



NEBRASKA STATE  
CLIMATE OFFICE

# North Central U.S. Climate and Drought Outlook

November 18, 2021

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# General Information

## Providing climate services to the North Central US

Collaborative Activity Among:

NOAA NCEI/NWS/OAR/NIDIS

USDA Climate Hubs

American Association of State Climatologists

Midwestern and High Plains Regional Climate Centers

National Drought Mitigation Center

## Next Regular Climate/Drought Outlook Webinar

*December 16<sup>th</sup>, 2021 (1 PM CDT), Dr. Justin Glisan, State Climatologist of Iowa*

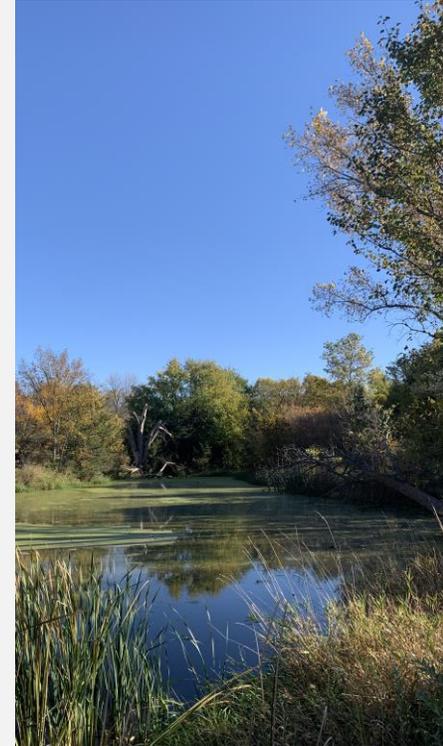
## Access to Future Climate Webinars and Information

<http://www.drought.gov/drought/content/regional-programs/regional-drought-webinars>

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

<http://www.hprcc.unl.edu/webinars.php>

**Open for questions at the end**



A warm start to November in southeast Nebraska.  
Photos courtesy Martha Shulski.

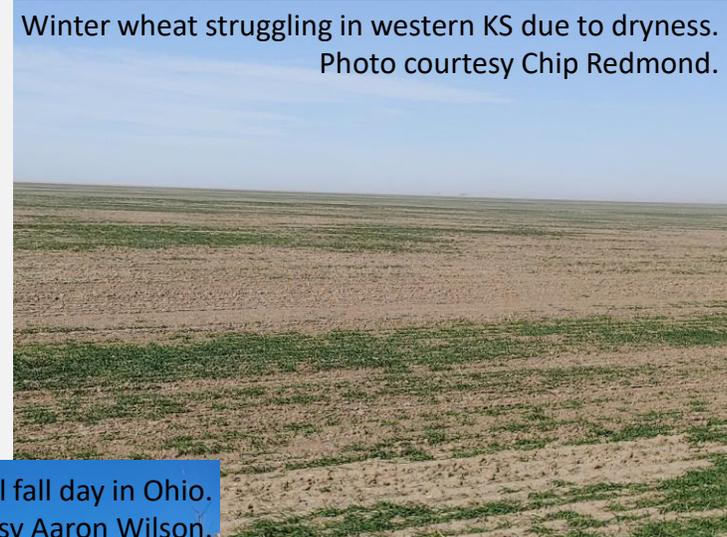
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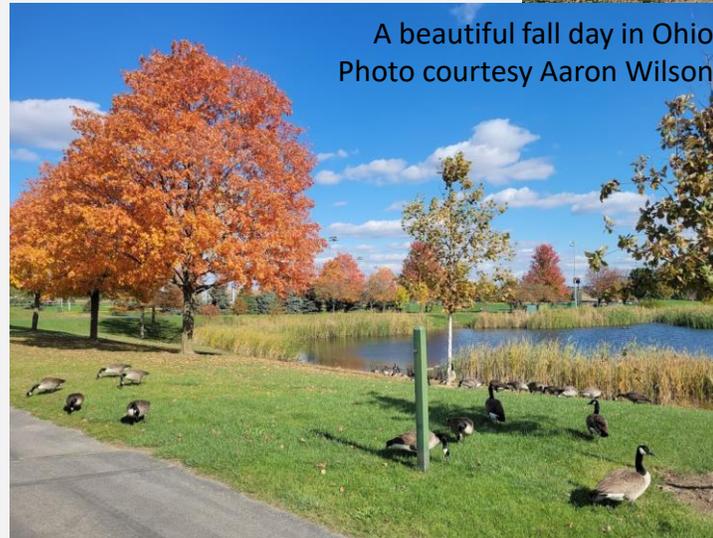
# Today's webinar

- **Recap and recent conditions.**
- **Drought changes.**
- **Impacts.**
- **Climate outlook.**

Winter wheat struggling in western KS due to dryness.  
Photo courtesy Chip Redmond.



A beautiful fall day in Ohio.  
Photo courtesy Aaron Wilson.

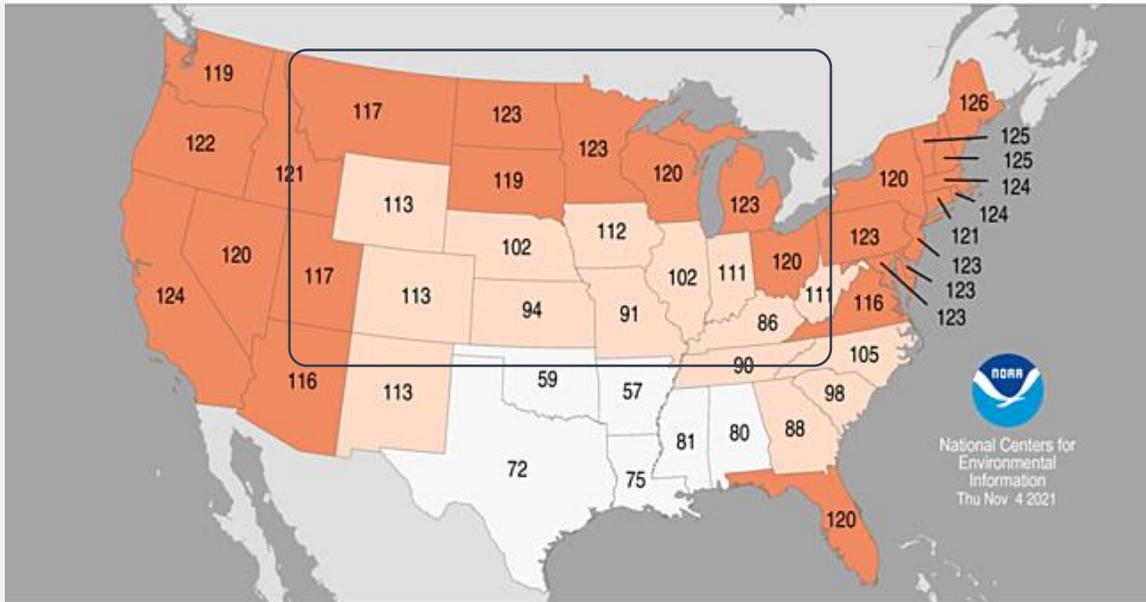


Standing water in corn field near Aberdeen, SD (Oct 30).  
Photo courtesy Laura Edwards.

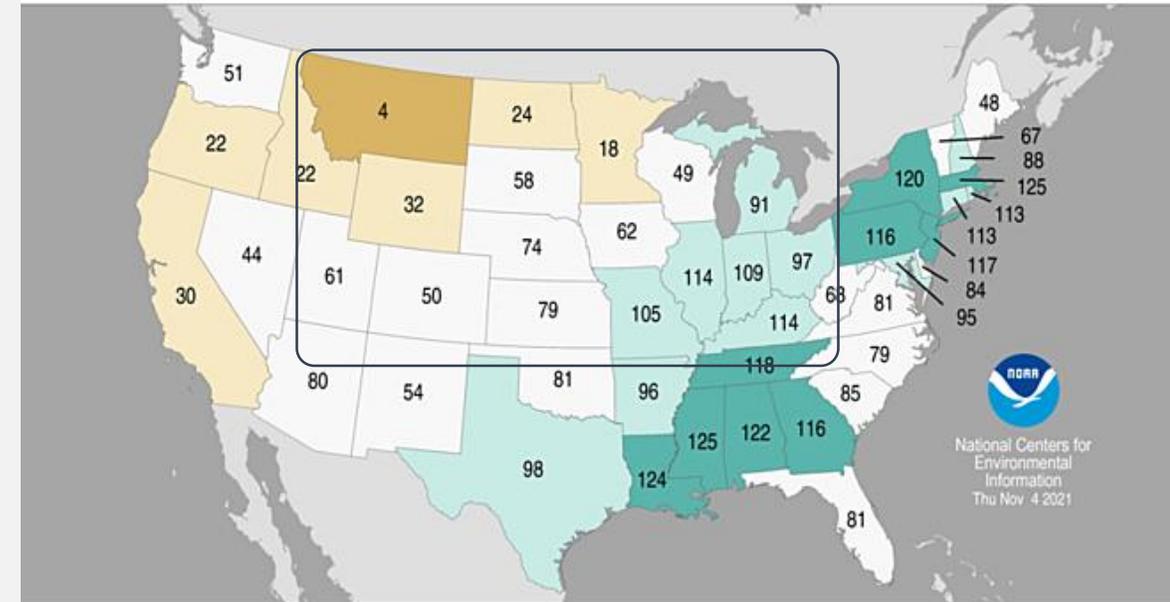
# Recap

**2021 YTD | warmth across the region (9<sup>th</sup> warmest nationally); dryness in the west, wet east**

Statewide Average Temperature Ranks  
January – October 2021  
Period: 1895–2021



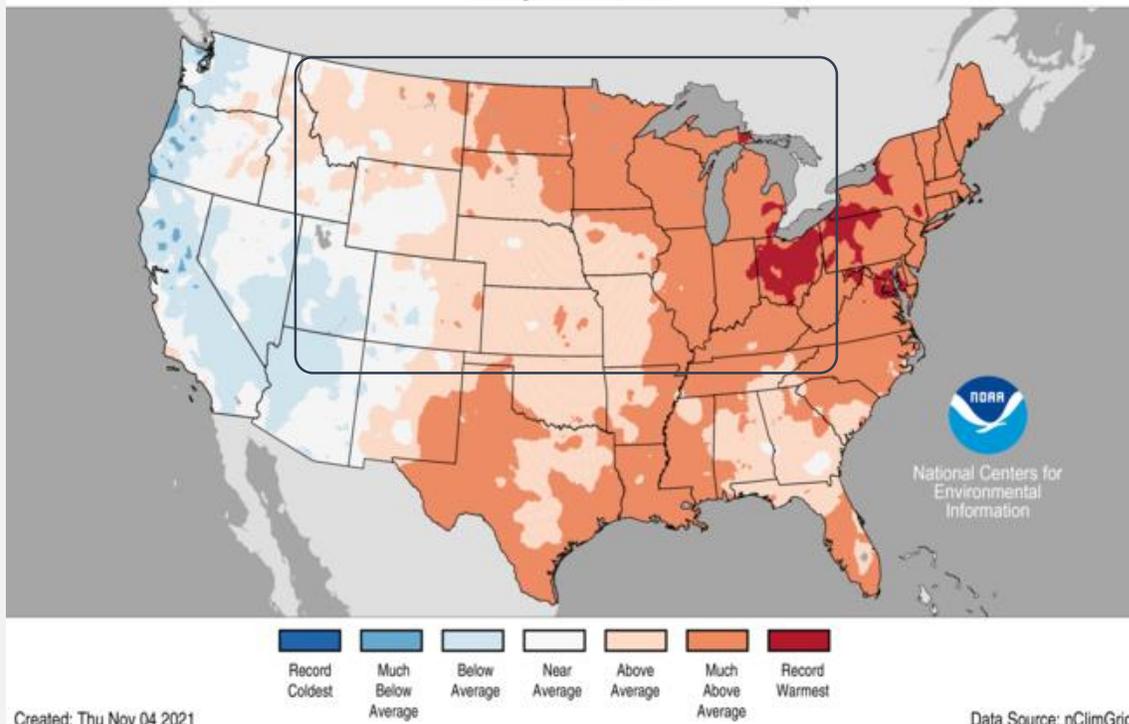
Statewide Precipitation Ranks  
January – October 2021  
Period: 1895–2021



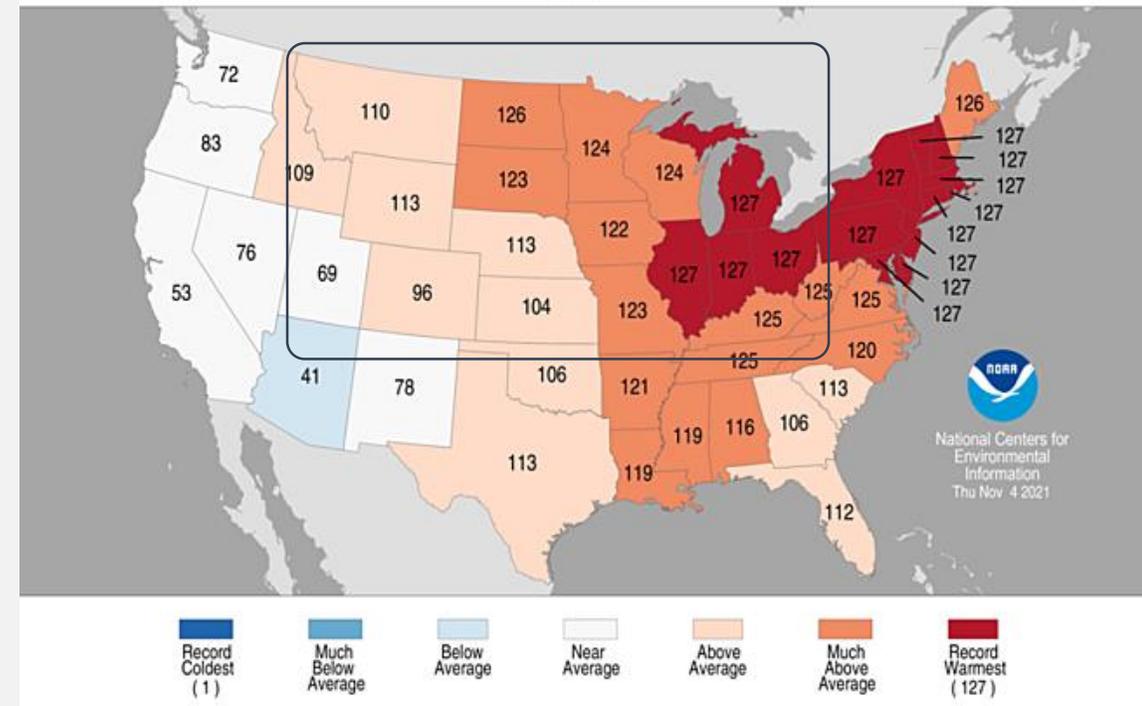
# Recap

October temperature | **6<sup>th</sup> warmest nationally, eastern portions at or near record warmth; near average in far west. Nighttime lows particularly warm.**

Mean Temperature Percentiles  
October 2021  
Ranking Period: 1895–2021

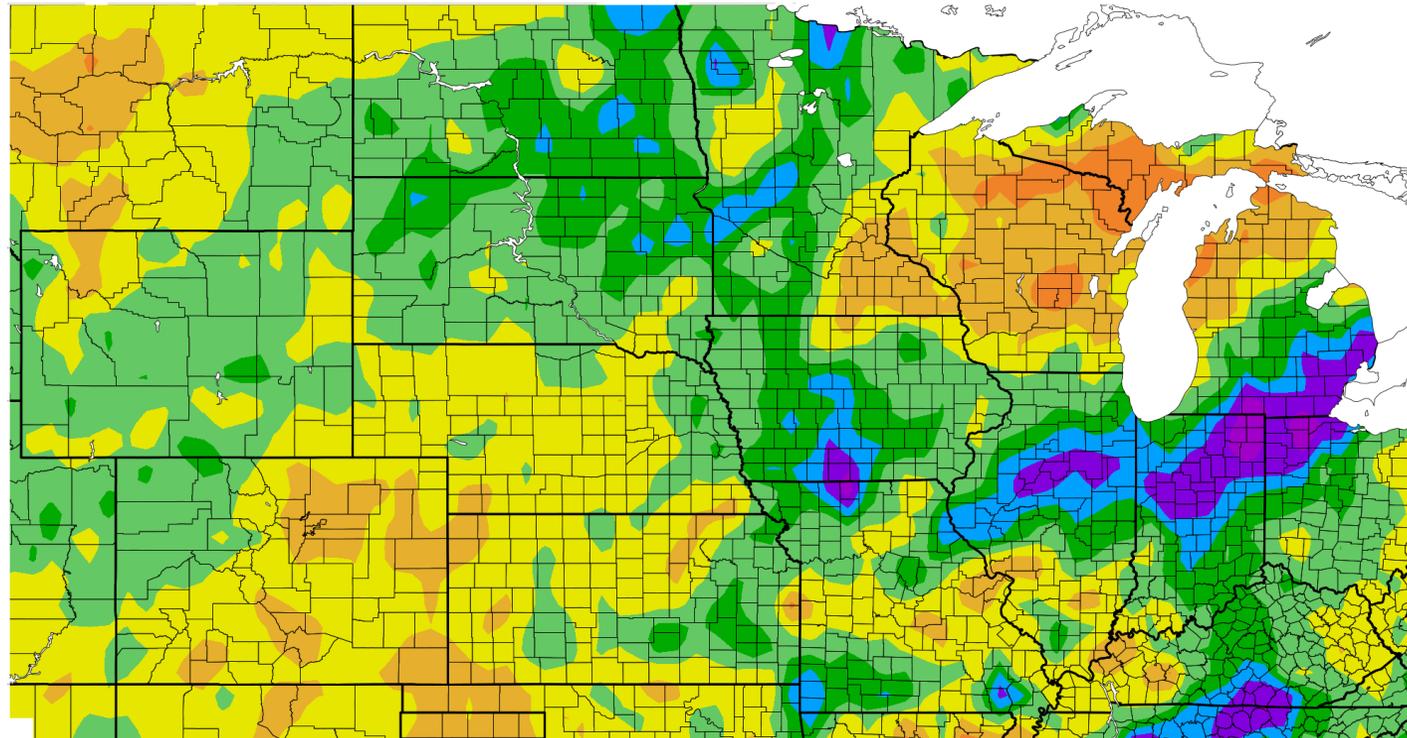


Statewide Minimum Temperature Ranks  
October 2021  
Period: 1895–2021

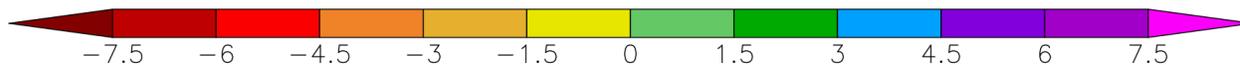


# Recap

## Precipitation | wetting and drying trends around region



60 day precipitation  
departure from normal  
*16 Sep – 14 Nov*



Generated 11/15/2021 at HPRCC using provisional data.

