North Central U.S. Climate and Drought Outlook

16 December 2021

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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 (1 PM CST): Presenter: Dr. Jeff Andresen, State Climatologist of Michigan
- **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**

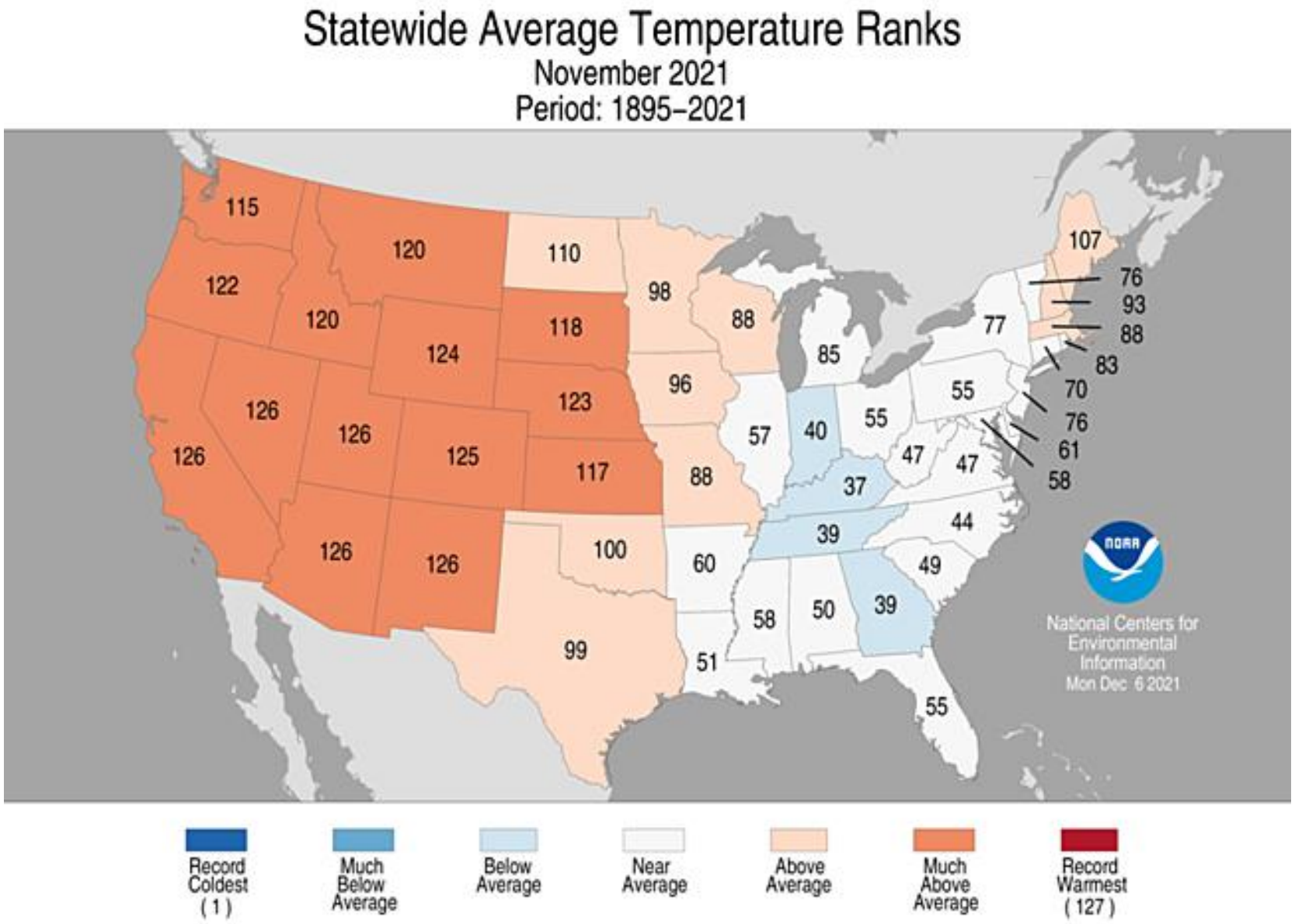
Presentation Outline

- Recent Conditions
  - Temperature and precipitation ranks
  - 30-day temperature and precipitation
  - Drought
- Growing Season Progress
- Snow, Fire, Rivers and Lakes
- Impacts and Notable Events
- Anomalous, off the charts, bizarre weather
- Outlooks
  - La Niña
  - Short-term
  - Winter season

Recent Conditions

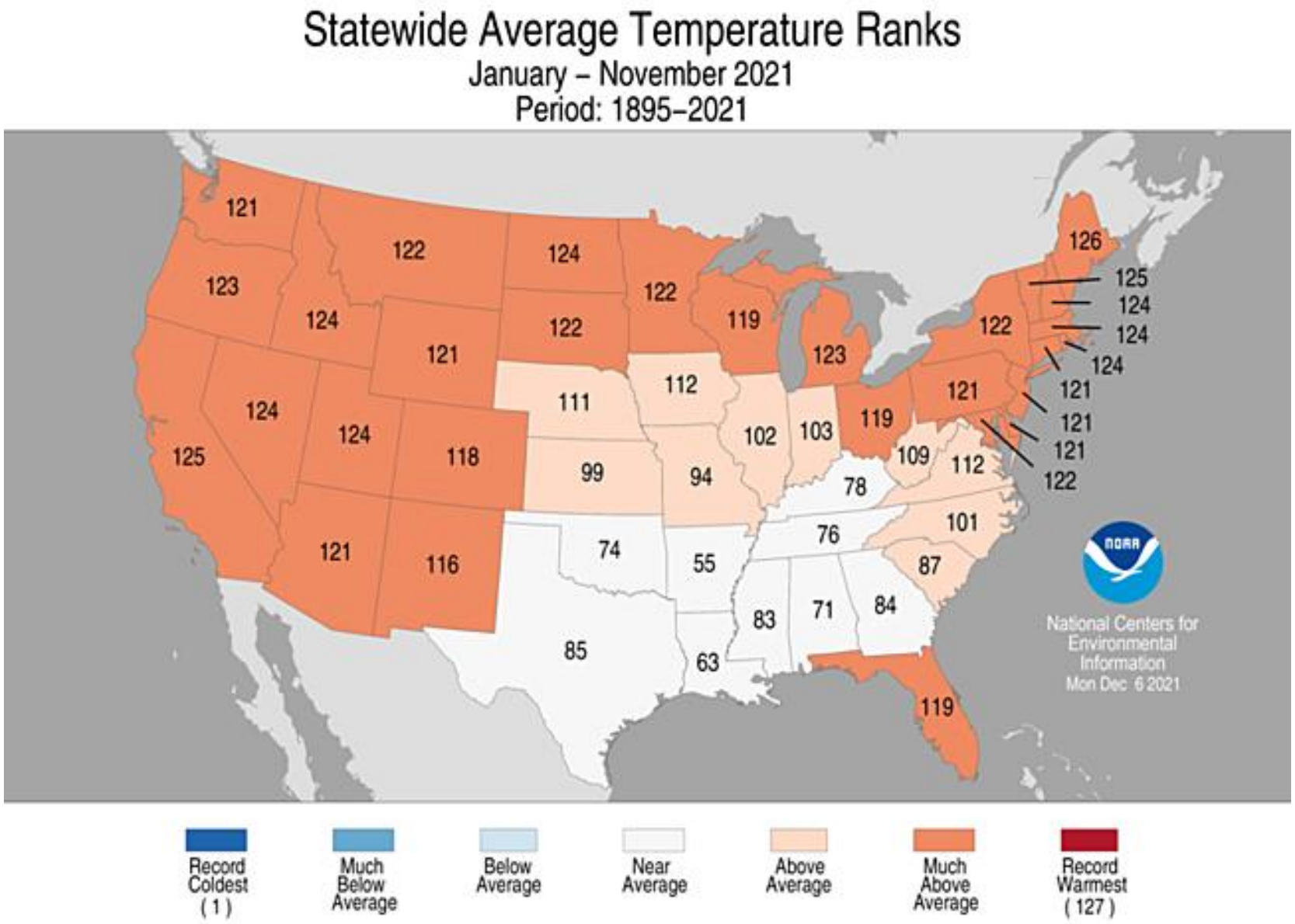
November Temperature and Precipitation Ranks
YTD Temperature and Precipitation Ranks
Departure from Normal Temperature and Precipitation
Soil Moisture, Streamflow and Drought

November Temperature Ranks



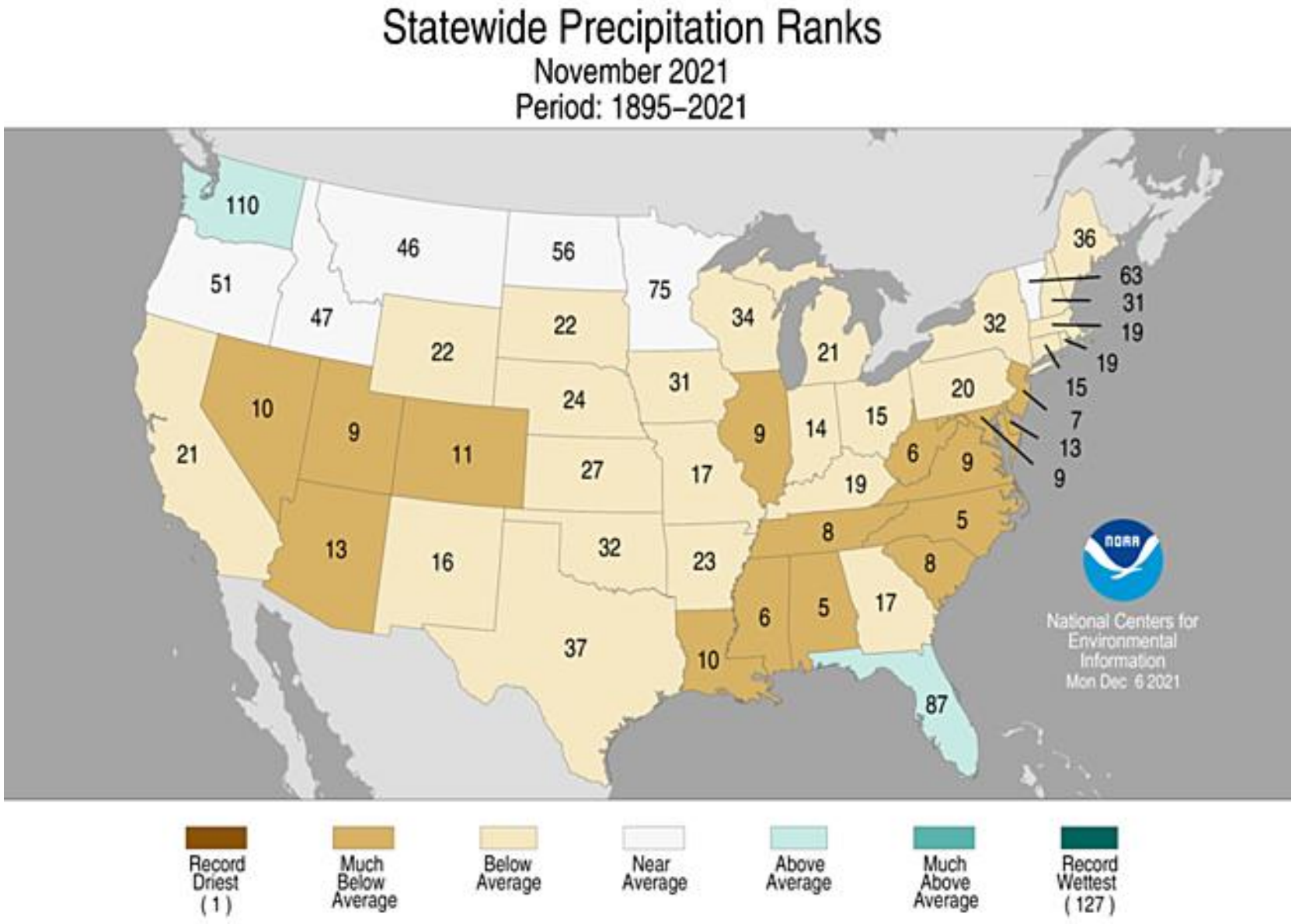
http://www.ncdc.noaa.gov/temp-and-precip/us-maps/

Year-To-Date Temperature Ranks



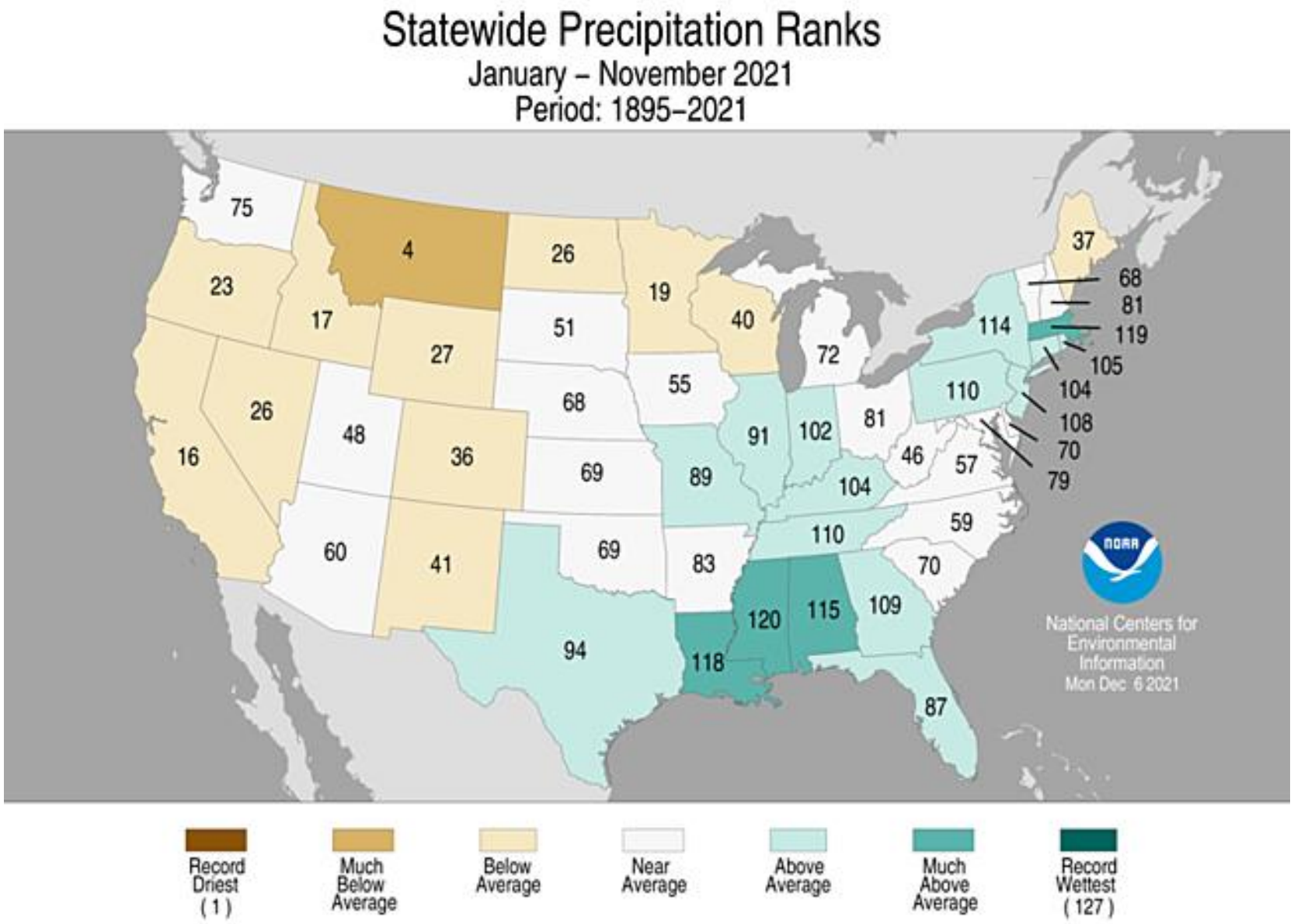
http://www.ncdc.noaa.gov/temp-and-precip/us-maps/

November Precipitation Ranks



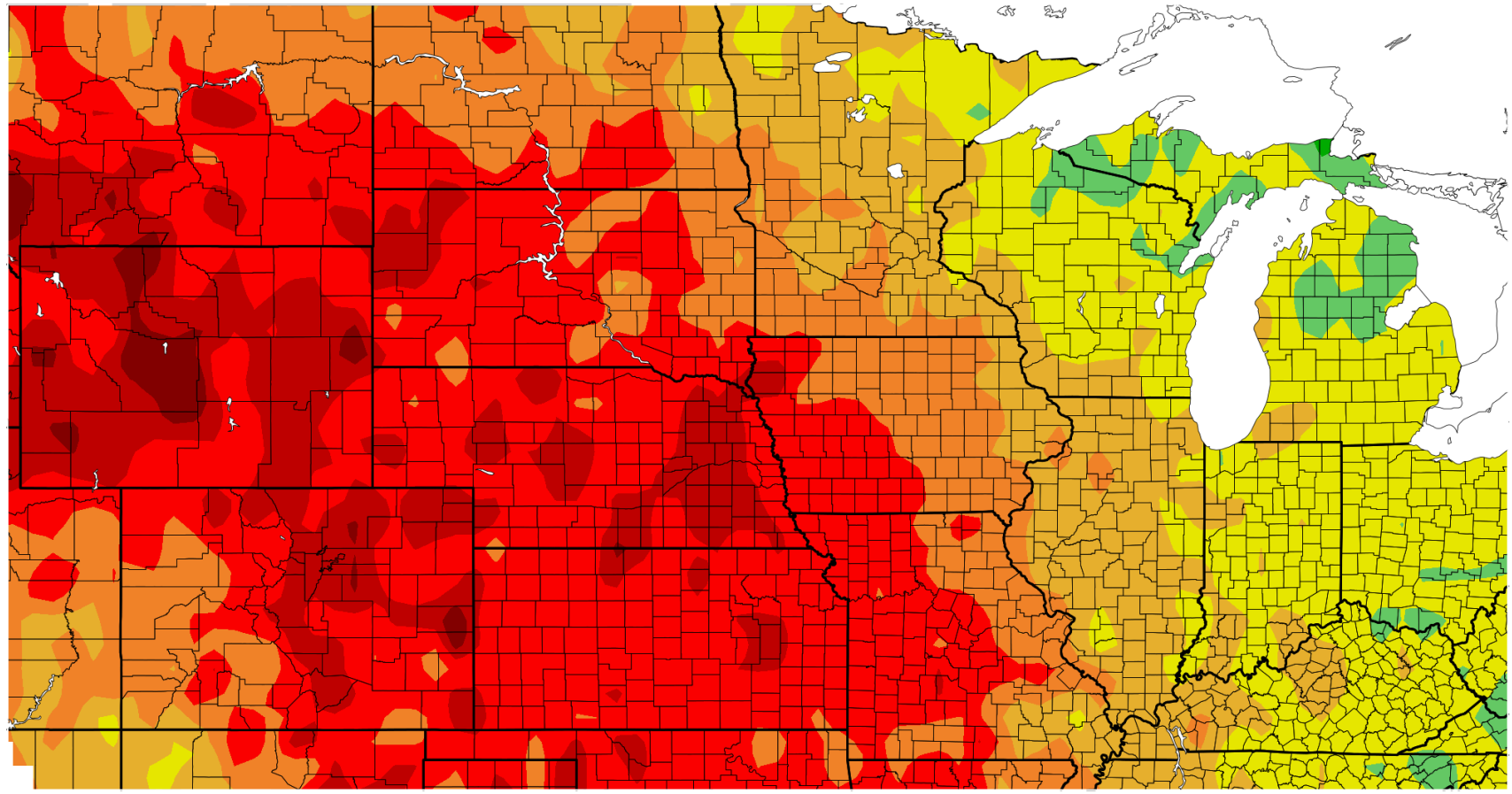
http://www.ncdc.noaa.gov/temp-and-precip/us-maps/

