North Central U.S. Climate & Drought Outlook

December 18, 2025

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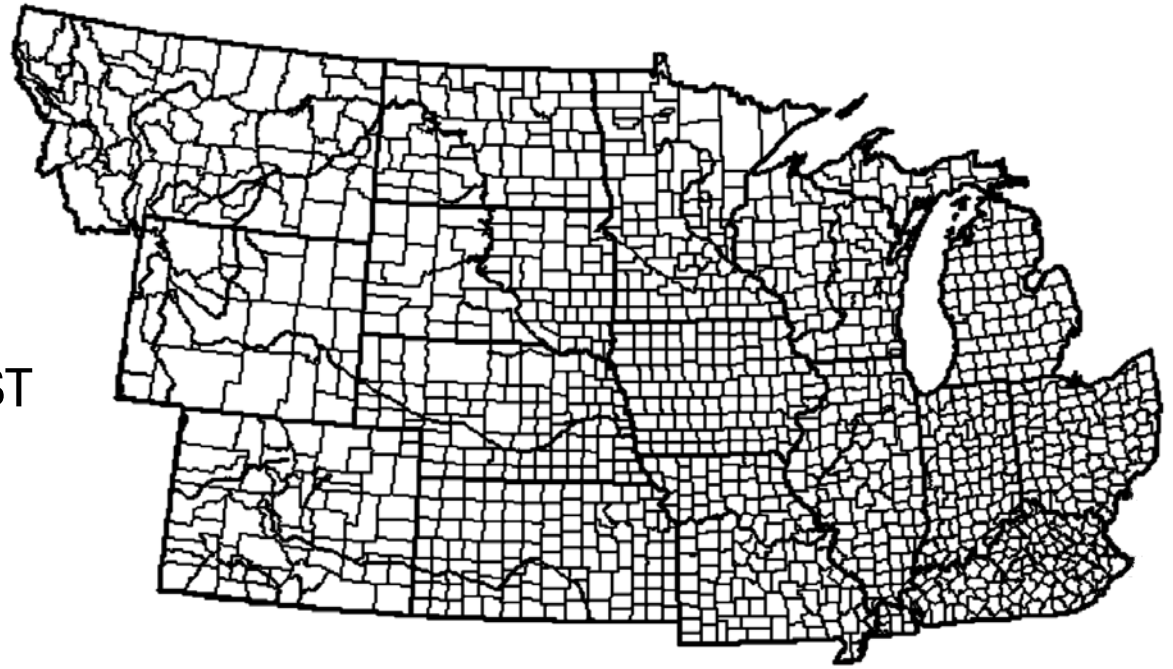
Wisconsin State Climatology Office
UNIVERSITY OF WISCONSIN-MADISON

Credit: UW News

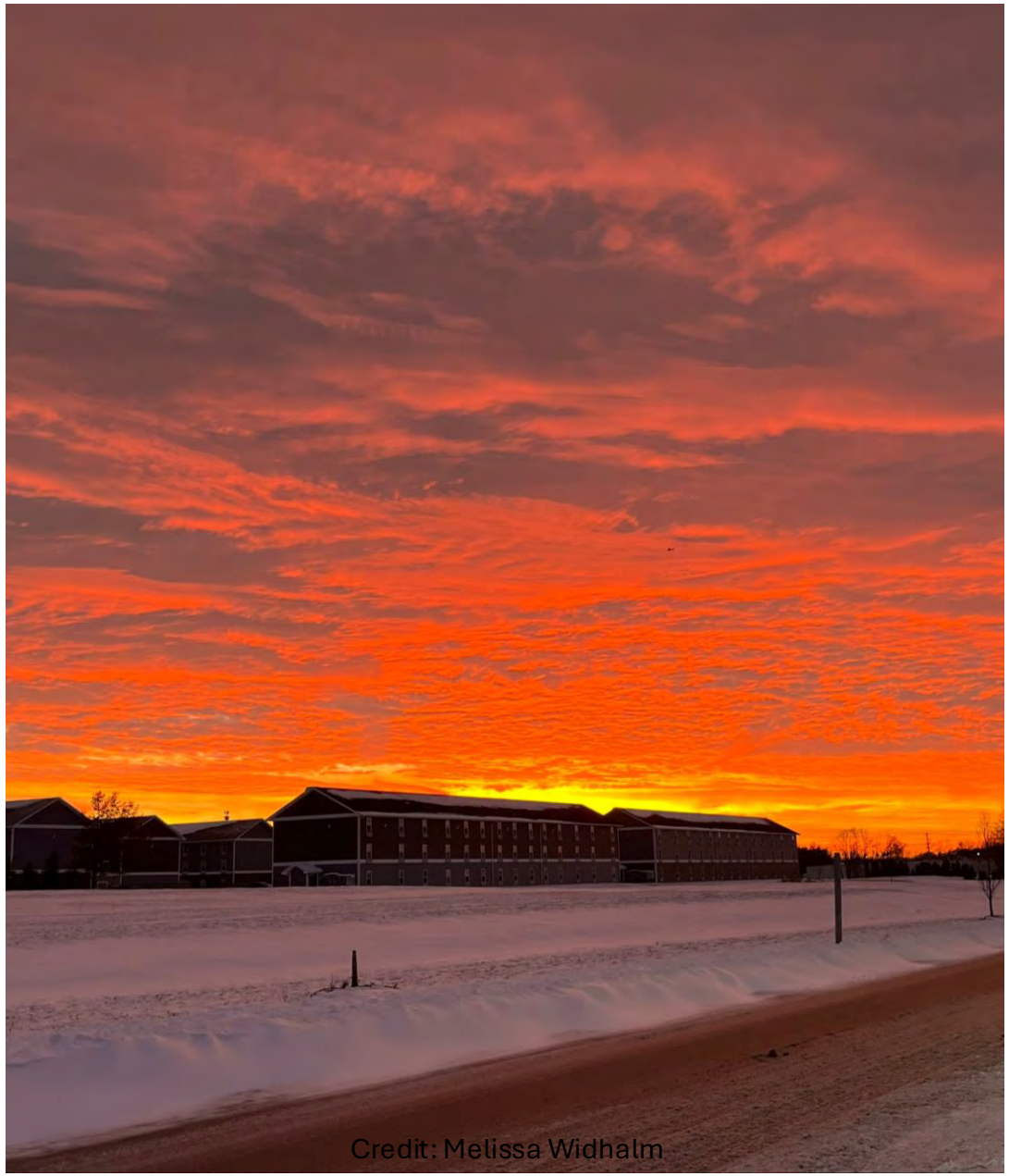
General Information

- Providing Climate Services to the North Central U.S.
  - Collaboration Among:
    - NOAA NCEI, NWS, OAR, and NIDIS
    - National Drought Mitigation Center
    - USDA Climate Hubs
    - American Association of State Climatologists
    - Midwest and High Plains Regional Climate Centers
- Past Webinars
  - https://mrcc.purdue.edu/webinars
  - https://hprcc.unl.edu/webinars.php
- Next Webinar
  - Thursday, January 15, 2024 @ 1:00pm CST
  - Dr. Zach Hoylman
    - Montana Assistant State Climatologist



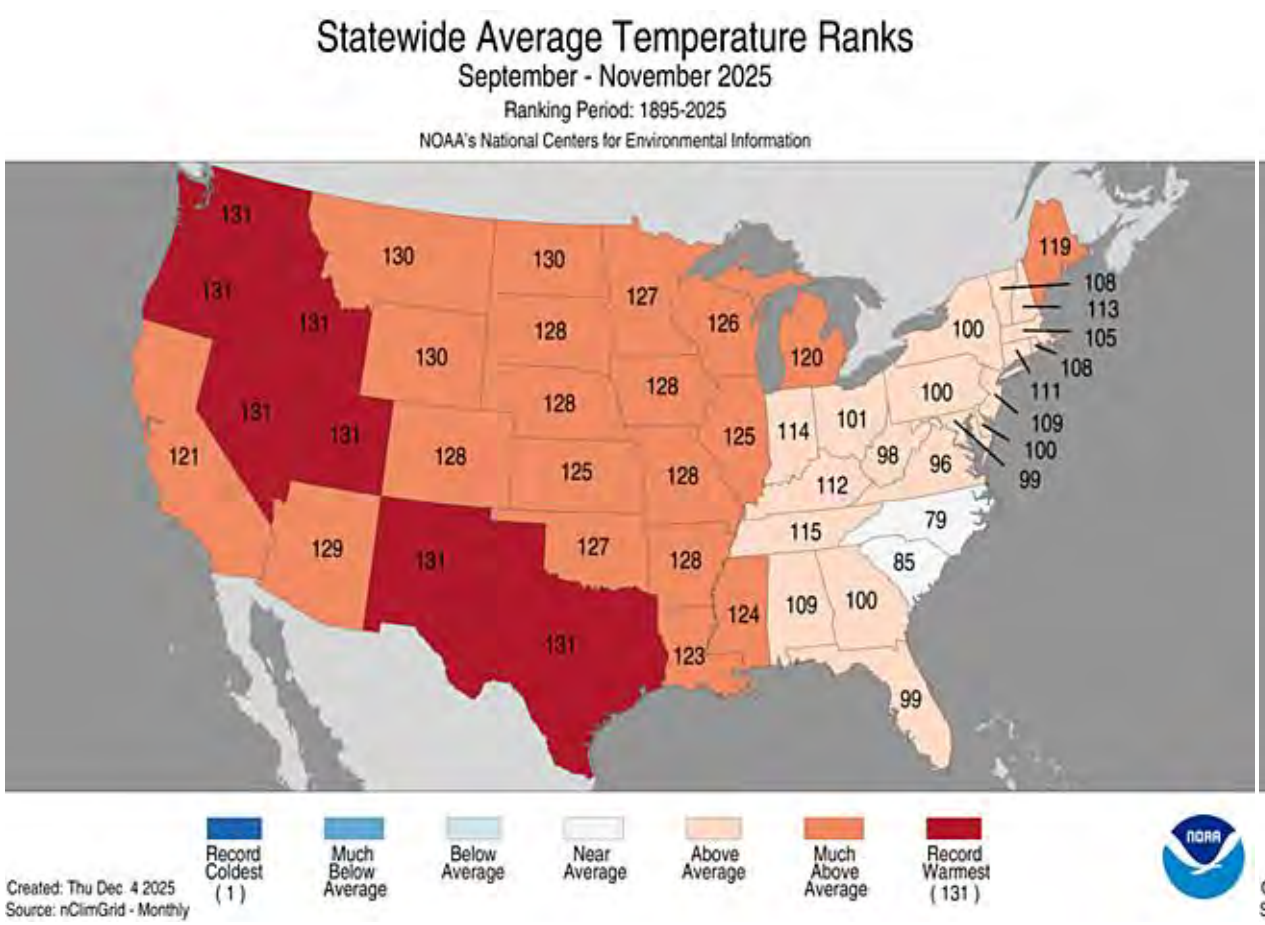
Outline

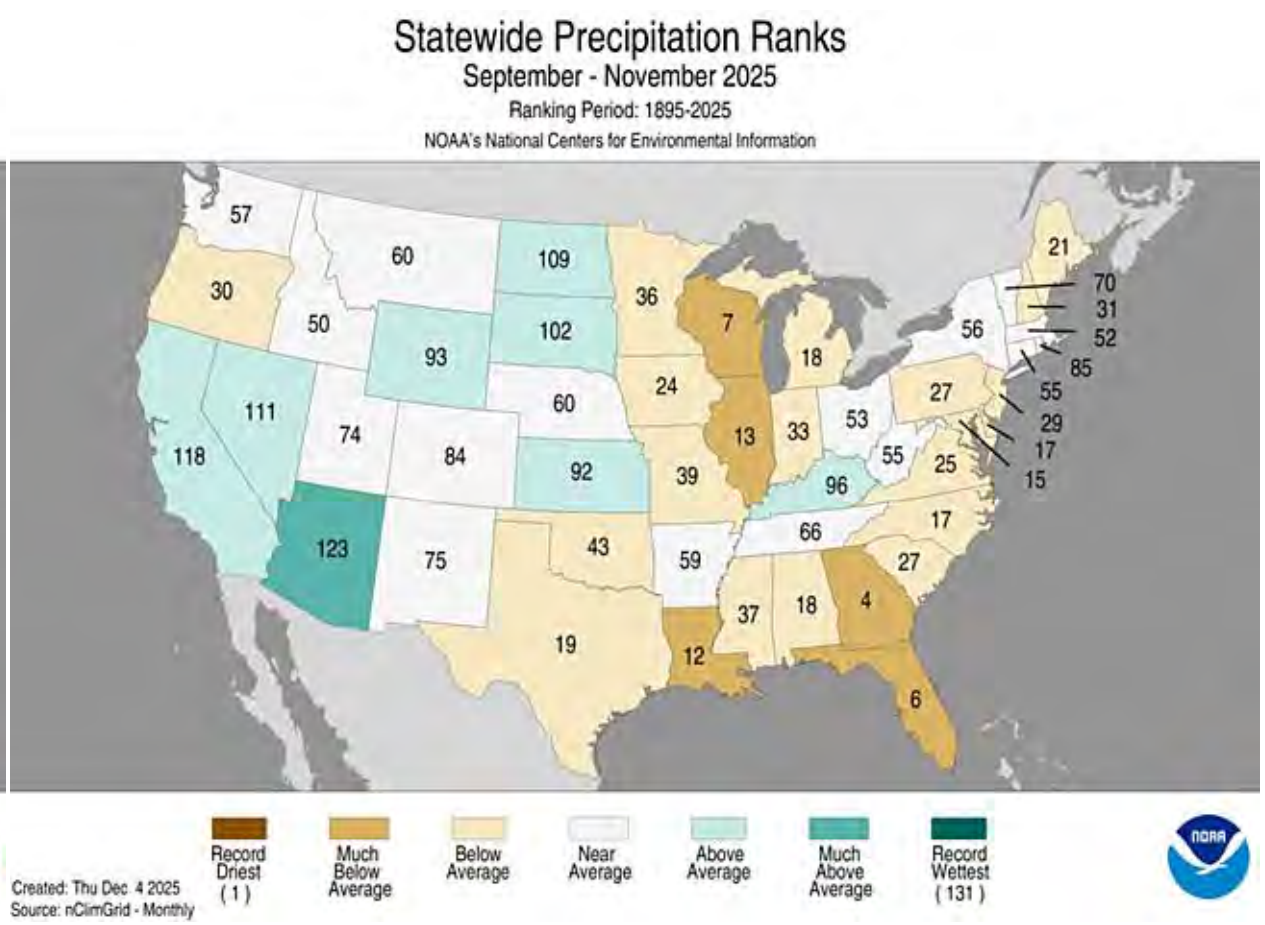
- Recent Conditions
- Impacts
- Winter Weather
- Outlooks
- Questions



Recent Conditions

Autumn (September-November)



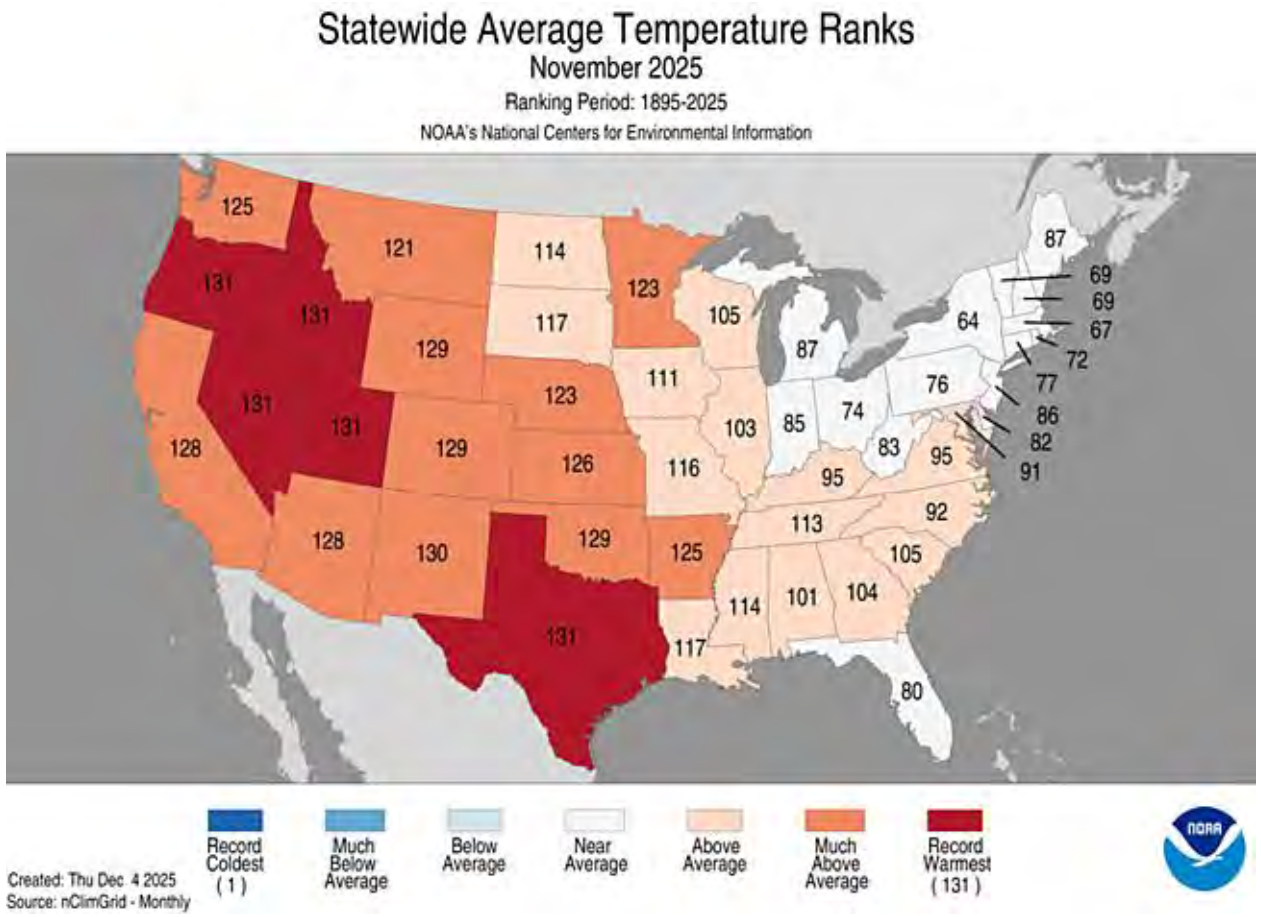


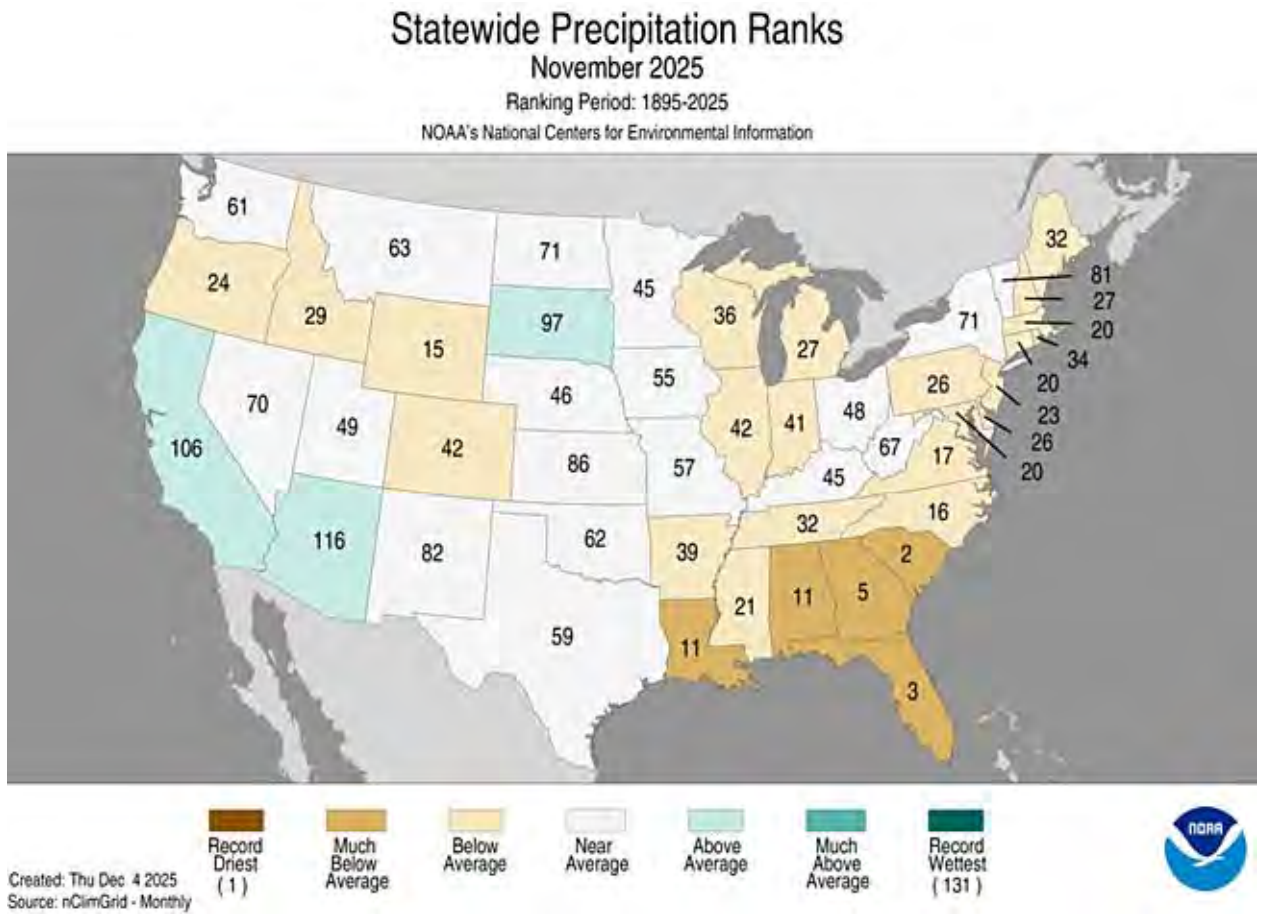
- Warmer than normal fall everywhere in the region, especially the further west you go
- 2nd warmest fall: MT, WY, ND
- 4th warmest fall: CO, SD, NE, IA, MO

Credit: NCEI

- Drier than normal fall for most of the Midwest, especially WI (7th driest) and IL (13th driest)
- Near normal precip for OH, NE, CO, MT
- Above normal precip for KY, KS, WY, Dakotas