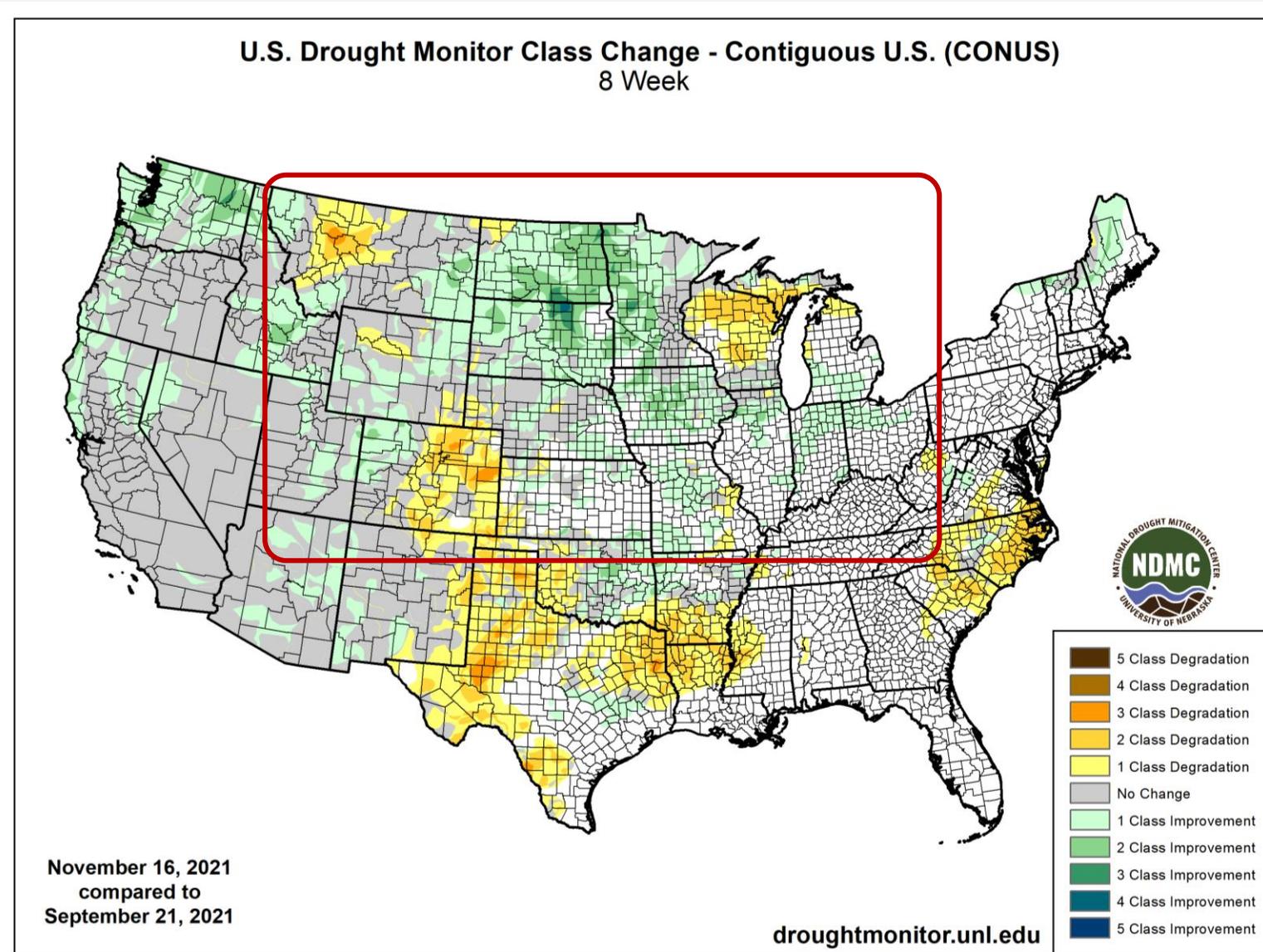
NOAA Regional Climate Centers

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

# Recap

Drought | 2 month  
change

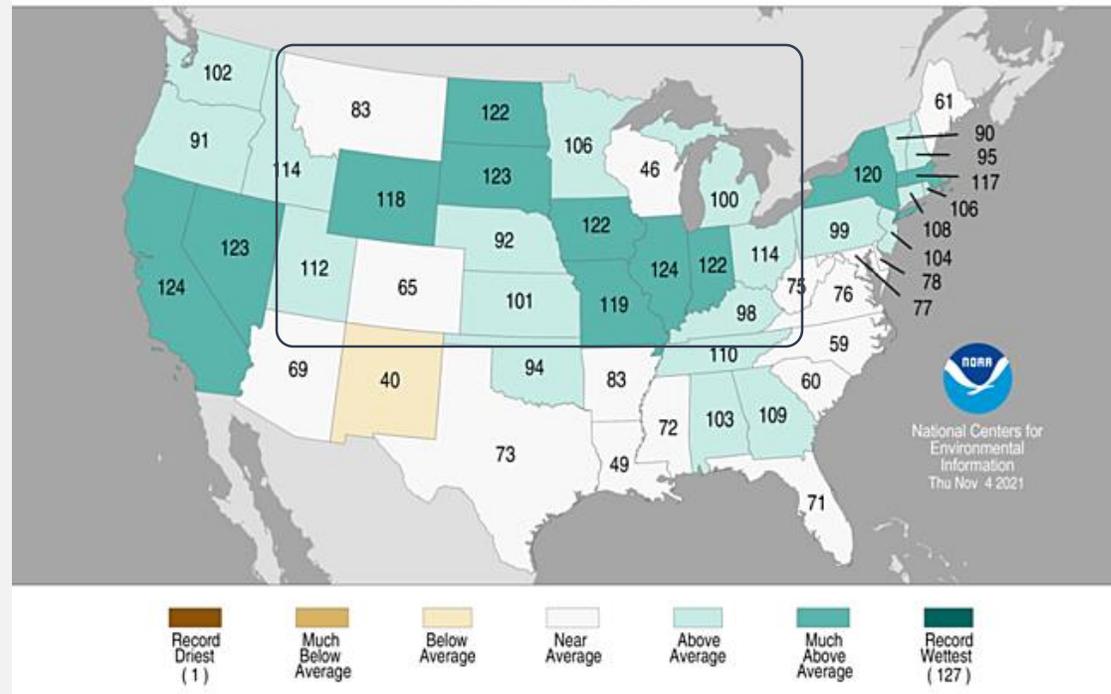
- Intensification of  
these same  
trends.



# Recap

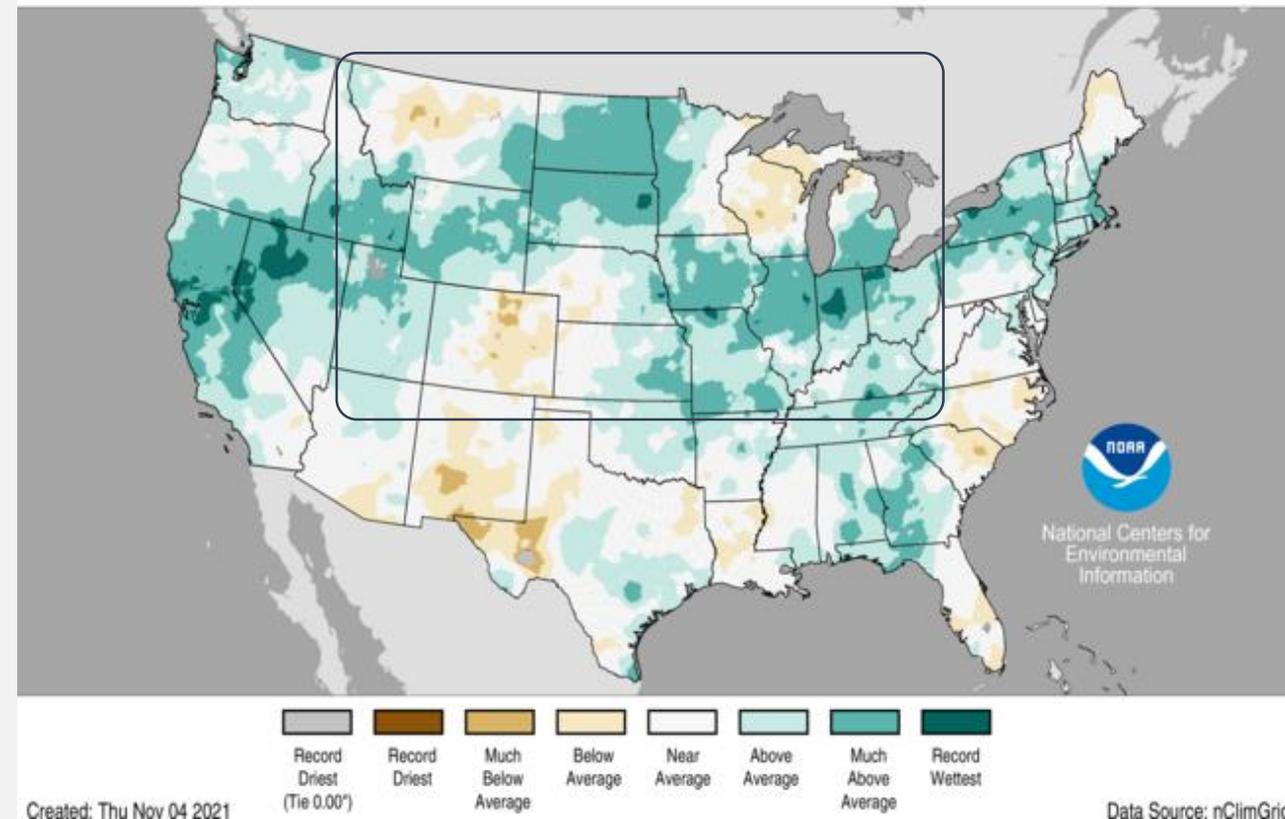
October precipitation | **9<sup>th</sup> wettest nationally. Much above average across region. Some areas missed out (MT, WI, CO)**

Statewide Precipitation Ranks  
October 2021  
Period: 1895–2021



Source: <https://ncdc.noaa.gov/temp-and-precip/us-maps/>

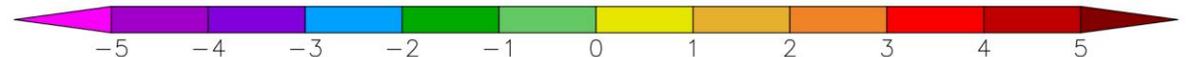
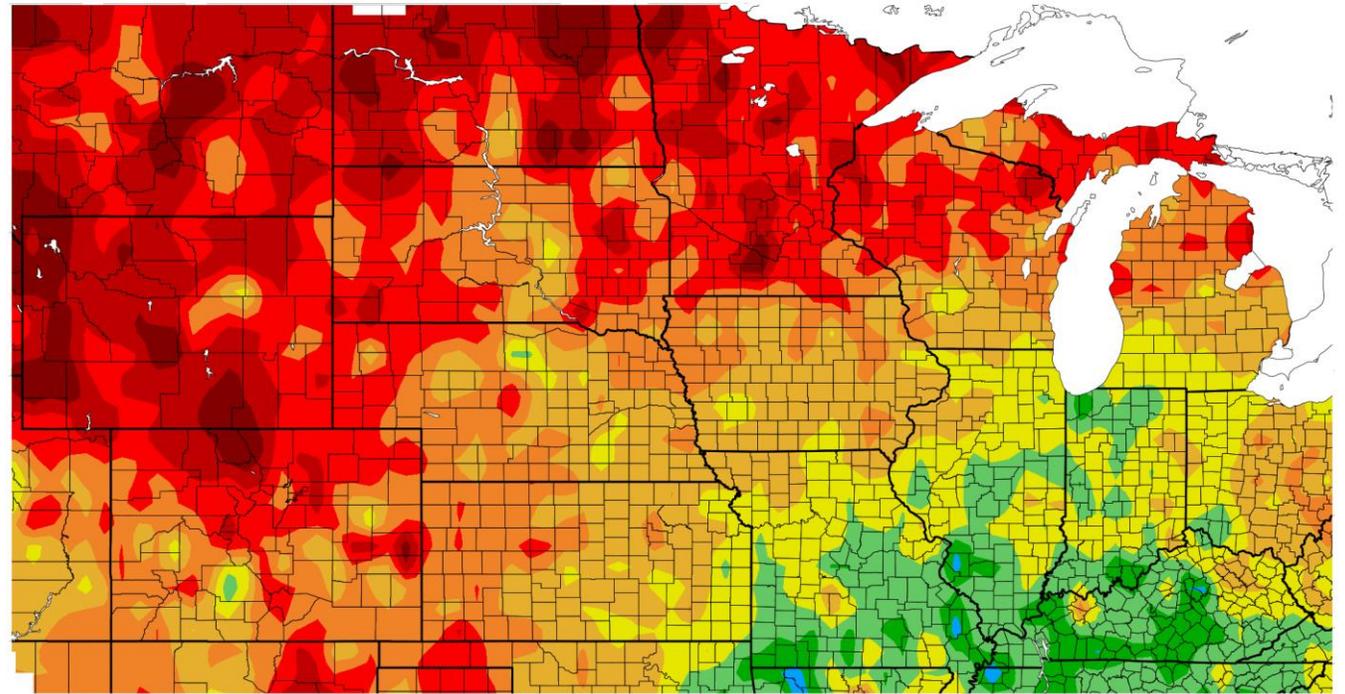
Total Precipitation Percentiles  
October 2021  
Ranking Period: 1895–2021



# Recent conditions

- 30 day temperatures |
- Above to much above normal temperatures in northern/western two-thirds of region.
  - Cooler conditions in the southeast.