Year-To-Date Precipitation Ranks



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

Departure from Normal Temperature (F)
11/16/2021 - 12/15/2021

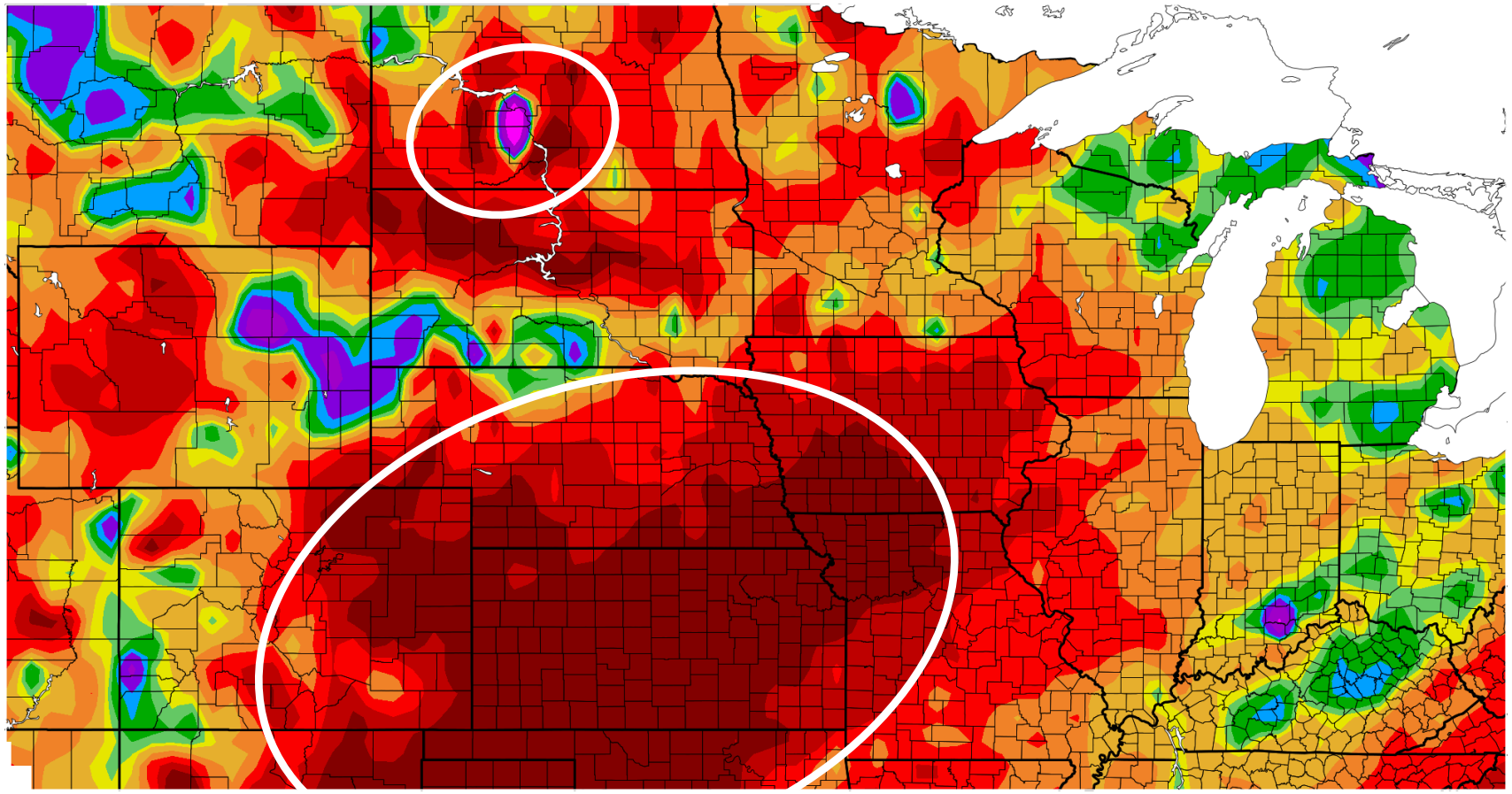


−10 −8 −6 −4 −2 0 2 4 6 8 10

Generated 12/16/2021 at HPRCC using provisional data.

NOAA Regional Climate Centers

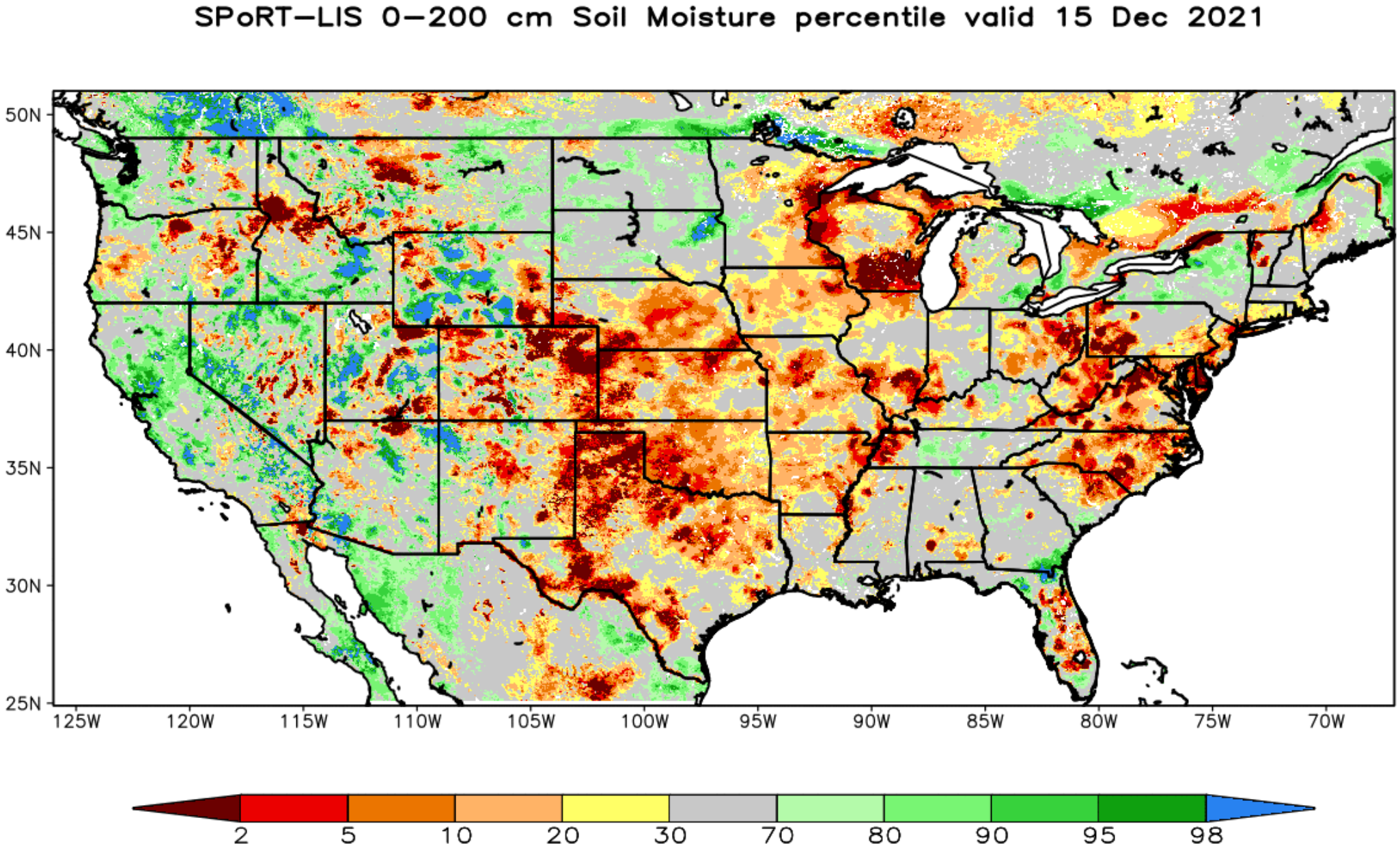
Percent of Normal Precipitation (%)
11/16/2021 - 12/15/2021



5 25 50 70 90 100 110 130 150 200 300

Generated 12/16/2021 at HPRCC using provisional data.

NOAA Regional Climate Centers



https://weather.msfc.nasa.gov/cgi-bin/basicLooper.pl?category=lis_CONUS&initialize=first&regex=vsm0-200percent_20201118

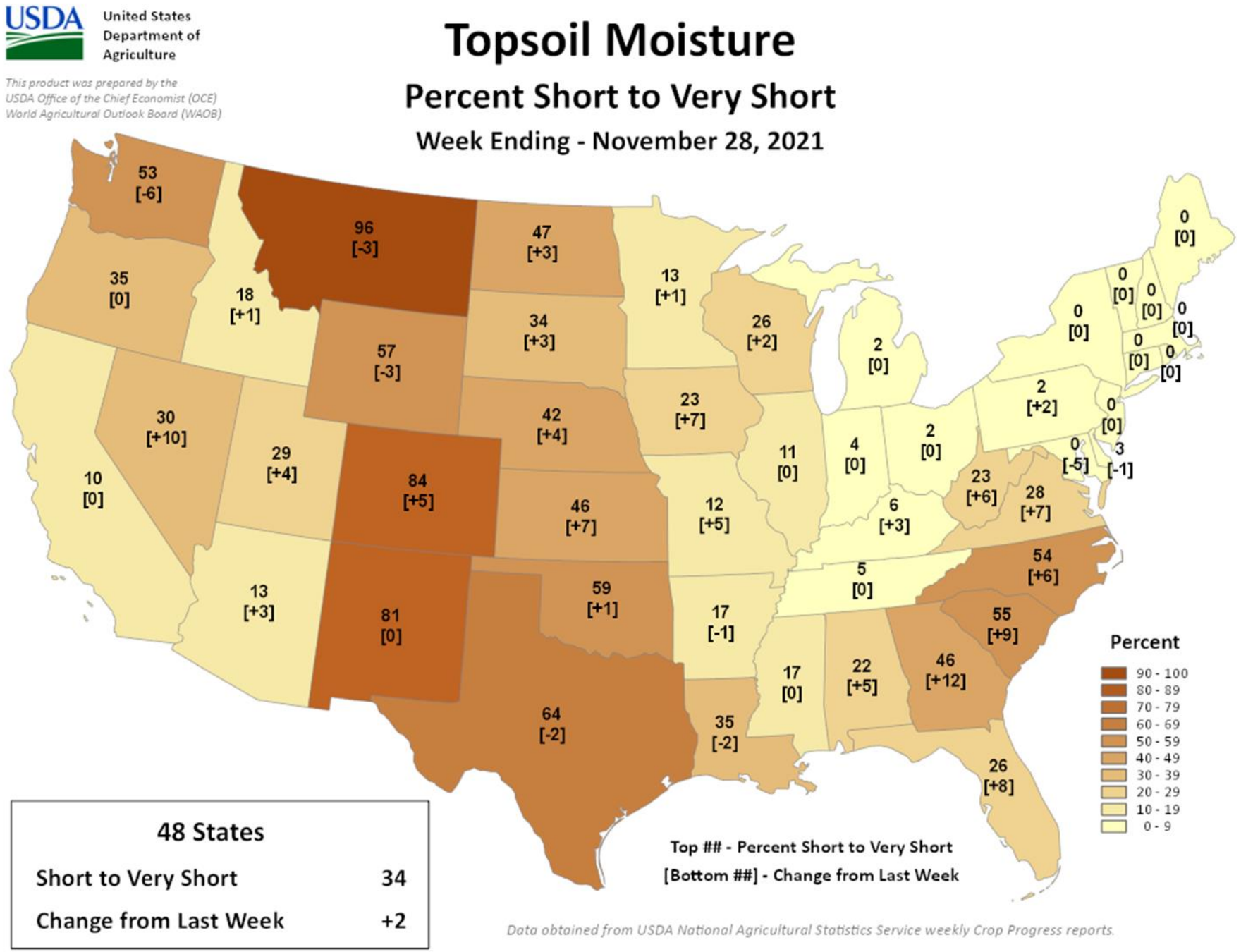
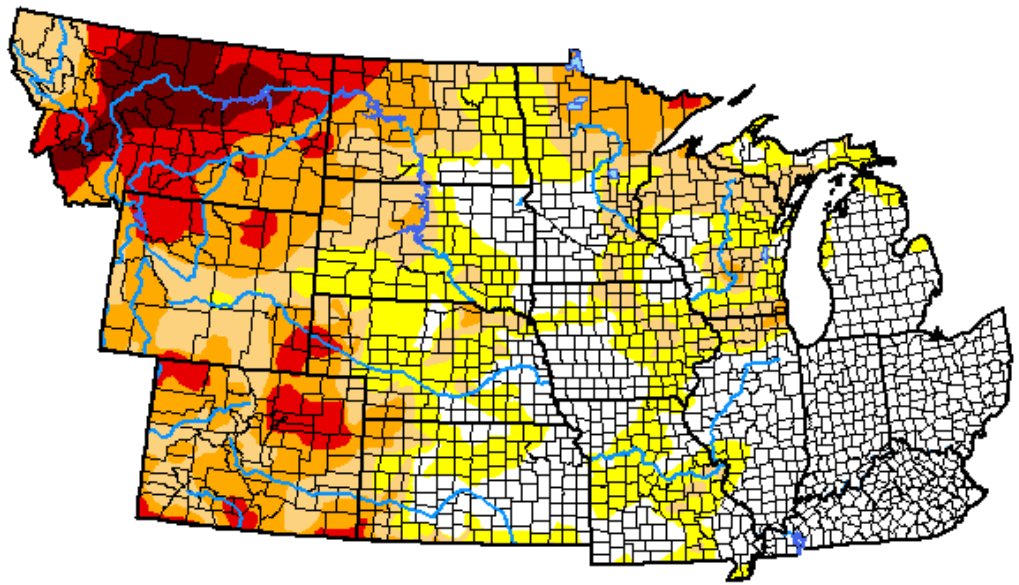


Figure Credit: Brad Rippey – USDA OCE/USDA NASS Data

U.S. Drought Monitor

NWS Central



December 14, 2021

(Released Thursday, Dec. 16, 2021)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	32.68	67.32	47.64	29.04	12.47	3.89
Last Week *12-07-2021*	33.81	66.19	48.99	30.10	12.71	4.21
3 Months Ago *09-14-2021*	33.14	66.86	48.97	36.08	19.66	3.49
Start of Calendar Year *12-29-2020*	30.52	69.48	46.07	24.23	12.18	2.52
Start of Water Year *09-28-2021*	31.08	68.92	50.85	37.30	18.35	3.17
One Year Ago *12-15-2020*	32.43	67.57	45.27	24.23	12.18	2.52

Intensity:

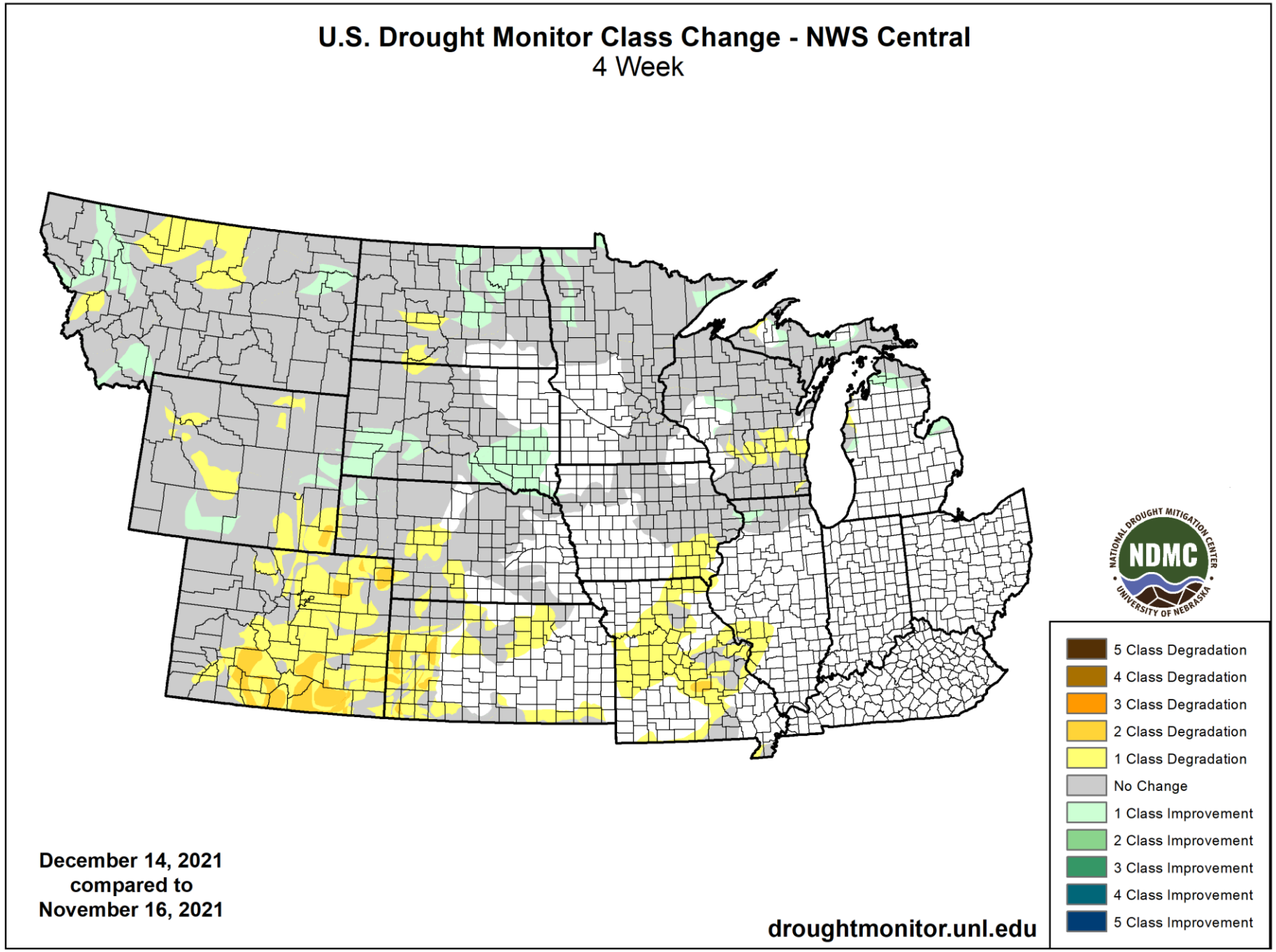
- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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:

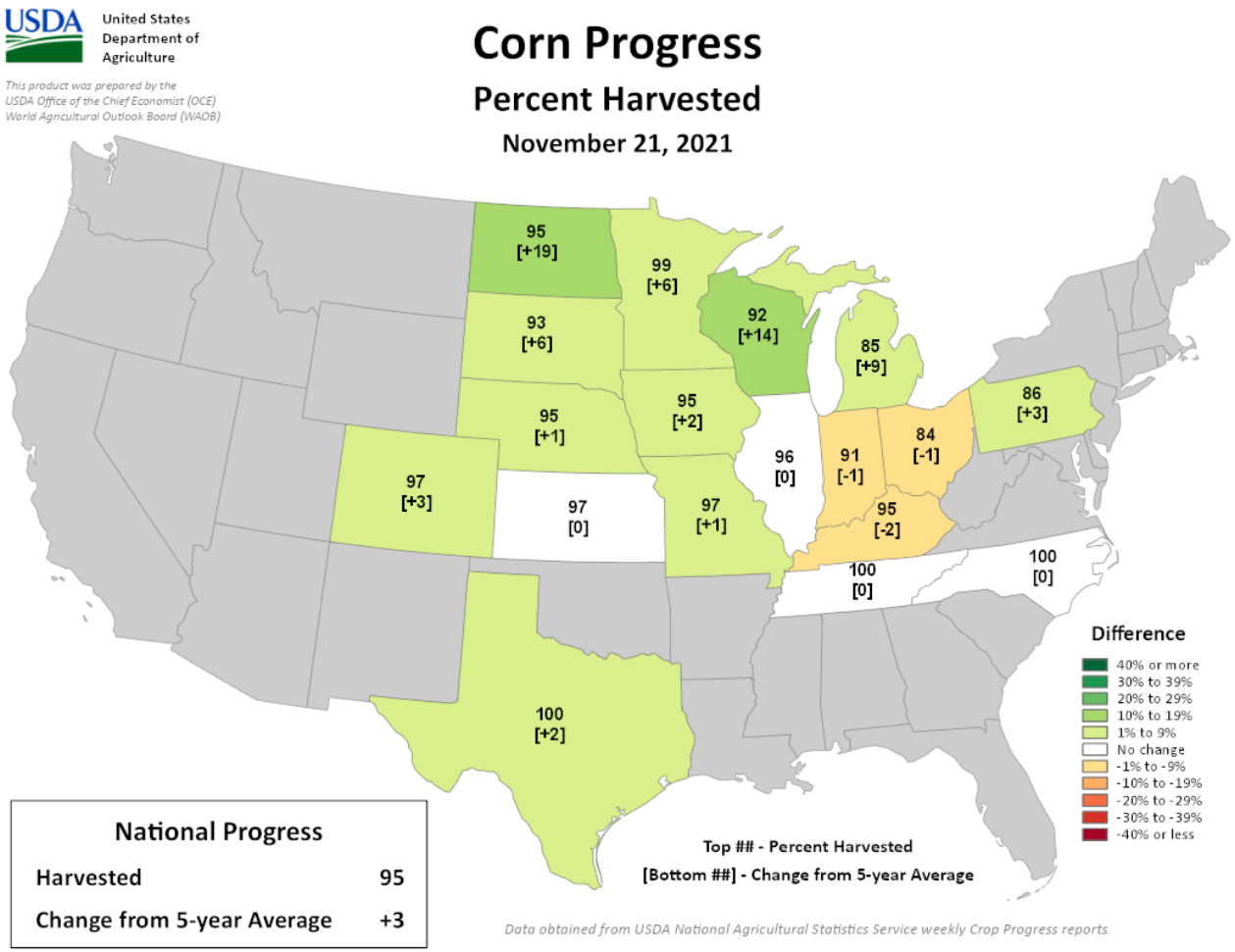
David Simeral
Western Regional Climate Center

