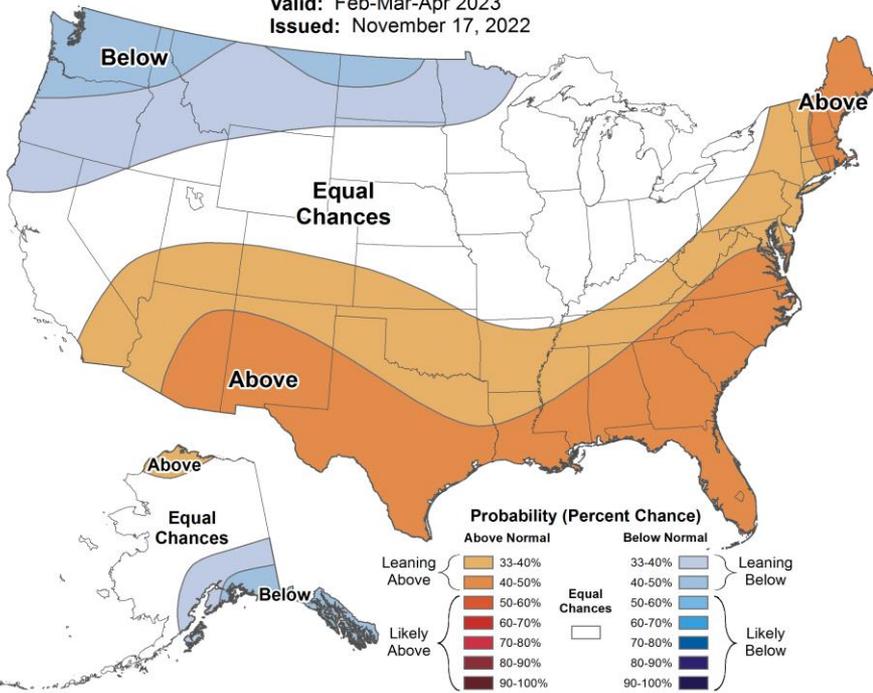
February – April 2023 Temperature & Precipitation Outlook