Departure from Normal Temperature (F)  
10/16/2021 – 11/14/2021

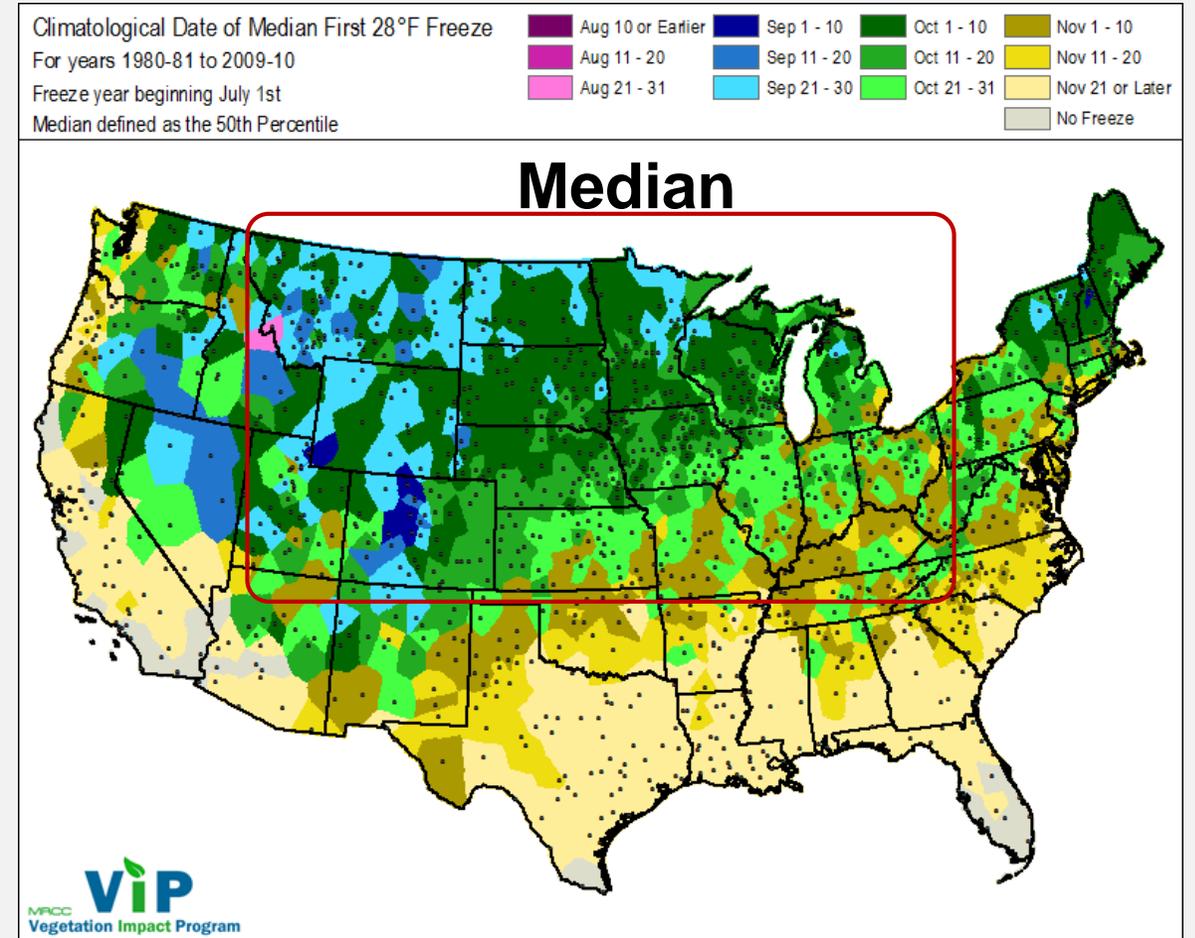
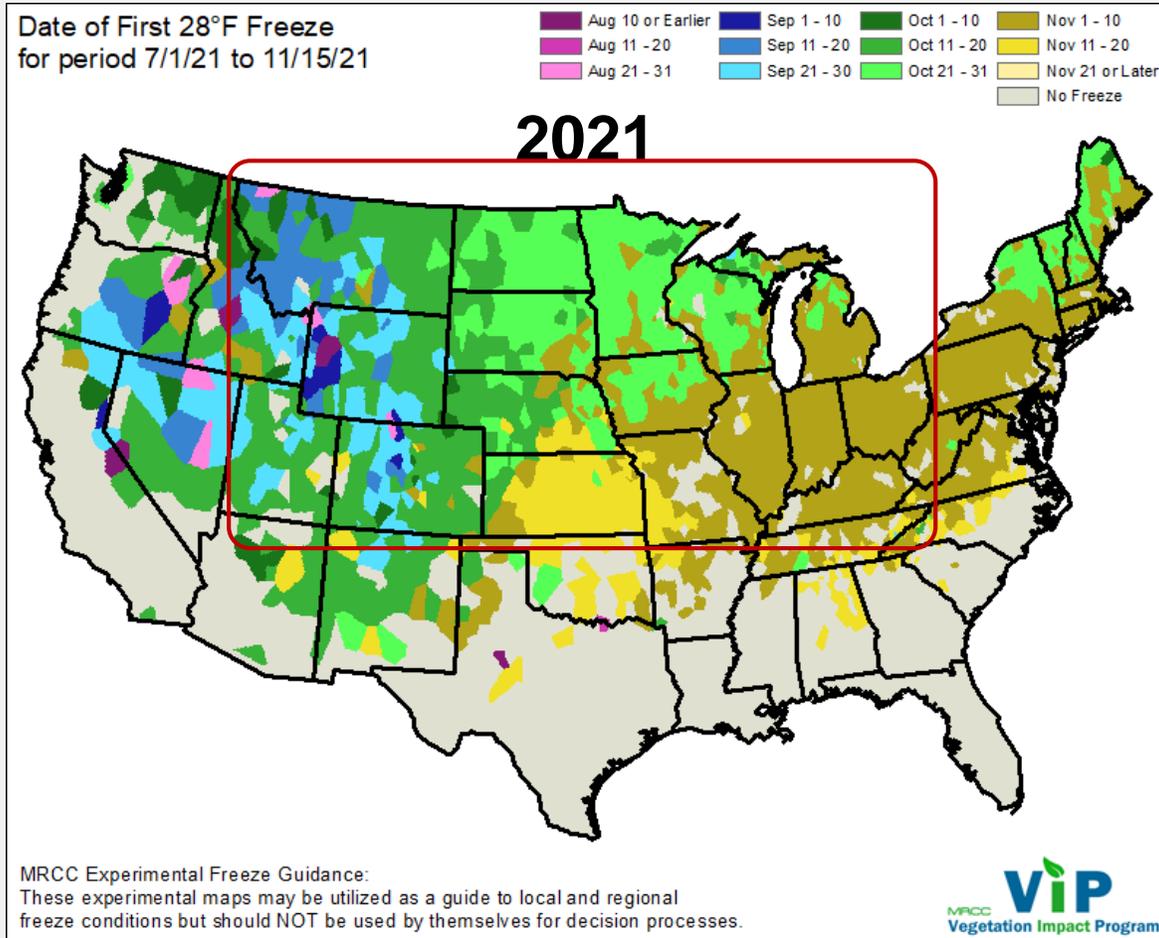


Generated 11/15/2021 at HPRCC using provisional data.

NOAA Regional Climate Centers

# Recent conditions

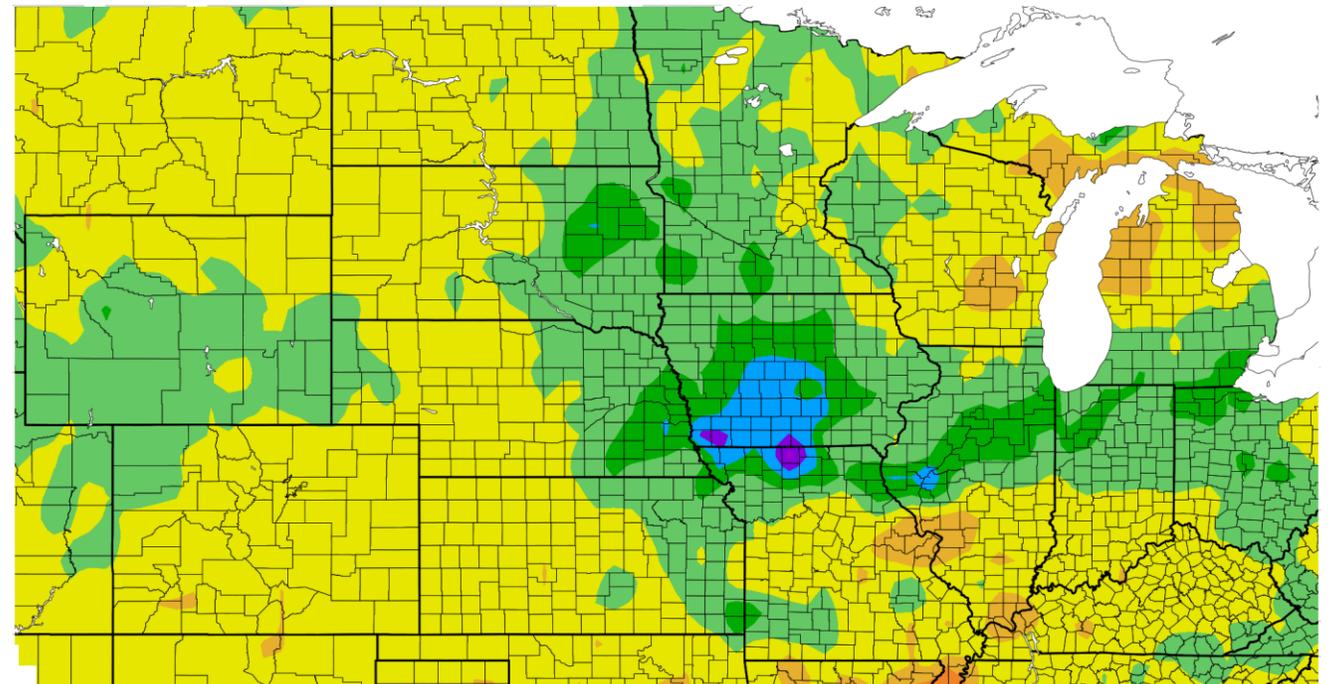
First freeze (28°F) | Later than average by 1 – 4 weeks.



# Recent conditions

- 30 day precipitation |
- Localized areas of heavy precipitation
- Notable dryness in portions of the west

Departure from Normal Precipitation (in)  
10/16/2021 – 11/14/2021



Generated 11/15/2021 at HPRCC using provisional data.

NOAA Regional Climate Centers

# Current drought (USDM)

## Drought

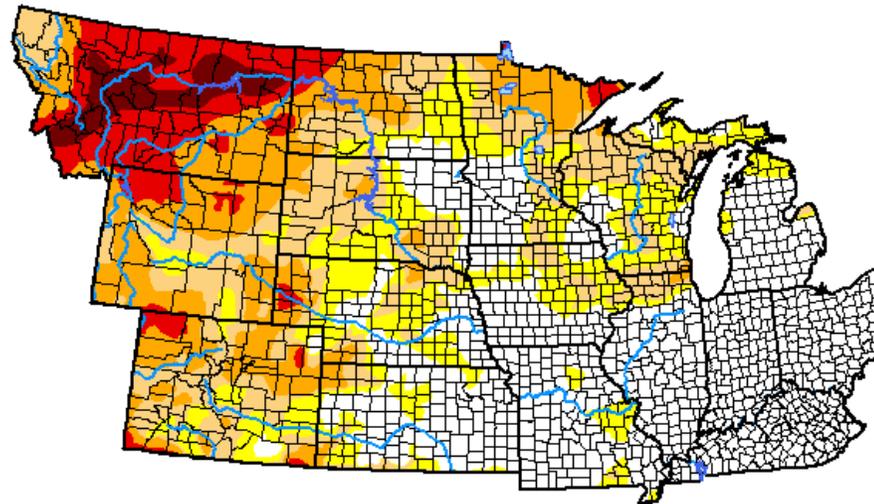
- NW to SE gradient: worst conditions to no drought.
- 46% D1 – D4.
- 16% abnormally dry.
- Exceptional drought in MT.

## U.S. Drought Monitor NWS Central

**November 16, 2021**  
(Released Thursday, Nov. 18, 2021)  
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	37.58	62.42	46.16	27.16	11.17	2.95
<b>Last Week</b> <i>11-09-2021</i>	36.59	63.41	47.12	27.91	11.77	2.83
<b>3 Months Ago</b> <i>08-17-2021</i>	36.03	63.97	51.34	40.21	24.38	3.89
<b>Start of Calendar Year</b> <i>12-29-2020</i>	30.52	69.48	46.07	24.23	12.18	2.52
<b>Start of Water Year</b> <i>09-28-2021</i>	31.08	68.92	50.85	37.30	18.35	3.17
<b>One Year Ago</b> <i>11-17-2020</i>	34.86	65.14	41.95	22.93	10.20	2.48



### Intensity:

None	D2 Severe Drought
D0 Abnormally Dry	D3 Extreme Drought
D1 Moderate Drought	D4 Exceptional Drought

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

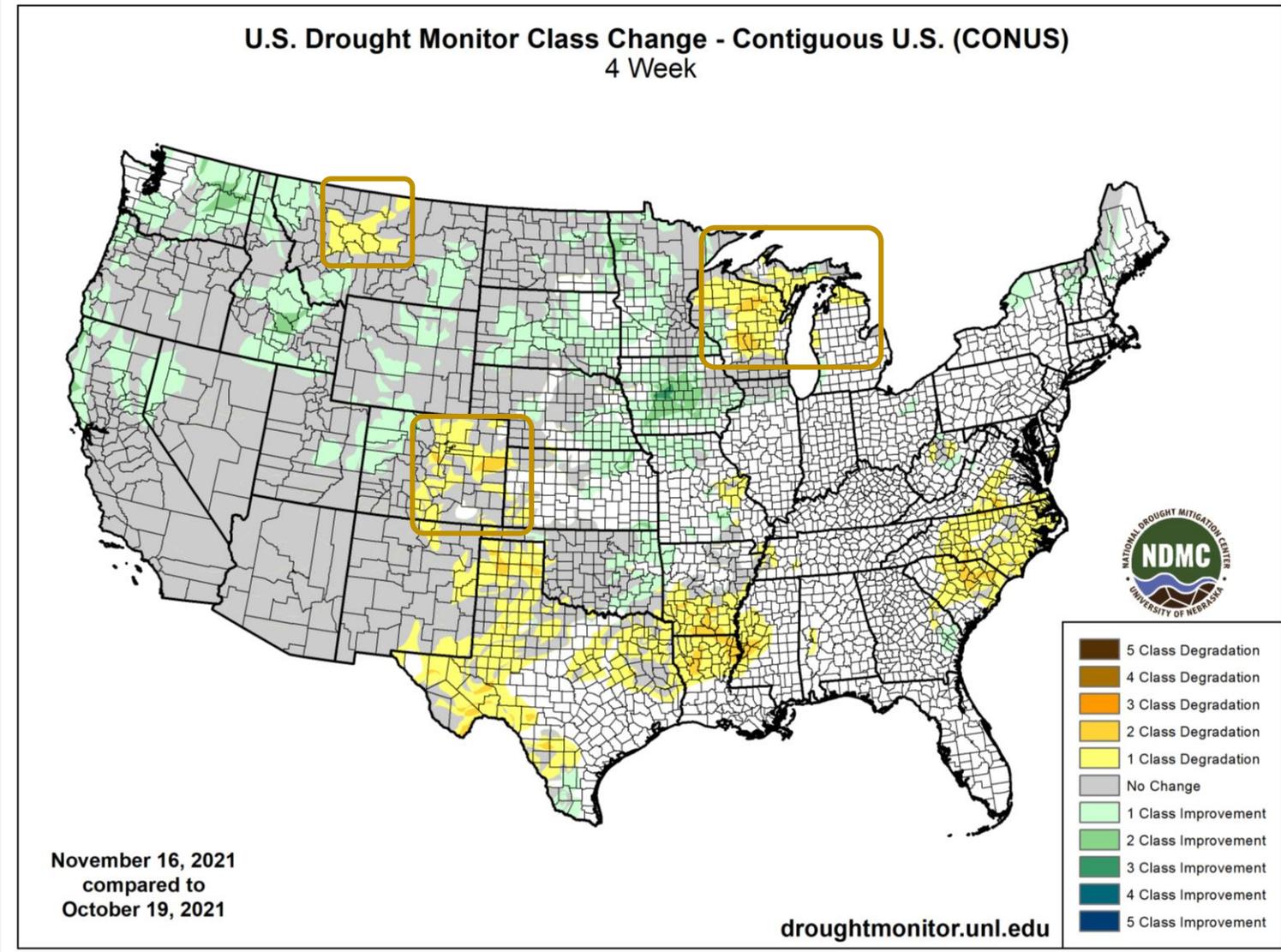
### Author:

Curtis Riganti  
National Drought Mitigation Center

Source: <https://droughtmonitor.unl.edu/maps/>

# Recent drought changes

- Intensification for WI, Upper MI, MT, CO.
- Continued improvements for central portion of the region, some areas of west.

