

North Central Region Climate and Drought Update + Outlook

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ATMOSPHERIC SCIENCE
COLORADO STATE UNIVERSITY

General Information

U.S. Drought Monitor
NWS Central

February 18, 2025
(Released Thursday, Feb. 20, 2025)
Valid 7 a.m. EST

Collaboration Among

- 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

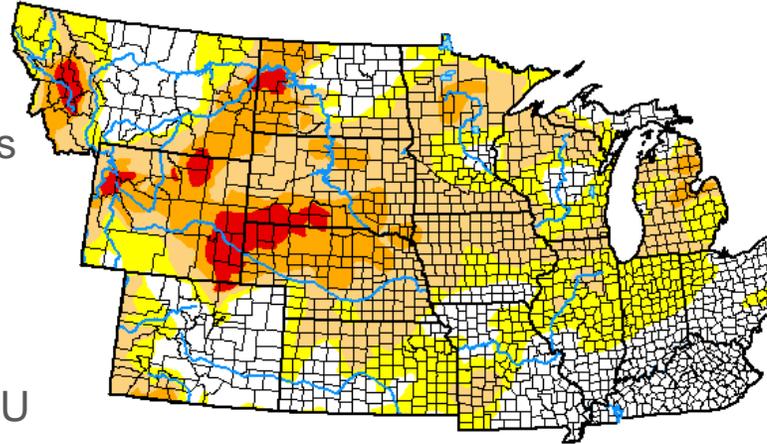
- March 20, 2025 - 1pm CT/12pm MT Matt Sittel KSU

Access to Future Climate Webinars

- <https://www.drought.gov/events>

Recordings of Past Webinars

- <https://mrcc.purdue.edu/multimedia/webinars.jsp>
- <https://hprcc.unl.edu/webinars.php>



Drought Conditions (Percent Area)

| | None | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4 |
|--|-------|-------|-------|-------|-------|------|
| Current | 30.16 | 69.84 | 45.00 | 16.27 | 3.60 | 0.00 |
| Last Week <i>02-11-2025</i> | 28.31 | 71.69 | 45.98 | 17.08 | 3.74 | 0.00 |
| 3 Months Ago <i>11-19-2024</i> | 20.64 | 79.36 | 56.39 | 23.92 | 7.19 | 0.28 |
| Start of Calendar Year <i>01-07-2025</i> | 31.02 | 68.98 | 45.49 | 19.38 | 5.80 | 0.00 |
| Start of Water Year <i>10-01-2024</i> | 20.79 | 79.21 | 36.88 | 12.04 | 3.20 | 0.40 |
| One Year Ago <i>02-20-2024</i> | 43.97 | 56.03 | 25.08 | 9.52 | 1.10 | 0.00 |

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:

Brian Fuchs
National Drought Mitigation Center



droughtmonitor.unl.edu

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



Summary and Outline

Recent Conditions

- 1-3 month & month-to-date temperature and precipitation
- Relevant longer-term climate conditions
- Snowpack/Snow cover
- Soil moisture
- Rivers, Lakes, and Reservoirs

Impacts

- Kentucky/Ohio River Flooding
- Impacts from recent cold weather
- Long-term Drought

Outlook

- Next two weeks
- Spring outlook/El Niño Southern Oscillation forecast
- Drought and River outlook



Blue Lake Pass facing south: July 2023
Credit: Peter Goble



Recent Conditions

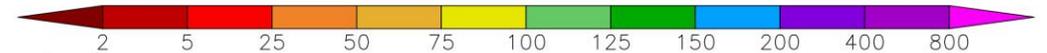
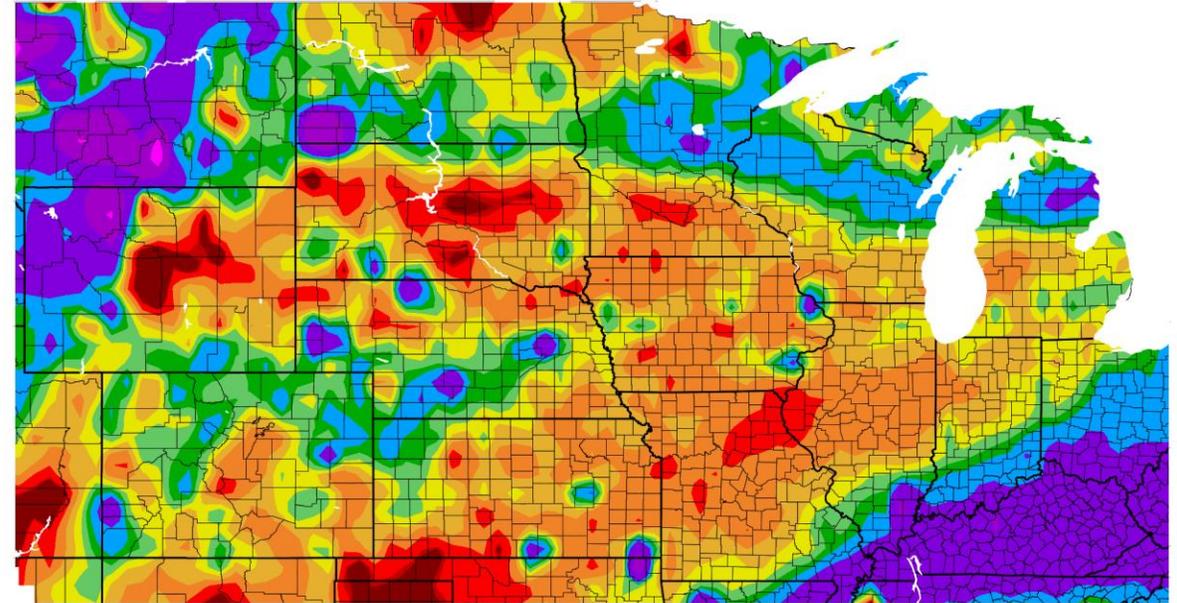
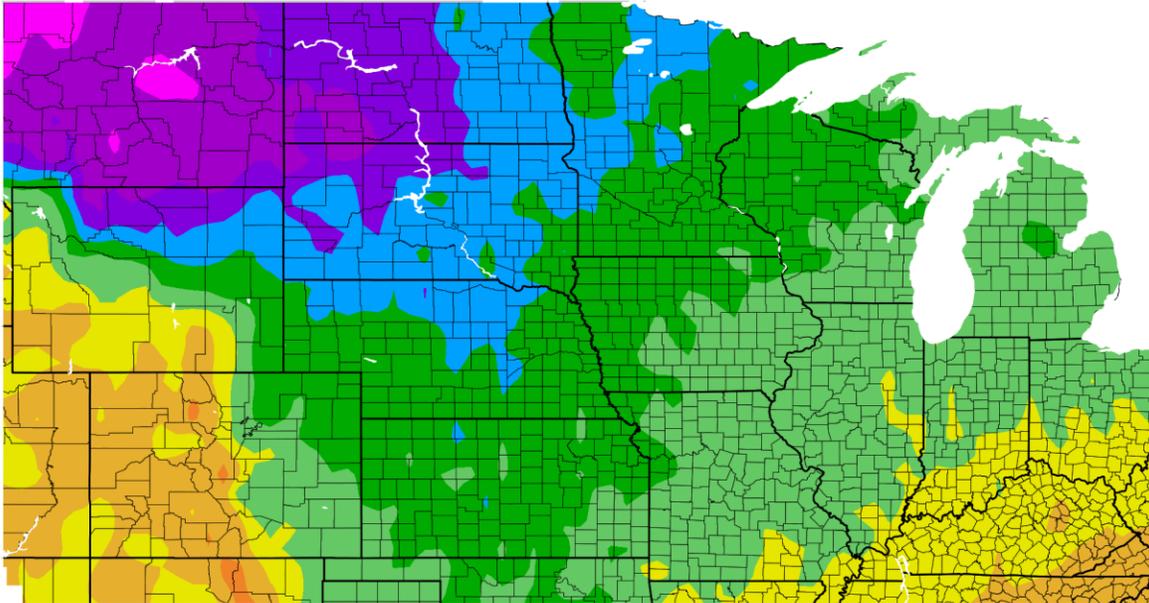


February so far

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

Departure from Normal Temperature (F)
2/1/2025 – 2/19/2025

Percent of Normal Precipitation (%)
2/1/2025 – 2/19/2025



Generated 2/20/2025 at HPRCC using provisional data.

NOAA Regional Climate Centers Generated 2/20/2025 at HPRCC using provisional data.

NOAA Regional Climate Centers

Record cold start to February for eastern Montana with cooler than normal temps across majority of region
Mix of above and below normal precipitation with much wetter than normal conditions in Ohio River Valley

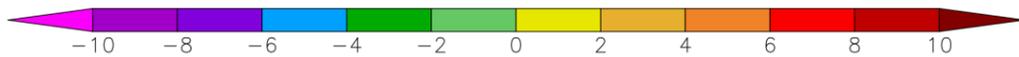
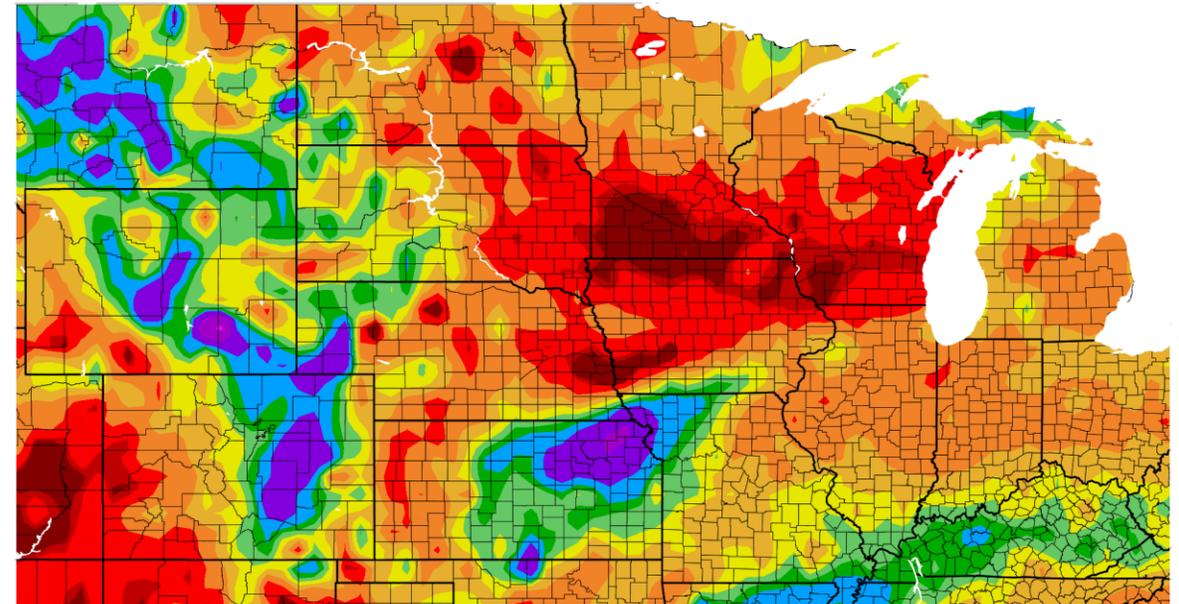
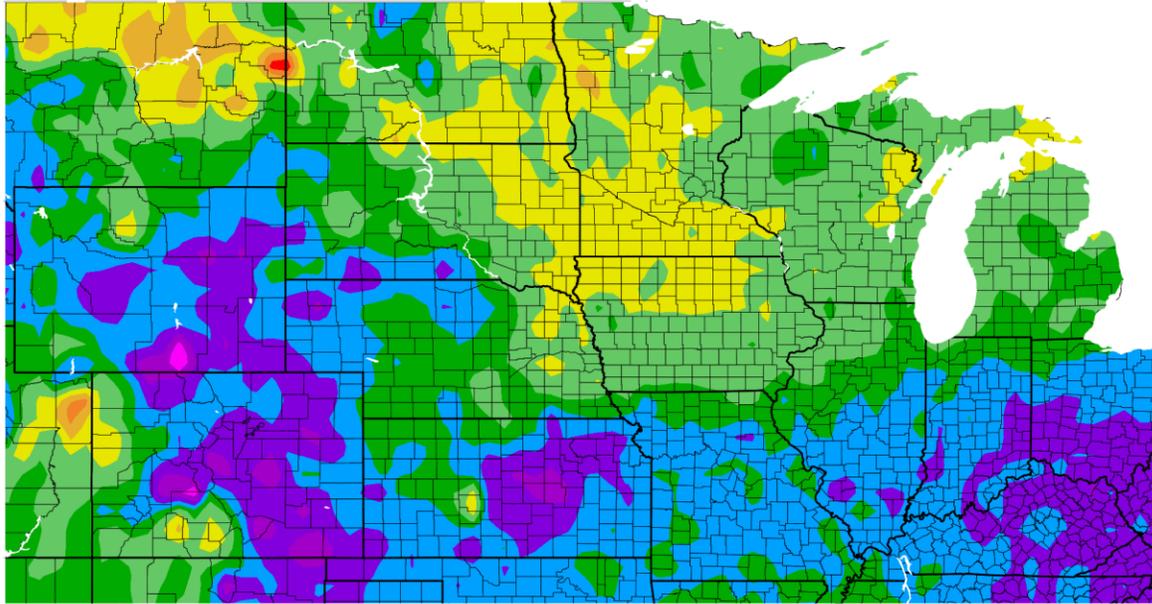


January

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

Departure from Normal Temperature (F)
1/1/2025 – 1/31/2025

Percent of Normal Precipitation (%)
1/1/2025 – 1/31/2025



Generated 2/20/2025 at HPRCC using provisional data.

NOAA Regional Climate Centers

Generated 2/20/2025 at HPRCC using provisional data.

