



IOWA DEPARTMENT OF
**AGRICULTURE &
LAND STEWARDSHIP**

North Central U.S. Climate and Drought Outlook

15 December 2022

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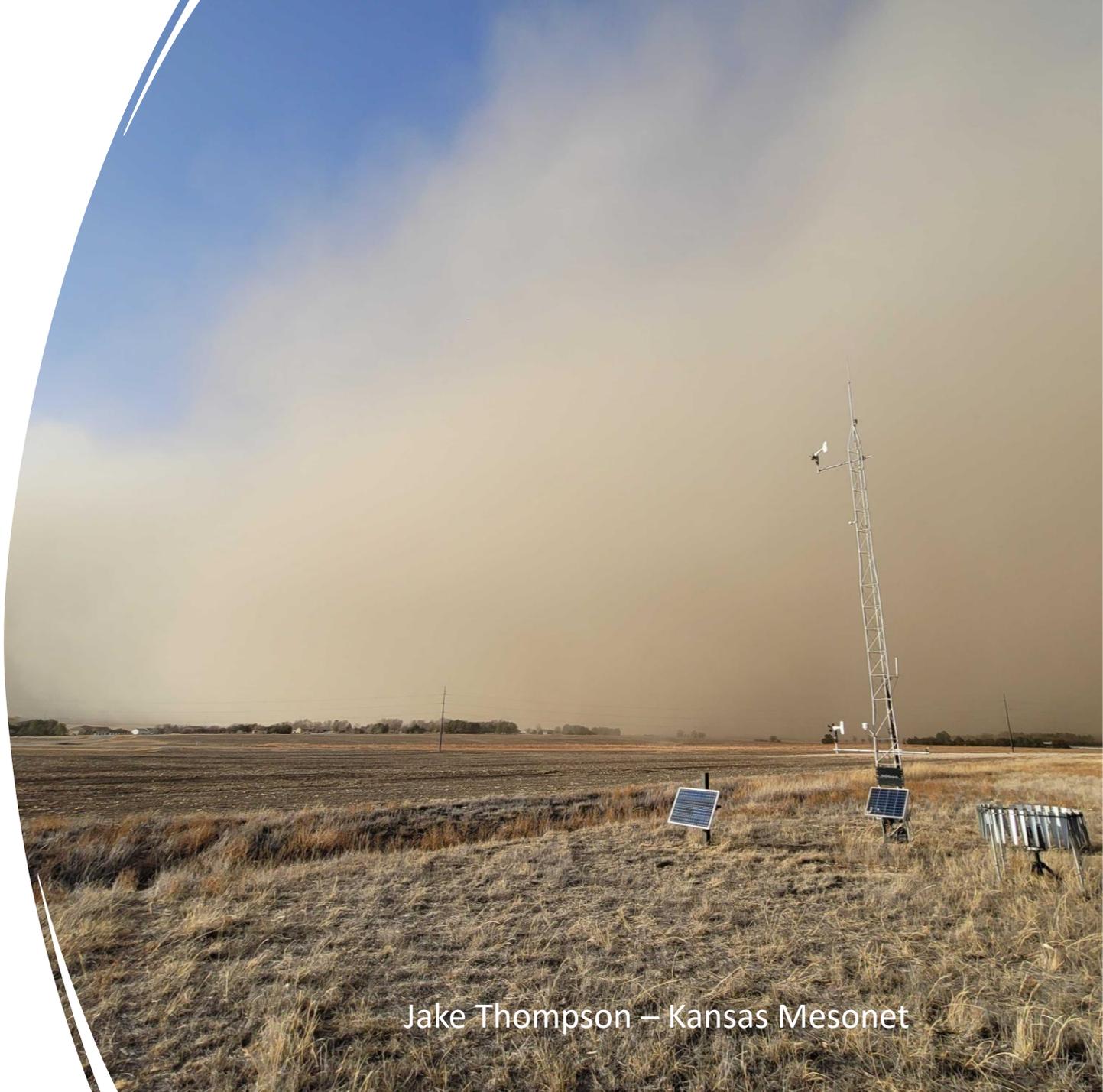
United States Department of Agriculture
Midwest Climate Hub

General Information

- **Providing climate services to the Central Region**
 - Collaboration Activity Between:
 - State Climatologists/American Association of State Climatologists
 - 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**
 - January 2023 (1 PM CST): Presenter: Dr. Martha Durr, State Climatologist of Nebraska
- **Access to Future Climate Webinars and Information**
- <http://www.drought.gov/drought/content/regional-programs/regional-drought-webinars>
- **Recordings of Past Webinars**
- <https://mrcc.purdue.edu/multimedia/webinars.jsp>
- <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
 - Drought
- Growing Season Progress
- Snow, Fire, Rivers and Lakes
- Impacts and Notable Events
- Outlooks
 - La Niña
 - Short-term
 - Winter season



Recent Conditions

November Temperature and Precipitation Ranks

YTD Temperature and Precipitation Ranks

Departure from Normal Temperature and Precipitation

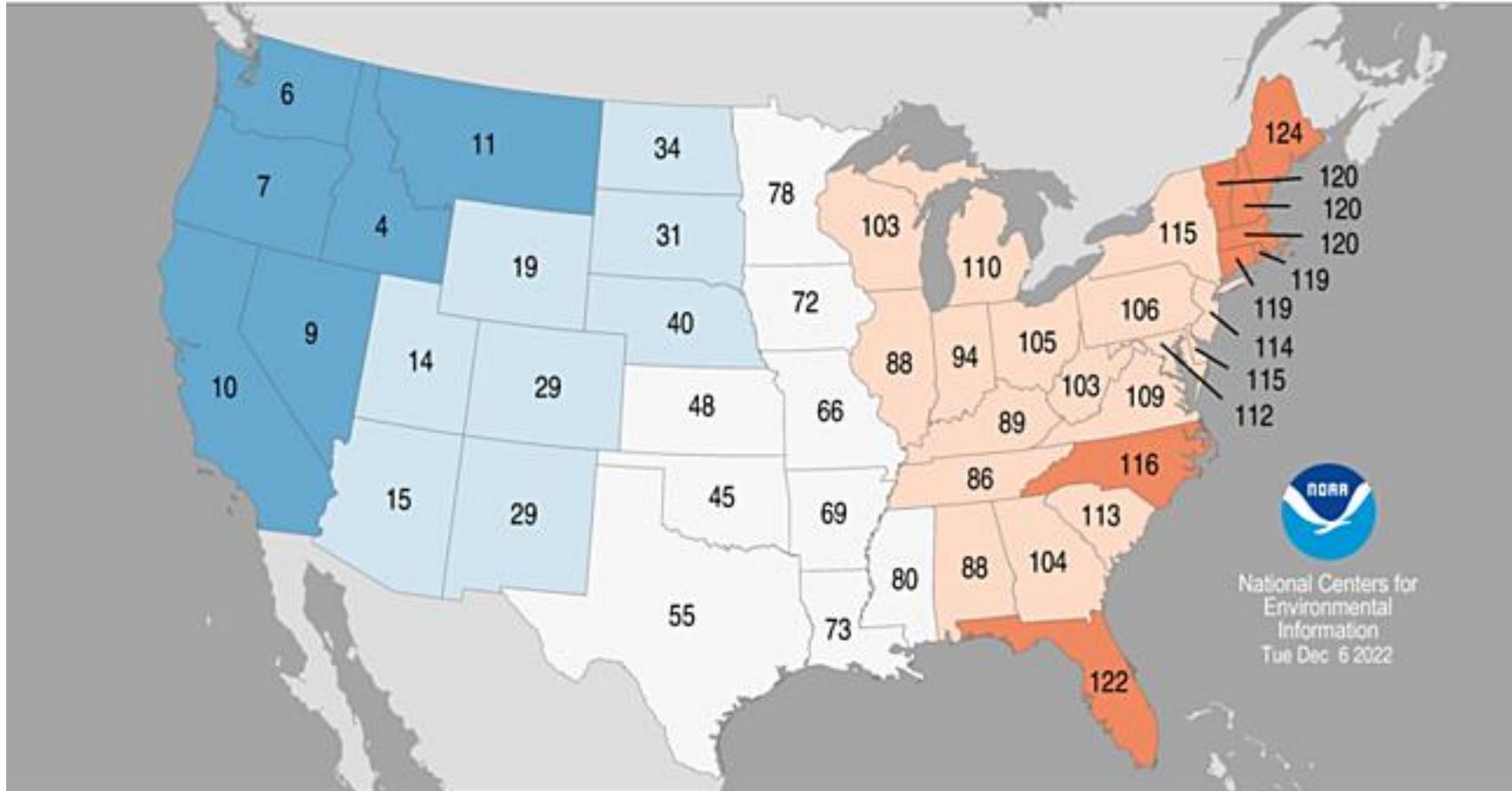
Long-term Precipitation Departures

Soil Moisture, Streamflow and Drought

November Temperature Ranks

Statewide Average Temperature Ranks

November 2022
Period: 1895–2022




National Centers for
Environmental
Information
Tue Dec 6 2022



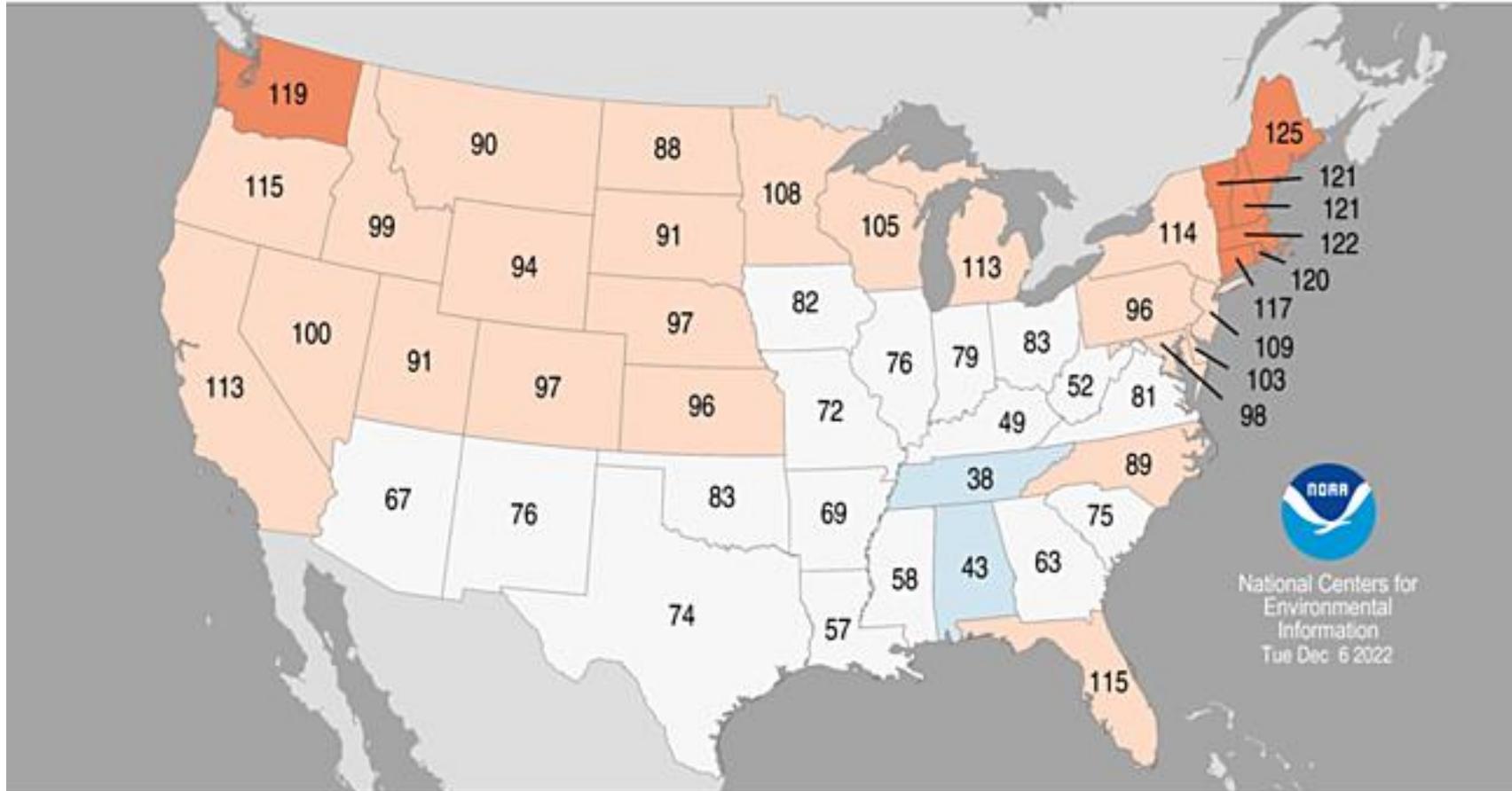
<http://www.ncdc.noaa.gov/temp-and-precip/us-maps/>

Fall Temperature Ranks

Statewide Average Temperature Ranks

September – November 2022

Period: 1895–2022



National Centers for
Environmental
Information
Tue Dec 6 2022

Record
Coldest
(1)

Much
Below
Average

Below
Average

Near
Average

Above
Average

Much
Above
Average

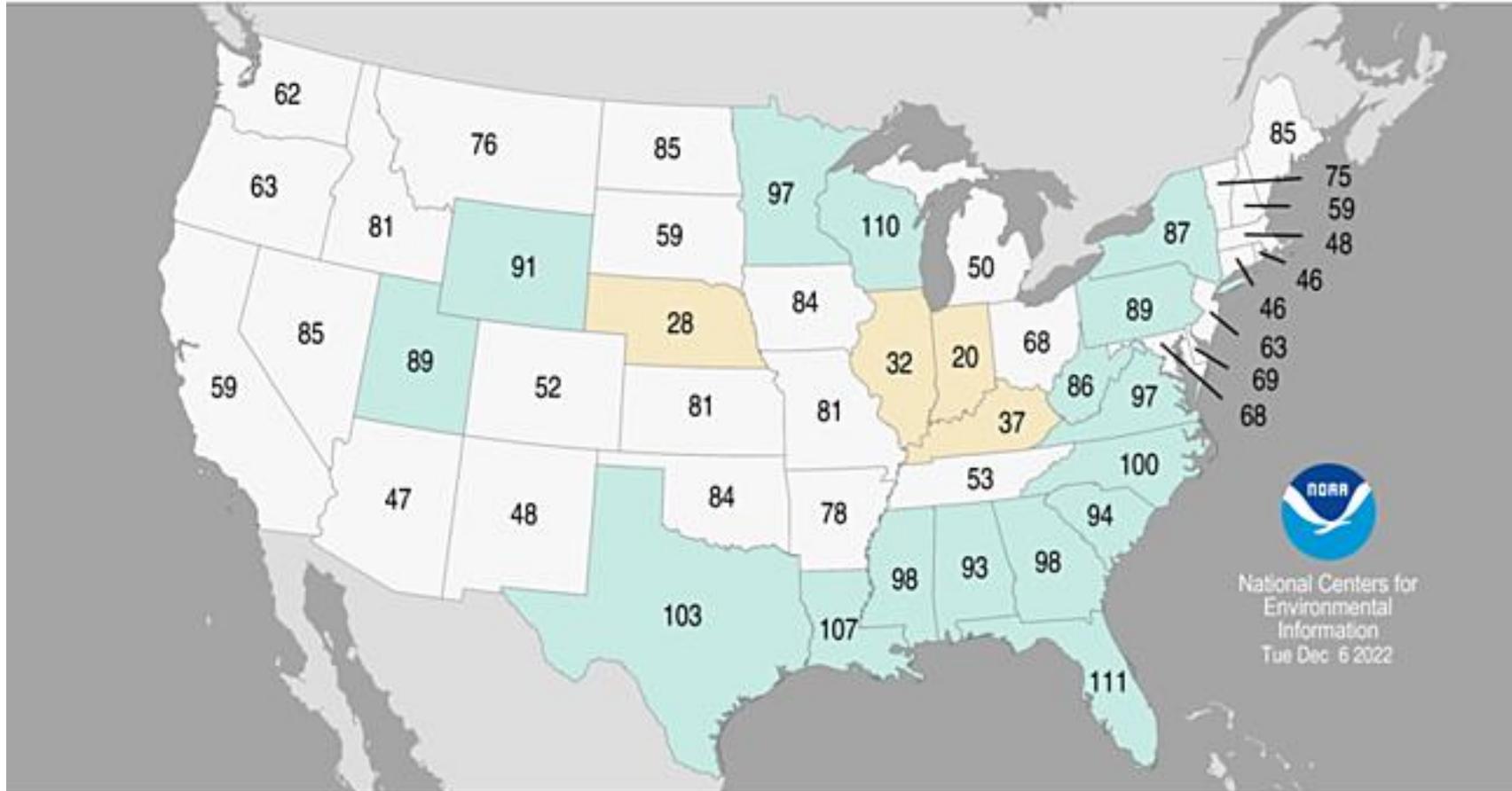
Record
Warmest
(128)