November



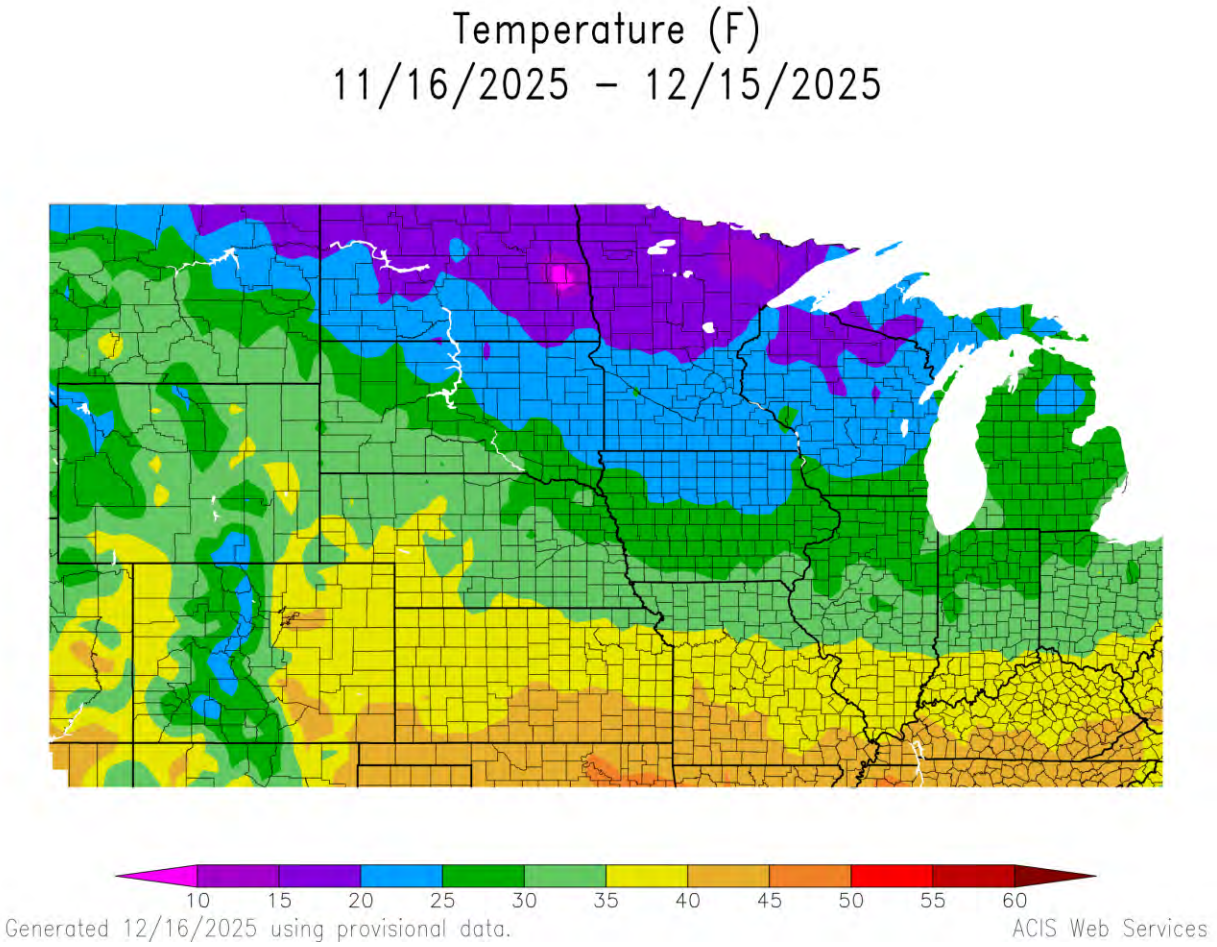


- Near normal Nov temps to the east
- Warmer than normal Nov the further west you go
- 3rd warmest Nov: WY, CO

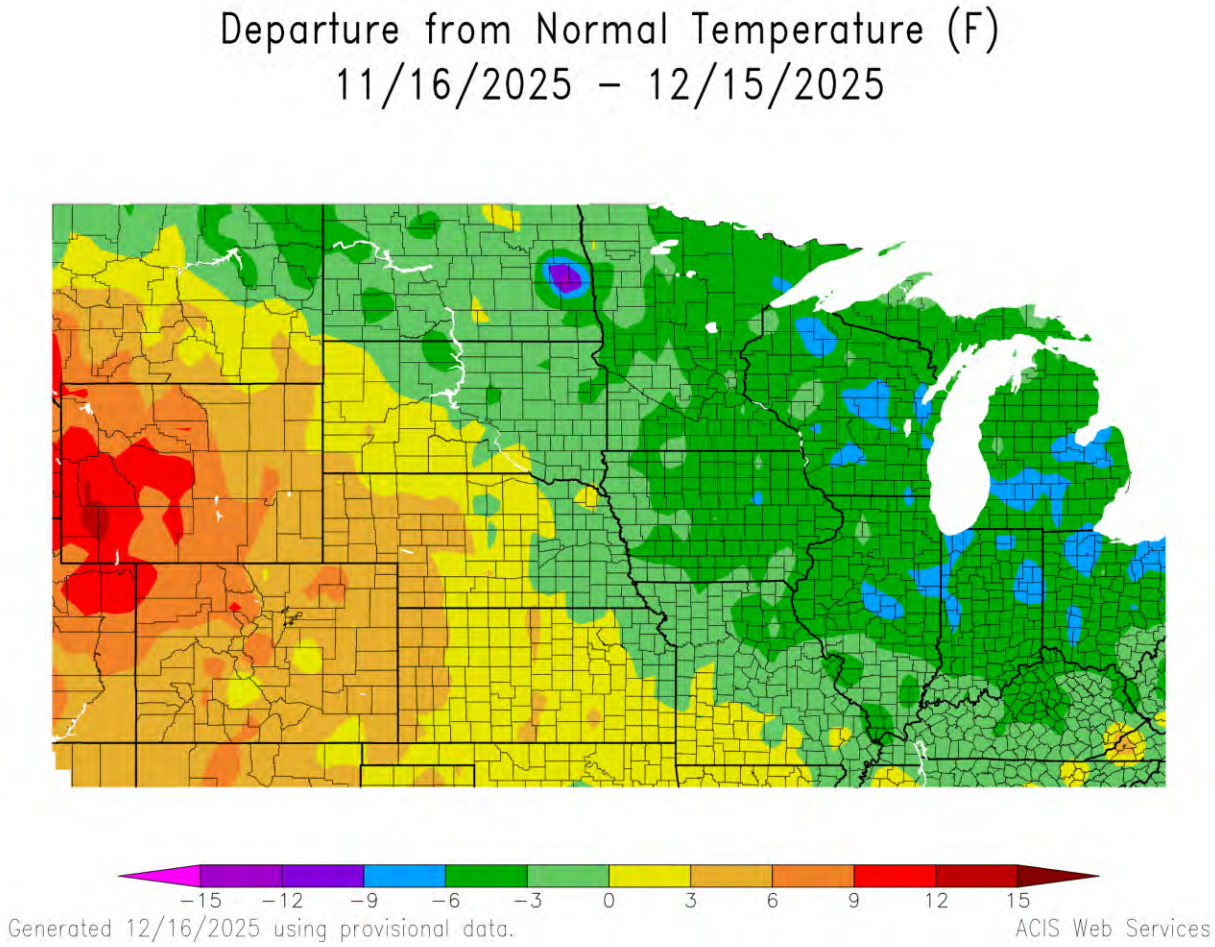
- Near normal Nov precip for most
- Slightly wetter than normal Nov for SD
- Slightly drier than normal Nov for the "central" Midwest, WY, and CO

Credit: NCEI

Last 30 Days: Temperatures



- Generally subfreezing to the north, east, and higher elevations (aligns with snowpack)
- Mid-30s and warmer for southern tier

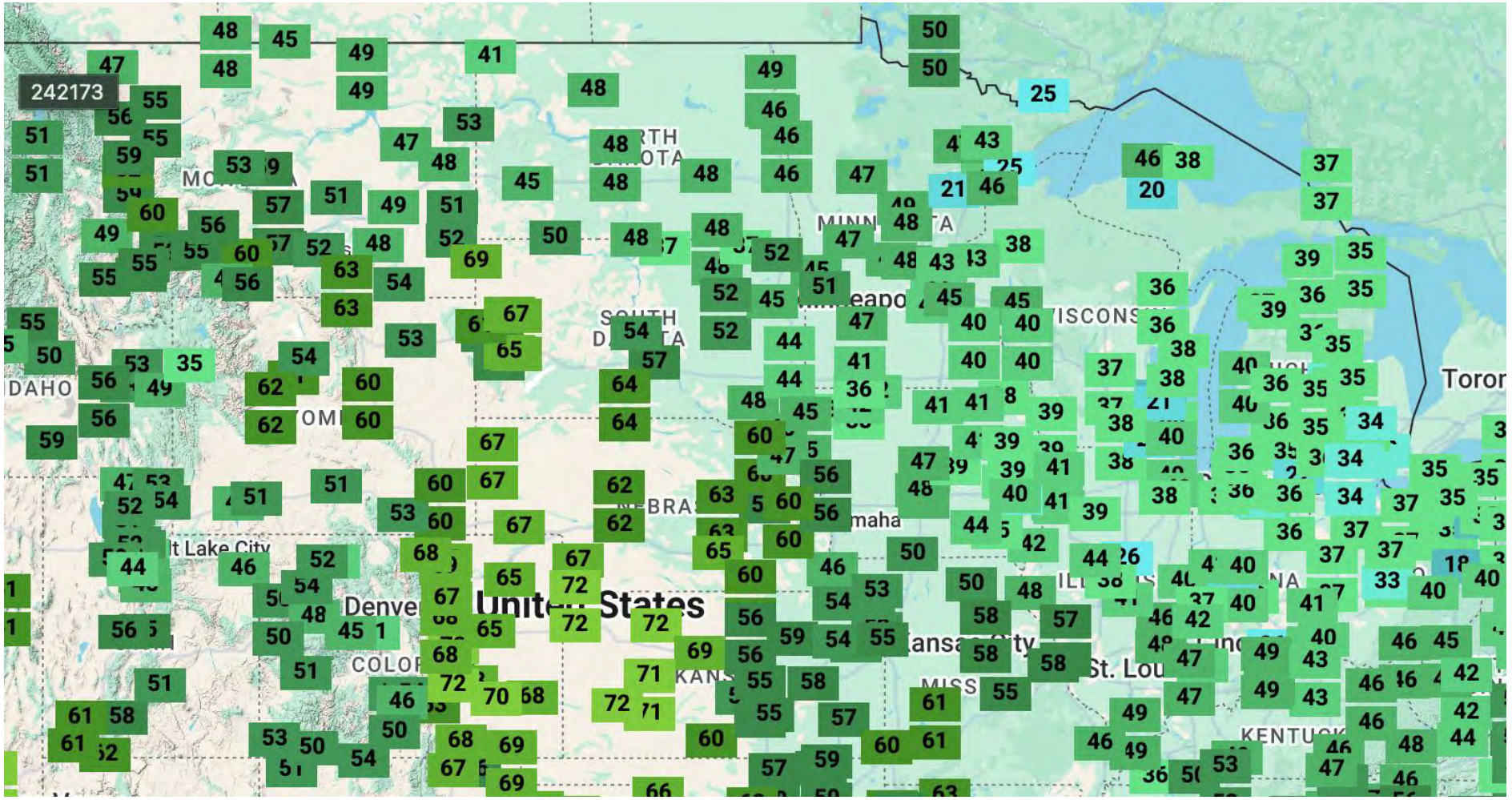


- Cooler than normal (3-9°F) for east
- Within 3°F of normal for central
- Warmer than normal (3-12°F) for west

Credit: HPRCC

Last 2 Days: Temperatures

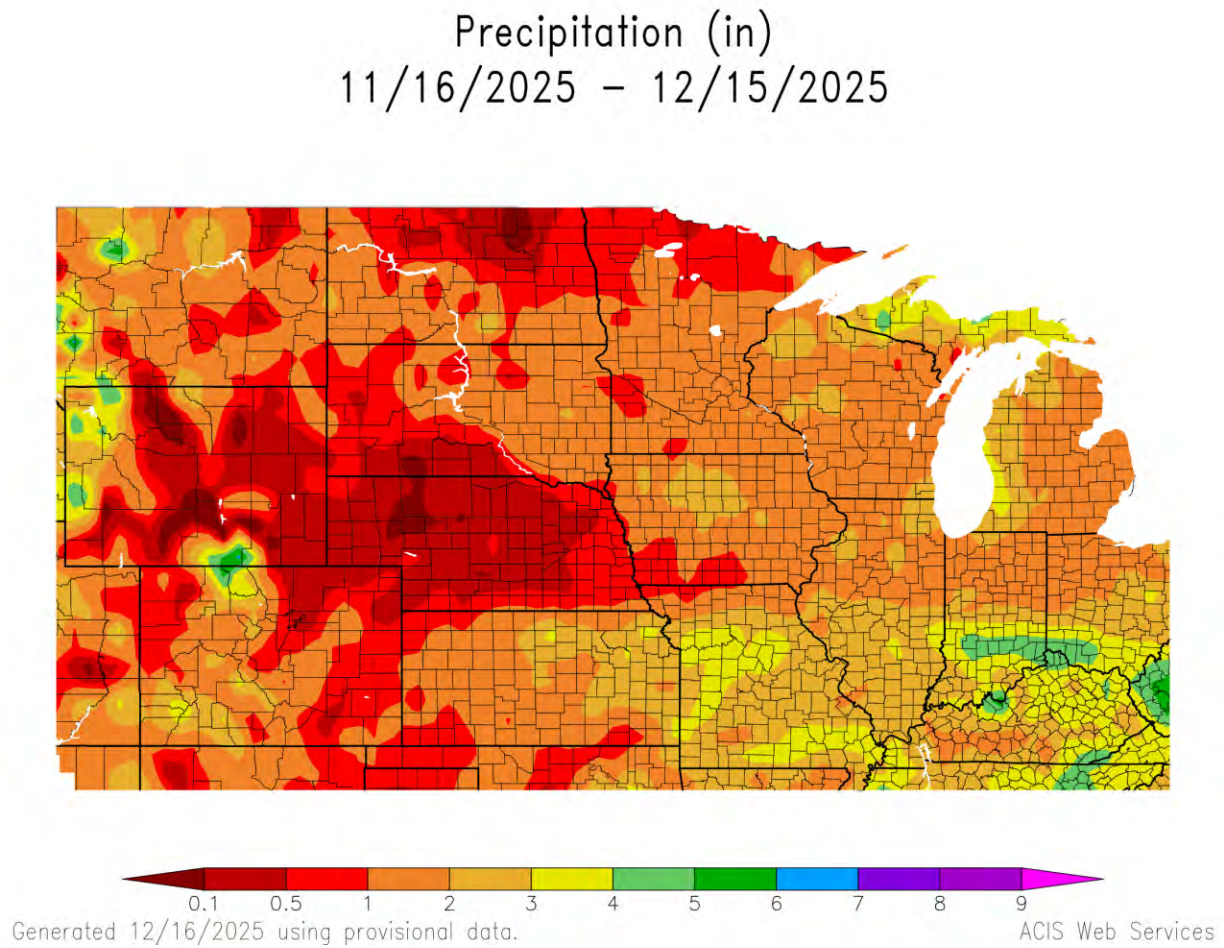
Max Temps on Dec 16, 2025



- 50s, 60s, 70s in the west, Great Plains, and MO
- 30s and 40s in most of the Midwest
- Lead to snow melt

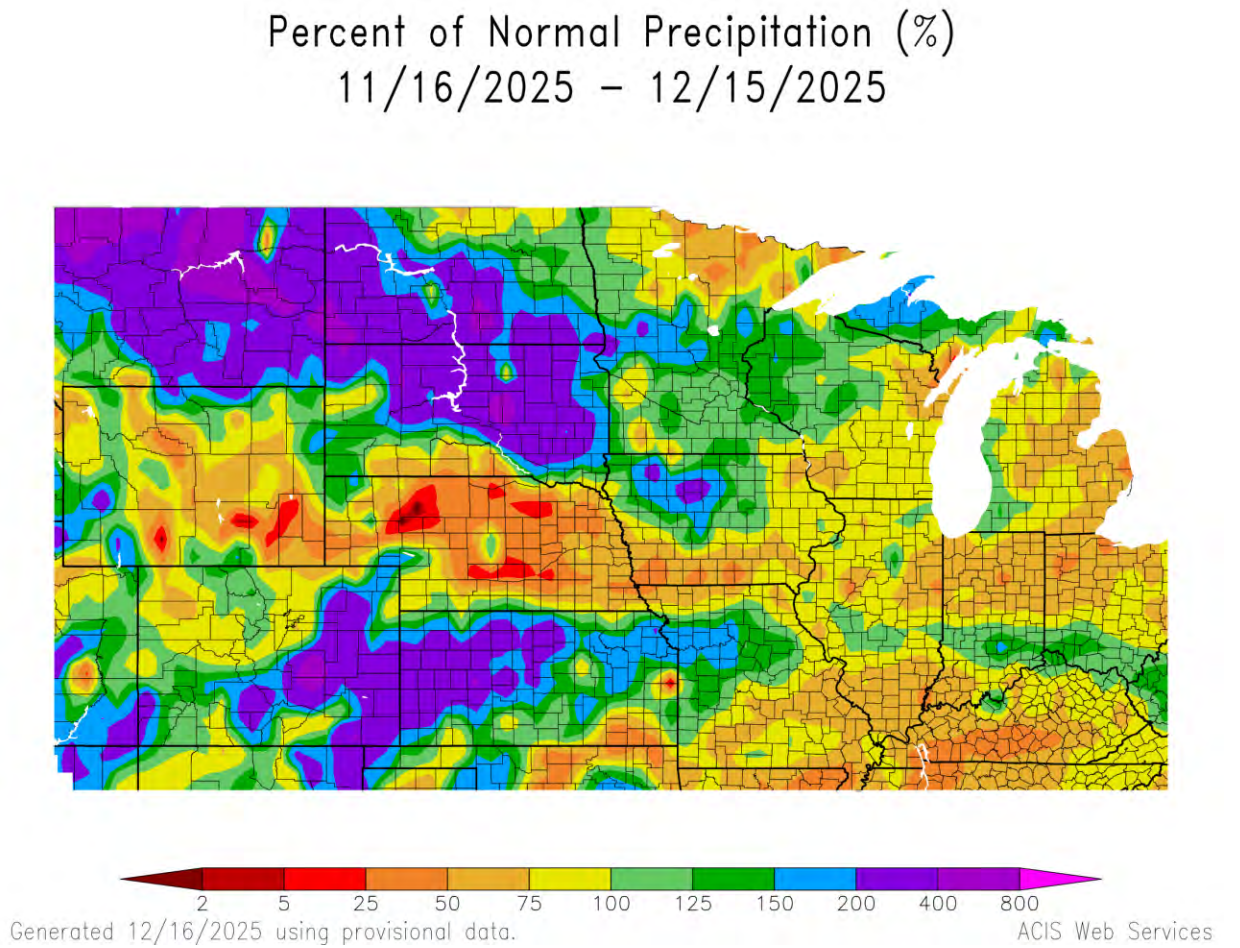
Credit: SERCC

Last 30 Days: Precipitation



- Less than 2 inches for most of the region
  - Large pockets of less than an inch across the west
- Pockets of 3 or more inches in the Ohio River Valley, MO, upper MI, and the far west

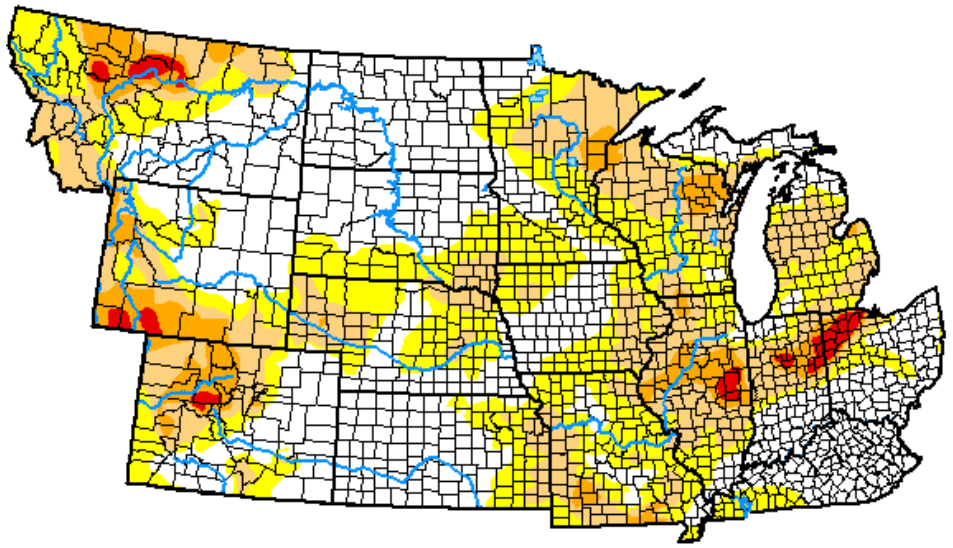
Credit: HPRCC

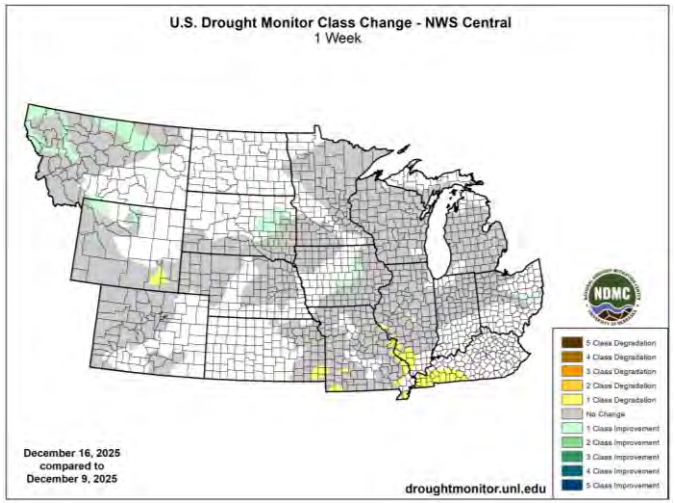


- 50-75% of normal for many in the Midwest, NE, & WY
  - Less than 25% of normal in pockets of NE and WY
- 200-400% of normal for MI, western KS, eastern CO, parts of the Dakotas, and much of Montana
  - More than 400% of normal in pockets of CO, Dakotas, and MT

Impacts

U.S. Drought Monitor – Dec 16





December 16, 2025
(Released Thursday, Dec. 18, 2025)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	43.08	56.92	29.34	8.39	1.49	0.00
Last Week 12-09-2025	43.17	56.83	30.02	9.18	1.53	0.00
3 Months Ago 09-16-2025	48.91	51.09	31.23	13.69	4.43	0.00
Start of Calendar Year 01-07-2025	31.02	68.98	45.49	19.38	5.80	0.00
Start of Water Year 09-30-2025	45.92	54.08	28.92	14.16	3.88	0.00
One Year Ago 12-17-2024	28.36	71.64	50.94	20.20	5.39	0.00

Intensity:

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

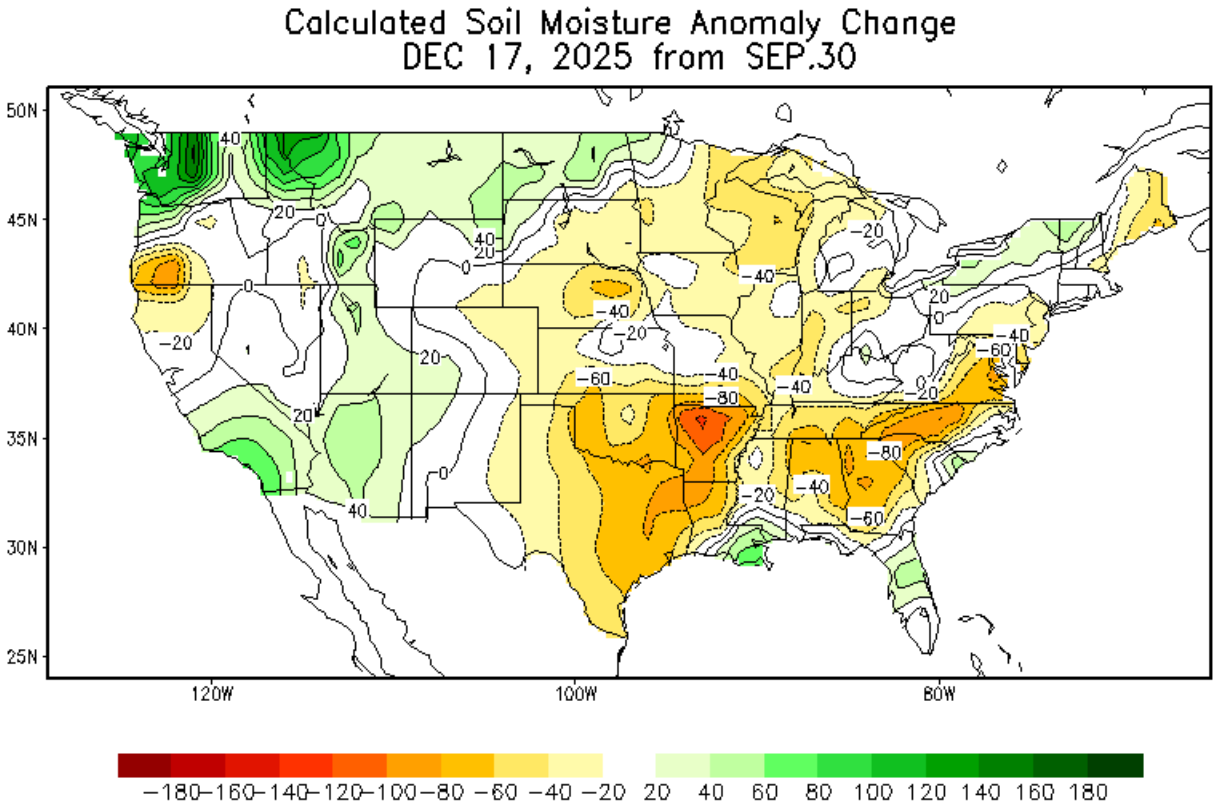
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:
Lindsay Johnson
National Drought Mitigation Center

droughtmonitor.unl.edu

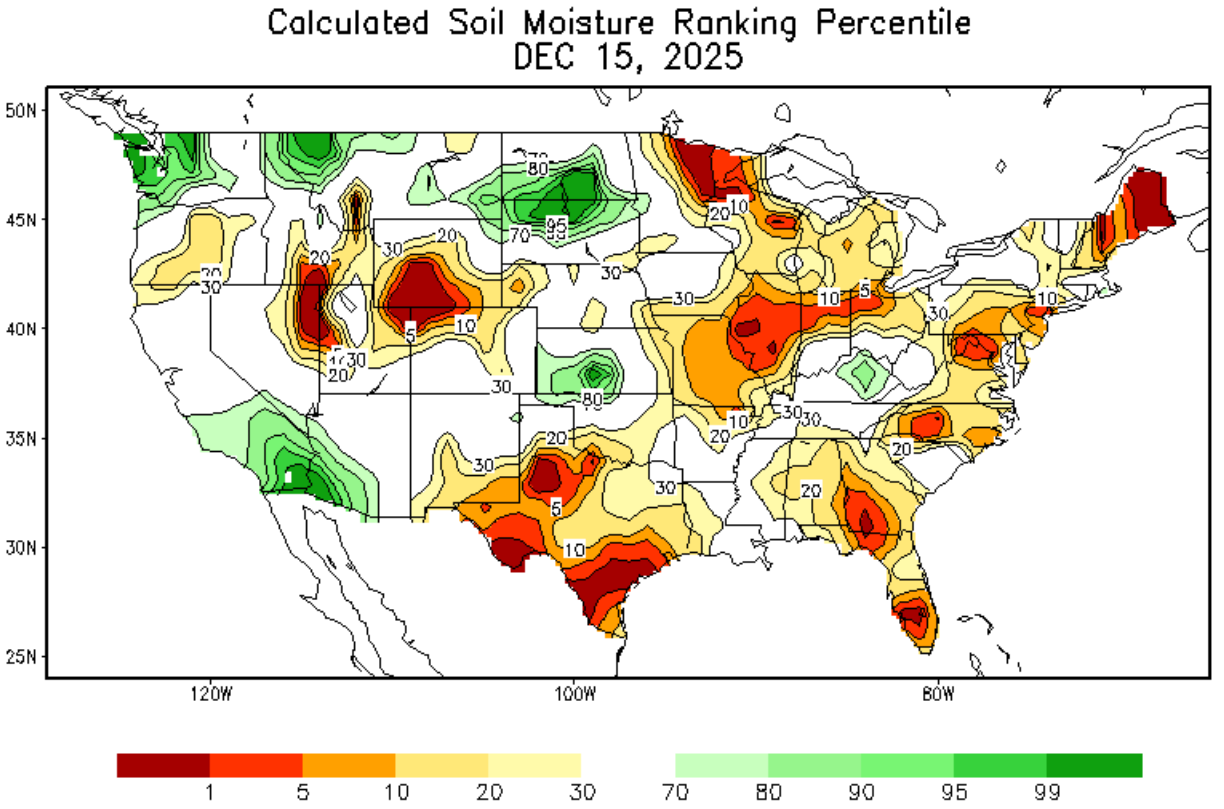
- 29% of region in drought (D1-D4)
- Lingering drought for eastern Midwest since summer & the west for over a year
- Fortunately, the rain in Montana helps
- Unfortunately, the snow generally does not improve drought greatly due to low liquid equivalence & not much infiltration
  - But we should still be thankful ☺
- Reminder: Winter is typically our driest time of the year, so it can be difficult to see drought improvement

Soil Moisture



- Not much change in soil moisture since the end of November
- Since mid-fall, drier across the Midwest & wettest across northern Plains
  - Aligns with 30- to 90-day precip pattern

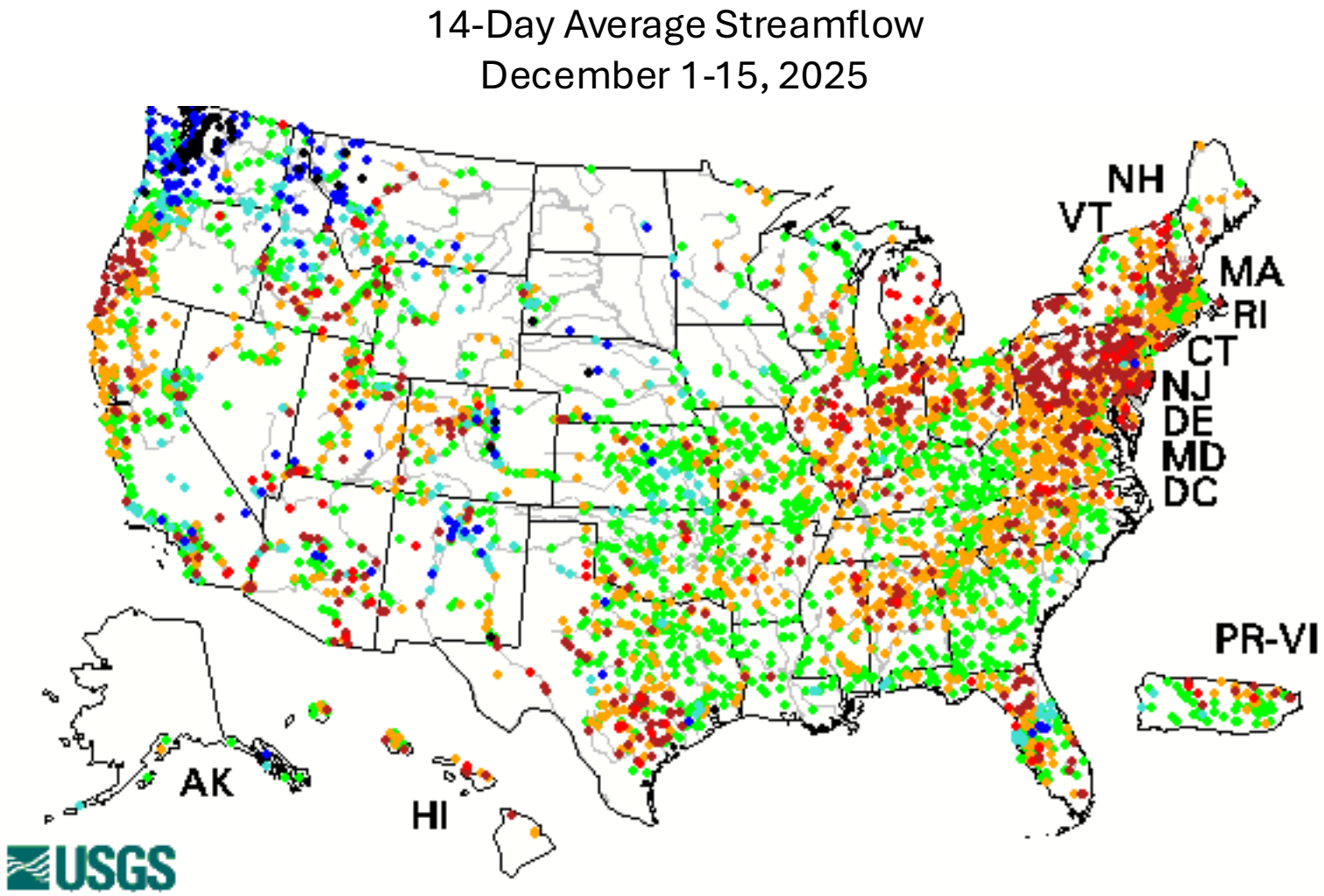
Credit: NOAA CPC



- Drier than normal across much of the Midwest, NW CO, WY, SW MT
- Slightly wetter than normal for eastern KY, central KS, central Dakotas, eastern & NW MT

Credit: NOAA CPC

Streamflow

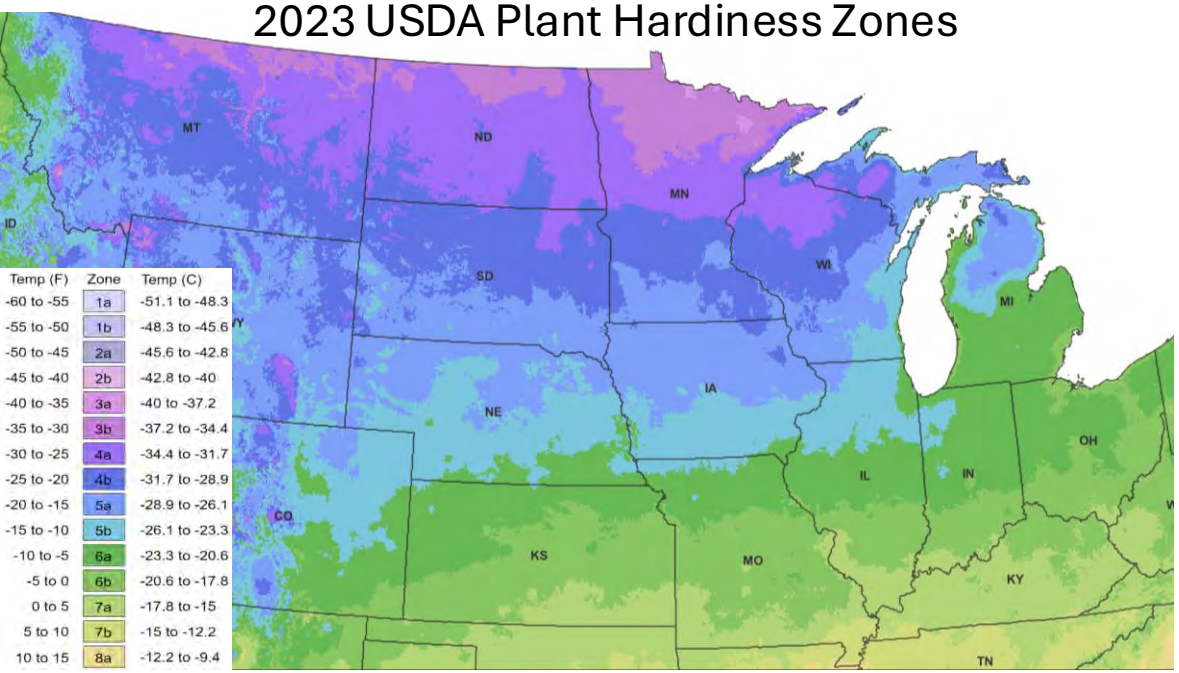


- Below normal for much of the Midwest
  - Even many gages labeled "normal" (green) are less than the 50th percentile
- Some gages above normal in MN, NE, KS
- Much above normal for western MT and mixed bag downstream
- Gap in the northern Plains due to frozen gages

Credit: USGS

Agriculture

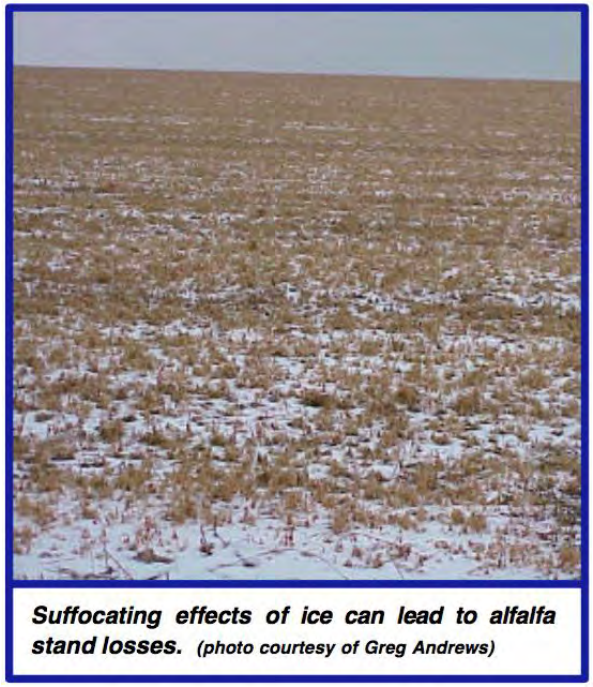
2023 USDA Plant Hardiness Zones



- Plant Hardiness Zones are guides for growing perennial plants
- They are based on the average lowest temperature a location sees
- The cold temps some of us saw over the last few weeks were near the average lowest temp depicted in the Plant Hardiness Zones

- Dry soils are not an immediate ag concern in winter, but could be concerning come spring
  - In spring, producers may consider limited tillage or earlier cover crop termination to conserve surface soil moisture
- When snowpack melts:
  - Good for soil moisture replenishment
  - Bad for livestock health (thawed, wet soils → muddy conditions → stress, illness, getting stuck)
  - If it refreezes, can cause damage to perennial crops

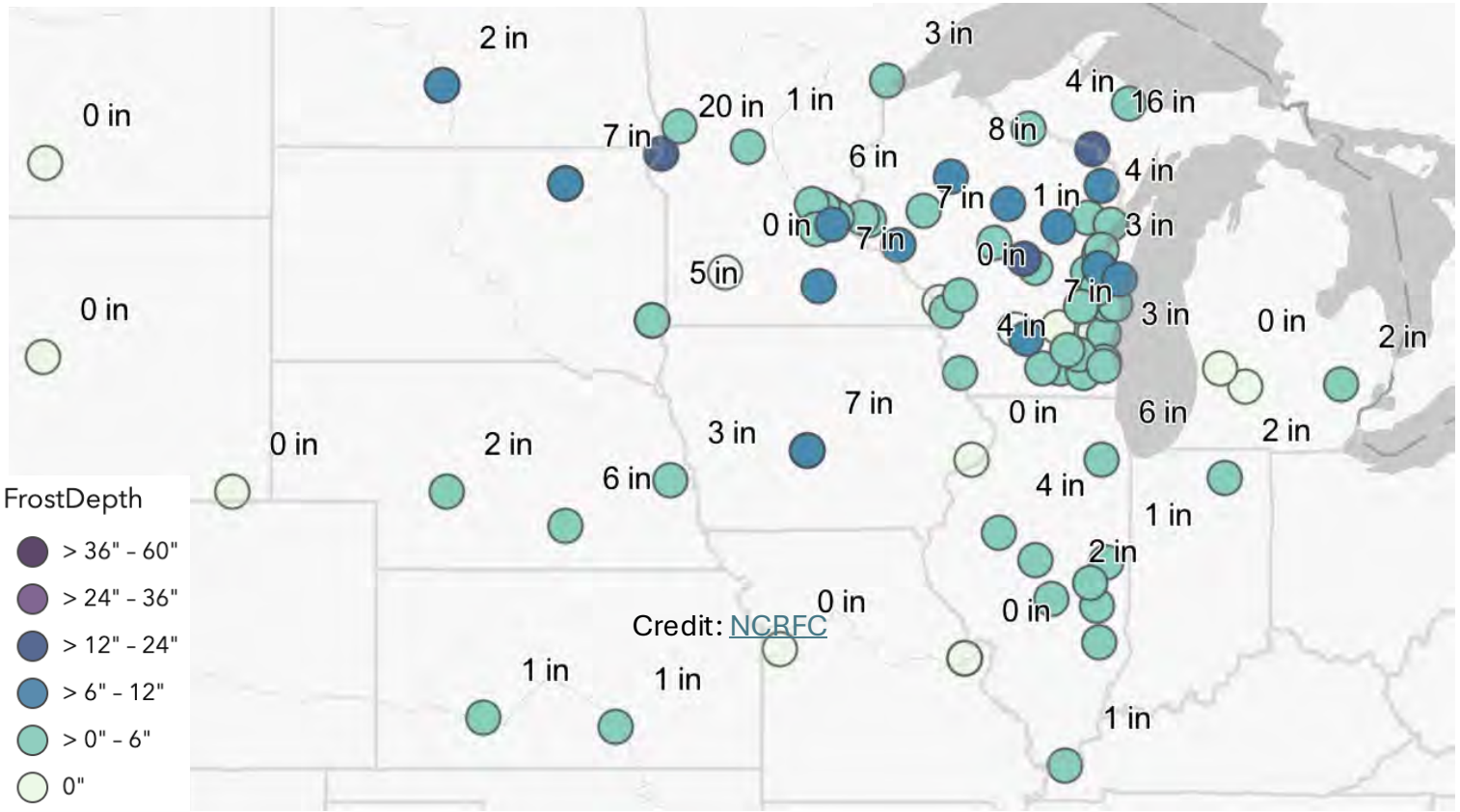
Example of newborn calf stuck in mud.
Credit: Bridgette Mason



Suffocating effects of ice can lead to alfalfa stand losses. *(photo courtesy of Greg Andrews)*

Frost Depth

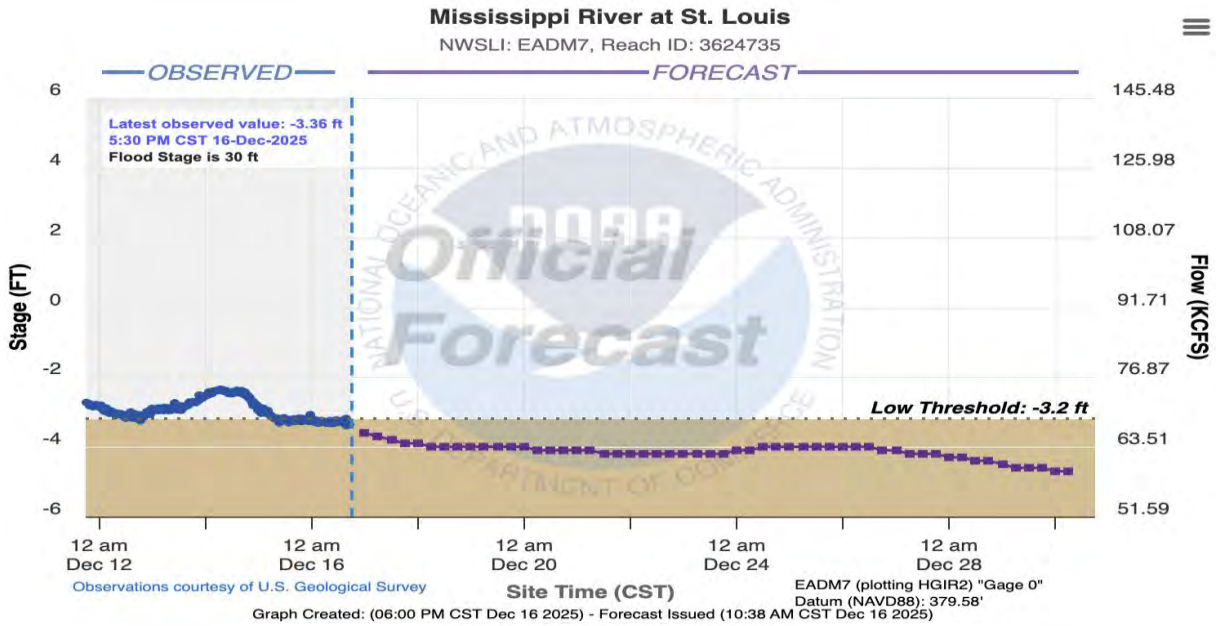
Soil Frost Depth as of 12:00 pm CST | Dec 16, 2025

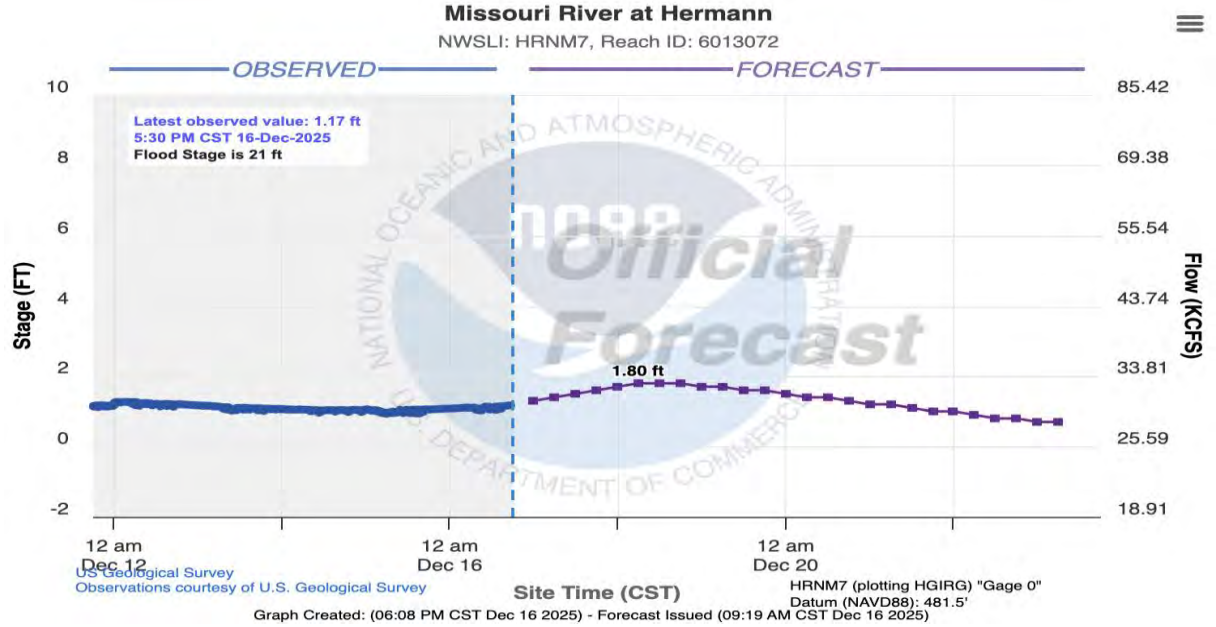


- Varying from little-to-no frost (generally in the south and west) to a few inches (generally in the Great Plains and upper Midwest)
- Many soils that are snow-covered are unfrozen or only have a few inches of frost
- Grounds under roads in northern WI, MN, & likely other northern areas are being declared frozen
  - Good for logging and transporting heavier loads of goods (logs, salt, sand)

Major Rivers

- Mississippi River
  - Monitoring low level around St. Louis, MO
    - Dredging south of St. Louis, MO for navigation
    - Low stages mean threat for ice bites, if cold
- Missouri River
  - Winter release from Gavins Point Dam (South Dakota) around Dec 4
  - Mainstem flows are low (10-24% of norm)
  - Hermann, MO levels are ~1.5 ft above the threshold at which low water impacts begin
    - Hermann should not reach the low water impact stage until early Jan
  - Ice jam along the North Platte River
- Ohio River
  - Slightly below normal flow recently
  - Forecasted to change to normal flow by the end of Dec, then above normal flow in Jan
    - This will help the lower Mississippi