NOAA Regional Climate Centers

Cooler than normal – also much drier than normal across North Central Region

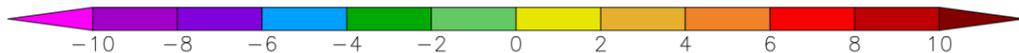
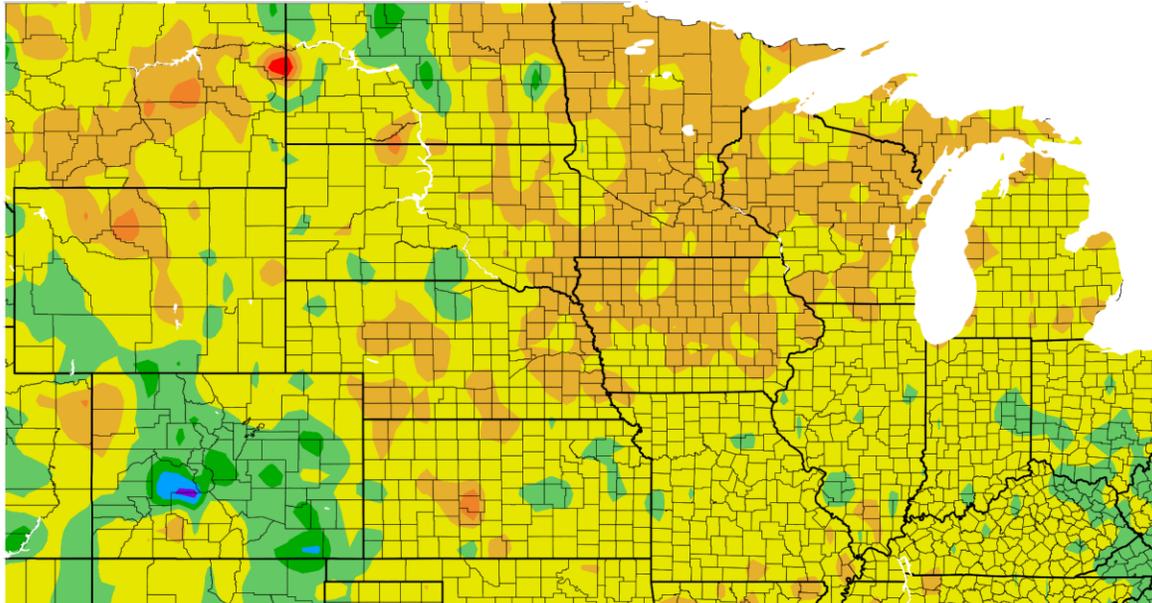
Top 10 dry conditions in Minnesota (9th) and Wisconsin (3rd)



November-January

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

Departure from Normal Temperature (F)
11/1/2024 – 1/31/2025



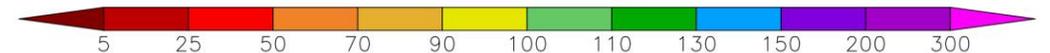
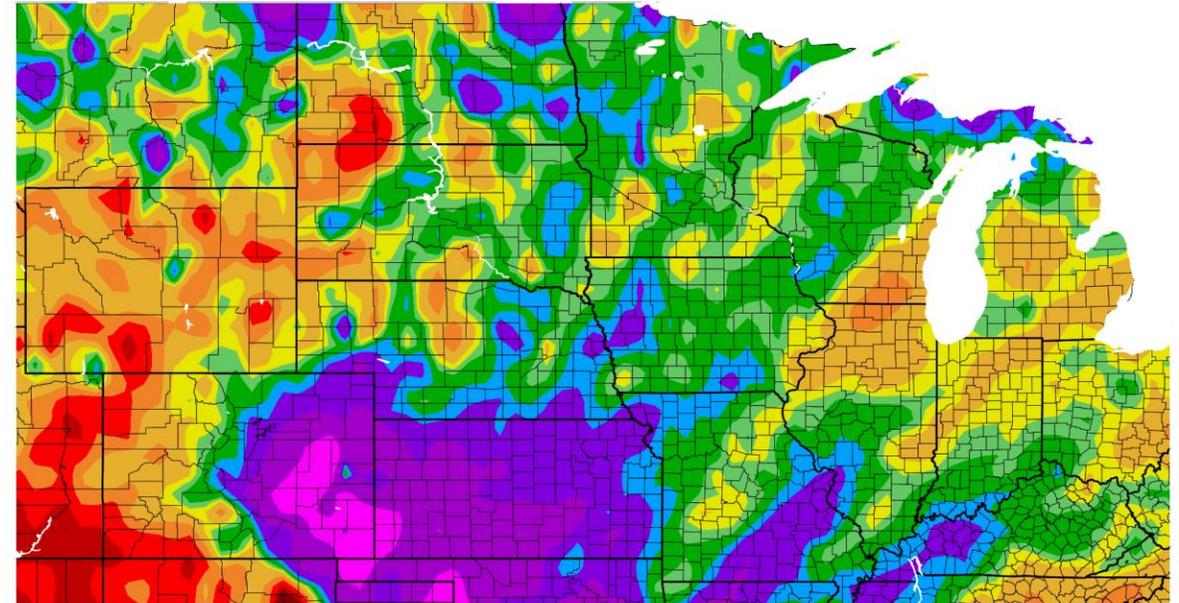
Generated 2/20/2025 at HPRCC using provisional data.

NOAA Regional Climate Centers

Generated 2/20/2025 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
11/1/2024 – 1/31/2025



Warmer than historical averages, but near normal by recent standards

Wetter than normal for most of Central Region, but still facing longer-term precipitation deficits

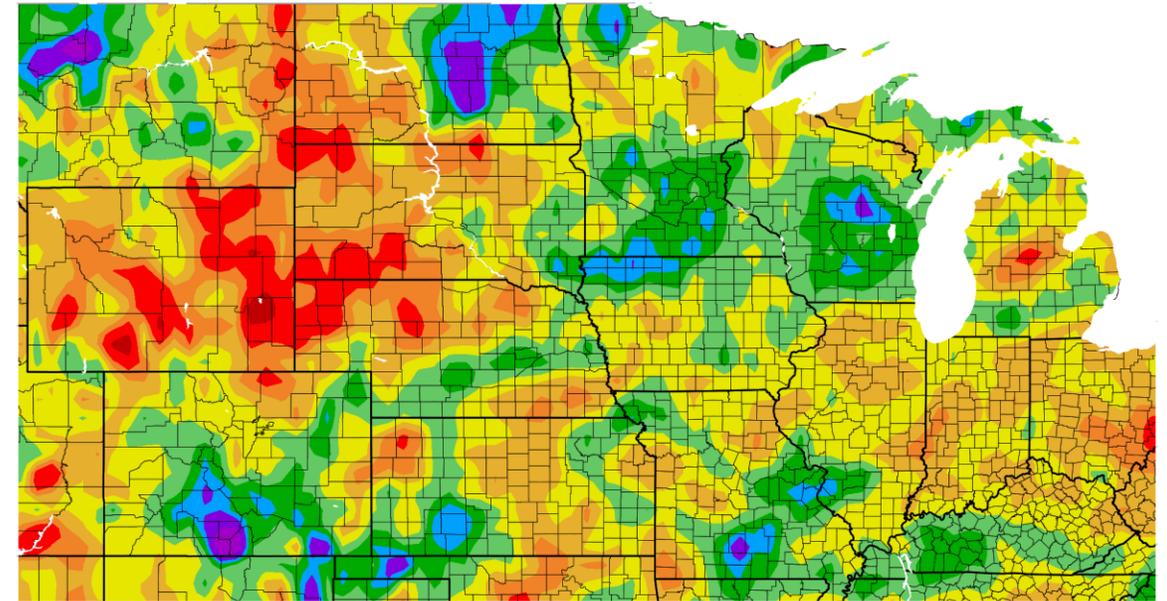
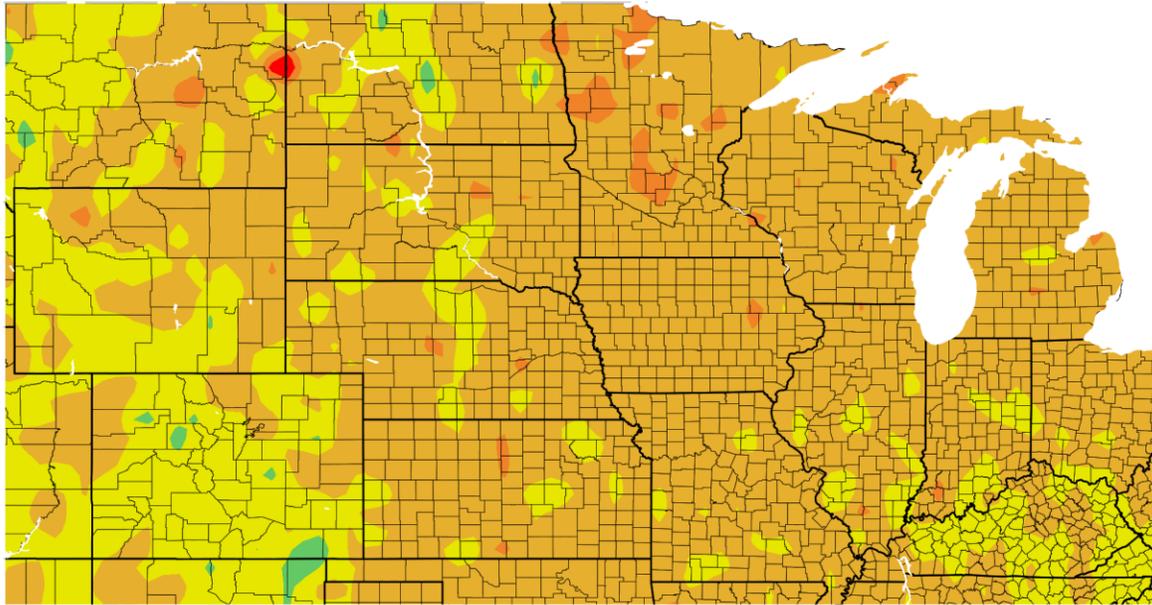


Last Twelve Months

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

Departure from Normal Temperature (F)
2/1/2024 – 1/31/2025

Percent of Normal Precipitation (%)
2/1/2024 – 1/31/2025



Generated 2/20/2025 at HPRCC using provisional data.

NOAA Regional Climate Centers

Generated 2/20/2025 at HPRCC using provisional data.

NOAA Regional Climate Centers

Top 20 or top 10 warmest August-January across North Central Region

Warm conditions combined with precipitation deficit are causing persistent drought conditions



Regional Snowfall

https://ag-wx.com/SNOW/snow_depart.png

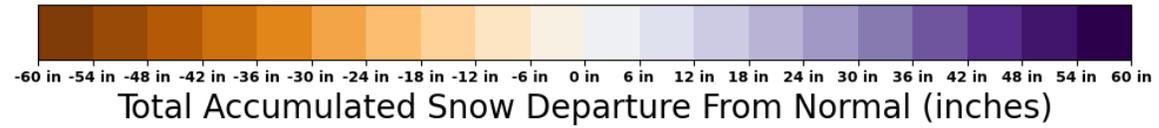
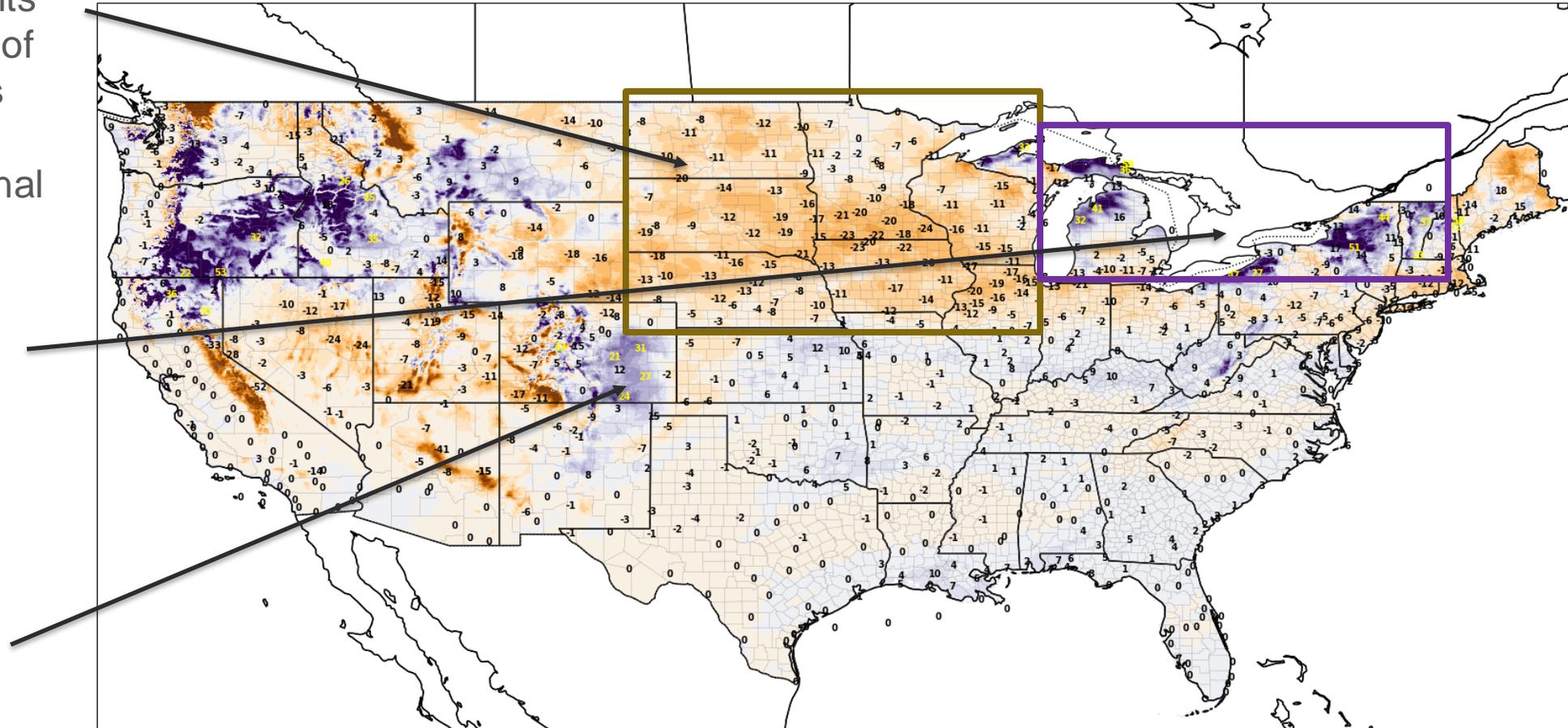
Season-to-Date Departure From Normal Snowfall: Beginning Sept 30, 2024

Valid for: Wed Feb 19, 2025

Seasonal snowfall deficits across northern portion of region. Over 20" deficits in southern Minnesota (~50% of normal seasonal snowfall to date)

Greater than average lake effect snow activity

SE CO surpluses largely from November blizzard

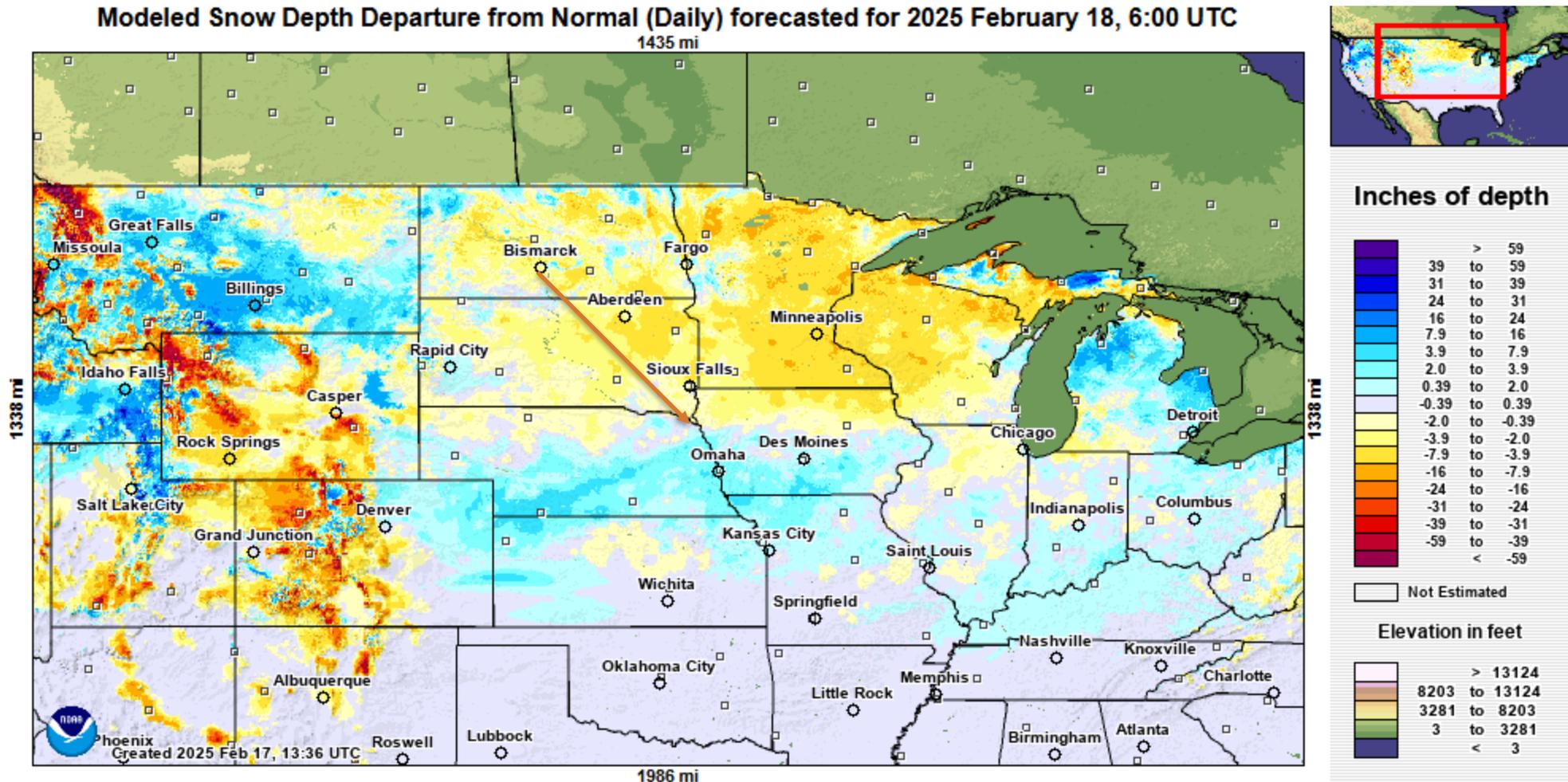


Regional Snow Cover

<https://www.nohrsc.noaa.gov/interactive/html/map.html?>

The majority of the North Central Region is currently covered by snow. Much of it will be gone within 1-2 weeks