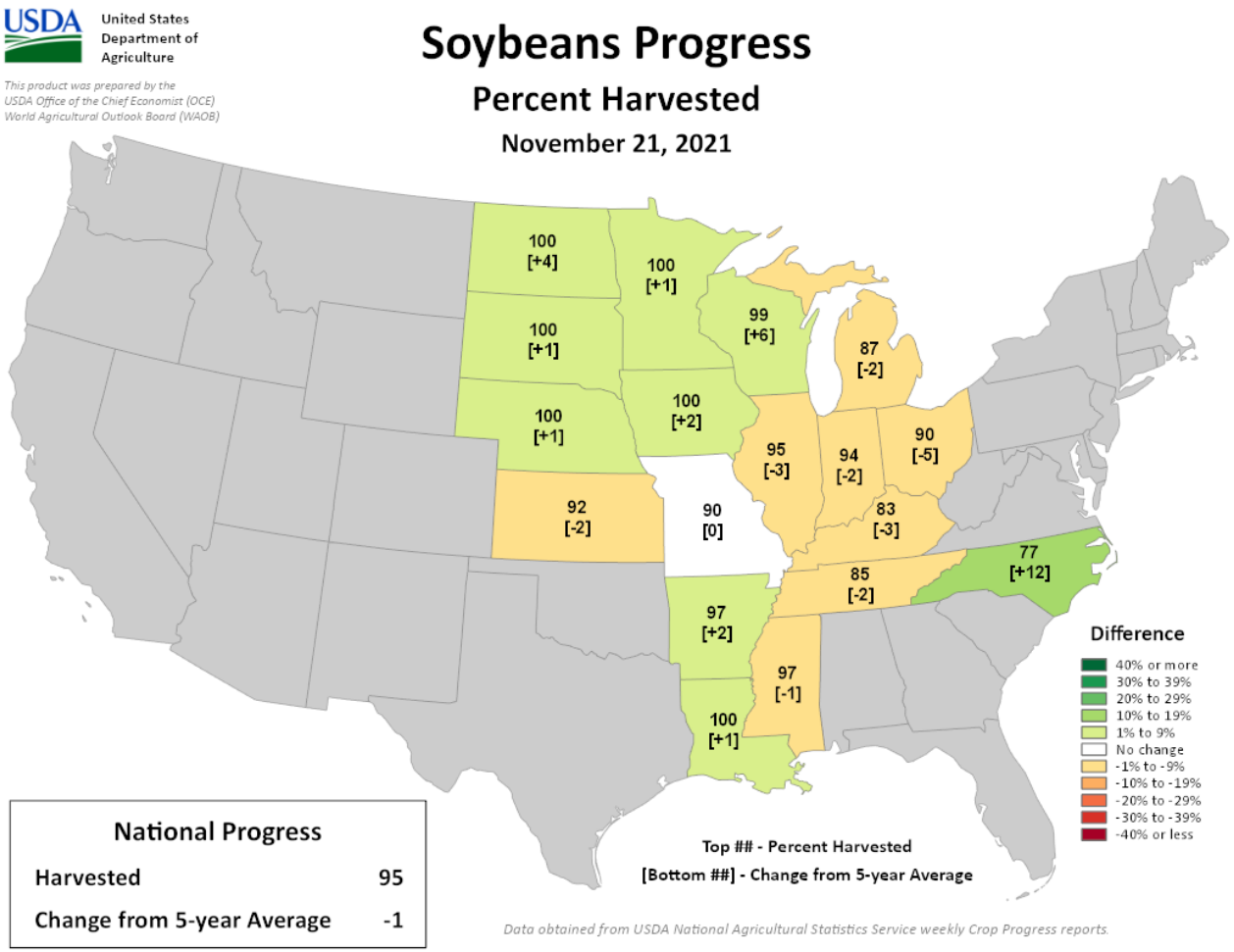
droughtmonitor.unl.edu



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

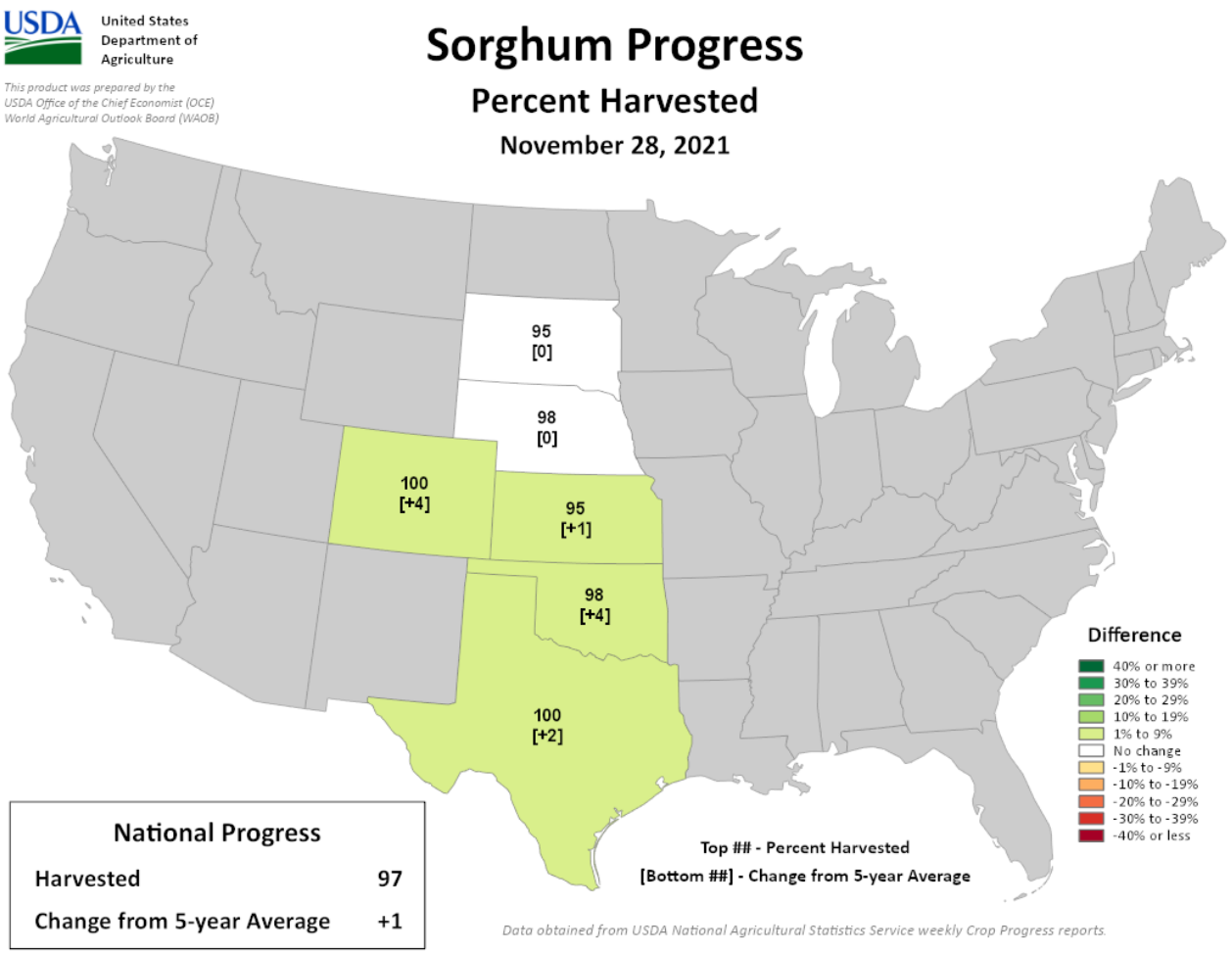
Growing Season Progress

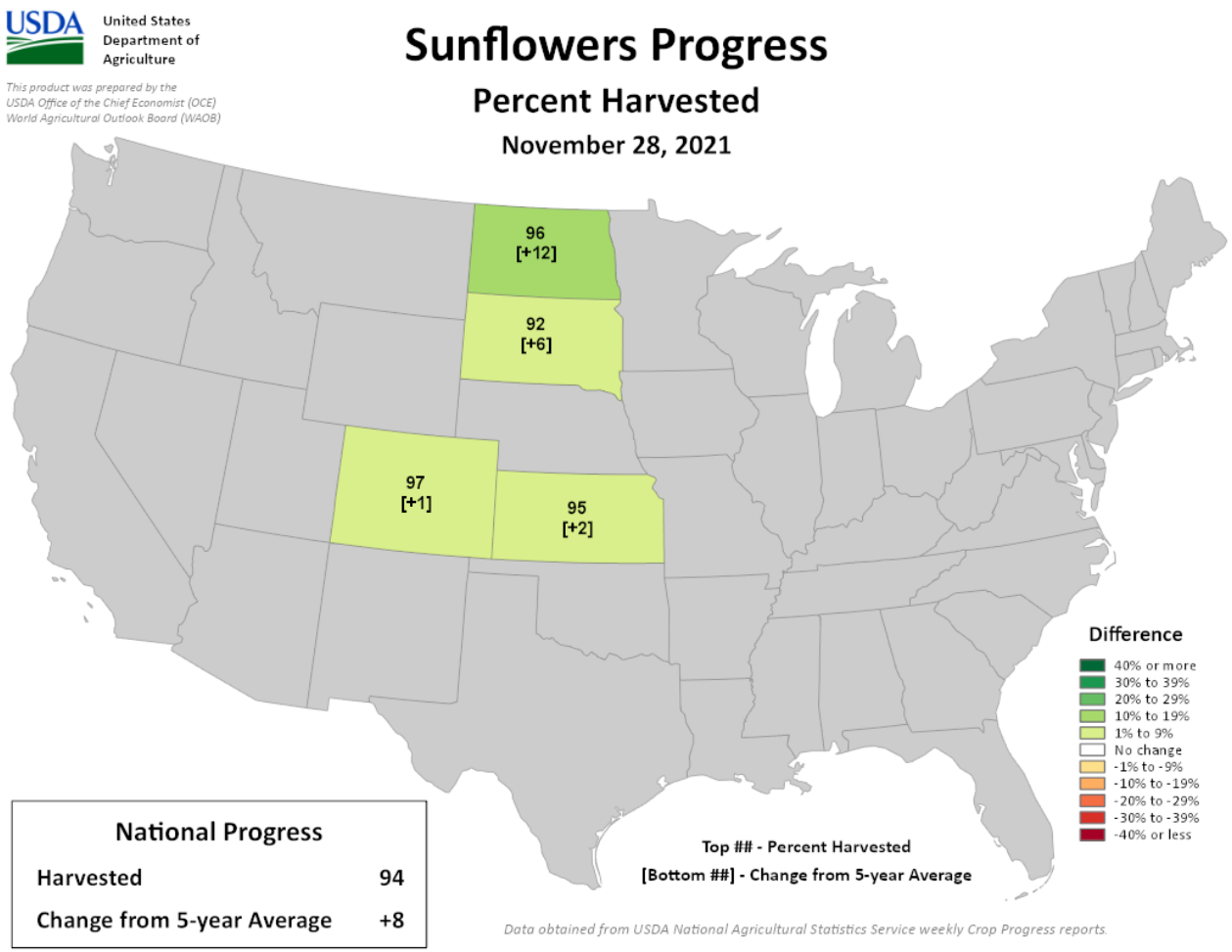




USDA NASS Reporting period has ended, though still harvest ongoing last week in OH and MI

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





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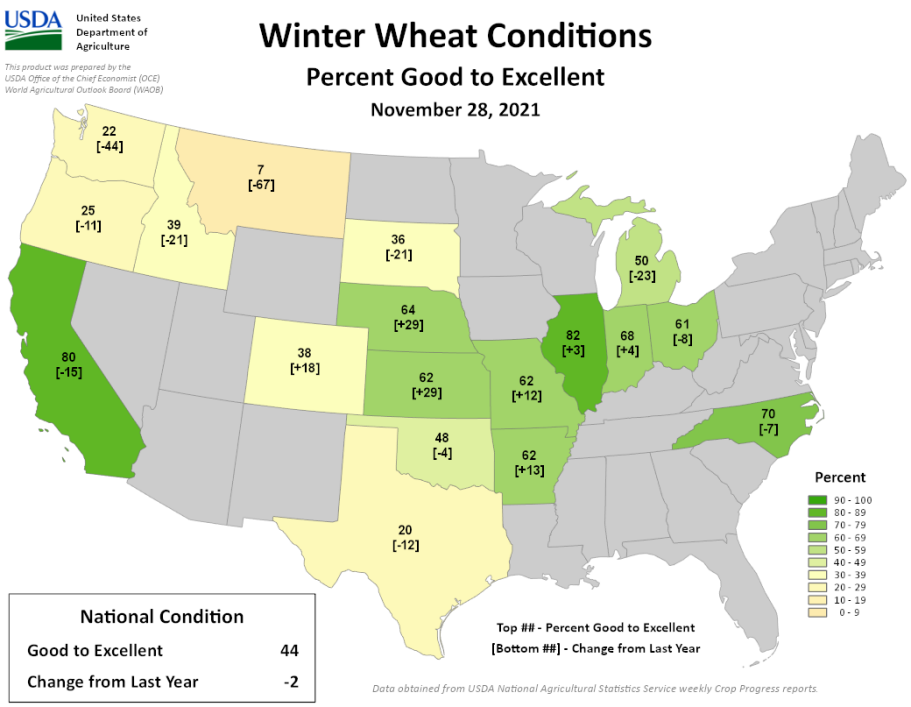
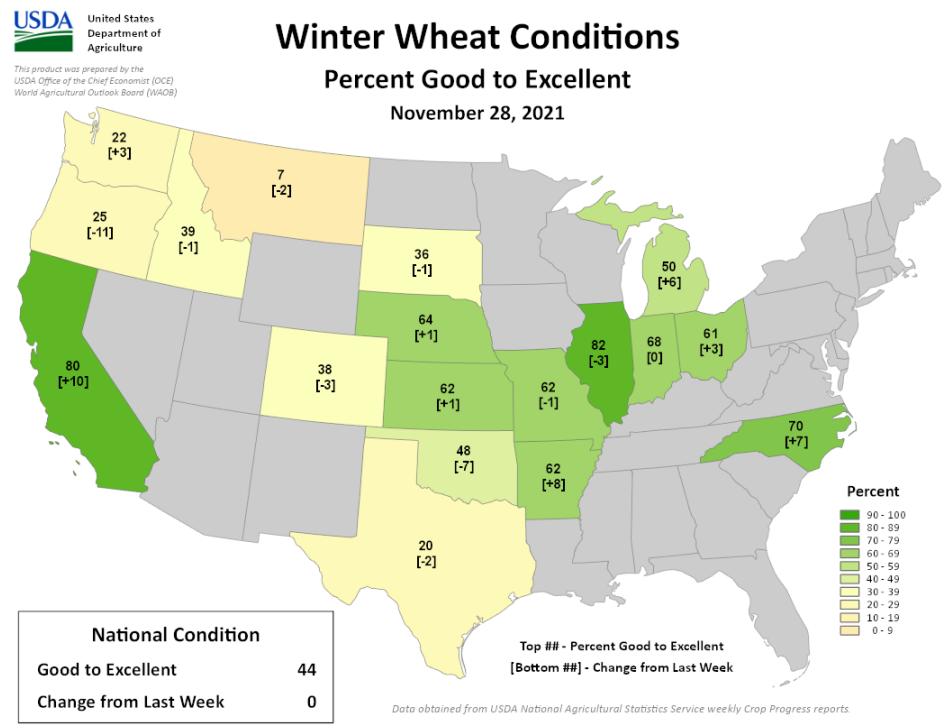




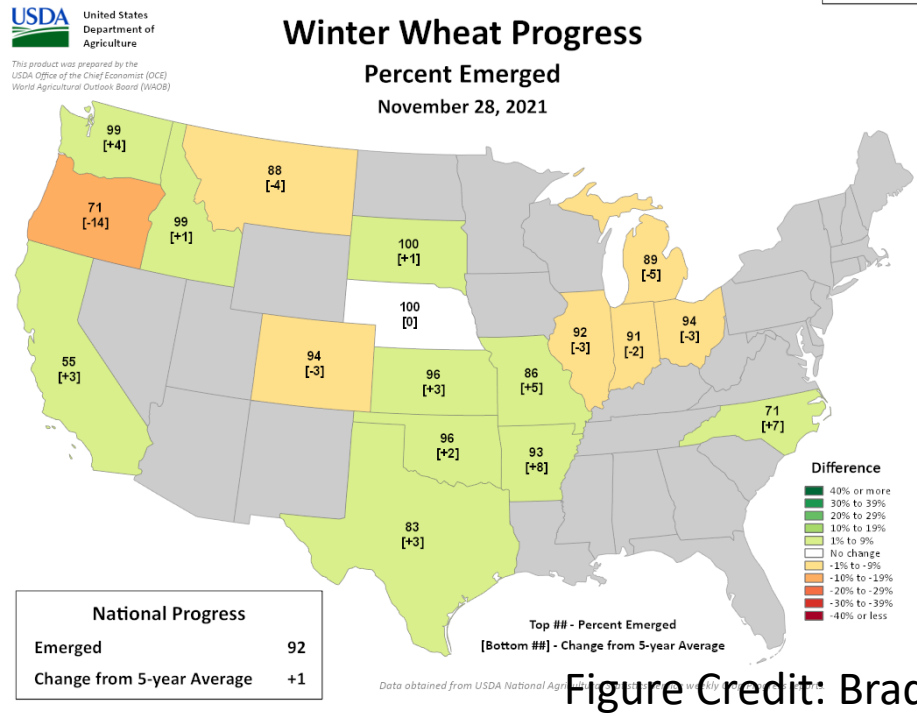


Figure Credit: Brad Rippey – USDA OCE/USDA NASS Data

Minnesota/North Dakota Sugar Beets

American Crystal Sugar Company

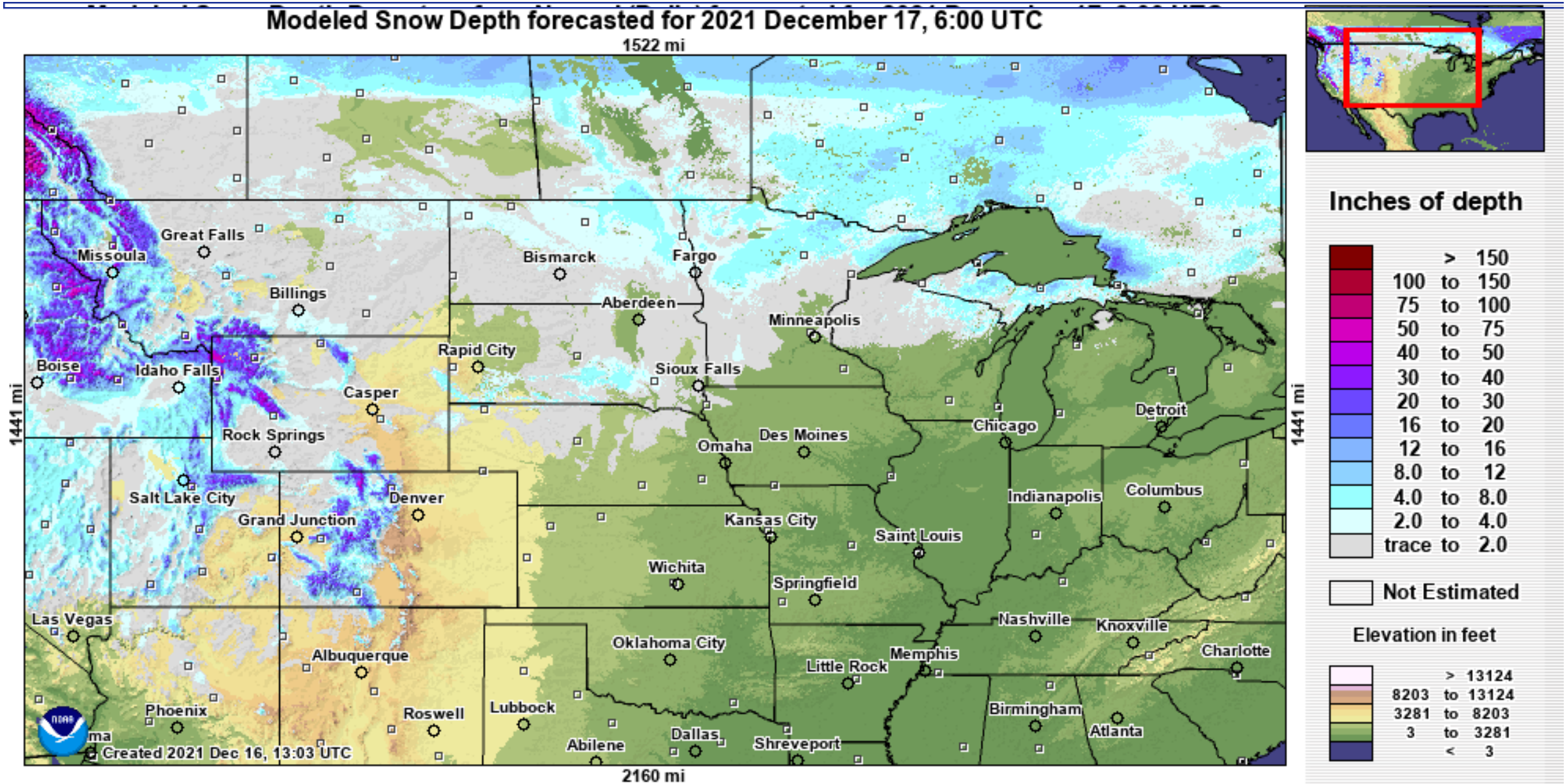
8 minutes ago ·

Although we battled extreme weather conditions and a drought this year, we are so proud to share that we had a record-breaking year, harvesting 11.8 million tons of sugarbeets! #SweetYear21