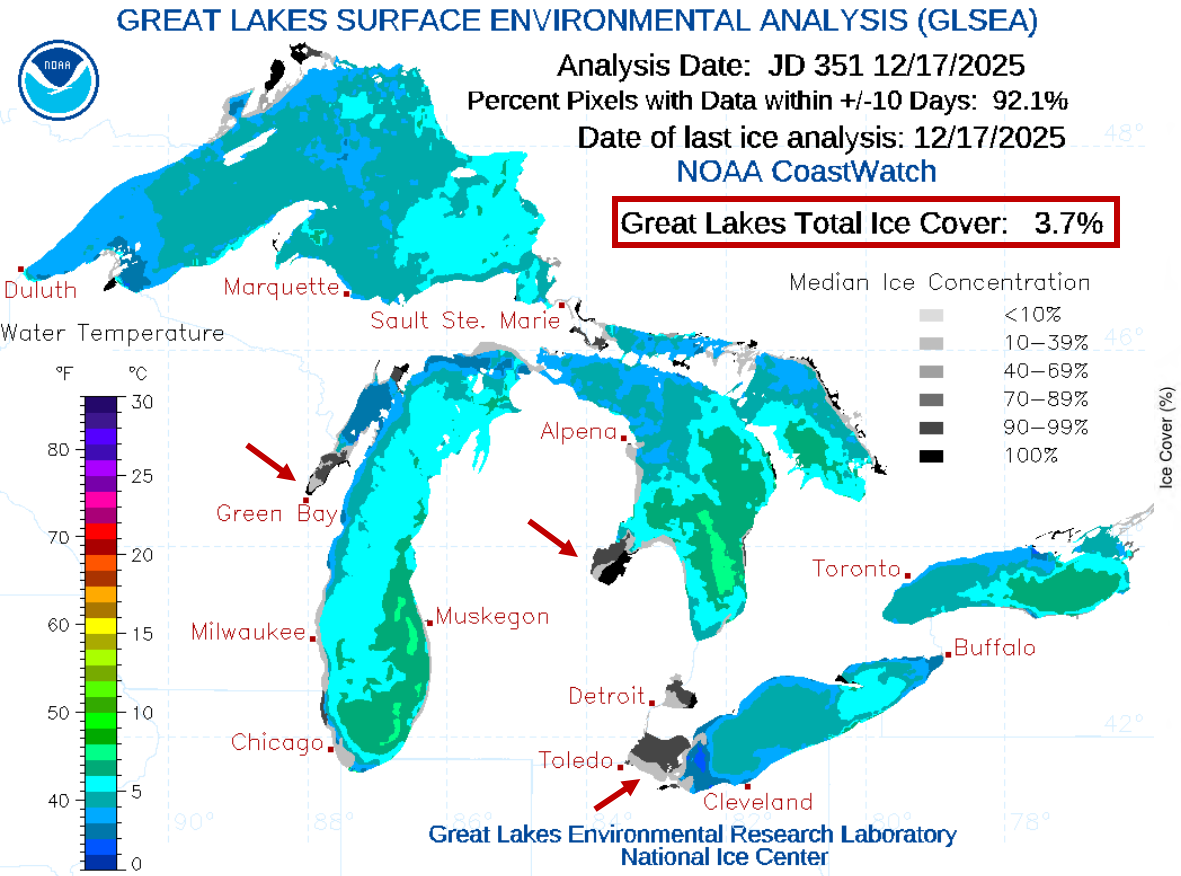


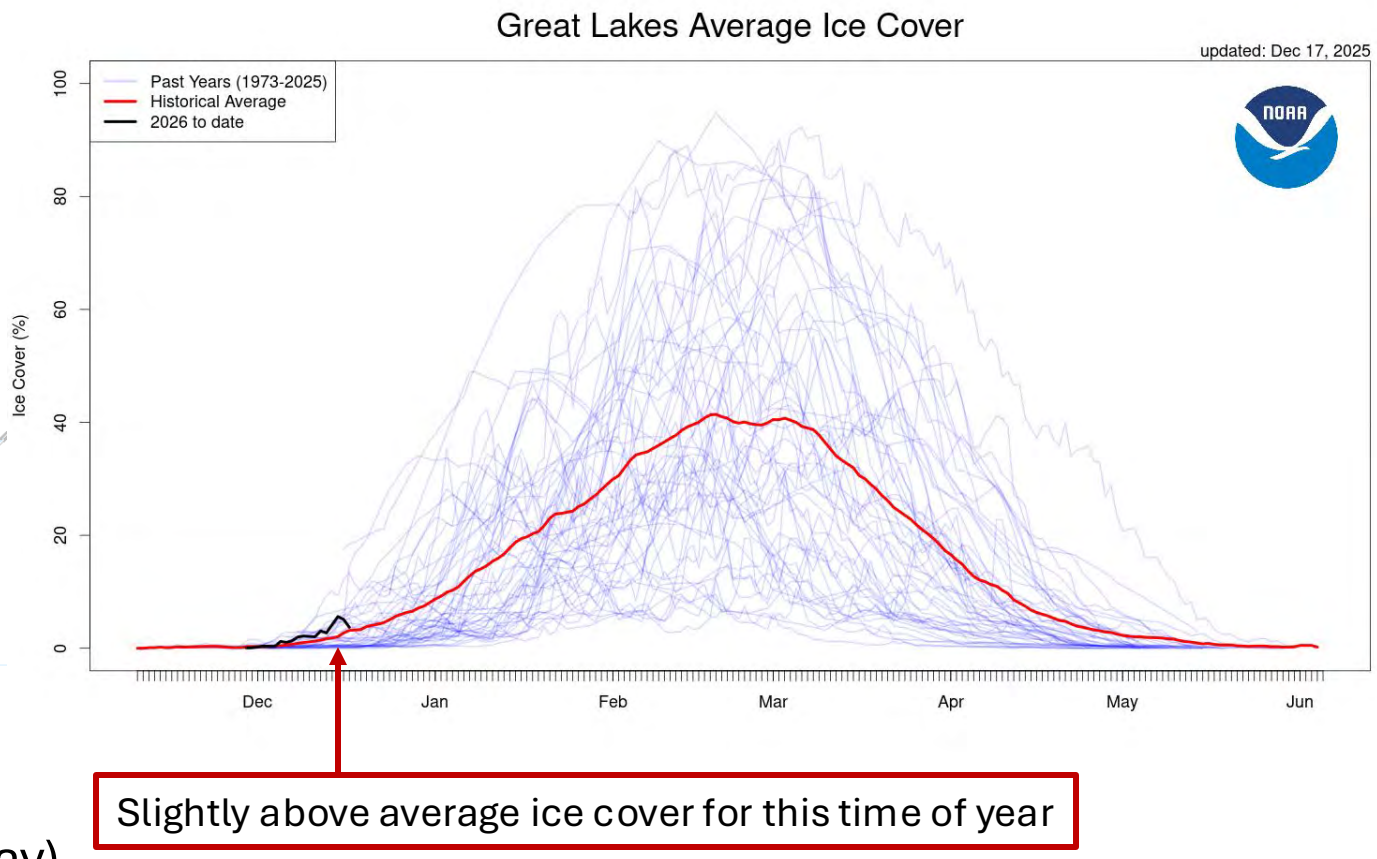


Mississippi at St. Louis: NOAA NWPS

Missouri at Hermann: NOAA NWPS

Great Lakes Ice Cover





- 3.7% total ice cover (down from 5.6% on Monday)
- Ice forming in along shores and shallow regions: Saginaw Bay, Western Lake Erie, Lake St. Clair, Green Bay

Credit: GLSEA

Credit: NOAA GLERL

Local Lake Ice Cover

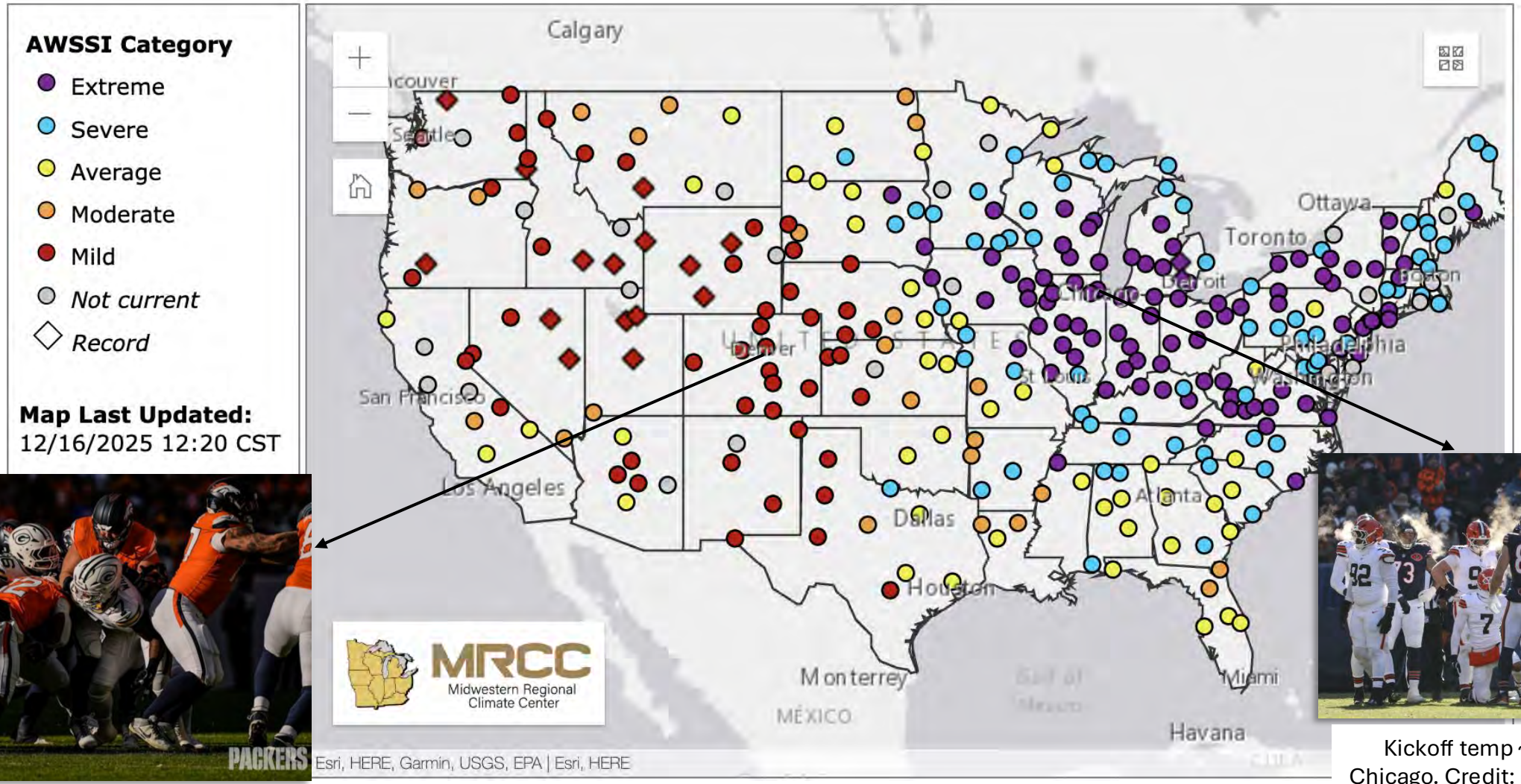
- Madison, WI: Lakes Wingra and Monona declared iced-over Dec 1 and 12, respectively
  - 2 days later than normal for Lake Wingra | 3 days ahead of normal for Lake Monona
  - No declaration for Lake Mendota
  - Records going back to 1800s (WI SCO)
- Many lakes in SD and MN have also frozen over
- Unfortunately, lake ice now turning to slush with the warmup – please use caution!

View of 60% ice cover on Lake Mendota in Madison, WI, the morning of 12/16/25.
Credit: David Liebl

Winter Weather

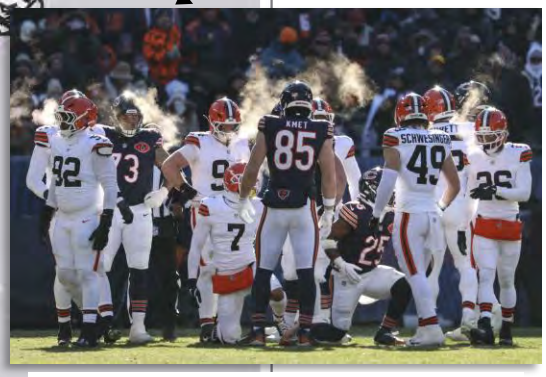
Accumulated Winter Season Severity Index

- What is AWSSI? A way to quantify the severity of winter
- Variables included: maximum & minimum temperatures, snowfall, snow depth
- West-to-east gradient of mild-to-extreme



Kickoff temp ~68°F 12/14 in Denver, CO. Credit: Packers

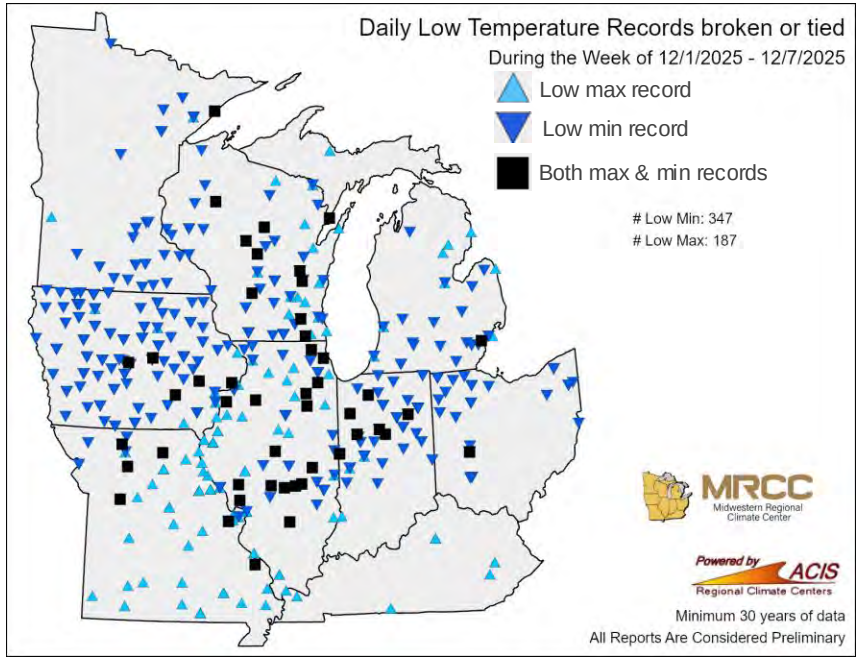
Credit: MRCC

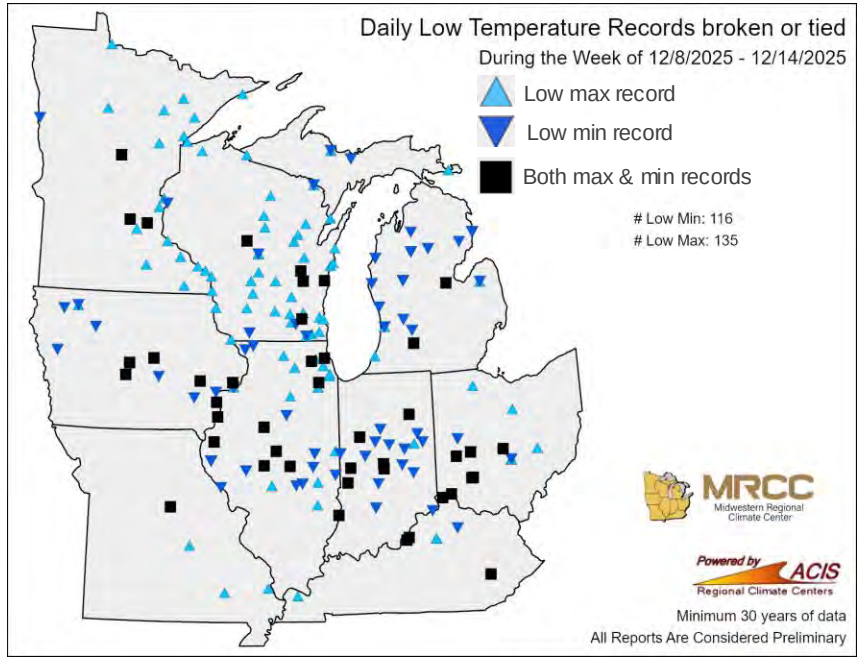


Kickoff temp ~8°F 12/14 in Chicago. Credit: Chicago Tribune

Extreme Cold in the Midwest

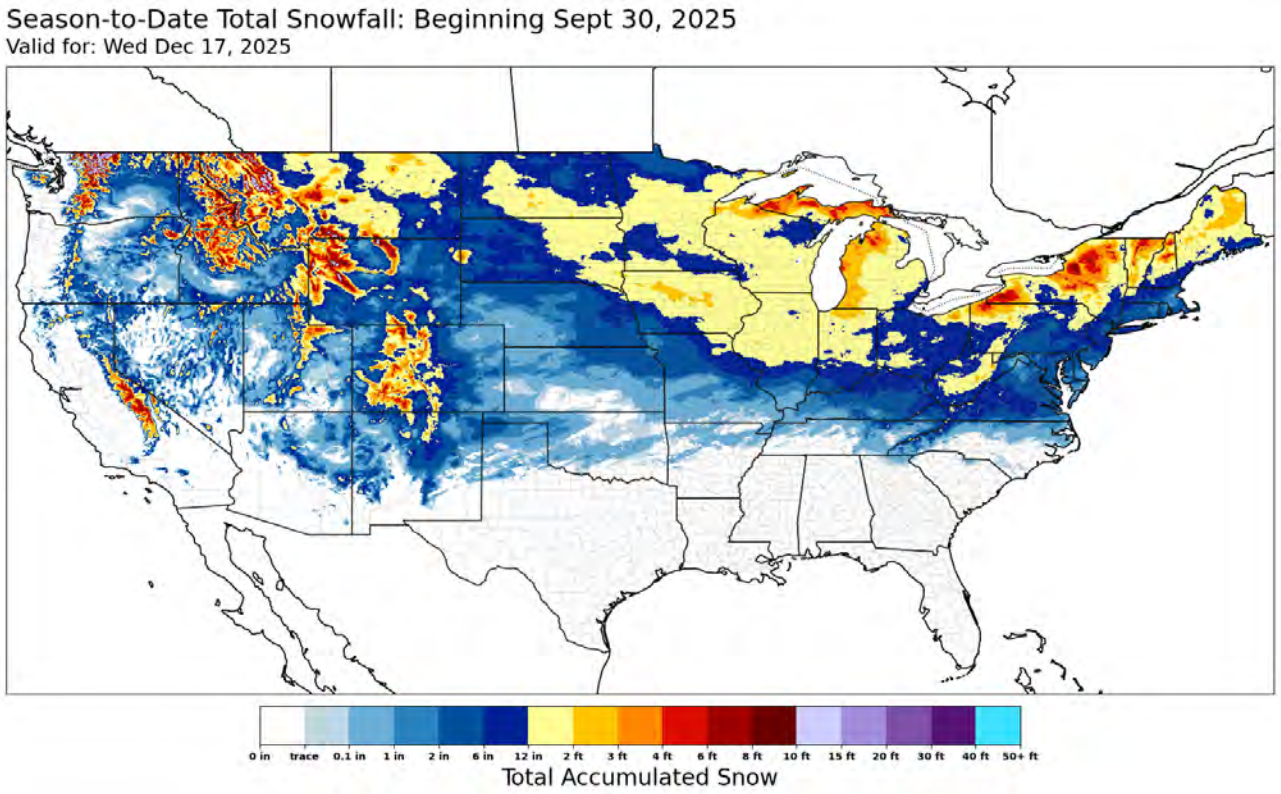
- Hundreds of stations set record-cold low and high temperatures
  - Indianapolis (IN) 12/14: low of -4°F (tied for 1901) and high of 7°F (previous: 9°F in 1963)
- Coldest start to winter (starting Dec 1):
  - Chicago & Rockford (IL) since 2013
  - Many stations in Ohio since 2010
  - Madison & Milwaukee (WI) since 1976
    - Madison (WI) saw -3°F 12/4 – its earliest sub-zero temp since 1985
- Ashland (WI) was below freezing Nov 27-Dec 15 (only other time this happened was 2007)
- Typically, this type of cold doesn't hit until January



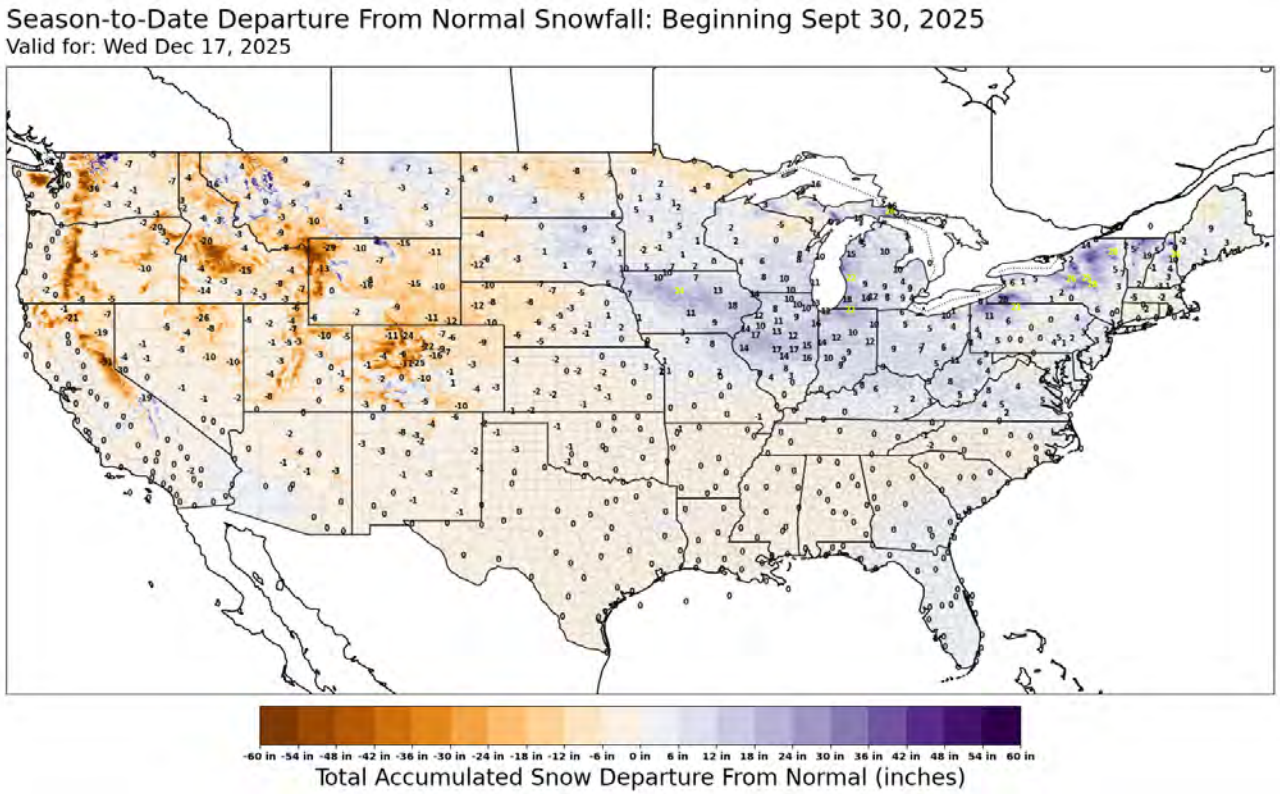


Credit: Aaron Wilson

Snow Drought in the West | Abundance in the East



- Snowfall for (almost) the entire region
- 12 inches or more for much of the upper Midwest
- 2 feet or more for lake-effect areas and higher elevations



- Above normal for most of the Midwest
  - Largest departures for IA, IL, IN, and some lake-effect areas
- Below normal for parts of the upper Midwest, Great Plains, and most of the west
  - Largest departures in higher elevations

Credit: Ag Wx

Atmospheric River Impacting Montana

Sanders Co, MT | Dec 11, 2025
Credit: Daily Inter Lake

Libby, MT | Dec 12, 2025
Credit: Daily Inter Lake

Libby, MT | Dec 11, 2025
Credit: Montana Free Press

Near-Record Precipitation Atmospheric River

Weather Forecast Office
Missoula, MT
Thursday, December 11

Bear Mountain SNOTEL, ID (5,460 ft.)