<http://www.ncdc.noaa.gov/temp-and-precip/us-maps/>

November Precipitation Ranks

Statewide Precipitation Ranks

November 2022
Period: 1895–2022




National Centers for
Environmental
Information
Tue Dec 6 2022

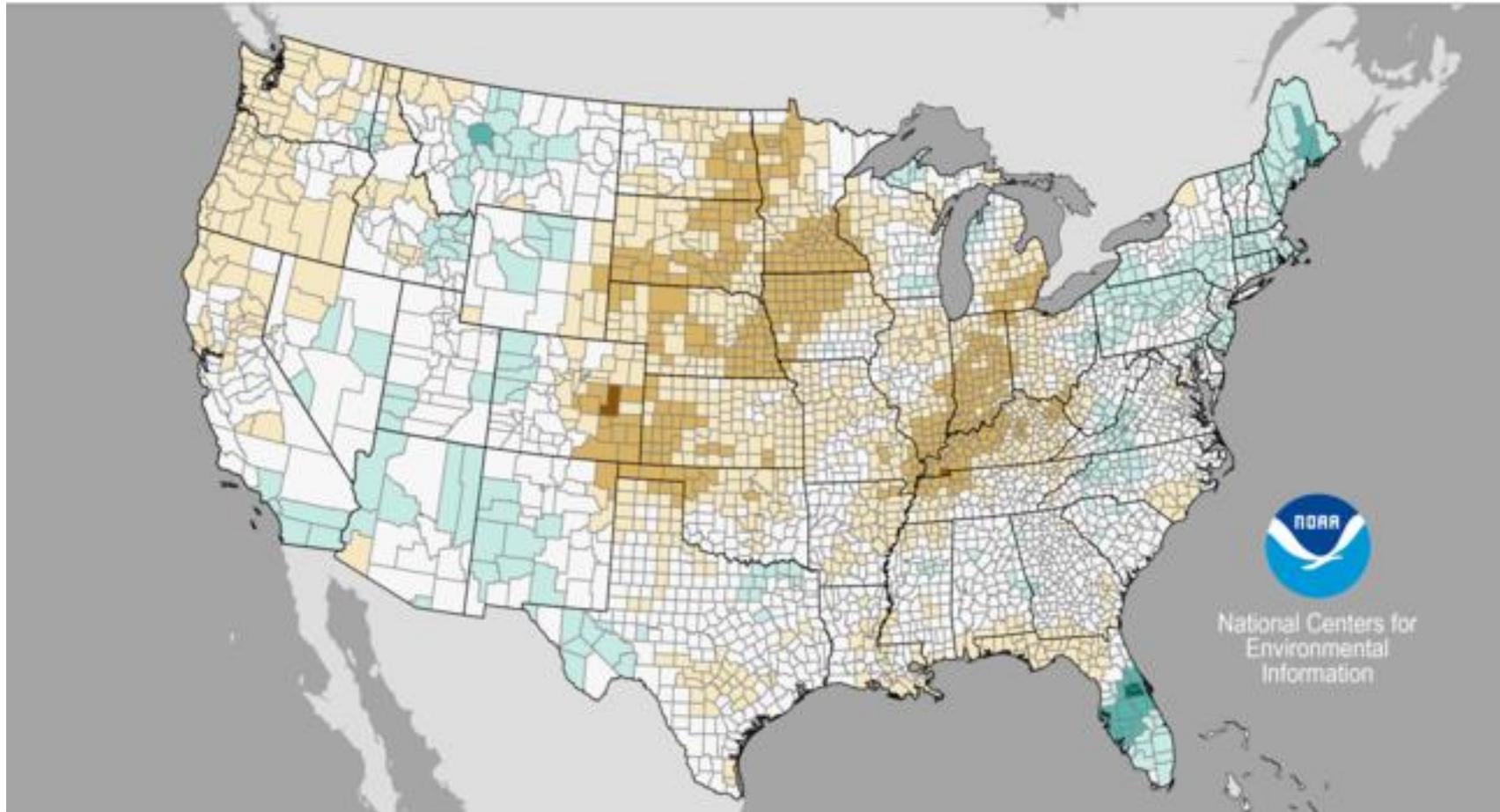


<http://www.ncdc.noaa.gov/temp-and-precip/us-maps/>

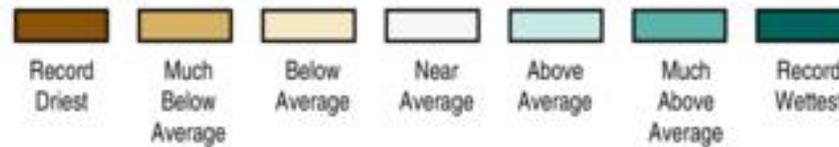
County Precipitation Ranks

September–November 2022

Period: 1895–2022



National Centers for
Environmental
Information

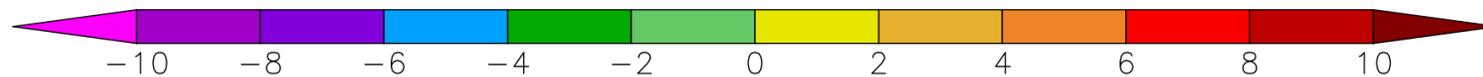
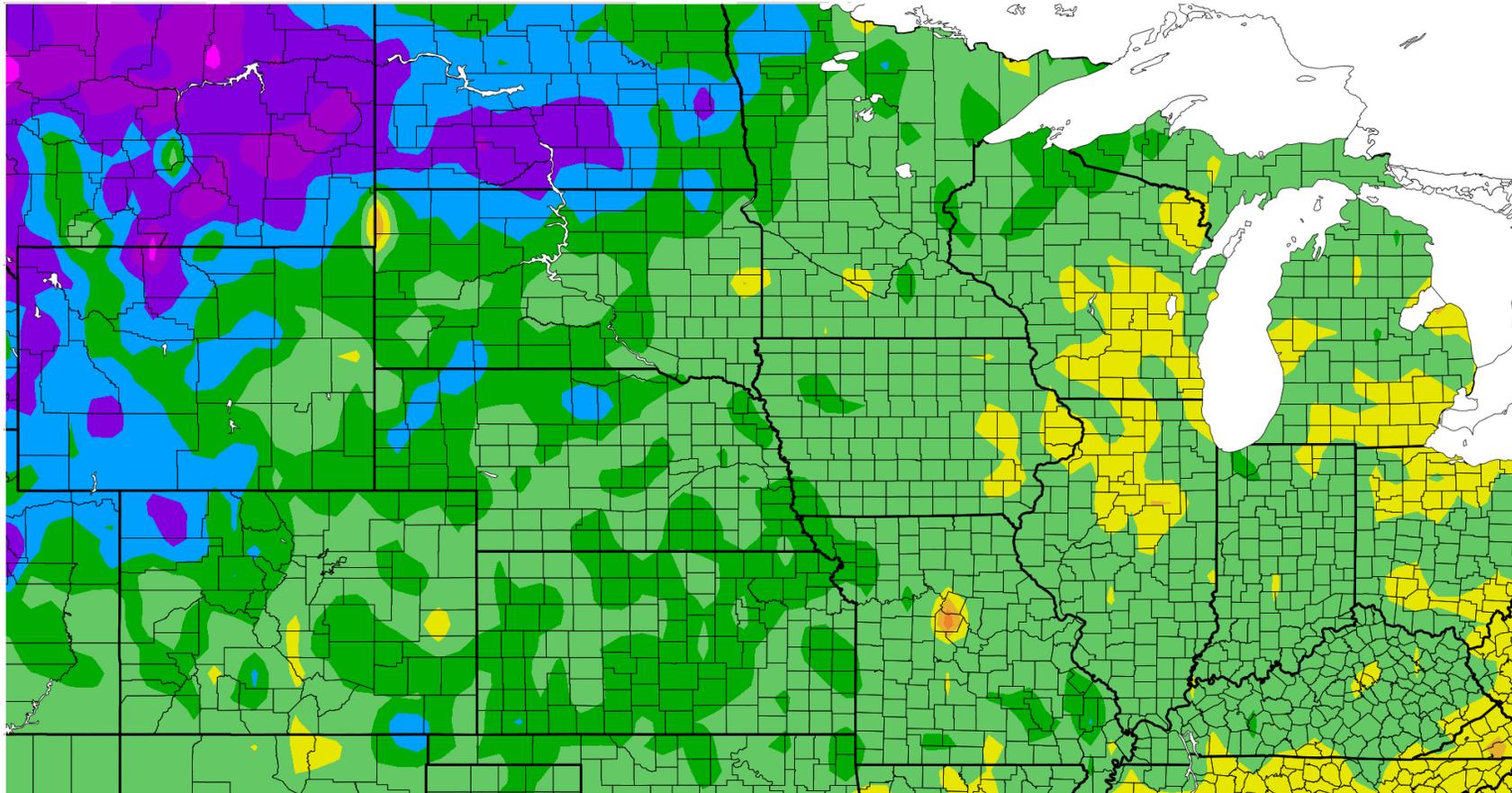


Created: Tue Dec 06 2022

Data Source: nClimGrid

Departure from Normal Temperature (F)

11/15/2022 – 12/14/2022

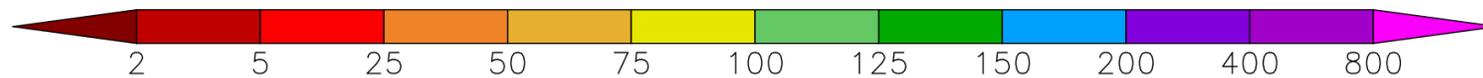
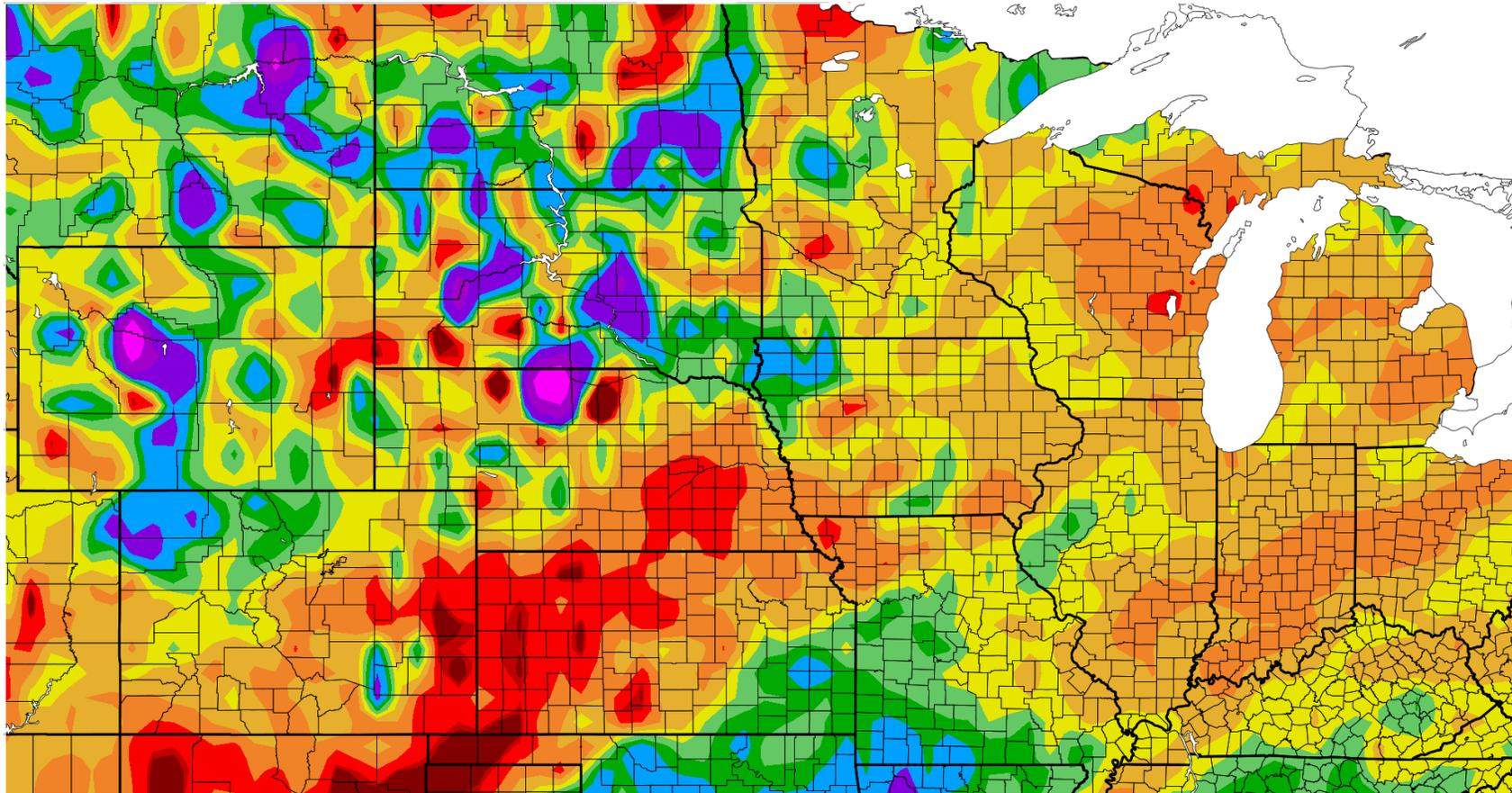


Generated 12/15/2022 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)

11/15/2022 – 12/14/2022

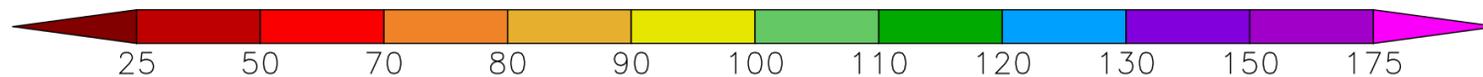
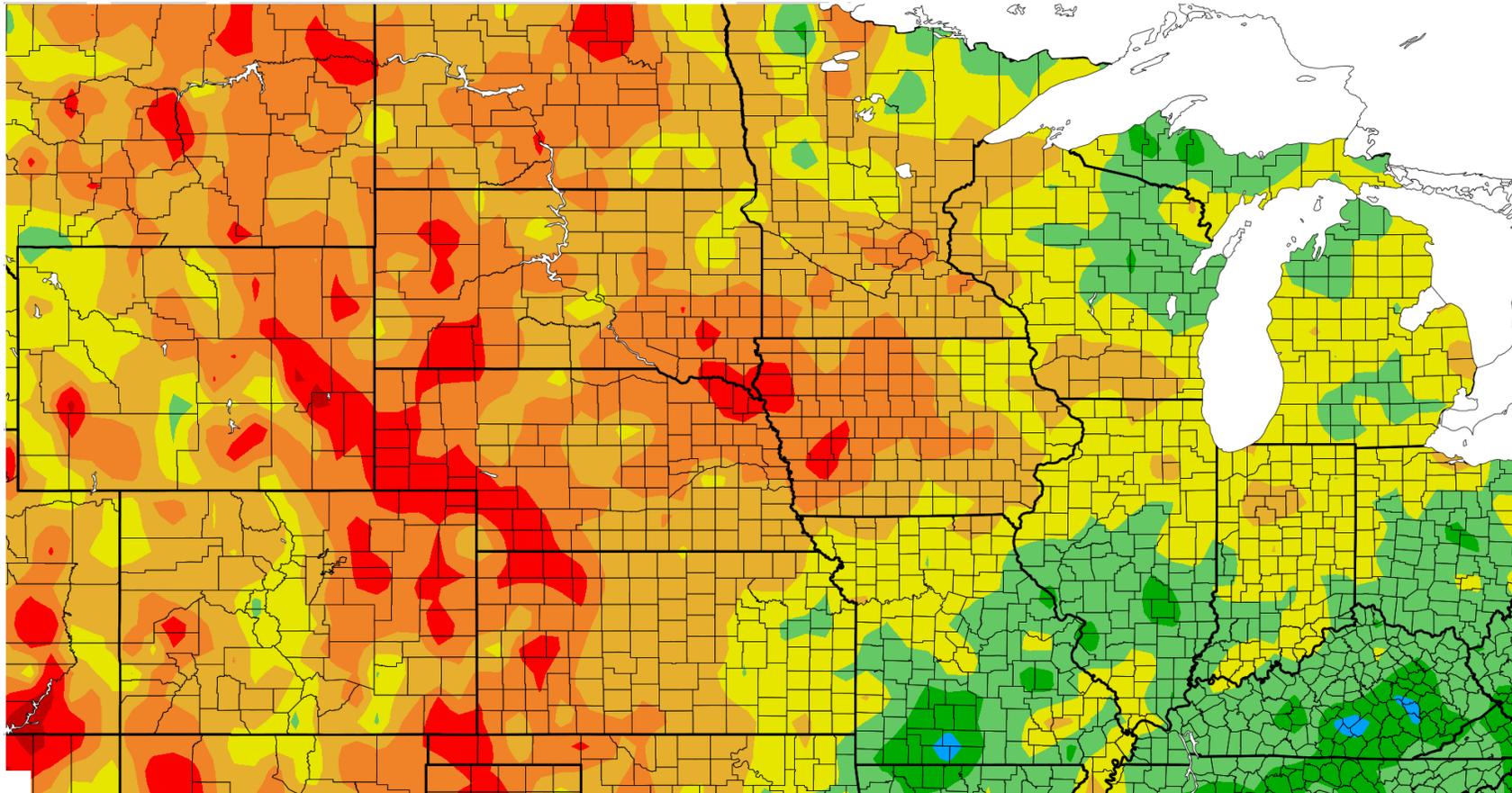


Generated 12/15/2022 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)

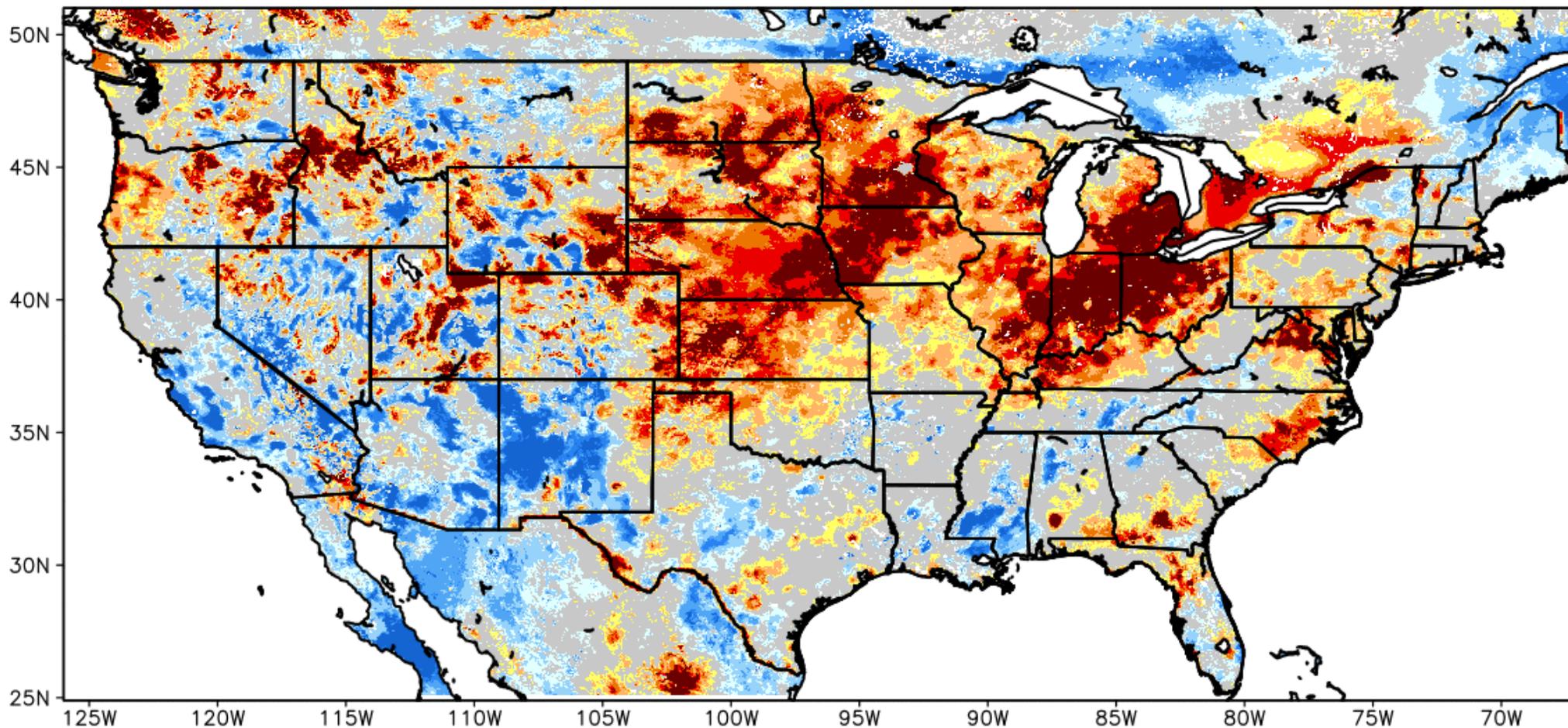
12/15/2019 – 12/14/2022



Generated 12/15/2022 at HPRCC using provisional data.

NOAA Regional Climate Centers

SPoRT-LIS 0-200 cm Soil Moisture percentile valid 15 Dec 2022

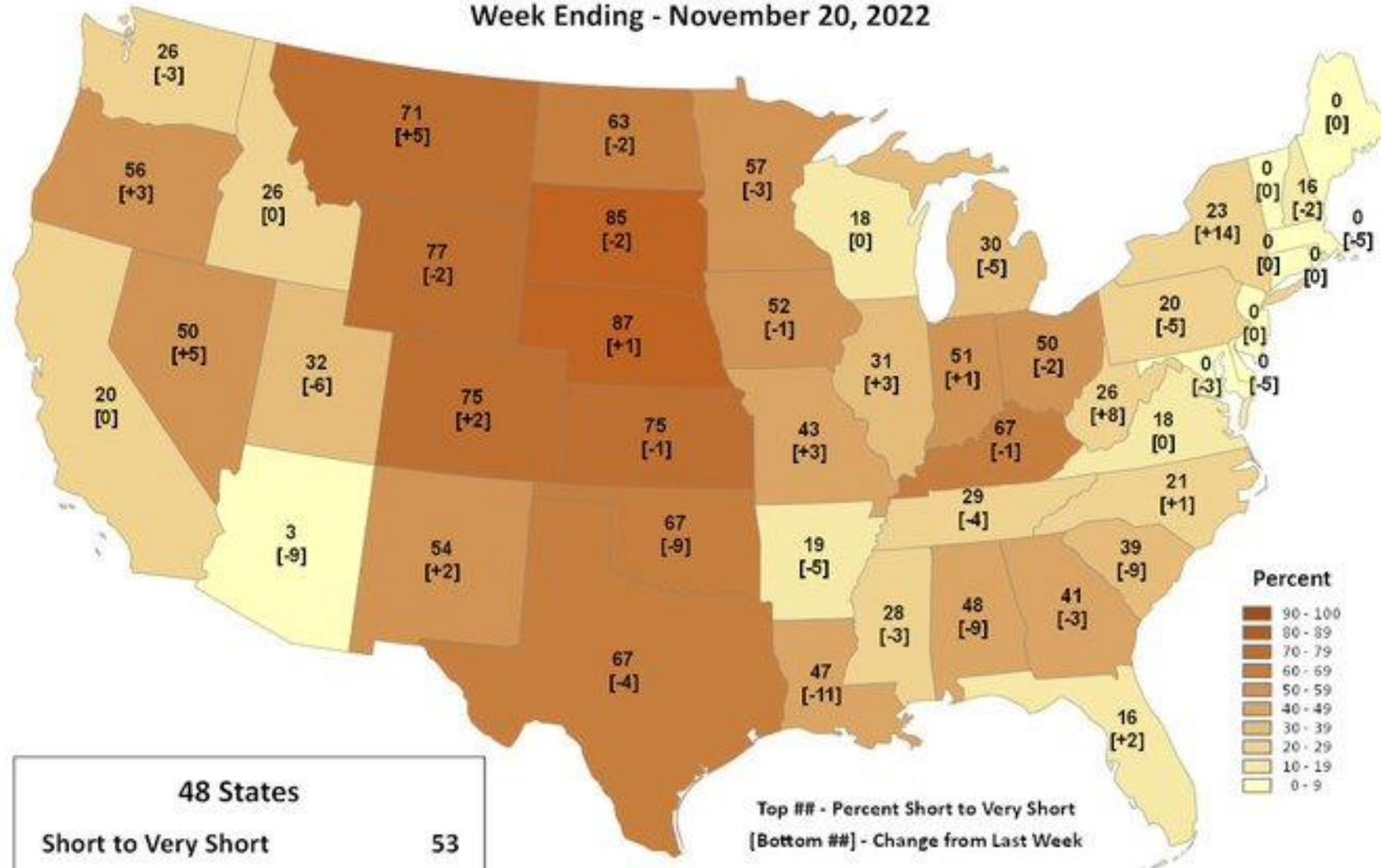


****NOTE****
****Experimental****

Topsoil Moisture

Percent Short to Very Short

Week Ending - November 20, 2022



48 States	
Short to Very Short	53
Change from Last Week	-1

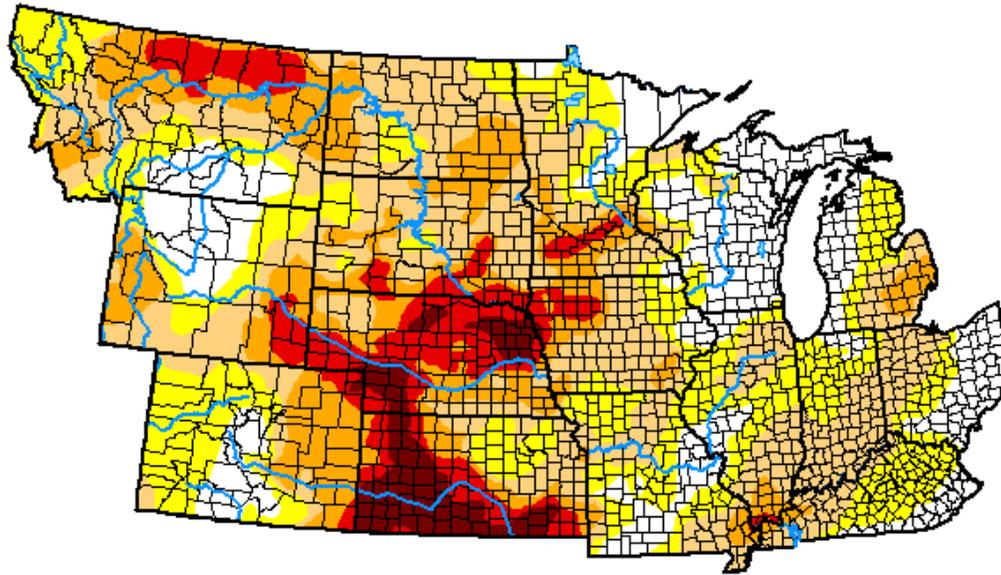
Top ## - Percent Short to Very Short
 [Bottom ##] - Change from Last Week