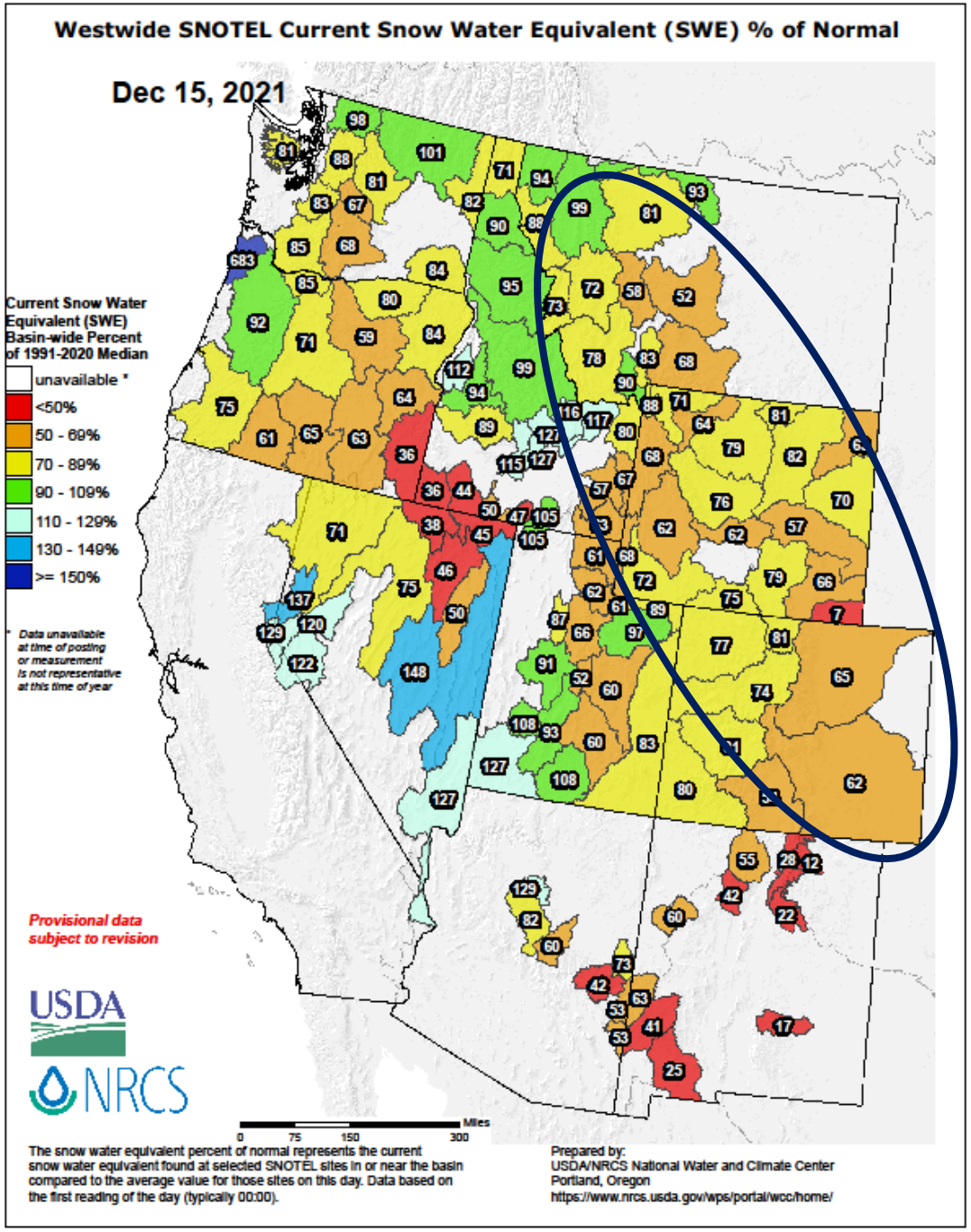
9 2 Shares

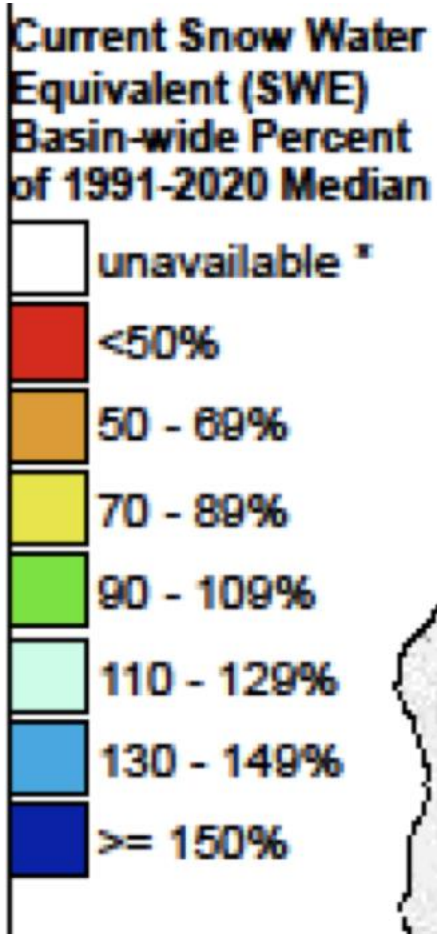
Like Comment Share

Snow, Fire, Rivers and Lakes

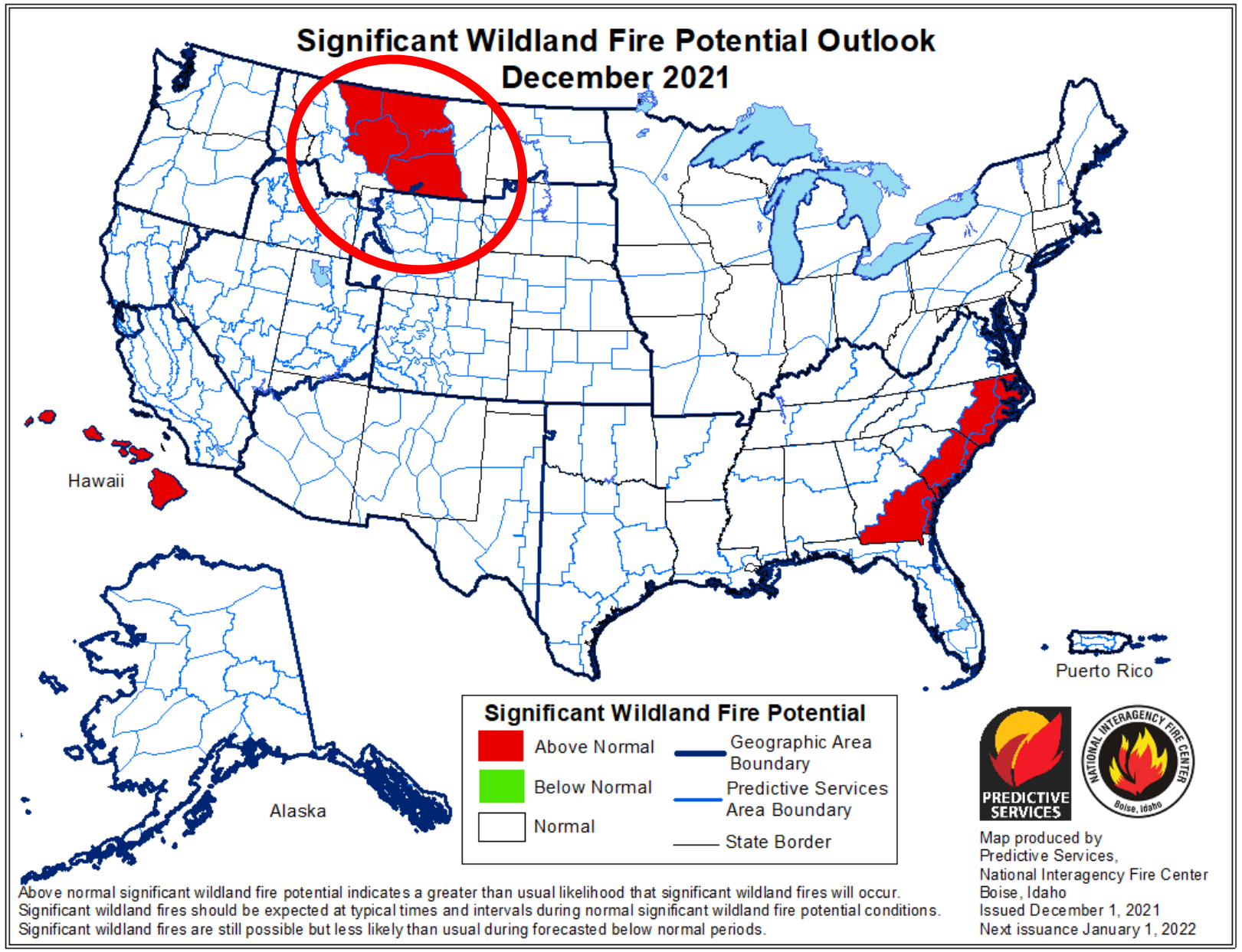


https://www.nohrsc.noaa.gov/nsa/





https://www.wcc.nrcs.usda.gov/ftpref/data/water/wcs/gis/maps/west_swepctnormal_update.pdf



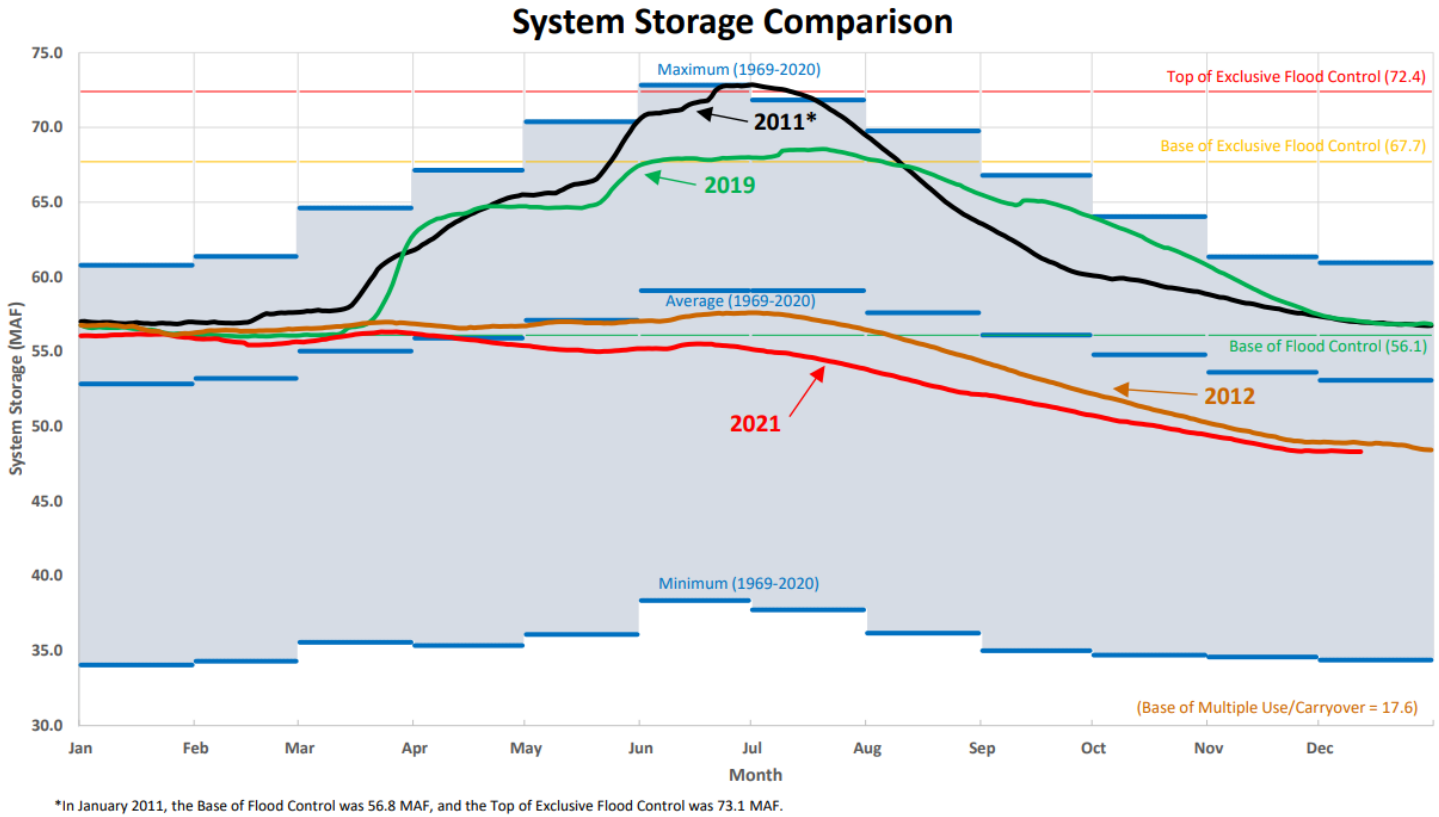
- Significant potential across parts of Montana
- Most of the area within red ellipse has large precipitation deficits as reflected in D3-D4 conditions

https://www.predictiveservices.nifc.gov/outlooks/outlooks.htm

Missouri River

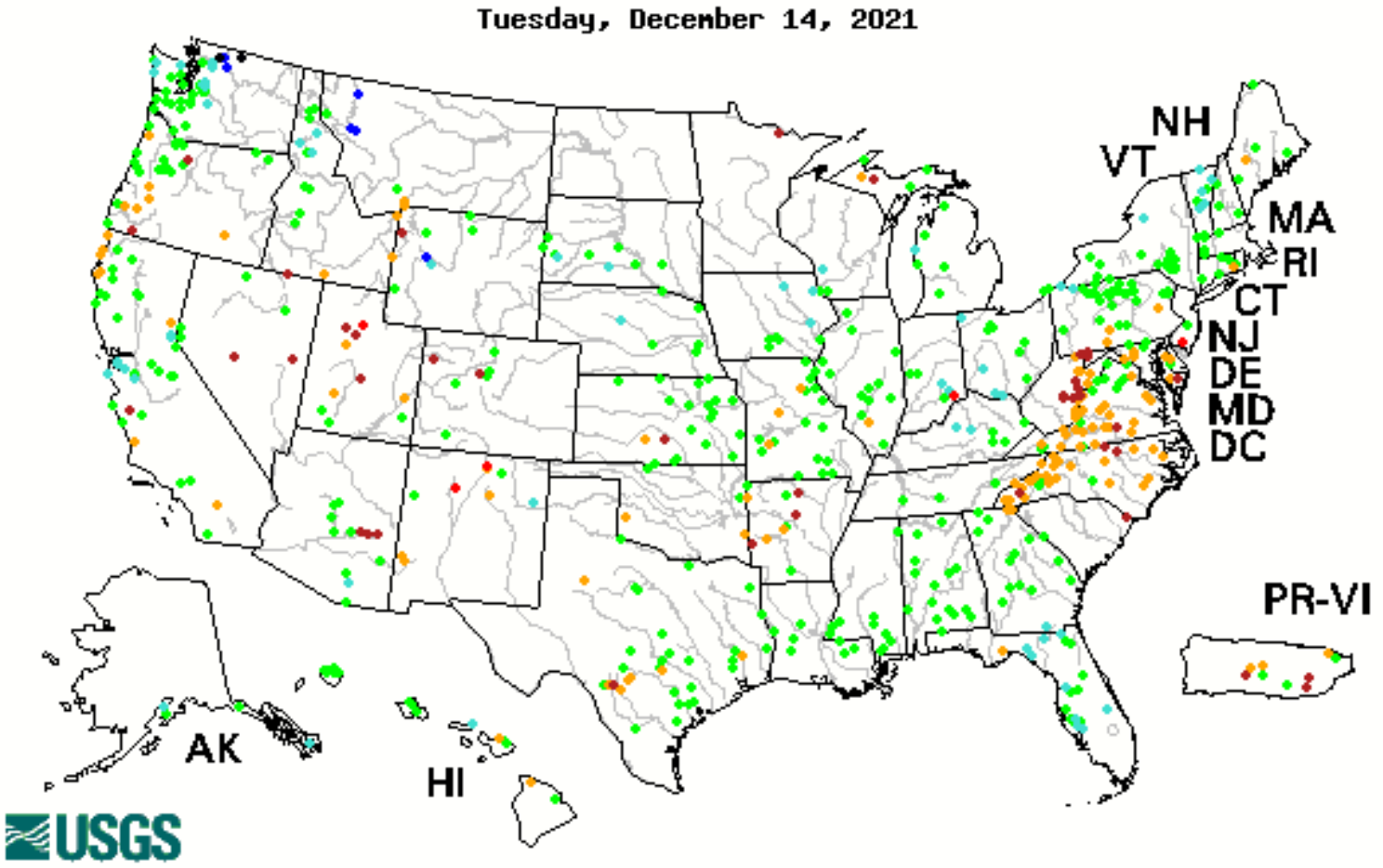
Missouri Mainstem Reservoir Status (as of 12/16/21):

- System storage is below 50.0 million-acre feet and running below 2012
- 5.0 million-acre feet off the 1969-2020 average
- The Gavins Point release is currently 12,000 cfs.
- 10th lowest runoff year on record (1898)



http://www.nwd-mr.usace.army.mil/rcc/reports/pdfs/weeklyupdate_previous.pdf

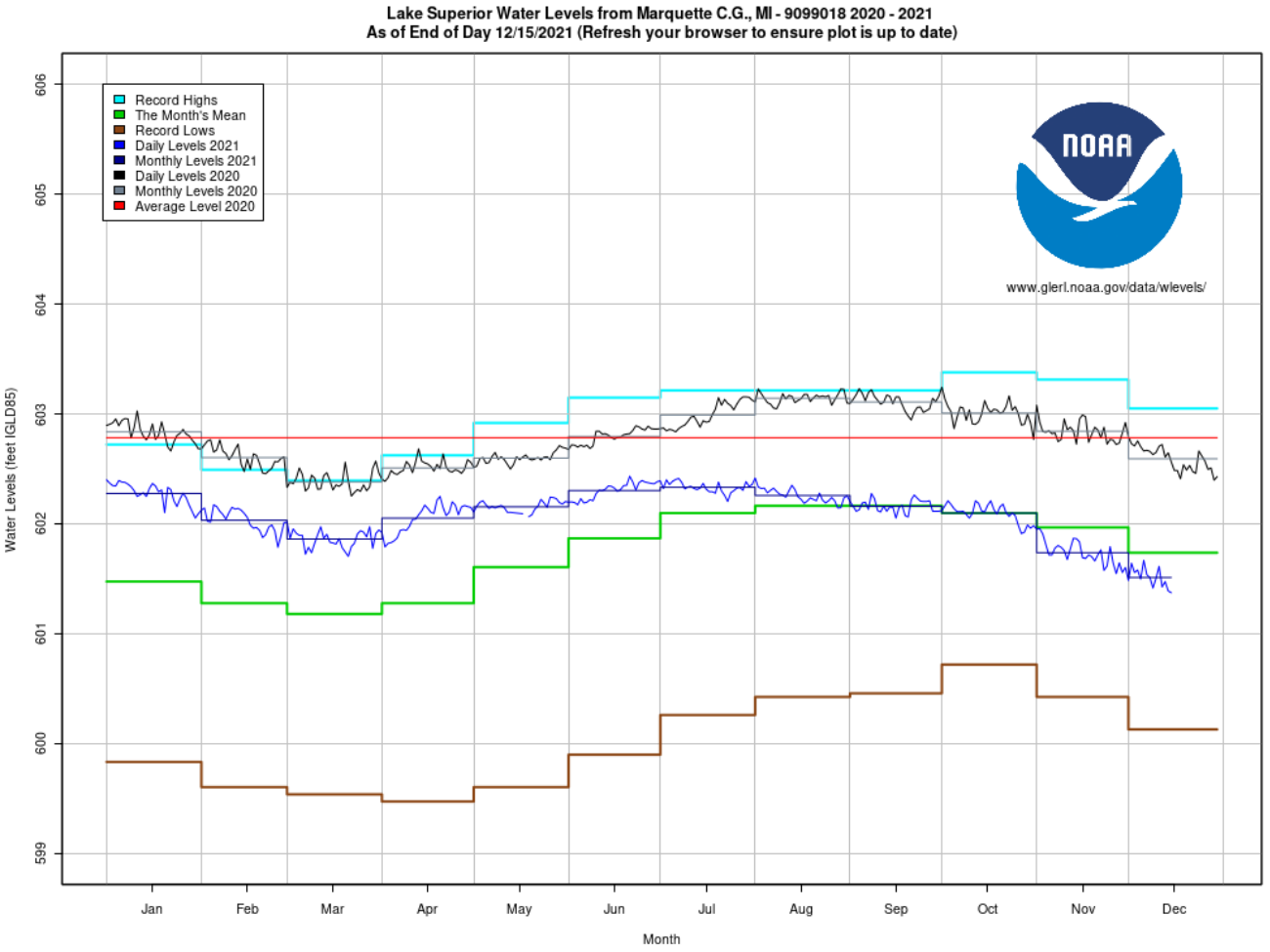
28-day Average Streamflow



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

Great Lakes Water Levels



- 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

https://www.glerl.noaa.gov/data/wlevels/data/superiorLevelsFeet.png

Impacts and Notable Events

State Impacts

- Snow pack had been rapidly decreasing in CO until a recent event at brought totals to near-normal
- Large wildfires across portions of Montana
- Wild and unprecedented severe weather outbreaks across MO/IL/AR/KY and IA/WI/MN