24 Hours: 6.50 inches (12/11/25) -> 3rd Wettest 24 hour period; 8.50" Nov. 6, 2006

6-Days: 13.00 inches Dec. 6-11, 2025 - 6th Wettest, All-Time 6-Day in a year, 20.60" Nov 2-7, 2006

Records started: Oct. 1, 1981

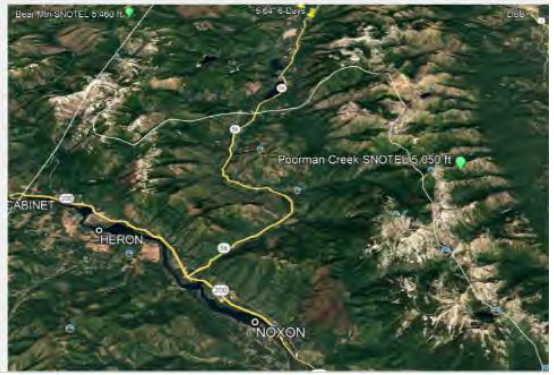
Poorman Creek SNOTEL, ID (5,050 ft.)

24 Hours: 5 inches (12/11/2025)->
3rd Wettest 24 hour period; 6.10" Nov. 6, 2006

6-Days: 12.01 inches Dec. 6-11, 2025->
2nd Wettest, All-Time 6-Day period in a year,
14.50" fell Nov 2-7, 2006

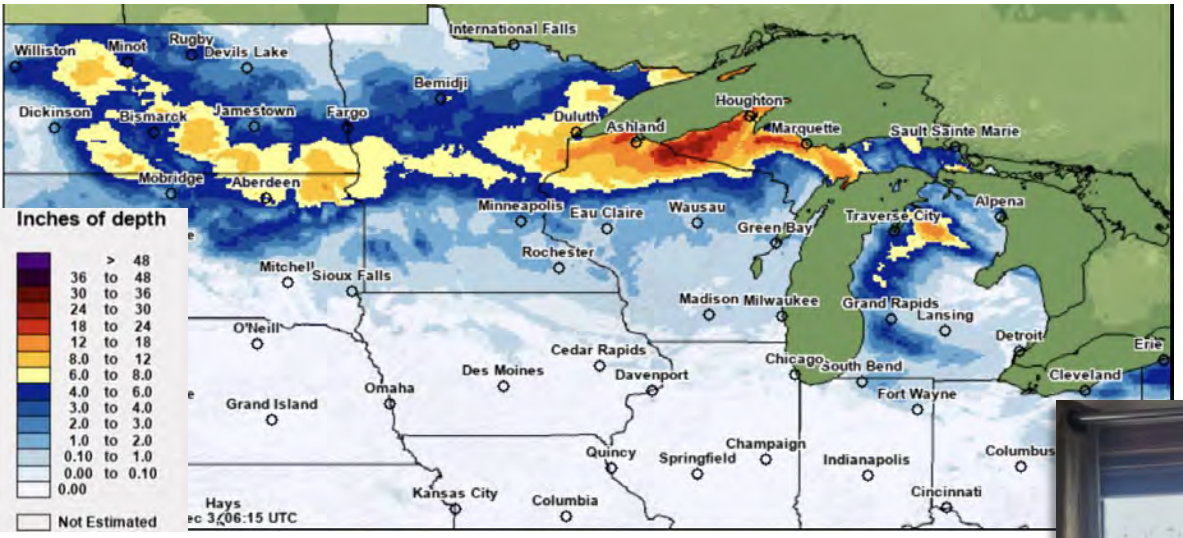
Records started: Oct. 1, 1998

<Preliminary USDA Data>

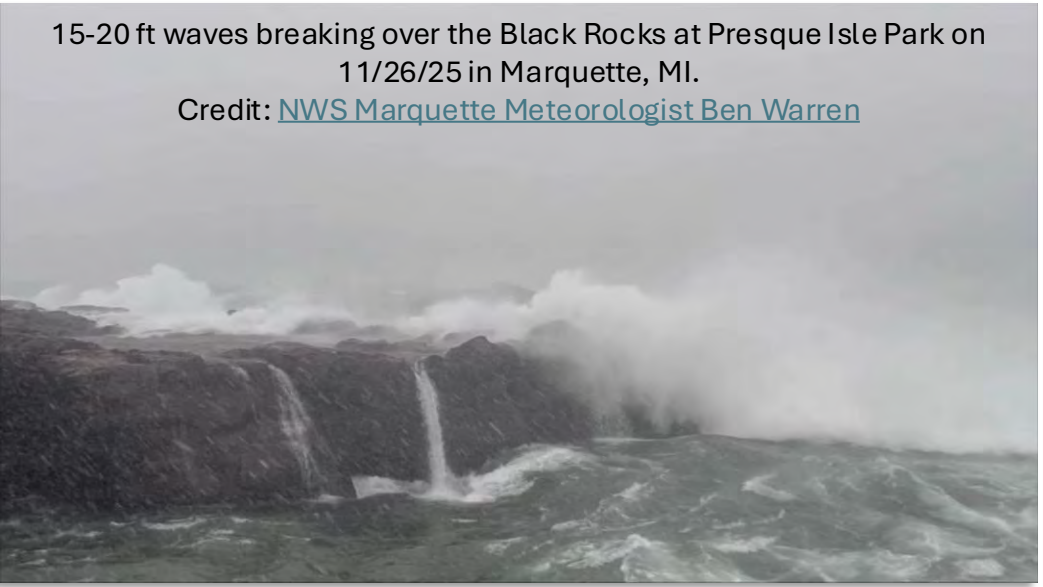


Pre-Thanksgiving Snowstorm in the North

Snowfall (in) from 6pm CST 11/24/25 to 6pm CST 11/27/25. Credit: NOHRSC.

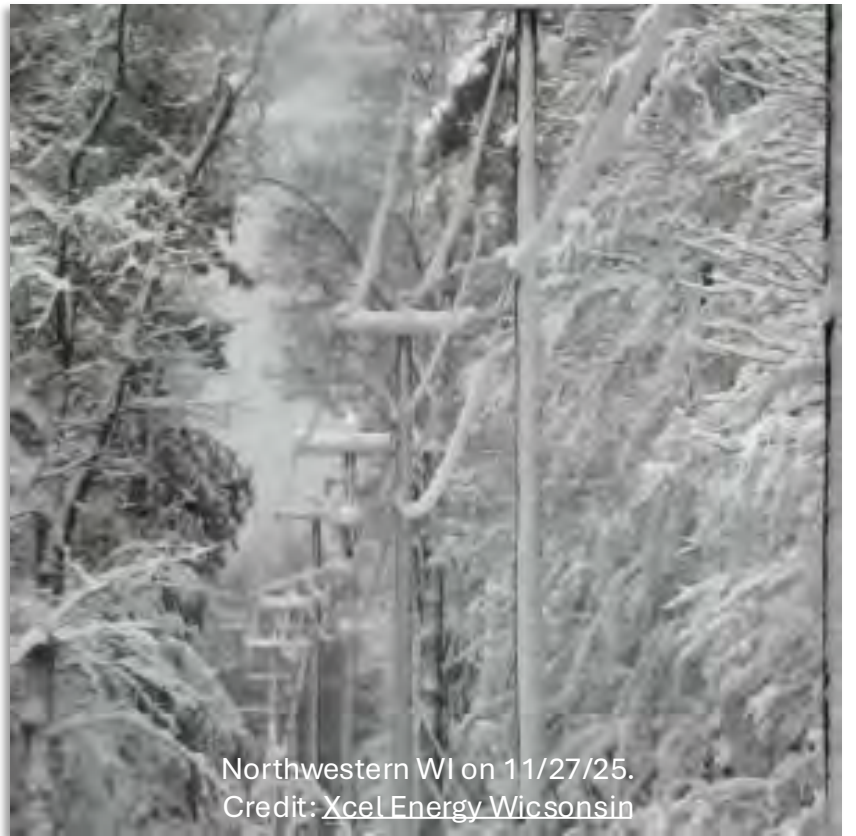


- 3” of snow for many | 30” in lake-effect areas
  - But not before rain
- Peak wind gusts (mph) in the 40s to 60s
- Widespread power outages
- Car accidents, trees on roads, and downed powerlines
  - I-94 pile-up in Clay Co, MN
  - Over 300 crashes & 400 spinouts in MN alone
- School and business closures



15-20 ft waves breaking over the Black Rocks at Presque Isle Park on 11/26/25 in Marquette, MI.
Credit: NWS Marquette Meteorologist Ben Warren

Nestoria, MI.
Credit: Jill Jacobs Meadow via NWS Marquette



Northwestern WI on 11/27/25.
Credit: Xcel Energy Wicsonsin

Pre-Thanksgiving Snowstorm in the North

Friends of Ottawa National Wildlife Refuge
about 3 weeks ago

As you walk across the exposed floor of Lake Erie, you are a witness... Not just to a rare natural event, but to all of the lives, all of the footsteps, all of the water and wind and time that have shaped this place. 🌊

When the seiche exposes the old lakebed, it reminds us that we stand on ancient ground, and that our daily work honors and protects that legacy.

📍Lamb Beach | Cedar Point National Wildlife Refuge ... See more

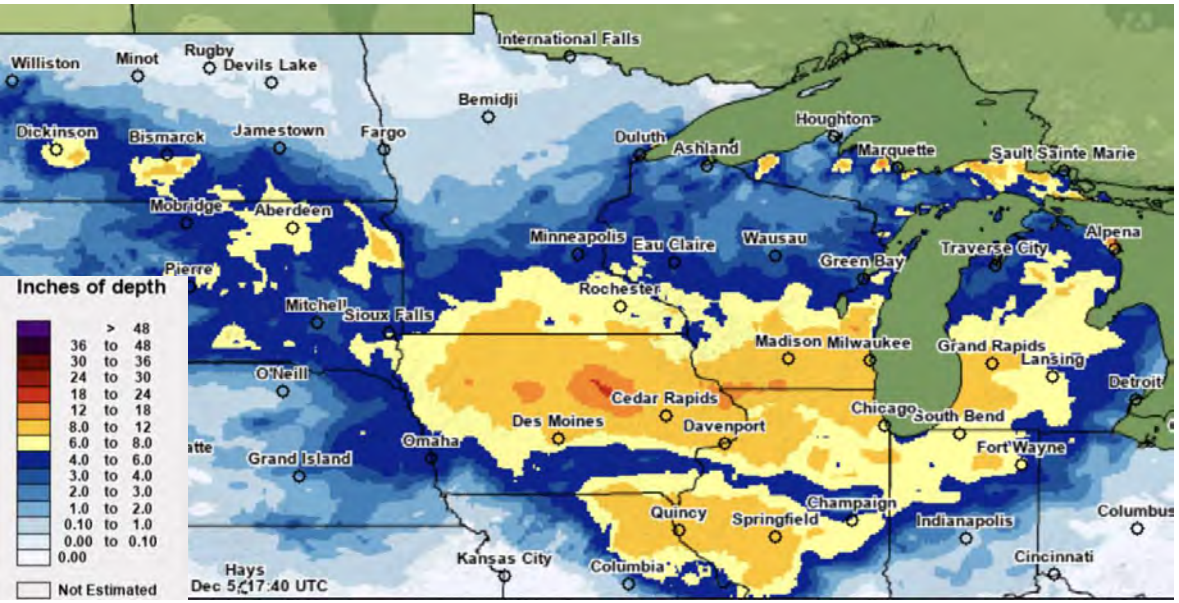
- The strong winds of the low-pressure system pushed water from Lake Erie's western basin toward the eastern basin
- This lowered levels near Kingsville, Ontario, by several feet and temporarily exposed the lakebed, including a sunken ship

Credit: Matt Vermette

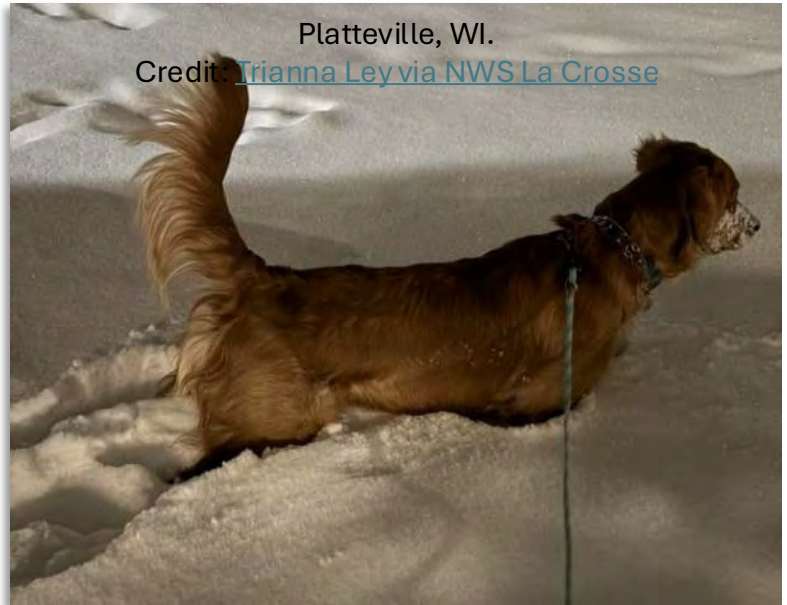
Credit: Detroit Free Press

Post-Thanksgiving Central Midwest Snowfall

Snowfall (in) from 6am CST 11/28/25 to 6am CST 11/30/25. Credit: NOHRSC.



- 6-16” across parts of the Dakotas, MN, IA, MO, WI, IL, MI, IN
- Largest single-day Nov snowfall (Nov 29) on record:
  - Dubuque, IA: 11”
  - Madison, WI: 9.3”
  - Springfield, IL: 8.9”
  - Chicago, IL: 8.4”
- Largest single-storm Nov snowfall (Nov 28-30) on record:
  - Waterloo, IA: 14.5”
  - Springfield, IL: 8.9”
- Peak wind gusts (mph) in the 30s to 50s
- Numerous car accidents, road closures, flights cancelled
  - I-70 pile-up near Terre Haute, IN – shut down for 6 hours



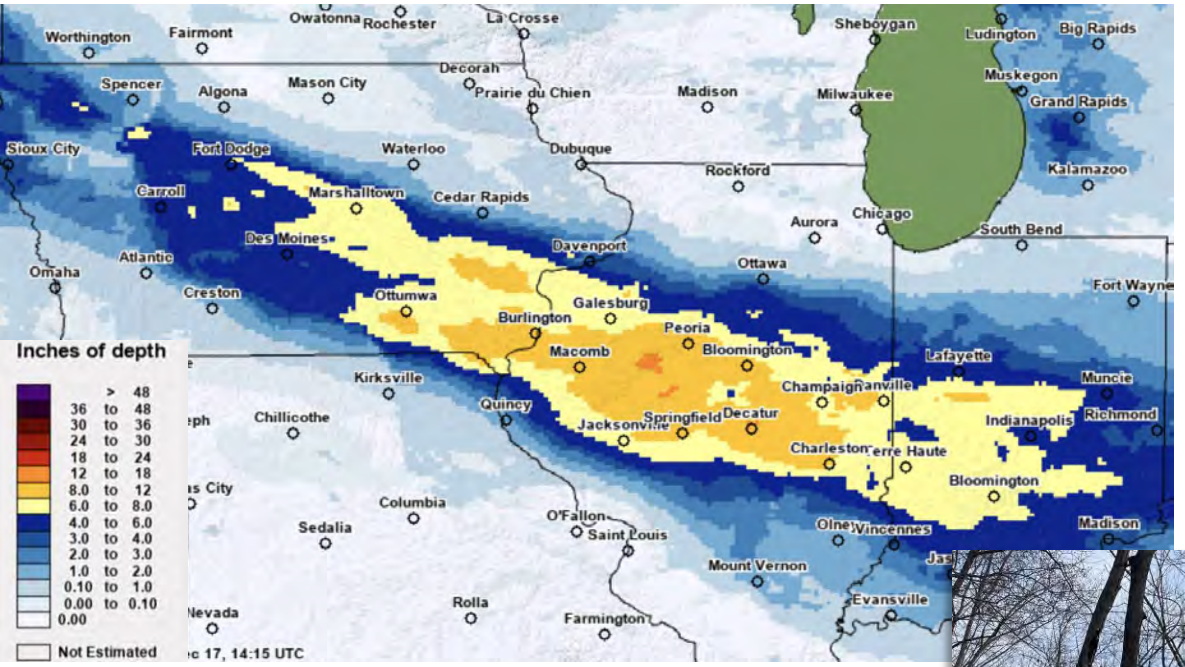
Platteville, WI.
Credit: Trianna Ley via NWS La Crosse

Park View, IA.
Credit: Dusty Mizer via NWS Quad Cities

Terre Haute, IN.
Credit: INDOT West Central

Mid-December "I" States Snowfall

Snowfall (in) from 6pm CST 12/10/25 to 6pm CST 12/13/25. Credit: NOHRSC.



- 6-12" across parts of IA, IL, IN
- Indianapolis (IN) at 14.7" of seasonal snowfall
  - 2nd greatest total through Dec 13
- Peak wind gusts in the 20s to 30s
- I-80 pile-up – shut down from Iowa City to Quad Cities

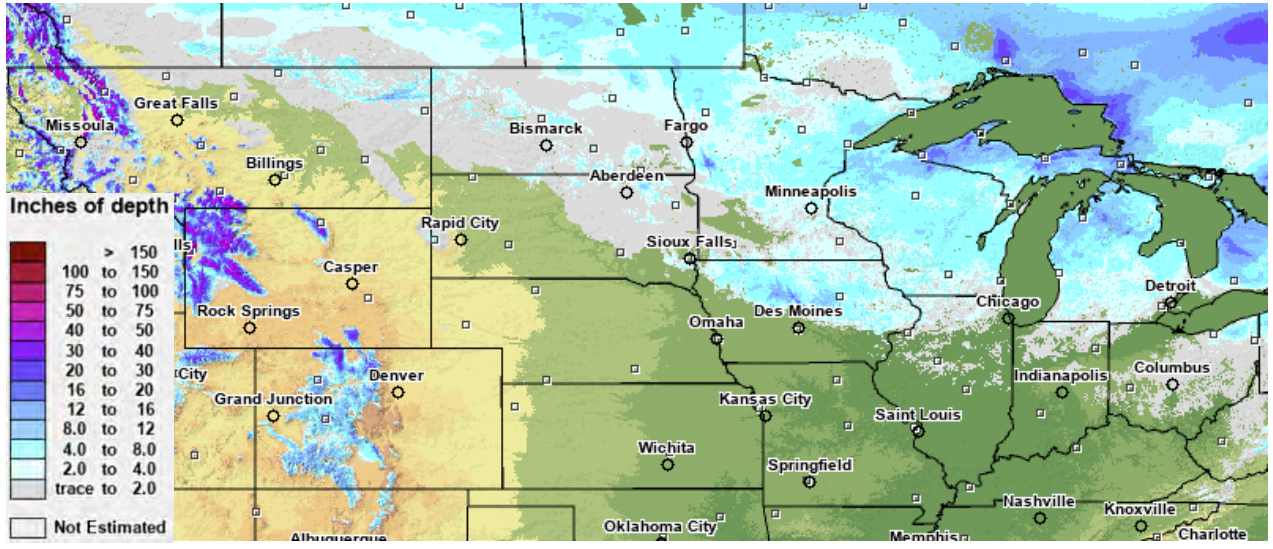

Snowy forest in west central IN
Credit: Melissa Widhalm

Credit: Andrew Wicks via Chris Kuball

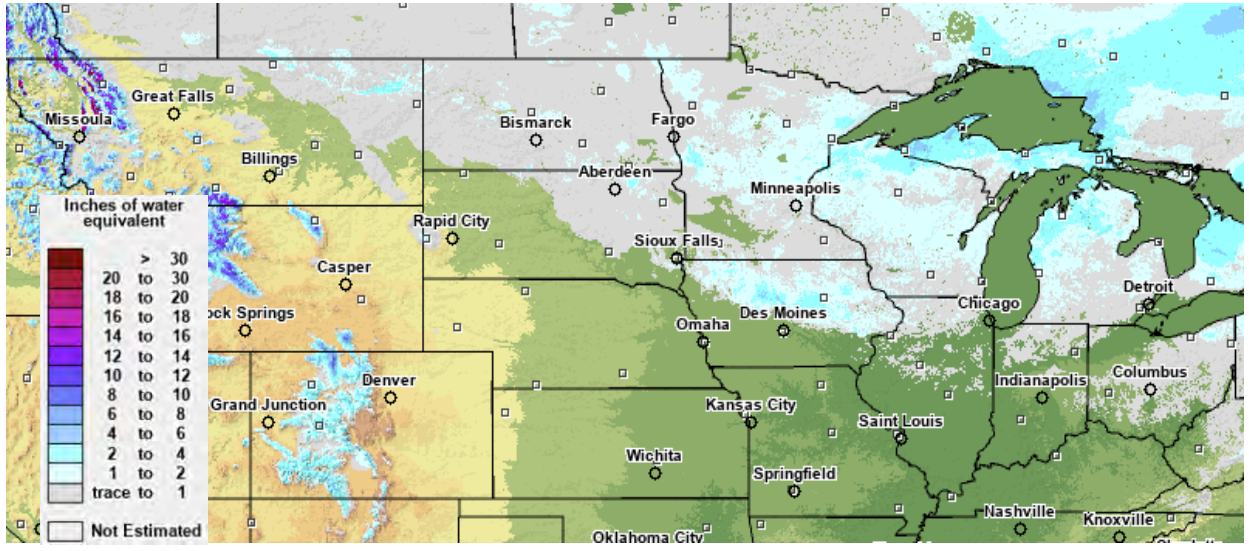
Current Snow Observations

Credit: NOHRSC

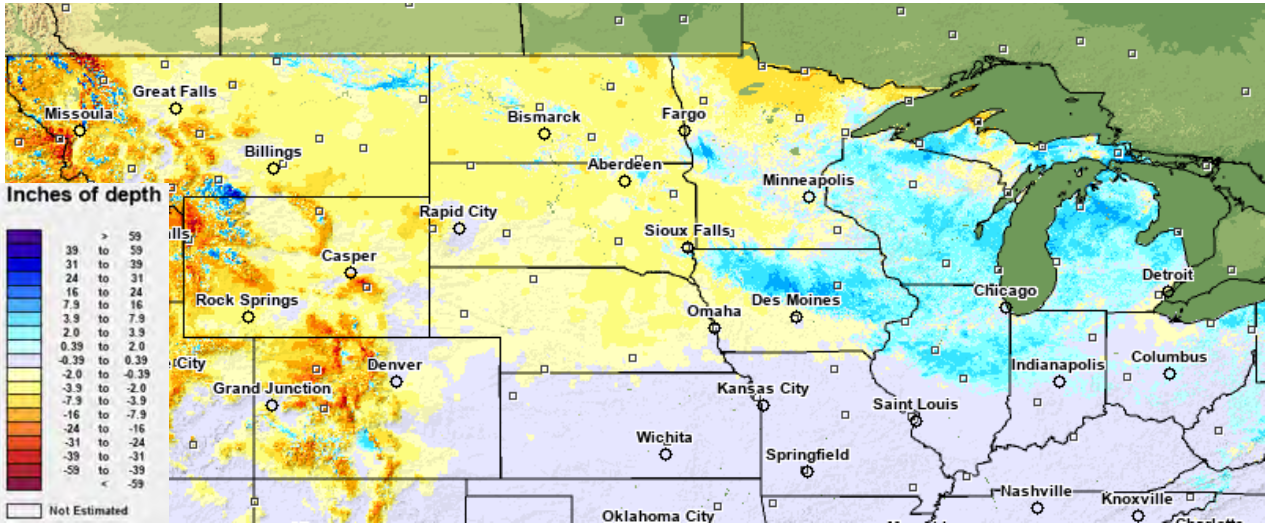
Modeled Snow Depth | 9:00 am Dec 18, 2025



