

# Central Region Climate & Drought Outlook

16 February 2023

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ATMOSPHERIC SCIENCE  
COLORADO STATE UNIVERSITY



# 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**

- March 16, 2023 (1 PM CDT), Zachary Hoylman, Assistant State Climatologist, University of Montana

- **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>
- <https://hprcc.unl.edu/webinars.php>

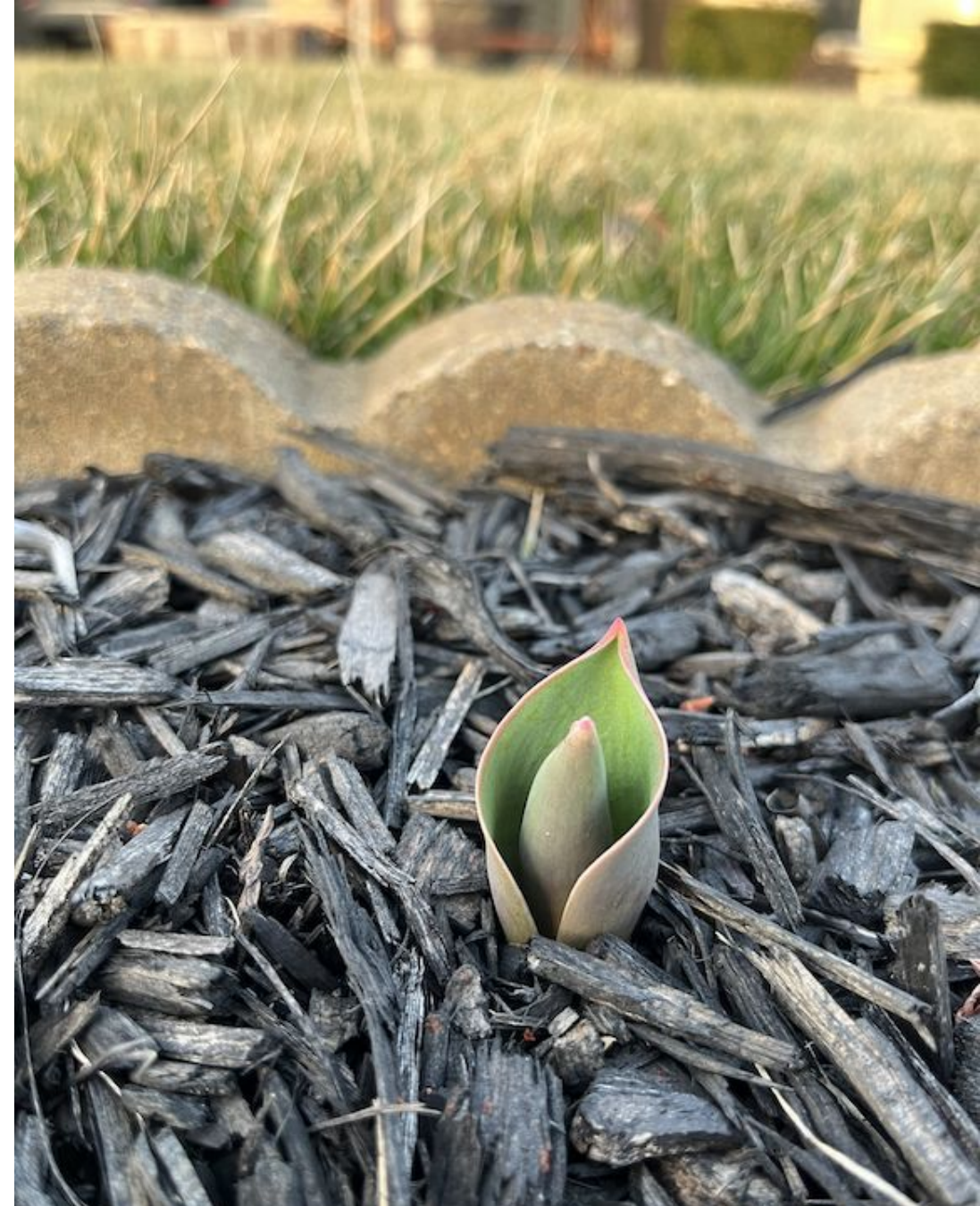
- **Open for questions at the end**



# Today's Agenda

- **Recent Conditions**
  - January ranks
  - Anomalous warmth
  - Clouds, precip, snow
- **Impacts**
  - Early blooming
  - Ag reports
  - Drought impacts
- **Outlooks**
  - La Niña Weakens
  - Spring and Potential Impacts

Early tulip budding– Melissa Widhalm

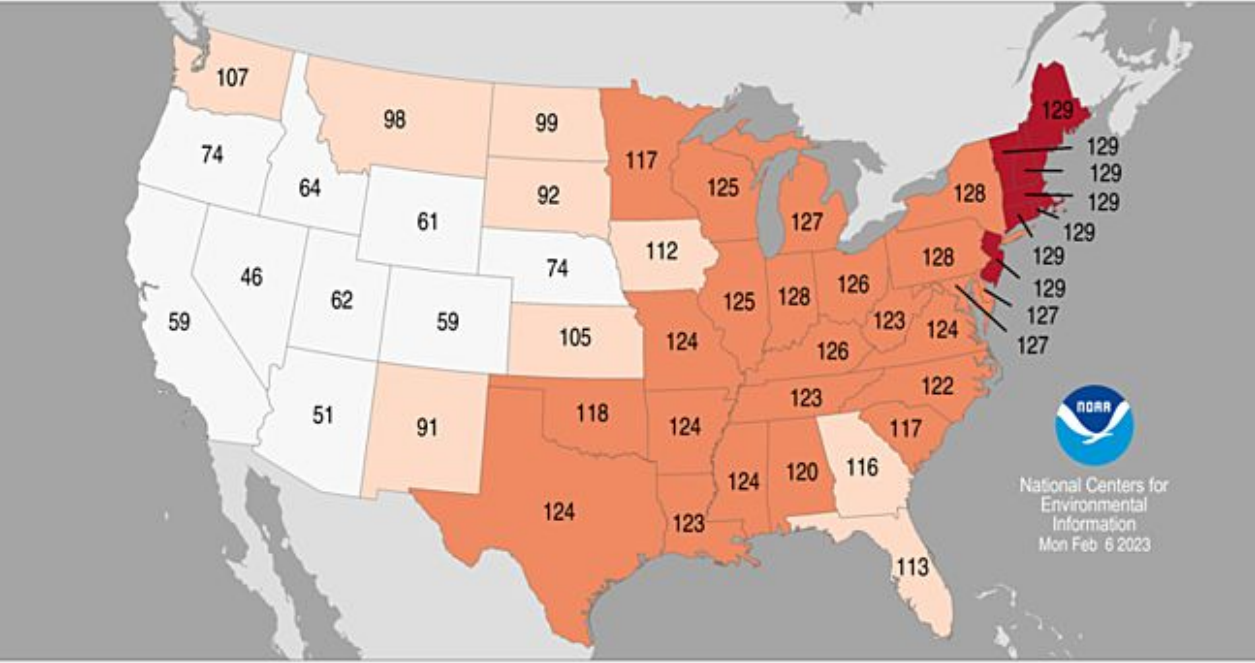




Recent Conditions...