Photo Credit: Accuweather

State Impacts

- A rare dust storm known as a “haboob” impacted Denver on Dec. 5th.
  - Greatly diminished sunlight for good period of time along with high winds
  - At this point, Denver had yet to see its first snowfall of the season
- Broke the record length of 233 consecutive days with no snow.
- Dust storm in eastern CO yesterday

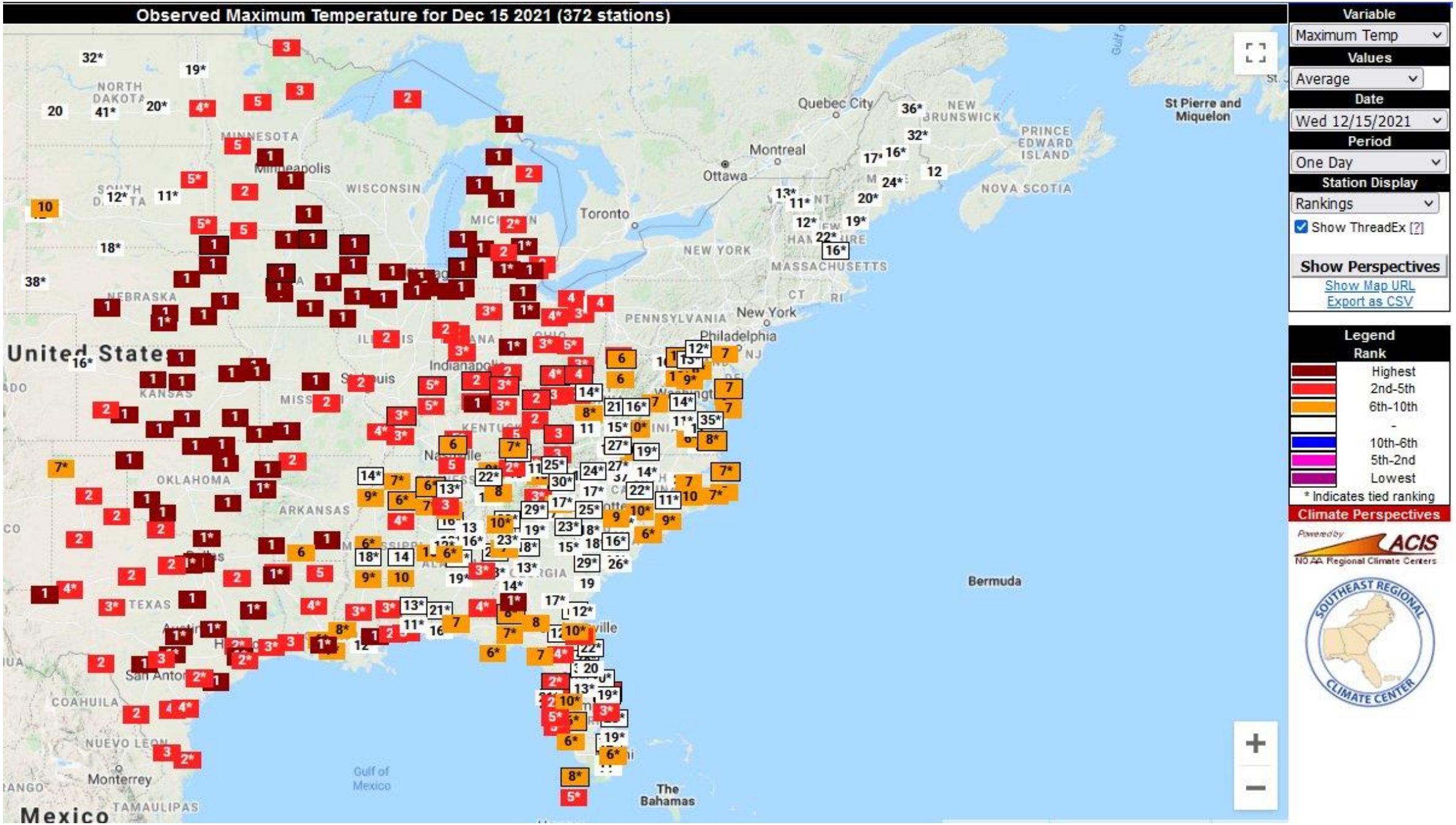
- Heavy snow event across southern MN on Dec. 10-11
  - Up to 21” fell in the SW corner
  - I-35 shut down multiple times
  - Over 300 car wrecks
- Snowfall rates approaching 2”/hour

- A late-season wildfire in central Montana incinerated much of the small farming town of Denton in early December.
  - The fire, fueled by high winds and unfettered by any snow, consumed vegetation desiccated by exceptional drought, melted rail cars
  - Destroyed more than two dozen homes and four grain elevators that had stood for more than a century

Station Extremes:

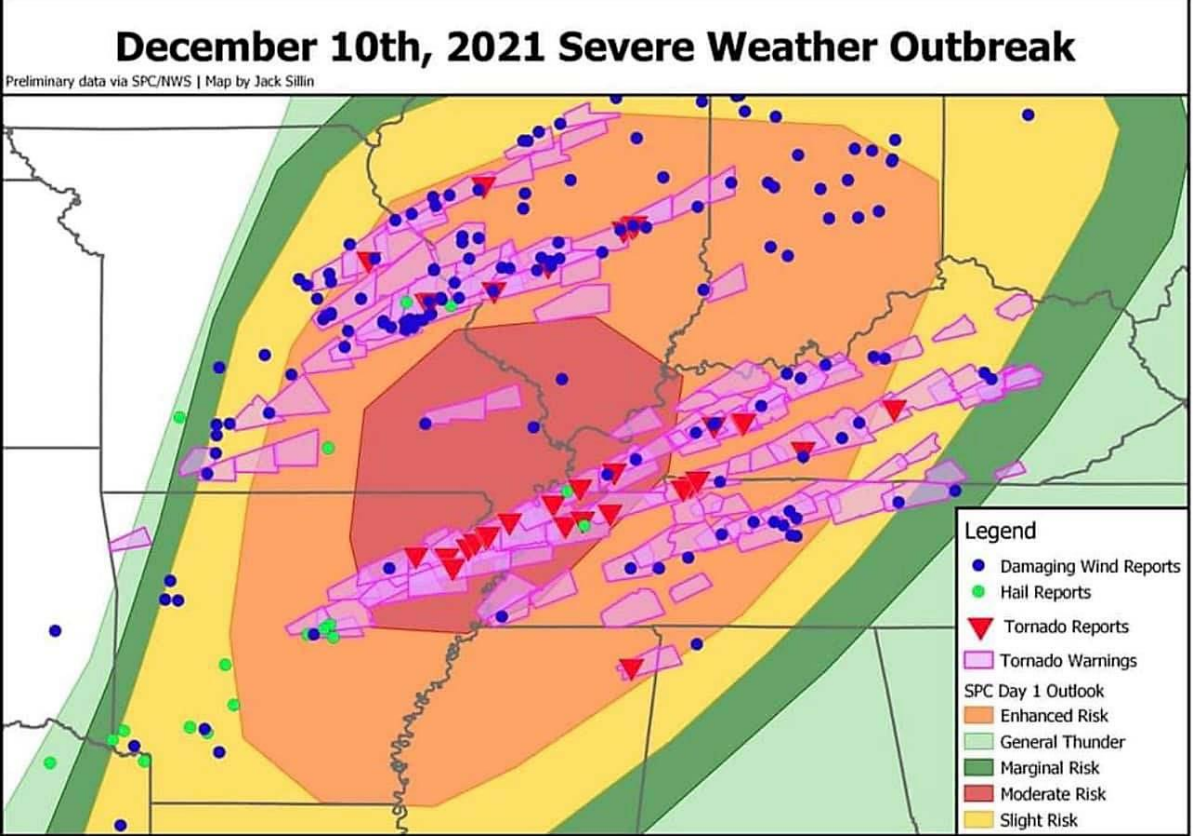
- Hettinger, ND broke a daily hig- temperature record of 71°F on Dec. 1, which is also the state record for a December day. The previous record was 70°F that was broken on December 20, 1894 in Napoleon, ND.
- Several stations in Iowa broke December's record high of 74 degrees on Dec.
- Many stations throughout the Midwest broke daily highs and lows as well as dewpoint records on the 15th

Photo: National Park Service

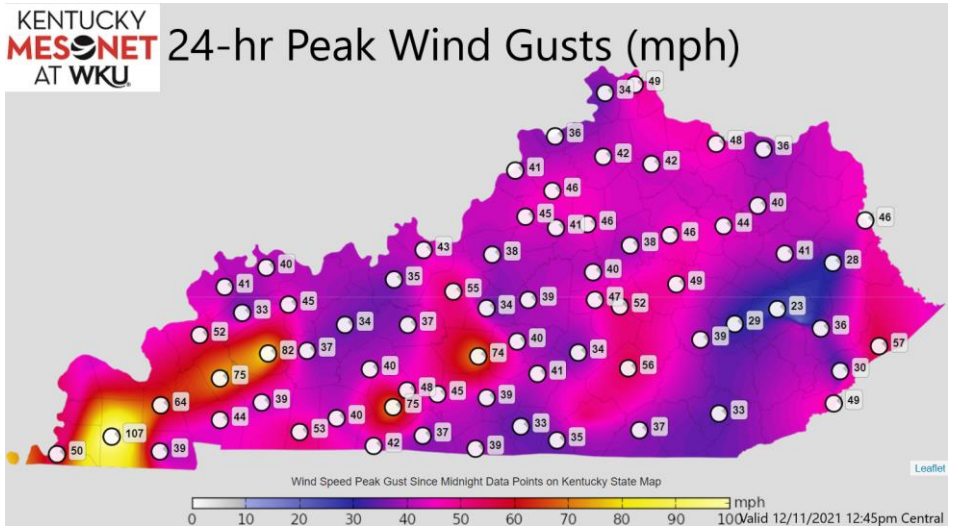

Observed Maximum Temperature for Dec 15 2021 (372 stations)
Variable
Maximum Temp
Values
Average
Date
Wed 12/15/2021
Period
One Day
Station Display
Rankings
Show ThreadEx [?]
Show Perspectives
Show Map URL
Export as CSV
Legend
Rank
Highest
2nd-5th
6th-10th
-
10th-6th
5th-2nd
Lowest
* Indicates tied ranking
Climate Perspectives
Powered by ACIS
NOAA Regional Climate Centers
SOUTHEAST REGIONAL CLIMATE CENTER
Quebec City
Montreal
Ottawa
Toronto
Minneapolis
New York
Philadelphia
Indianapolis
St Louis
Nashville
San Antonio
Monterrey
Bermuda
The Bahamas
Gulf of Mexico
St Pierre and Miquelon
NORTH DAKOTA
MINNESOTA
WISCONSIN
NEBRASKA
KANSAS
OKLAHOMA
TEXAS
ARKANSAS
COAHUILA
NUEVO LEON
TAMAULIPAS
NEW YORK
PENNSYLVANIA
MASSACHUSETTS
NOVA SCOTIA
PRINCE EDWARD ISLAND
NEW BRUNSWICK

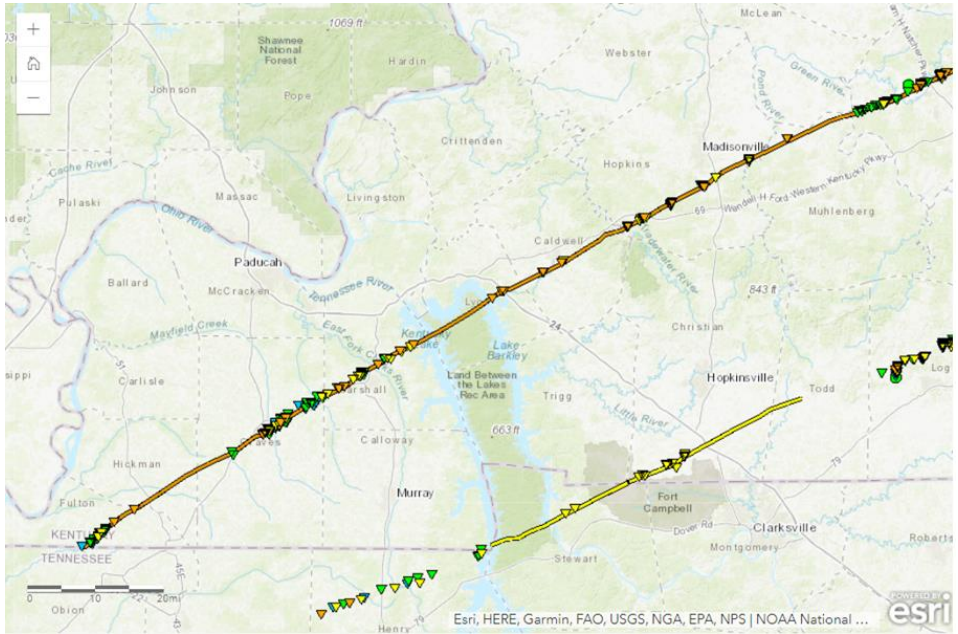
Severe Weather

Bryon Houlgrave, The Des Moines Register



- A historic long-track tornado entered western Kentucky from Tennessee shortly before 9:00 pm
- Path length estimate at 190 miles at EF-4
- The tornado continued northeast through Mayfield, KY about 9:25 to 9:30 PM CST, where it produced widespread destruction.
- More than 80 feared dead with many unaccounted

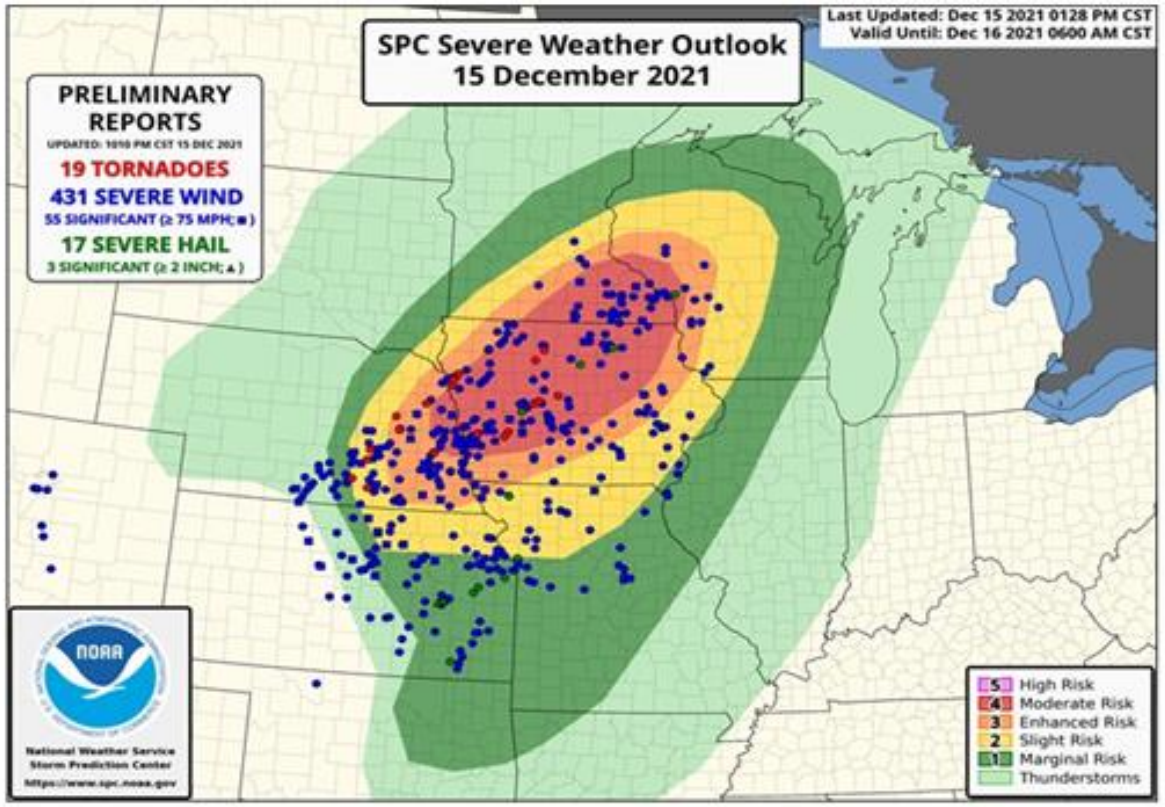




MO-IL Tornadoes

- Worst of the tornadoes was an EF-3 that set down in the St. Louis Metro East and seriously damaged an Amazon warehouse in Edwardsville.
- So far there have been 6 confirmed fatalities and several injuries.
- This event was the first in 4 years with a tornado-related death in Illinois.