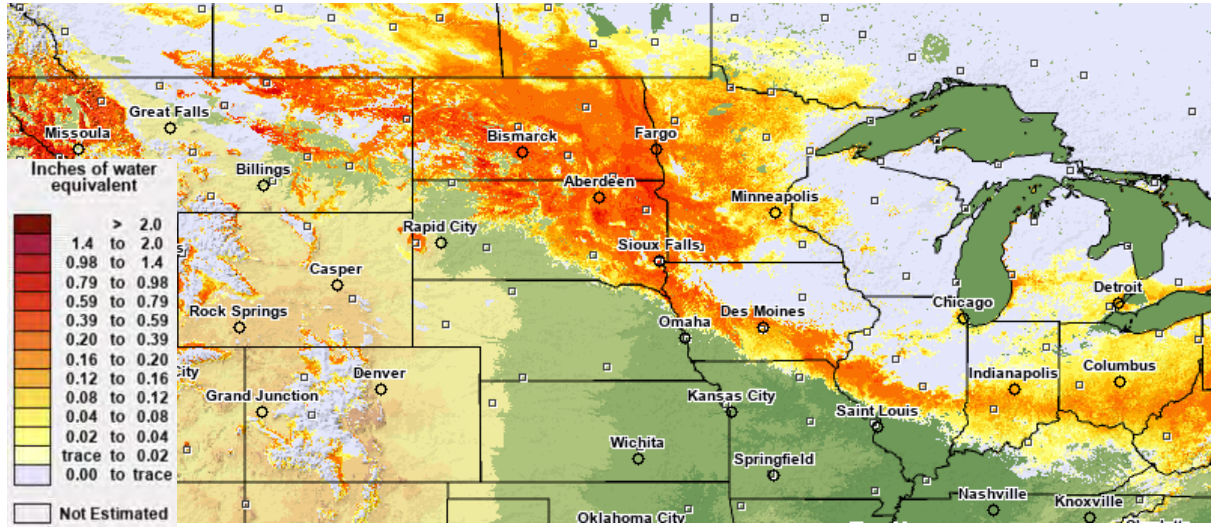
Modeled Snow Water Equivalent | 9:00 am Dec 18, 2025



Modeled Snow Depth Departure from Normal | 12:00 am Dec 18, 2025

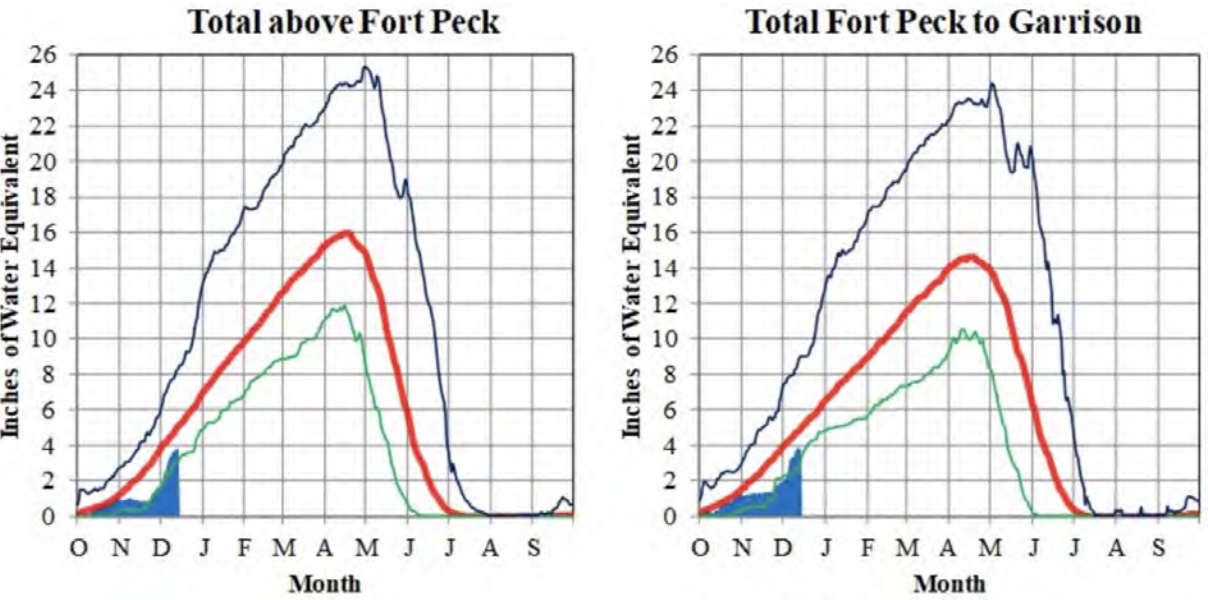


Modeled Snow Melt | 11:00 pm Dec 15 – 11:00 pm Dec 17, 2025



Snowpack Water Content

Missouri River Basin – Mountain Snowpack Water Content
December 14, 2025

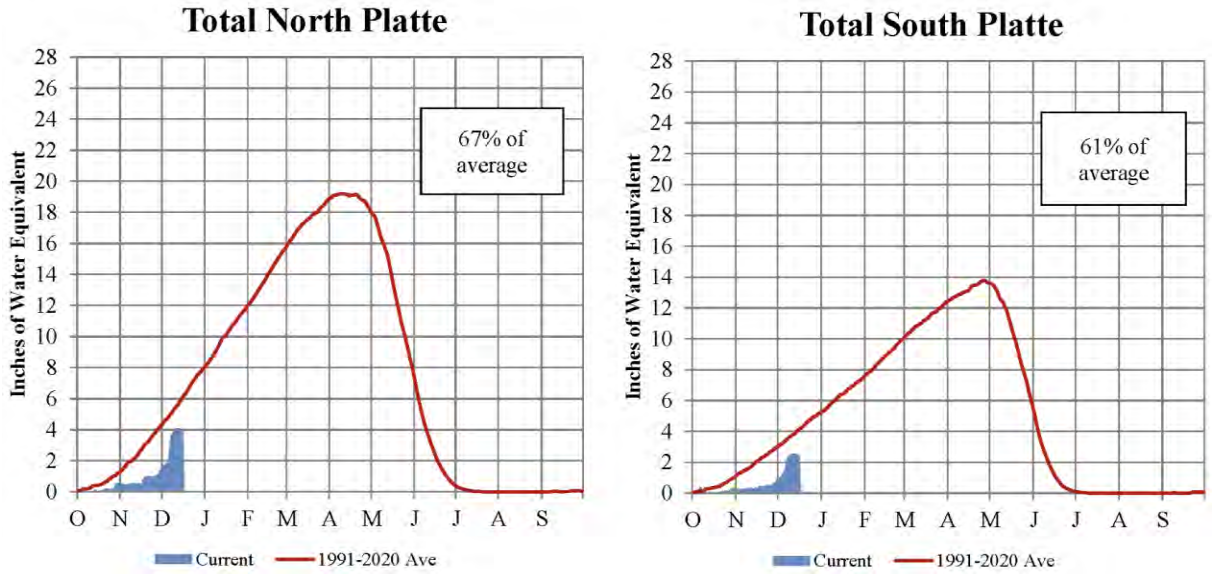


On December 14, 2025 the mountain Snow Water Equivalent (SWE) in the "Total above Fort Peck" reach is 3.8" and 75% of the (1991-2020) average. The mountain SWE in the "Fort Peck to Garrison" reach is 3.8" and 76% of the (1991-2020) average. The normal peak for both reaches occurs near April 17.

*Refers to the minimum or maximum SWE in the basin for that day in the historical years 1991-2020.

Credit: USACE

Platte River Basin – Mountain Snowpack Water Content
December 16, 2024



The North and South Platte River Basin mountain snowpacks normally peak near April 10 and the end of April, respectively. As of December 16, 2025, the mountain snowpack SWE in the "Total North Platte" reach is 4.0", 67% of the (1991-2020) average. The mountain snowpack SWE in the "Total South Platte" reach is 2.5", 61% of the (1991-2020) average.

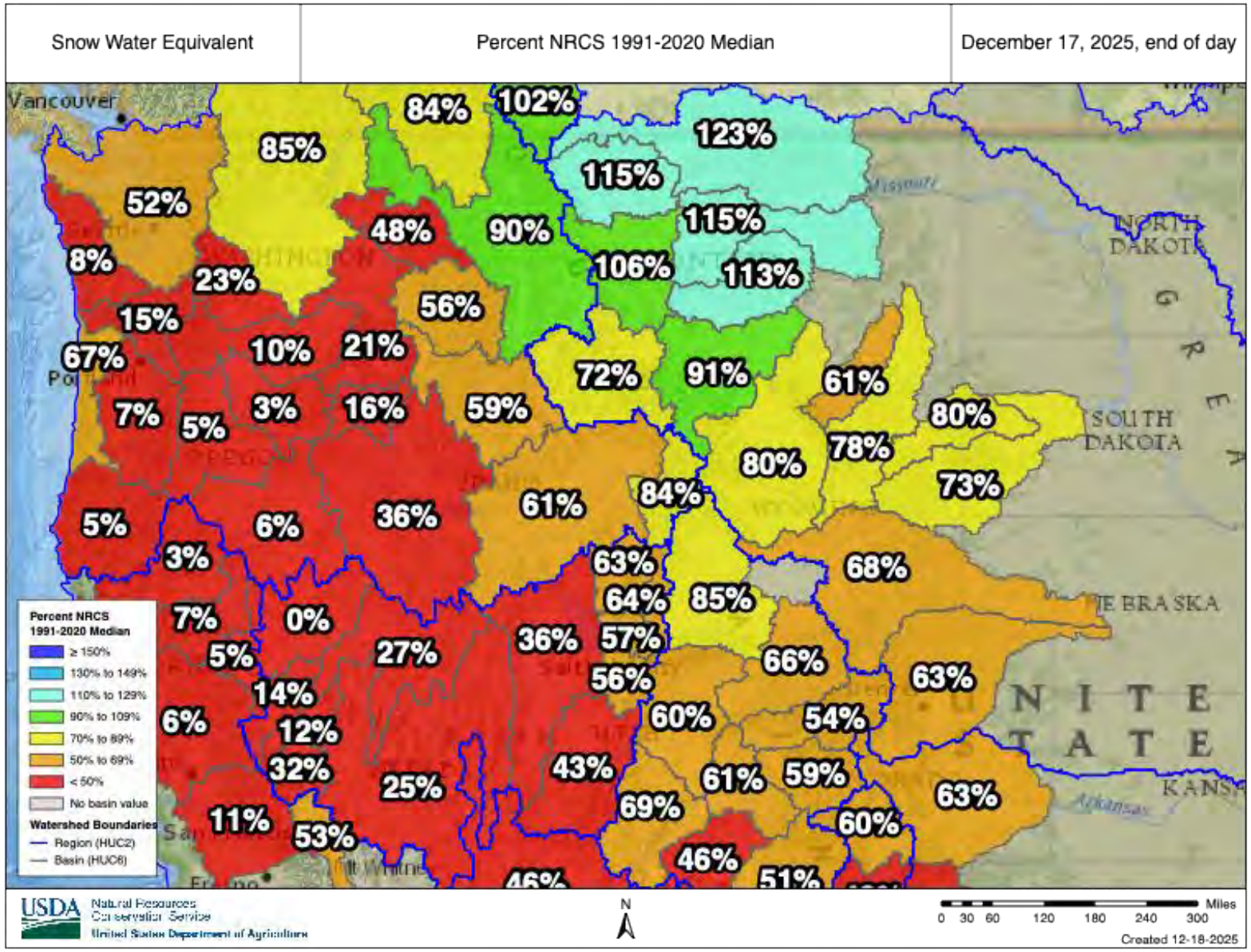
Source: USDA, Natural Resource Conservation Service

Provisional Data. Subject to Revision

Credit: USACE

- Snowpack water content is running below average (about 60-75% of normal) as of mid December
  - Thanks to warm temps over the last few months, thus below normal snow
- Accumulation is still early in the season, thus there is still room to increase water content

Snowpack Water Content



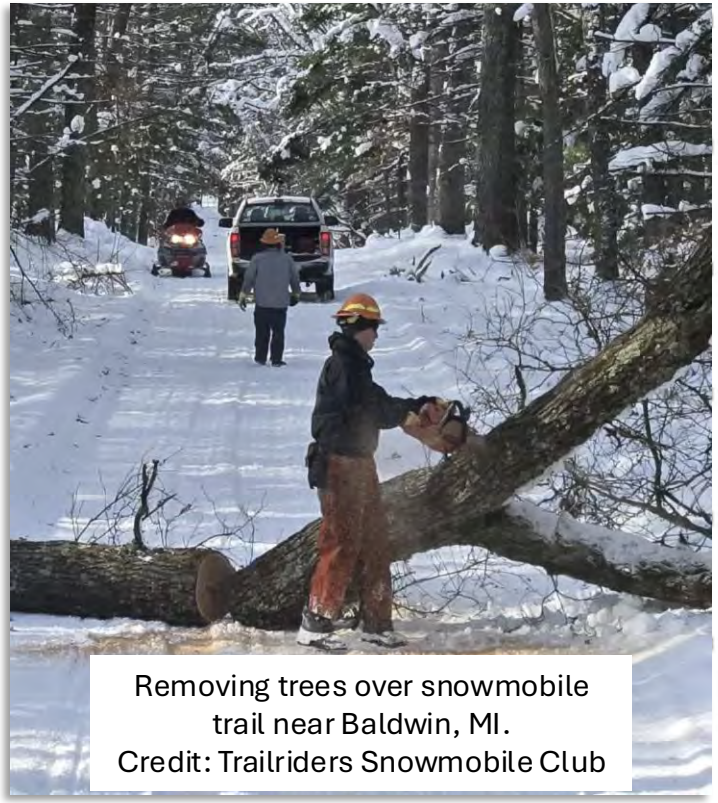
Credit: USDA NRCS

- Improvement over the mountains of MT, WY, CO since last month
- Still, much of the Missouri River Basin below normal SWE (largely <90% of normal)
  - Thanks to warm temps over the last few months, thus below normal snow
- Areas with >90% of normal coincide with abundance of precip in MT
- Again, accumulation is still early in the season

Winter Recreation

- Ice fishing & skating started much earlier than recent years; unfortunately, now turning to slush…
- Mallard migration uptick with cold & snow
- Ski hills across Dakotas, MN, WI, MI open due to snowfall and/or ability to make snow
- Snowmobiling conditions started off much better than recent years; unfortunately, snow is melting…
  - In MI, abundance of downed trees on trails due to freezing rain, snow, winds
- "Survival Running"
  - Per Doug Kluck & Brad Rippey, the cold has been ideal for a sense of adventure and survival, especially if winds are ≥ 10 mph

Frozen Little Lake Butte des Morts
Credit: Outdoor Hub



Removing trees over snowmobile trail near Baldwin, MI.
Credit: Trailriders Snowmobile Club

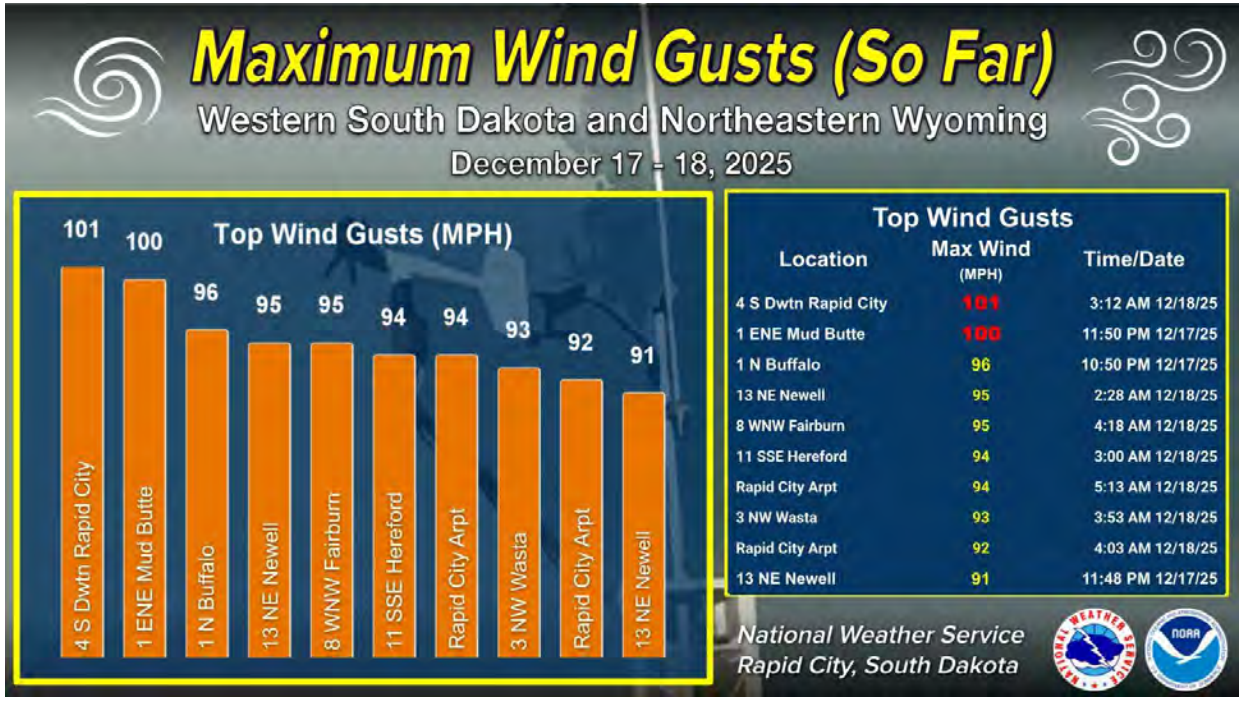
The Past 24-ish Hours

WYDOT District 5-Northwest Wyo... · Follow
13h ·

She's angry. Wind speeds are averaging 87 mph.

Wyoming Highway 28 is closed as of 8:07 a.m. between Lander and Farson due to wind. Semi-truck has rolled north of Red Canyon. #wyoroad

Air temperature	39°F (4°C)
Relative humidity	67%
Dew point	30°F (-1°C)
Visibility	23295.1 ft (7100 m)
Surface temperature	35°F (2°C)
Wind gust	123.0 mph (198.0 km/h)
Wind average	87.0 mph (140.0 km/h)
Wind direction	SW



Various Wind Gust Stats

- 10:30am 12/17 – 10:30am 12/18 from the South Dakota Mesonet
  - 94 mph at New Underwood
  - 87 mph at Sturgis
  - 83 mph at union Center NW
  - 80 at Provo, Prairie City, and Elm Springs
- 8am 12/17 from NWS Western Region Headquarters
  - 123 mph at Lower Red Canyon (WY)
  - 91 mph at Lander (WY)

Outlook

La Niña

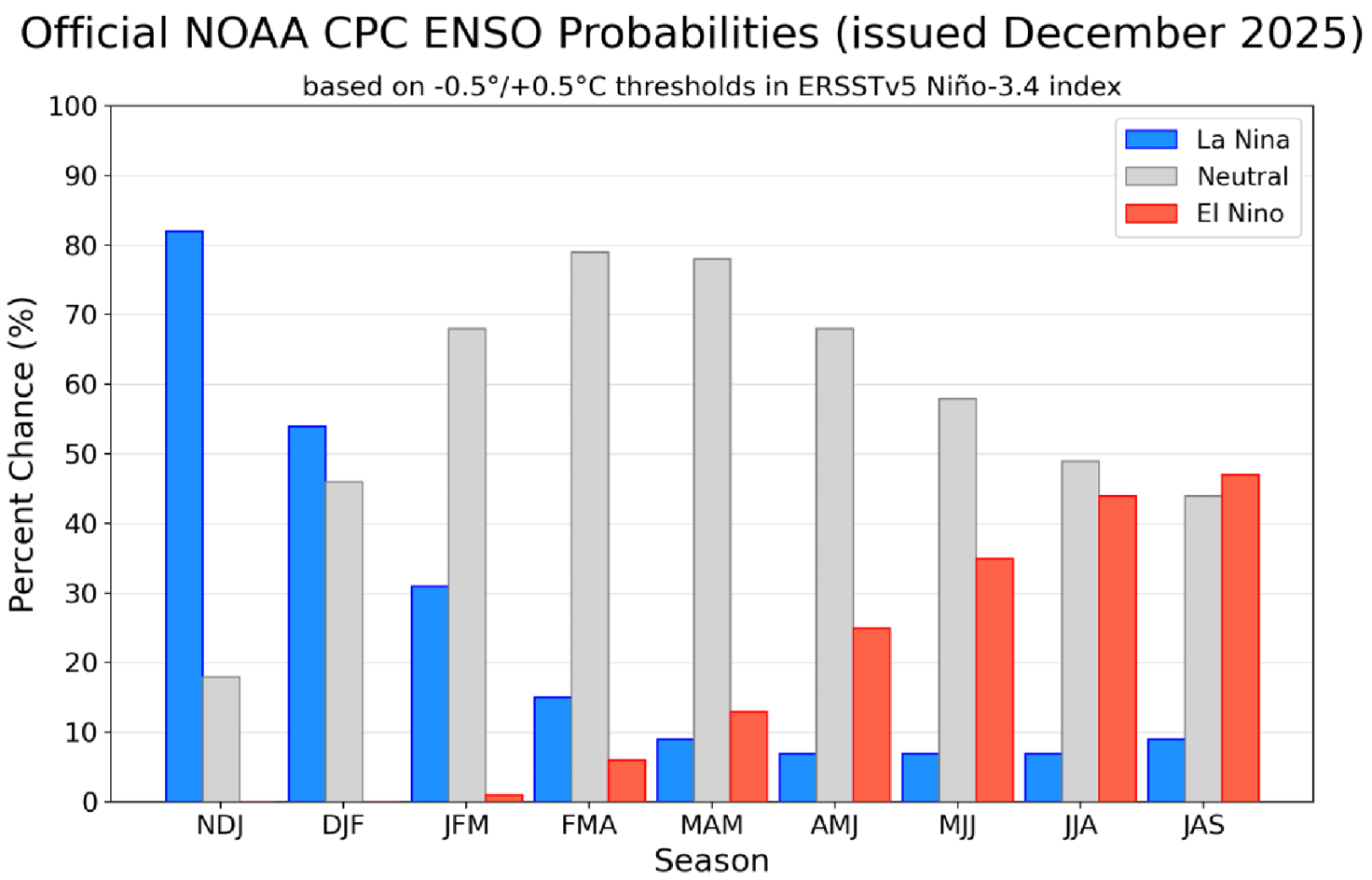


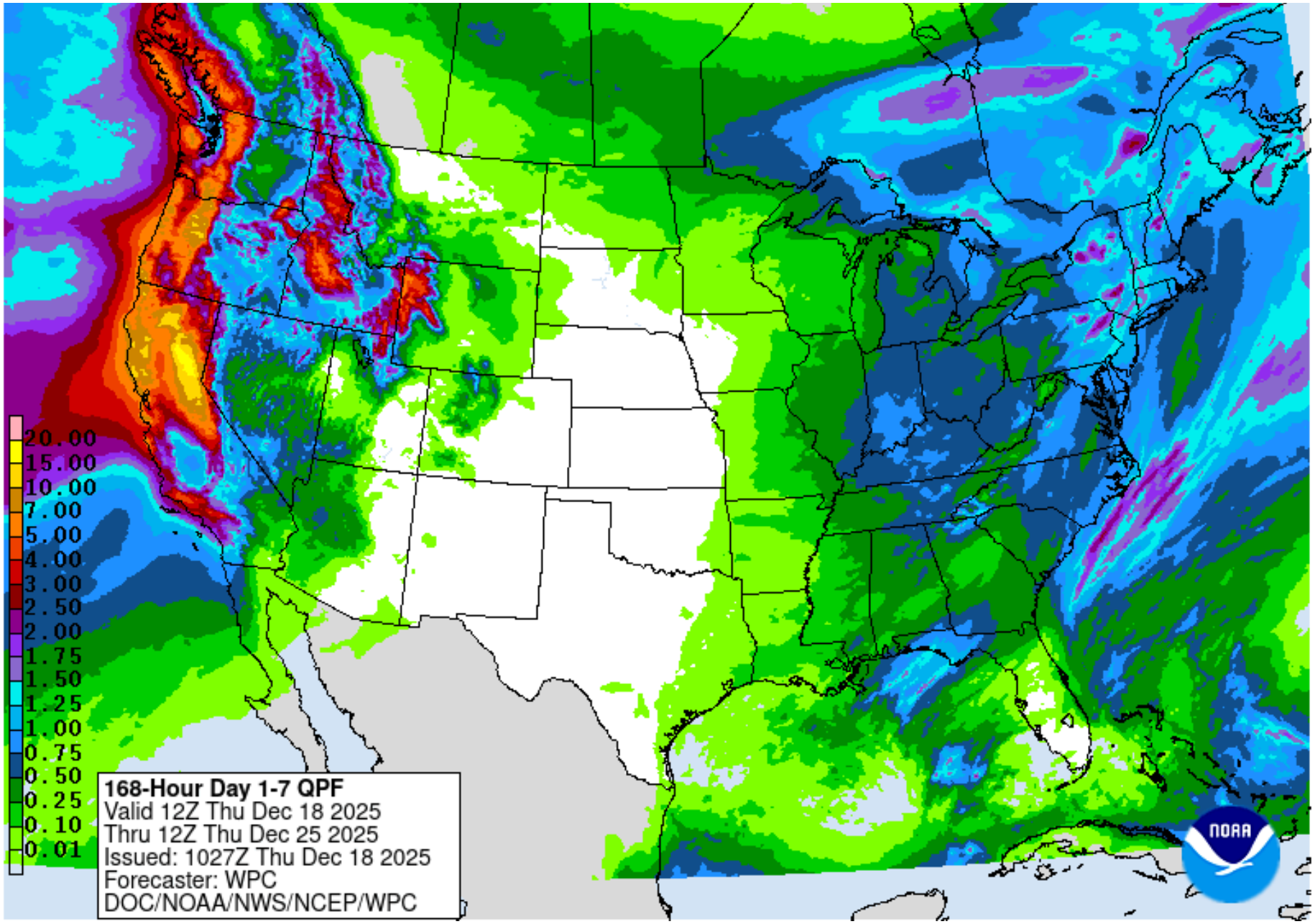
Figure 7. Official ENSO probabilities for the Niño 3.4 sea surface temperature index (5°N-5°S, 120°W-170°W). Figure updated 11 December 2025.