Seasonal Temperature Outlook



Valid: Feb-Mar-Apr 2023
Issued: November 17, 2022



Temperature

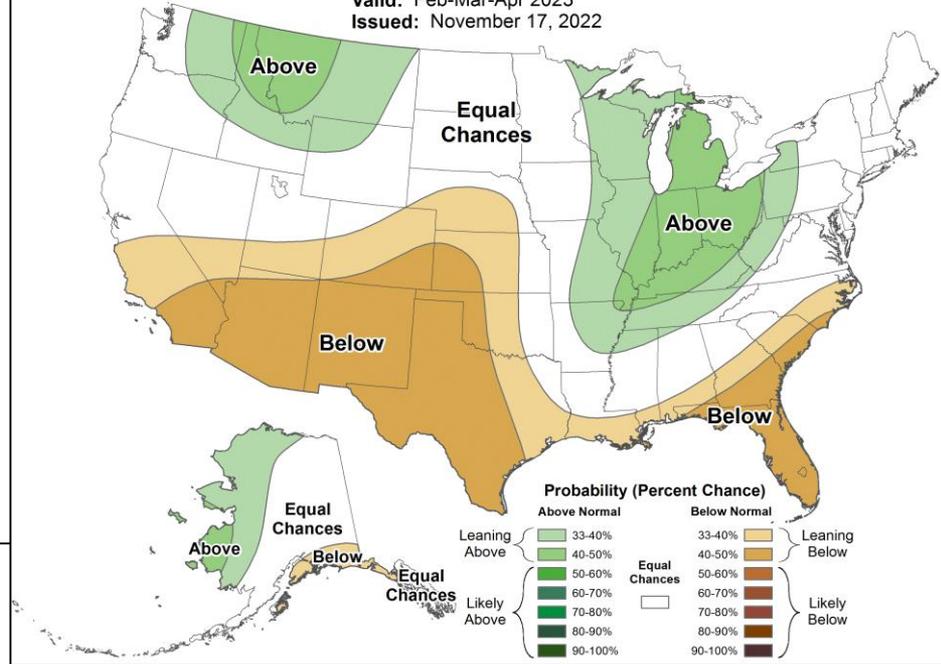
Precipitation



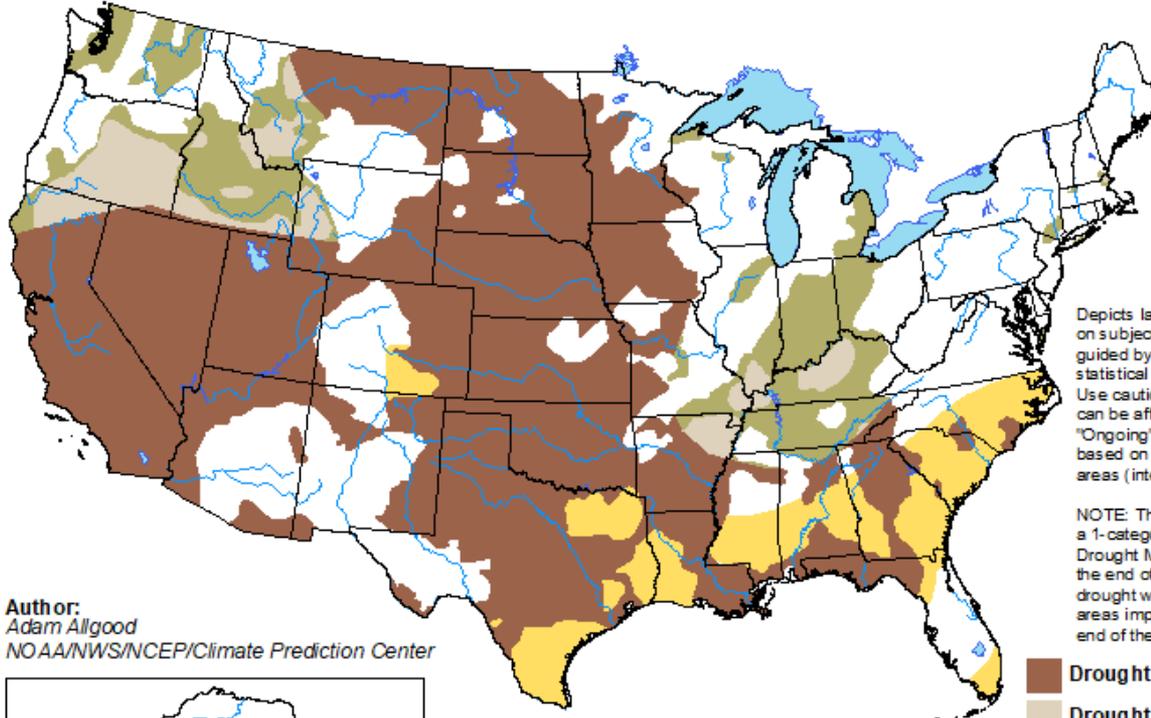
Seasonal Precipitation Outlook



Valid: Feb-Mar-Apr 2023
Issued: November 17, 2022



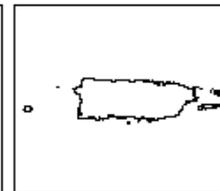
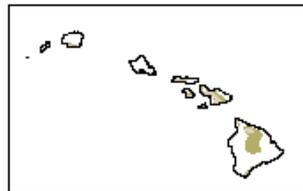
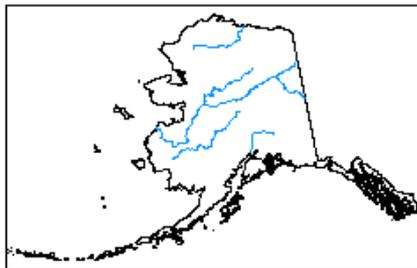
U.S. Seasonal Drought Outlook Valid for November 17, 2022 - February 28, 2023 **Drought Tendency During the Valid Period** Released November 17, 2022



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).

Author:
Adam Allgood
NOAA/NWS/NCEP/Climate Prediction Center



- Drought persists**
- Drought remains but improves**
- Drought removal likely**
- Drought development likely**



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



Key Points

* **Current Conditions**

- * Current ENSO condition – **Under a La Niña Advisory, 3rd year in row**
- * Dryness continues across most of the North Central U.S.

* **Outlook**

- * Very short term (7 days): Cold then warming up and mostly dry
- * Short term (Week 2):
 - * Temperatures: warmer than normal except far eastern Great Lakes/Ohio
 - * Precipitation: relatively dry to near average (especially east)
- * Long term (monthly and seasonal): La Niña pattern
 - * Temperatures: Enhanced cold north/northwest, equal chances generally
 - * Precipitation: Enhanced likelihood of wetter than normal conditions from Montana to the Great Lakes/Ohio basin (especially later winter/early spring)
- * La Niña to slow ebb away and transition to neutral conditions by late spring
 - * Will take some time for the atmosphere to reflect those changes

For More Information



@usdaclimatehubs
@dennistoday



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

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 **USDA** Midwest Climate Hub
U.S. DEPARTMENT OF AGRICULTURE

Photo:

Emma Todey

ISU Campus/Ames, IA