The portions of the North Central Region that usually have more substantial snow cover have less than normal (e.g. Minnesota, Wisconsin, Wind River Range in Wyoming)

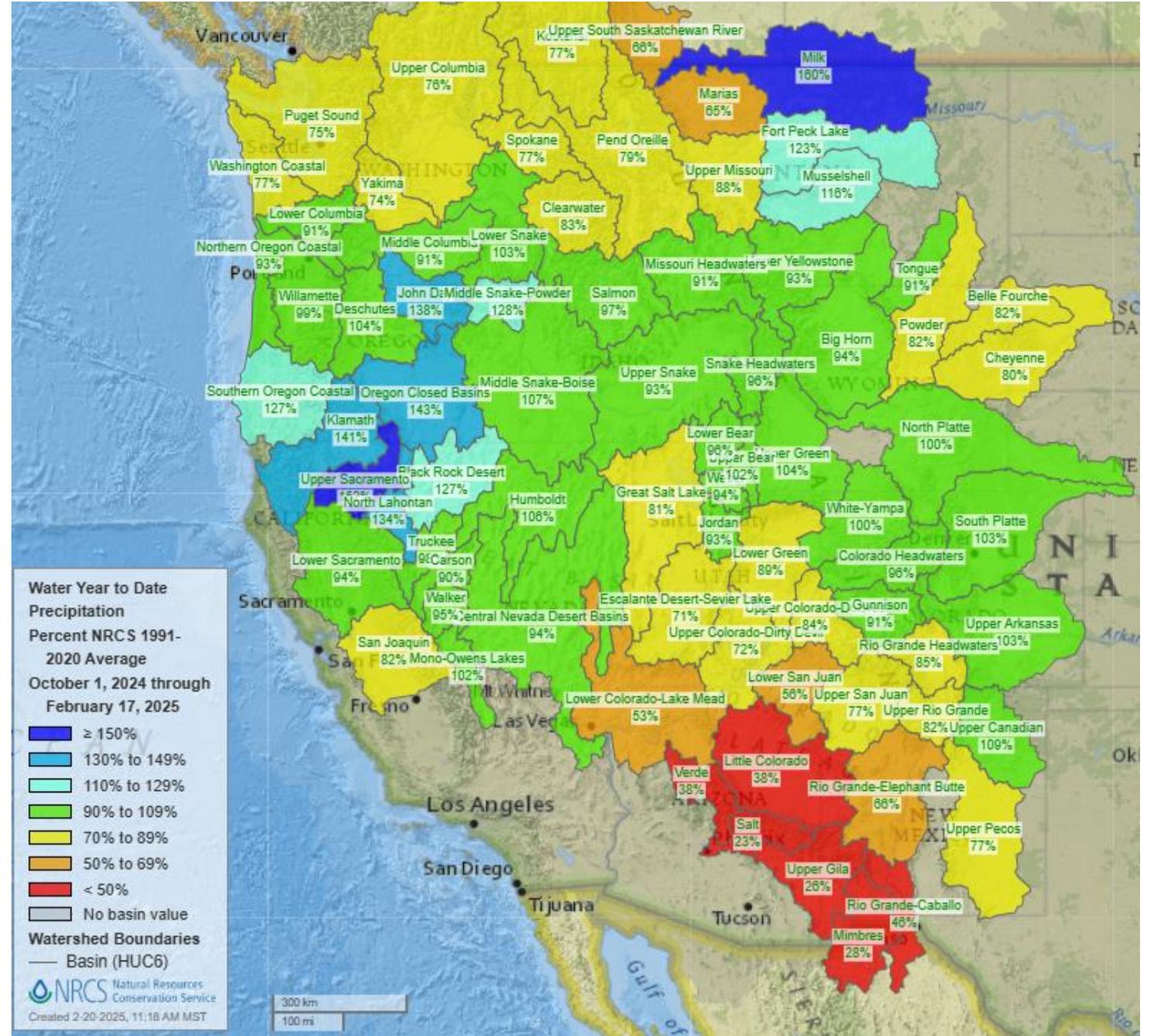


High Elevation Snowpack

Near normal snowpack across Upper Missouri Basin and Platte Basin

Much better than this time last year for Upper Missouri Basin

Outliers in Marias Basin (low)



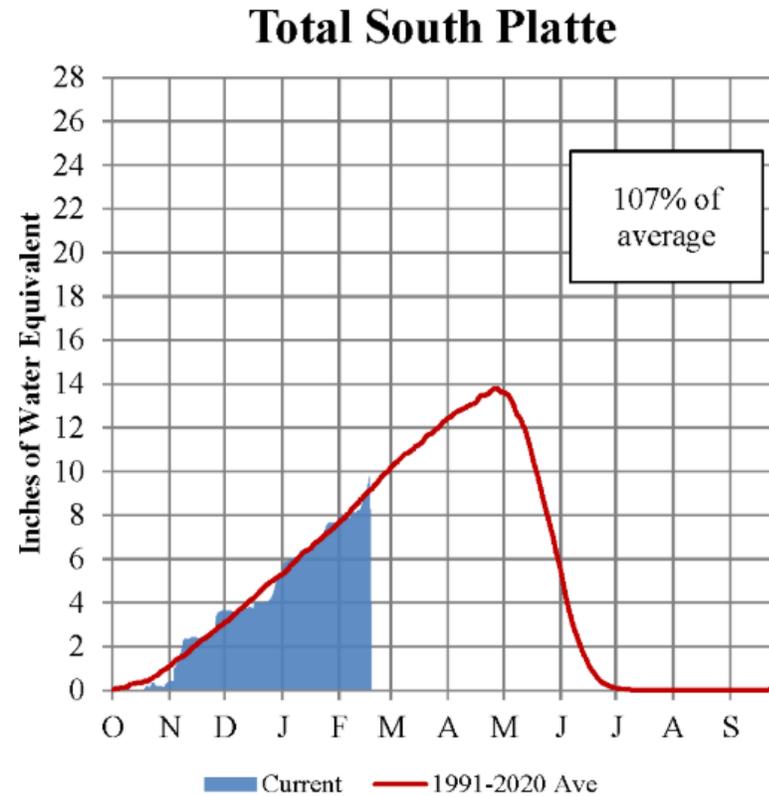
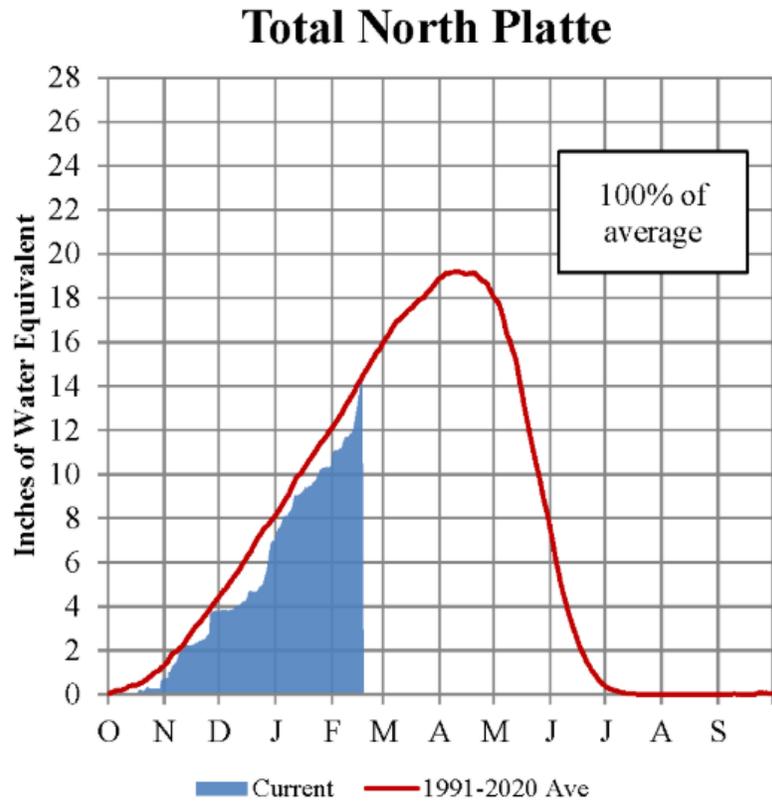
<https://nwcc-apps.sc.egov.usda.gov/imap/>



Platte River Basin - Mountain Snowpack Water Content

Water Year 2024-2025

February 18, 2025



The North and South Platte River Basin mountain snowpacks normally peak near April 10 and the end of April, respectively. As of February 18, 2025, the mountain snowpack SWE in the "Total North Platte" reach is 14.4", 100% of the (1991-2020) average. The mountain snowpack SWE in the "Total South Platte" reach is 9.8", 107% of the (1991-2020) average.

Source: USDA, Natural Resource Conservation Service

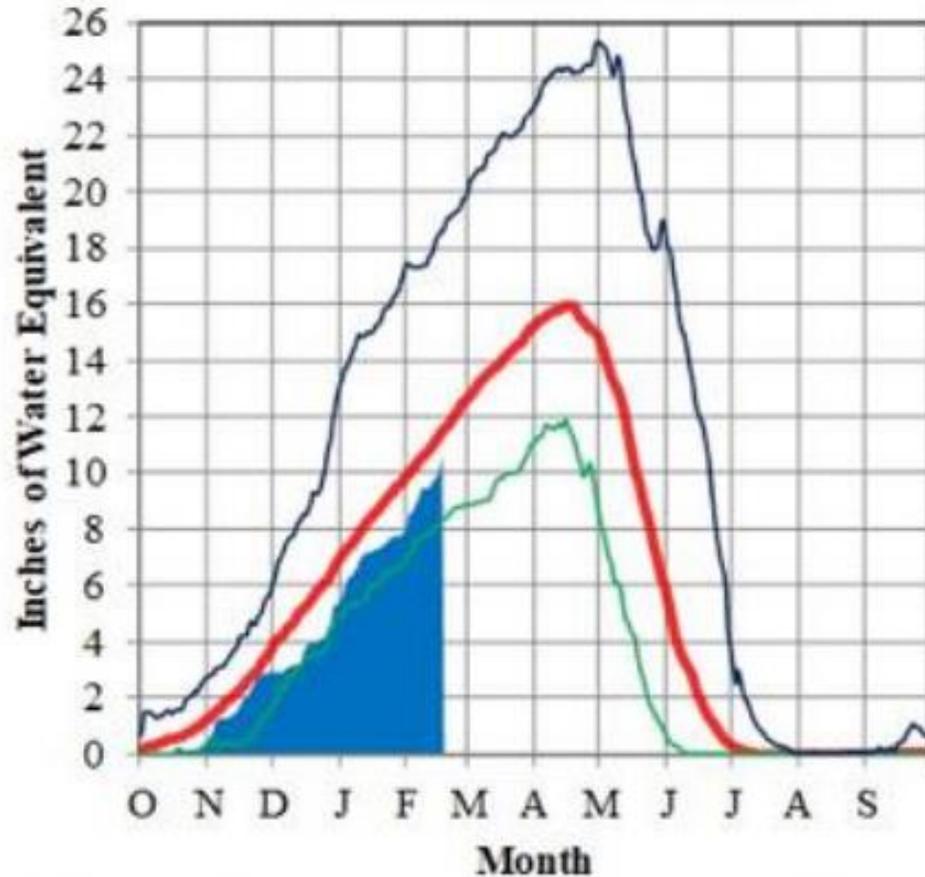
Provisional Data. Subject to Revision



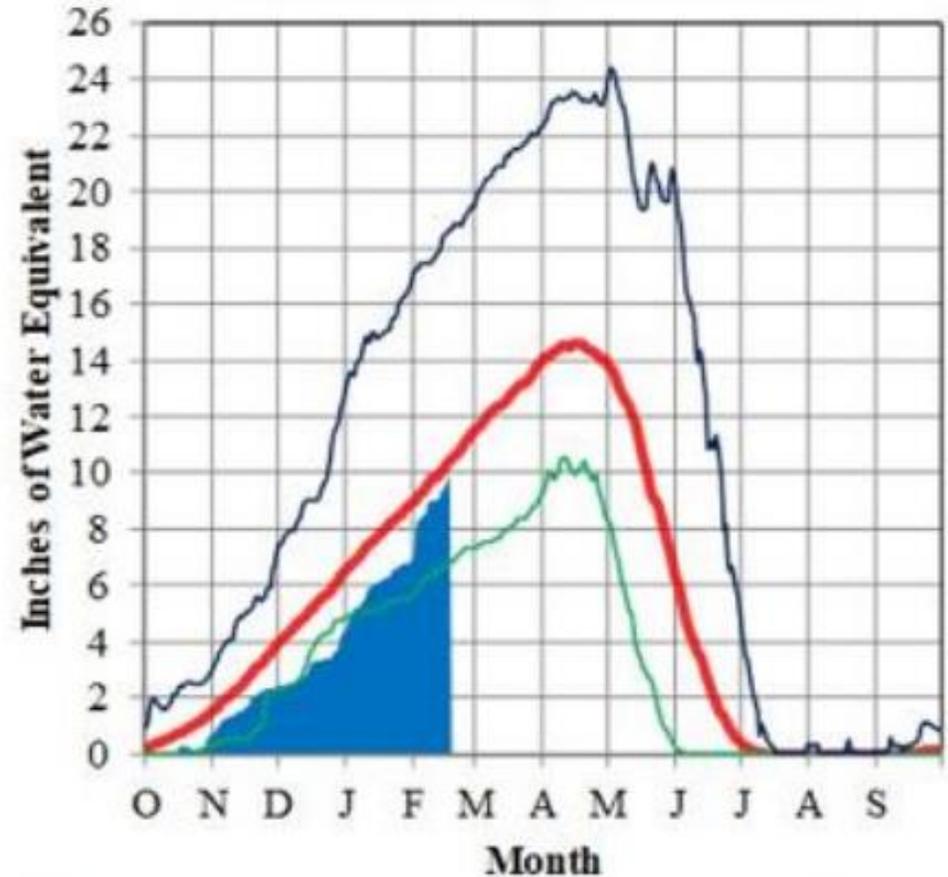
Missouri River Basin

Mountain Snowpack – February 17, 2025

Total above Fort Peck



Total Fort Peck to Garrison



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

2024-2025 1991-2020 Ave *Minimum *Maximum 2024-2025 1991-2020 Ave *Minimum *Maximum



Great Lakes Ice Cover

GREAT LAKES SURFACE ENVIRONMENTAL ANALYSIS (GLSEA)