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

Figure Credit: Brad Rippey – USDA OCE/USDA NASS Data

U.S. Drought Monitor NWS Central

December 13, 2022
(Released Thursday, Dec. 15, 2022)
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	17.91	82.09	57.82	29.23	12.22	3.87
Last Week <i>12-06-2022</i>	17.10	82.90	60.12	29.70	12.37	3.80
3 Months Ago <i>09-13-2022</i>	36.06	63.94	34.67	19.67	6.47	1.62
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>12-14-2021</i>	32.68	67.32	47.64	29.04	12.47	3.89

Intensity:



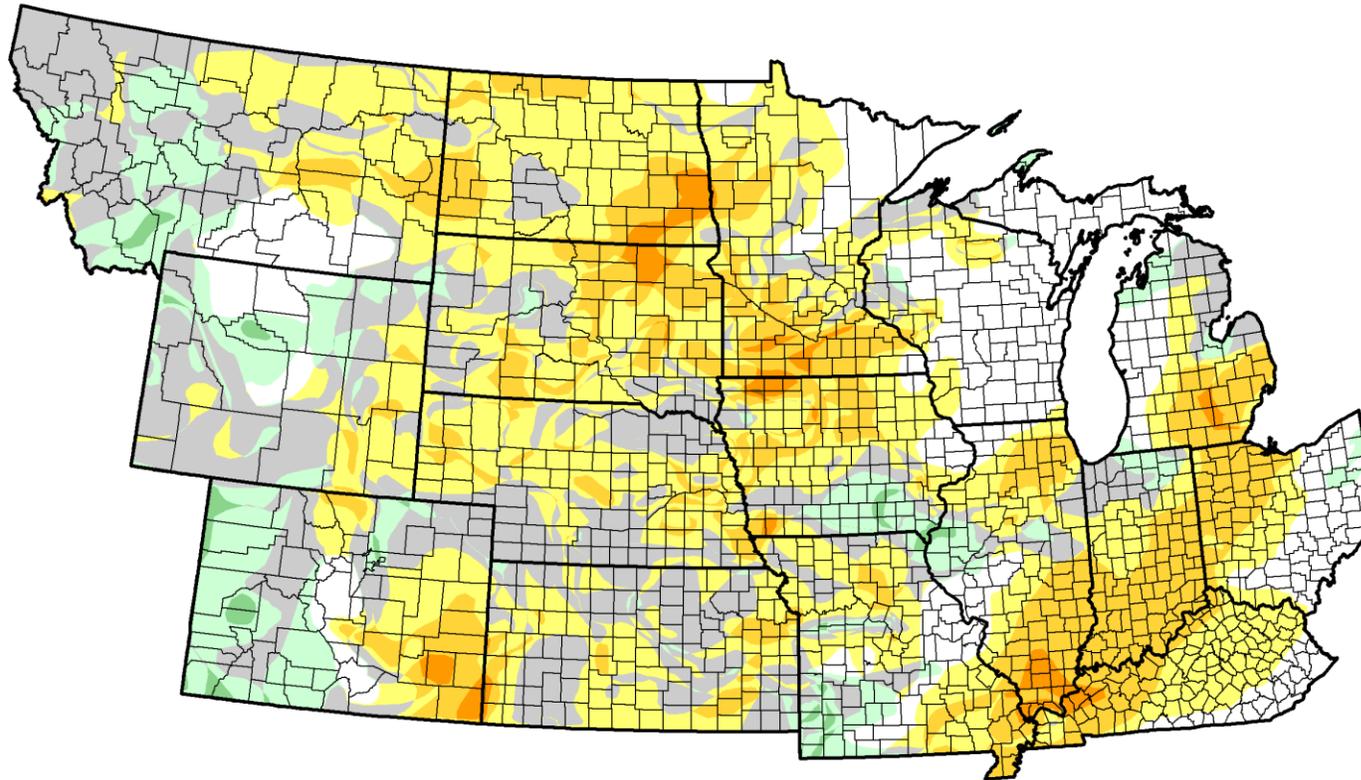
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Curtis Riganti
National Drought Mitigation Center



U.S. Drought Monitor Class Change - NWS Central 13 Week



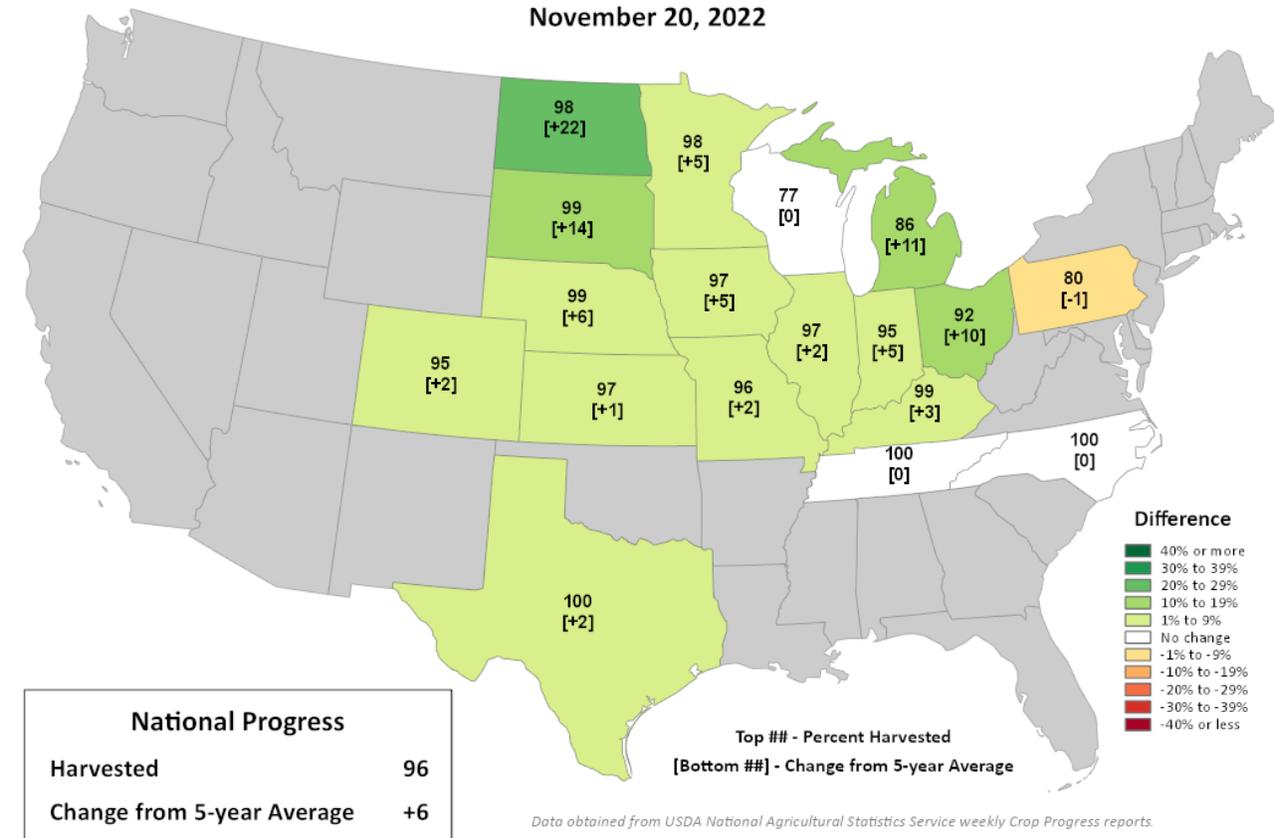
December 13, 2022
compared to
September 13, 2022

droughtmonitor.unl.edu

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

Growing Season Progress

Corn Progress Percent Harvested November 20, 2022



Soybeans Progress Percent Harvested November 13, 2022

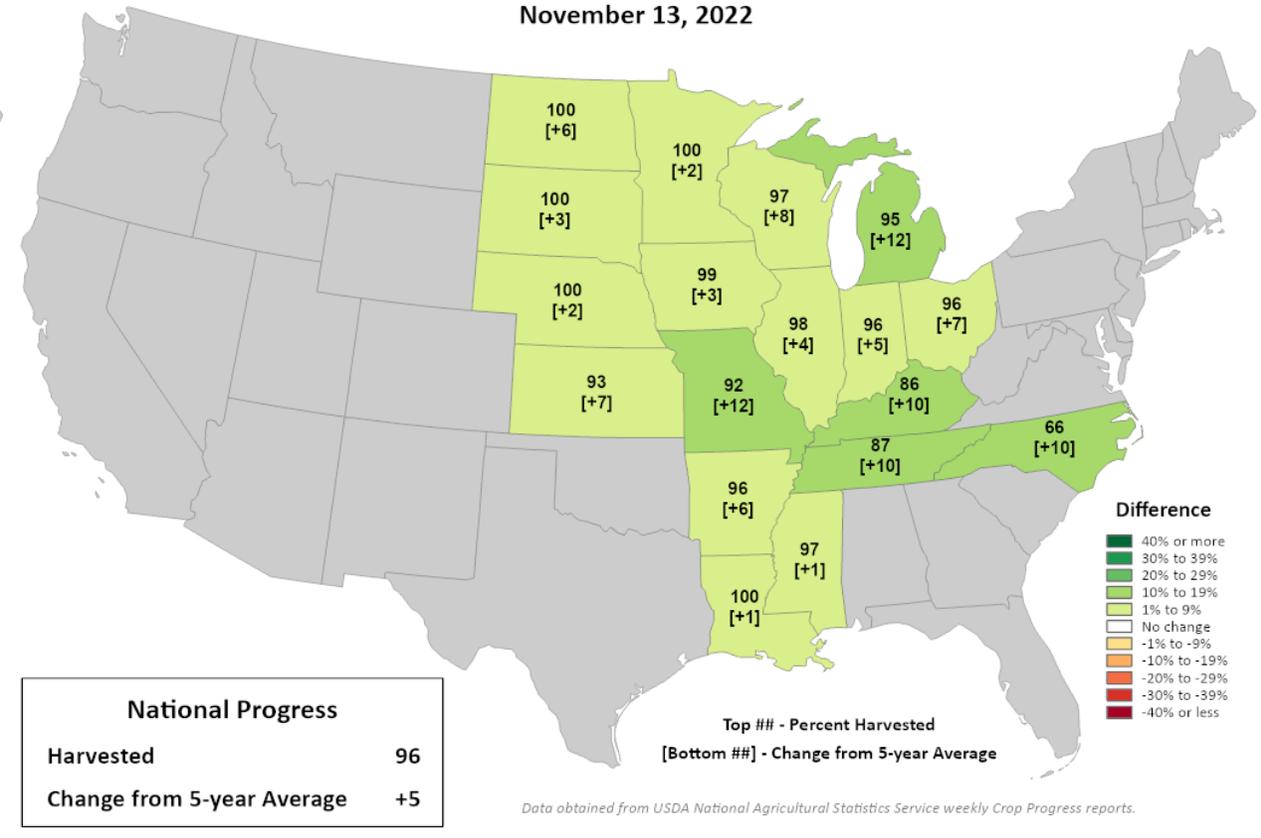
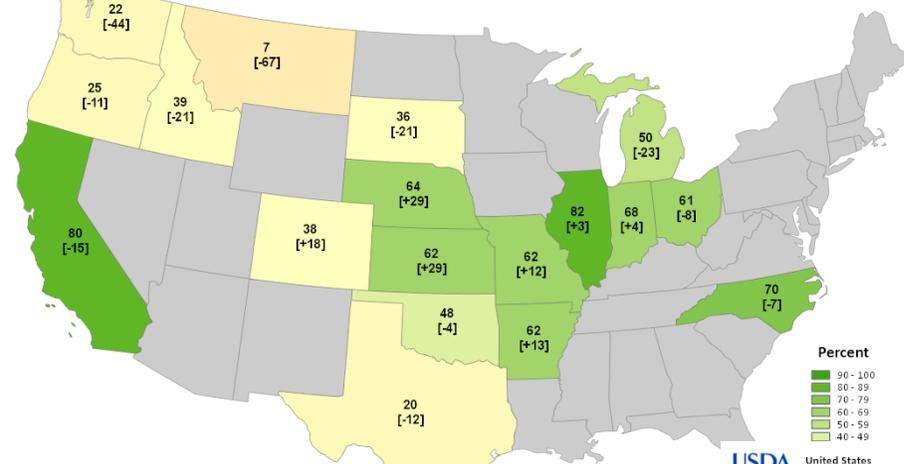


Figure Credit: Brad Rippey – USDA OCE/USDA NASS Data

Winter Wheat Conditions

Percent Good to Excellent

November 28, 2021



Percent
 90 - 100
 80 - 79
 70 - 79
 60 - 69
 50 - 59
 40 - 49

National Condition	
Good to Excellent	44
Change from Last Year	-2

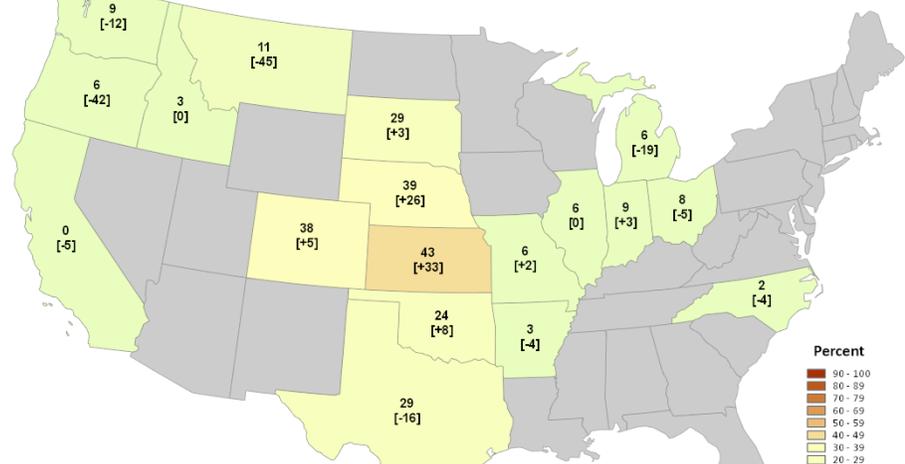
Top ## - Percent Good to Excellent
 [Bottom ##] - Change from Last Year

Data obtained from USDA National Agricultural Statistics Service weekly

Winter Wheat Conditions

Percent Poor to Very Poor

November 27, 2022



Percent
 90 - 100
 80 - 59
 70 - 79
 60 - 69
 50 - 59
 40 - 49
 30 - 39
 20 - 29
 10 - 19
 0 - 9

National Condition	
Poor to Very Poor	26
Change from Last Year	+3

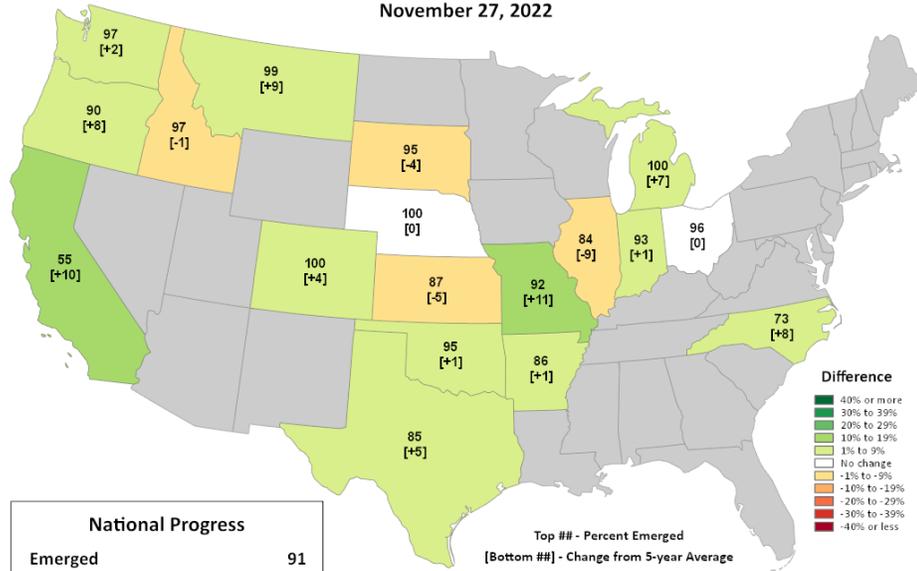
Top ## - Percent Poor to Very Poor
 [Bottom ##] - Change from Last Year

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

Winter Wheat Progress

Percent Emerged

November 27, 2022



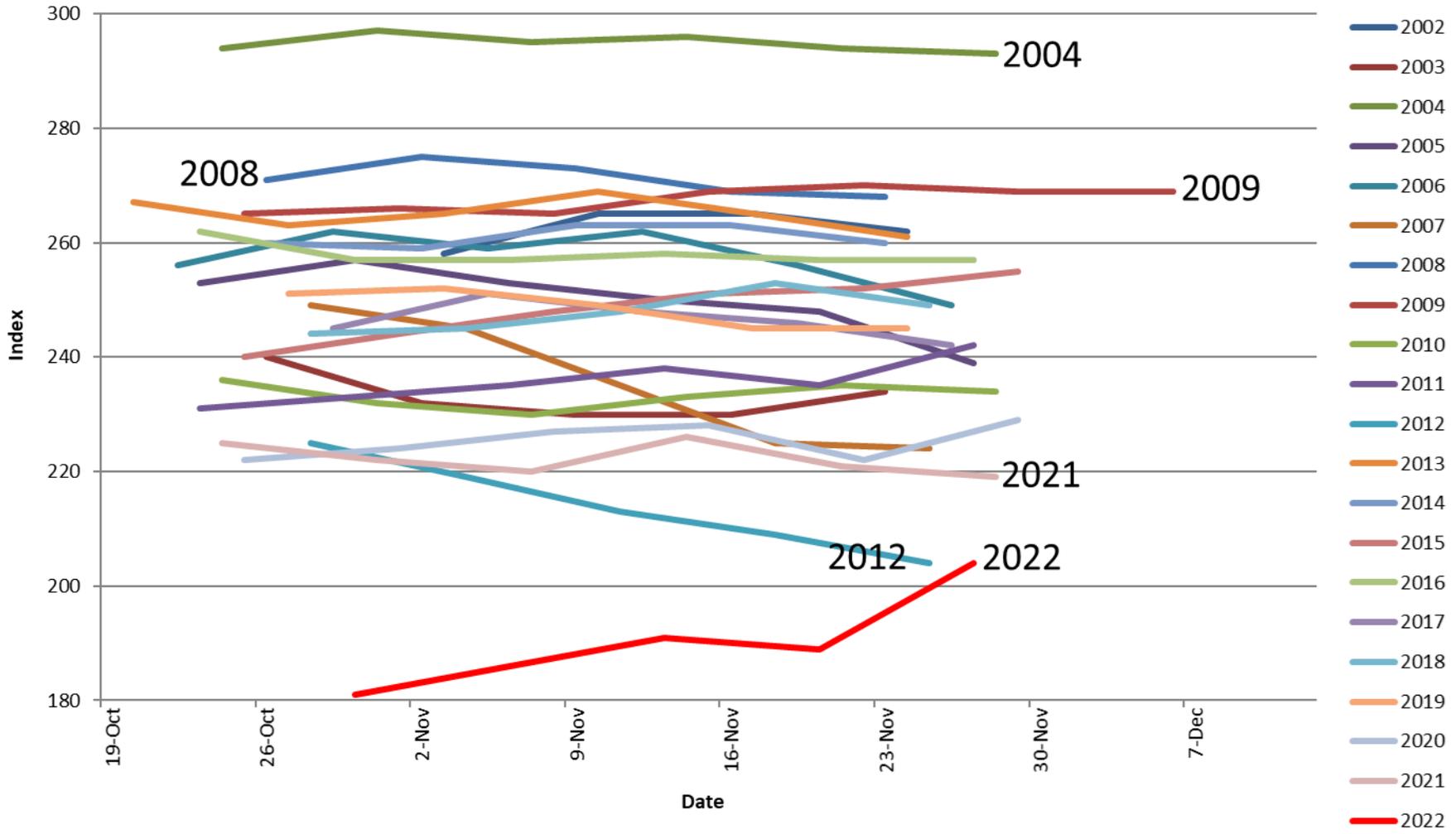
Difference
 40% or more
 30% to 39%
 20% to 29%
 10% to 19%
 1% to 9%
 No change
 -1% to -9%
 -10% to -19%
 -20% to -29%
 -30% to -39%
 -40% or less