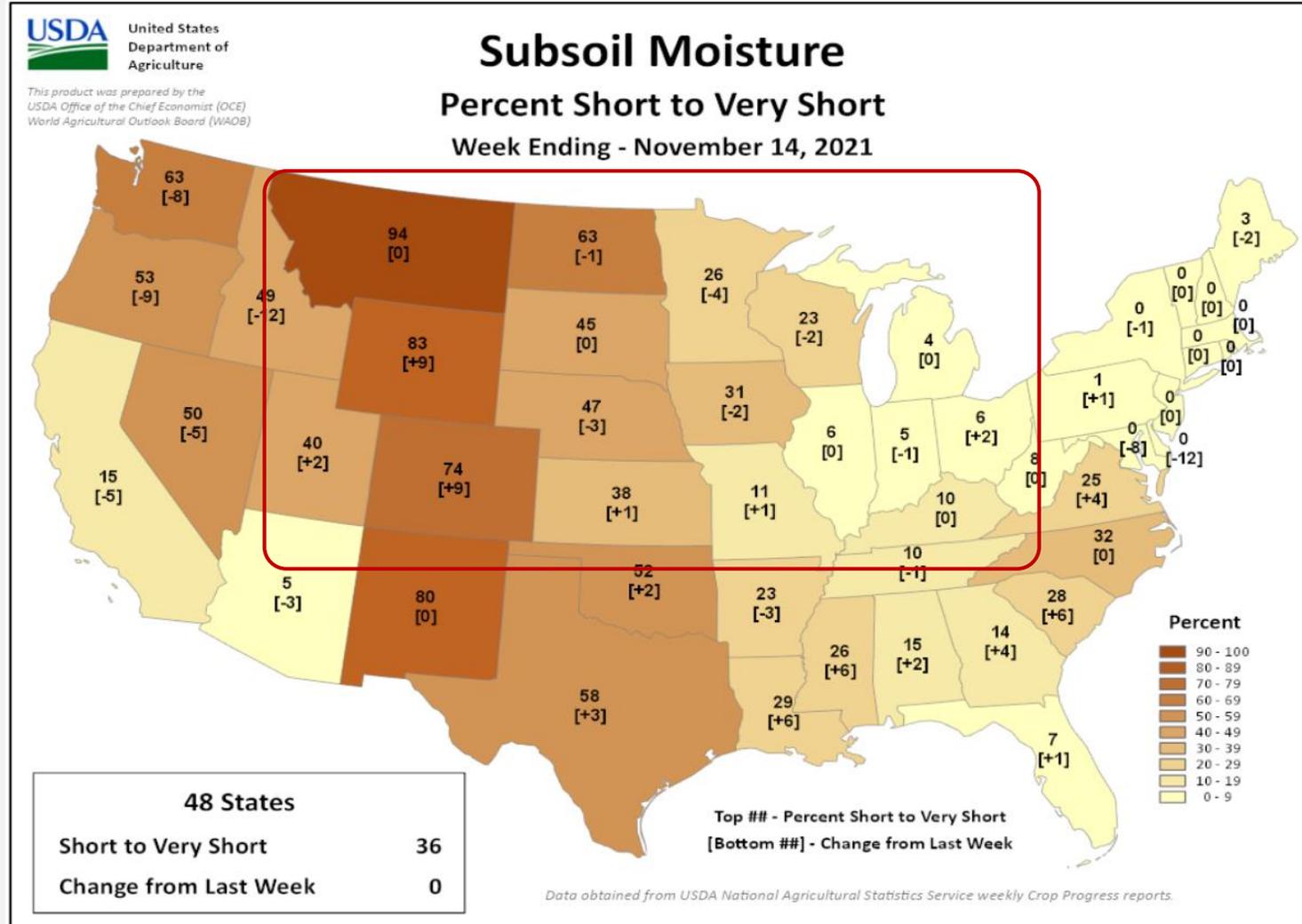


# Soils

Soil moisture |

- **Subsoil conditions generally dry in central and west.**

- **Topsoil (6") moisture generally slightly better condition.**



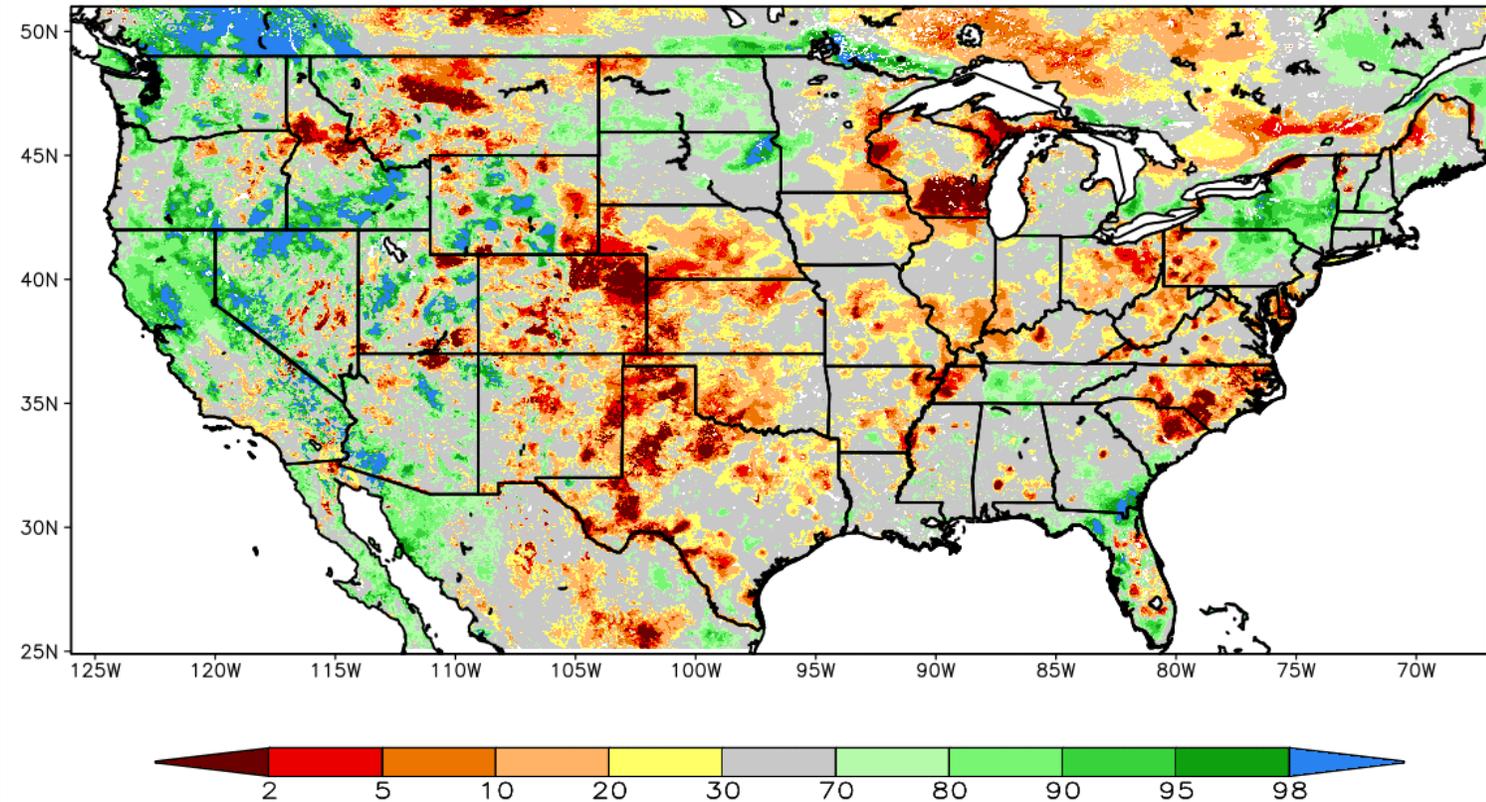
Thank you to Brad Rippey and USDA-OCE

<https://www.usda.library.cornell.edu/concern/publications/cj82k728n?locale=en>

# Soils

Soil moisture |  
- Modeled data reflects  
recent and long-term  
precipitation patterns.

SPoRT-LIS 0-100 cm Soil Moisture percentile valid 18 Nov 2021

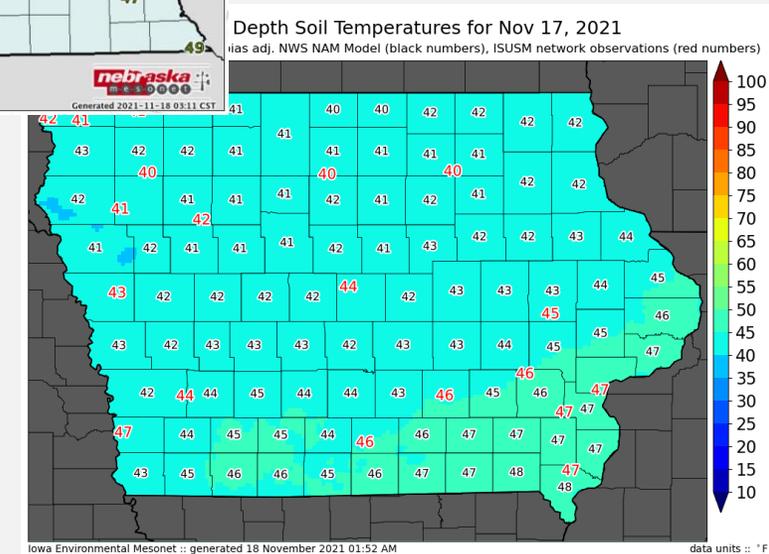
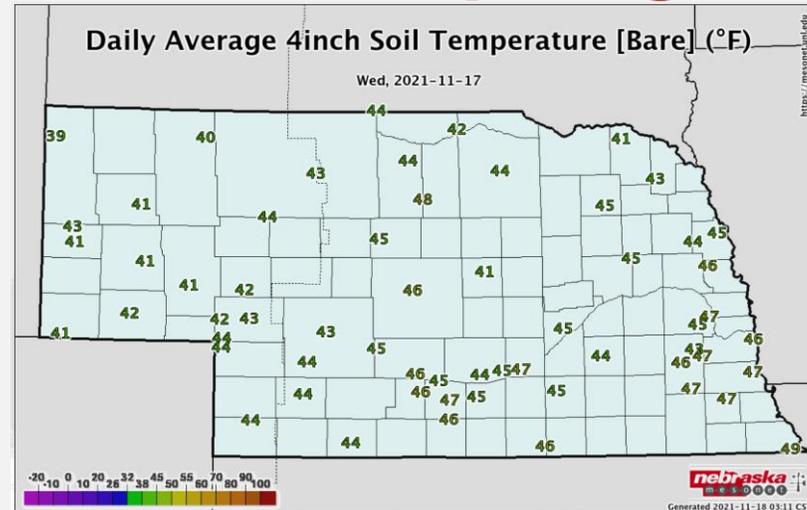
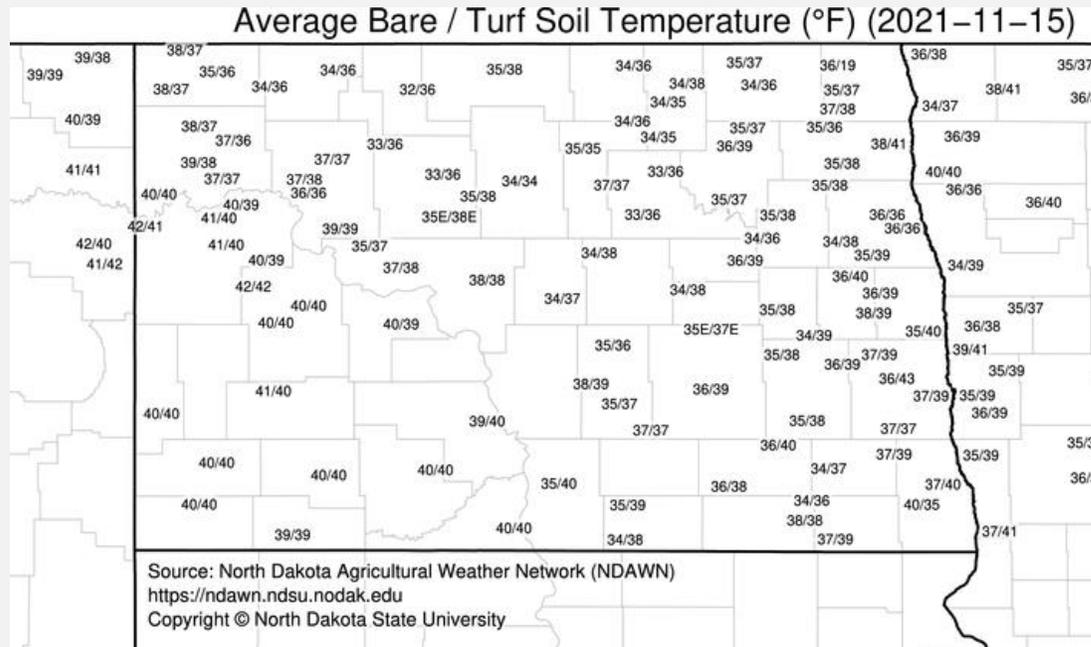


\*\*NOTE\*\*  
\*\*Experimental\*\*

[https://weather.msfc.nasa.gov/cgi-bin/basicLooper.pl?category=lis\\_CONUS&initialize=first&regex=vsm0-100percent\\_20211118](https://weather.msfc.nasa.gov/cgi-bin/basicLooper.pl?category=lis_CONUS&initialize=first&regex=vsm0-100percent_20211118)

# Soils

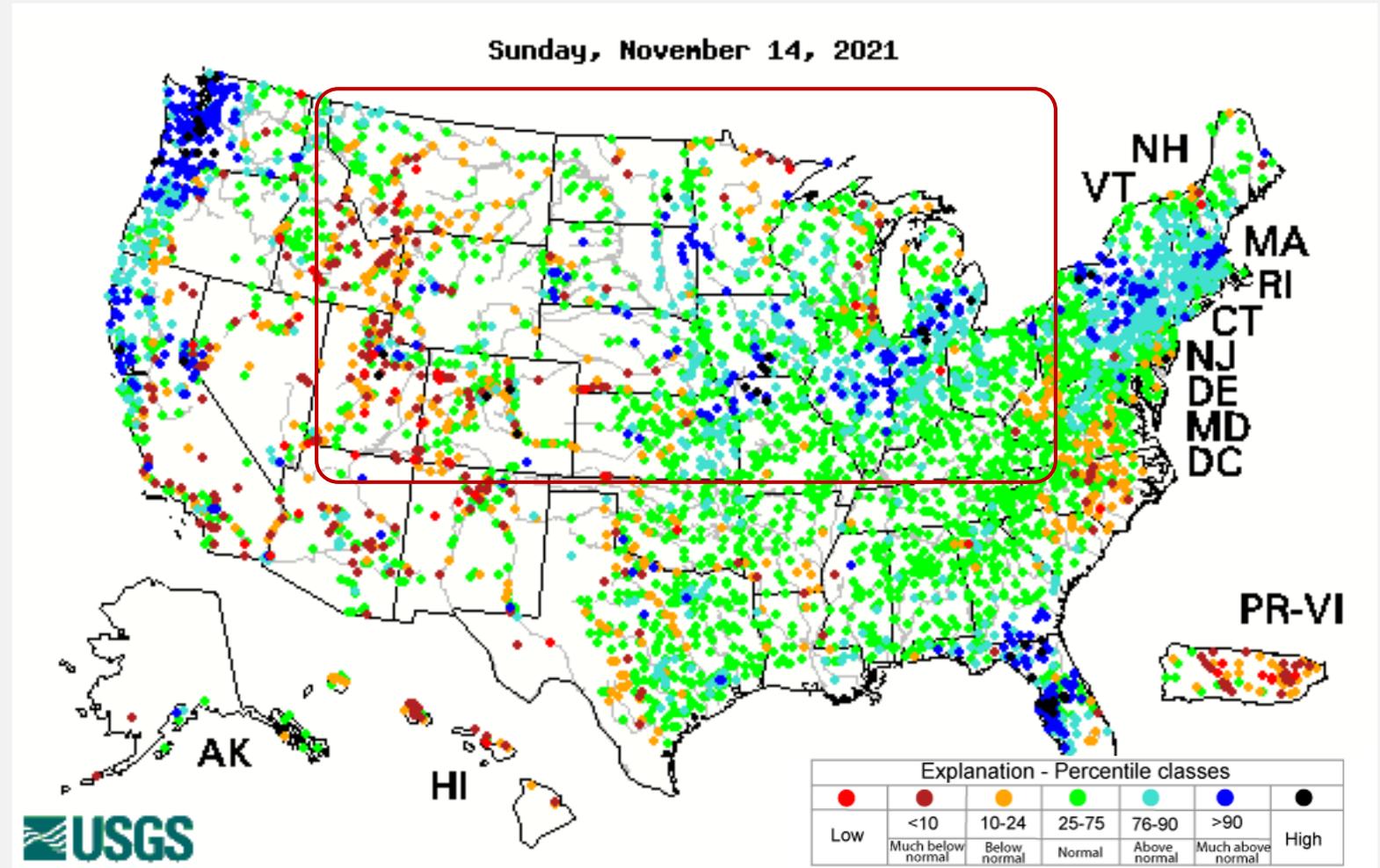
Soil temperatures | **Still above freezing across region.**  
**Precipitation will be beneficial to help augment soil profile in dry areas.**



# Hydrology

## River flows |

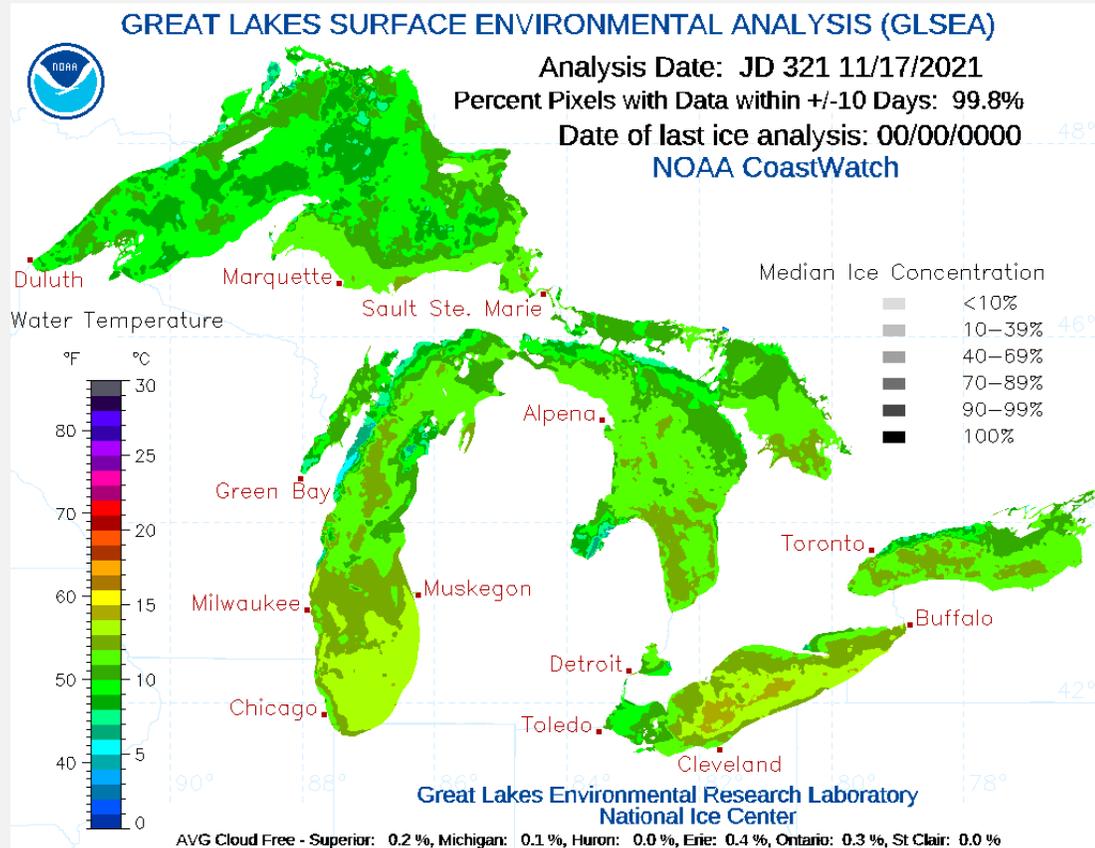
- Much of region in normal or higher category.
- Dryness evident in the west and north.
- Recent rain filling soil profile.