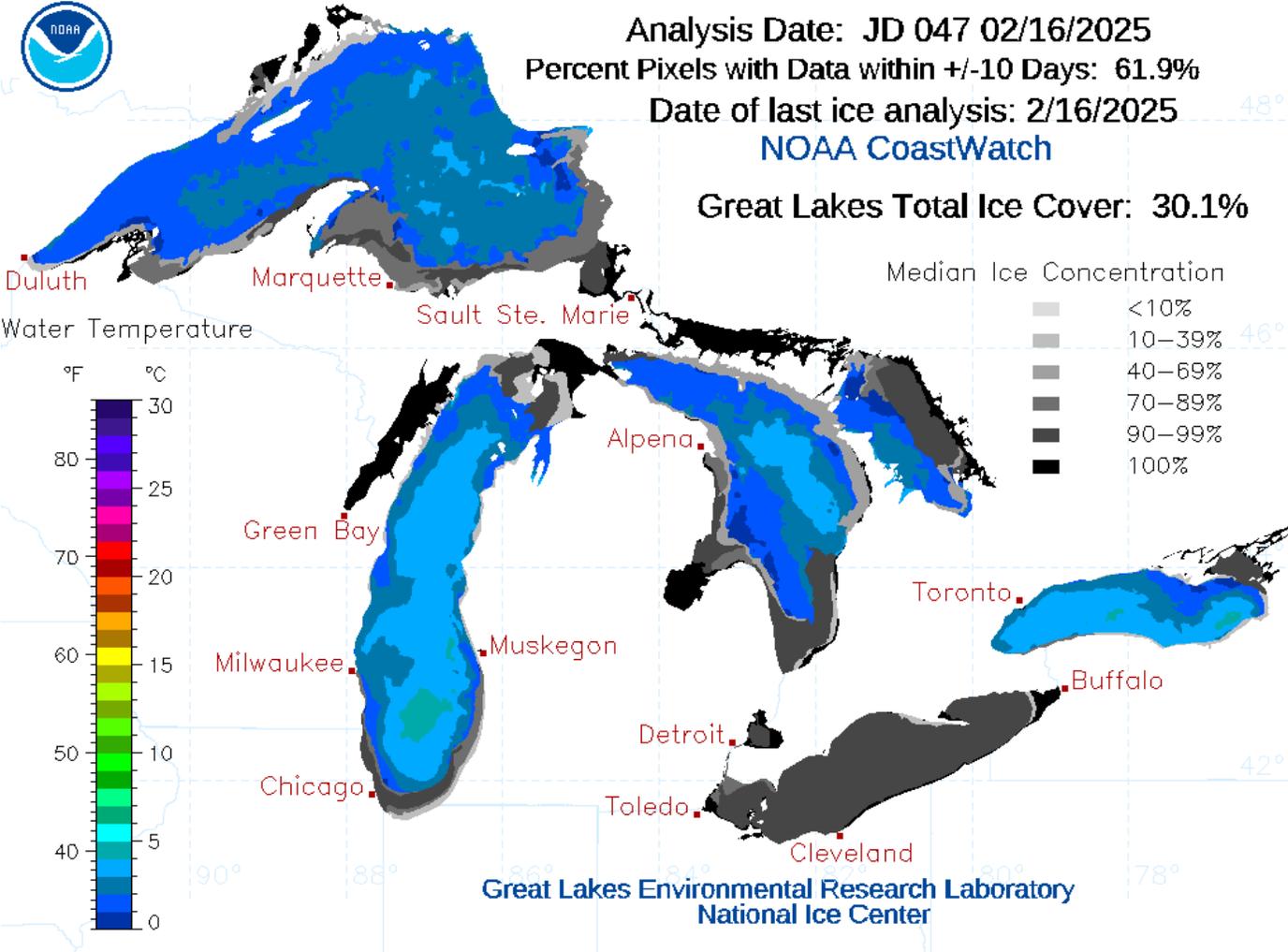


Analysis Date: JD 047 02/16/2025
 Percent Pixels with Data within +/-10 Days: 61.9%
 Date of last ice analysis: 2/16/2025
 NOAA CoastWatch

Great Lakes Total Ice Cover: 30.1%

Median Ice Concentration

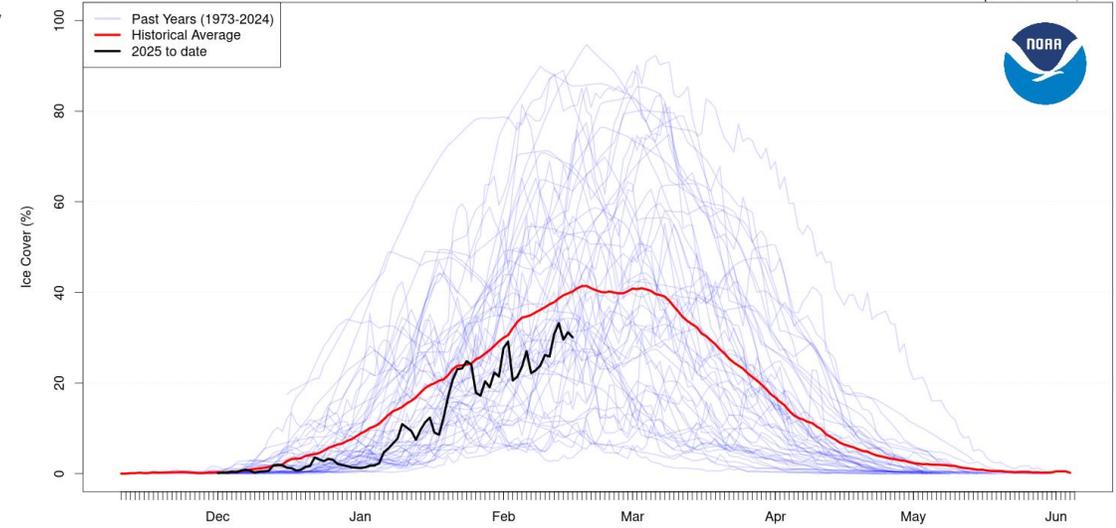
- <10%
- 10-39%
- 40-69%
- 70-89%
- 90-99%
- 100%



https://apps.glerl.noaa.gov/coastwatch/webdata/glsea/cur/glsea_cur_3.png

Great Lakes Average Ice Cover

updated: Feb 16, 2025



https://www.glerl.noaa.gov/data/ice/spaghetti/bas_ice_compare.png



<https://www.star.nesdis.noaa.gov/GOES/sector.php?sa=G16§or=cgl>

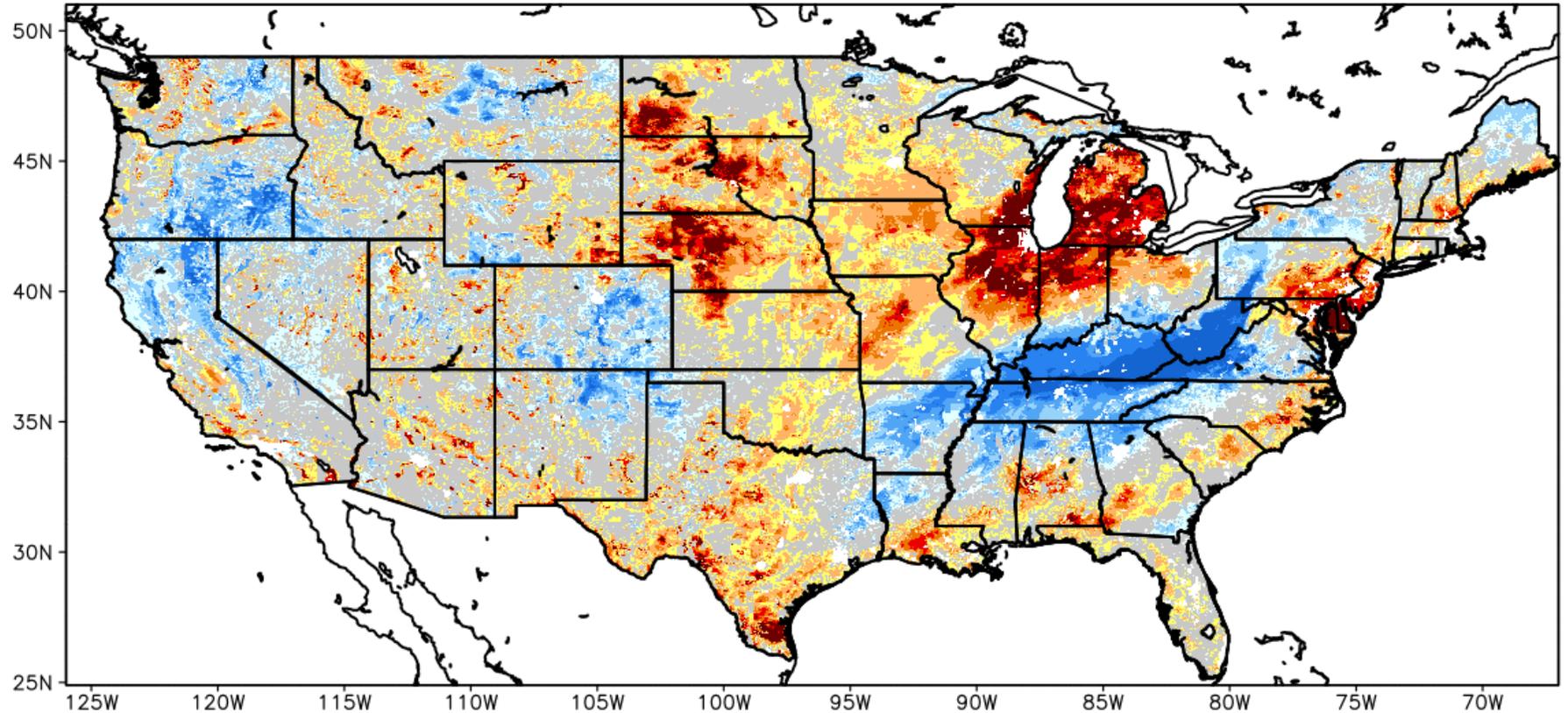


Soil Moisture

SPoRT-LIS 0-2 m RSM percentile valid 17 Feb 2025

Soil moisture deficits remain over Midwest and High Plains from last summer/fall

If deficits persist, this could increase the probability of a warm and dry summer



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

https://weather.ndc.nasa.gov/sport/viewer/?dataset=lis_conus&product=rsm02percent

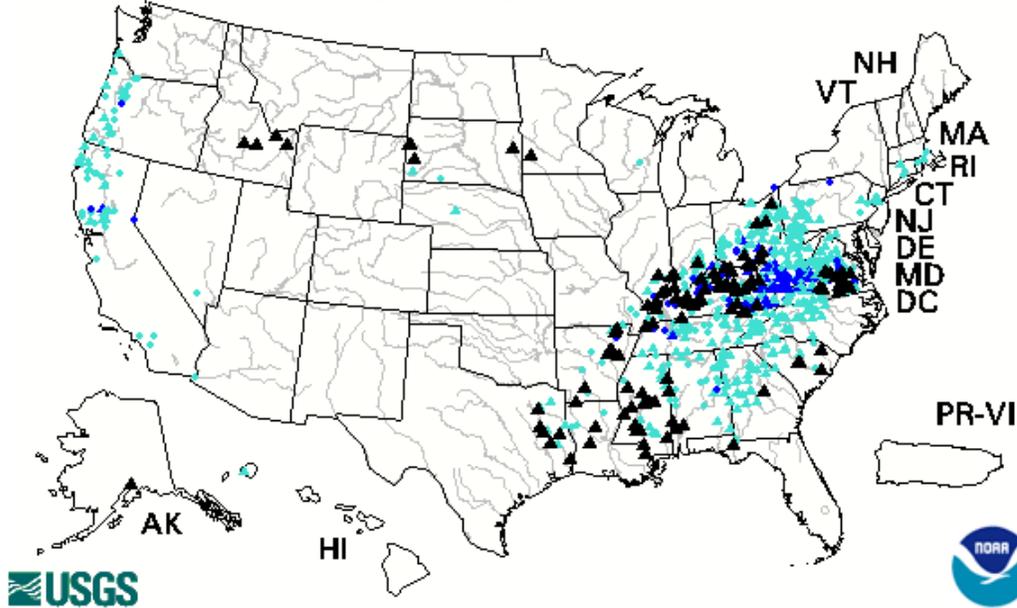


Streamflow

28-day average flows

Monday, February 17, 2025 17:30ET

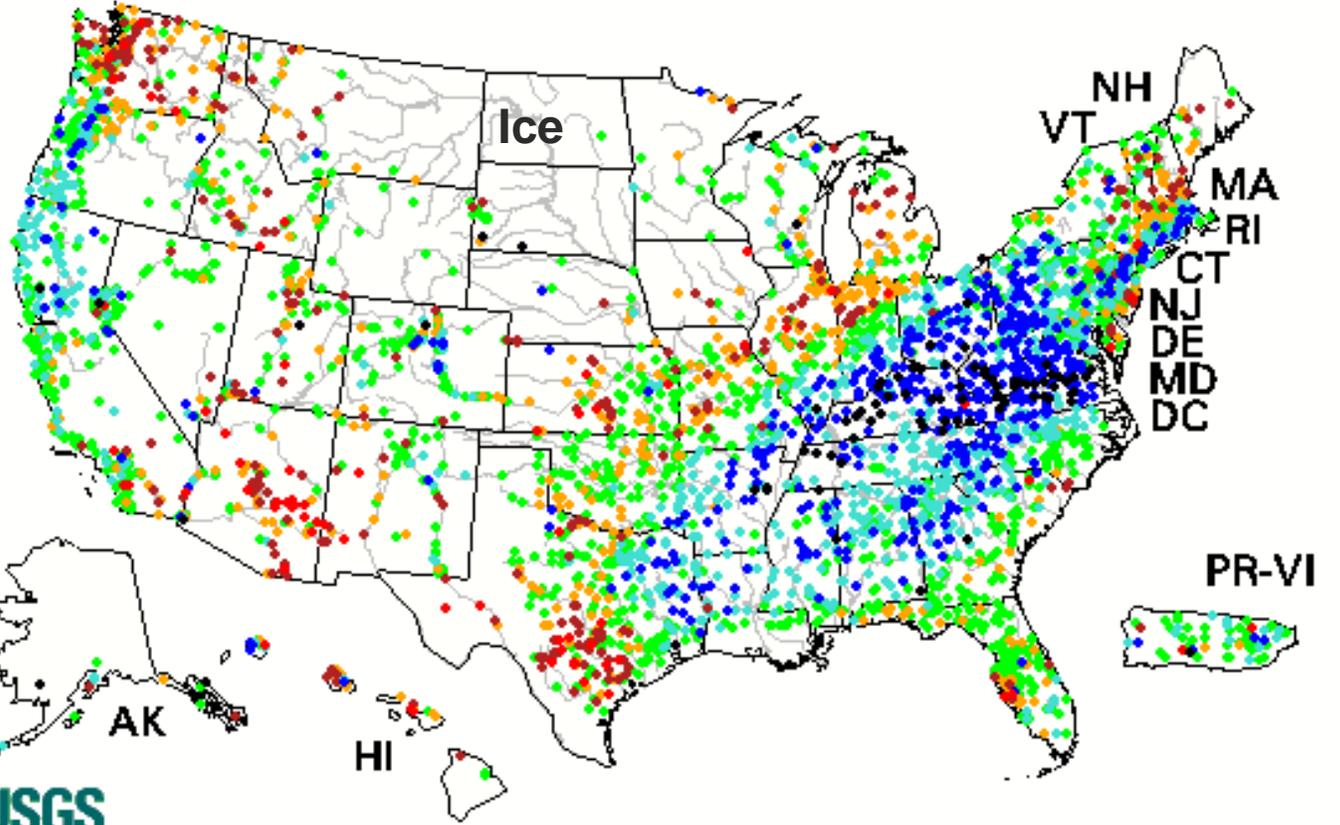
Monday, February 17, 2025 17:30ET



Flood Stages

| Explanation - Percentile classes | | |
|----------------------------------|-----------------------------------|-------------------------|
| 95-98 | >= 99 | River above flood stage |
| △ Streamgauge with flood stage | ○ Streamgauge without flood stage | |