National Progress	
Emerged	91
Change from 5-year Average	+1

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

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

U.S. WINTER WHEAT Condition Index



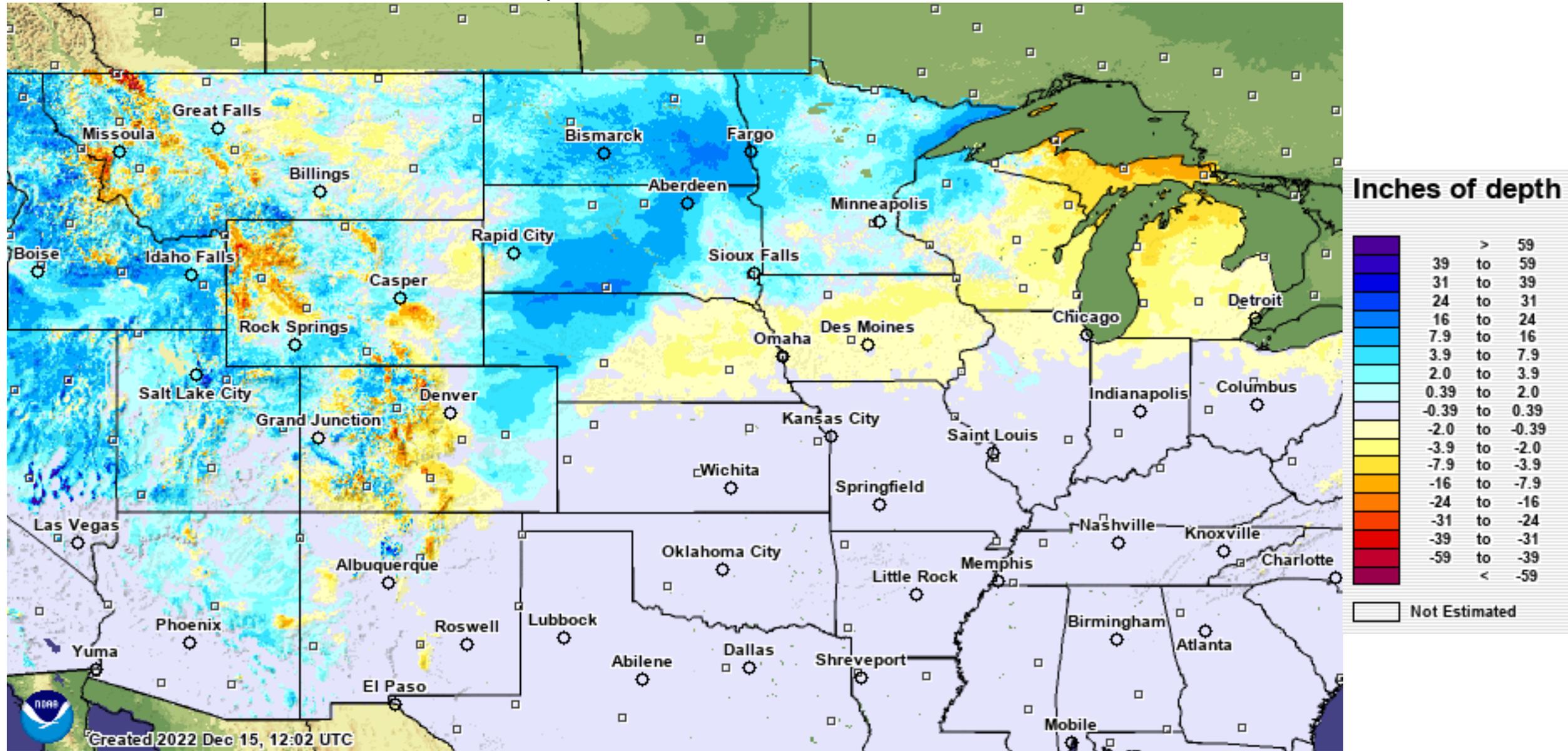
- Winter wheat crop conditions are historically low.
- There was modest improvement in November rain on the southern Plains and snow on the northern Plains.
- However, this year's wheat condition index (heading into dormancy) is tied with 2012 for the worst of the 21st century to date.

Condition Index = 4*Excellent + 3*Good + 2*Fair + 1*Poor

Based on NASS crop progress data.

Snow, Fire, Rivers and Lakes

Current Snowpack vs. Normal: Valid 12 UTC – Dec. 15

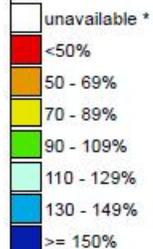


<https://www.nohrsc.noaa.gov/nsa/>

Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Dec 13, 2022

Current Snow Water Equivalent (SWE) Basin-wide Percent of 1991-2020 Median



* Data unavailable at time of posting or measurement is not representative at this time of year

Provisional data subject to revision



The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

Prepared by:
USDA/NRCS National Water and Climate Center
Portland, Oregon
<https://www.nrcs.usda.gov/wps/portal/wcc/home/>

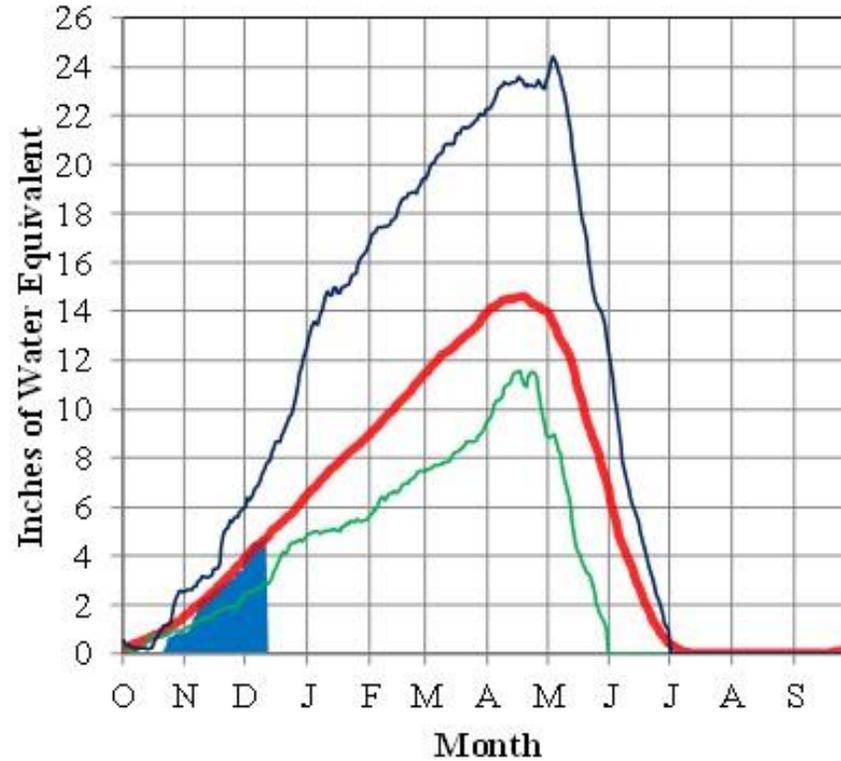
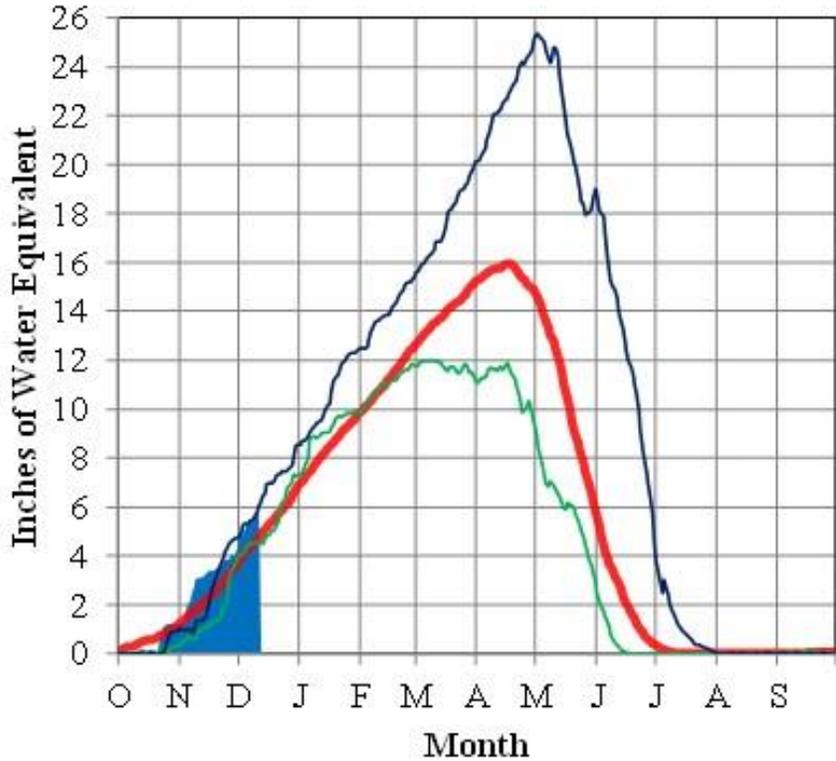
Missouri River Basin – Mountain Snowpack Water Content

2022-2023 with comparison plots from recent high and low years

11-Dec-2022

Total above Fort Peck

Total Fort Peck to Garrison



■ 2022-2023 ■ 1991-2020 Ave ■ *Minimum ■ *Maximum

■ 2022-2023 ■ 1991-2020 Ave ■ *Minimum ■ *Maximum

- Mountain SWE is at 123% of normal above Fort Peck and near the 1991-2020 average from Fort Peck to Garrison.
- Snow starting off well, but 75% accumulation to go.
- Both reaches normally peak on April 17.

On December 11, 2022 the mountain Snow Water Equivalent (SWE) in the "Total above Fort Peck" reach is 5.8" and 123% of the (1991-2020) average. The mountain SWE in the "Fort Peck to Garrison" reach is 4.8" and 102% of the (1991-2020) average. The normal peak for both reaches occurs near April 17.

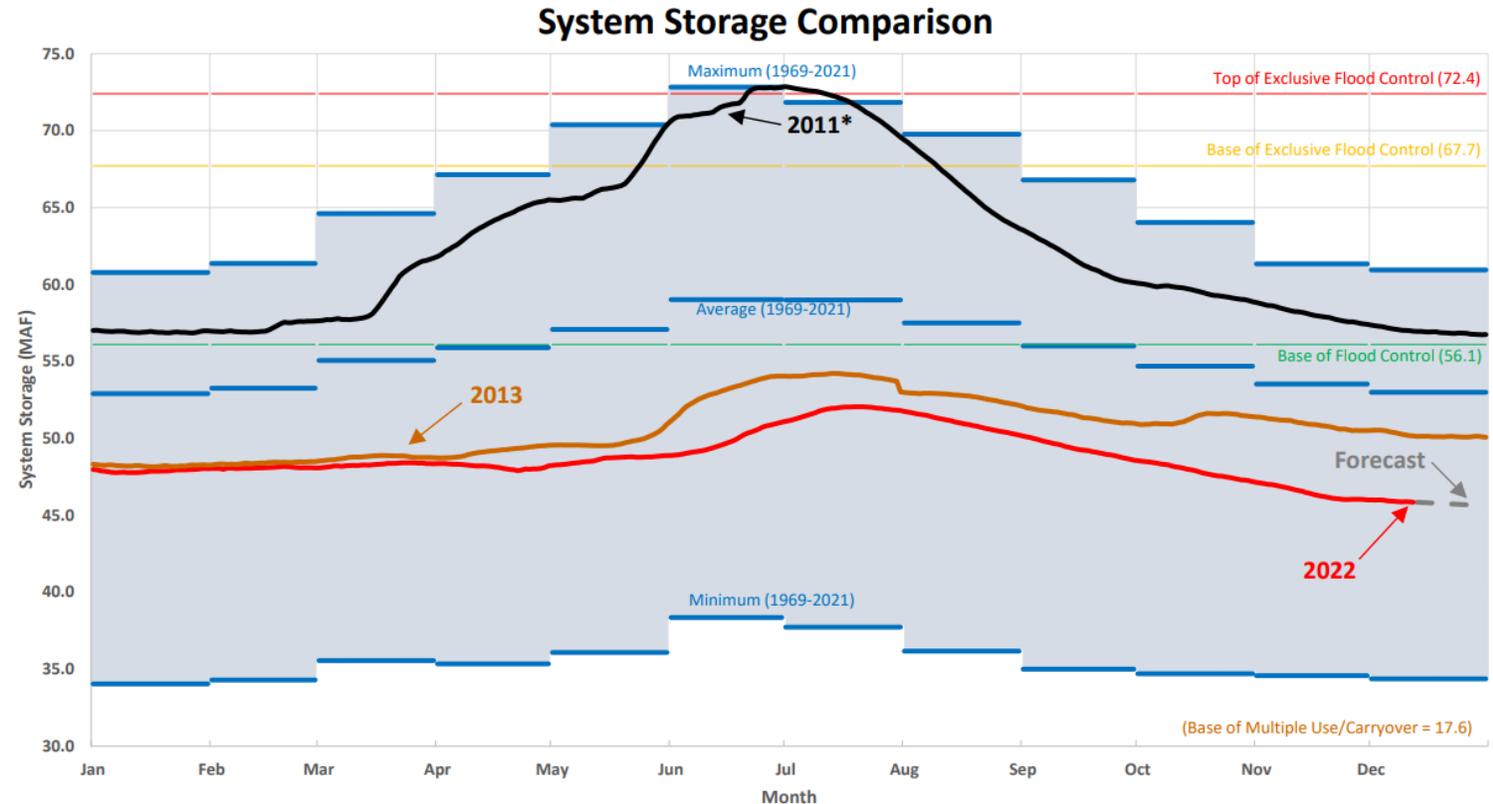
*Minimum peak SWE between 1991-2020 occurred in 2015 above Fort Peck, and in 2001 between Fort Peck and Garrison.
Maximum peak SWE between 1991-2020 occurred in 2011 above Fort Peck, and in 1997 between Fort Peck and Garrison.

Provisional data. Subject to revision.

Missouri River System Storage

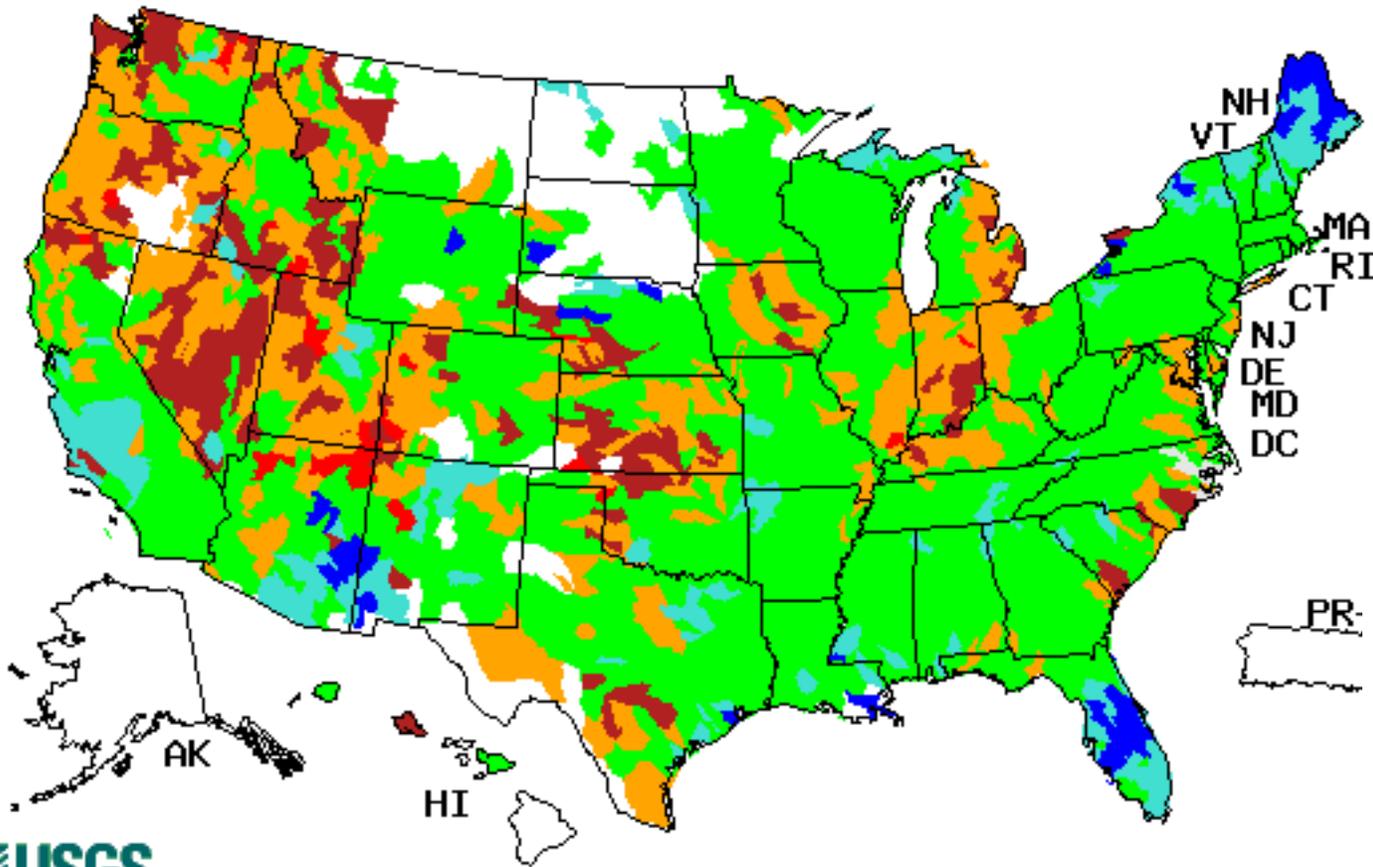
Missouri Mainstem Reservoir Status (as of 12/6/22):

- System storage is 46.0 million-acre feet, below the 2013 minimum
- The Gavins Point release is currently 13,000 cfs and forecasted to reach 12,000 cfs on Dec. 11.
- Total runoff above Sioux City:
 - Sep. 47% of average
 - Oct. 60% of average
 - Nov. 51% of average
 - S-O-N: 53% of average



28-day Average Streamflow

Wednesday, December 14, 2022

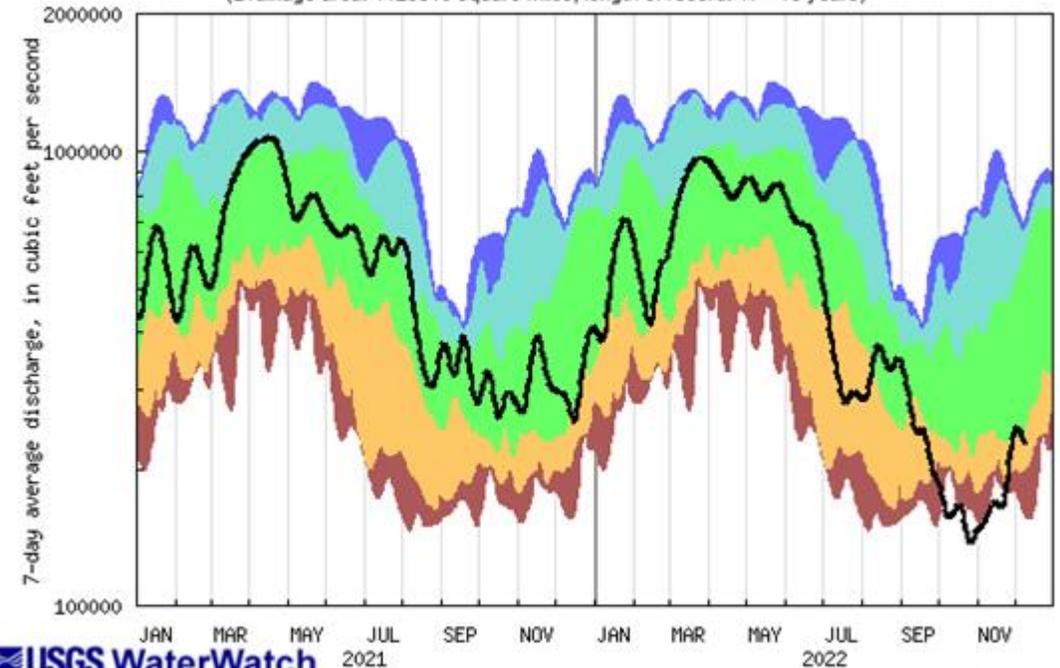


Explanation - Percentile classes						
	●	●	●	●	●	●
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

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

- Although streamflows are below average overall, ice-over is expected on most Upper Plains streams over the next two weeks with the forecasted cold snap.
- Again, don't expect much in way of hydrologic hazards associated with the impending freeze-up.