Credit: NOAA CPC

- La Niña favored over the next 1-2 months, with a transition to ENSO-neutral most likely in Jan-Mar

- La Niña conditions
  - **Sea surface temperatures** in the tropical Pacific are *cooler than normal* by 0.5°C or more
  - There is an **atmospheric response** in the tropical Pacific that can affect the continental US, mostly in winter

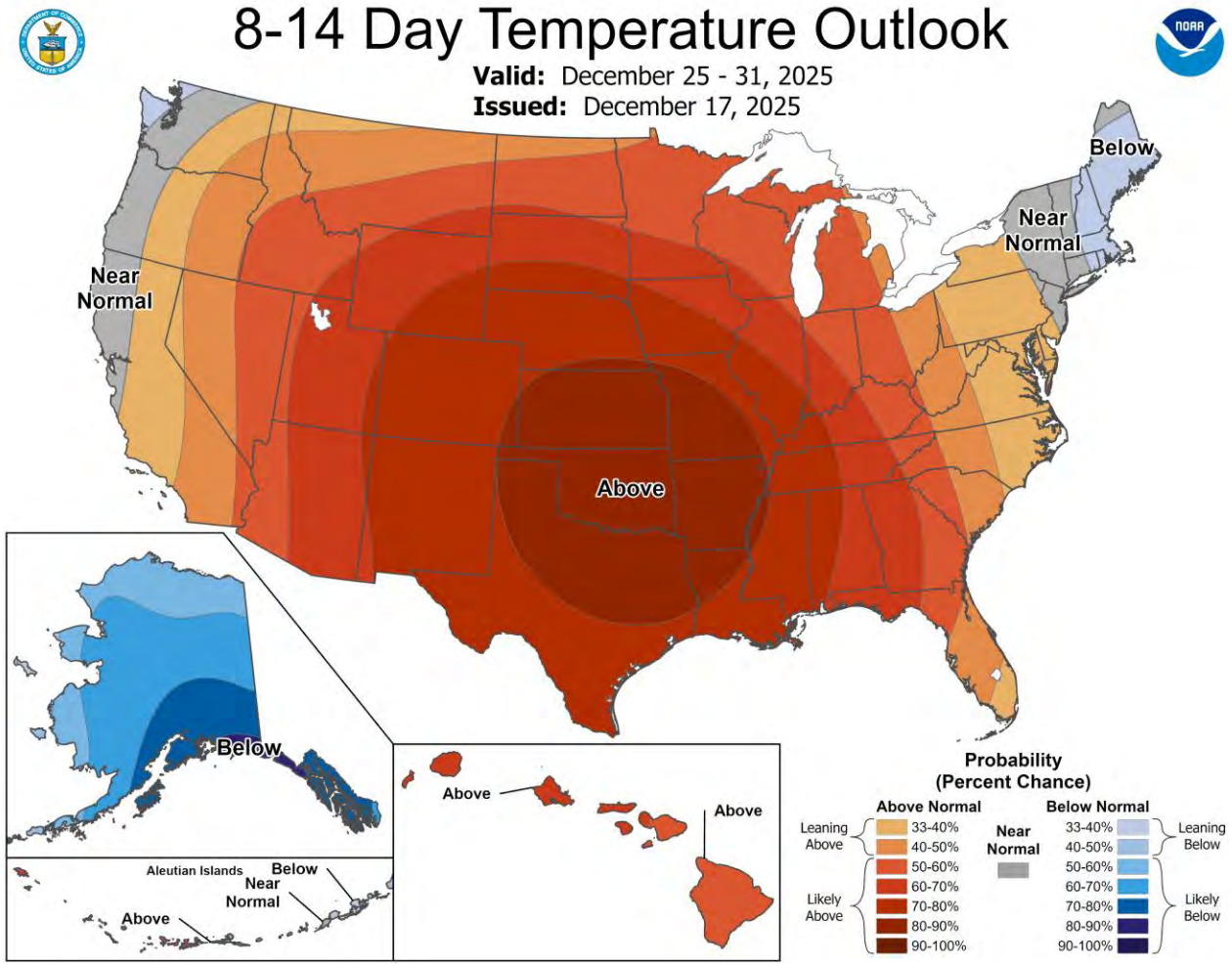
Precipitation Forecast – December 18-25

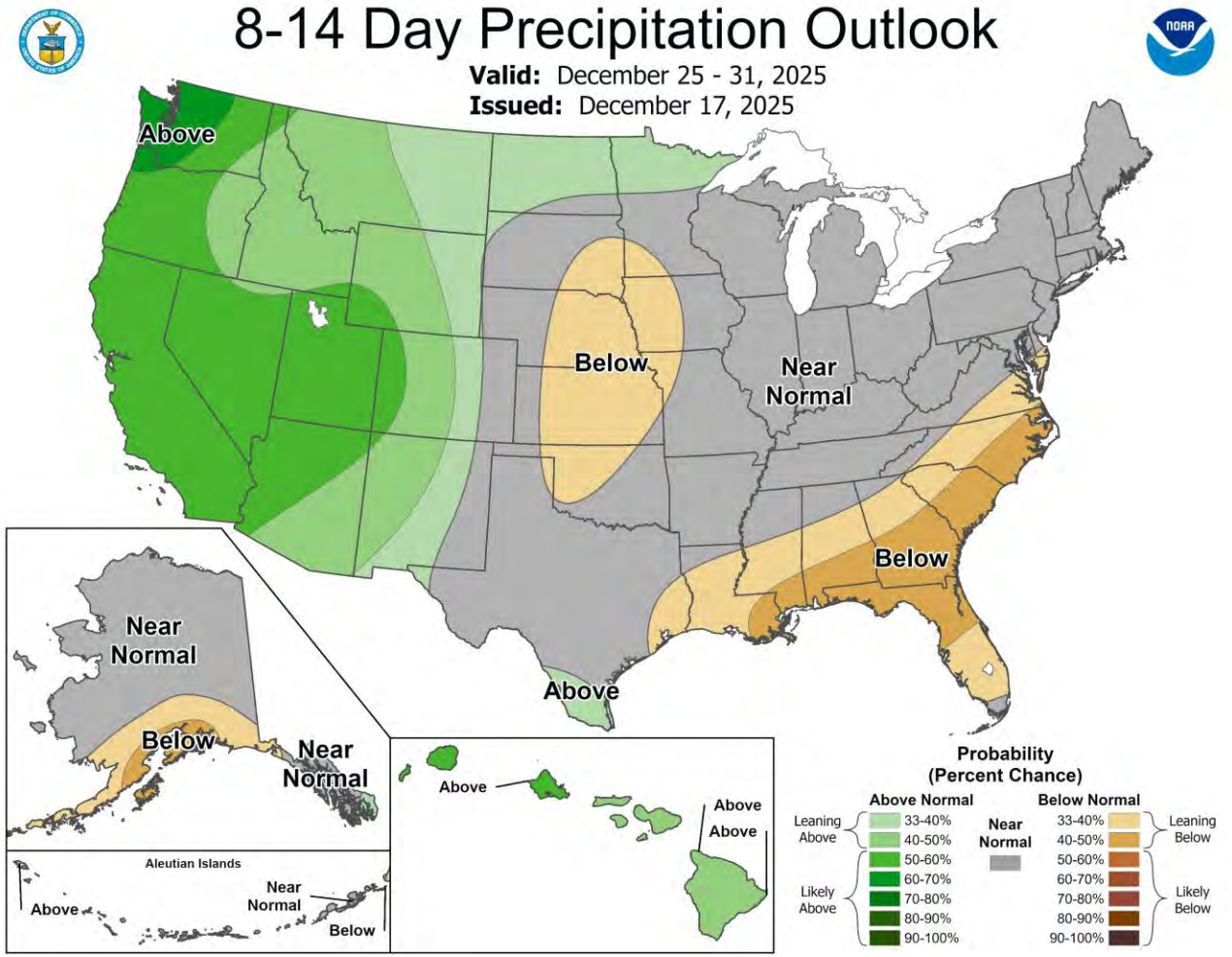


- Higher chances for precip over the eastern states and higher elevations to the west
- Low chances for Great Plains

Credit: NWS WPC

8-14-Day Outlook

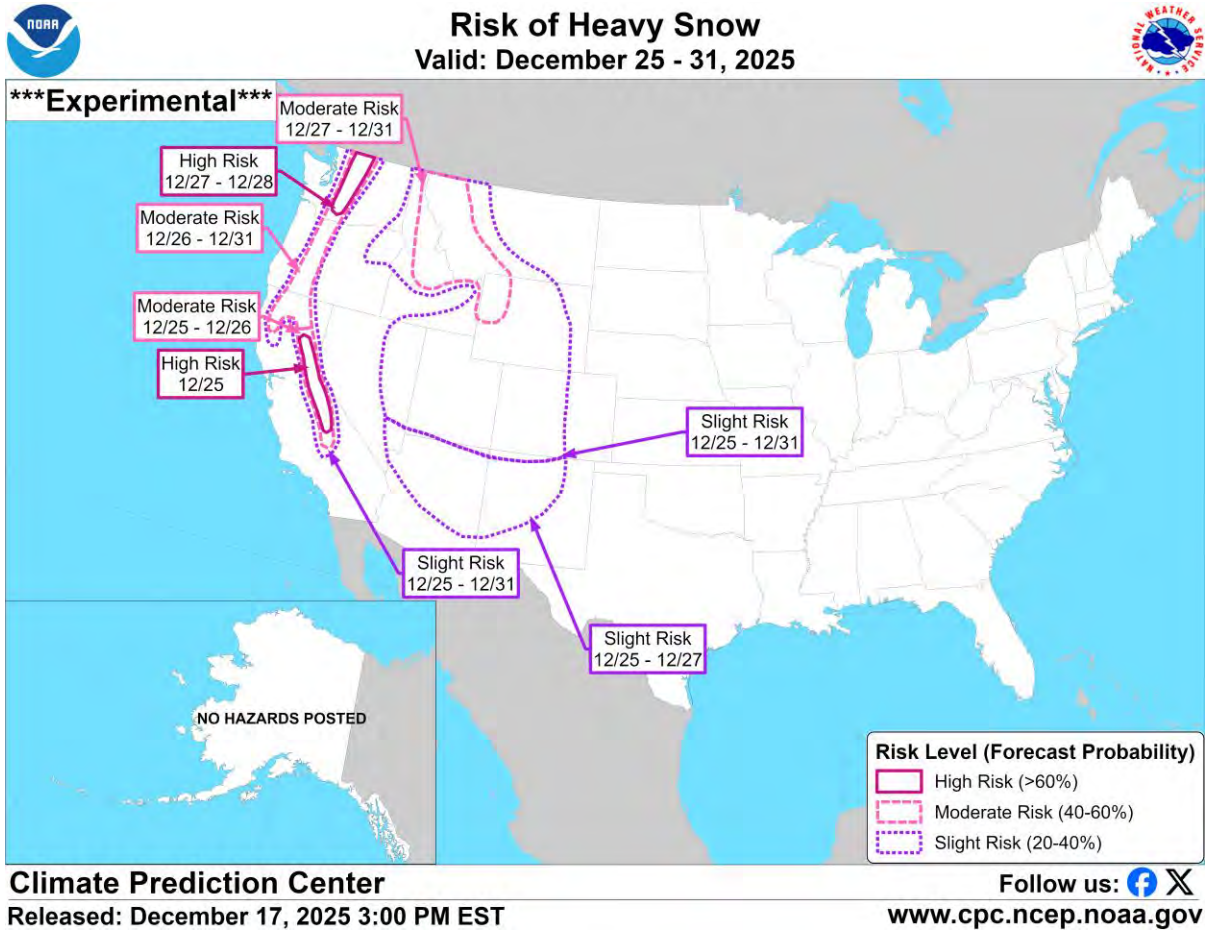




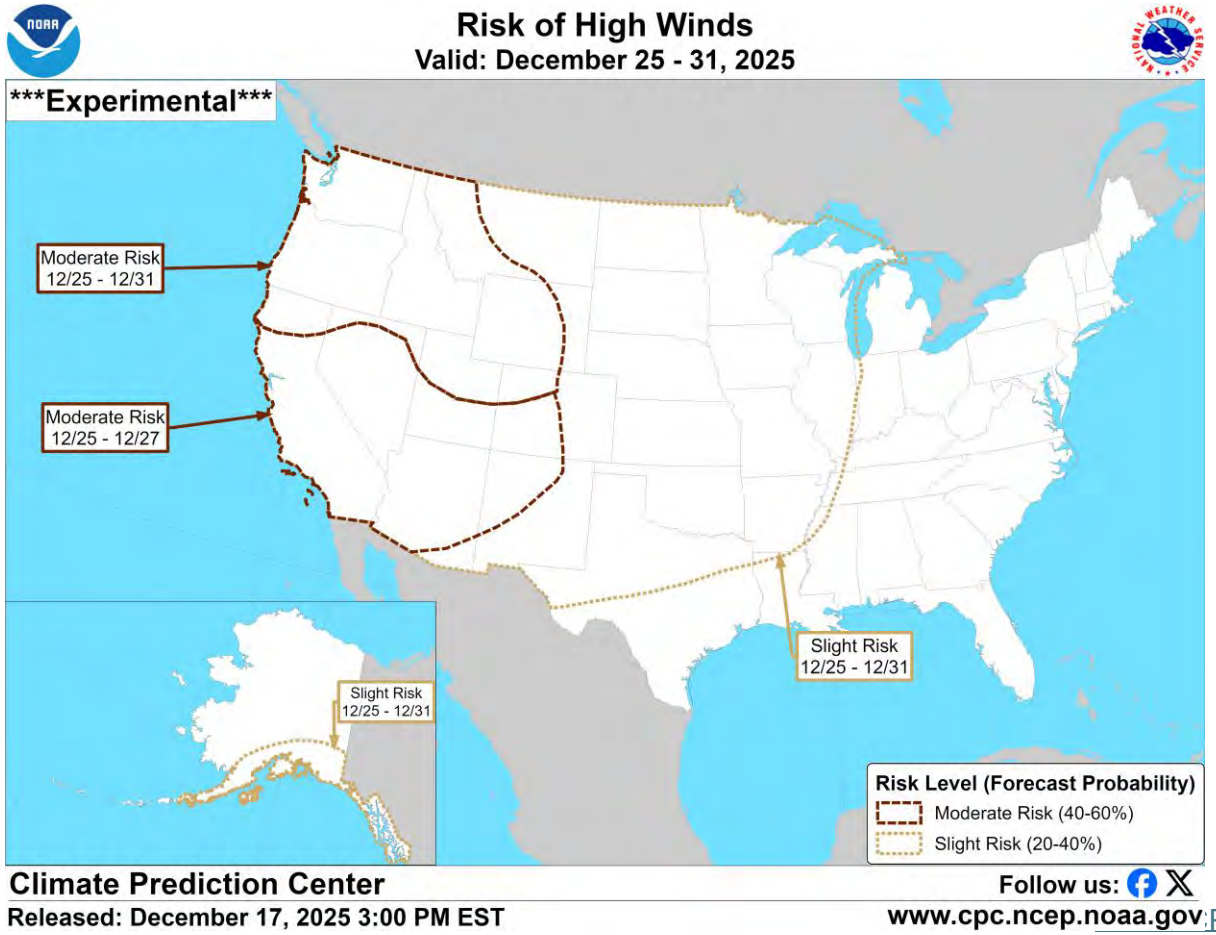
- Very likely warmer than normal to end the year
- Most of the Midwest and parts of the Great Plains could see near normal precipitation
- Slight chance that parts of the Great Plains into western Midwest could see drier than normal precipitation
- Slight chance that the western states and into ND & MN could see wetter than normal precipitation

Credit: NOAA CPC

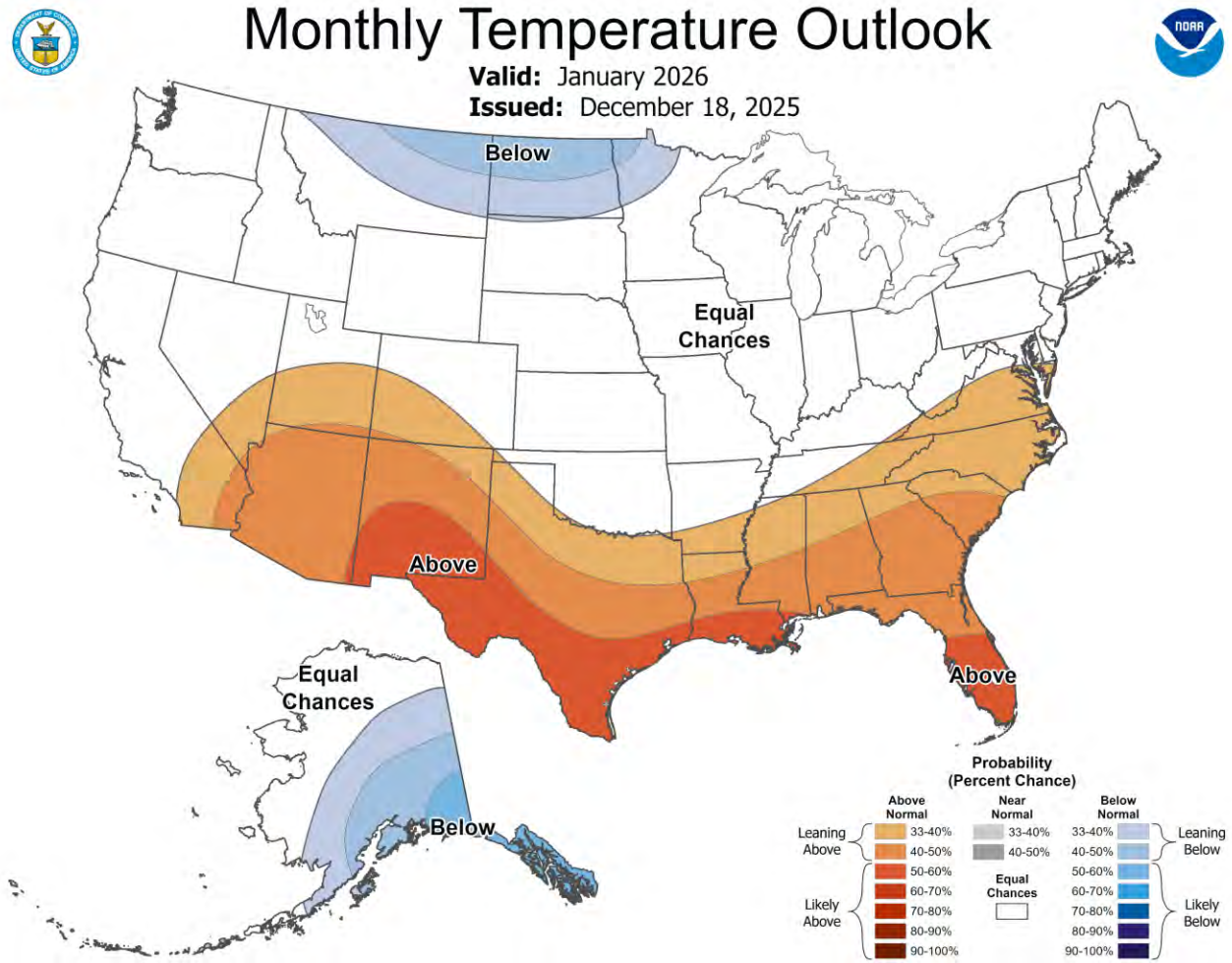
Potential Hazards

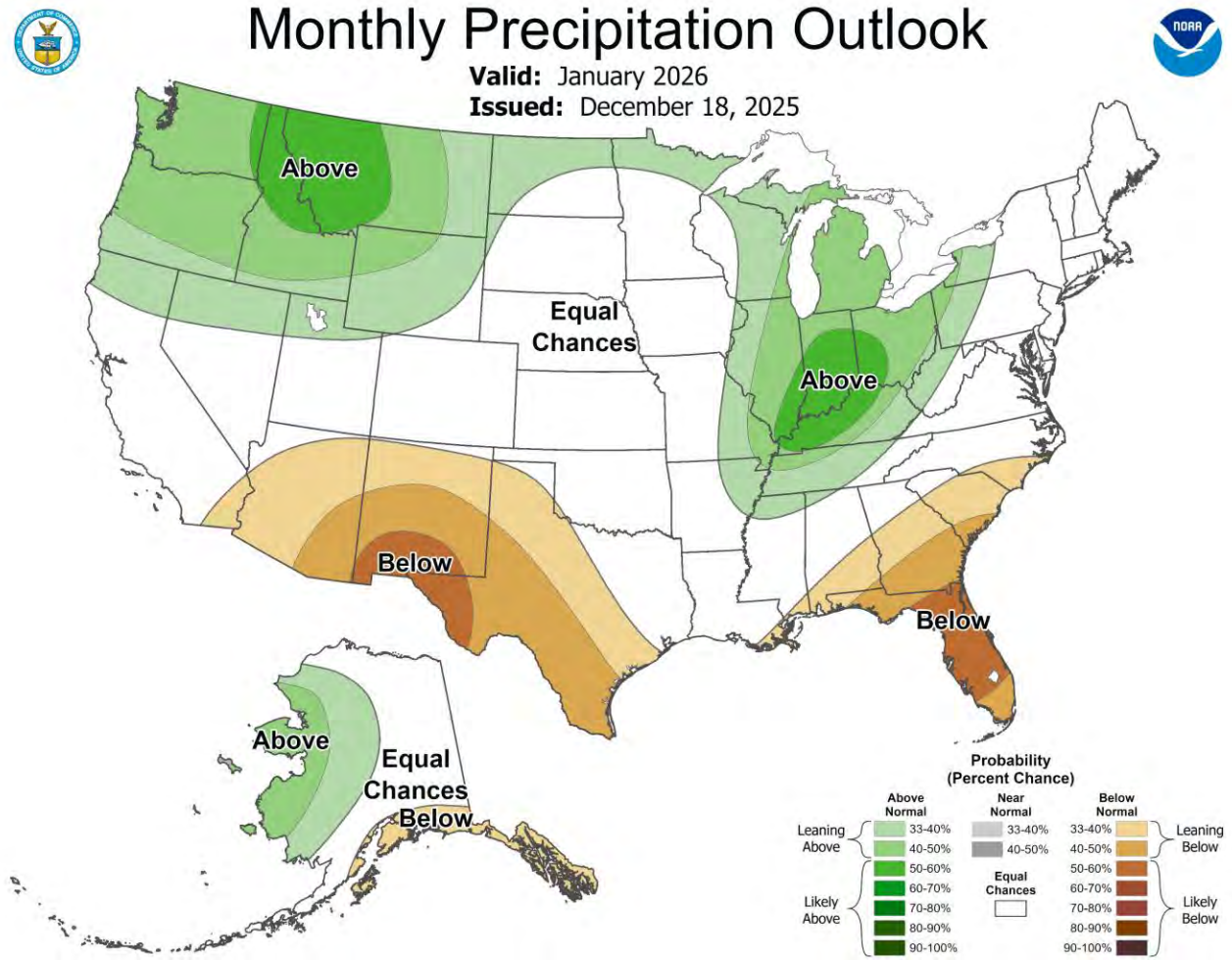


- Moderate risk (40-60%) for heavy snow in western MT, and slight risk (20-40%) for WY & CO
- Moderate risk (40-60%) for high winds in western MT, WY, & NW CO, and slight risk (20-40%) for much of the region