<https://waterwatch.usgs.gov/index.php?id=flood>



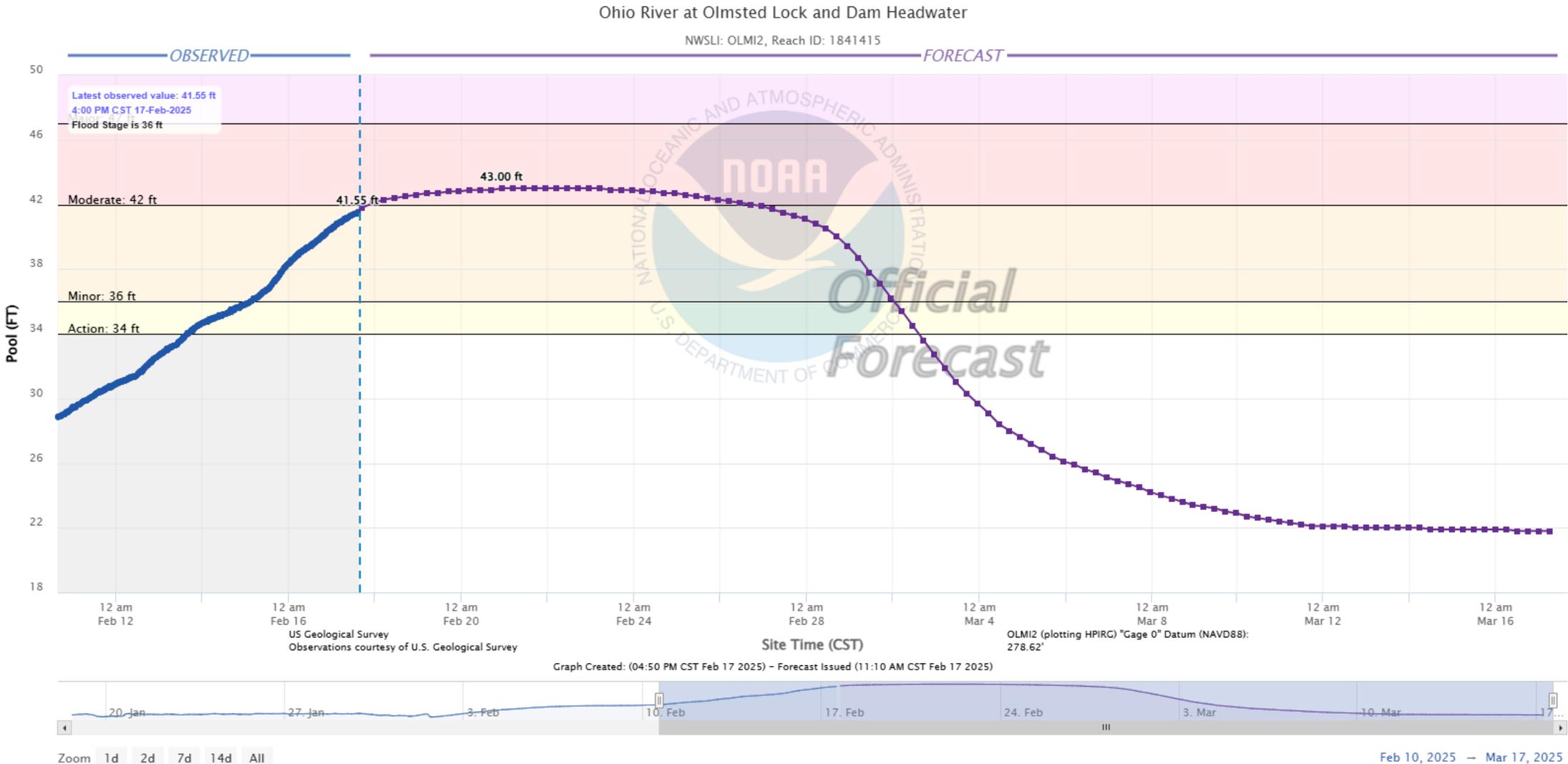
| Explanation - Percentile classes | | | | | | |
|----------------------------------|-------------------|--------------|--------|--------------|-------------------|------|
| | ● | ● | ● | ● | ● | ● |
| Low | <10 | 10-24 | 25-75 | 76-90 | >90 | High |
| | Much below normal | Below normal | Normal | Above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

<https://waterwatch.usgs.gov/index.php?id=pa28d>



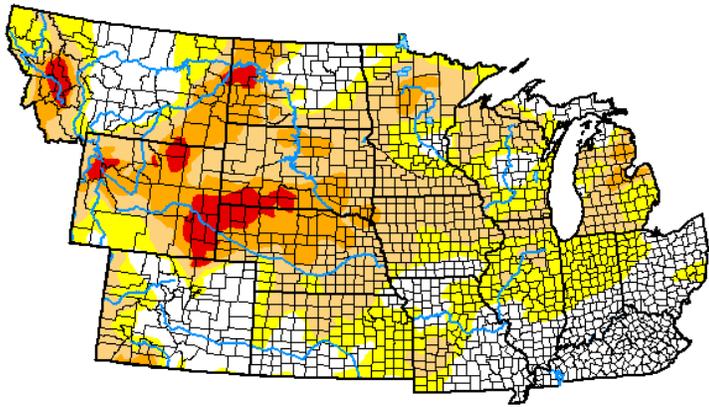
Streamflow

Ohio River at moderate flood stage near Kentucky/Illinois border



US Drought Monitor

U.S. Drought Monitor NWS Central



February 18, 2025
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Drought Conditions (Percent Area)

| | None | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4 |
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Author:

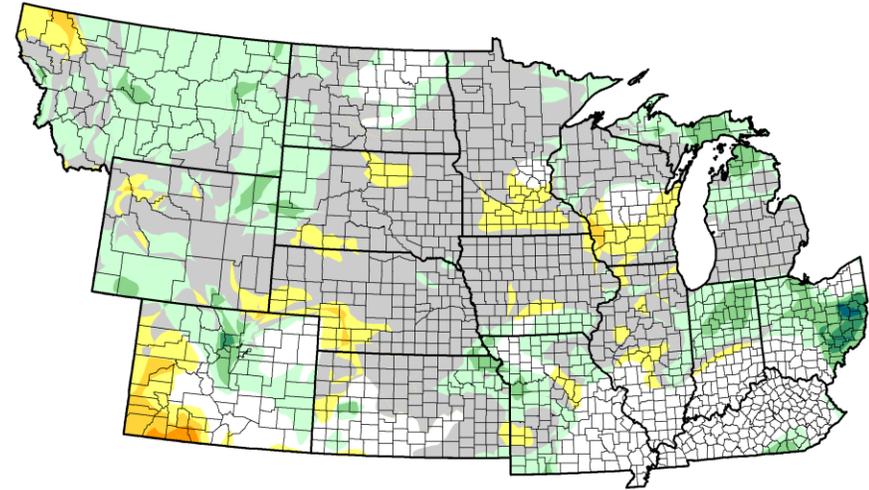
Brian Fuchs
National Drought Mitigation Center



droughtmonitor.unl.edu

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

U.S. Drought Monitor Class Change - NWS Central 12 Week



February 18, 2025
compared to
November 26, 2024

droughtmonitor.unl.edu



| | |
|--|---------------------|
| | 5 Class Degradation |
| | 4 Class Degradation |
| | 3 Class Degradation |
| | 2 Class Degradation |
| | 1 Class Degradation |
| | No Change |
| | 1 Class Improvement |
| | 2 Class Improvement |
| | 3 Class Improvement |
| | 4 Class Improvement |
| | 5 Class Improvement |

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

- 45% D1 or worse
- Down 11% from 12 weeks ago
- Up 20% from this time last year
- (improvements concentrated in Montana and Ohio)
- Changes tend to be slow during winter



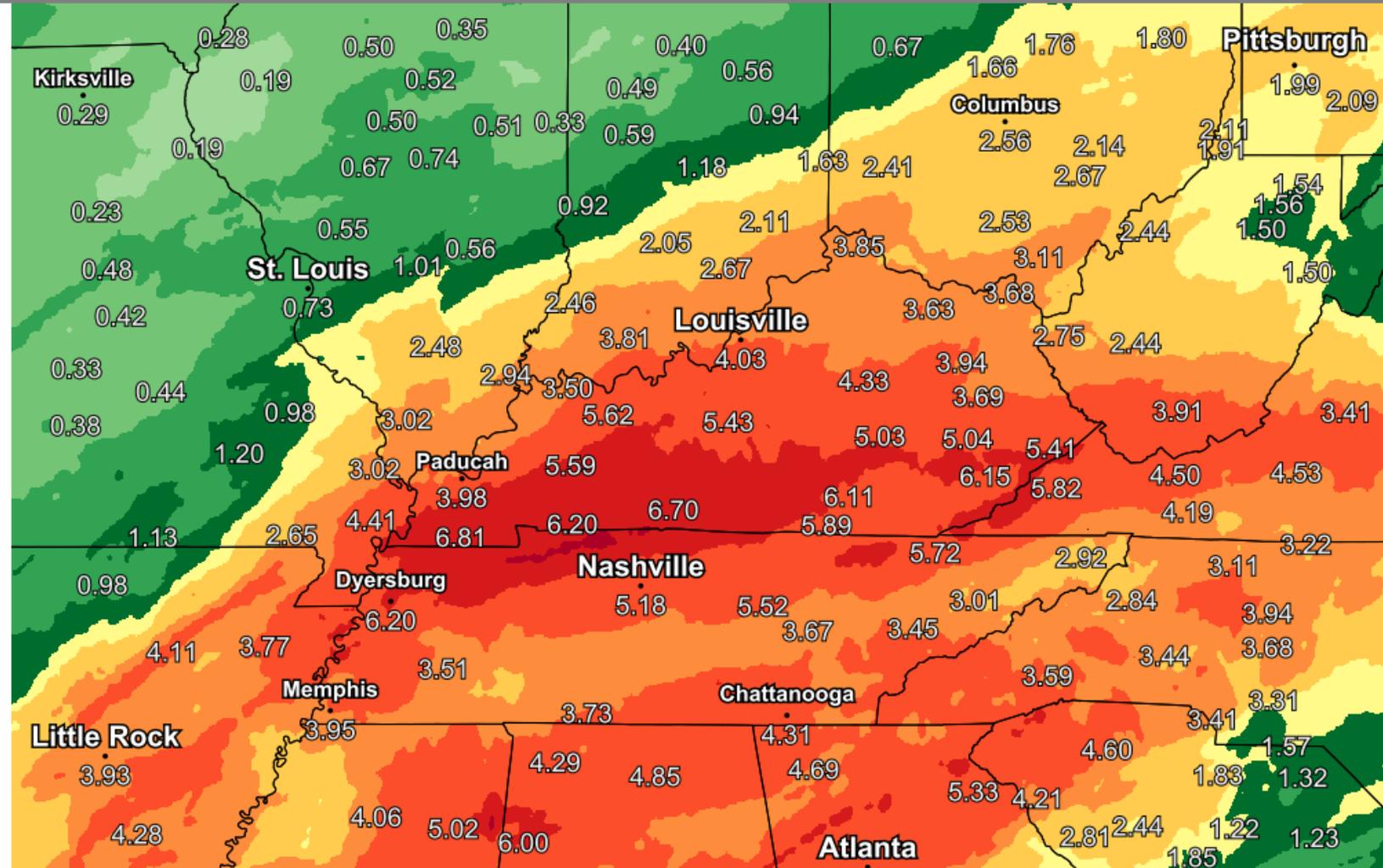
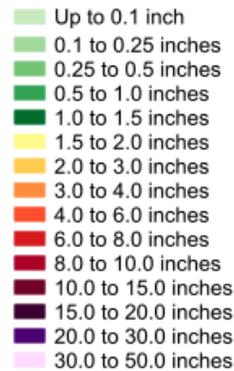
Impacts



Impacts: Flooding Kentucky/Ohio River Valley

Observed Precipitation

Valid Ending Tuesday February 18th, 2025 at 11 AM EST



Graphic Created
February 18th, 2025
11:58 AM EST

Widespread heavy rainfall impacted Tennessee, Kentucky, Virginia, and West Virginia, with rainfall totals up to 8 inches on Saturday, February 15, 2025.

Significant to catastrophic flooding occurred, resulting in thousands of swift water and car rescues, submerged buildings, road closures, and mudslides.

Thirteen fatalities have been reported so far occurring in Kentucky (10), Virginia (1), and West Virginia (2).



Impacts: Flooding Kentucky/Ohio River Valley

Three to eight inches of rain fell across Kentucky on Saturday leading to widespread flooding impacts, including cars and buildings underwater and over 40,000 customers without power, 9000+ without water, and 20,000+ under boil advisory.

Ten fatalities have been confirmed involving vehicles hydroplaning or swept away.

Contact James Noel for additional details:
james.noel@noaa.gov



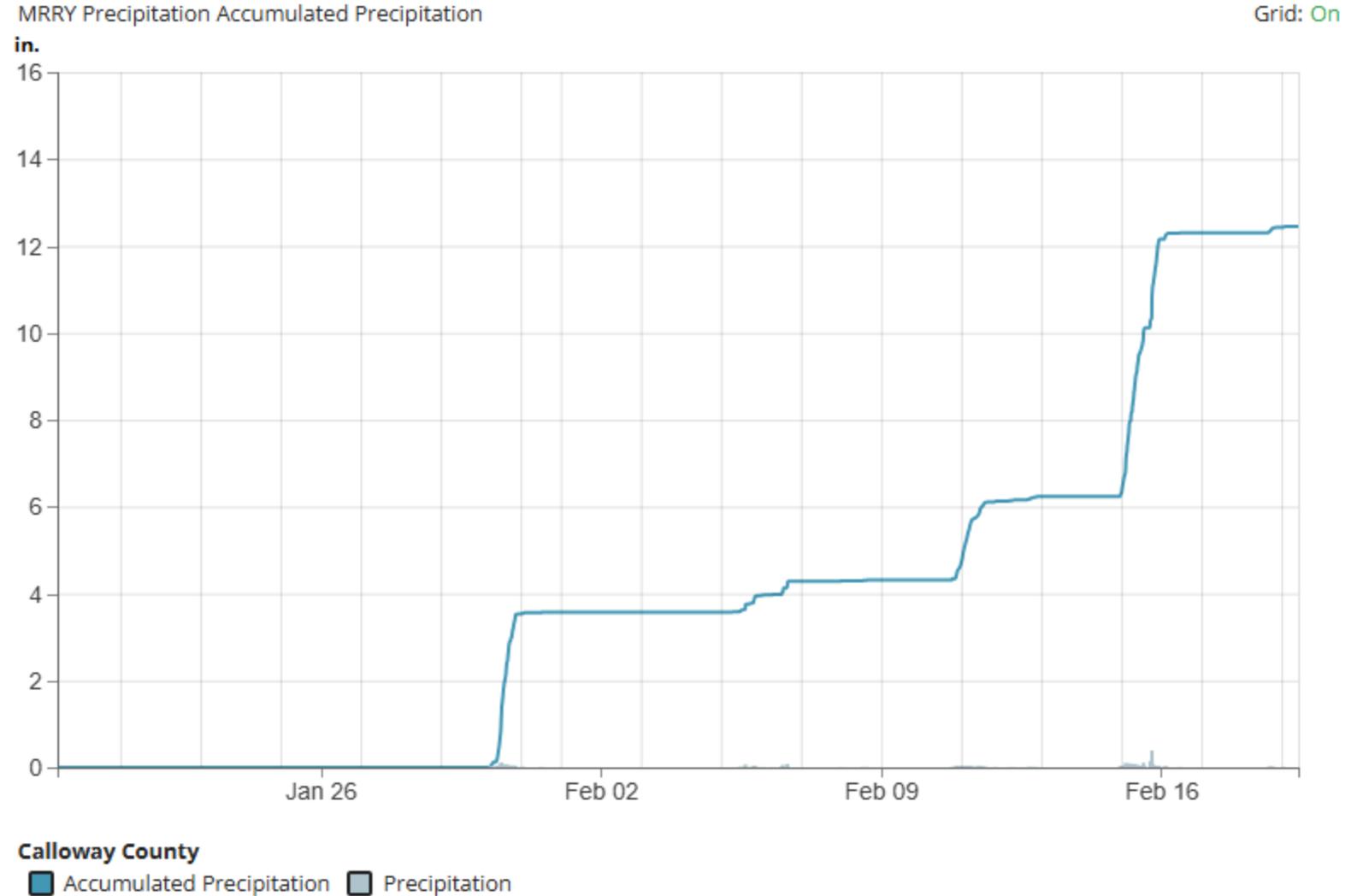
Aerial photo shows significant flooding in Pikeville, with waters taking over a large portion of Pikeville High School's football field. Shared by James Noel, NOAA



Impacts: Flooding Kentucky/Ohio River Valley

Flooding was made worse by saturated soils prior to February 16th accumulation event

Portions of southern Kentucky have received over 12" of moisture over the previous 30 days (8-10" above normal)



<https://www.kymesonet.org/graphs.html?county=MRRY>



Impacts: Missouri River Ice Jams

Ice jams on the Missouri River have raised gage heights over six feet above the jam, and lead to low flows below the jam at Sioux City, IA