# Statewide Average Temperature Ranks

January 2023  
Period: 1895–2023

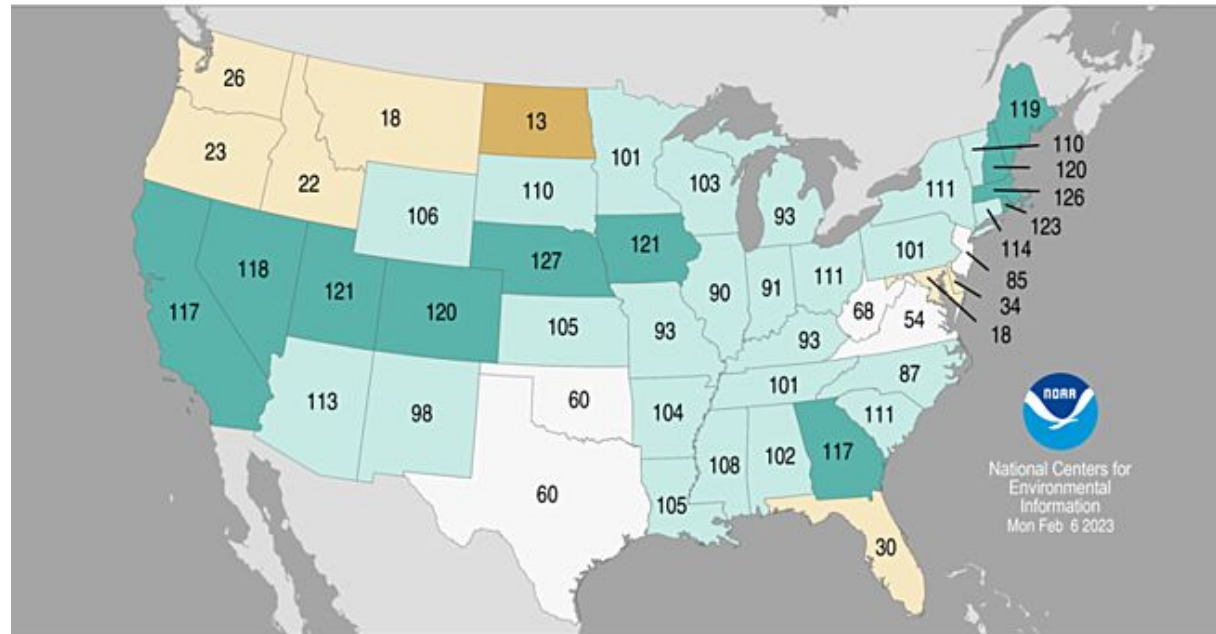


**6th warmest January on record for CONUS**

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

# 18th wettest January on record for CONUS

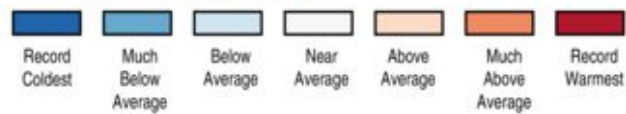
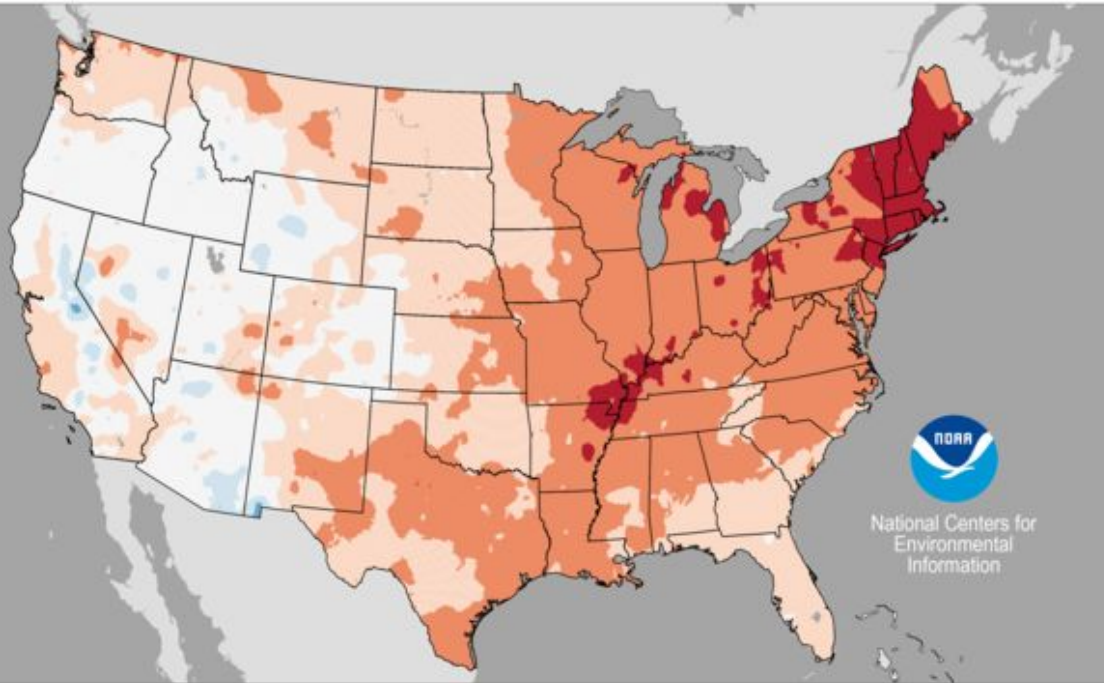
Statewide Precipitation Ranks  
January 2023  
Period: 1895–2023



## Minimum Temperature Percentiles

January 2023

Ranking Period: 1895–2023



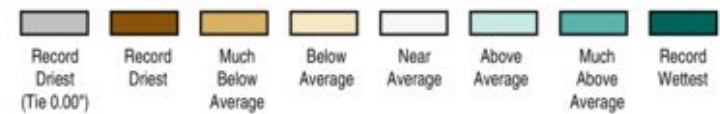
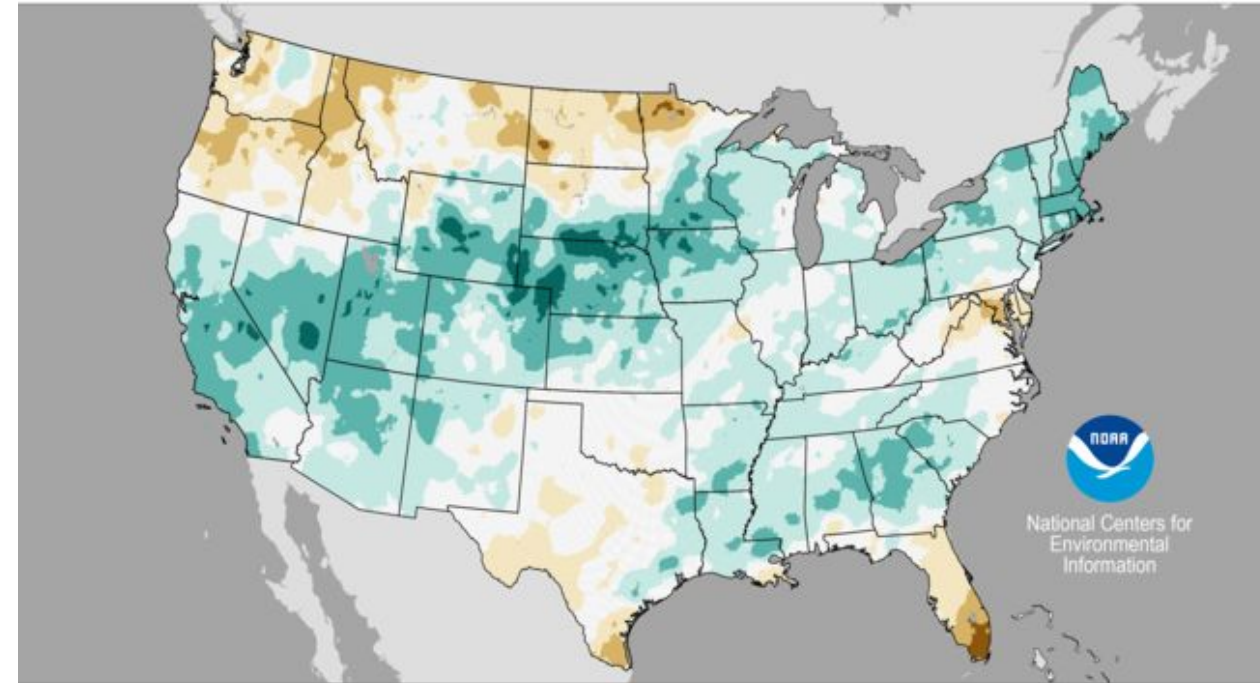
Created: Mon Feb 06 2023

Data Source: nClimGrid

## Total Precipitation Percentiles

January 2023

Ranking Period: 1895–2023



Created: Mon Feb 06 2023

Data Source: nClimGrid

Warmth in the region has been most notable in the minimum temperatures. Some isolated areas in the Midwest and Great Lakes saw record warm minimum temperatures for January

A swath of very wet January conditions extends from Colorado and Wyoming and northeast through Nebraska and into Iowa and Minnesota. Dry through Montana, the Dakotas and northern Minnesota.

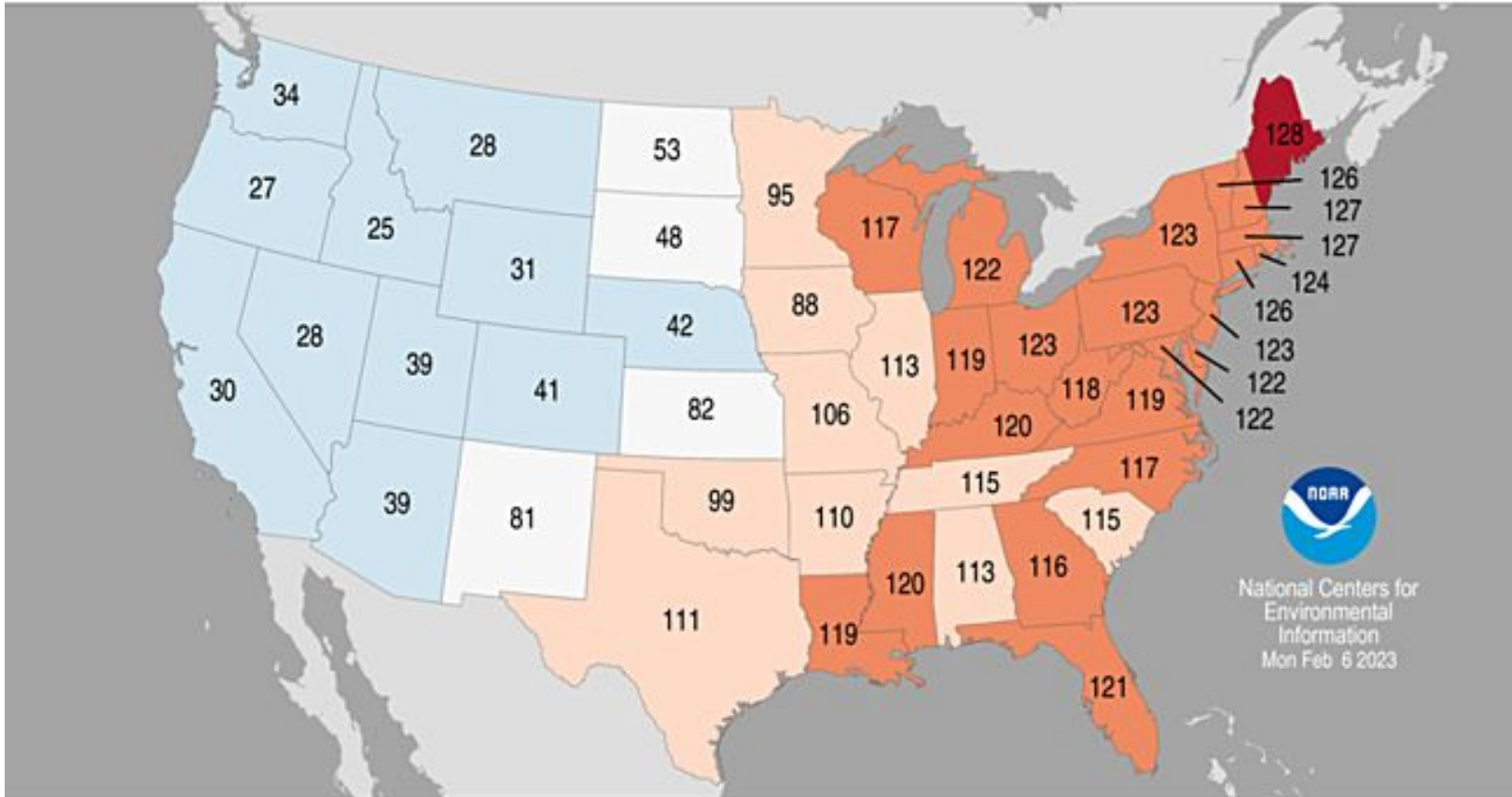
<http://www.ncdc.noaa.gov/temp-and-precip/us-maps/>



# Statewide Average Temperature Ranks

November 2022 – January 2023

Period: 1895–2023



Our pattern of warm to the east and cold to the west has persisted since November.