USGS 07374000 Mississippi River at Baton Rouge, LA
(Drainage area: 1125810 square miles, length of record: 17 - 18 years)



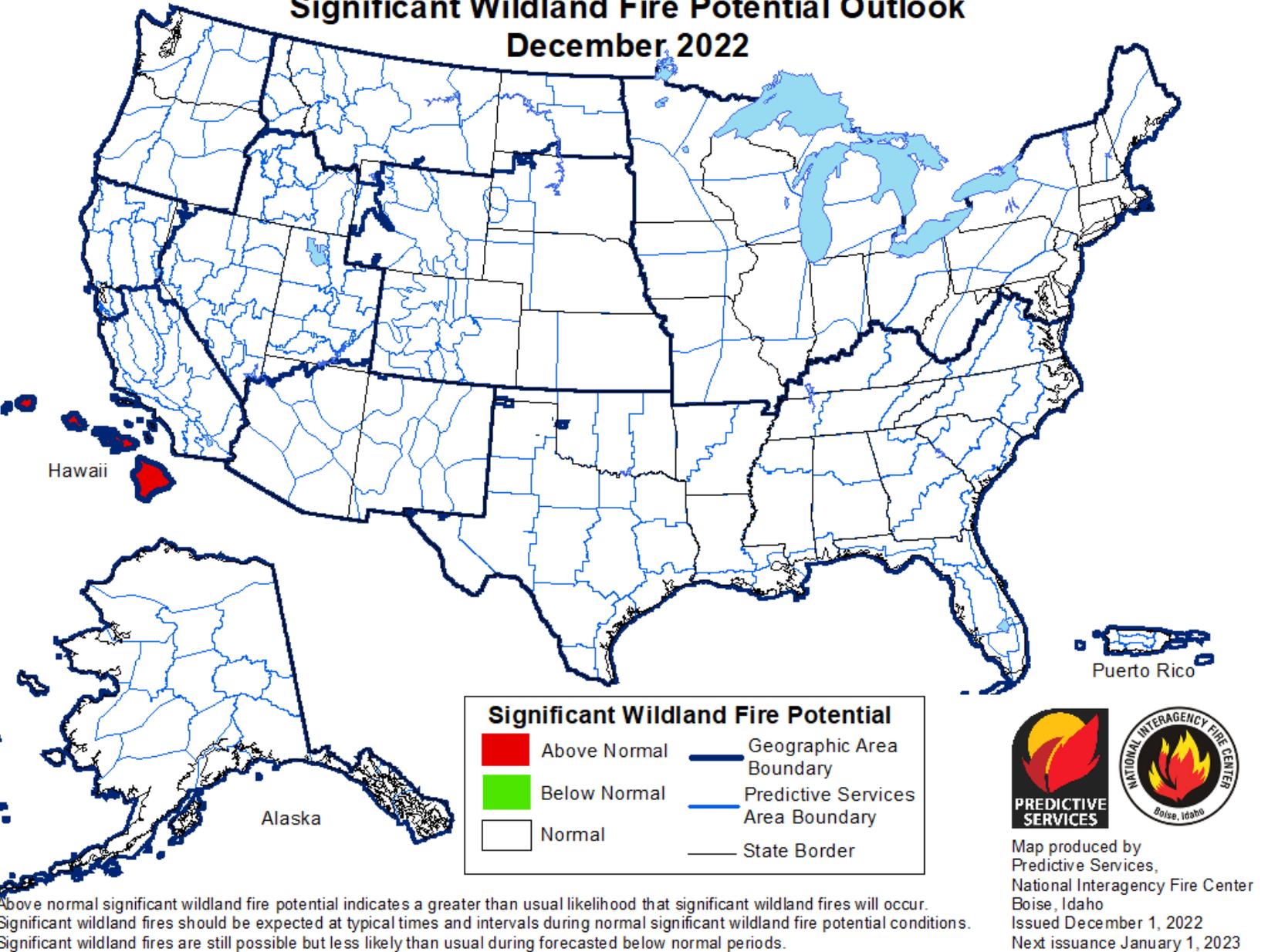
USGS WaterWatch

2021

2022

Last updated: 2022-12-09

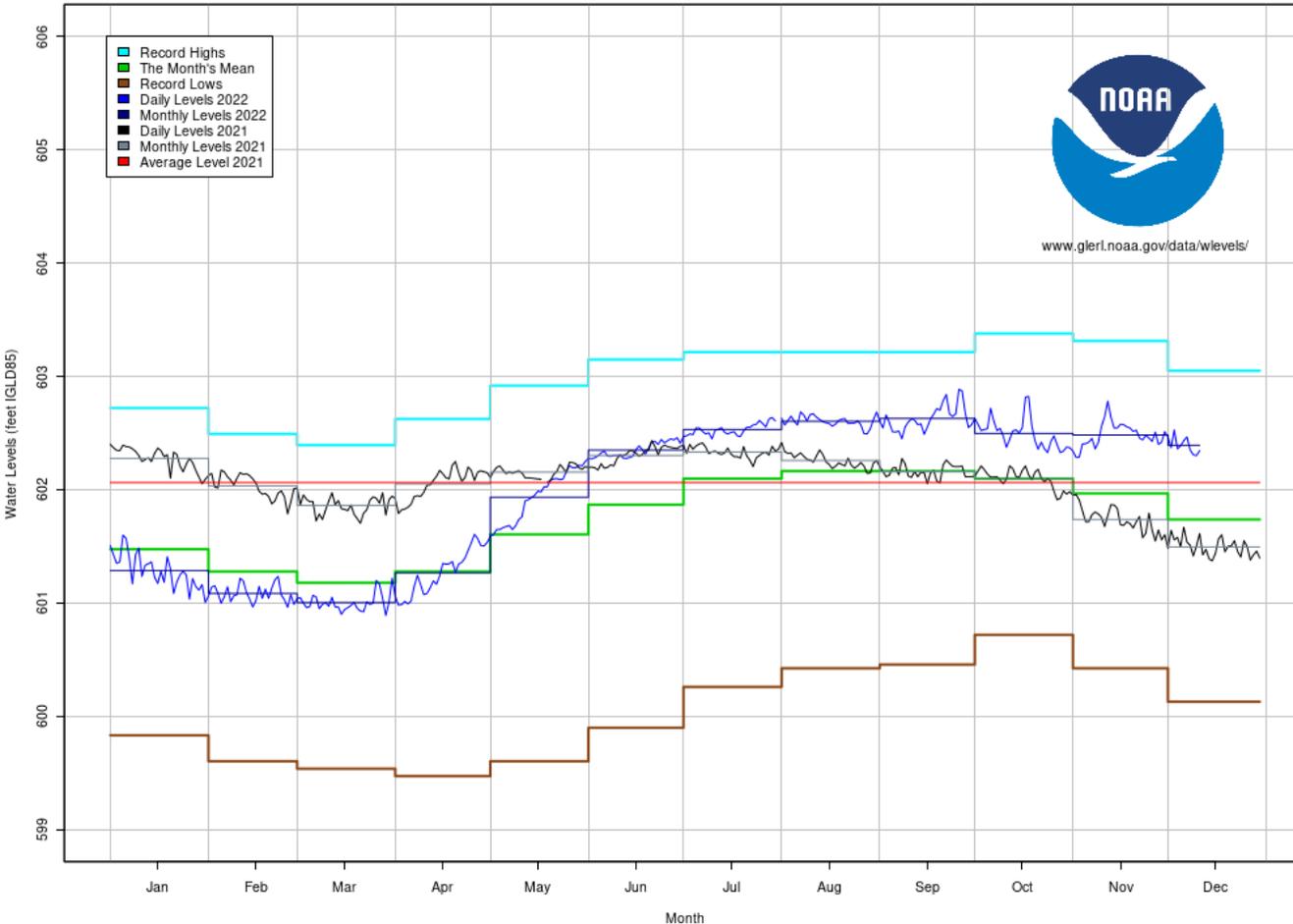
Significant Wildland Fire Potential Outlook December 2022



- No significant wildland fire potential through Winter 2022/2023
- There are several counties in ND that have burn bans or restrictions

Great Lakes Water Levels

Lake Superior Water Levels from Marquette C.G., MI - 9099018 2021 - 2022
As of End of Day 12/12/2022 (Refresh your browser to ensure plot is up to date)

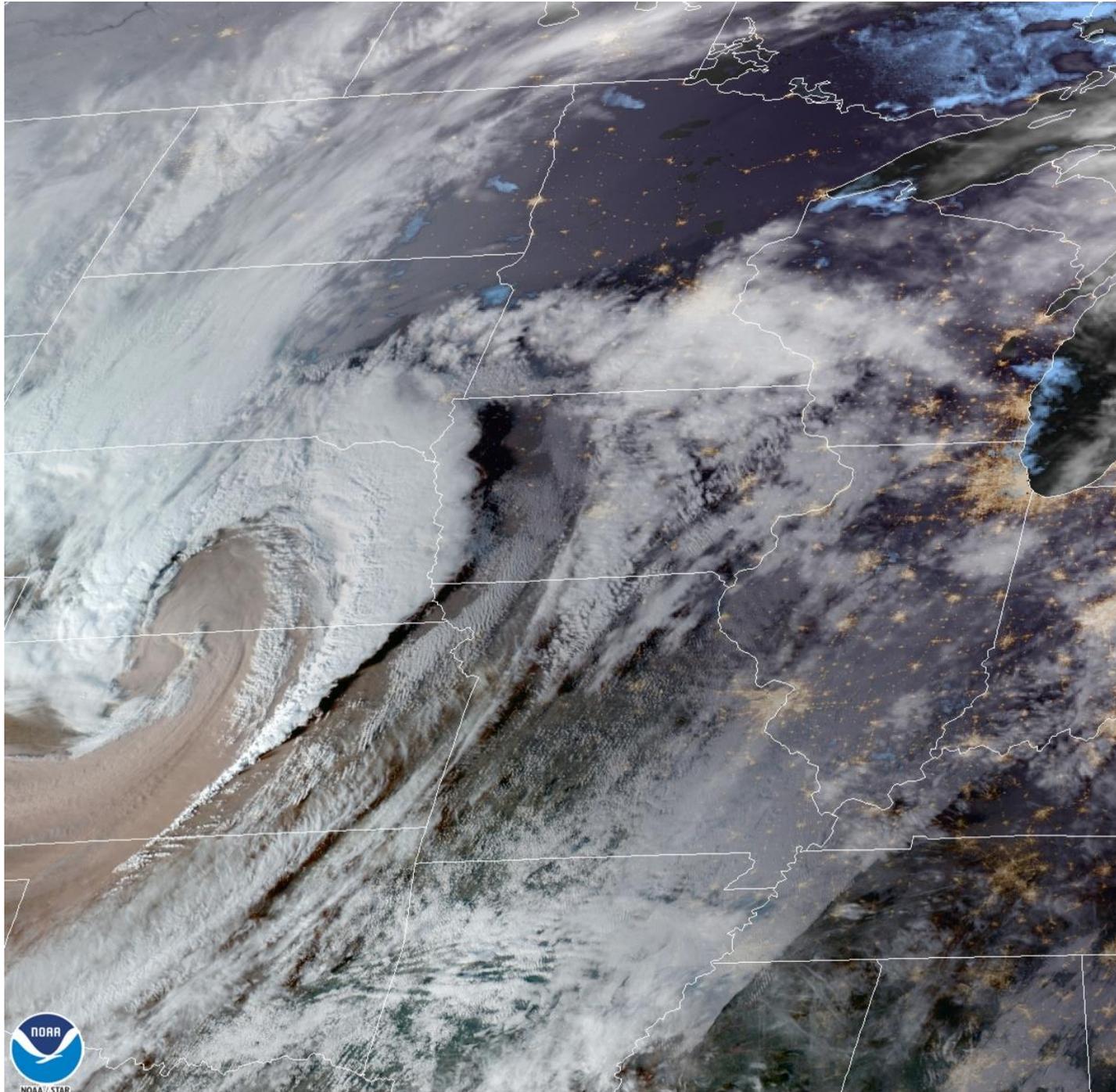


- All Great Lakes running near their long-term averages
- They have dropped from higher levels over the last several years
- Forecasted levels over the next six months should remain near the long-term average

Impacts and Notable Events

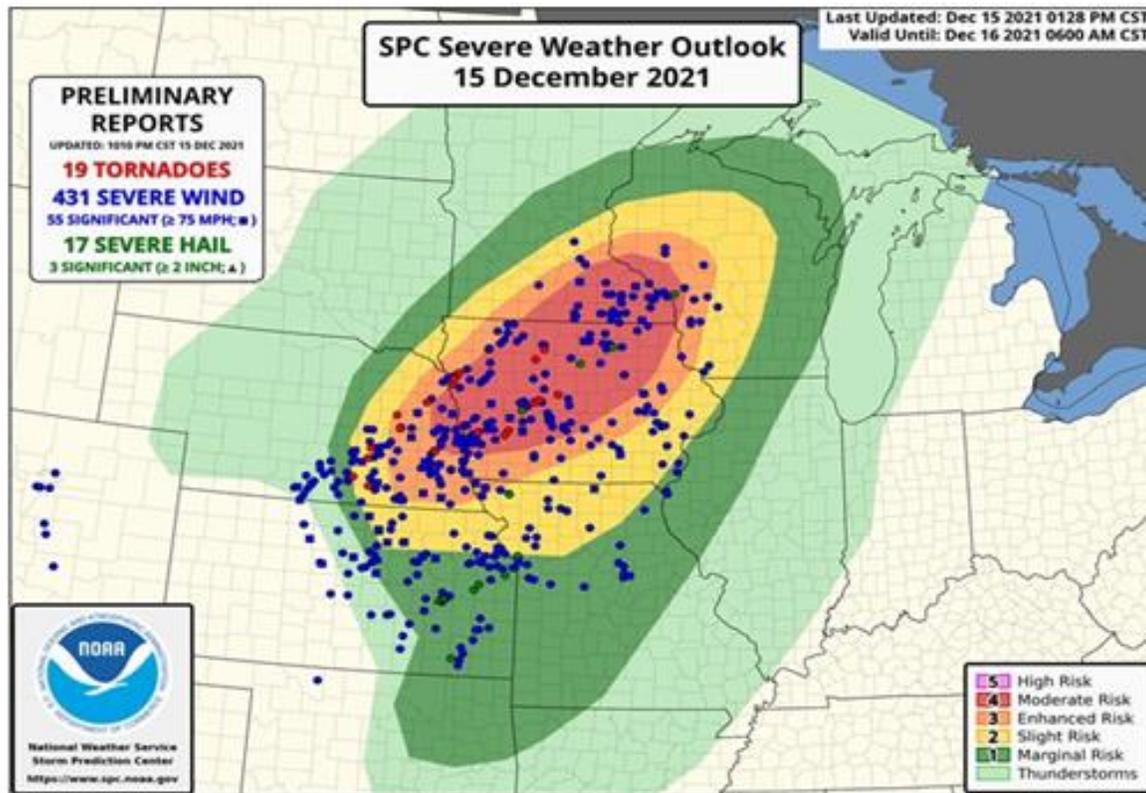


Photo: National Park Service

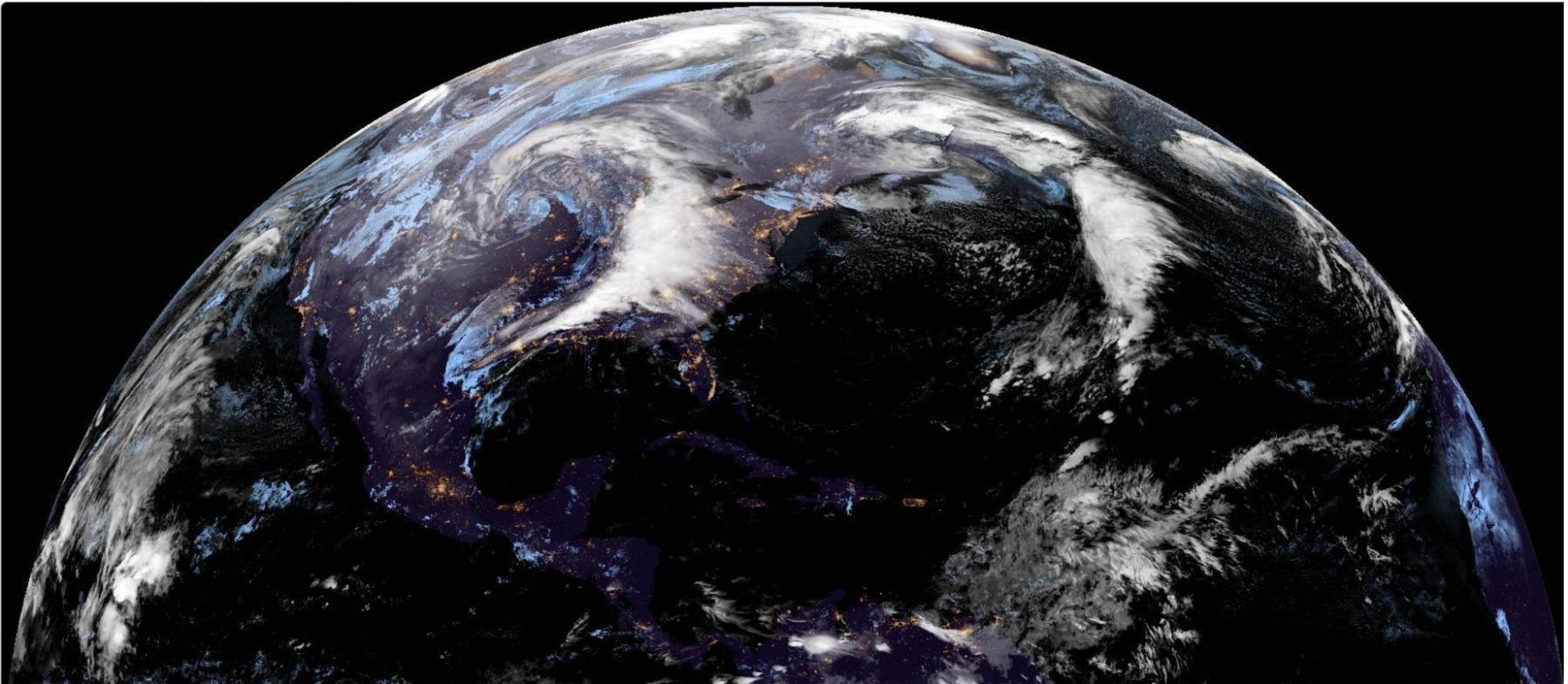


15 Dec 2021 21:26Z NOAA/NESDIS/STAR GOES-East GEOCOLOR

15 December 2021 Event



- First Moderate Risk area in the IA/MN/WI region during the month of December in SPC history.
- Widespread damage from severe thunderstorms with wind gusts exceeding 70 mph
- Multiple reports of 80 MPH winds with thunderstorms
- Multiple reports of 70+ MPH with non-thunderstorm winds
- At least 5 tornadoes in Iowa; surveys may reveal more
- 1 fatality with blown over semi-truck



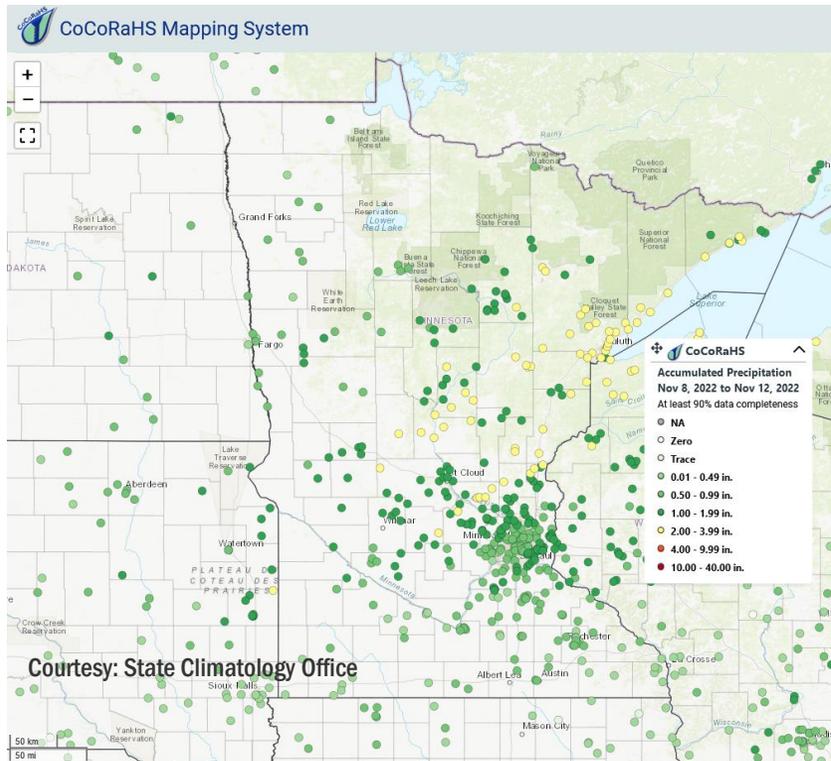
- Large, potent low pressure system moving through the US
- Blizzard conditions in the Dakotas
- Severe weather/tornadoes along the Gulf Coast
- Beneficial moisture over unfrozen ground



State Impacts

- Harvest generally completed without major delays or impacts.
- Dry and windy conditions impacting winter wheat.
- Montana/Wyoming snowpack doing well - 85%-100% of normal.
- Colorado starting off with good snowpack, especially west of the Continental Divide
- Late season, above-normal precipitation falling on still unfrozen soils.
- Minnesota: 10th wettest autumn

State Impacts

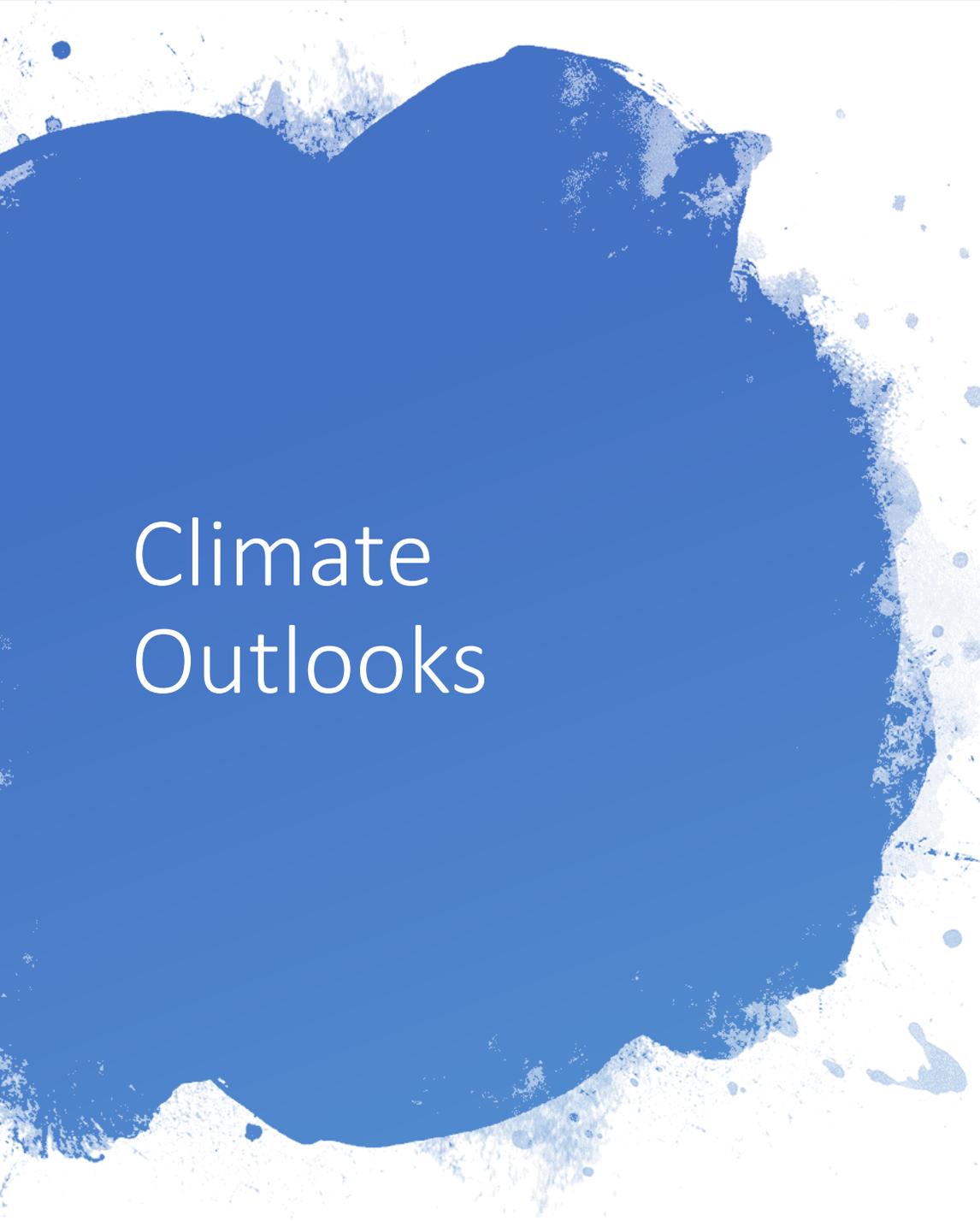


- A dry fall across North Dakota has led to concerns on spring forage production
- Increased feed use due to cold weather, though no concerns of availability right now.