# Hydrology

## Great Lakes |

- Much warmer than normal. No ice. Levels generally high.



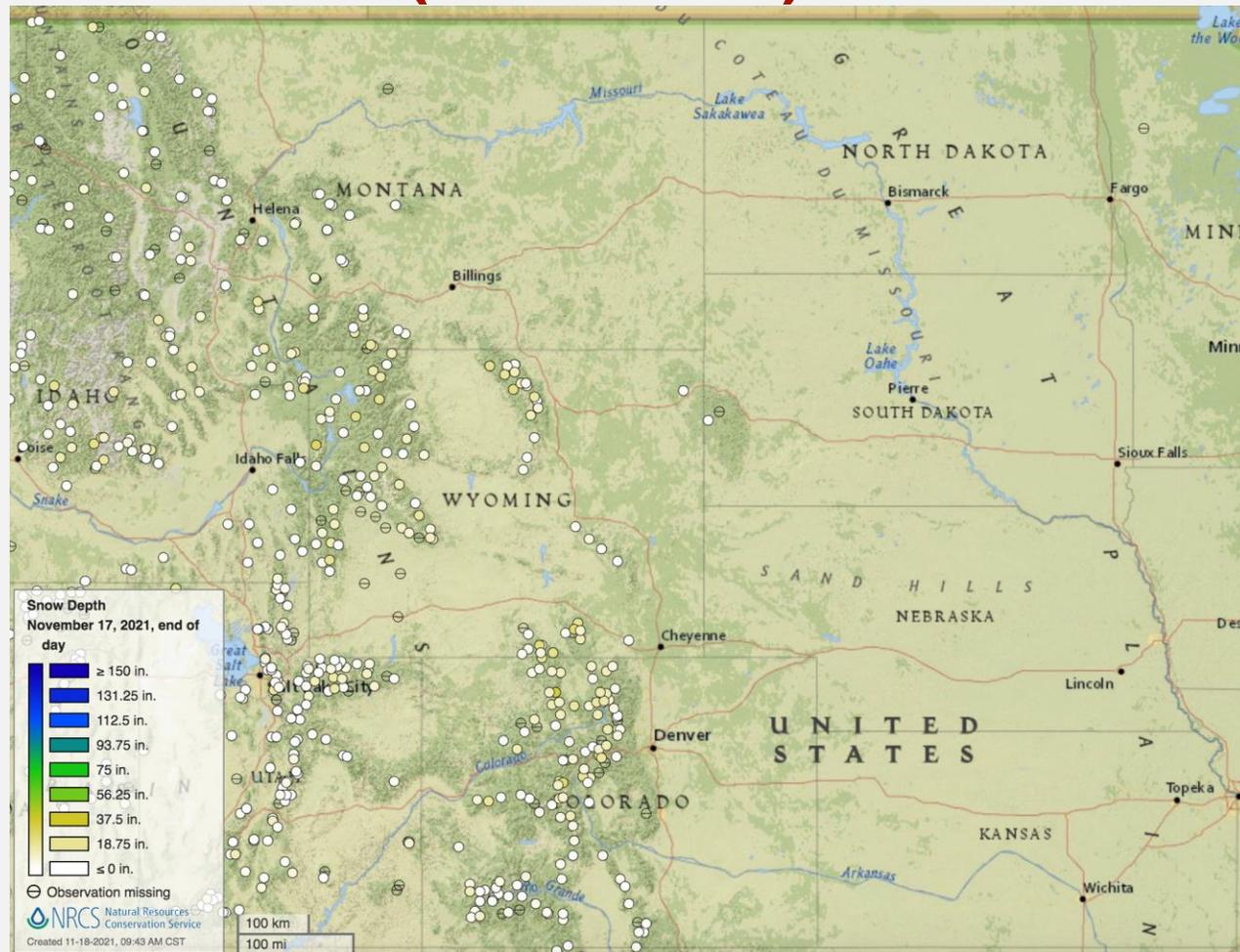
Rain, wind and waves bring flooding to Grand Marais, MN (north shore of Lake Superior).



<https://bringmethenews.com/minnesota-lifestyle/gales-of-november-giant-waves-on-lake-superior-floods-grand-marais>

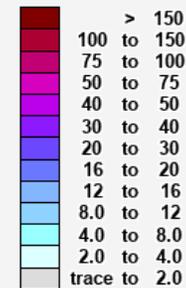
# Snow

- Confined to high elevation locations (0 - 20 inches) and Upper Midwest (< 8 inches).



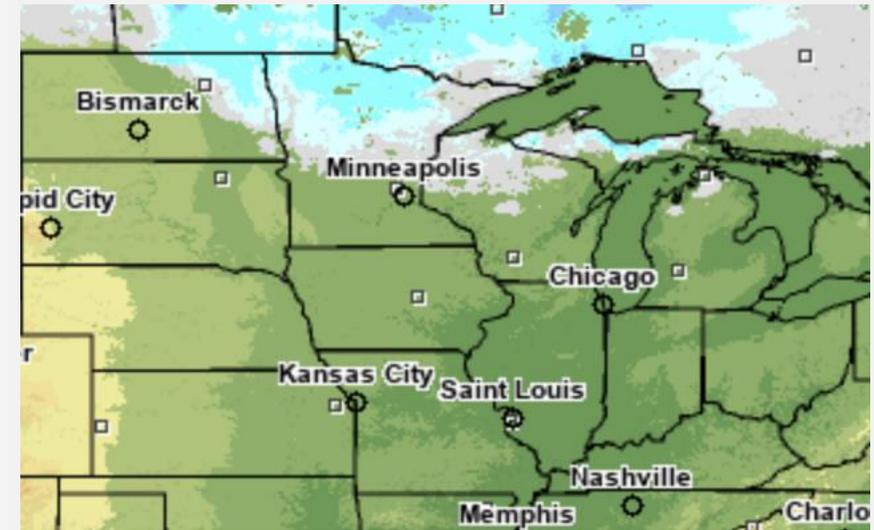
## November 18<sup>th</sup> Snow Depth

### Inches of depth



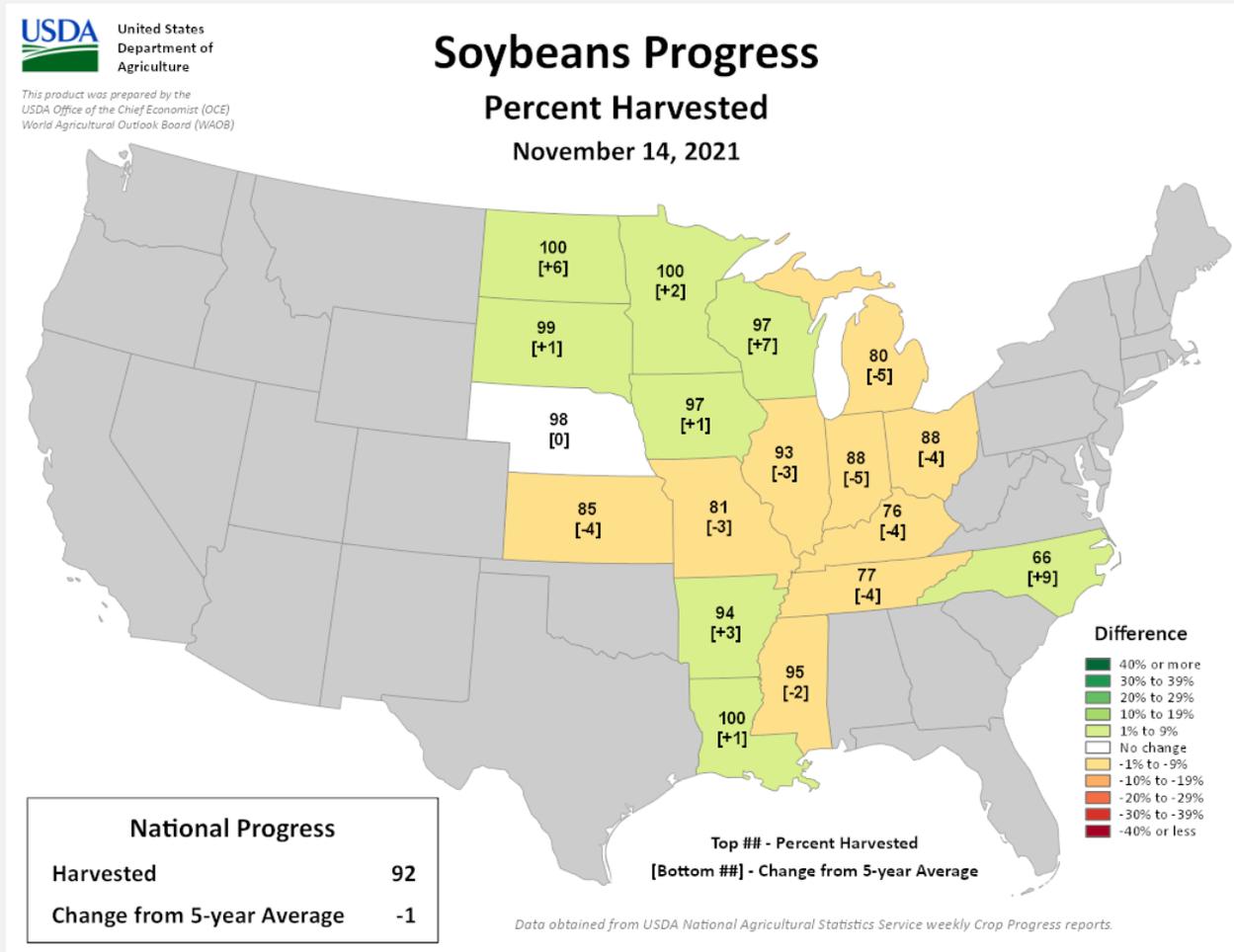
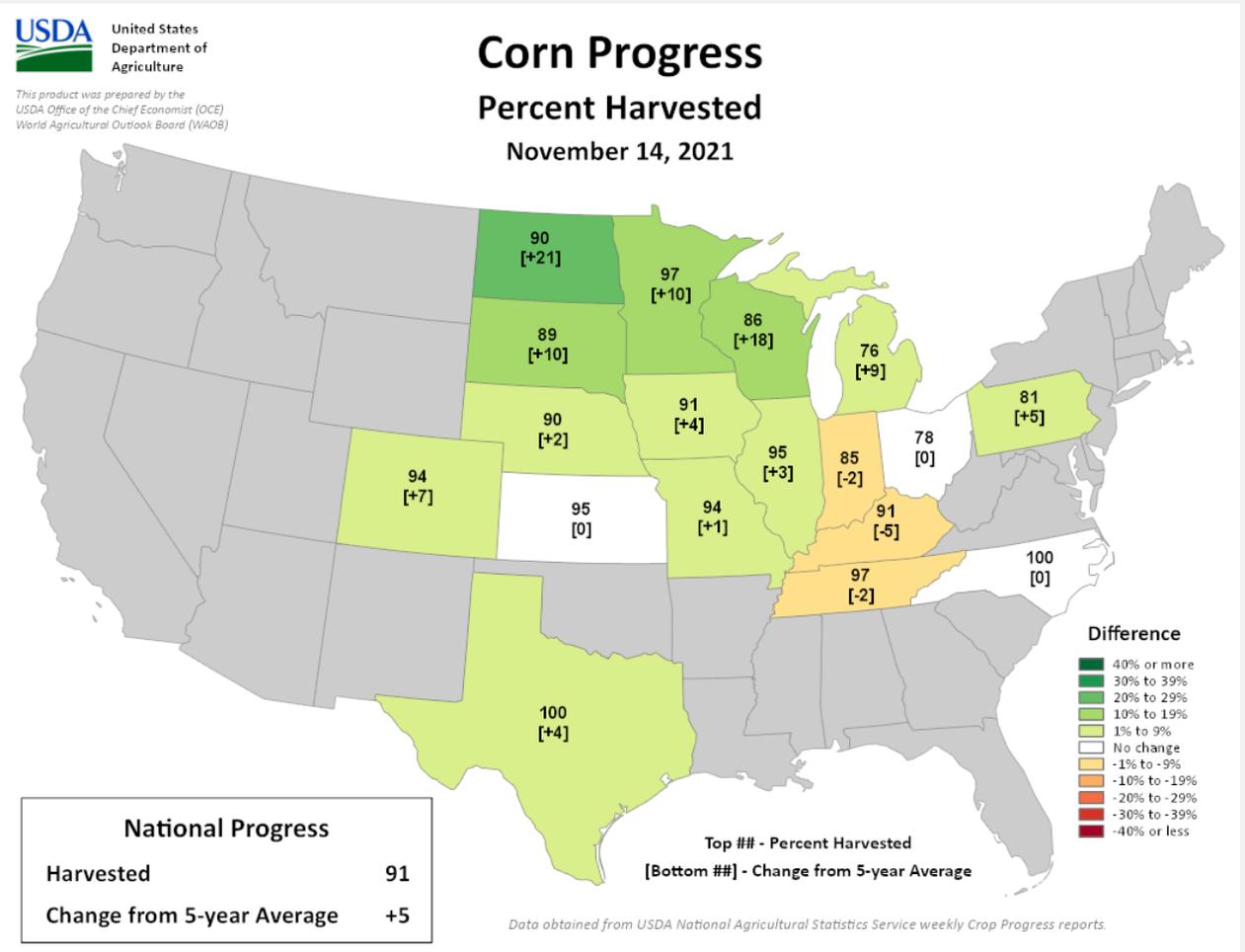
□ Not Estimated