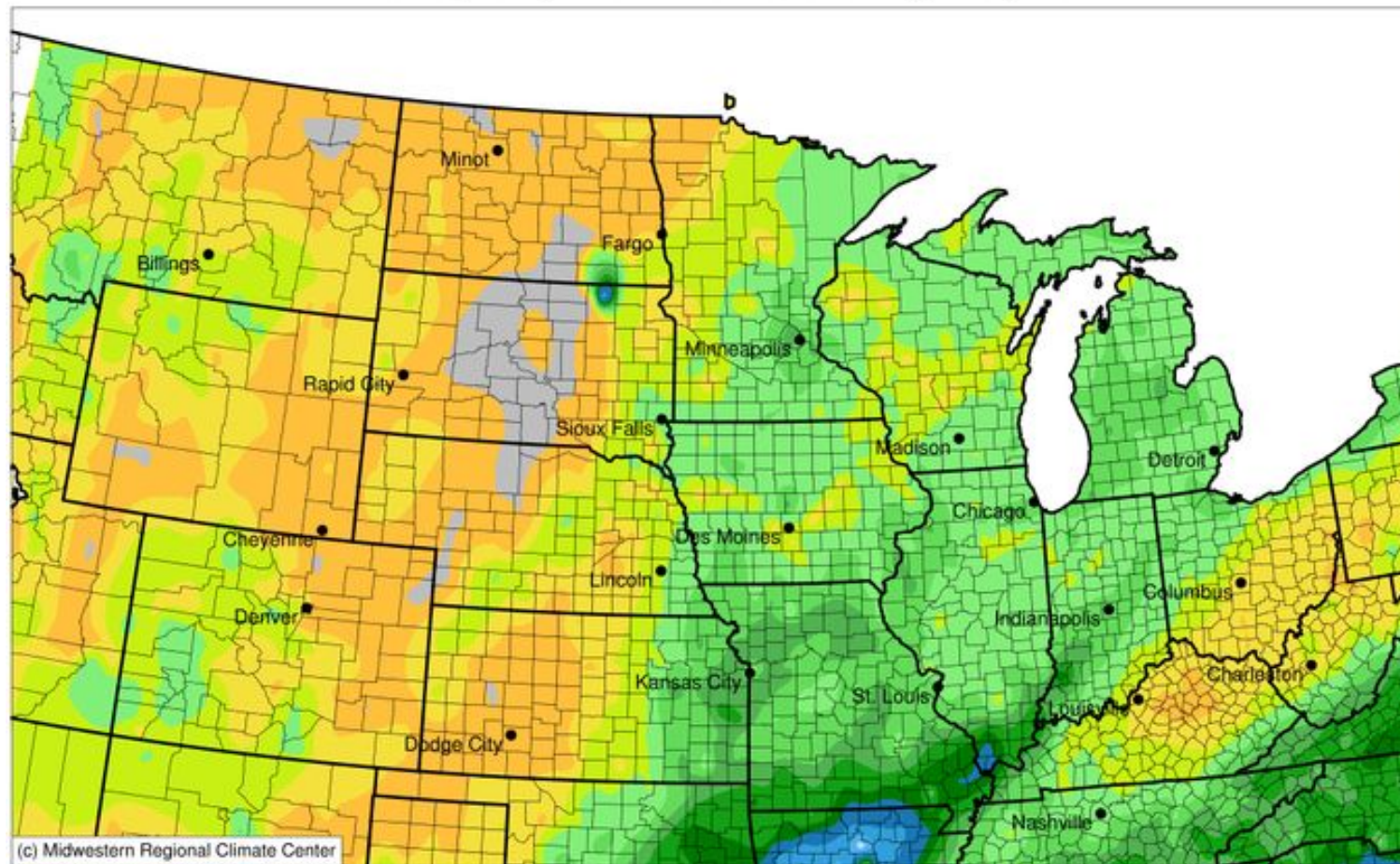


<http://www.ncdc.noaa.gov/temp-and-precip/us-maps/>



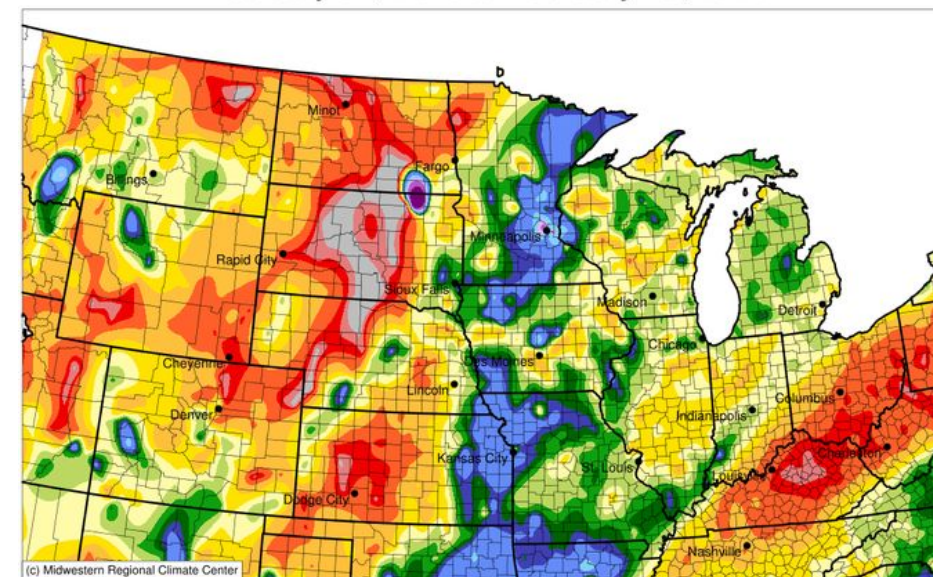
# Accumulated Precipitation (in)