As of 2/19/2025 the biggest concern is whether locations downstream of the ice jams will receive enough water

Upstream flooding risk is currently low as winter base flows are low

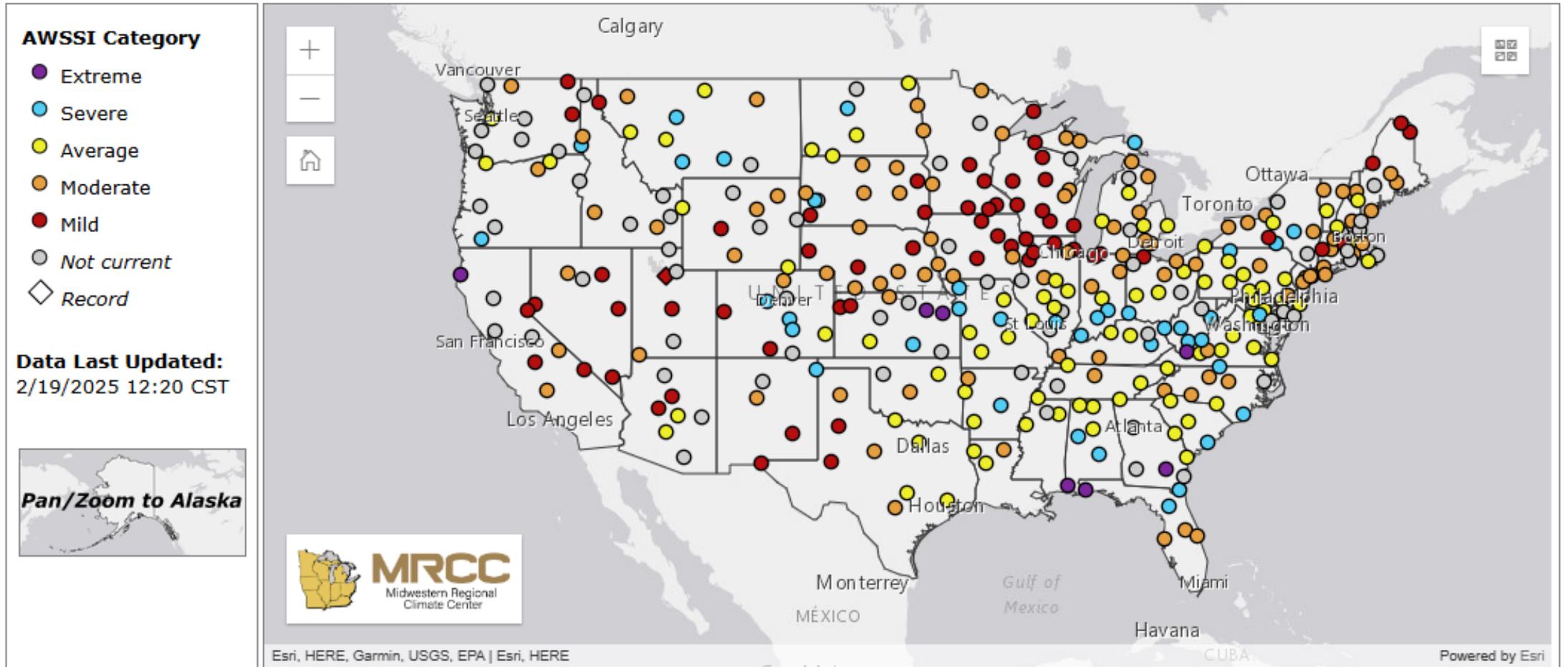


Photo of Veteran's Memorial Bridge over Missouri River taken by local emergency management personnel



Impacts: Winter Severity

Current Season

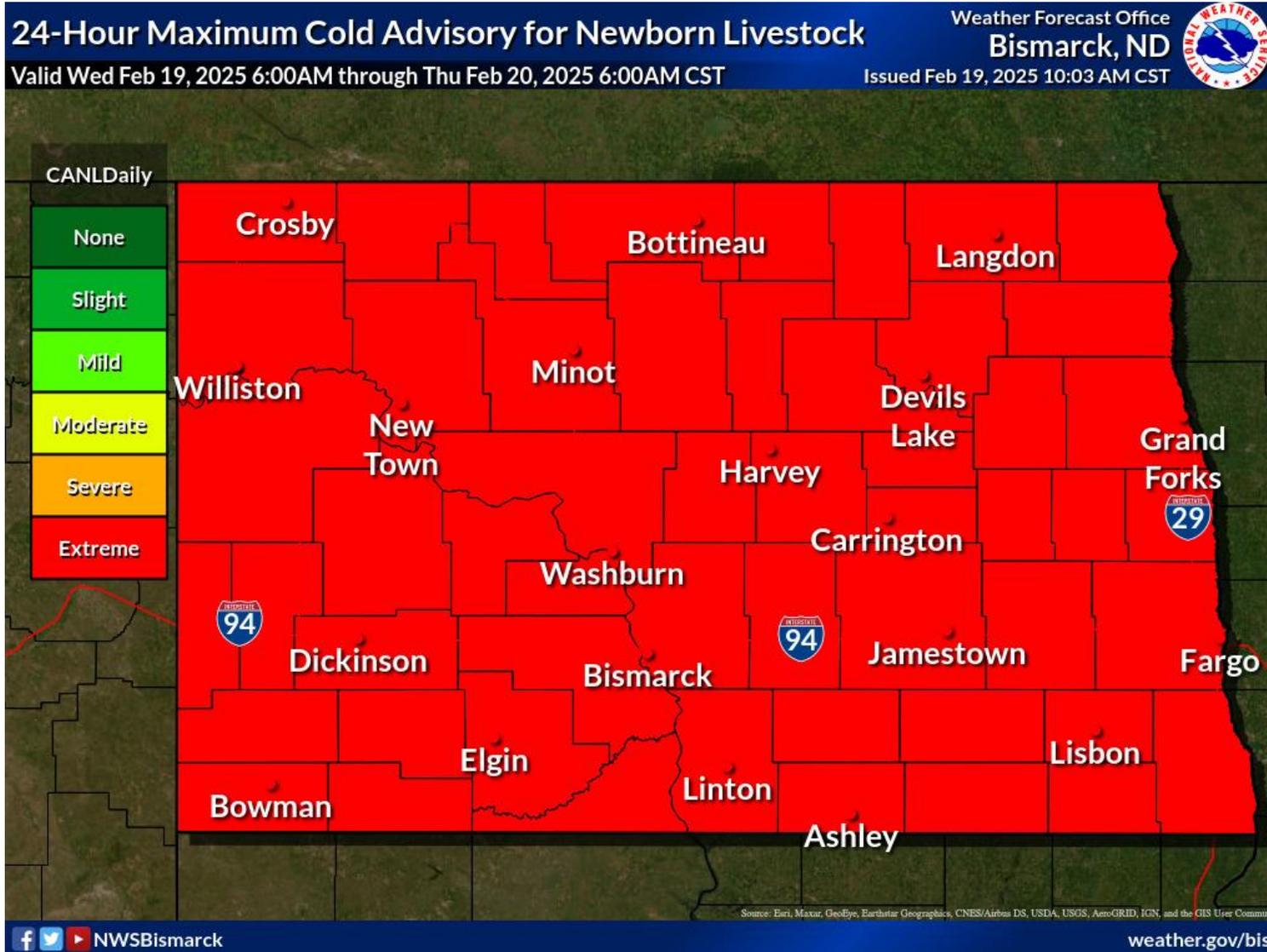


[[Open Charts Window](#)]

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



Impacts: Cold Weather



Calving season is beginning across the region

Winter cold snaps present dangerous conditions for livestock births

Much of the high plains (North Dakota shown here) have been experiencing extremely dangerous weather for calving

<https://www.weather.gov/bis/canl>

<https://www.weather.gov/cys/newbornlivestock>



Impacts: Long-Term Drought



Jeff Burbrink, LaGrange County – located northeast Indiana

Recent conditions have been cold and wet for many parts of the region

The impacts of drought may be hidden in winter, but long-term drought persists across parts of the Midwest and much of the High Plains

Lake and pond levels may be low along with streamflow and soil moisture

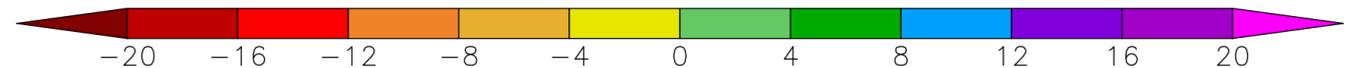
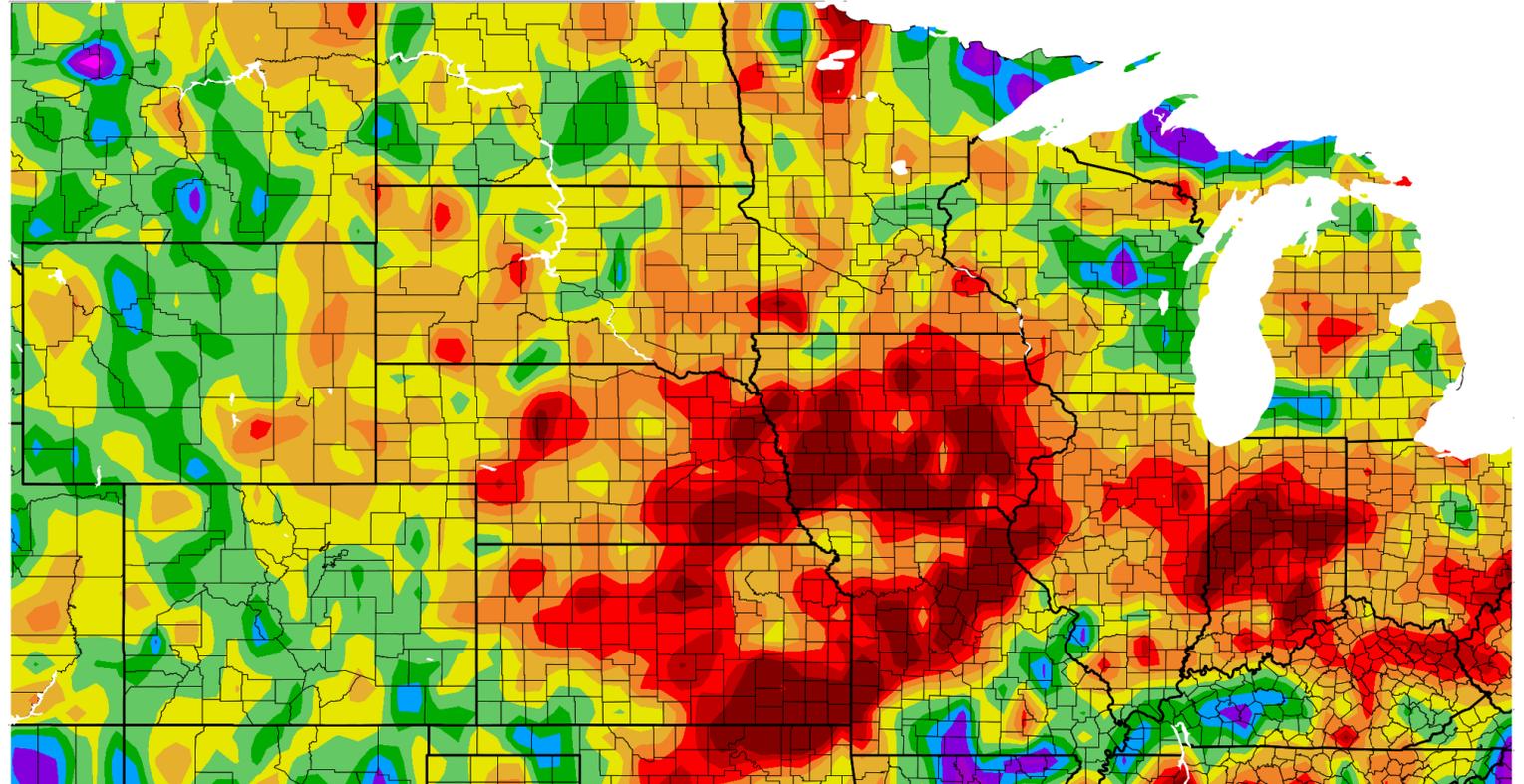


Impacts: Long-Term Drought

Portions of Kansas, Nebraska, Iowa, Missouri, and Indiana have accrued over 20" precipitation deficits over the last three years. In some locations this is over half a year's-worth of precipitation

If we do not have a wet spring, drought impacts could emerge across this portion of the country more quickly than normal

Departure from Normal Precipitation (in)
2/19/2022 – 2/18/2025



Generated 2/19/2025 at HPRCC using provisional data.

NOAA Regional Climate Centers

<https://hprcc.unl.edu/products/maps/acis/nwscr/36mPDeptNWSCR.png>



Other Regional Impacts

Illinois – cooler and wetter than normal in south and central Illinois. Recent spike in ice rescues. Lakes where folks do not normally attempt ice fishing are frozen enough to tempt unseasoned recreators

Indiana – Wetter than normal in southern portion of state. Drier than normal in northern portion. Parts of northern Indiana over 10” of snowfall below normal for January

Ohio – 3-4” of moisture in southern portion of state from recent storm. Drought conditions improving in NW OH, but still dry

Minnesota – Greater than normal frost depths, which may cause some structural issues in spring. Epicenter of seasonal snow drought

Missouri – Colder than average January, likely colder than average February. This broke a streak of warmer than normal months going back to September

Iowa – 20” below normal snowfall across parts of the state for the season. Recent cold events have created safety concerns for livestock

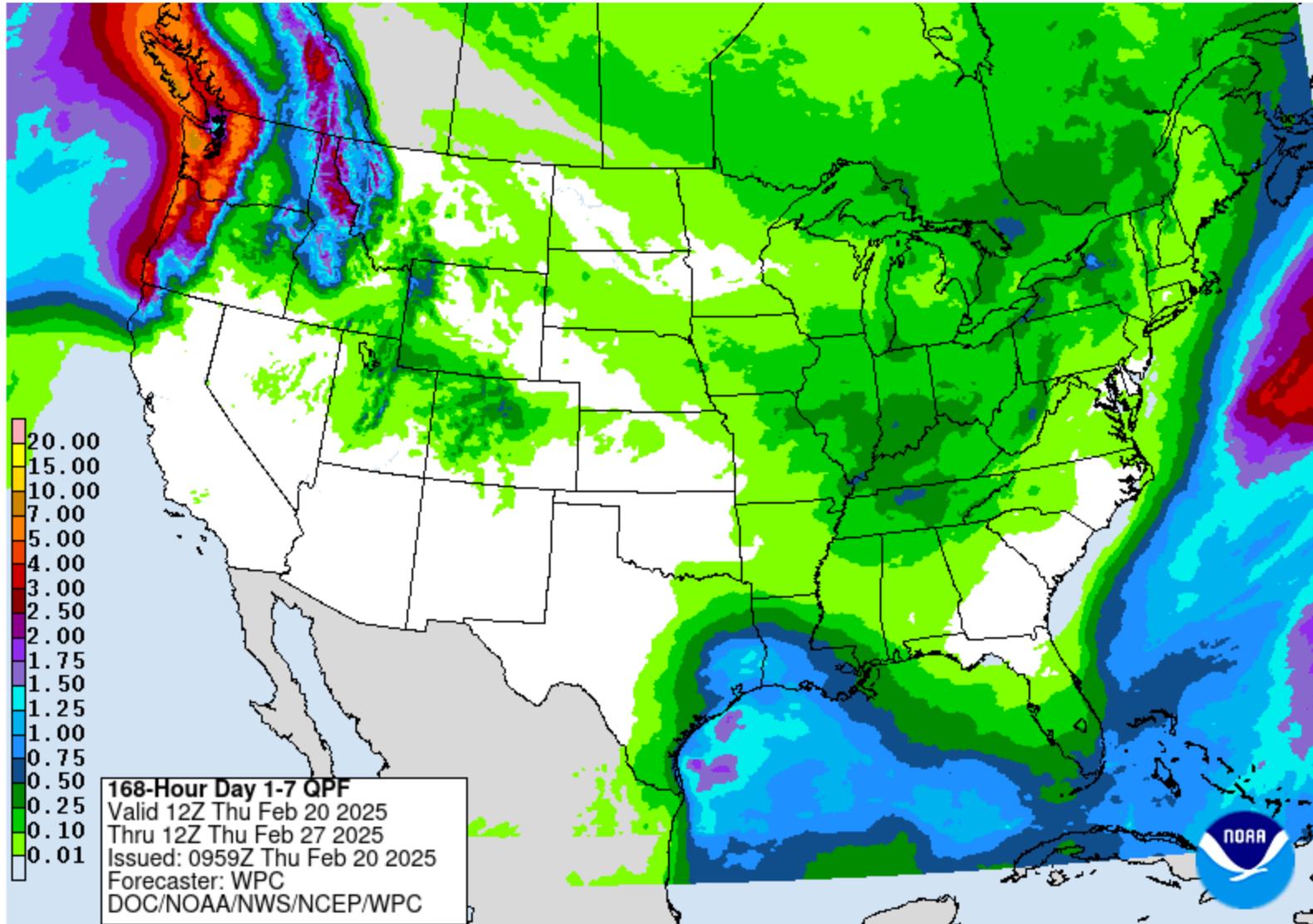
Nebraska – Record low daily maximum temperatures across parts of the state on 2/18. Long-term drought over central portion of state