### Elevation in feet



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

# Agriculture - harvest





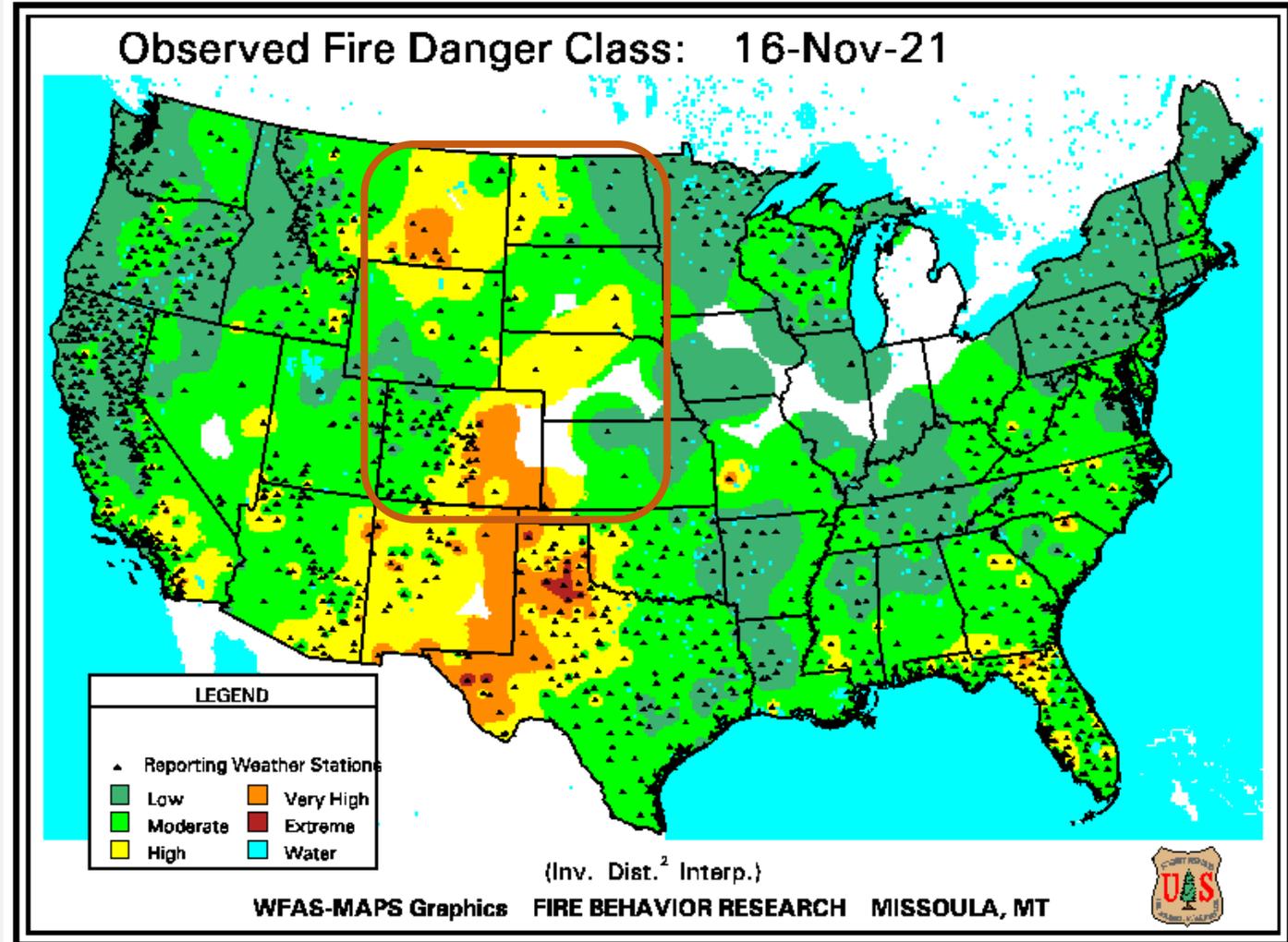


# Wildfire

- **Dry conditions, low humidity, gusty winds have fueled wildfires recently.**



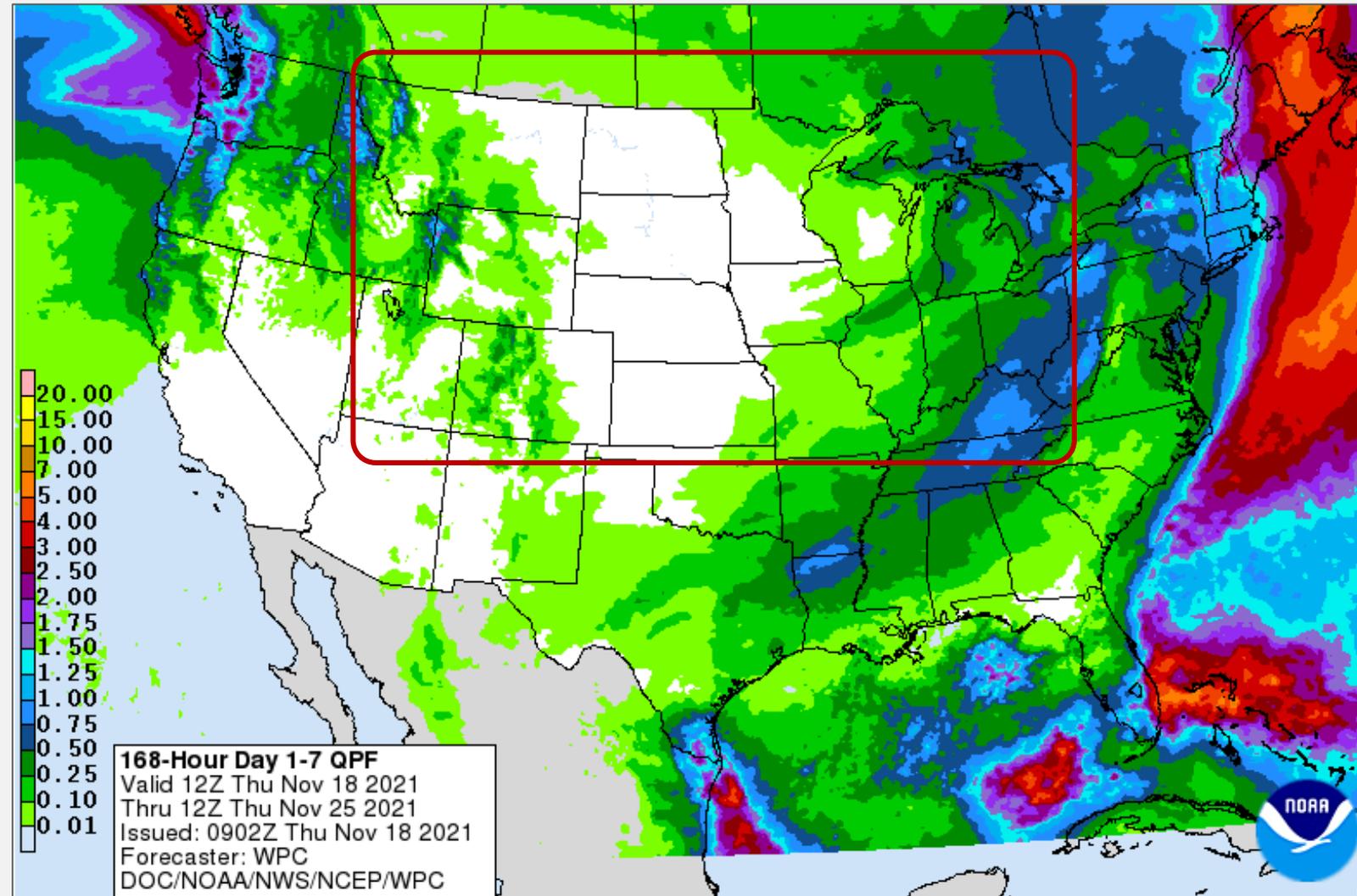
Buffalo Creek fire, Nebraska Panhandle, 11/15/21  
Image courtesy Gary Stone.



# Precipitation outlook (Nov18-25)

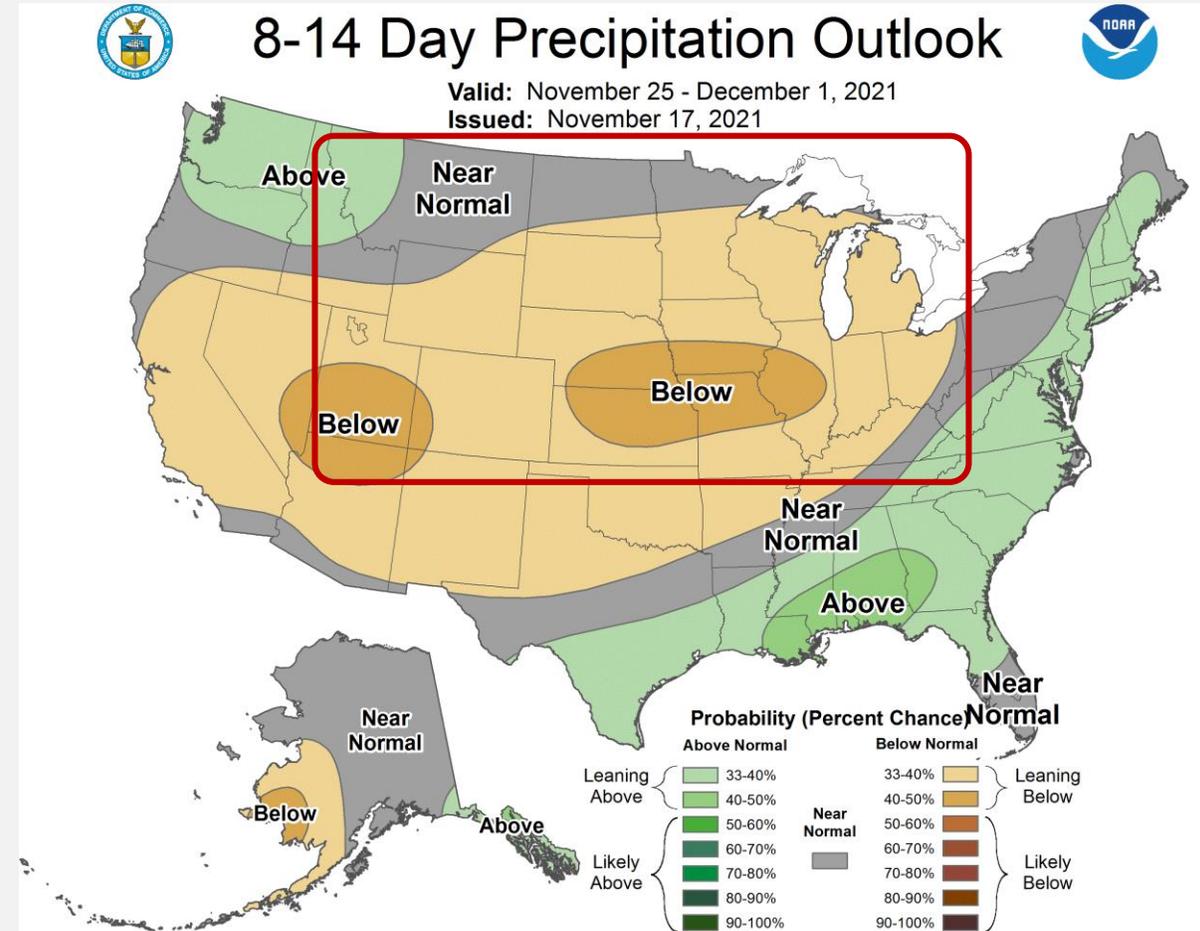
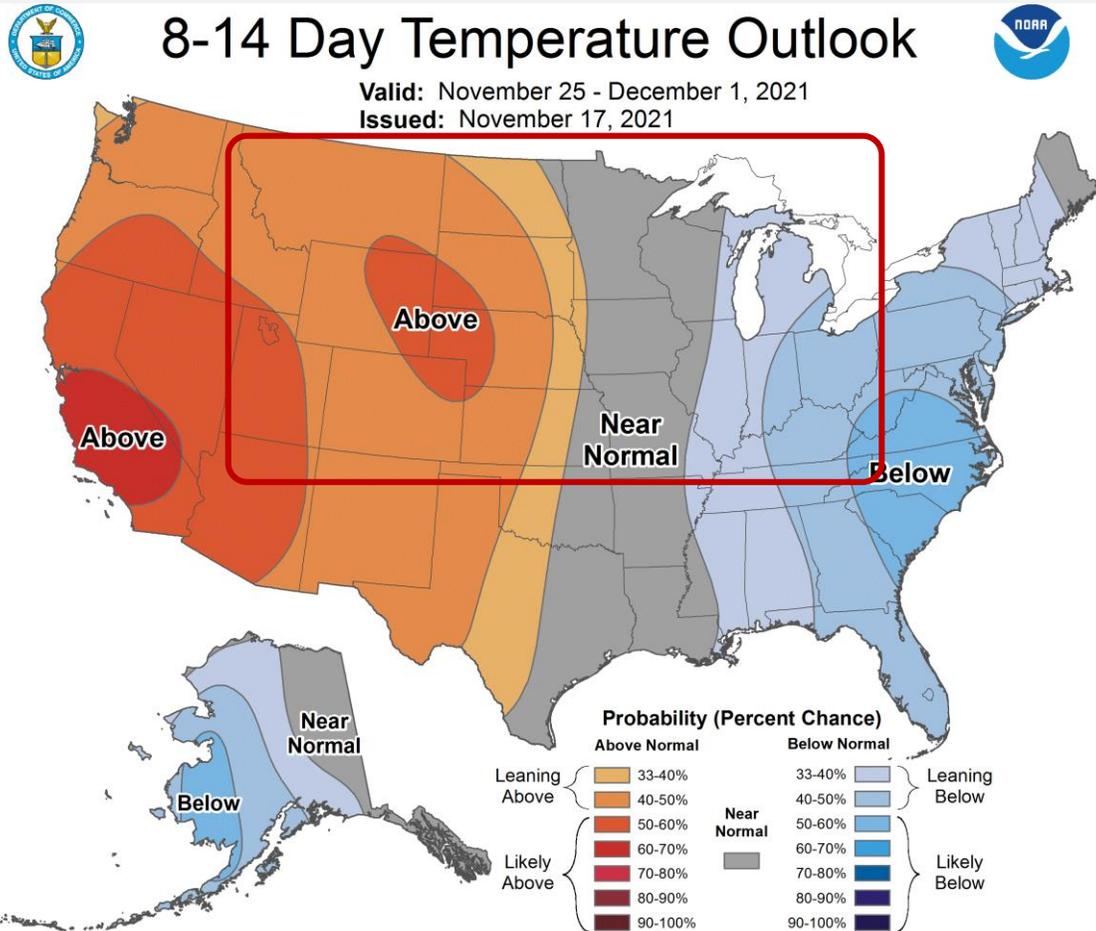
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- Eastern portions of the region and isolated areas in the west will see the greatest amounts.
- Otherwise, dry in the central.



# Short-term outlook (Nov25 – Dec1) NEBRASKA STATE CLIMATE OFFICE

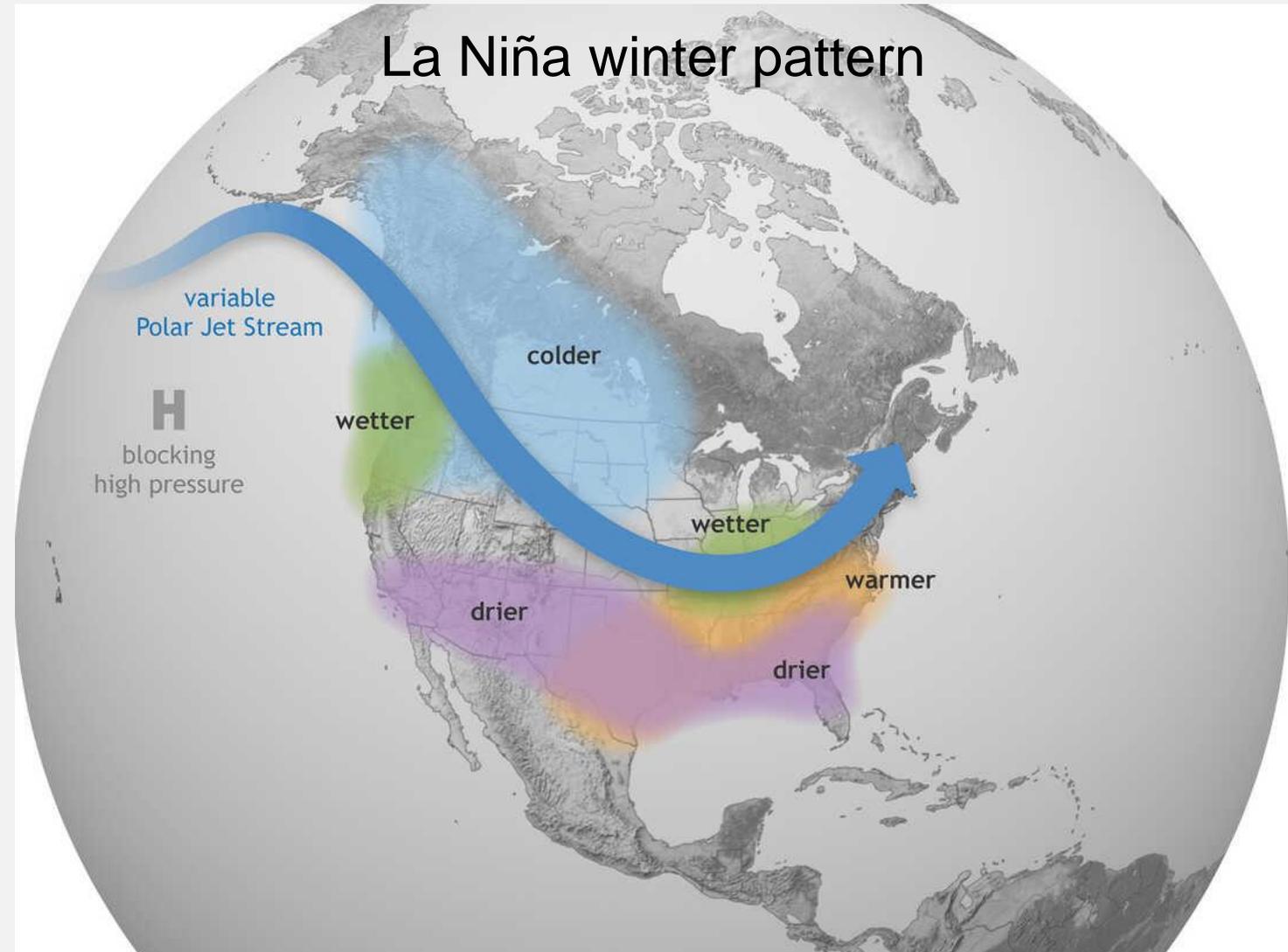
- Odds tilted to warmth in west, cold in the east.  
 Dry for much of the region (in a dry time of year).