February 01, 2023 to February 15, 2023



# Accumulated Precipitation (in): Percent of 1991-2020 Normals

February 01, 2023 to February 15, 2023



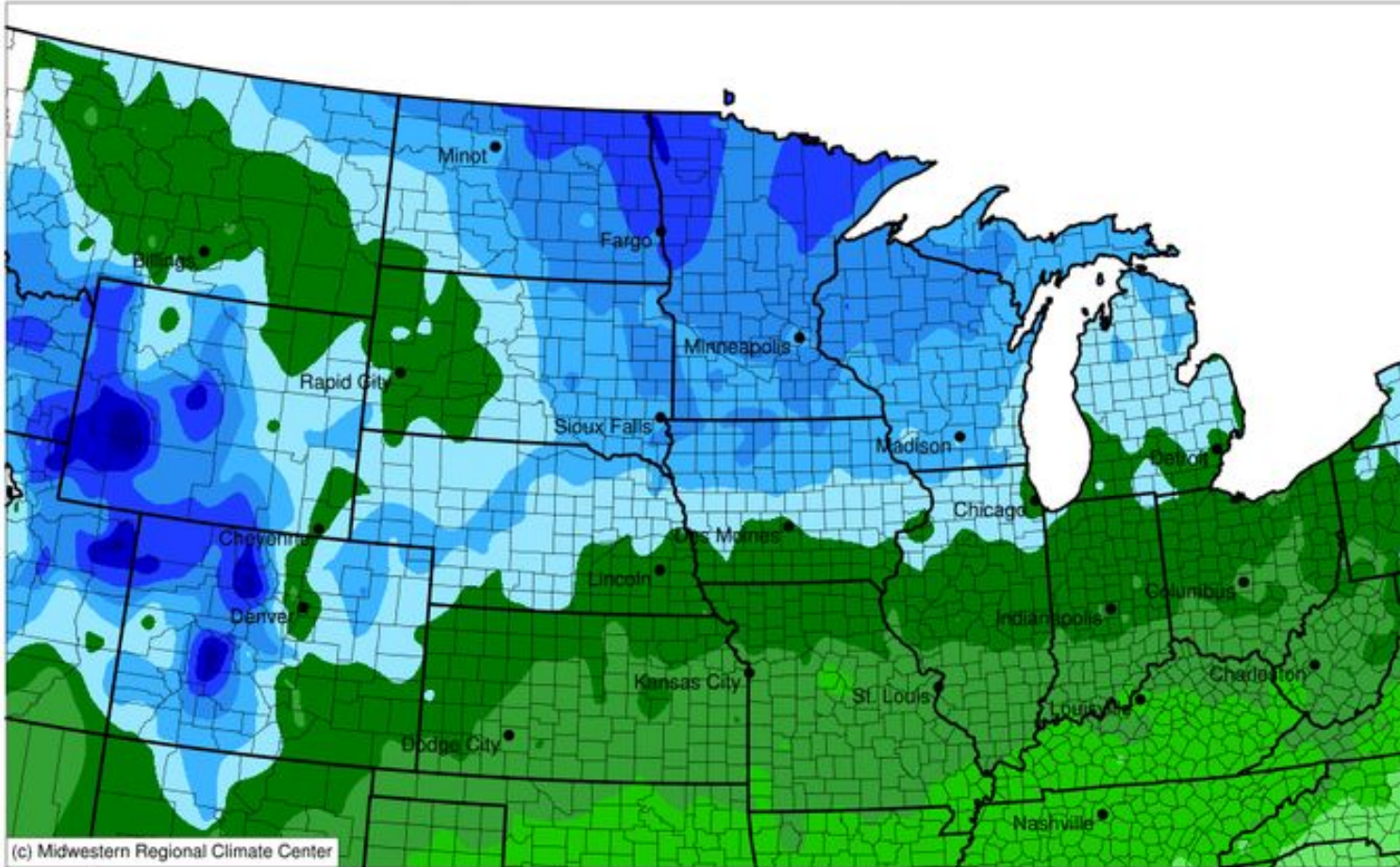
<https://mrcc.purdue.edu/CLIMATE/>





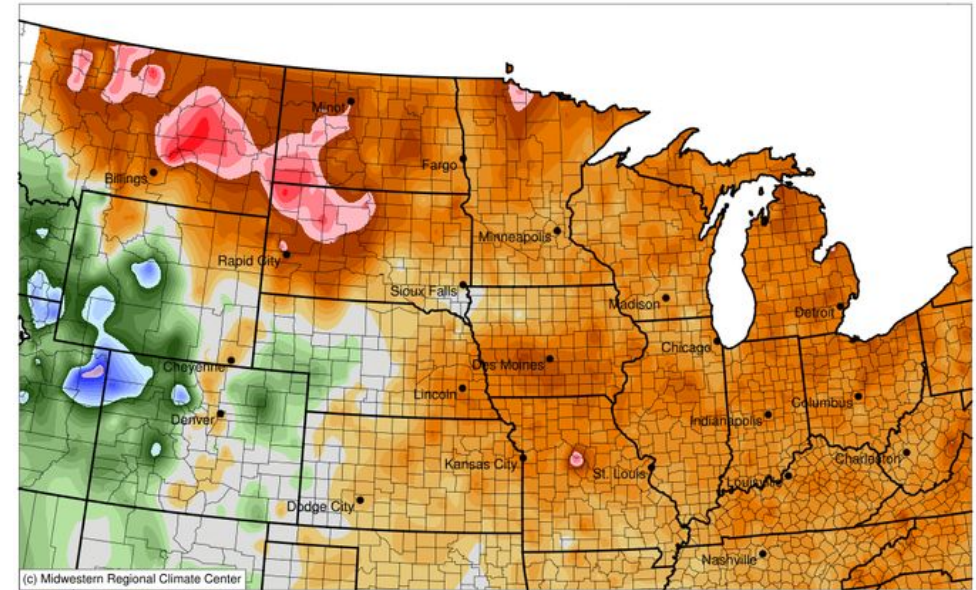
# Average Temperature (°F)

February 01, 2023 to February 15, 2023



# Average Temperature (°F): Departure from 1991-2020 Normals

February 01, 2023 to February 15, 2023



Stations from the following networks used: WBAN, COOP, FAA, GHCN, ThreadEx, CoCoRaHS, WMO, ICAO, NWSLI, Missouri FSA, Missouri Mesonet, Midwest Regional Climate Center  
cli-MATE: MRCC Application Tools Environment  
Generated at: 2/15/2023 6:45:59 PM CST

0 5 10 15 20 25 30 35 40 45 50 55 60

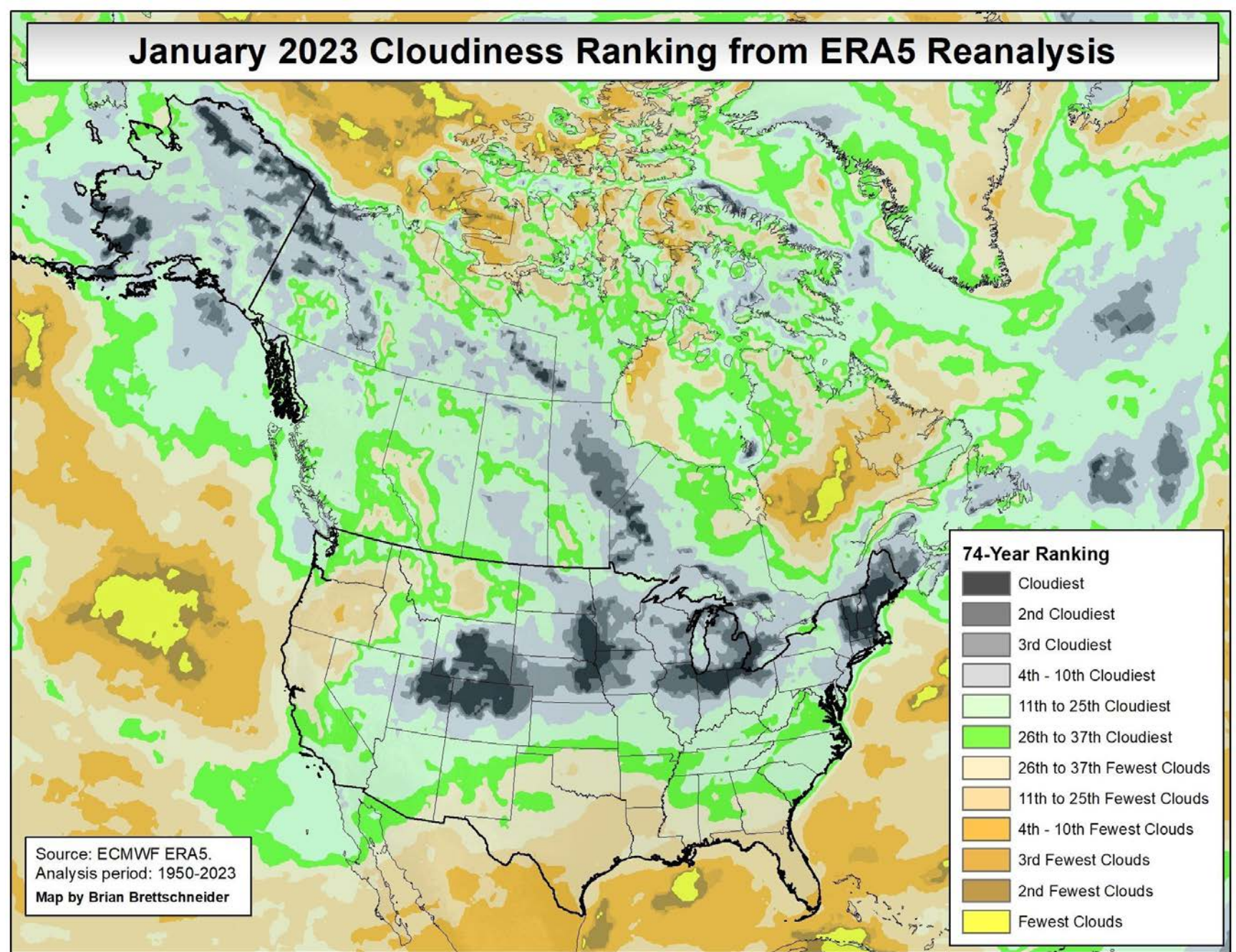
Stations from the following networks used: WBAN, COOP, FAA, GHCN, ThreadEx, CoCoRaHS, WMO, ICAO, NWSLI, Missouri FSA, Missouri Mesonet, Midwest Regional Climate Center  
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Generated at: 2/15/2023 6:41:37 PM CST