Powerful MN Fall Storm – Nov. 8-12, 2022

- A long-lasting system brought rain, thunderstorms, warm air, record humidity, strong winds, a massively fast drop in temperatures, and even some ice and heavy snows
- A record-breaker, as it arrived with more moisture than ever observed during November in Minnesota

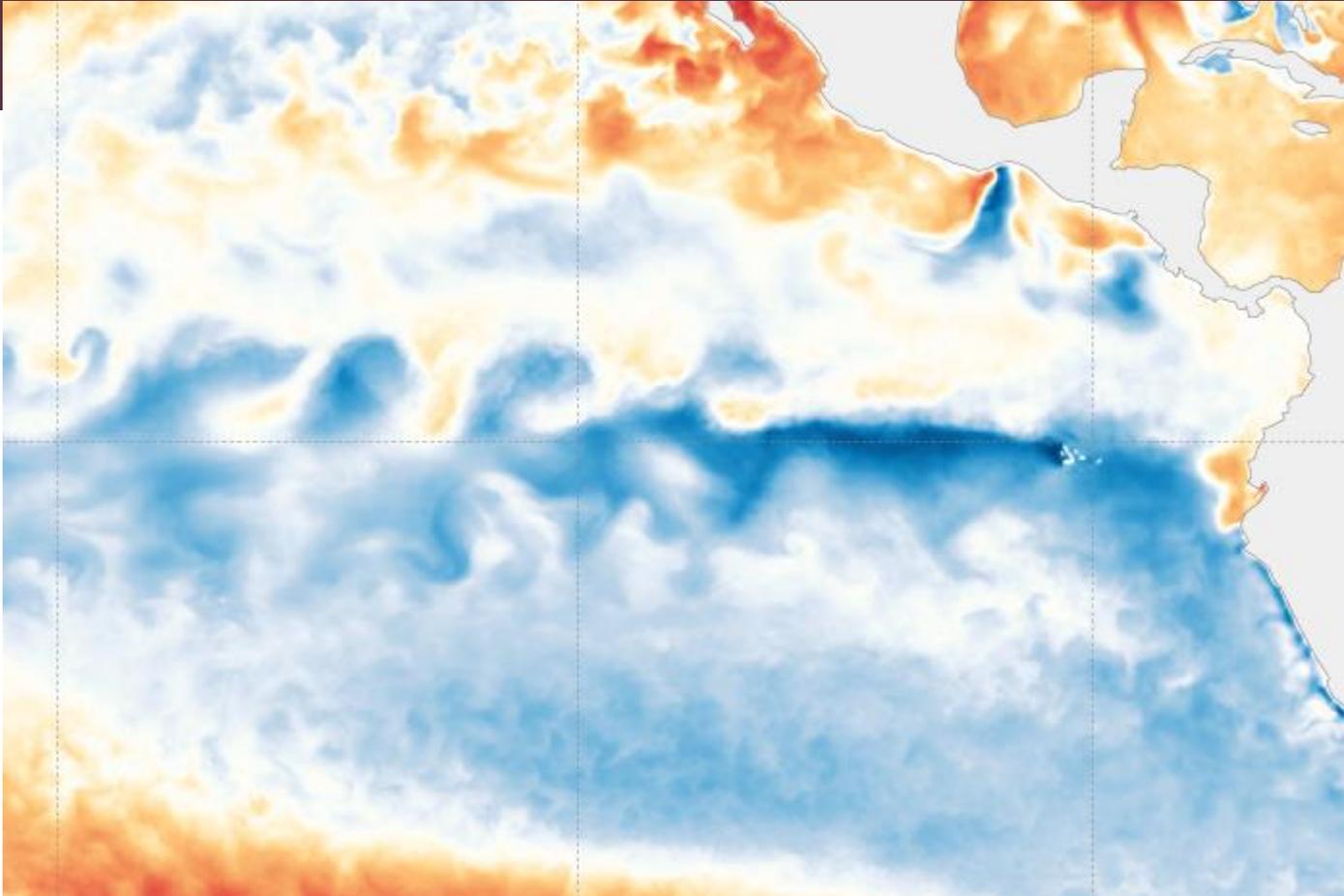




Climate Outlooks

- La Niña
- 7-day Precipitation Forecast
- U.S. Hazard Outlooks
- 8 – 14 day Outlook
- JFM temperature and precipitation
- FMA temperature and precipitation

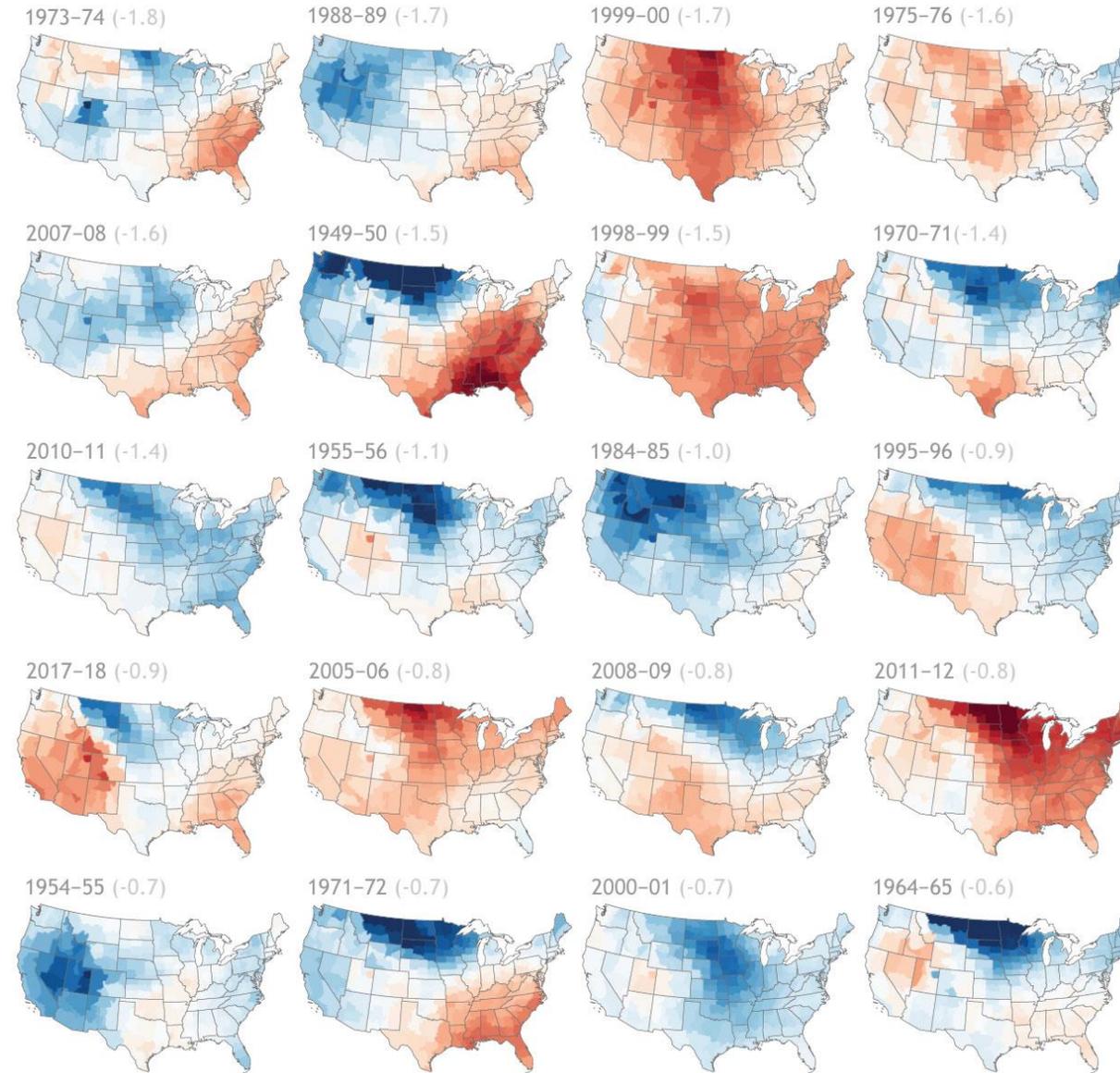
La Niña Advisory



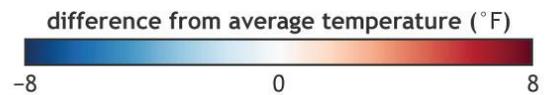
- Third consecutive winter of La Niña – triple dip
- La Niña is likely to continue across the Northern Hemisphere winter
 - Equal chances of La Niña and ENSO-neutral during January-March 2023
 - ~71% chance of transitions to ENSO-neutral in the Feb. – Apr. 2023 timeframe

Winter temperature patterns during the 20 strongest La Niña events since 1950

Dec-Feb (ONI value)



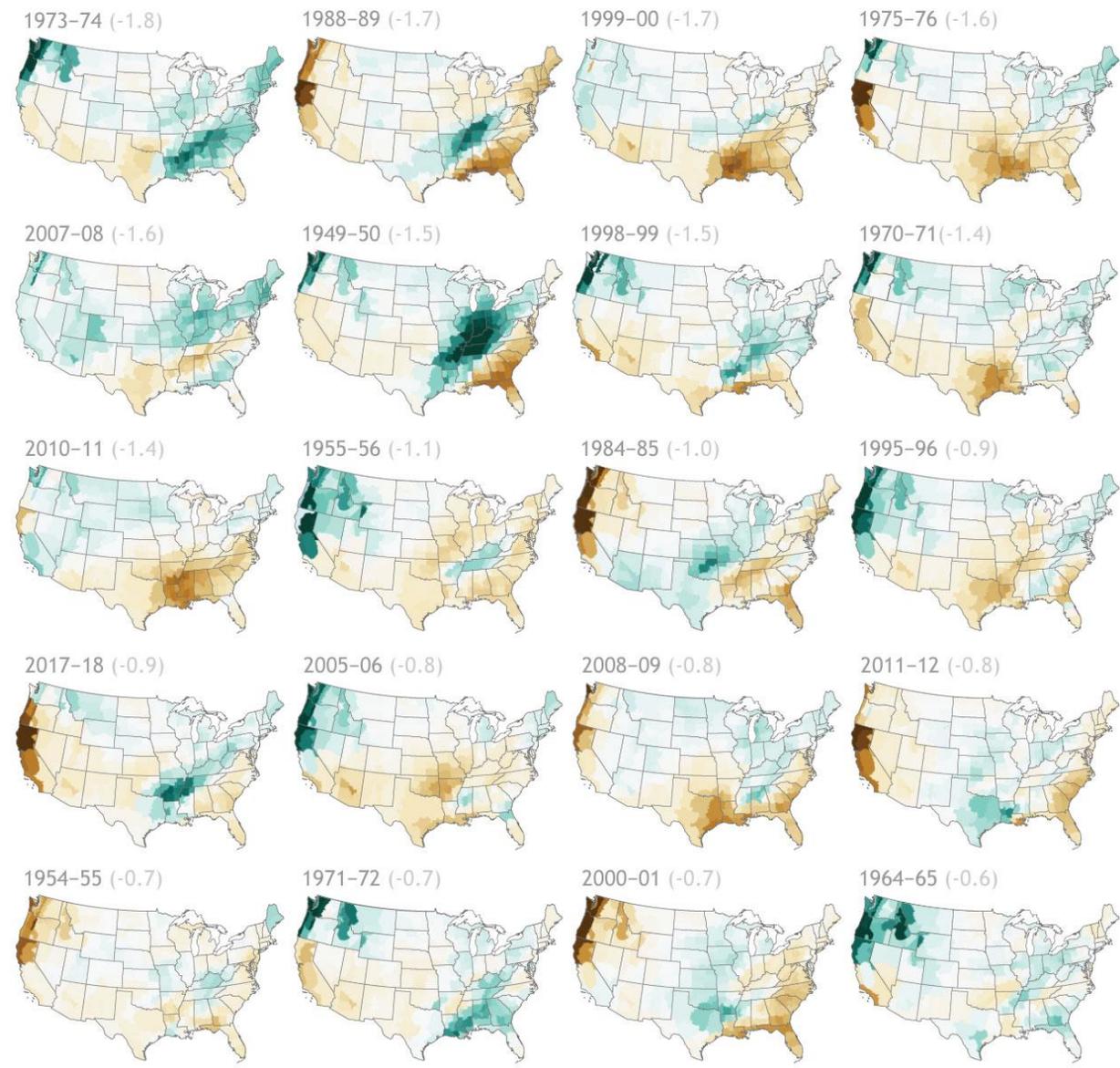
December-February
vs. 1981-2020 average



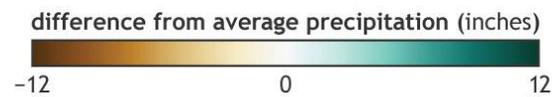
NOAA Climate.gov
Data: NCDC/ESRL

Winter precipitation during the 20 strongest La Niña events since 1950

Dec-Feb (ONI value)