15 December 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

Summary of 12/15/2021 Severe Weather

December 16, 2021
6:58 AM

Historical Context

- **Prior to 12/15/2021, only 5 confirmed tornadoes in the month of December in Iowa**
  - **1 in 1975**
  - **1 in 1982**
  - **2 in 2015**
  - **1 in 2017**

- **Dating back to 2004, the 55+ reports of Significant Wind Gusts 75+ MPH is the most ever for the lower 48 United States, surpassing the 2020 Derecho of 53 reports**

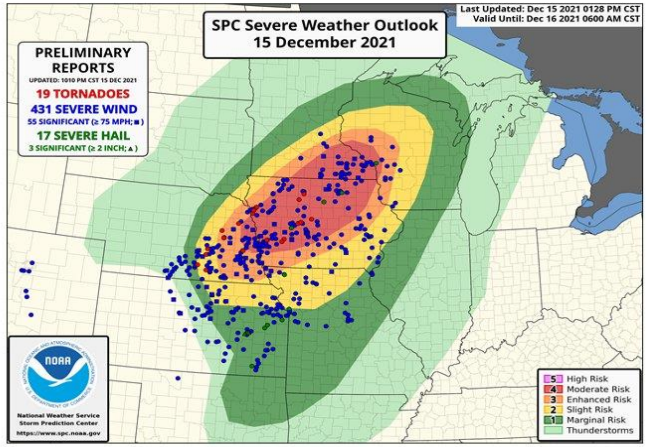
- **Iowa's Warmest December Temperature Record Broken Yesterday**
  - **Previous: 74°F in Thurman, IA 12/06/1939**
  - **Yesterday: 75°F in Ottumwa, IA (not all reports are in yet)**

- **Dating back to 1990, this was the 1st Moderate Risk issued by NWS SPC for Iowa in the month of December**

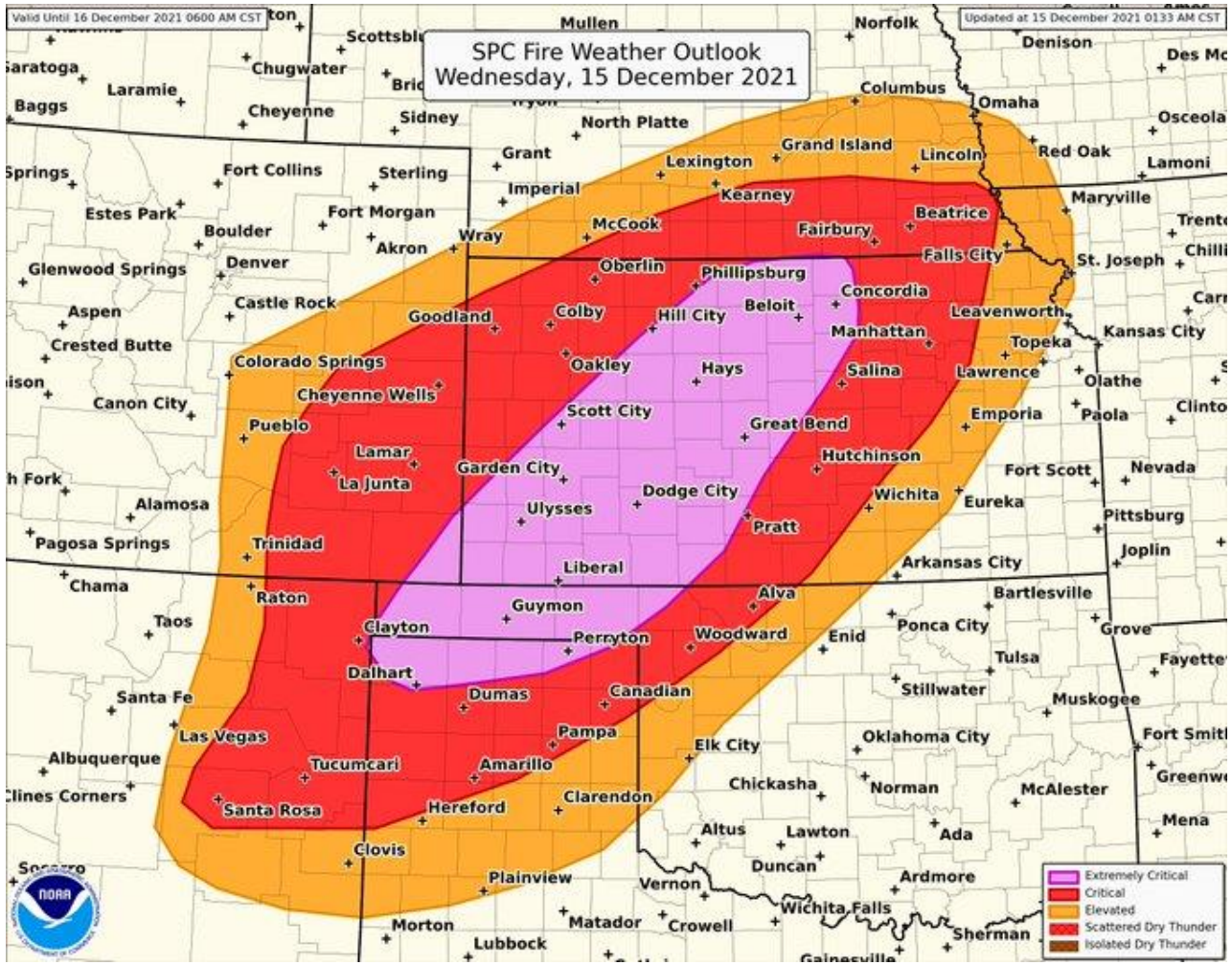
- **High Wind Warnings for non-thunderstorm winds are not issued frequently in Iowa, sometimes less than 3 times per year!**

Most Significant (75+ mph) Wind Gusts in a Day since at least 2004*

Top 8 Days by Number of Significant Wind Gusts	
Date	# of 75+ mph wind gusts
12/15/2021	**55+**
8/10/2020	53
6/6/2020	44
6/29/2012	37
6/14/2014	30
6/30/14 & 6/16/17 & 6/10/21	23



*Data from 2004 to present. Data is preliminary and subject to change before final storm data publication.



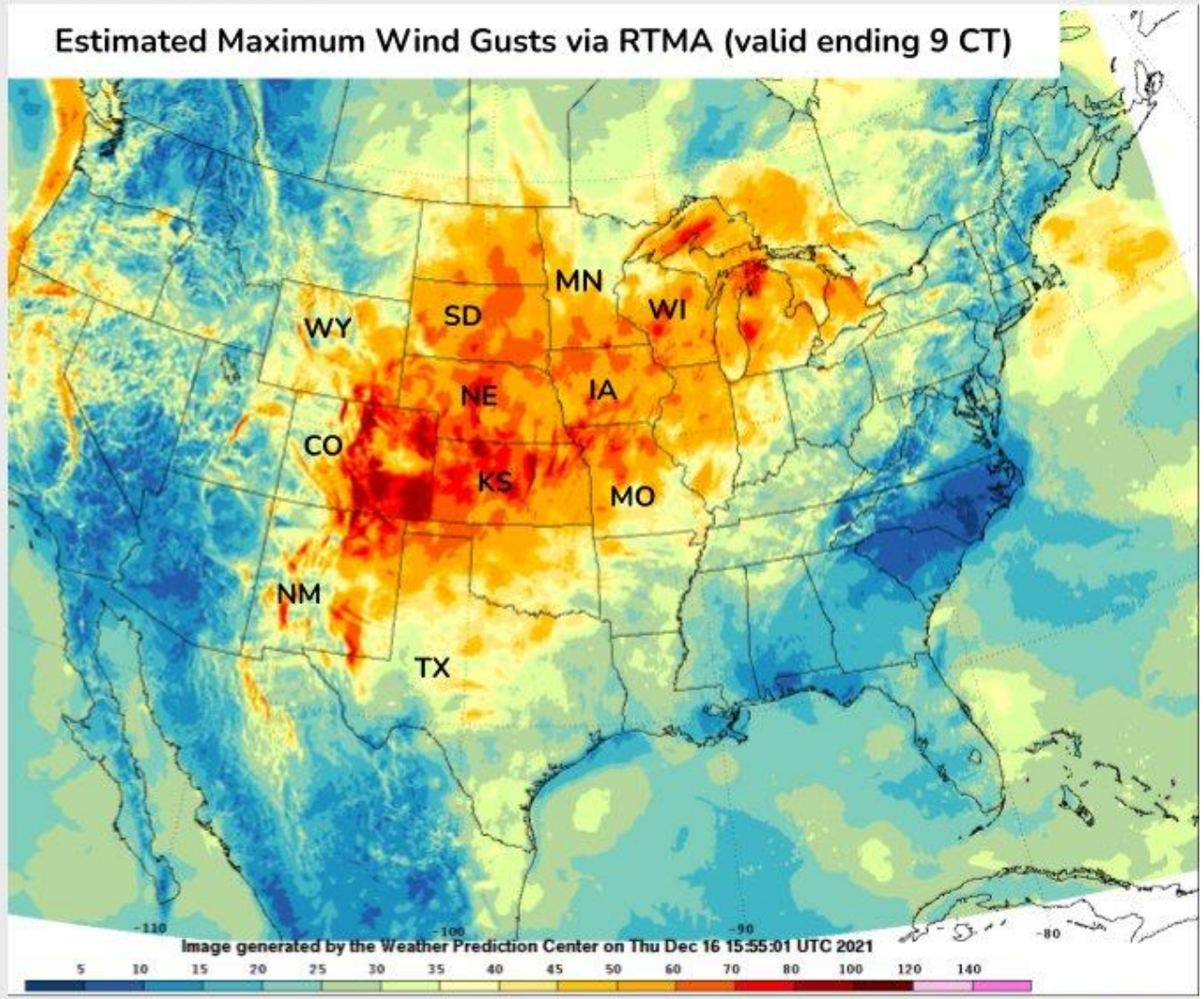
- The first Extremely Critical Fire Weather Outlook for the Southern and Central Plains during December in SPC history.
- Dangerous, life-threatening fire weather conditions are likely with fast moving and uncontrollable fire spread due to extreme winds and dry conditions.

Storm Summary for Central U.S. Extreme Wind Event

Updated 12/16/2021
12:00 PM ET

The powerful low pressure system responsible for high winds over the last 24 hours has exited the Nation. Here is a brief summary of the highest recorded wind gusts.

- **Colorado**
  Lamar 4 WSW (107 mph)
- **Iowa**
  Mason City Airport (83 mph)
- **Kansas**
  Russell (100 mph)
- **Minnesota**
  Plainview (85 mph)
- **Missouri**
  Corning 3 N (90 mph)
- **Nebraska**
  Lincoln 5 WNW (93 mph)
- **New Mexico**
  Red River 9 SSW (103 mph)
- **South Dakota**
  Wasta 3 NW (79 mph)
- **Texas**
  Sunray 9 NNE (90 mph)
- **Wisconsin**
  Rhinelander (76 mph)
- **Wyoming**
  Crystal Lake 10 ESE (94 mph)

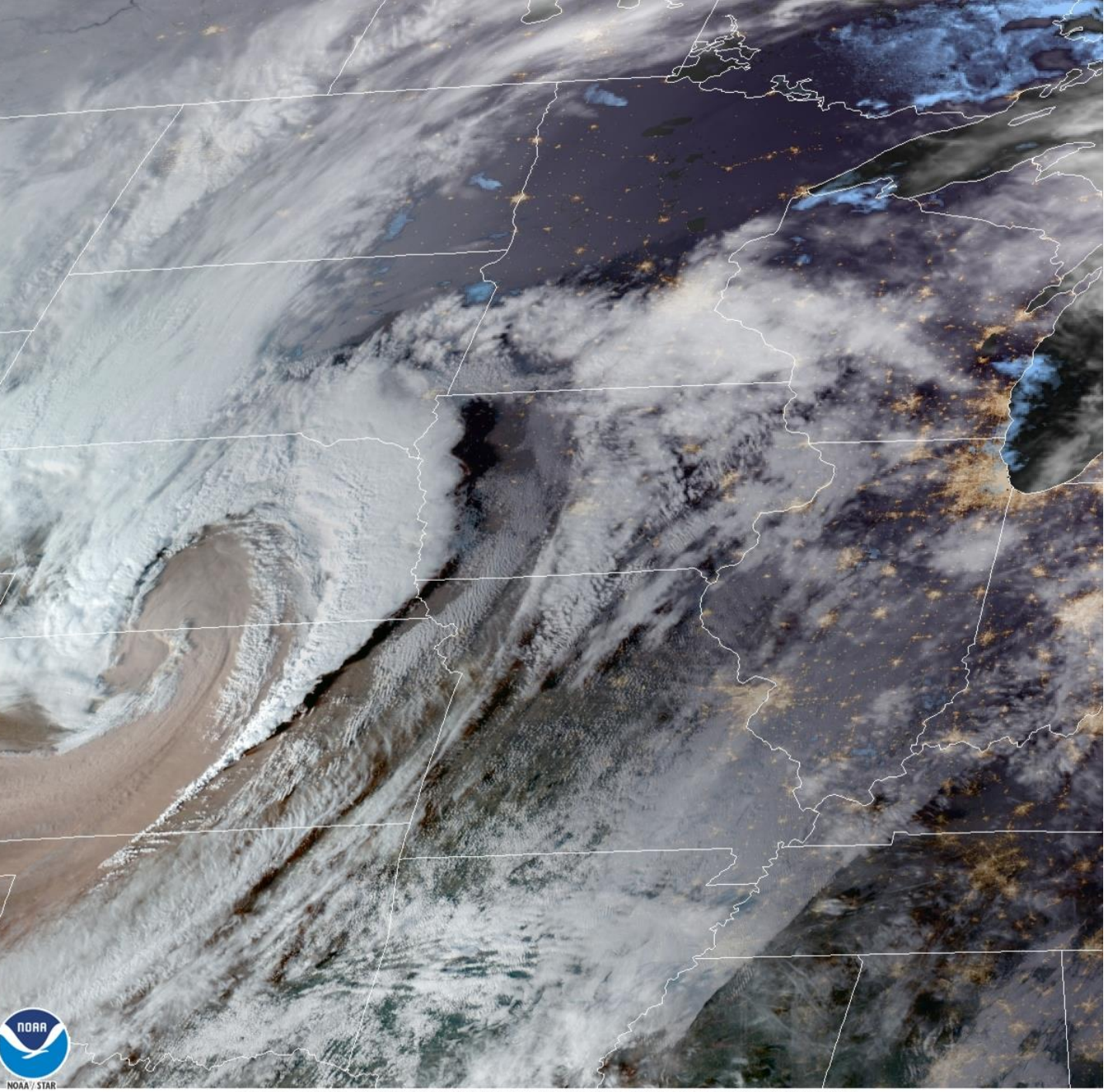


National Oceanic and Atmospheric Administration
U.S. Department of Commerce

For more information go to:
www.wpc.ncep.noaa.gov and www.weather.gov

Weather Prediction Center
College Park, MD

https://twitter.com/NWSWPC/status/1471531145816952832/photo/1



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

8:49 5G

9

CW **City of Waukee** 8:41 PM
To: WHO News >

Advisory Message: Current Smoke Smell is Not Local

Message sent via Nixle | Go to nixle.com | Unsubscribe

Wednesday December 15, 2021, 8:40 PM

City of Waukee

Advisory: Current Smoke Smell is Not Local

Dear Nixle User,

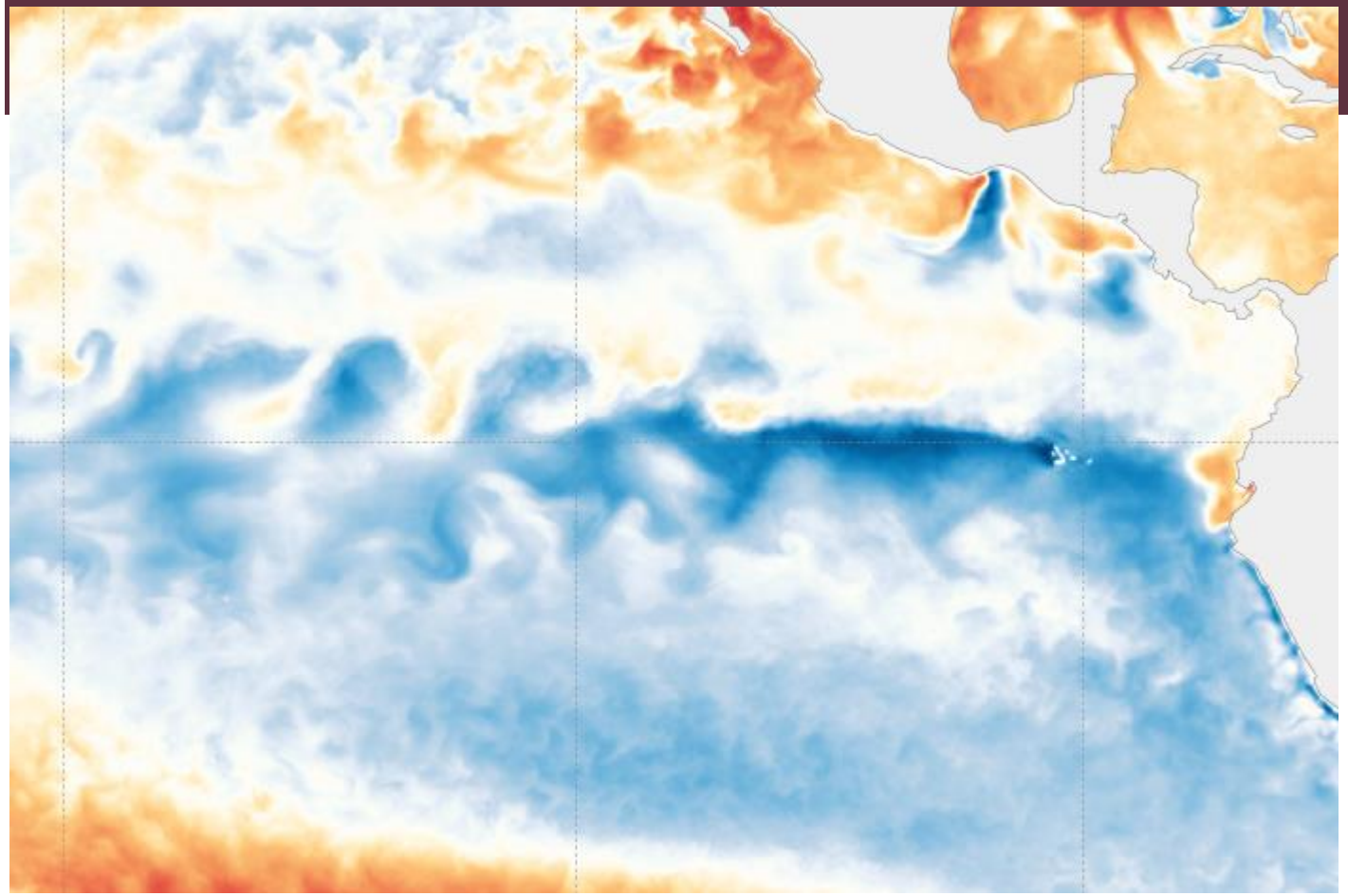
Smelling smoke? According to the National Weather Service, this storm has brought in a smell from a large fire all the way in Kansas.

For full details, view this message on the web.

Climate Outlooks

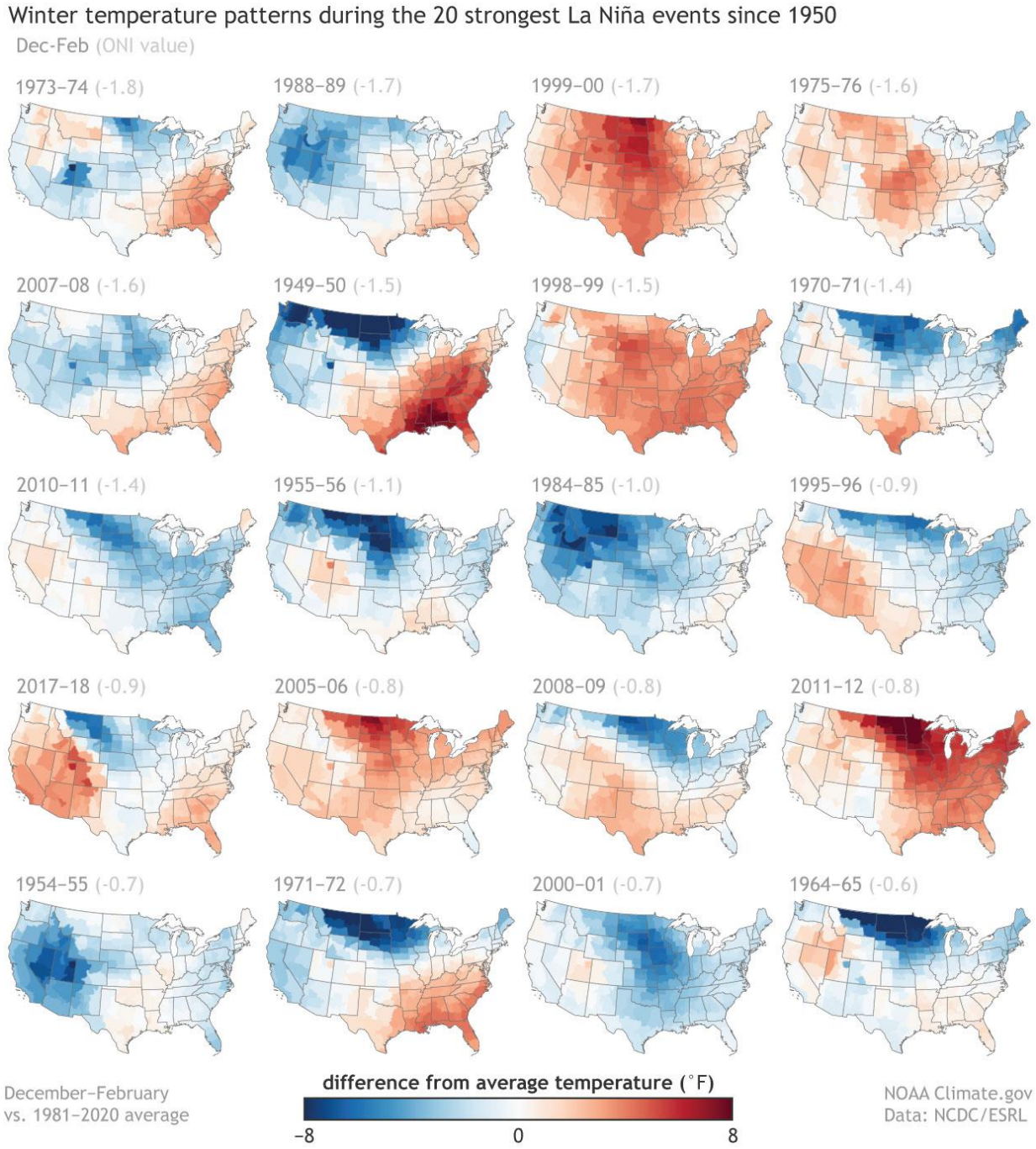
- La Niña
- 7-day Precipitation Forecast
- U.S. Hazard Outlooks
- 8 – 14 day Outlook
- December temperature and precipitation
- JFM temperature and precipitation
- MAM temperature and precipitation