<https://mrcc.illinois.edu/CLIMATE/>



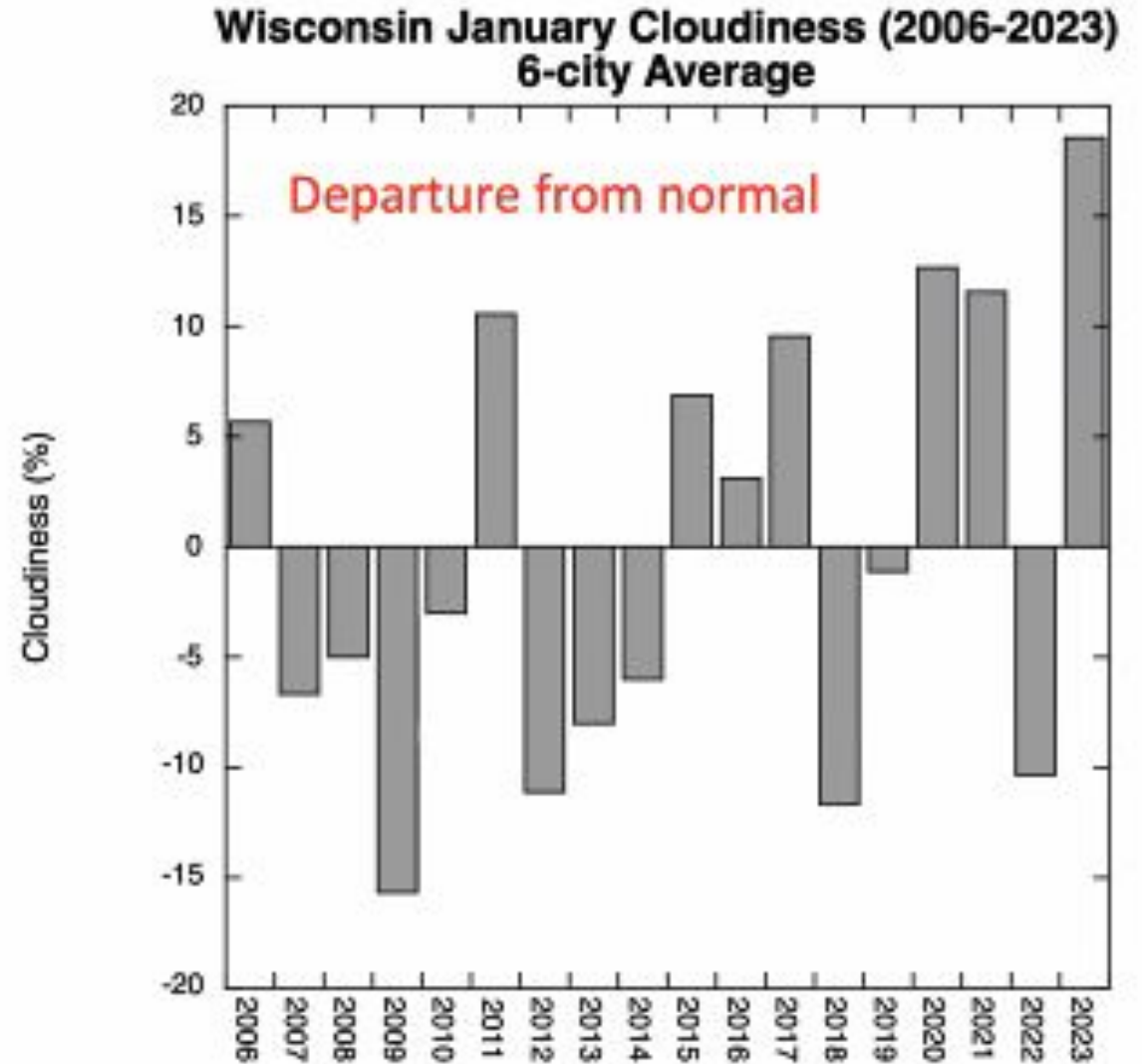
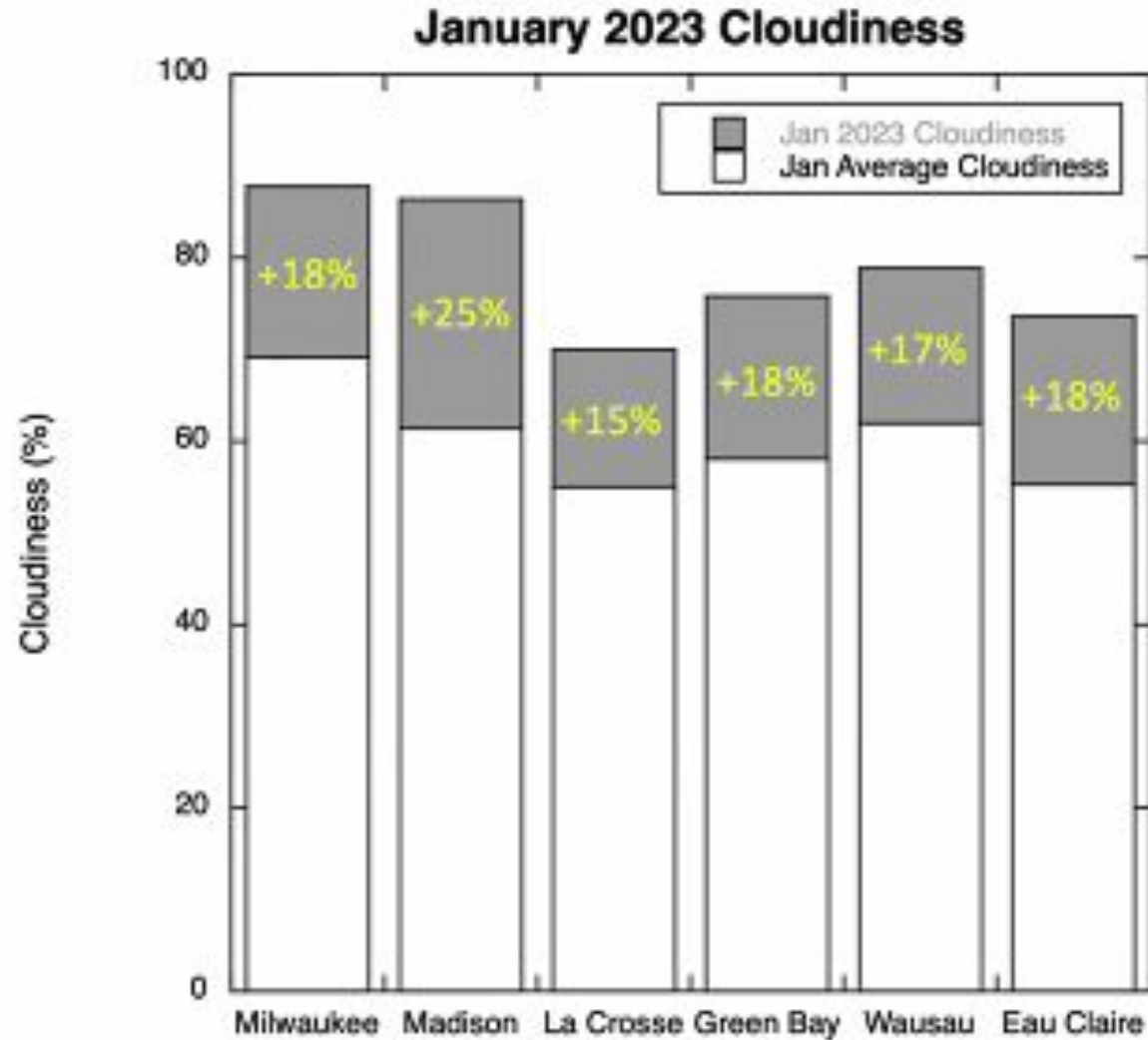
# It's been cloudy!

Gridded model data back to 1950 shows January cloudiness compared to past January data. Areas in grey experienced top 10 ranked cloudiness or higher.



# It's been cloudy!

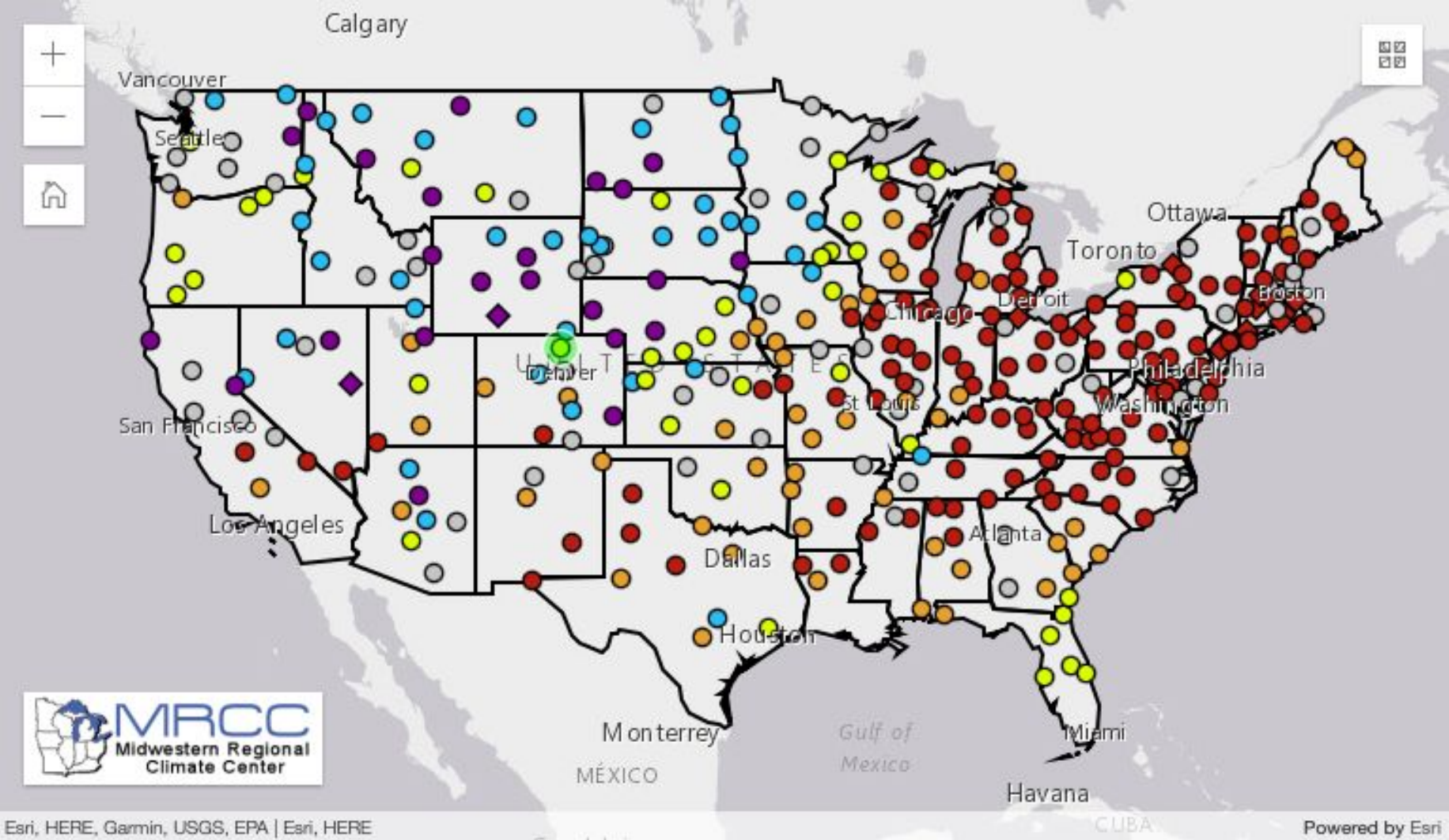
Observed data supports the models – it was definitely cloudy!