January 2025 Outlook

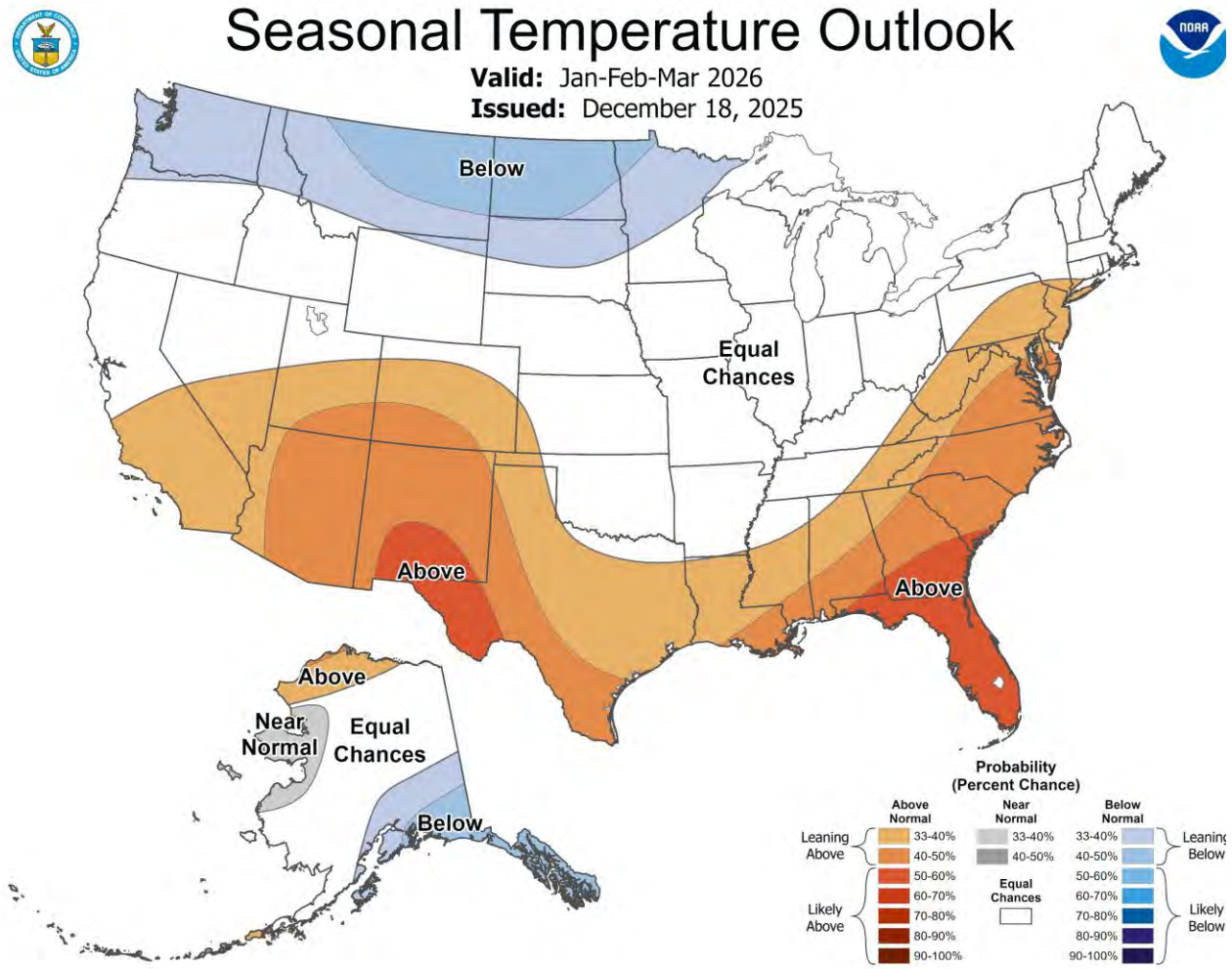


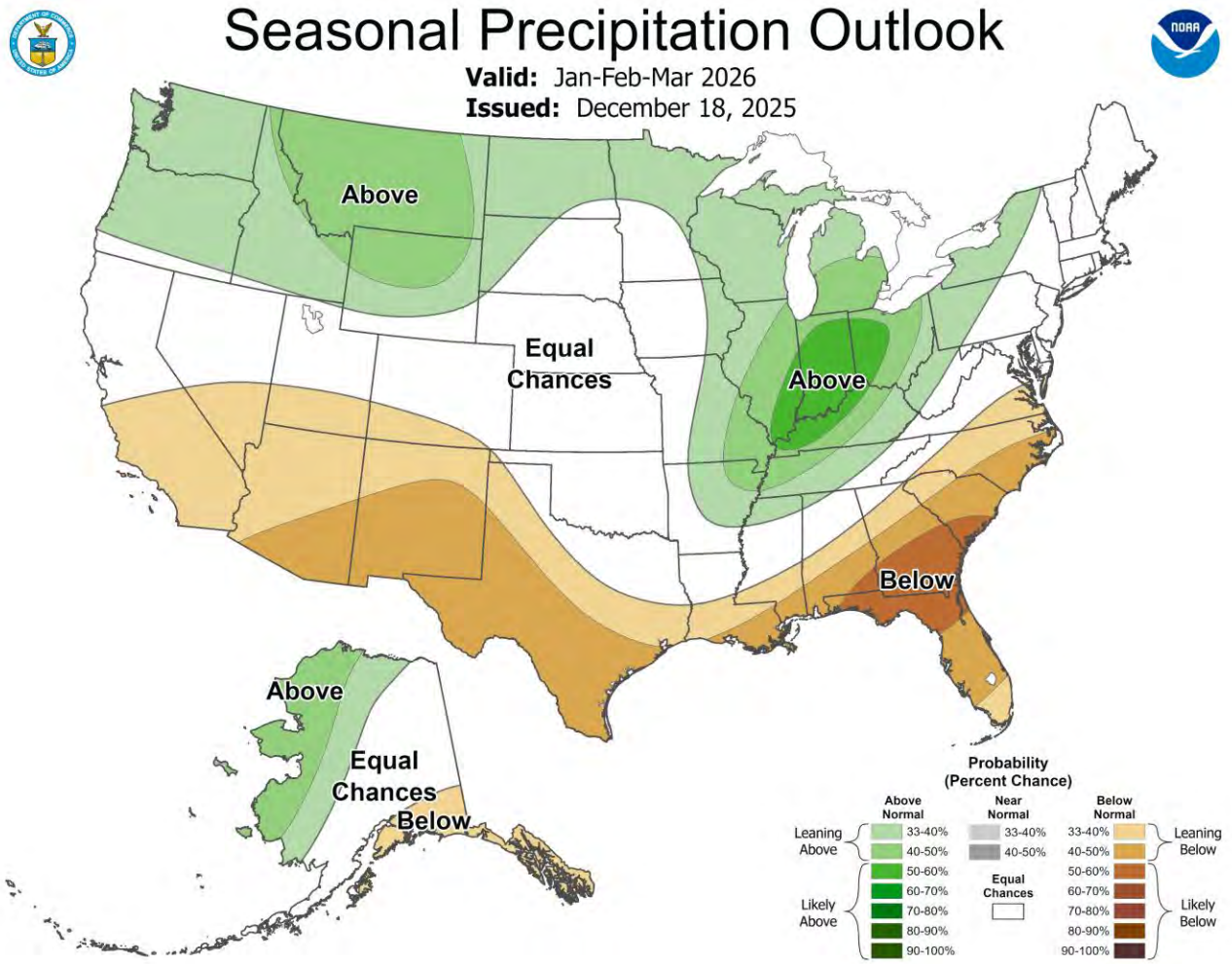


- Equal chances for above, near, or below normal temperatures for most
  - Slight chance for cooler than normal temps over NE MT, ND, NW MN, and warmer than normal over SW CO
- Equal chances for above, near, or below normal precipitation for most of the Great Plains, CO, and into the Midwest
- Chance for wetter than normal conditions over the the Great Lakes, Ohio River Valley, & northern Rockies
  - Higher chances for the Ohio River Valley & northern Rockies

Credit: NOAA CPC

January-February-March 2025 Outlook

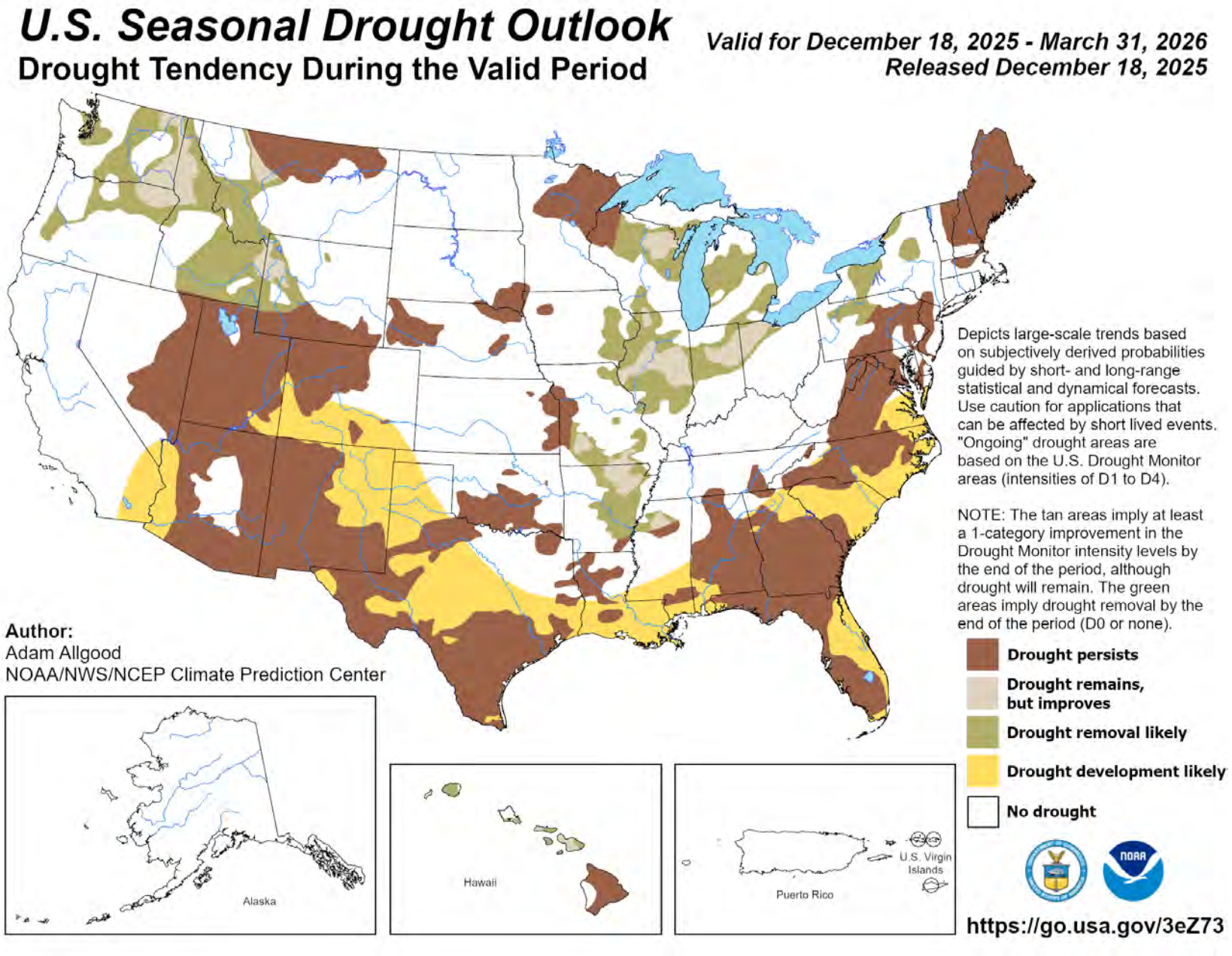




- Equal chances for above, near, or below normal temperatures for most
  - Slight chance for cooler than normal temps over NE MT, ND, NW MN, and warmer than normal over CO
- Equal chances for above, near, or below normal precipitation for most of the Great Plains, CO, and into the Midwest
- Chance for drier than normal conditions into southern CO
- Chance for wetter than normal conditions over the the Great Lakes, Ohio River Valley, & northern Rockies
  - Higher chances for the Ohio River Valley

Credit: NOAA CPC

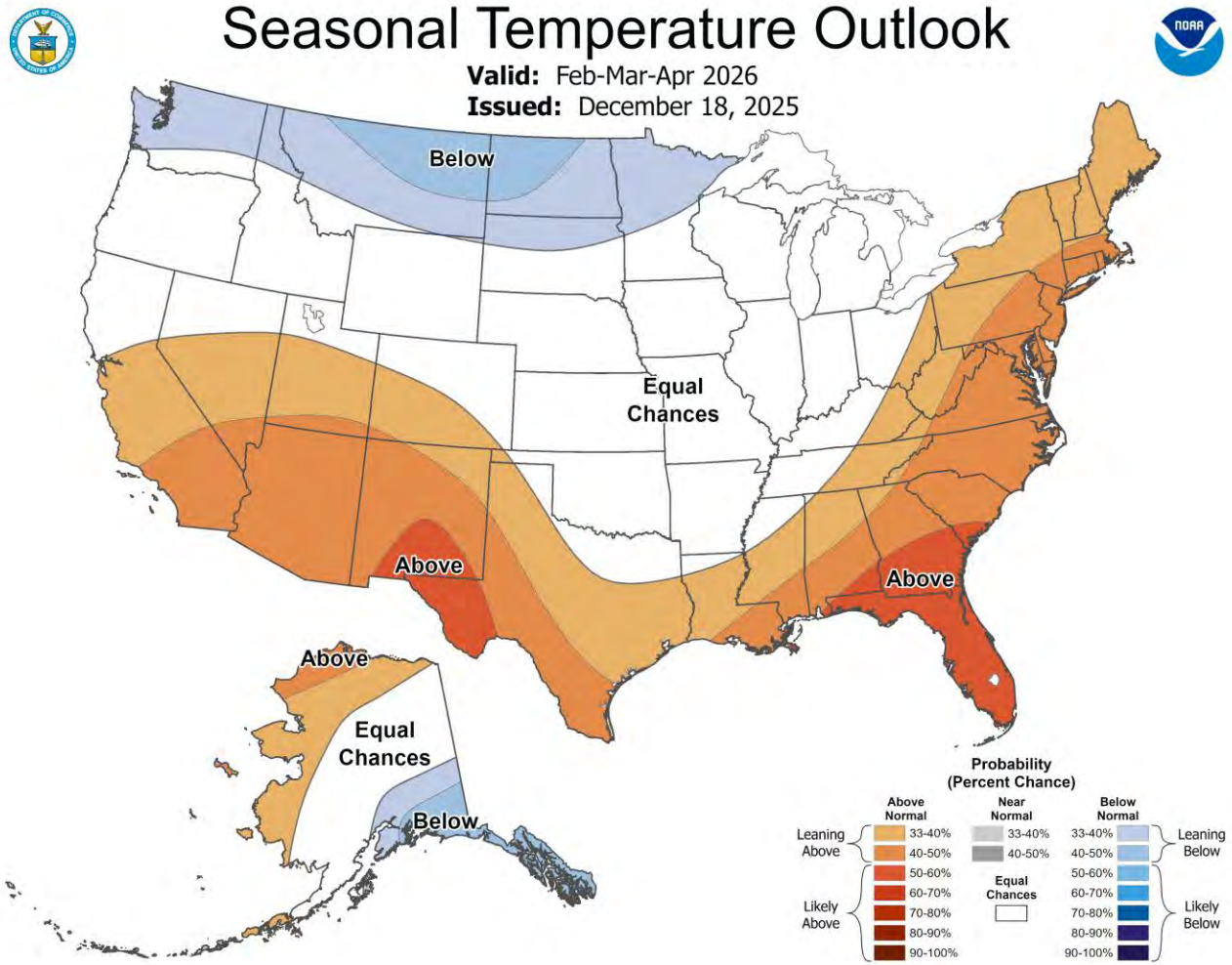
January-February-March 2025 Outlook

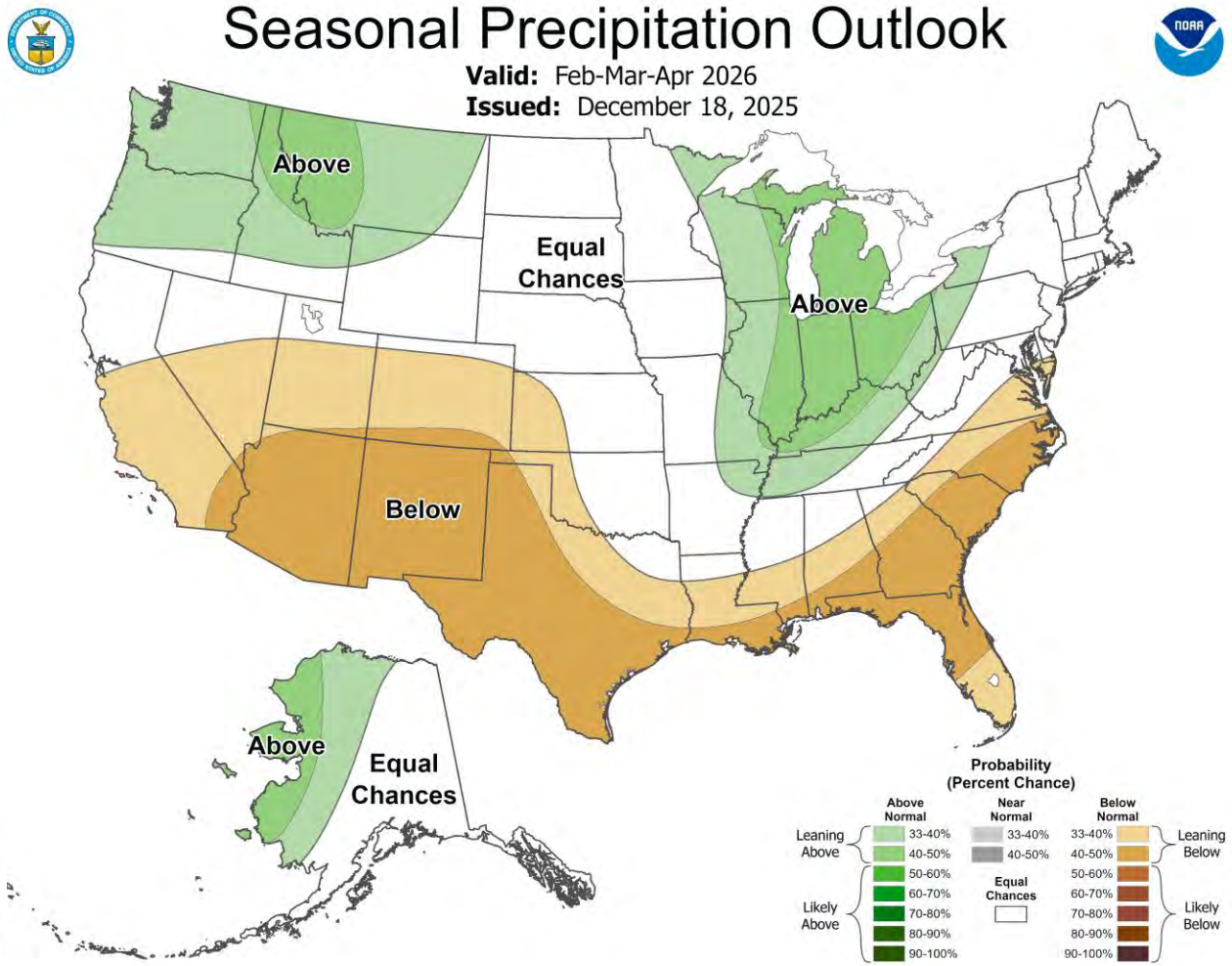


- Potential for drought improvement around the Midwest, MT, WY
- Persistent drought in northern MN & WI and parts of the Plains and Rockies
- Winter is our driest season, so drought improvement can be difficult at this time of the year

Credit: NOAA CPC

February-March-April 2025 Outlook





Credit: NOAA CPC

Summary

- Current Conditions
  - Dry for many, despite snowfall
    - Abundant snowfall for eastern region – great for winter recreation, but made travel difficult
  - No major issues on the Mississippi, Missouri, or Ohio Rivers
    - Monitoring low flows around St. Louis & Hermann, MO
  - Great Lakes and local ice cover near normal for this time of year, though melting
  - Winter is off to an extreme start for those in the east; mild in the west

- Outlook
  - Best chances for precip for eastern Midwest & Rockies over next 7 days
  - Potential for heavy snow in the Rockies & high winds across region between Dec 25-31
  - Equal chances for above, near, or below normal temp & precip for most for Jan-Mar
    - Potential for cooler than normal for the northern Plains and wetter than normal over the Great Lakes, Ohio River Valley, and northern Rockies

Further Information – Partners

- Today's and Past Recorded Presentations
  - https://mrcc.purdue.edu/webinars
  - https://hprcc.unl.edu/webinars.php
- NOAA National Centers for Environmental Information – www.ncei.noaa.gov
- Monthly Climate Reports (US & Global) – https://www.ncdc.noaa.gov/sotc/
- NOAA Climate Prediction Center – www.cpc.ncep.noaa.gov
- Climate Portal – www.climate.gov
- U.S. Drought Portal – www.drought.gov
- National Drought Mitigation Center – https://drought.unl.edu
- State Climatologists – http://www.stateclimate.org
- Regional Climate Centers
  - Midwestern – https://mrcc.purdue.edu
  - High Plains – https://hprcc.unl.edu
- USDA Midwest Climate Hub – https://www.climatehubs.usda.gov/hubs/midwest

NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION U.S. DEPARTMENT OF COMMERCE

REGIONAL CLIMATE CENTERS

NDMC NATIONAL DROUGHT MITIGATION CENTER UNIVERSITY OF NEBRASKA

AASC AMERICAN ASSOCIATION OF STATE CLIMATOLOGISTS

USDA

Thank you very much! Questions?

- Climate
  - Bridgette Mason – bmmason2@wisc.edu
  - Dennis Todey – dennis.todey@usda.gov
  - Doug Kluck – doug.kluck@noaa.gov
  - Brian Fuchs – bfuchs2@unl.edu
- Weather
  - crhroc@noaa.gov
- Agriculture
  - Brad Rippey, brad.rippey@usda.gov

My dog & I snowplowing after the Thanksgiving snowstorm ☺