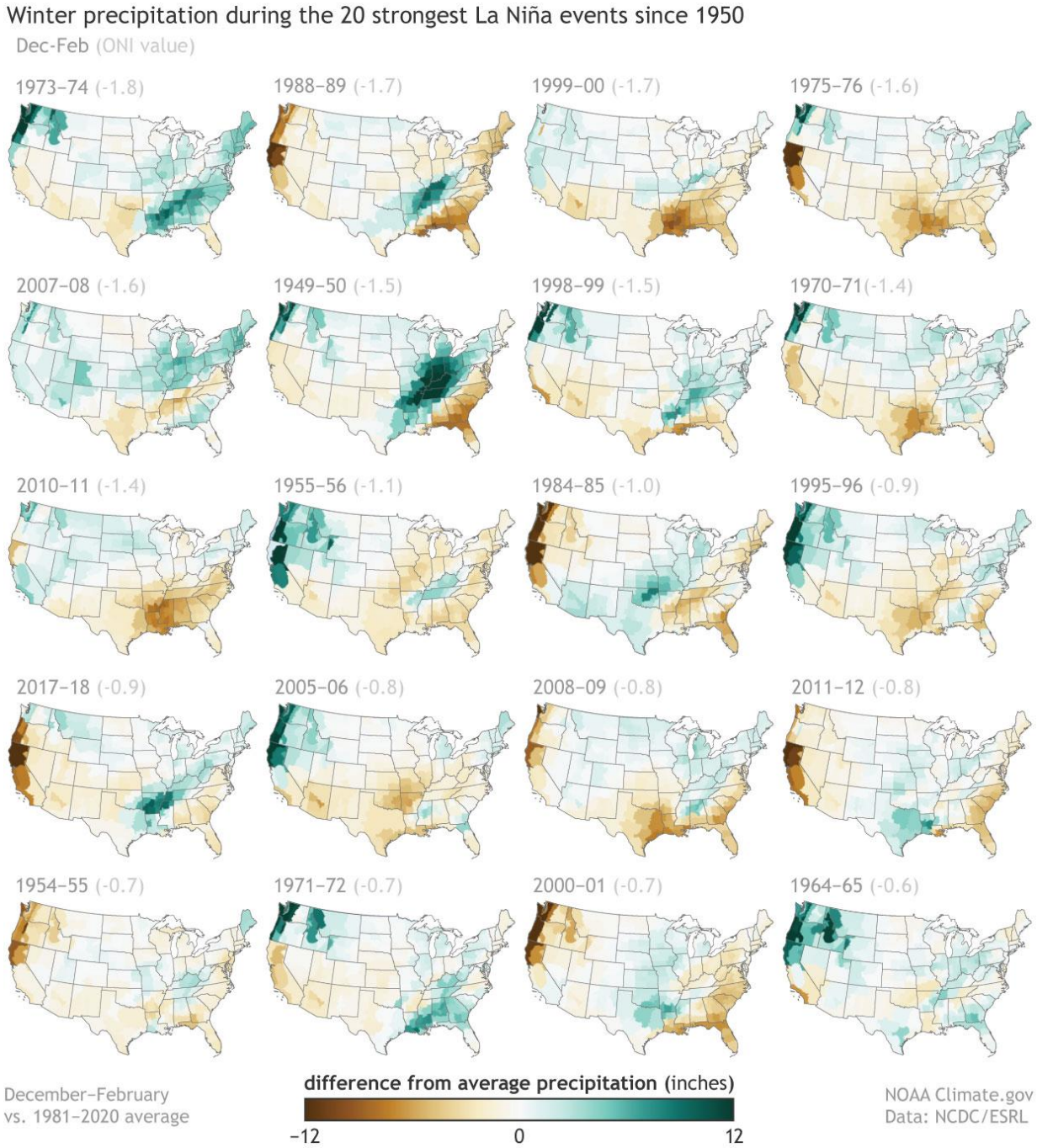
La Niña Advisory



- In October, the tropical Pacific and atmosphere both indicated a strengthening La Niña
- Moderate phase forecasted at 59%
- Second La Niña in two years, known as a Double-Dip La Niña
- La Niña is likely to continue across the Northern Hemisphere 2021-22 winter
  - ~95% chance during January-March and into spring 2022
  - ~60% chance of transitions to ENSO- neutral during Spring 2022
-

https://www.climate.gov/news-features/blogs/enso/november-2020-la-ni%C3%B1a-update-just-us-chickens


Winter temperature patterns during the 20 strongest La Niña events since 1950
Dec-Feb (ONI value)
1973–74 (-1.8)
1988–89 (-1.7)
1999–00 (-1.7)
1975–76 (-1.6)
2007–08 (-1.6)
1949–50 (-1.5)
1998–99 (-1.5)
1970–71(-1.4)
2010–11 (-1.4)
1955–56 (-1.1)
1984–85 (-1.0)
1995–96 (-0.9)
2017–18 (-0.9)
2005–06 (-0.8)
2008–09 (-0.8)
2011–12 (-0.8)
1954–55 (-0.7)
1971–72 (-0.7)
2000–01 (-0.7)
1964–65 (-0.6)
December–February
vs. 1981–2020 average
difference from average temperature (°F)
-8
0
8
NOAA Climate.gov
Data: NCDC/ESRL


Winter precipitation during the 20 strongest La Niña events since 1950
Dec-Feb (ONI value)
1973–74 (-1.8)
1988–89 (-1.7)
1999–00 (-1.7)
1975–76 (-1.6)
2007–08 (-1.6)
1949–50 (-1.5)
1998–99 (-1.5)
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1955–56 (-1.1)
1984–85 (-1.0)
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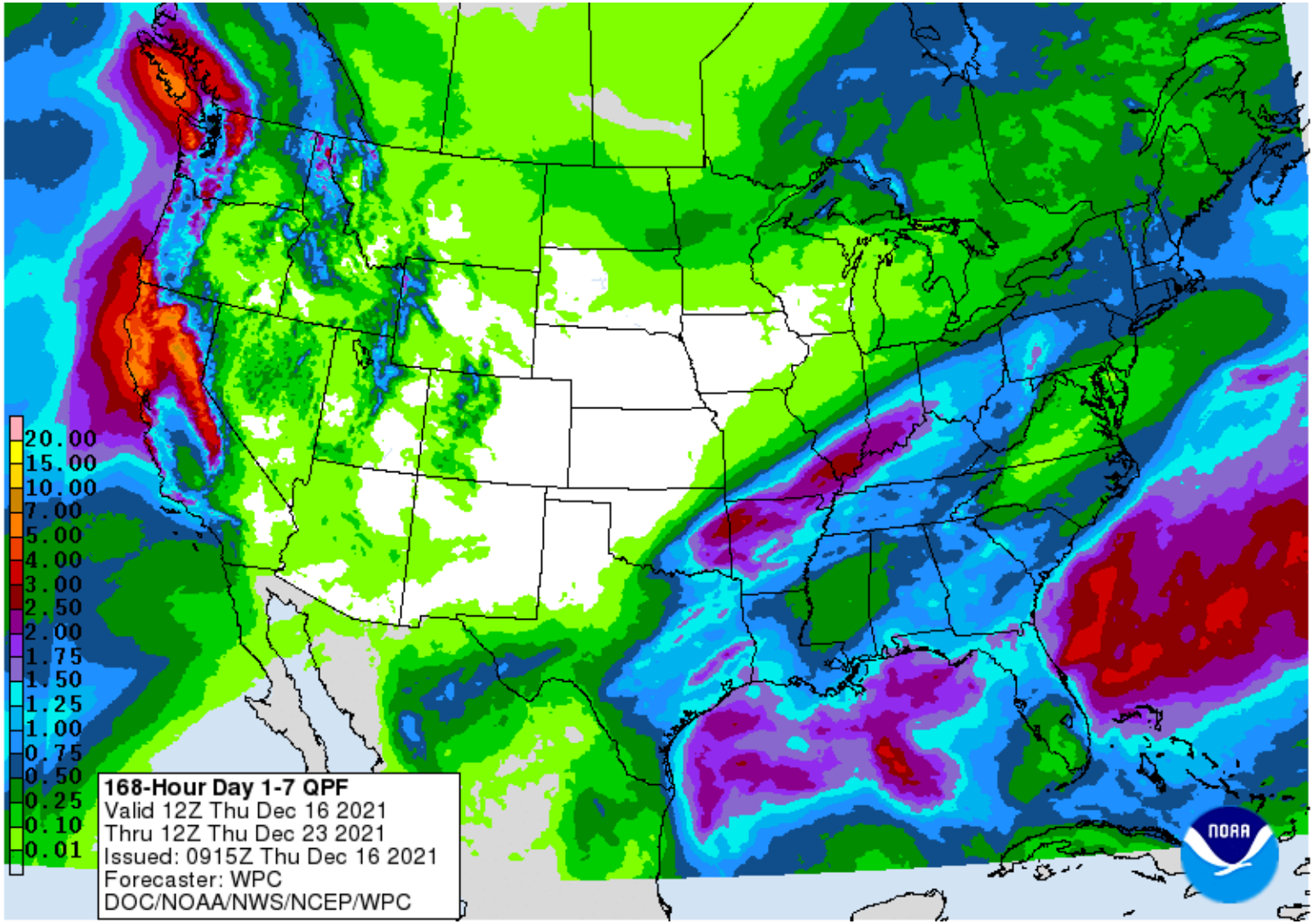
2008–09 (-0.8)
2011–12 (-0.8)
1954–55 (-0.7)
1971–72 (-0.7)
2000–01 (-0.7)
1964–65 (-0.6)
December–February
vs. 1981–2020 average
difference from average precipitation (inches)
−12
0
12
NOAA Climate.gov
Data: NCDC/ESRL

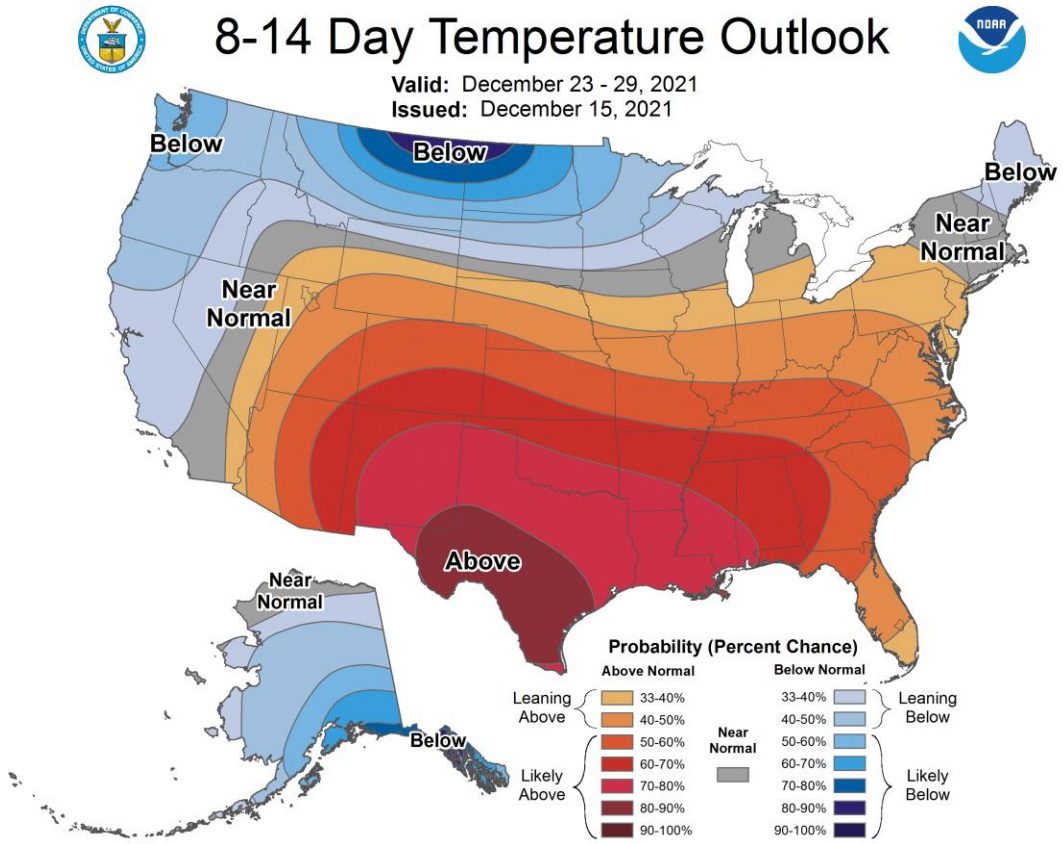
7-day Quantitative Precipitation Forecast

Valid: 16 Dec. – 23 Dec.