Steve Vavrus, Wisconsin State Climatologist



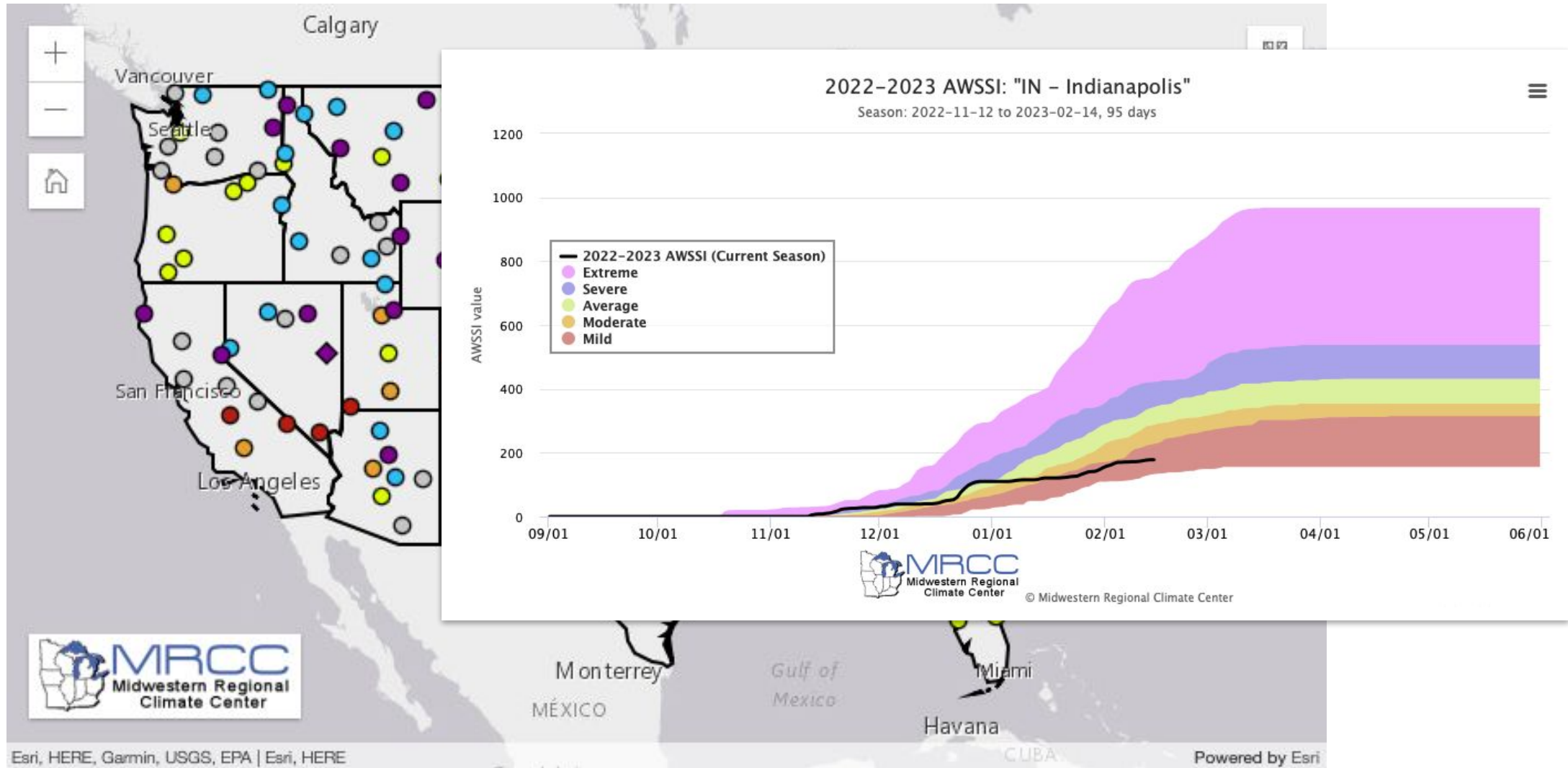
# Winter Severity – mild to the east, severe to the north and west