Outlook



Next Seven Days



Colder than normal conditions currently prevail across the North Central Region

Cold air will be replaced by warmer than normal air across the region by Monday/Tuesday of next week

Models suggest a likely low pressure system development across the region by mid-week, but it will not bring as much cold air, or large amounts of moisture

<https://www.wpc.ncep.noaa.gov/qpf/>



8-14 Day Outlook

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



8-14 Day Temperature Outlook



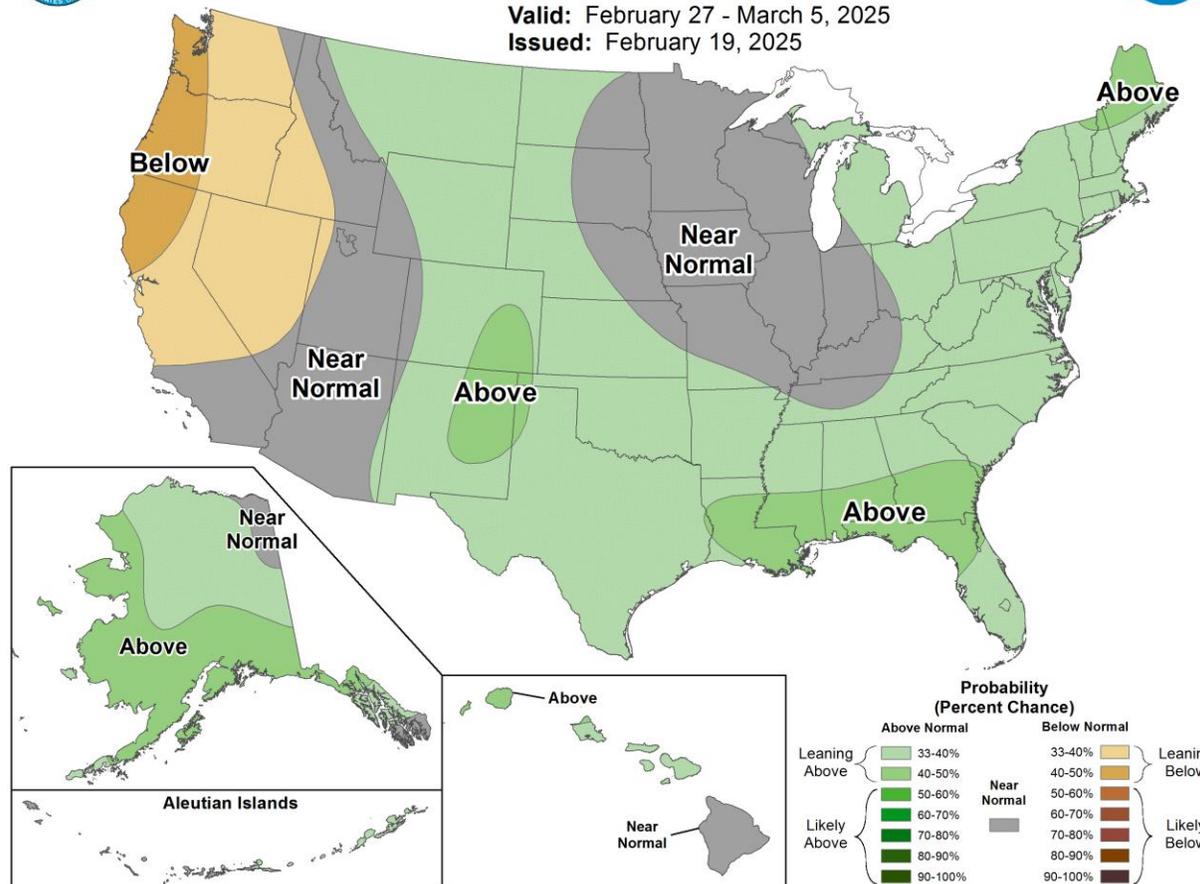
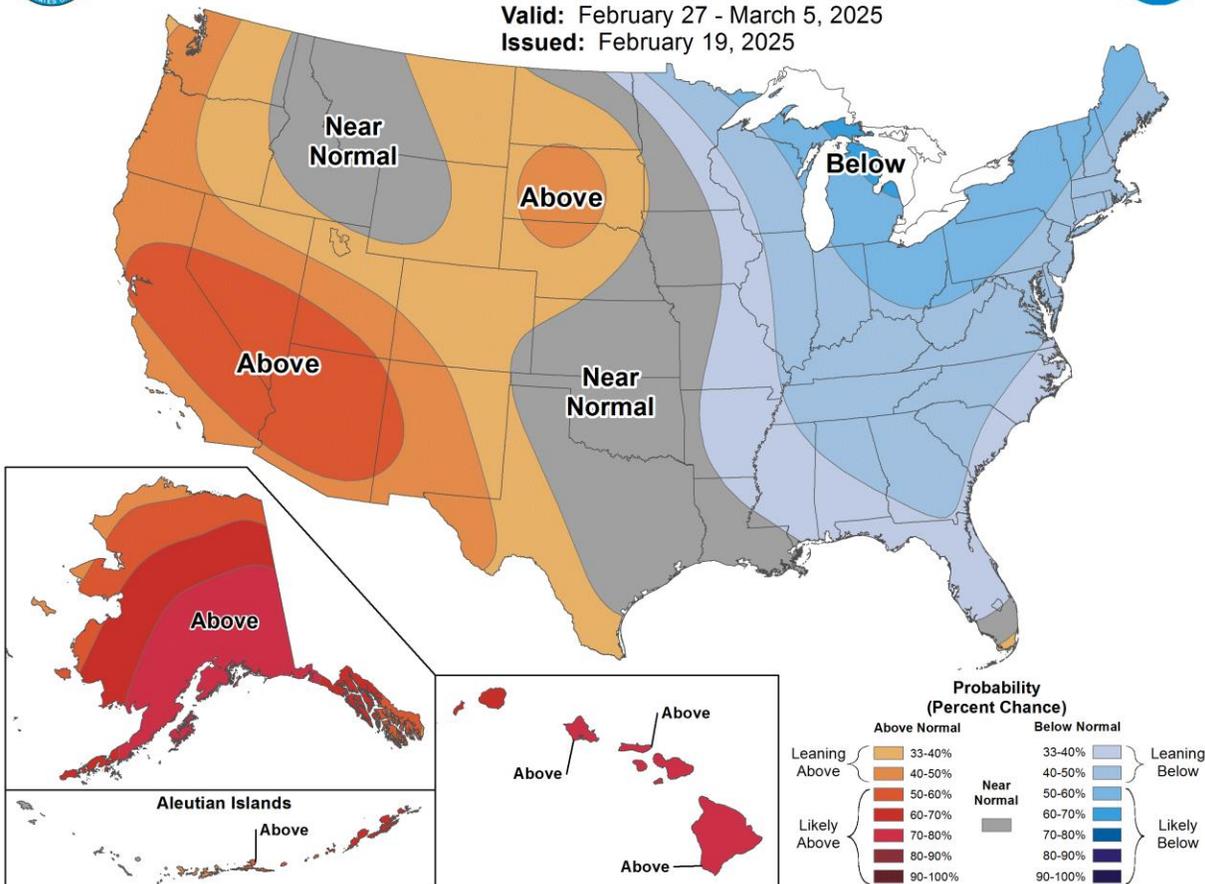
Valid: February 27 - March 5, 2025
Issued: February 19, 2025



8-14 Day Precipitation Outlook



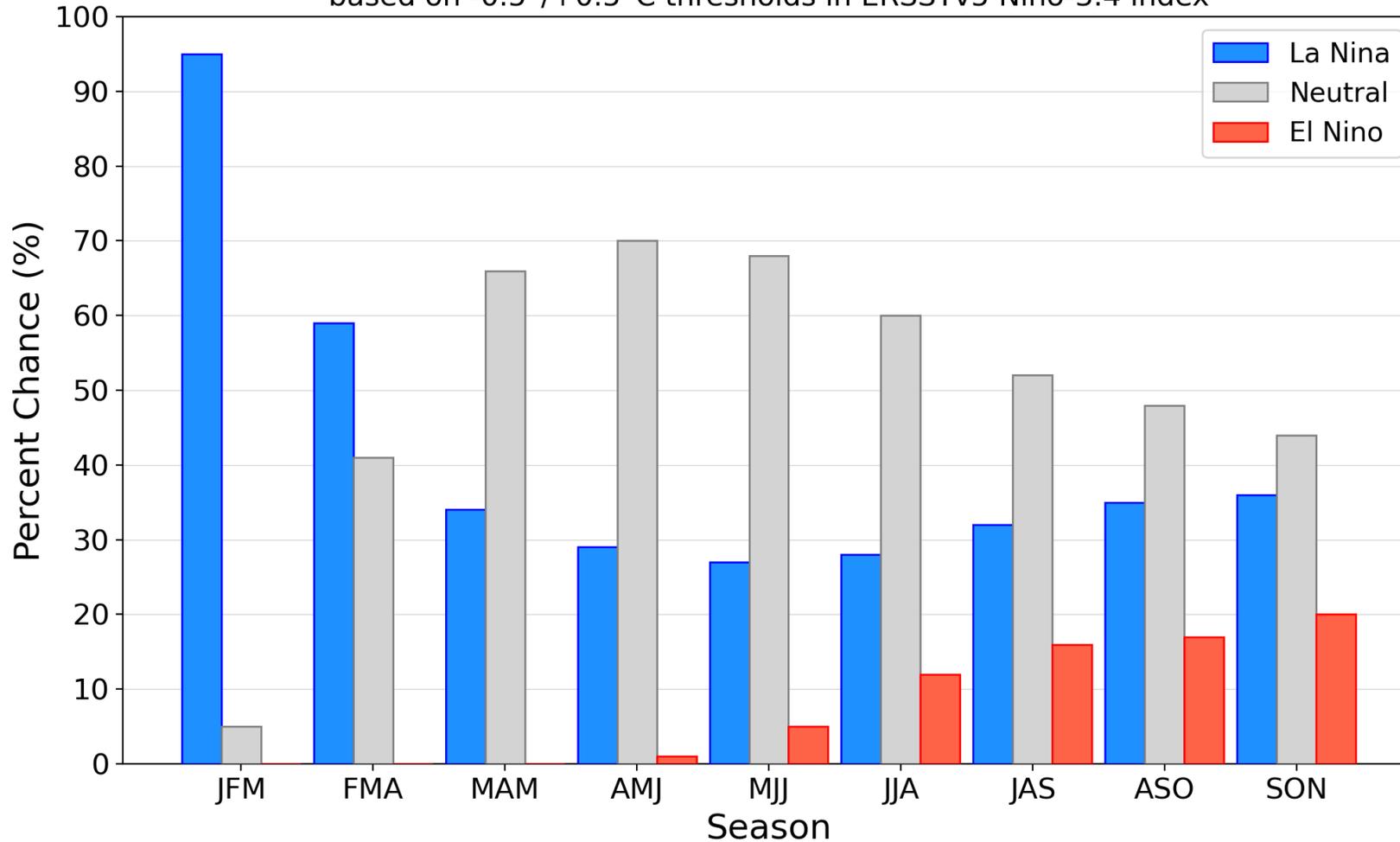
Valid: February 27 - March 5, 2025
Issued: February 19, 2025



La Niña Outlook

Official NOAA CPC ENSO Probabilities (issued February 2025)

based on $-0.5^{\circ}/+0.5^{\circ}\text{C}$ thresholds in ERSSTv5 Niño-3.4 index



Weak La Niña conditions are in place over the Central Pacific Ocean

Typically, La Niña brings above normal moisture to the Great Lakes Region and Ohio River Valley

There is about a 1/3 chance that La Niña ends before spring is over, but lagged impacts typically remain for several weeks after

JFM = "January, February, March"

https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/?enso_tab=enso-cpc_plume