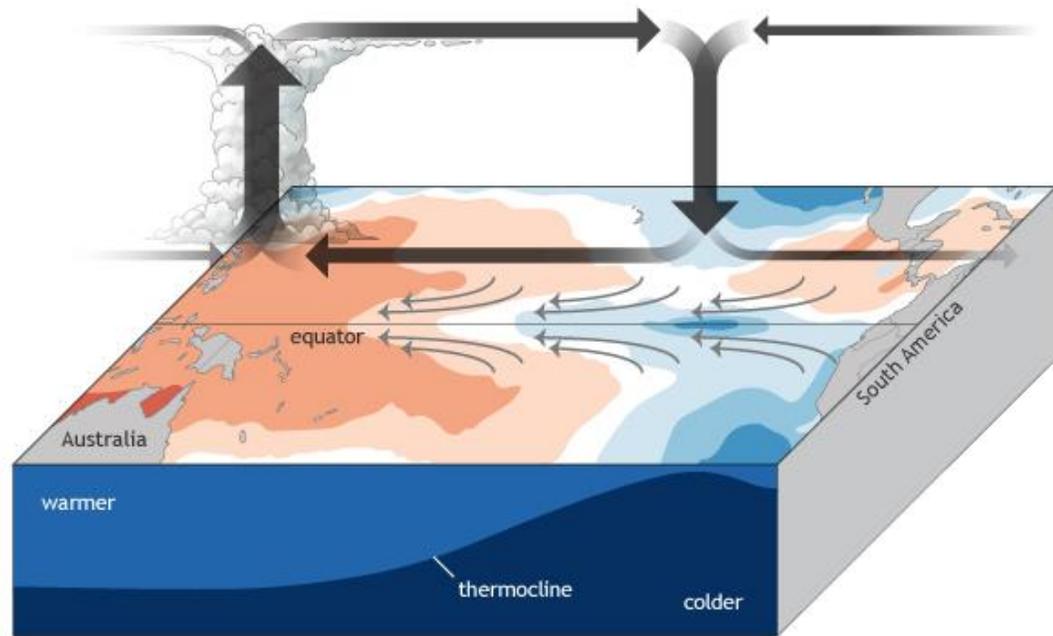
December-February
vs. 1981-2020 average



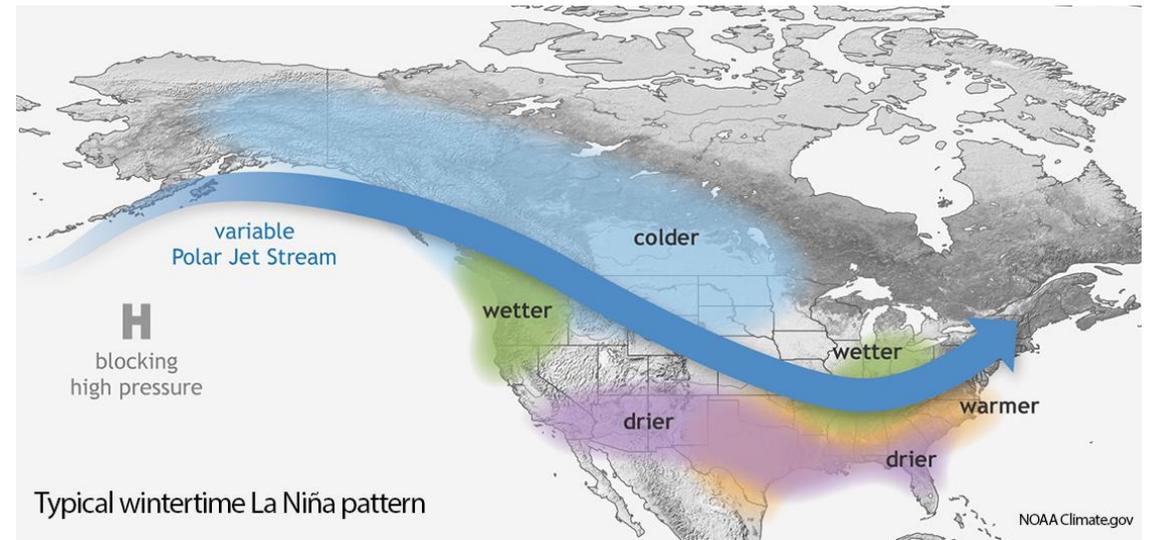
NOAA Climate.gov
Data: NCDC/ESRL

La Niña Wintertime Pattern

Atmosphere-ocean feedbacks during El Niño-Southern Oscillation
La Niña



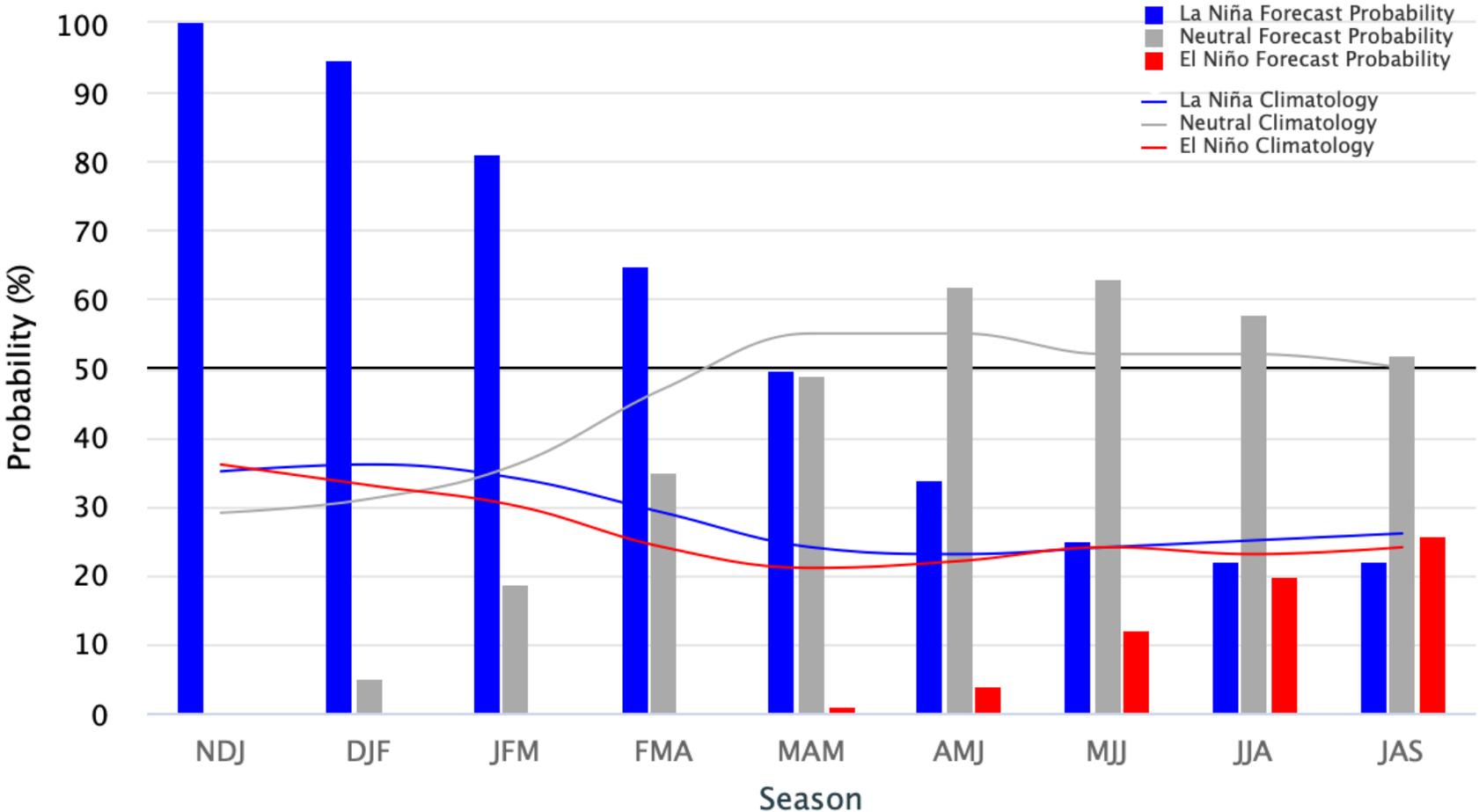
NOAA Climate.gov



ENSO Probabilities

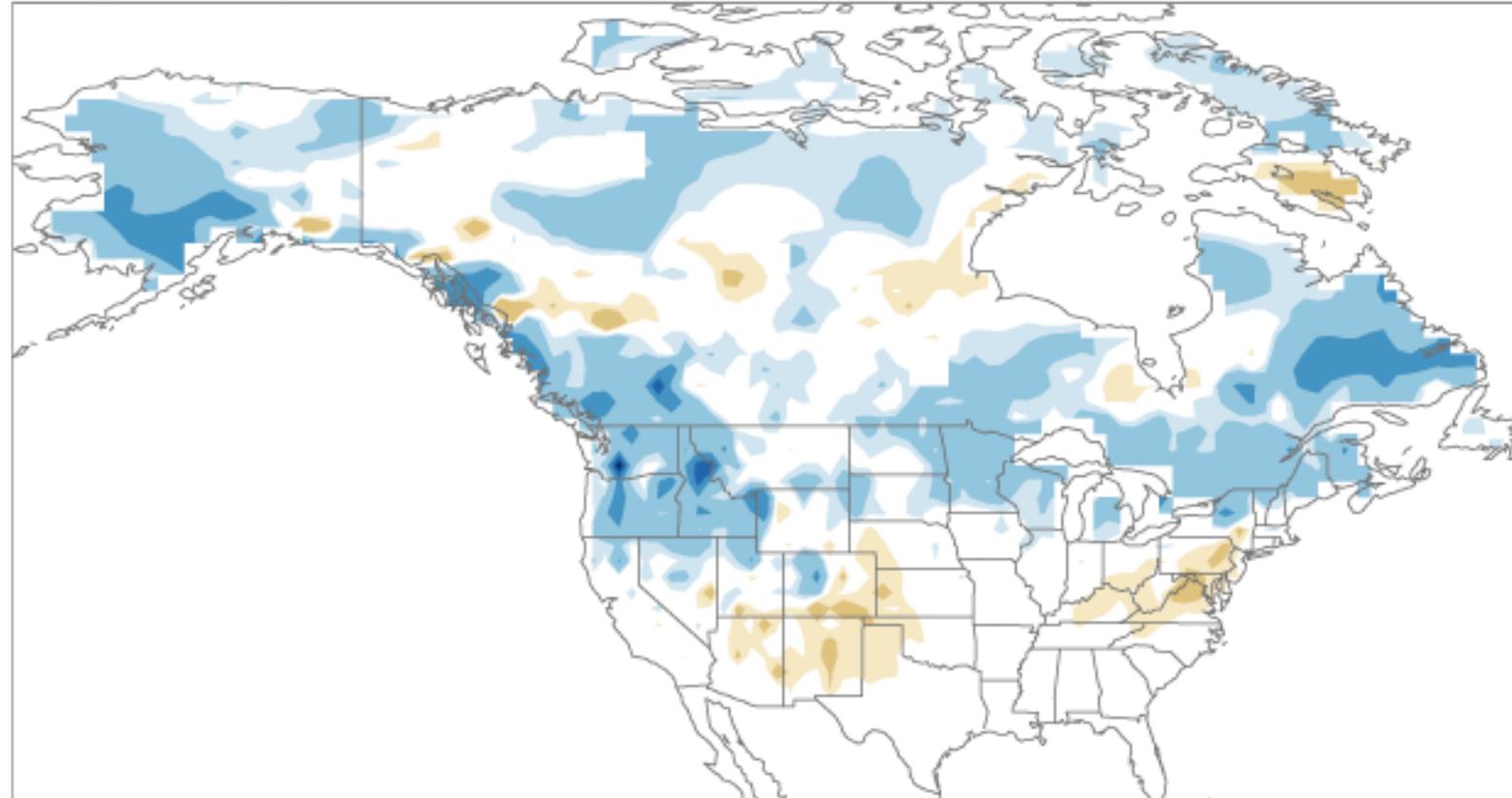
Early-December 2021 CPC/IRI Official Probabilistic ENSO Forecasts

ENSO state based on NINO3.4 SST Anomaly
Neutral ENSO: -0.5 °C to 0.5 °C



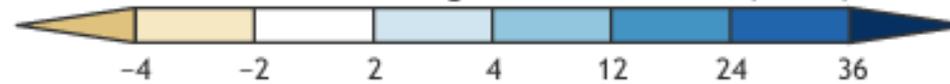
La Niña Snow Potential

Average snowfall patterns for all La Niña years



October-April
1950-51 to 2008-09

Difference from average seasonal snowfall (inches)

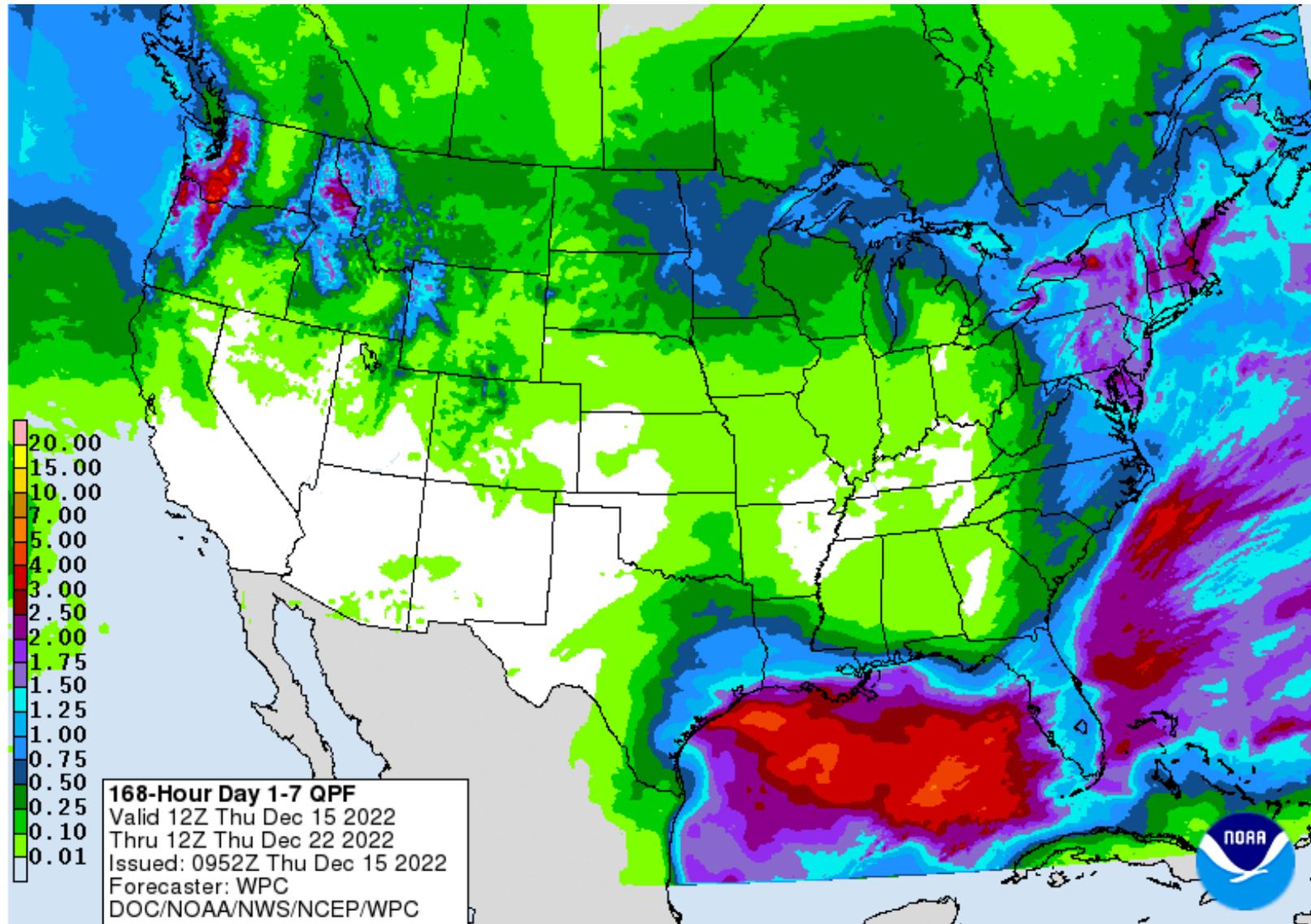


NOAA Climate.gov
Data: Rutgers GSL

<https://www.climate.gov/news-features/blogs/enso/what-about-snow-during-la-ni%C3%B1a-winters>

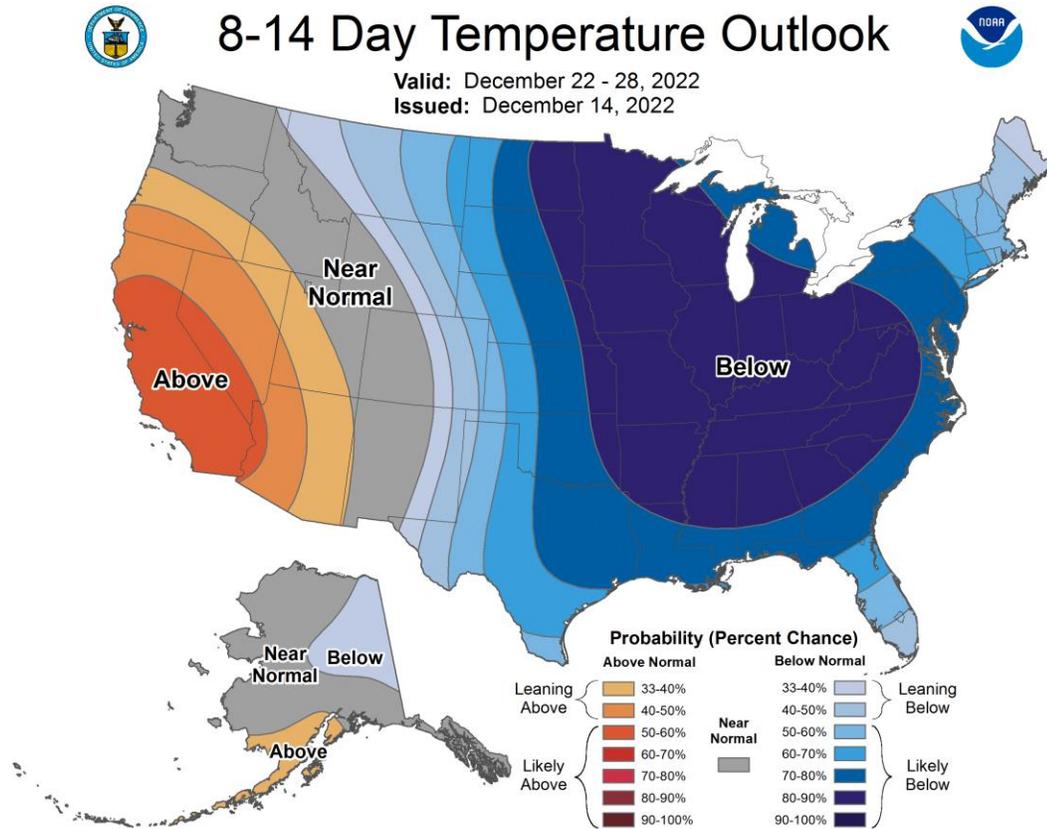
7-day Cumulative Precipitation Forecast

Valid: 15 Dec. – 22 Dec.

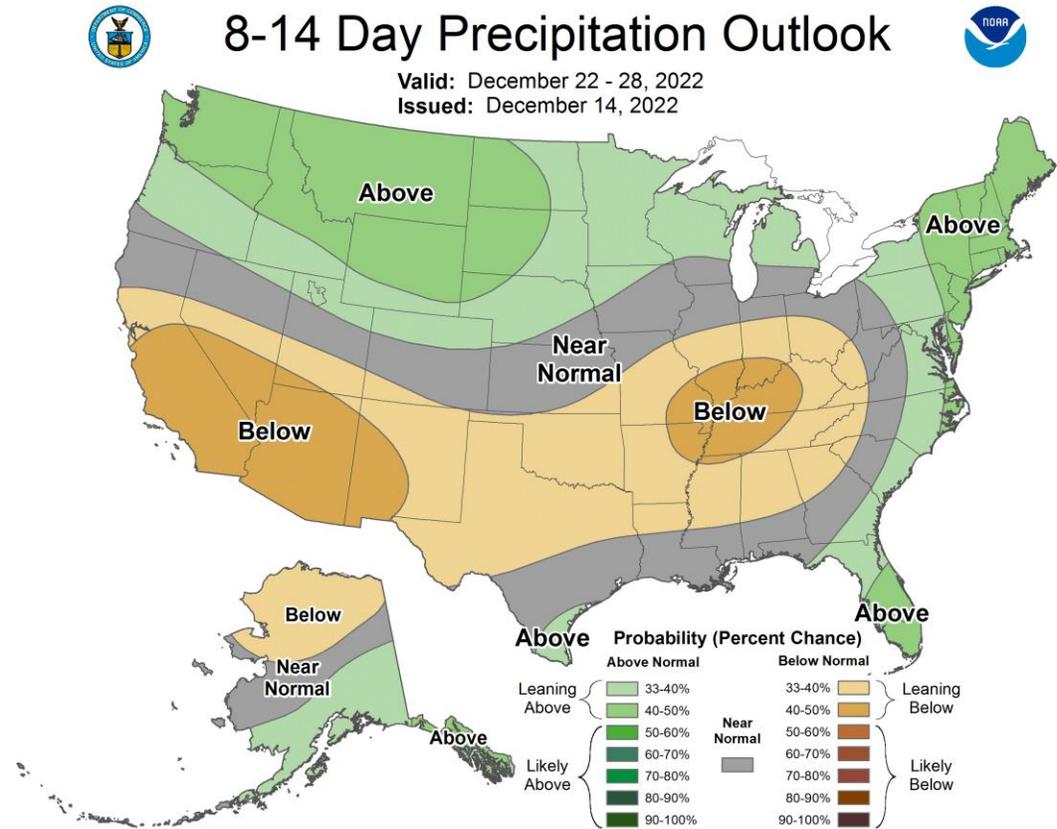


<https://www.wpc.ncep.noaa.gov/qpf/day1-7.shtml>

8-14 Day Outlook



Temperature



Precipitation

KEY MESSAGES

Very cold Arctic air masses will envelop the nation during the week 2 period **(a)** including the busy holiday travel season.

Temperatures in the negative teens are possible in the Northern Rockies and Northern Plains, with sub-zero temperatures reaching as far south as the Central Plains **(b)**.

Areas farther south and east, such as the Great Lakes, Ohio Valley, Mid-Atlantic, and Northeast are favored to have temperatures reach the single digits and teens. Well below freezing temperatures are also expected throughout the Southern Plains and Southeast.

Timing: Leading up to* and continuing from December 20, 2022 - December 26, 2022. The cold is expected to move southward then eastward as the Week-2 period progresses.

The upper level pattern is favorable to sending several bitterly cold Arctic air masses southward into the lower 48 states that may persist into week 3 **(c)**.

* For short-term forecasts (prior to December 20), visit www.wpc.ncep.noaa.gov and weather.gov.

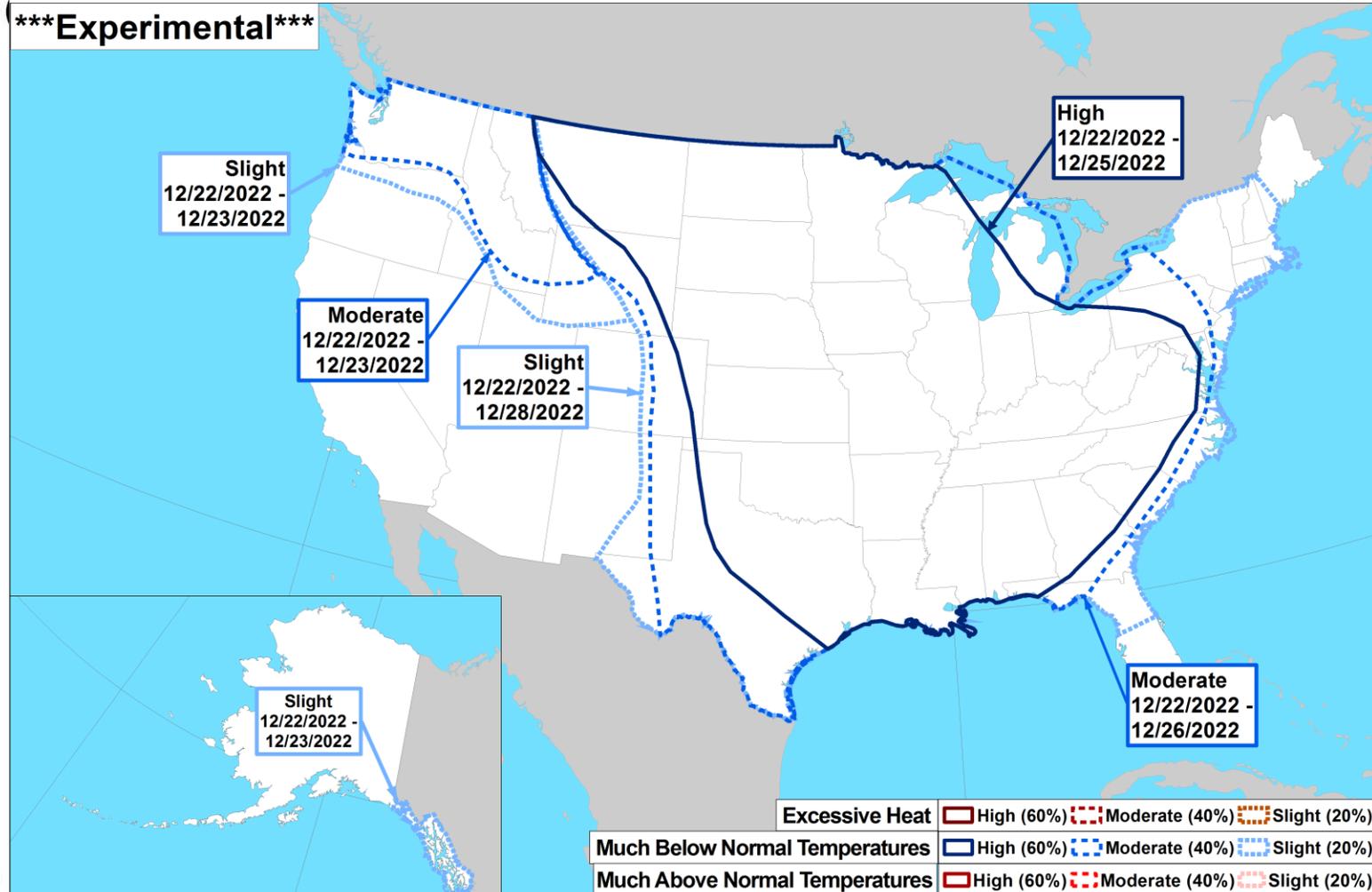


Risk of Hazardous Temperatures

Valid: 12/22/2022-12/28/2022



Experimental



Climate Prediction Center

Made: 12/14/2022 3PM EST

Follow us:

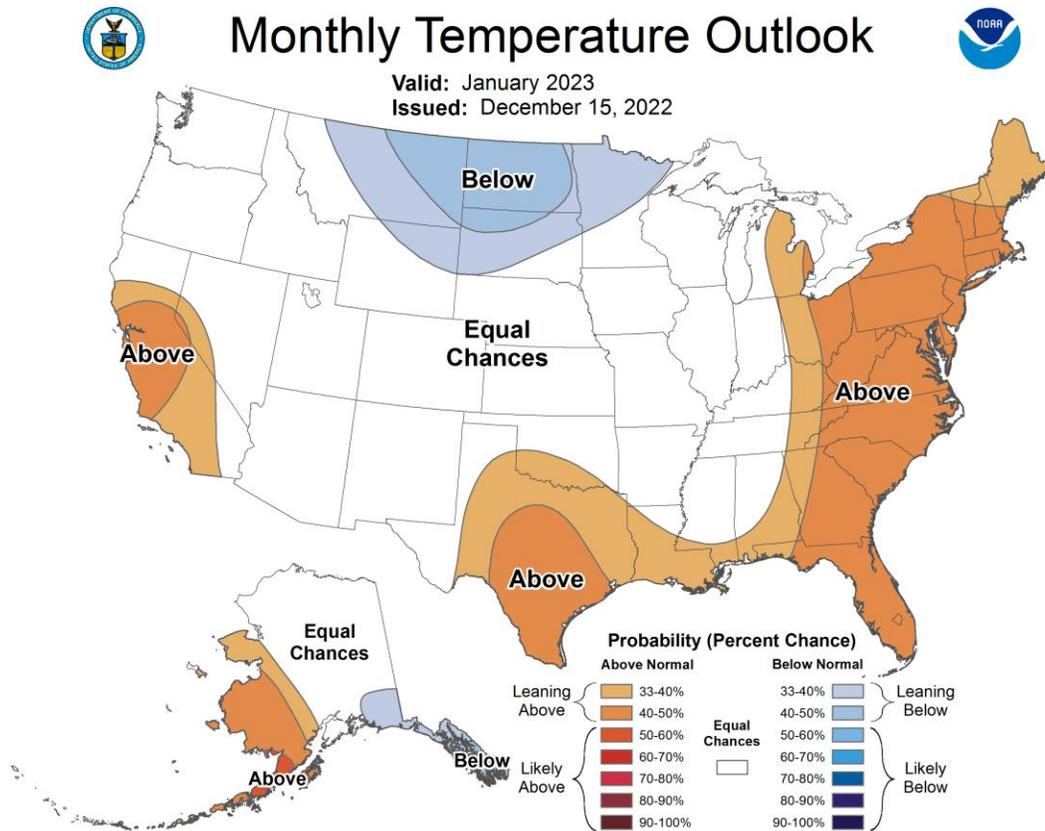
www.cpc.ncep.noaa.gov



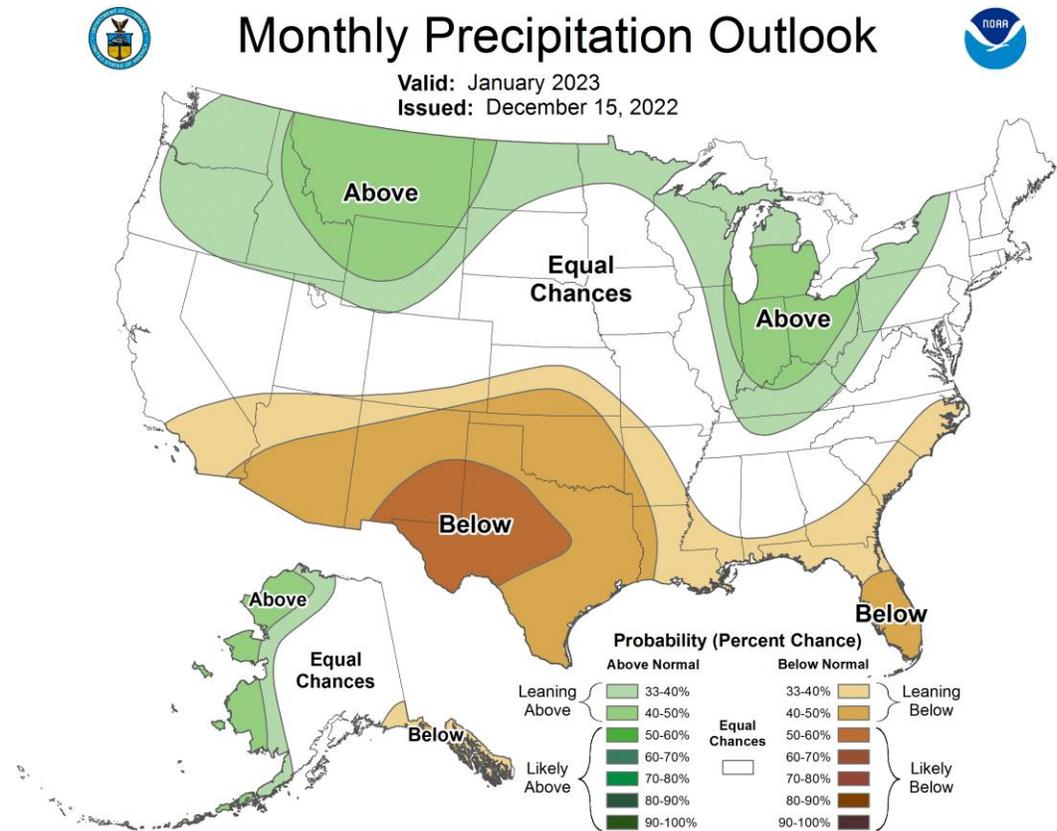
National Oceanic and Atmospheric Administration

U.S. Department of Commerce

January Outlook

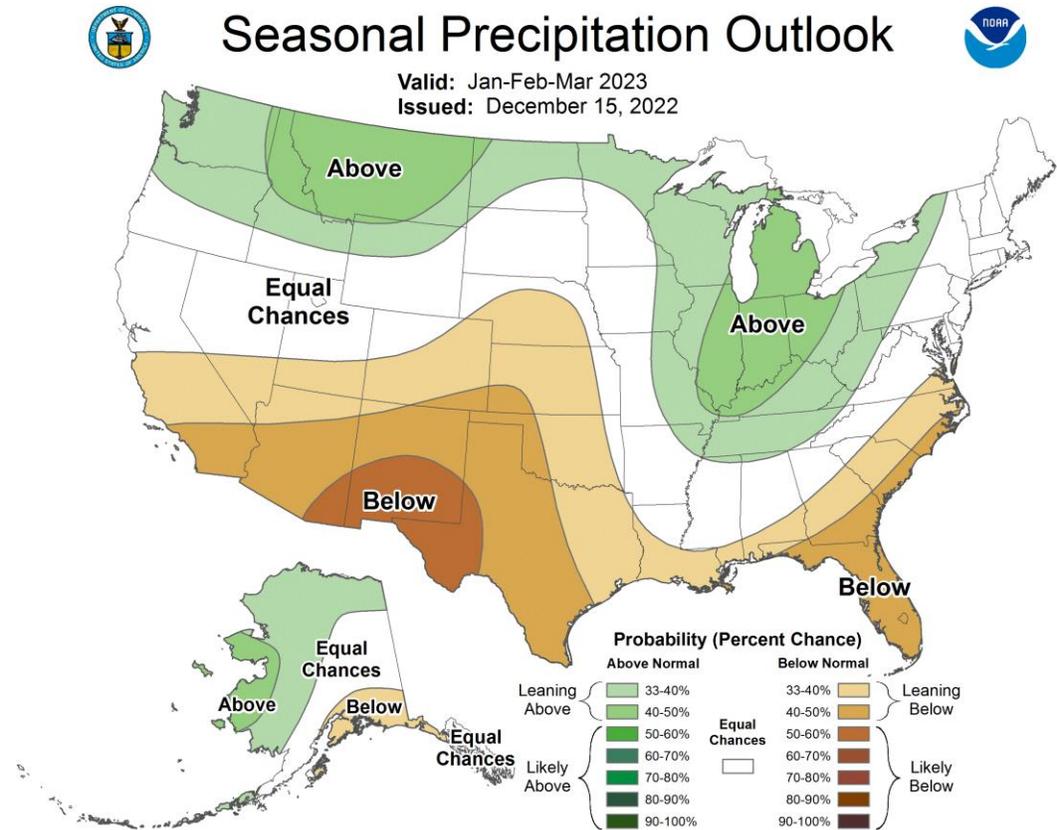
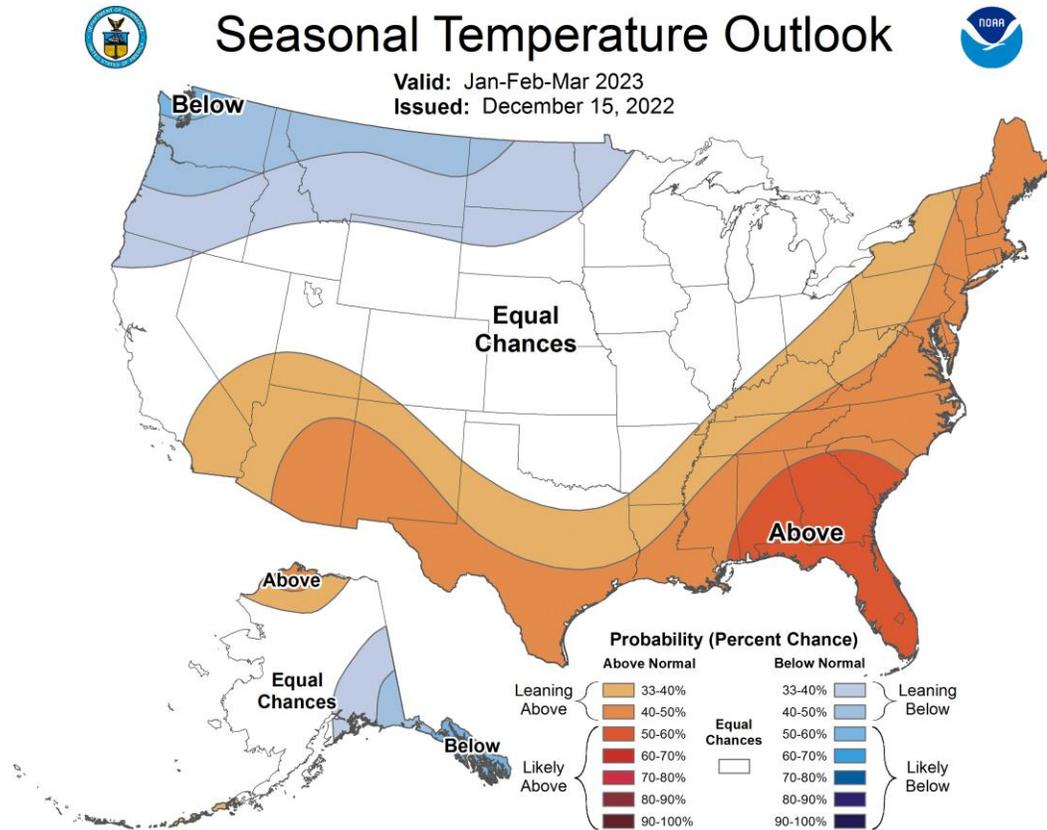


Temperature



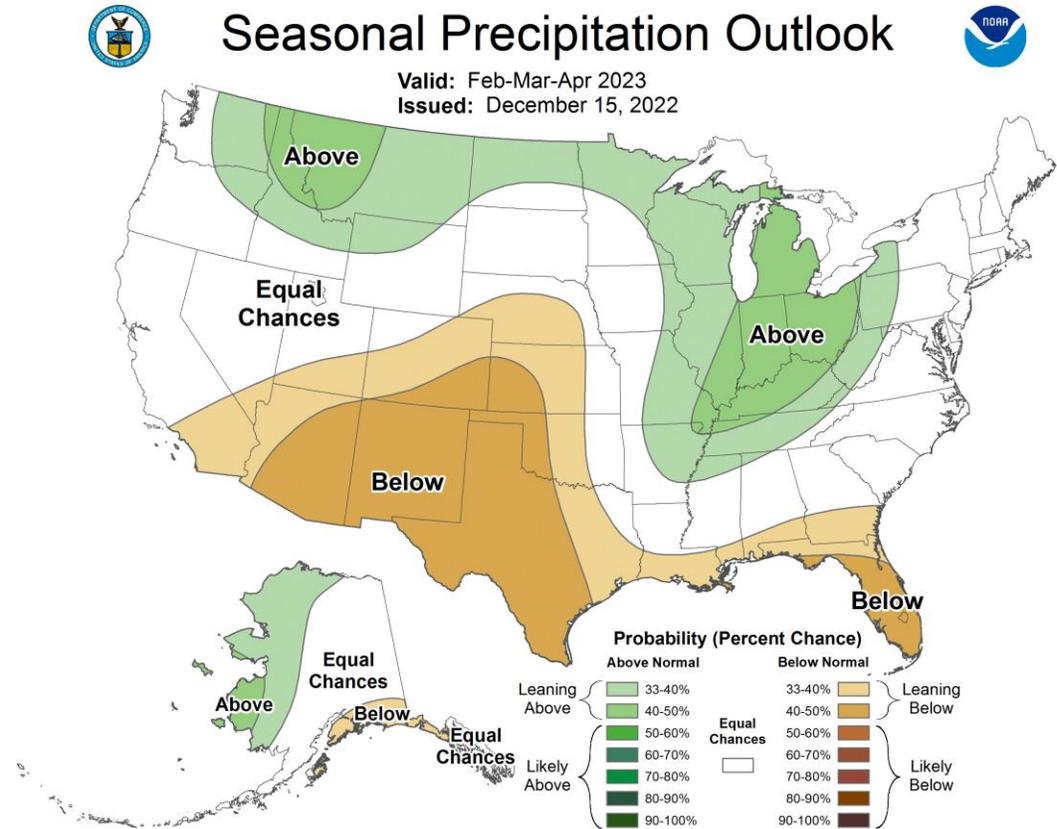
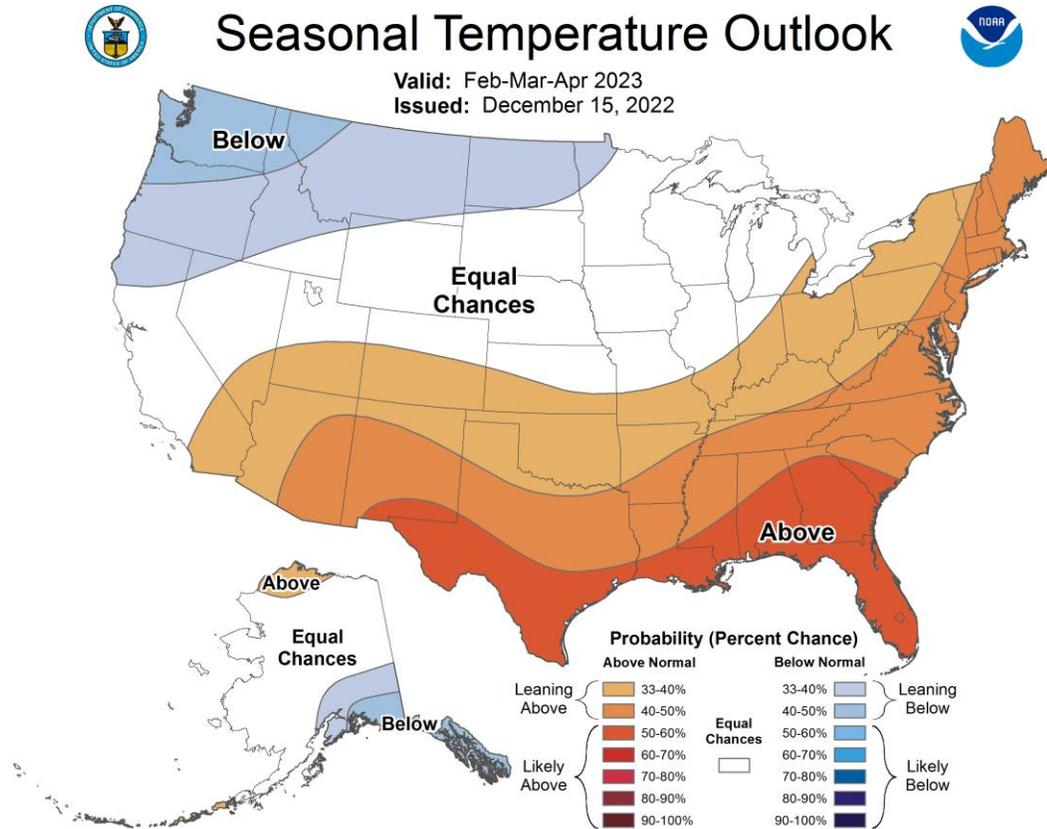
Precipitation

JFM 2023 Outlooks



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

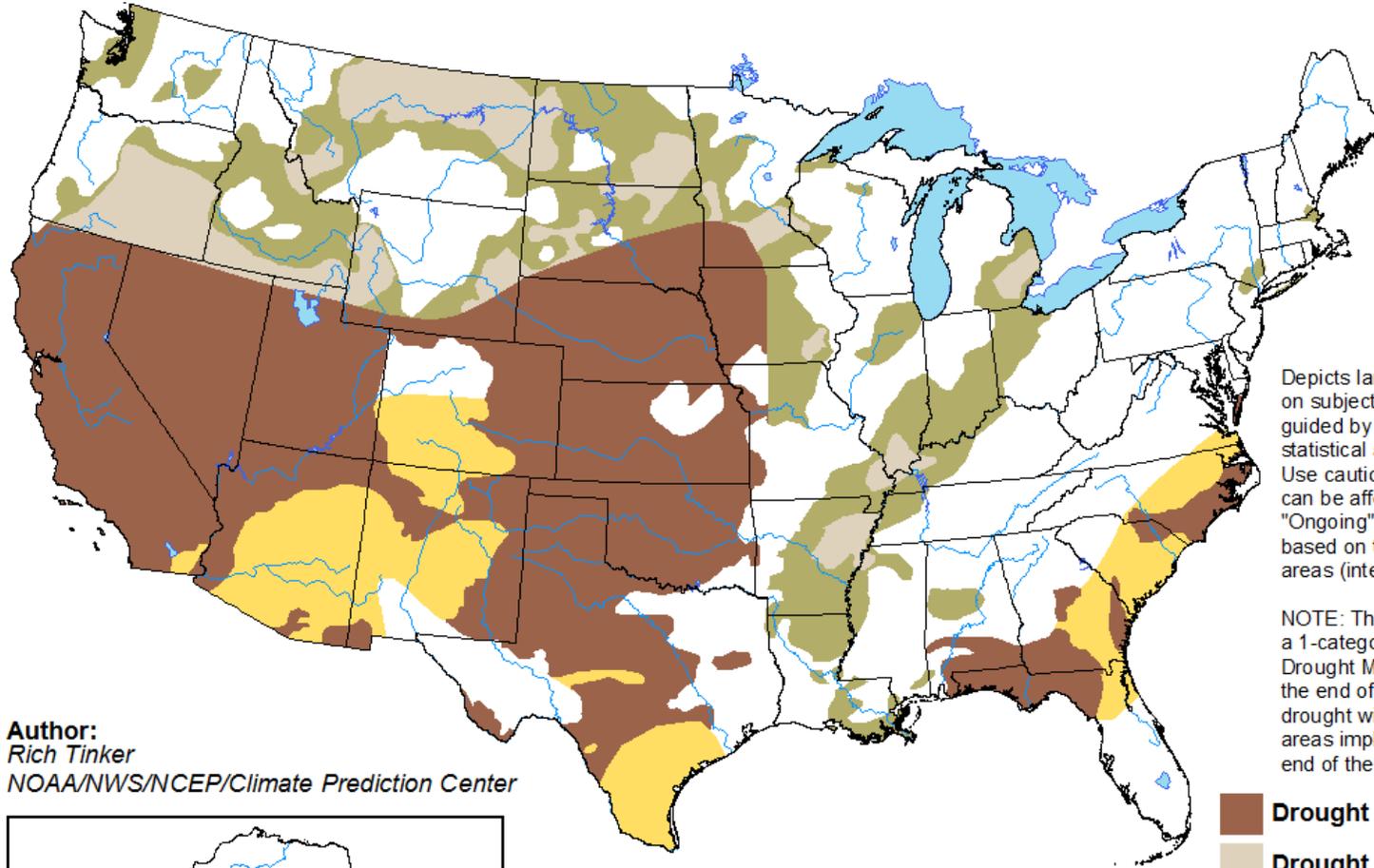
FMA 2023 Outlooks



U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

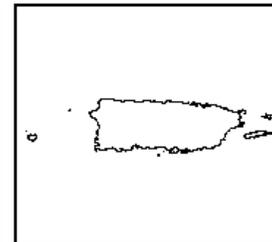
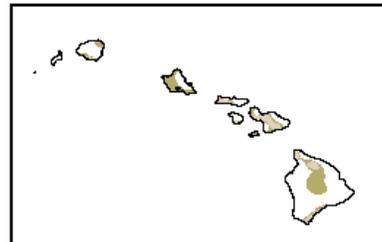
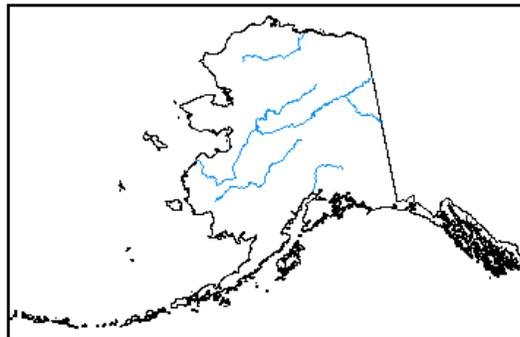
Valid for December 15, 2022 - March 31, 2023
Released December 15, 2022



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:
Rich Tinker
NOAA/NWS/NCEP/Climate Prediction Center



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



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

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

Outlook Summary

- Short-term outlooks showing high probabilities of anomalous cold for most of CONUS and wetter to near-normal precip. potential.
- The La Niña signal persist through Winter 2022/2023
 - Widespread precipitation variability of the wintertime LN pattern
 - Dominant behavior in precipitation shifting west into Midwest
 - Strength of LN will be a good indicator of snowpack potential
- Higher chances of a transition to ENSO-neutral into spring
 - This will be a slow transition as the atmosphere respond to oceanic behavior
 - Climatology and recent trends will provide better guidance as opposed to an EN/LN phase.
- Potential drought improvement Upper Midwest through eastern Corn Belt

Further Information - Partners

- **Today's and Past Recorded Presentations:**
- <http://www.hprcc.unl.edu/webinars.php>
- <http://www.hprcc.unl.edu>
- NOAA's National Centers for Environmental Information: www.ncdc.noaa.gov
 - Monthly climate reports (U.S. & Global): www.ncdc.noaa.gov/sotc/
- 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:

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- **Weather:**

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