# ENSO status

## La Niña

- **Currently in a La Niña status (advisory).**
- **Moderate La Niña by mid-winter.**
- **Shift to neutral is most likely scenario by late spring.**



# December outlook

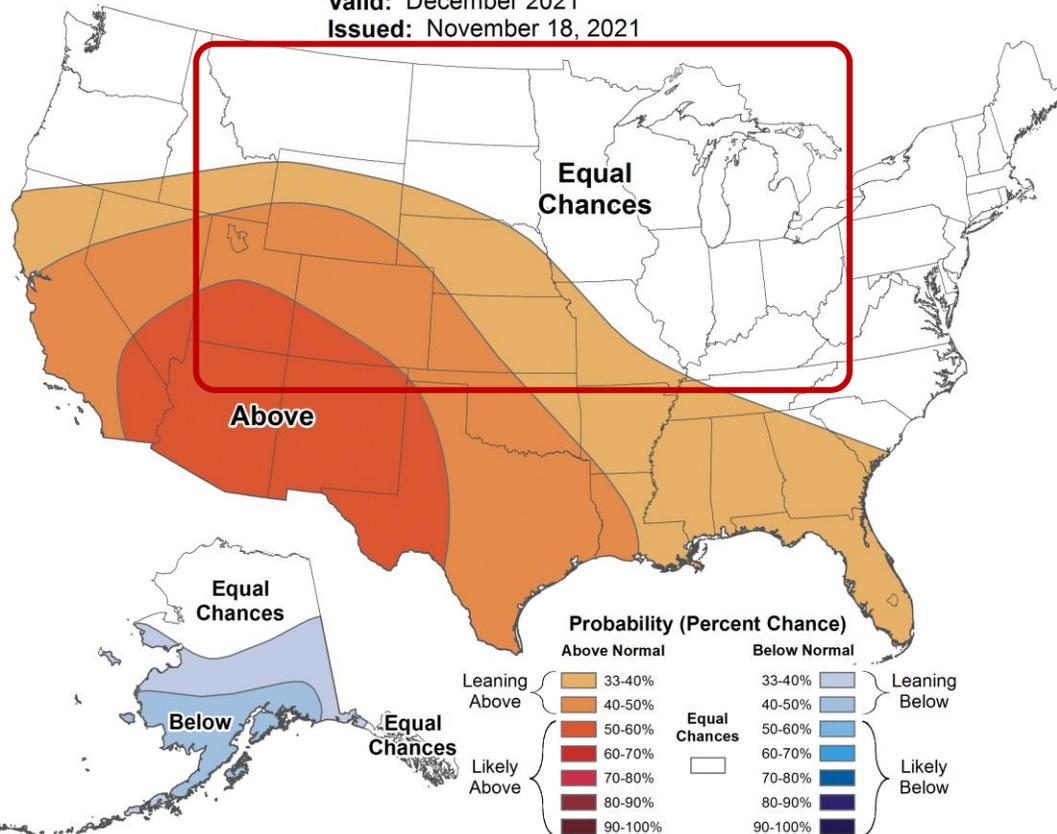
- La Niña type of pattern. Temperatures leaning above normal for southeast portion. Above normal precipitation for NW, Great Lakes.



## Monthly Temperature Outlook



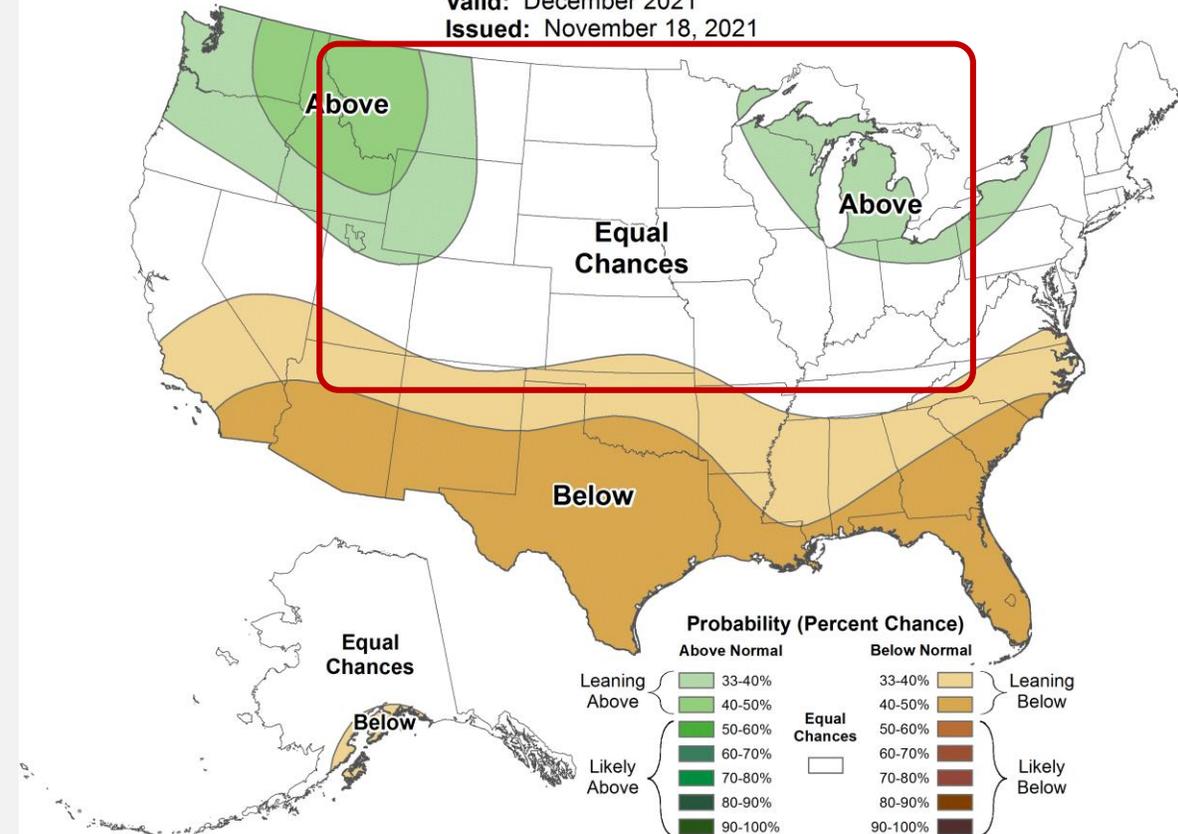
Valid: December 2021  
Issued: November 18, 2021



## Monthly Precipitation Outlook

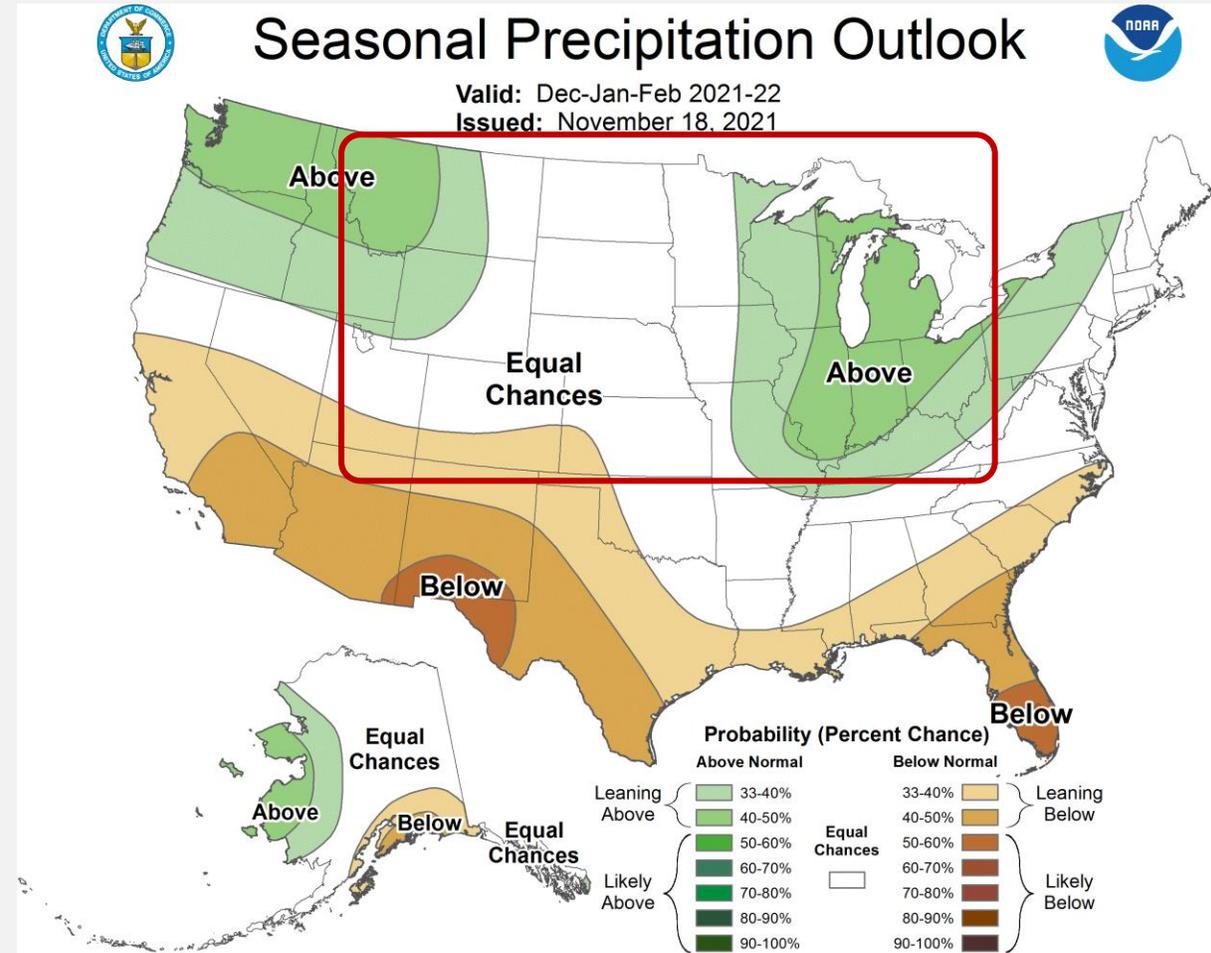
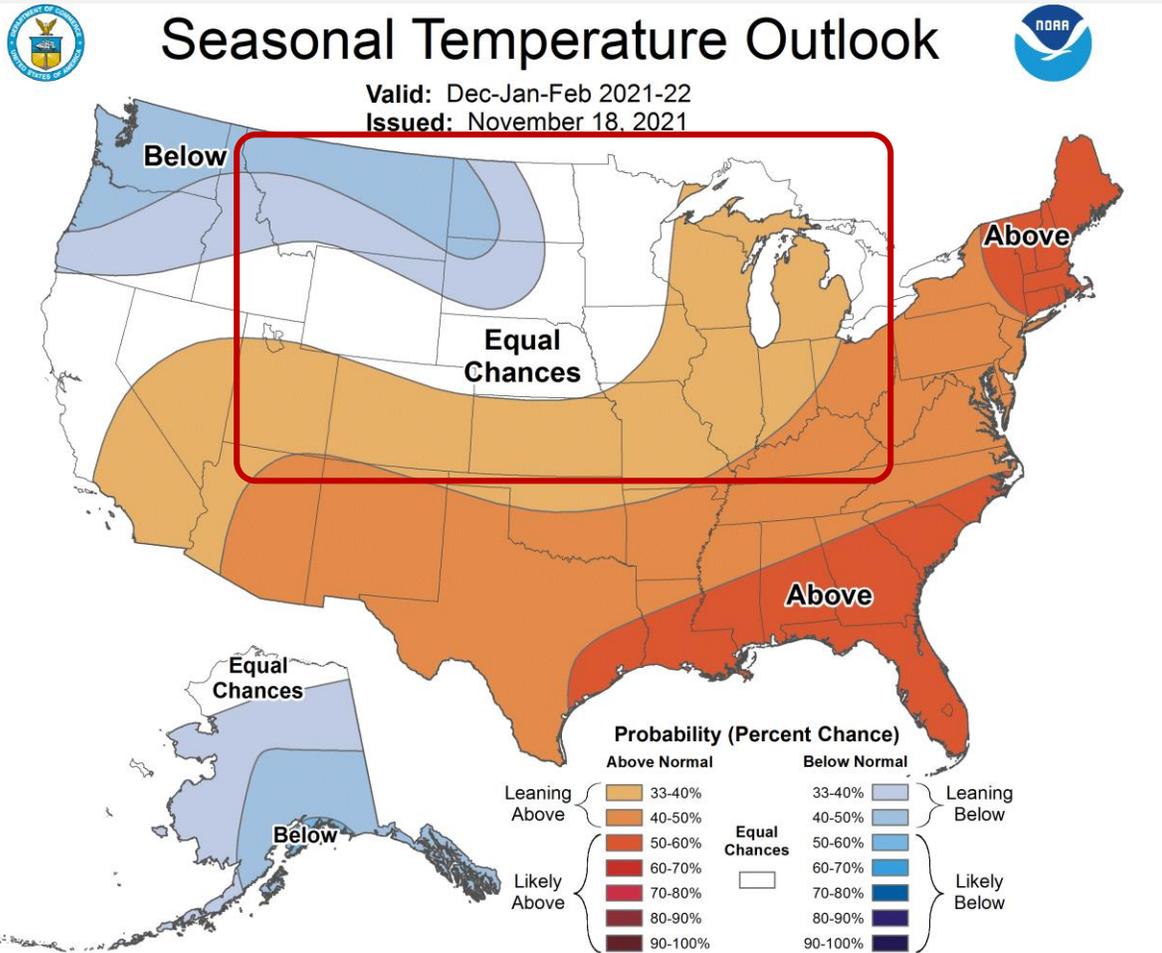


Valid: December 2021  
Issued: November 18, 2021



# Winter outlook (Dec – Feb)

- No two La Niña's are alike, but here's the current thinking.

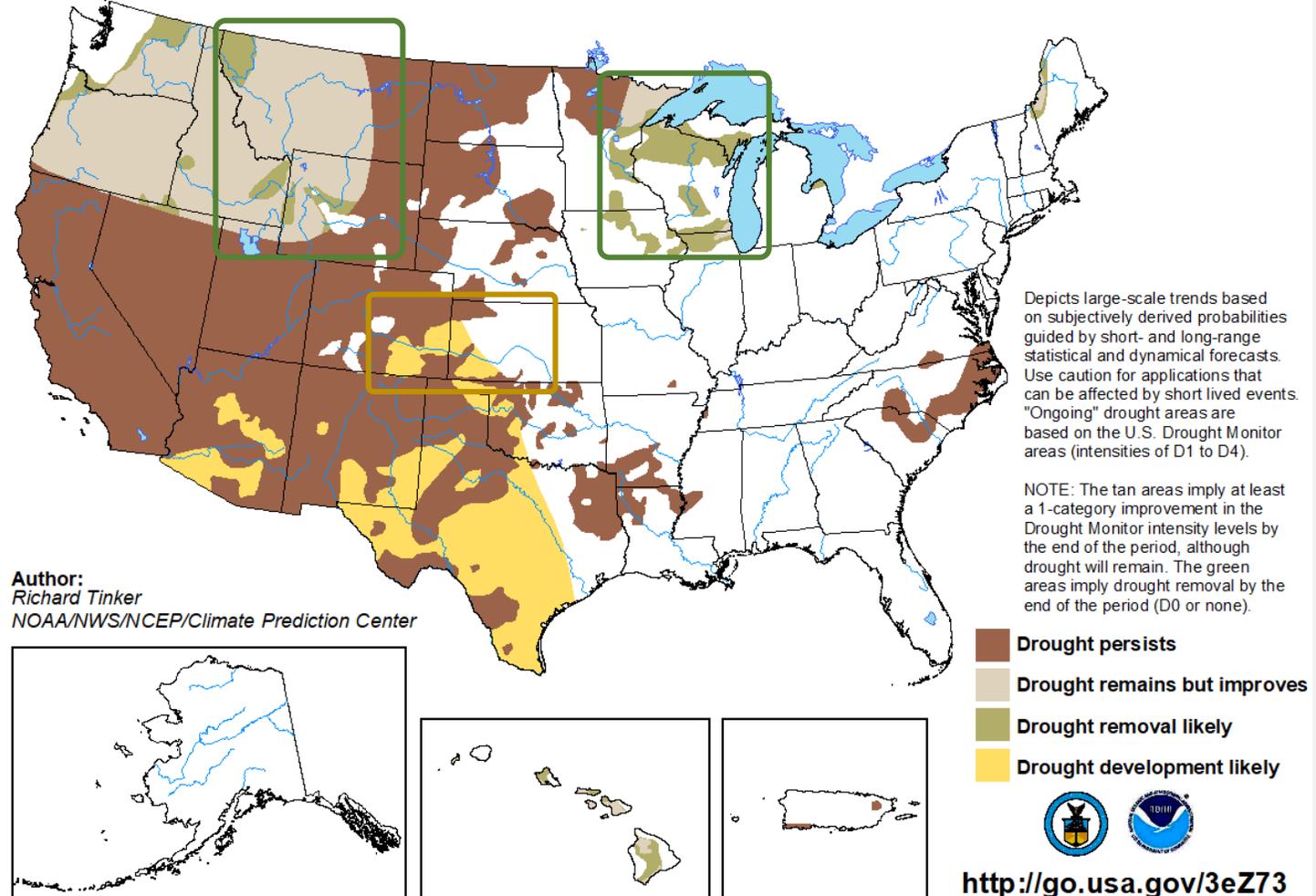


# Drought outlook (Nov – Feb)

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- Two main areas of improvement associated with wet signal.
- Drought development likely around CO and KS border.
- Persistence of current drought elsewhere.