March

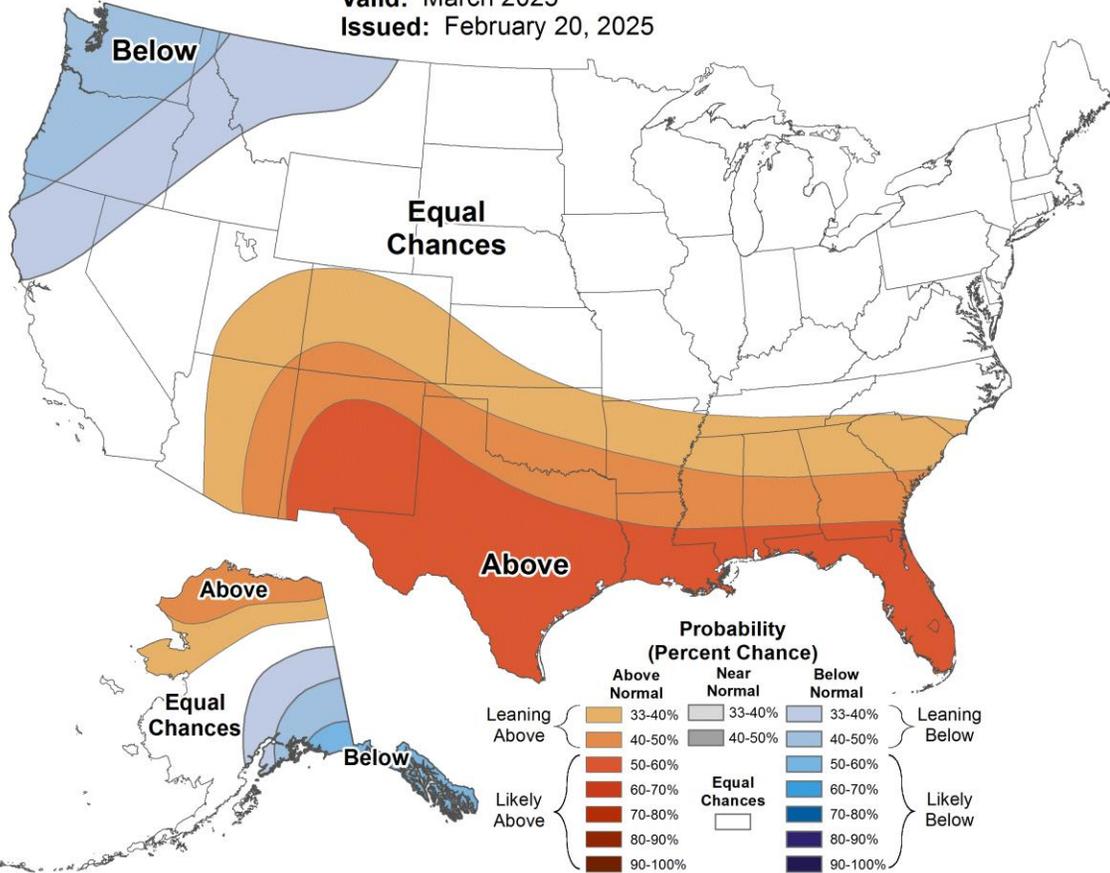
<https://www.cpc.ncep.noaa.gov/>



Monthly Temperature Outlook



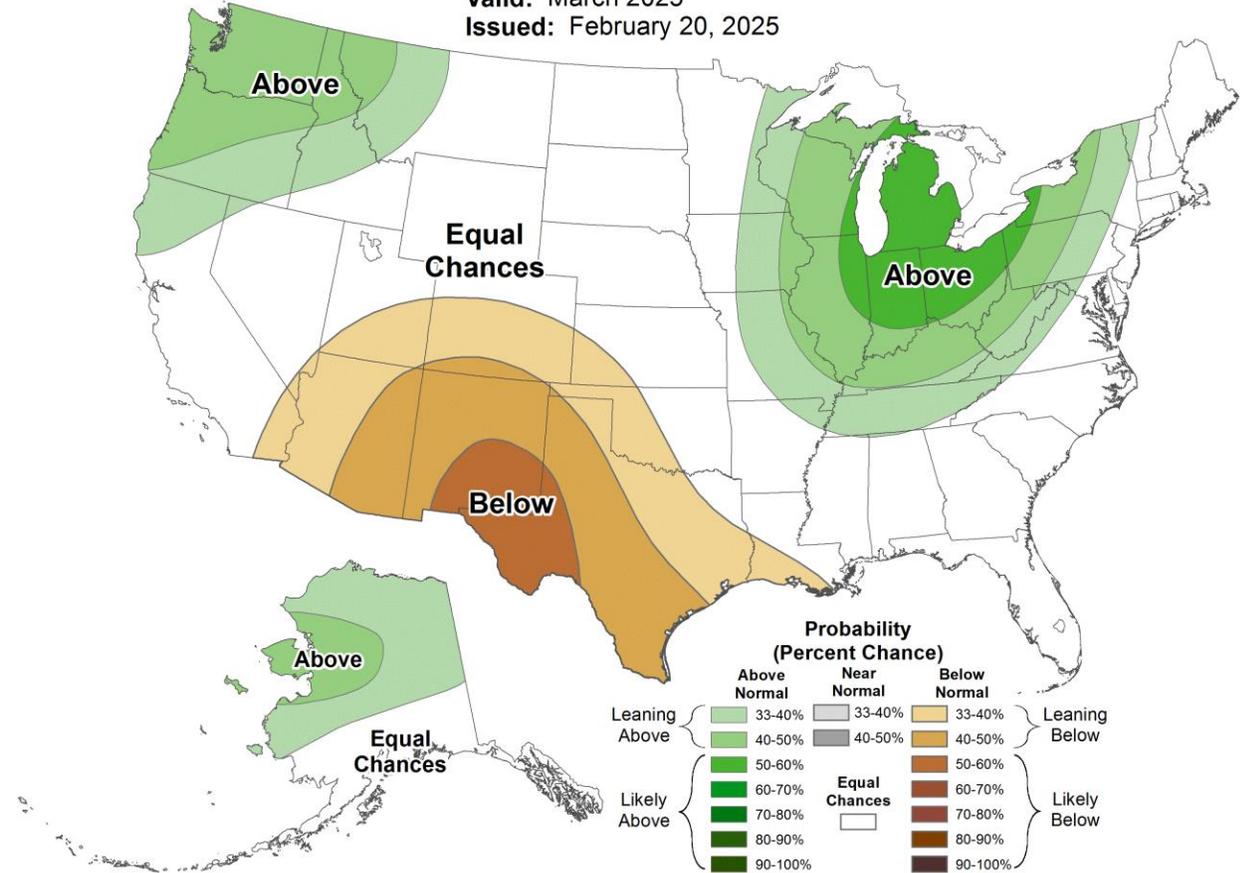
Valid: March 2025
Issued: February 20, 2025



Monthly Precipitation Outlook



Valid: March 2025
Issued: February 20, 2025



March-May

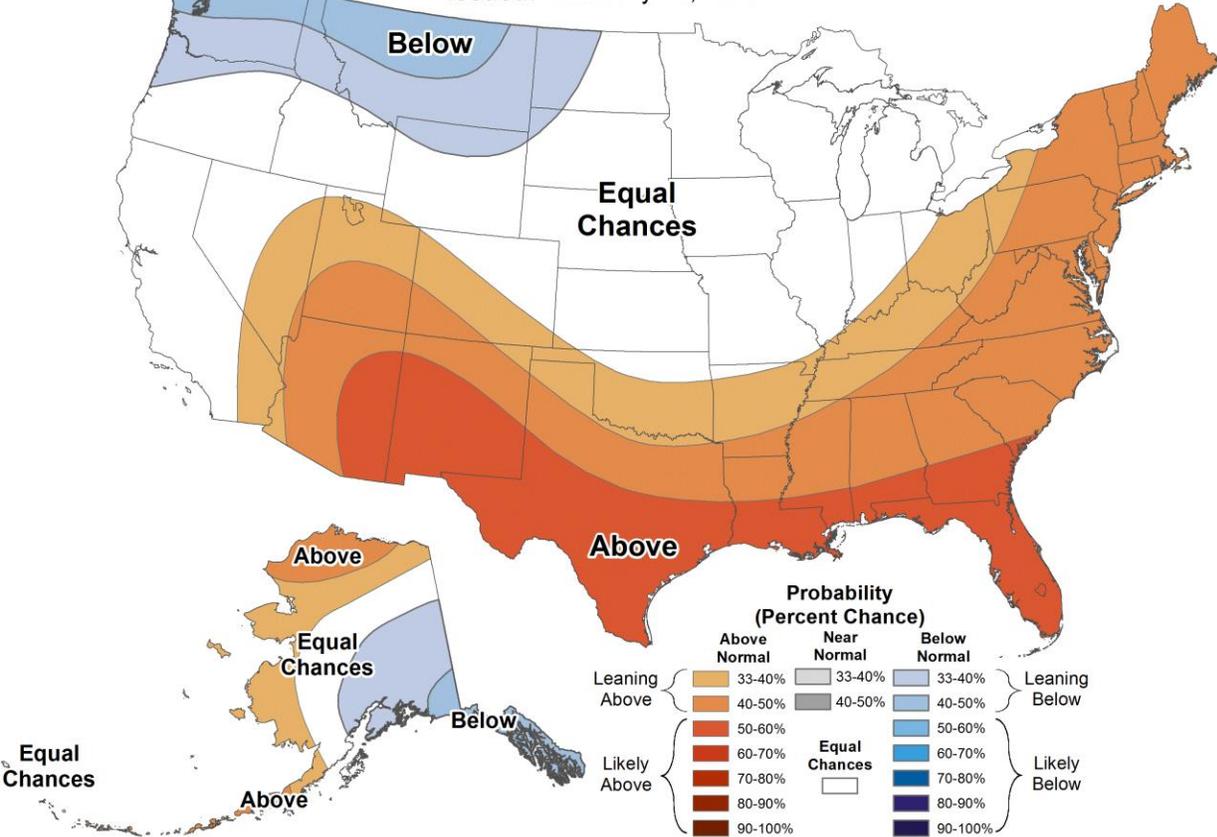
<https://www.cpc.ncep.noaa.gov/>



Seasonal Temperature Outlook



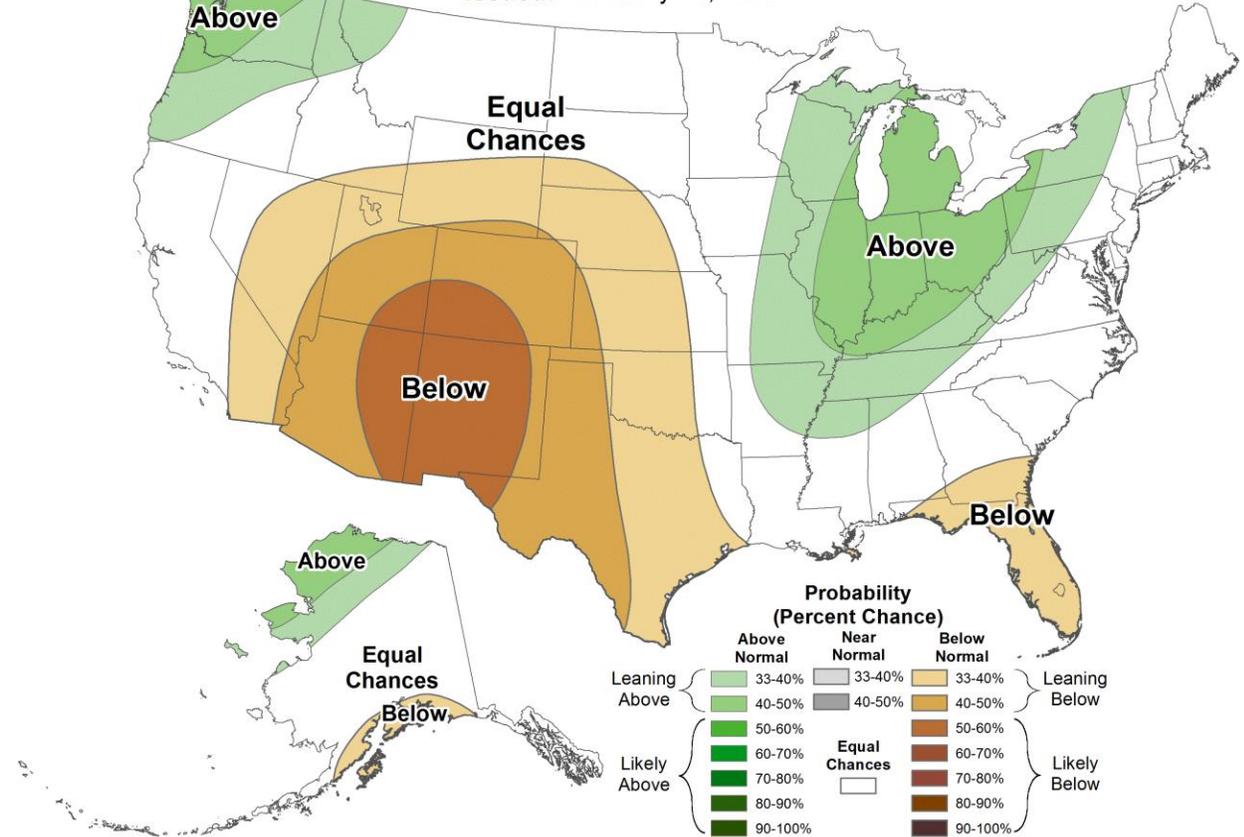
Valid: Mar-Apr-May 2025
Issued: February 20, 2025



Seasonal Precipitation Outlook



Valid: Mar-Apr-May 2025
Issued: February 20, 2025



River Forecasts

Six-month flooding probabilities
across Mississippi basin

Green < 50% any flooding

Yellow > 50% minor flooding

Red > 50% moderate flooding

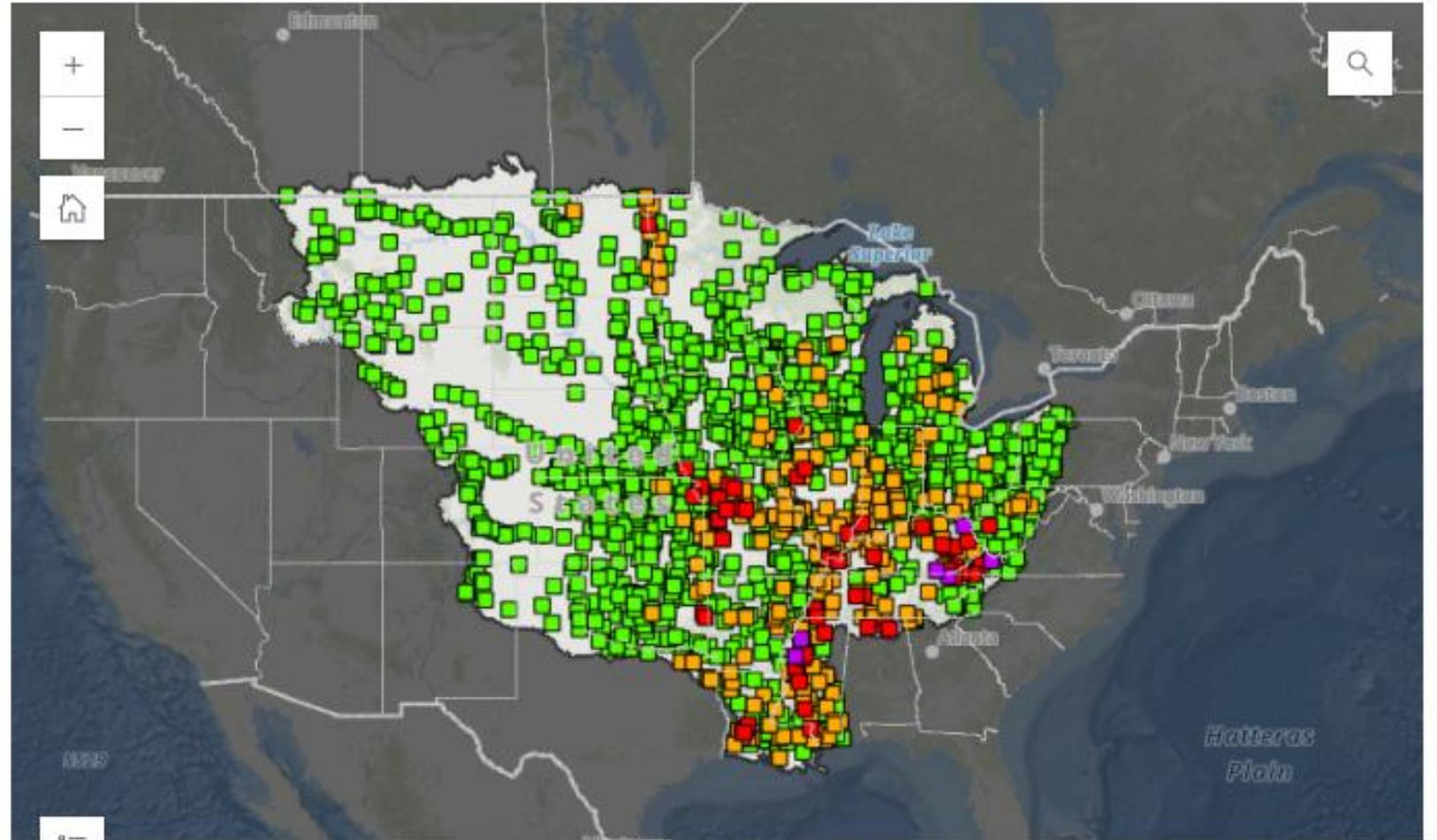
Purple > 50% major flooding

Next update: Thursday, February
27th

Final Update: Thursday, March
13th

Great Lakes 6 Month Forecast (USACE)

Long Range Flood Outlook (50% Chance Exceedance) Valid Through Mid-May



Source: Missouri River Basin Forecast Center (MRBFC)



Summary

Recent Conditions

- Much cooler than normal conditions for northern/western portion of the region for February to date
- Much wetter than normal conditions in Kentucky/Ohio/SE MO including flooding
- Snow drought over portions of Minnesota, Iowa, Dakotas and Nebraska
- Near normal snowpack in western portion of region
- Longer-term drought still evident looking at soil moisture, streamflows, lakes and ponds for central portions of the region

Impacts

- Kentucky flooding: Major flooding event in Kentucky earlier this week. Flooding along Ohio mainstem
- Cold weather: Ice jams on Missouri River. Riskier livestock conditions in portions of region
- Long-term drought: Despite recent conditions, long-term drought persists for portions of the high plains and lower Missouri Basin

Outlook

- Short term: Cold air will be replaced by warmer than normal conditions next week
- Long term: Typical La Niña pattern forecasted for spring. Wetter than normal in eastern portion of region
- ENSO Forecast: La Niña likely to wane and possibly disappear by end of May, but La Niña impacts likely to linger
- Drought: Drought removal or improvement likely in Michigan/Wisconsin. Development in CO/KS



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Thank you!



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