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



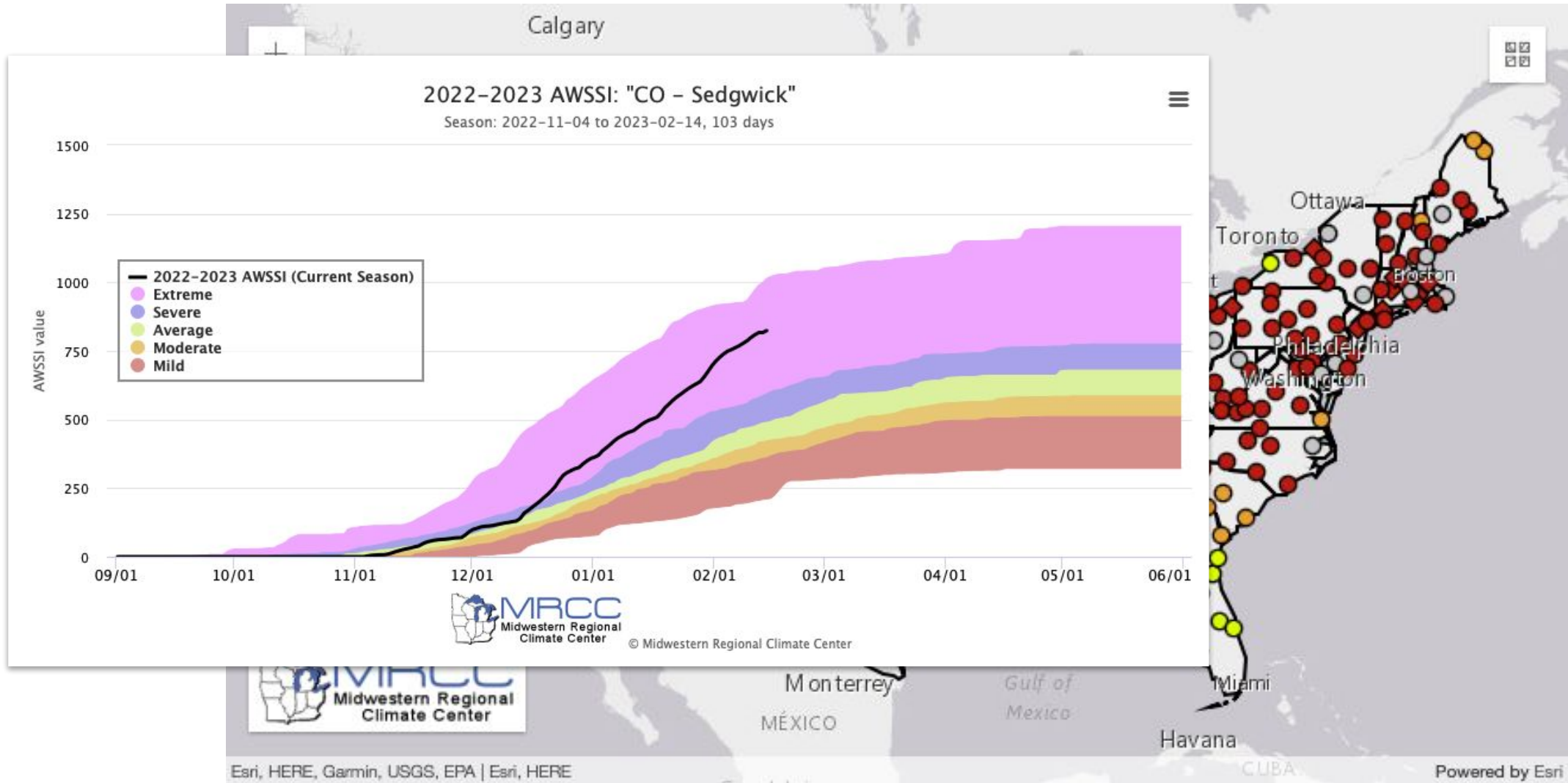
# Winter Severity



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



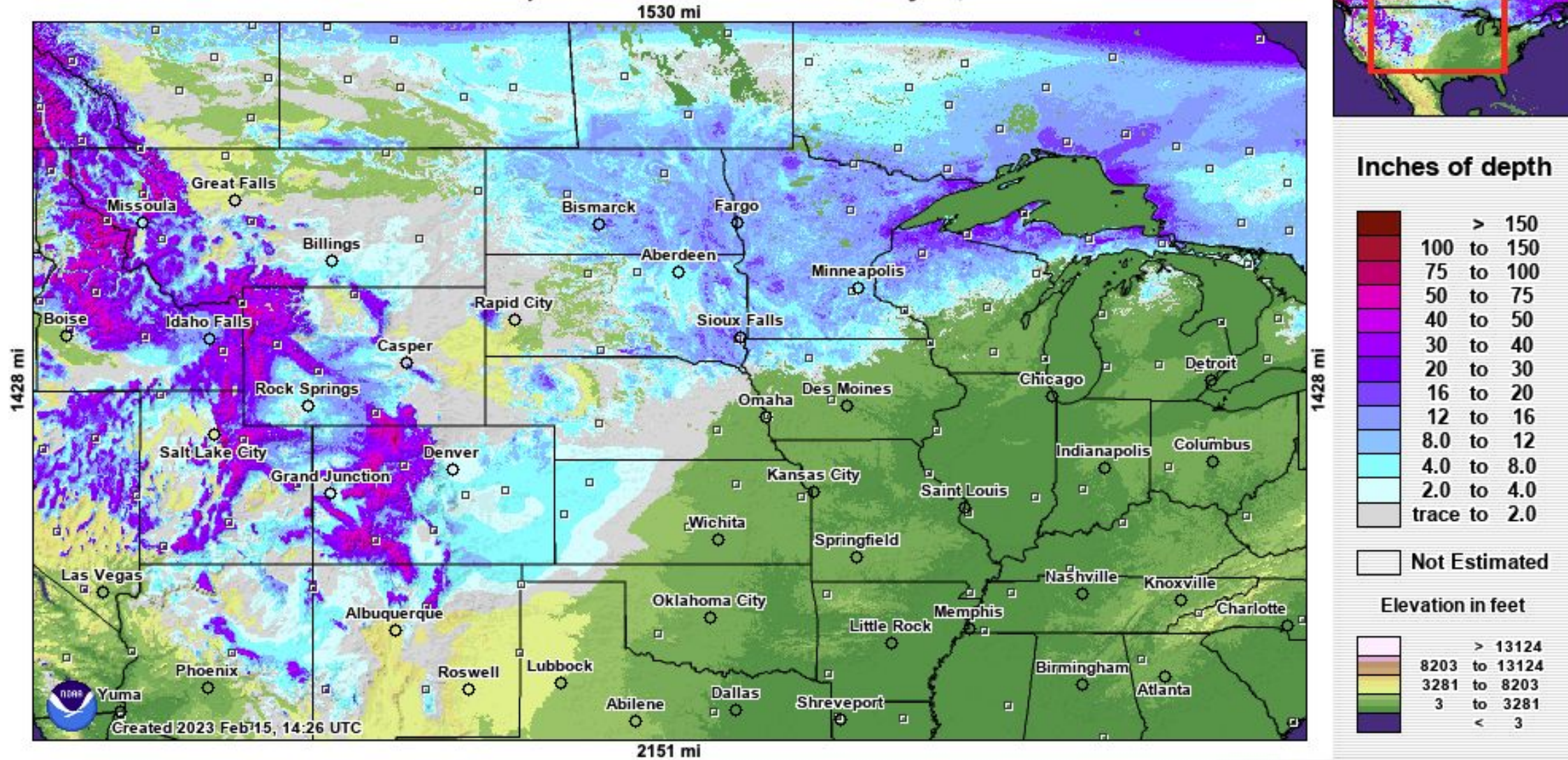
# Winter Severity



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



# Modeled Snow Depth forecasted for 2023 February 16, 0:00 UTC



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



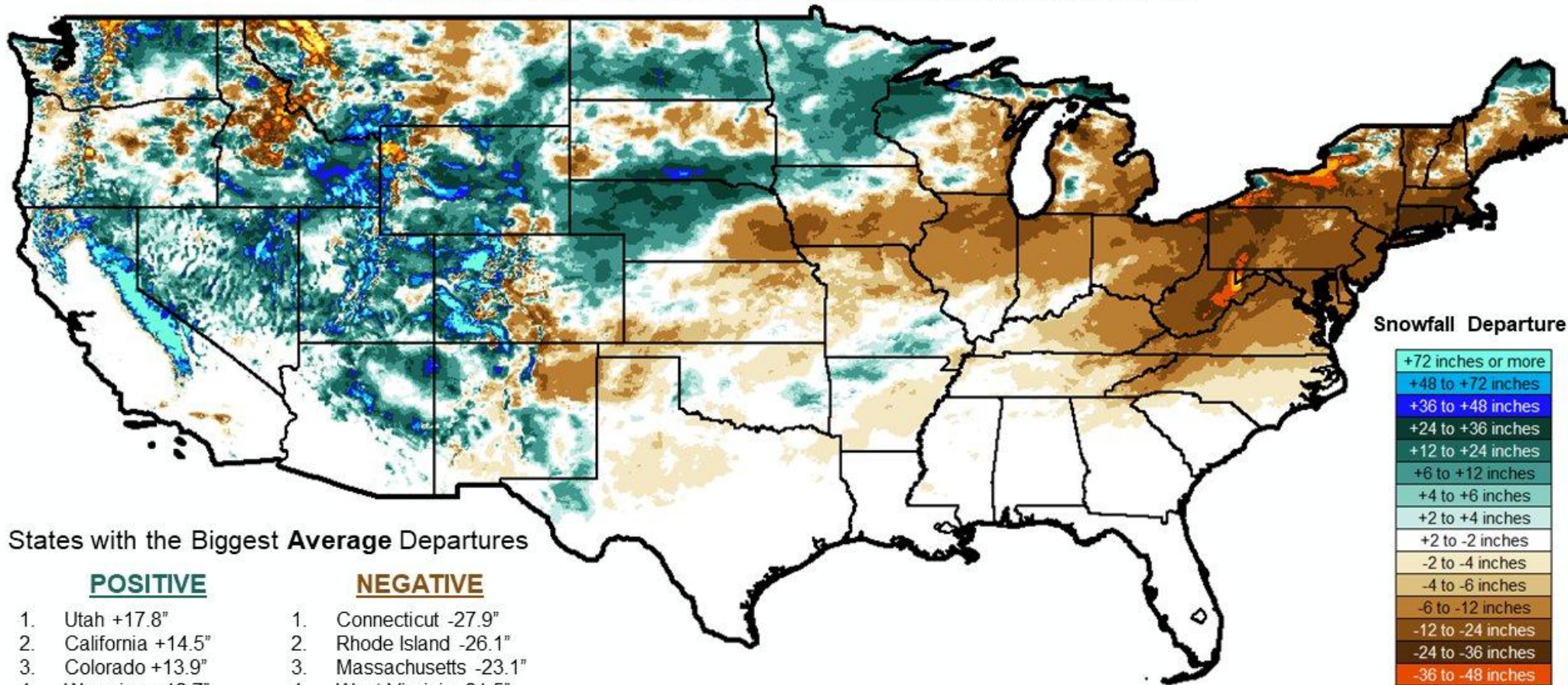


# Winter 2022-2023 Snowfall Departure From Average



October 1, 2022 to February 15, 2023 ("winter so far")