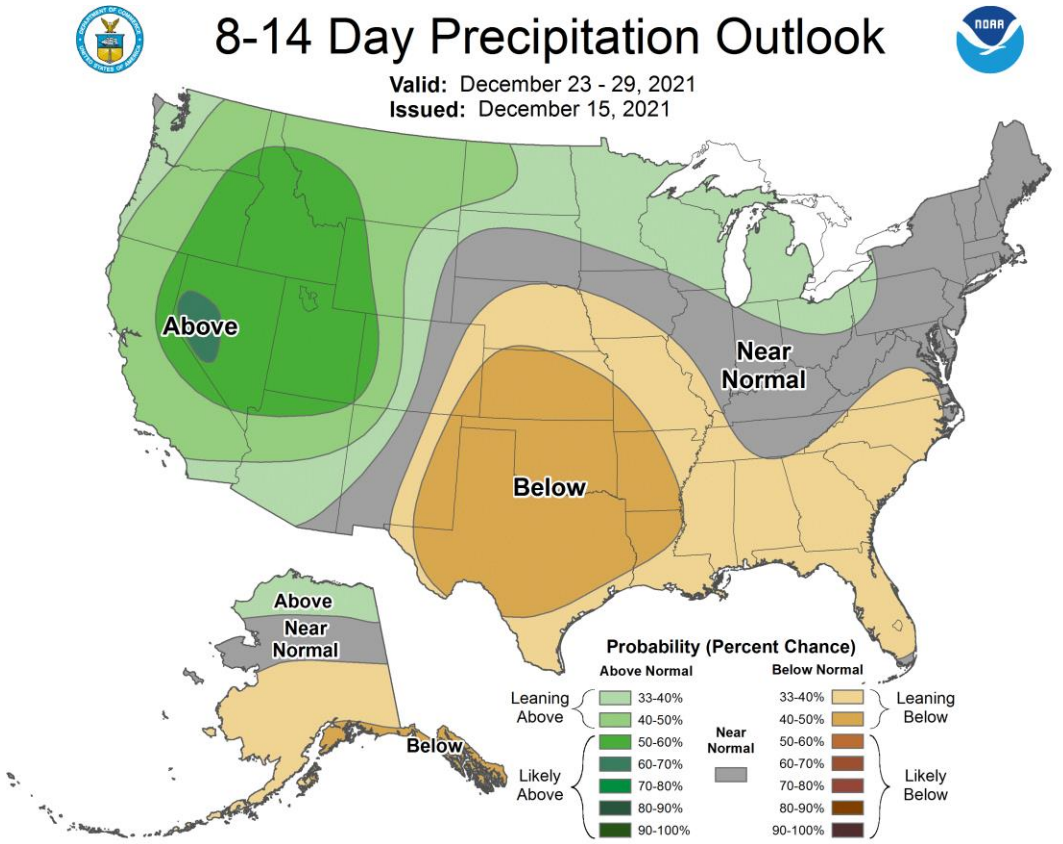


https://www.wpc.ncep.noaa.gov/qpf/day1-7.shtml

8-14 Day Outlook

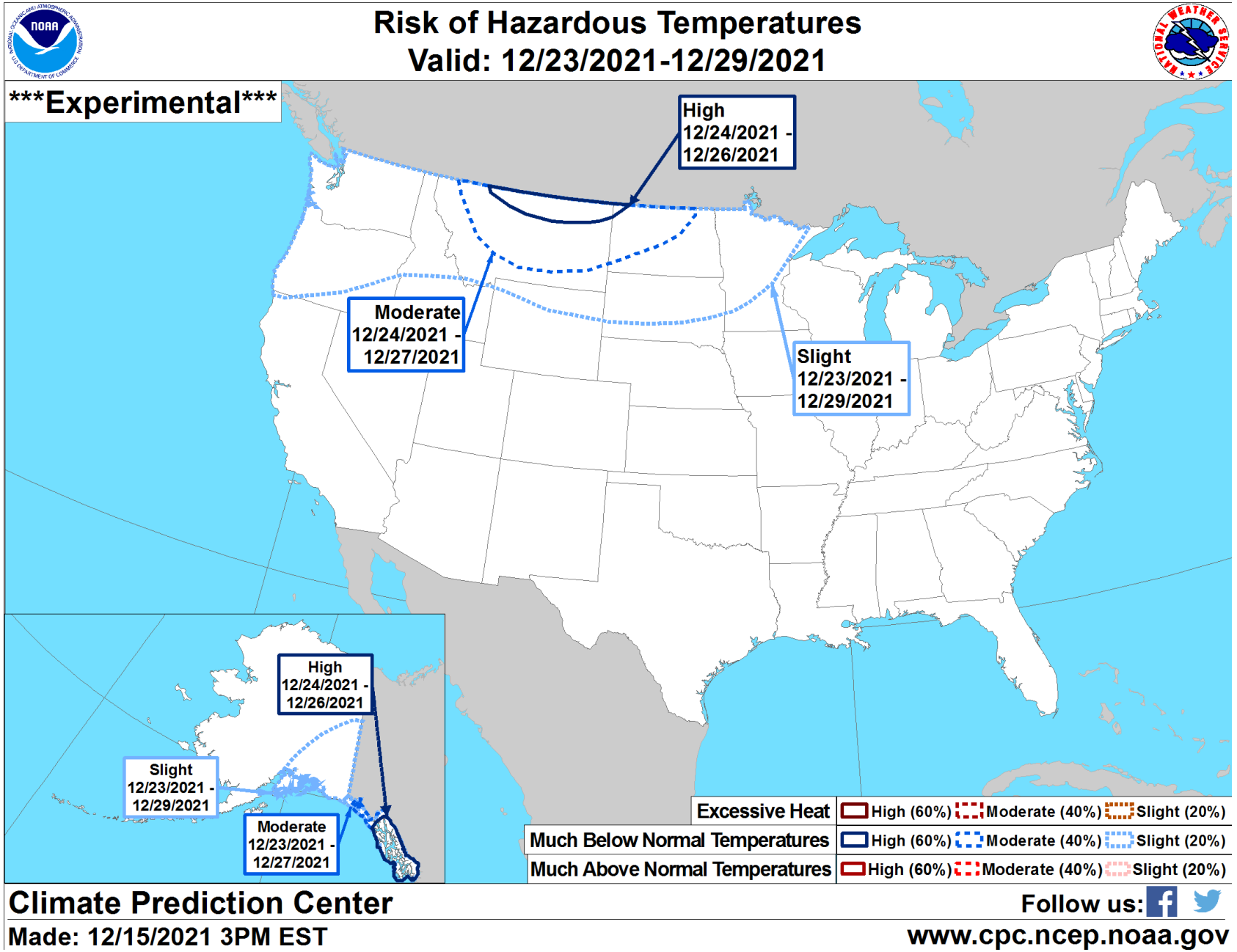


Temperature



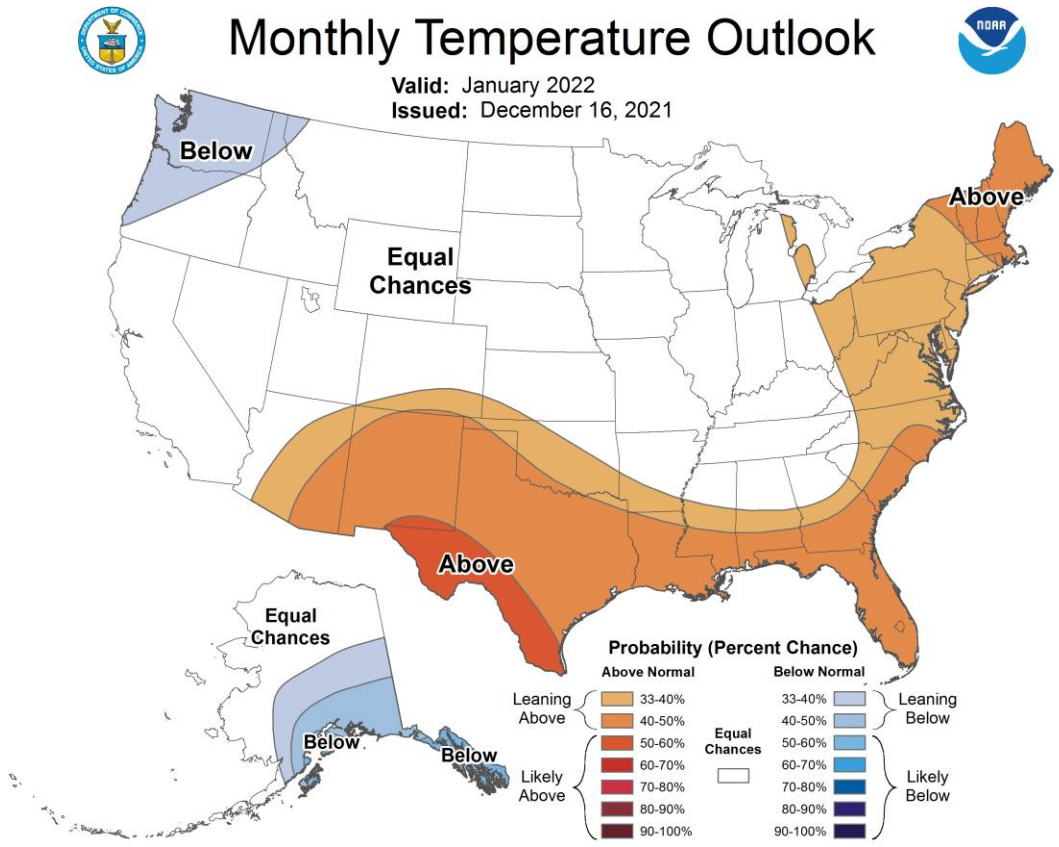
Precipitation

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

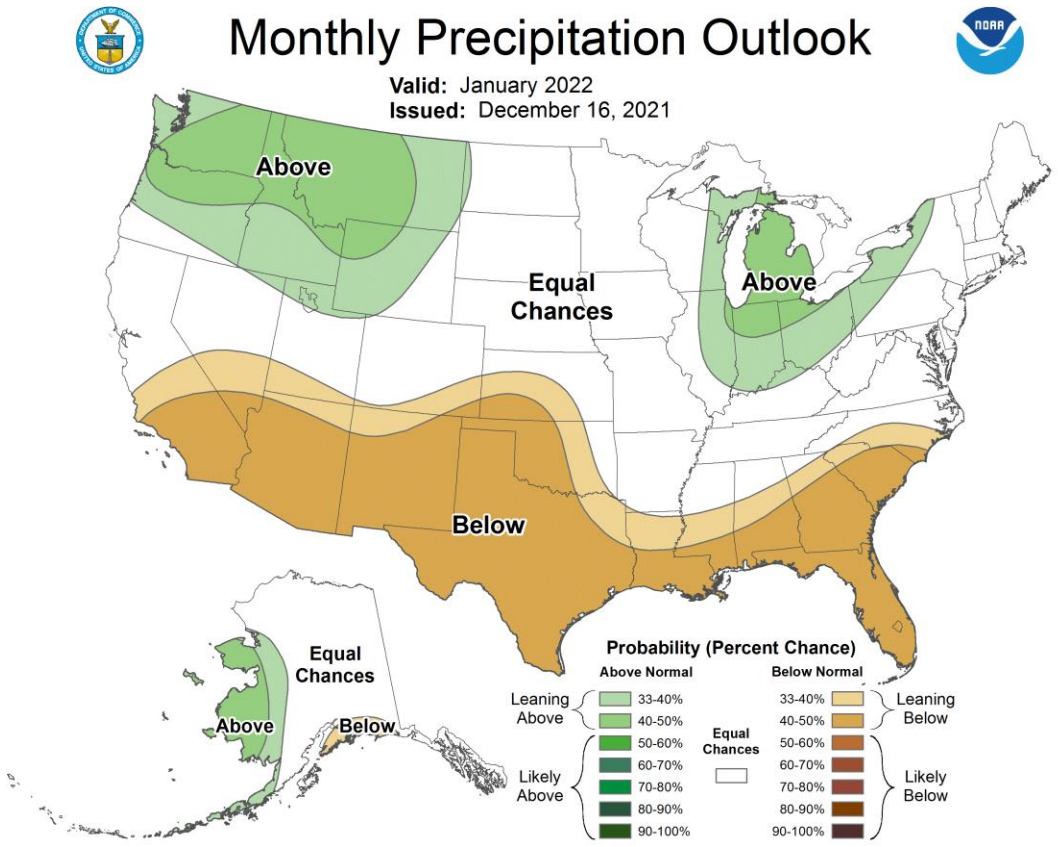


https://www.cpc.ncep.noaa.gov/products/predictions/threats/temp_probhazards_d8_14_contours.png

January Outlooks



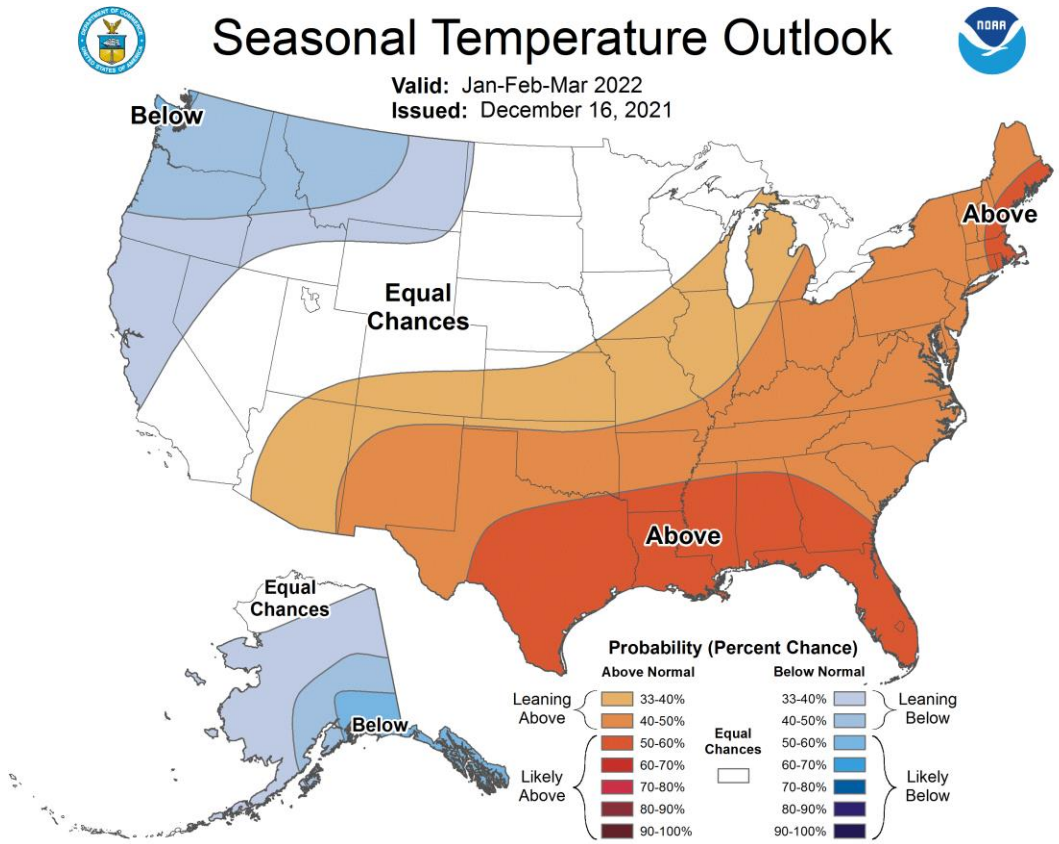
Temperature

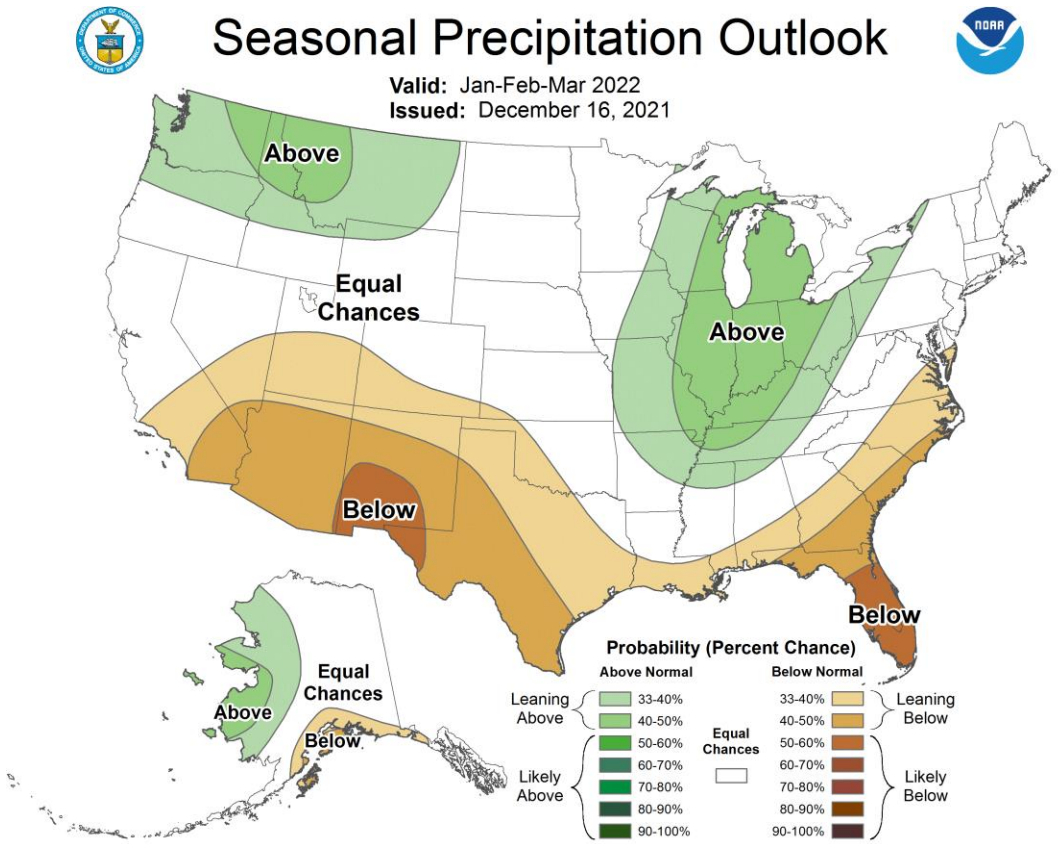


Precipitation

http://www.cpc.ncep.noaa.gov/products/predictions/long_range/lead14/

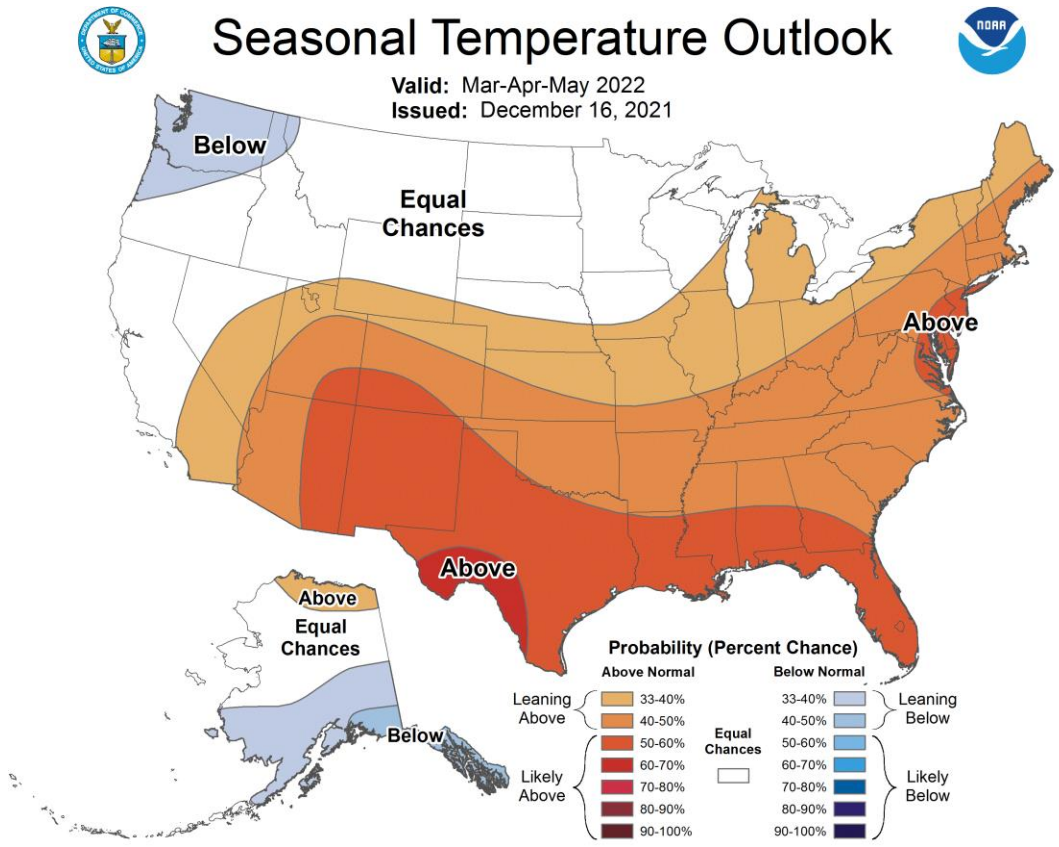
JFM 2022 Outlooks

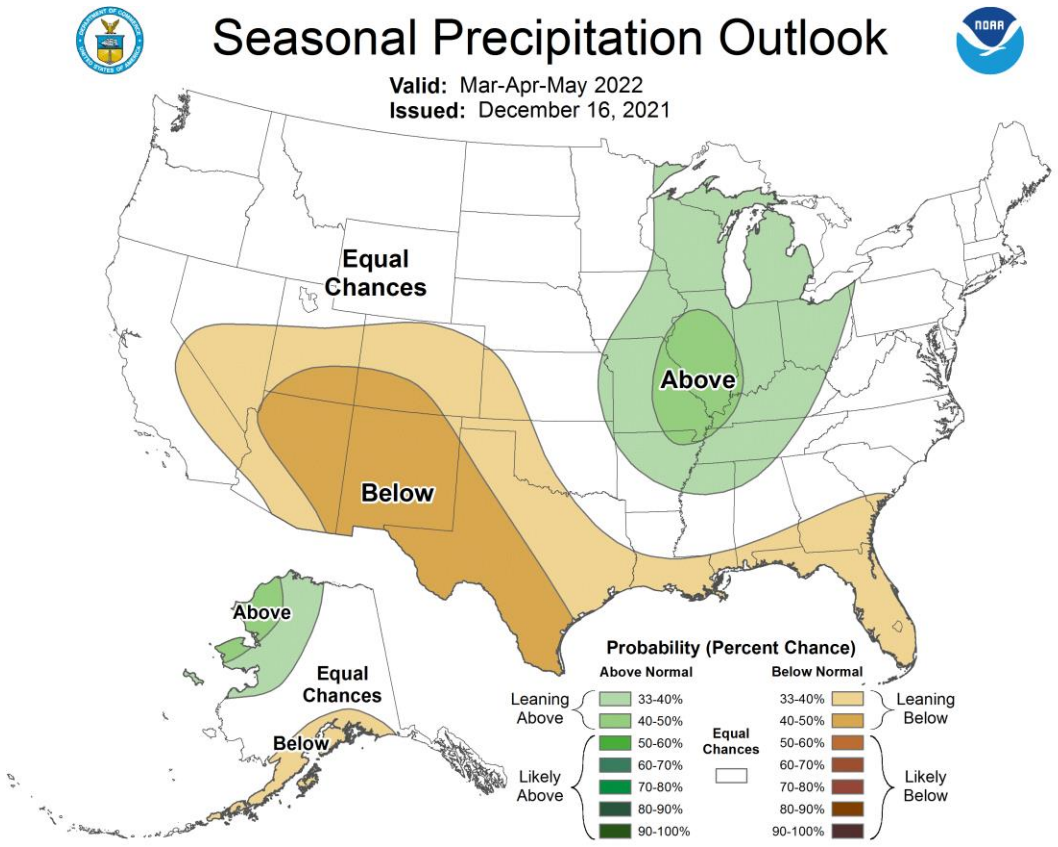




https://www.cpc.ncep.noaa.gov/products/predictions/long_range/

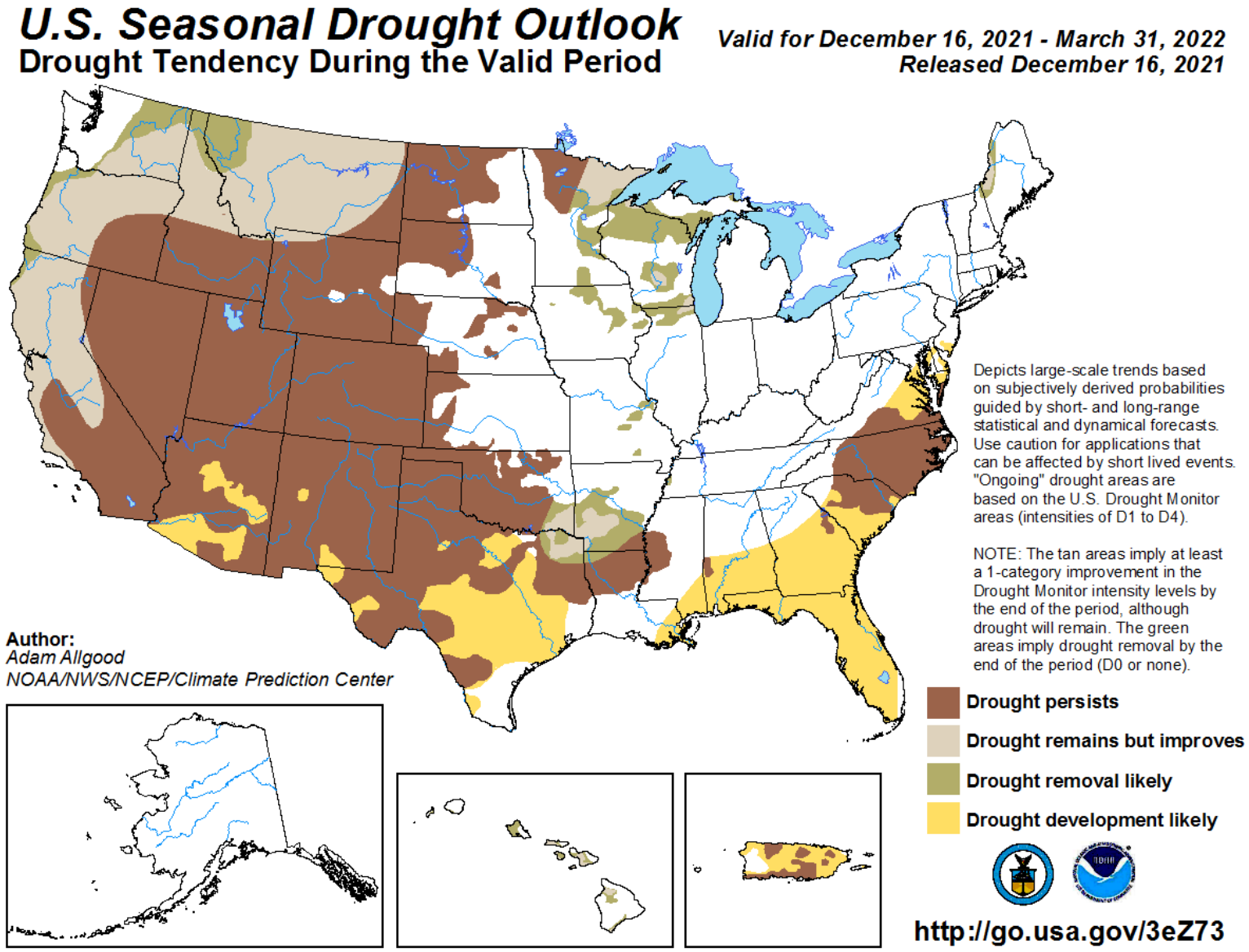
MAM 2022 Outlooks





https://www.cpc.ncep.noaa.gov/products/predictions/90day/

Seasonal Drought Outlook



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

Outlook Summary

- Short-term outlooks showing colder and wetter north to warmer and drier south
- Classic La Niña signal showing in updated monthly and seasonal outlooks
  - High probability of a weak to moderate La Niña
  - We shouldn’t expect major changes in the maps moving forward
  - Analog years show high variability in temperature and precipitation
  - Some of the biggest signals from La Niña will be late winter and early spring, especially across the Ohio Valley and Great Lakes – wet.

Further Information - Partners

- **Today's and Past Recorded Presentations:**
  https://mrcc.purdue.edu/multimedia/webinars.jsp
  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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  - crhroc@noaa.gov