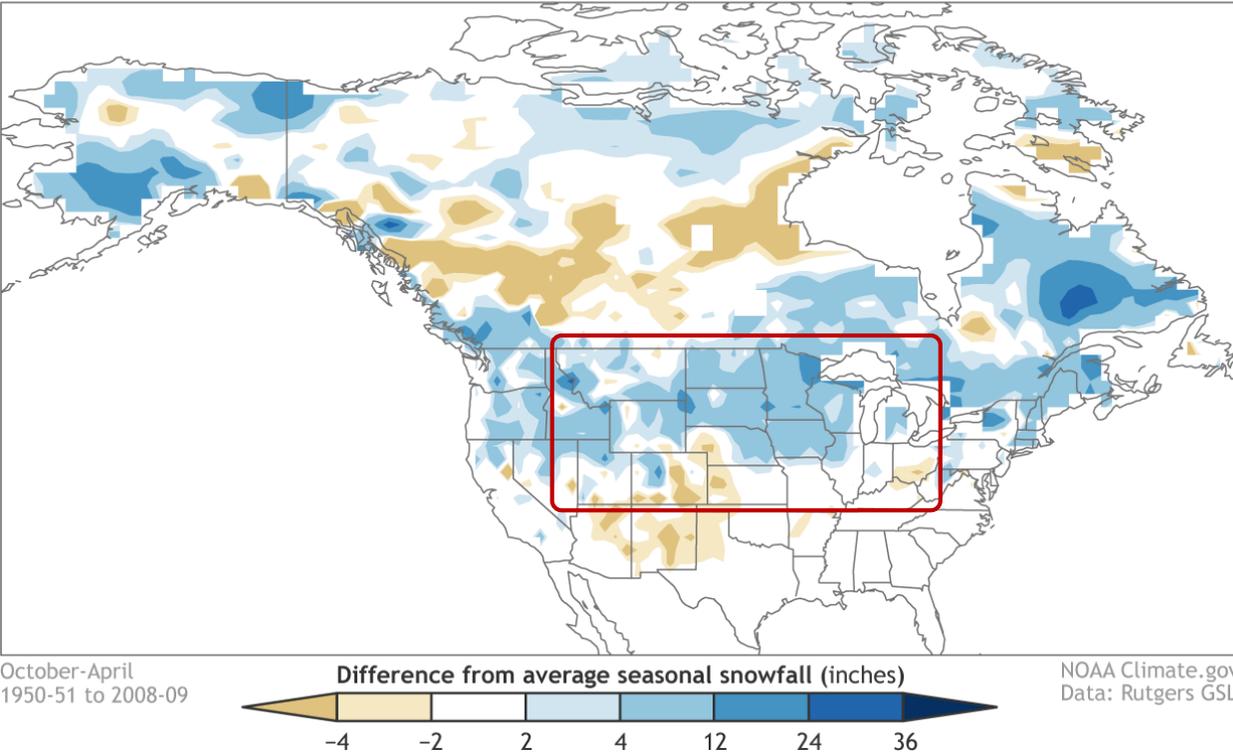
## **U.S. Seasonal Drought Outlook** Valid for November 18, 2021 - February 28, 2022 Drought Tendency During the Valid Period Released November 18, 2021



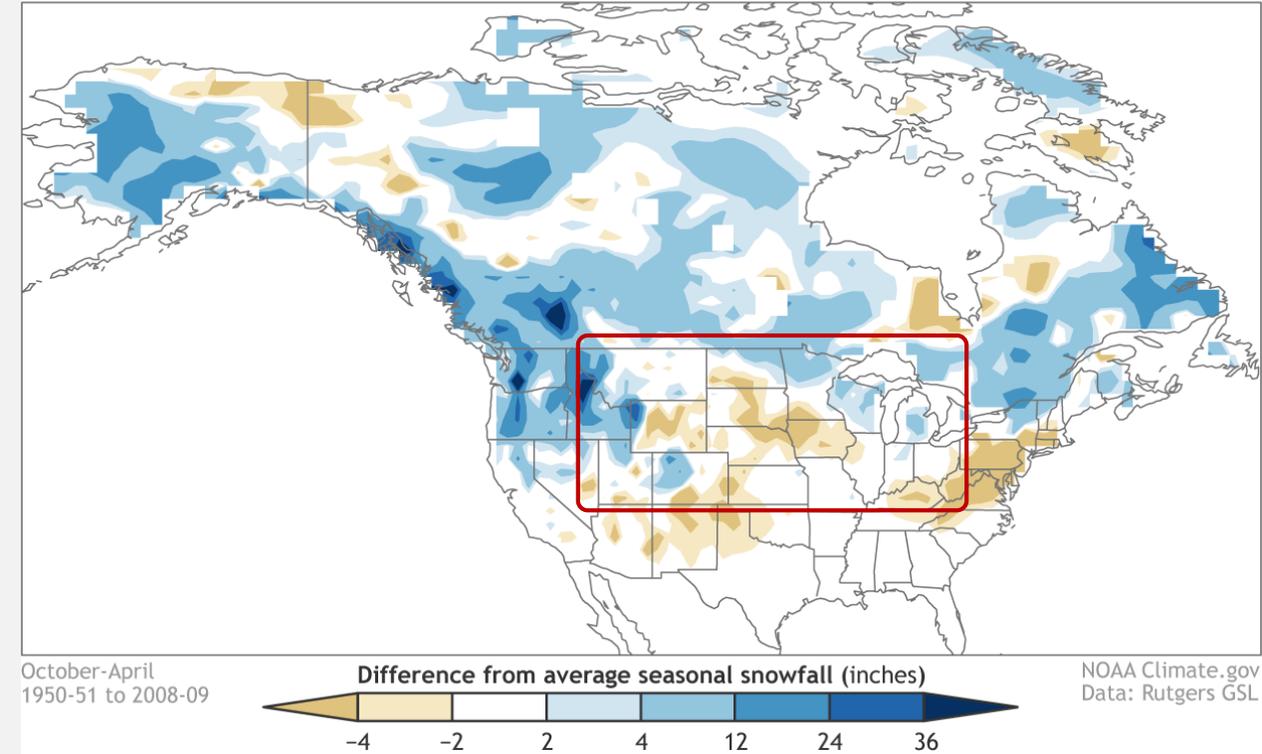
# Snow during La Niña winters

## - Weak vs. Strong La Niña shows a pattern adjustment

Average snowfall patterns for weak La Niña years



Average snowfall patterns for strong La Niña years



# Recent climate tendencies

## Central Region climate trends since 1991

Month	Temperature	Precipitation
December	slightly warmer	wetter
January	warmer	slightly drier
February	colder	wetter

# Jan-Feb-Mar outlook

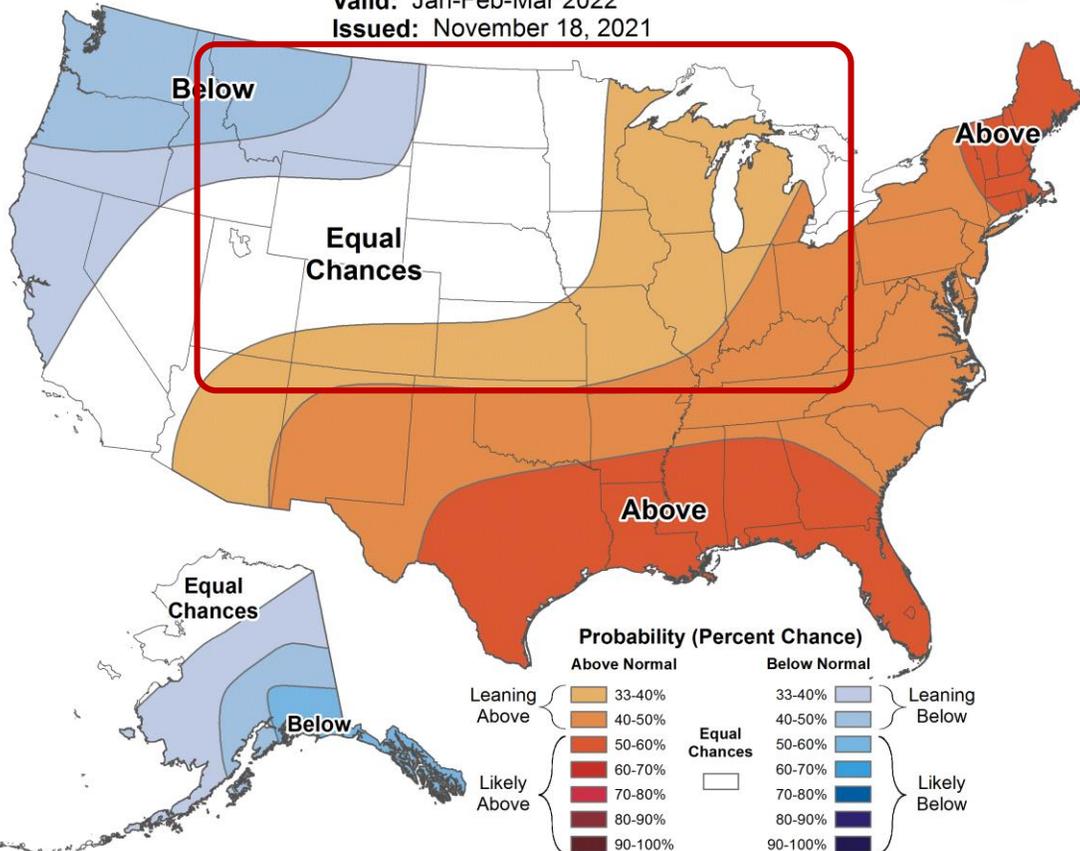
- Warm signal in the east, leaning below in the northwest.  
Precipitation enhanced for Great Lakes and southward, NW. Dry



## Seasonal Temperature Outlook



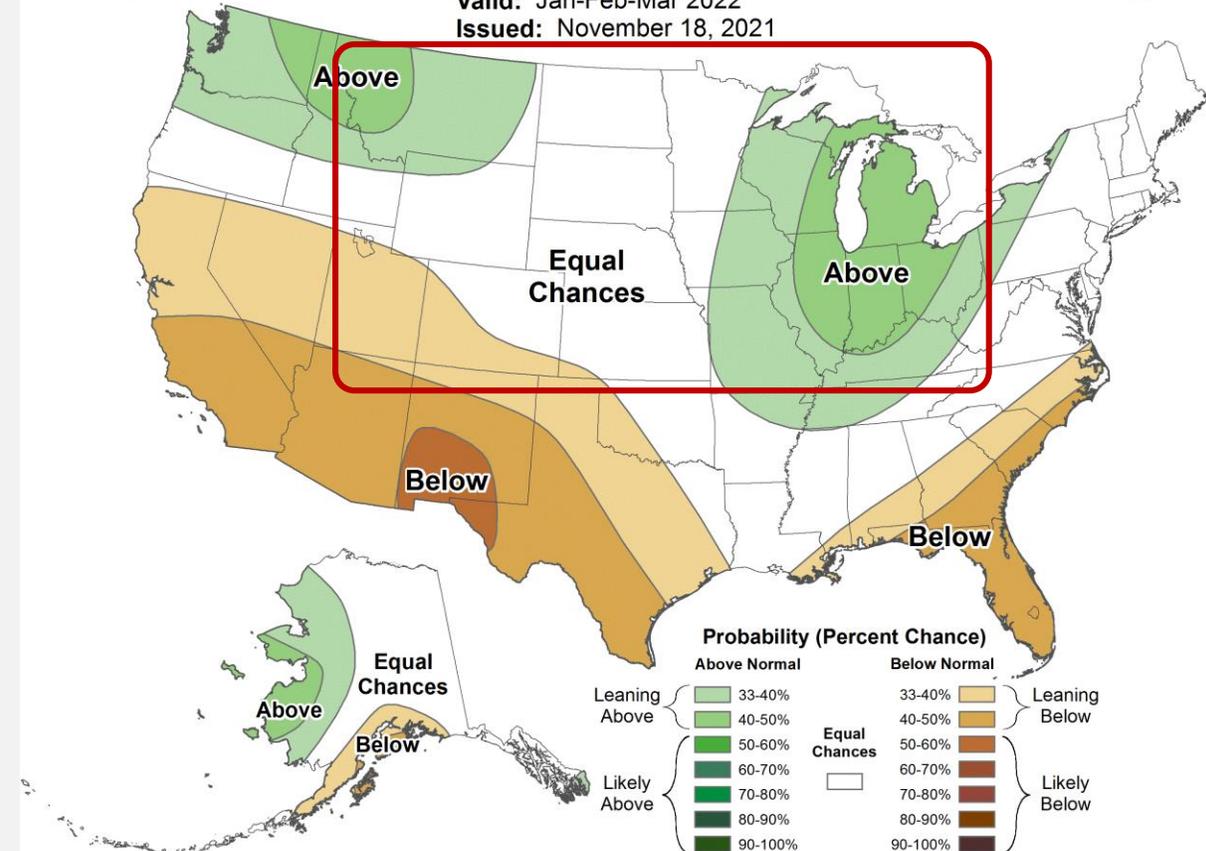
Valid: Jan-Feb-Mar 2022  
Issued: November 18, 2021



## Seasonal Precipitation Outlook



Valid: Jan-Feb-Mar 2022  
Issued: November 18, 2021



# Key impacts

- **Growing season ended later than average this year. Harvest at or near completion (lagging in wet areas).**
- **Concerns for winter wheat condition in northern, western areas.**
- **Moisture before freeze up will be helpful for dry soil profiles.**
- **Fire danger will be issue, especially in dry areas, until snow cover established.**

# Outlook summary

- **La Niña advisory in effect, moderate event on tap for the winter.**
- **Northwest and eastern portions of the region expecting to see wetter than normal conditions.**
  - **Improvement in drought conditions for these areas.**
  - **Potential for excessive wetness in Ohio Valley.**
- **Dryness and potential for warmth in southwest region.**
  - **Likelihood of drought going into 2022 growing season for CO/KS area.**
- **Keep recent trends in mind as conditions vary throughout winter.**

# For additional information

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## Recording of today's and past presentations:

<https://mrcc.purdue.edu/multimedia/webinars.jsp>  
<http://www.hprcc.unl.edu>

## NOAA's National Centers for Environmental Information

[www.ncdc.noaa.gov](http://www.ncdc.noaa.gov)

**Monthly Climate Reports** [www.ncdc.noaa.gov/sotc/](http://www.ncdc.noaa.gov/sotc/)

**NOAA's Climate Prediction Center** [www.cpc.ncep.noaa.gov](http://www.cpc.ncep.noaa.gov)

**U.S. Drought Portal** [www.drought.gov](http://www.drought.gov)

**National Drought Mitigation Center** [drought.unl.edu](http://drought.unl.edu)

**State Climatologists** [www.stateclimate.org](http://www.stateclimate.org)

**Regional Climate Centers** [www.hprcc.unl.edu](http://www.hprcc.unl.edu) [mrcc.purdue.edu](http://mrcc.purdue.edu)



Minnesota fall colors.  
Photo courtesy Pete Boulay.

# Questions

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- **Doug Kluck:** [doug.kluck@noaa.gov](mailto:doug.kluck@noaa.gov)
- **Melissa Widhalm:** [mwidhalm@purdue.edu](mailto:mwidhalm@purdue.edu)
- **Brian Fuchs:** [bfuchs2@unl.edu](mailto:bfuchs2@unl.edu)



Fall colors of Minnesota.  
Photo courtesy Pete Boulay.



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# 2020-21 Snow Season