Gridded analysis based on NOHRSC National Gridded Snowfall from NWC/OWP



Snowfall Departure



## States with the Biggest Average Departures

### POSITIVE

1. Utah +17.8"
2. California +14.5"
3. Colorado +13.9"
4. Wyoming +12.7"
5. Nevada +12.2"

### NEGATIVE

1. Connecticut -27.9"
2. Rhode Island -26.1"
3. Massachusetts -23.1"
4. West Virginia -21.5"
5. Pennsylvania -19.1"

Mapping analysis by the Weather Prediction Center, College Park, MD

<https://twitter.com/NWSWPC/status/1625968883558666241>

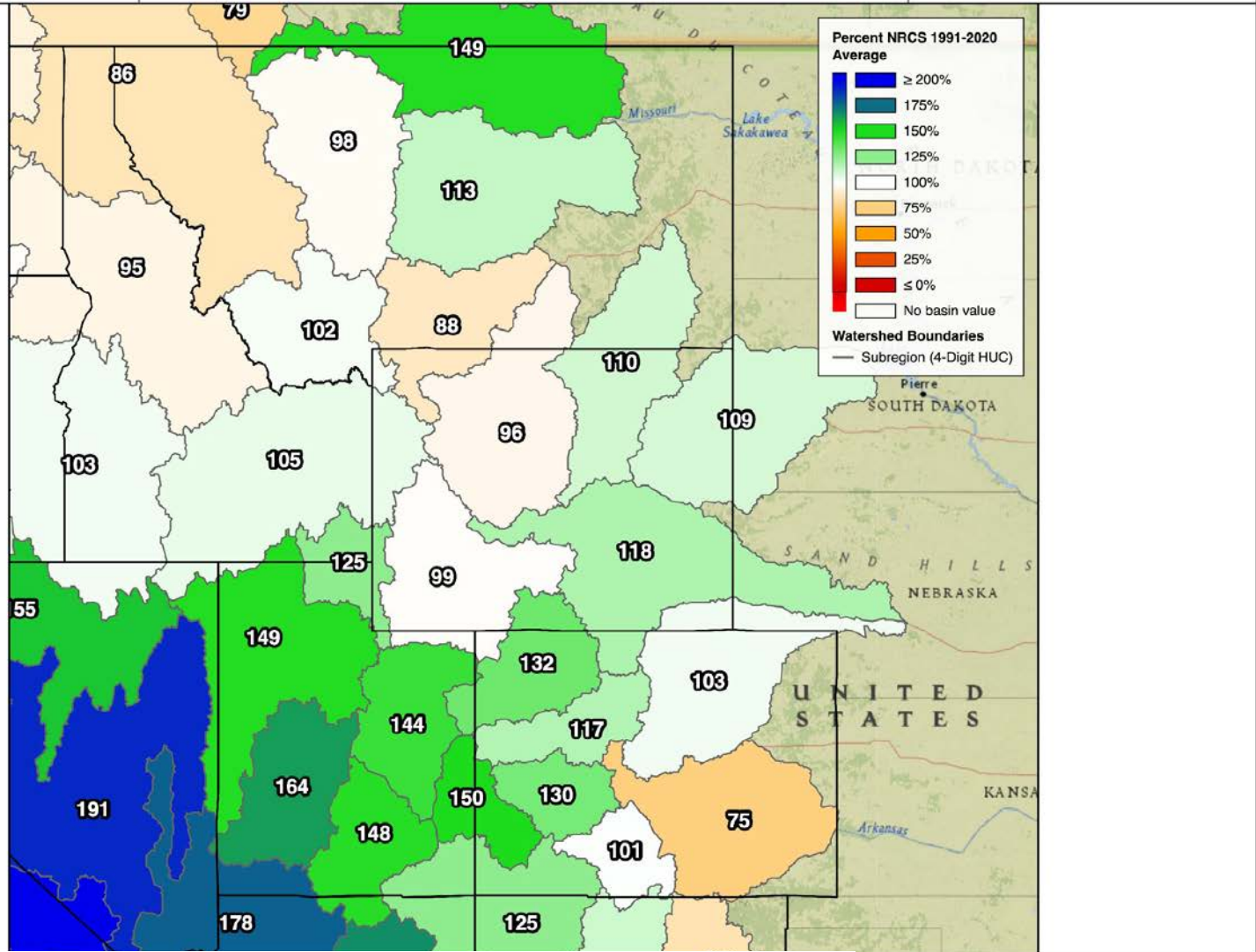




Snow Water Equivalent

Percent NRCS 1991-2020 Average

February 14, 2023, end of day

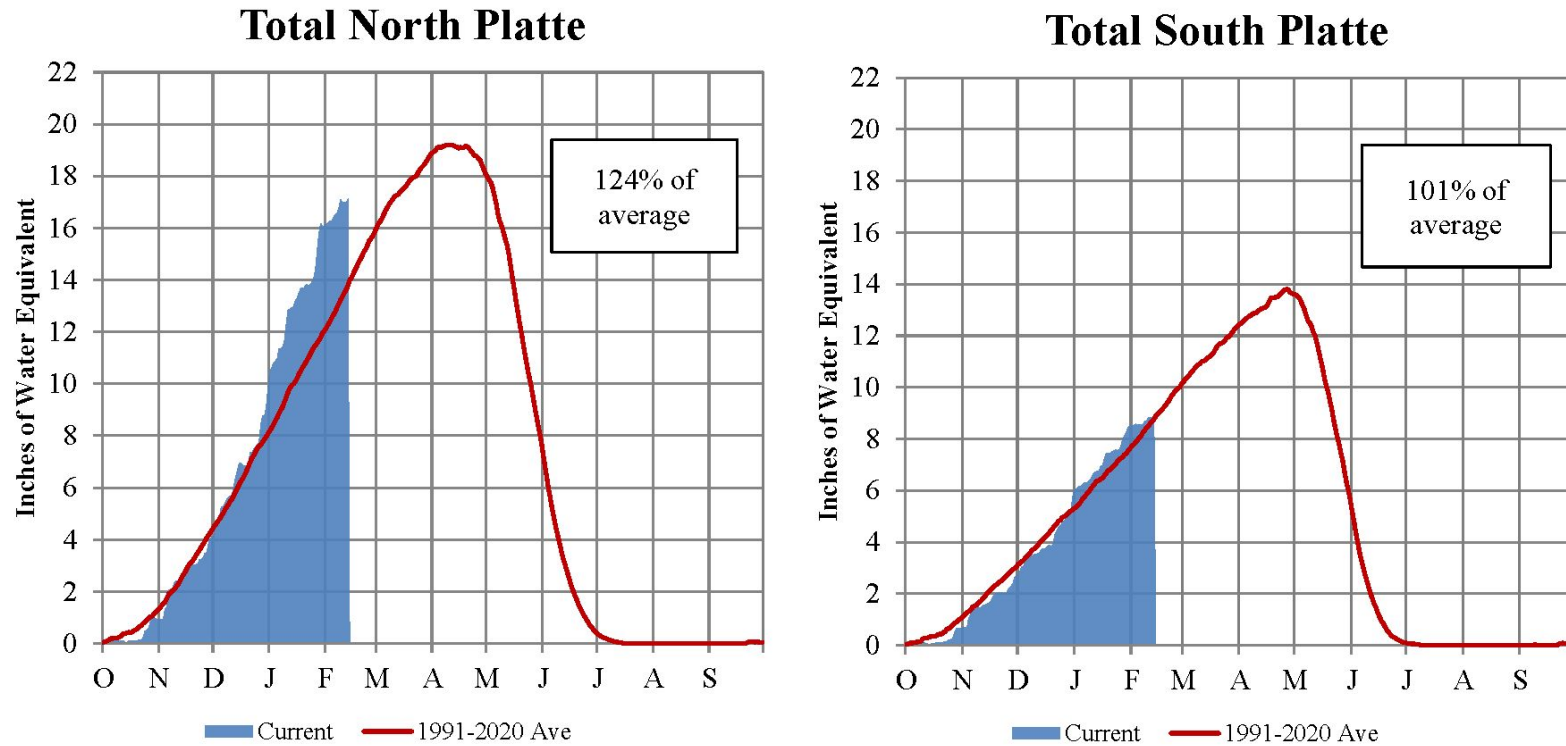


<https://www.nrcs.usda.gov/wps/portal/wcc/home/imap/>



# Platte River Basin - Mountain Snowpack Water Content Water Year 2022-2023

February 14, 2023



The North and South Platte River Basin mountain snowpacks normally peak near April 10 and the end of April, respectively. As of February 14, 2023, the mountain snowpack SWE in the "Total North Platte" reach is 17.1", 124% of the (1991-2020) average. The mountain snowpack SWE in the "Total South Platte" reach is 8.9", 101% of the (1991-2020) average.

Source: USDA, Natural Resource Conservation Service

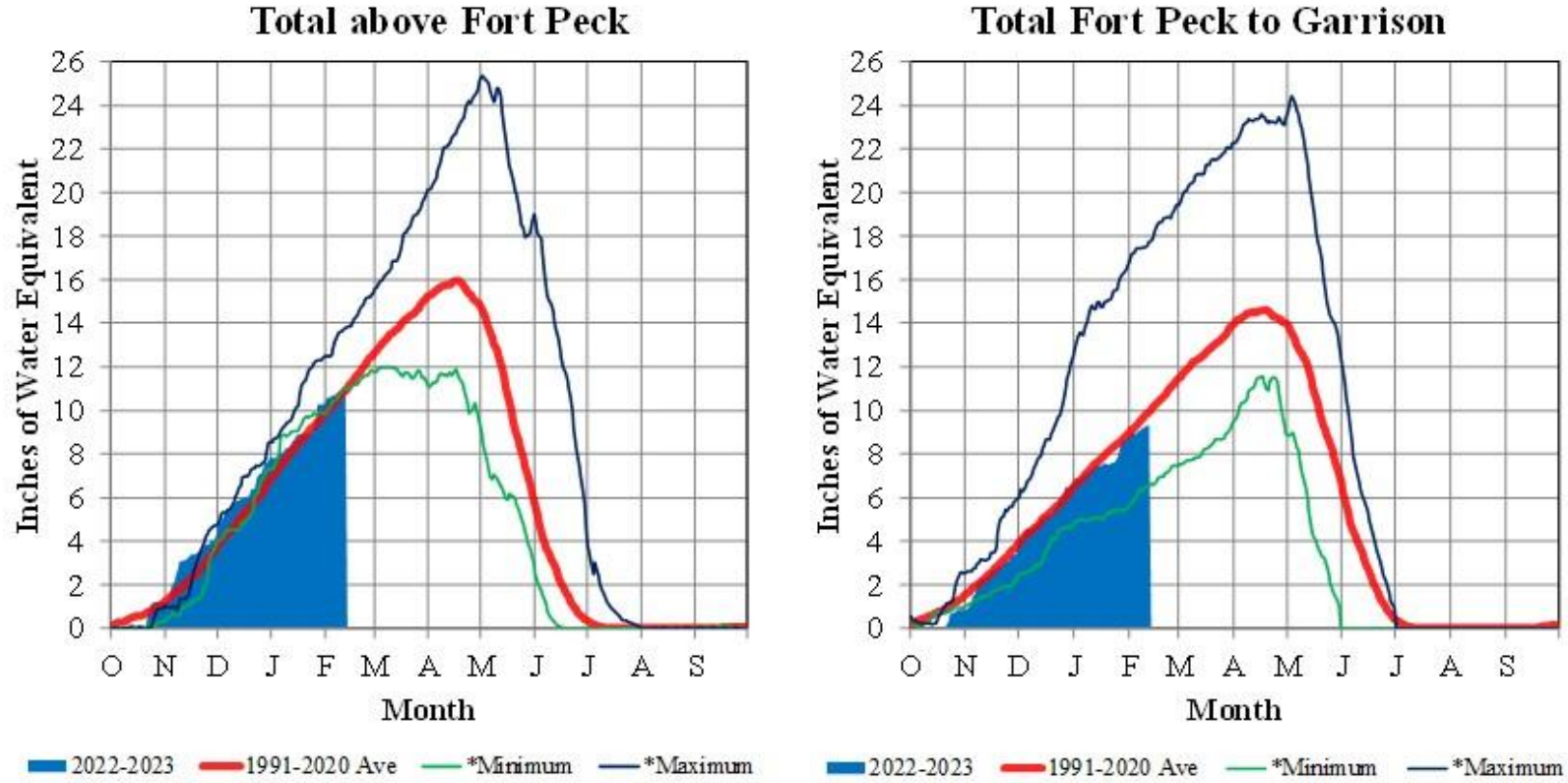
Provisional Data. Subject to Revision

[https://www.nwd-mr.usace.army.mil/rcc/reports/platte\\_snow.png](https://www.nwd-mr.usace.army.mil/rcc/reports/platte_snow.png)



# Missouri River Basin – Mountain Snowpack Water Content 2022-2023 with comparison plots from recent high and low years

12-Feb-2023



On February 12, 2023 the mountain Snow Water Equivalent (SWE) in the "Total above Fort Peck" reach is 10.9" and 100% of the (1991-2020) average. The mountain SWE in the "Fort Peck to Garrison" reach is 9.3" and 94% of the (1991-2020) average. The normal peak for both reaches occurs near April 17.

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

Provisional data. Subject to revision.

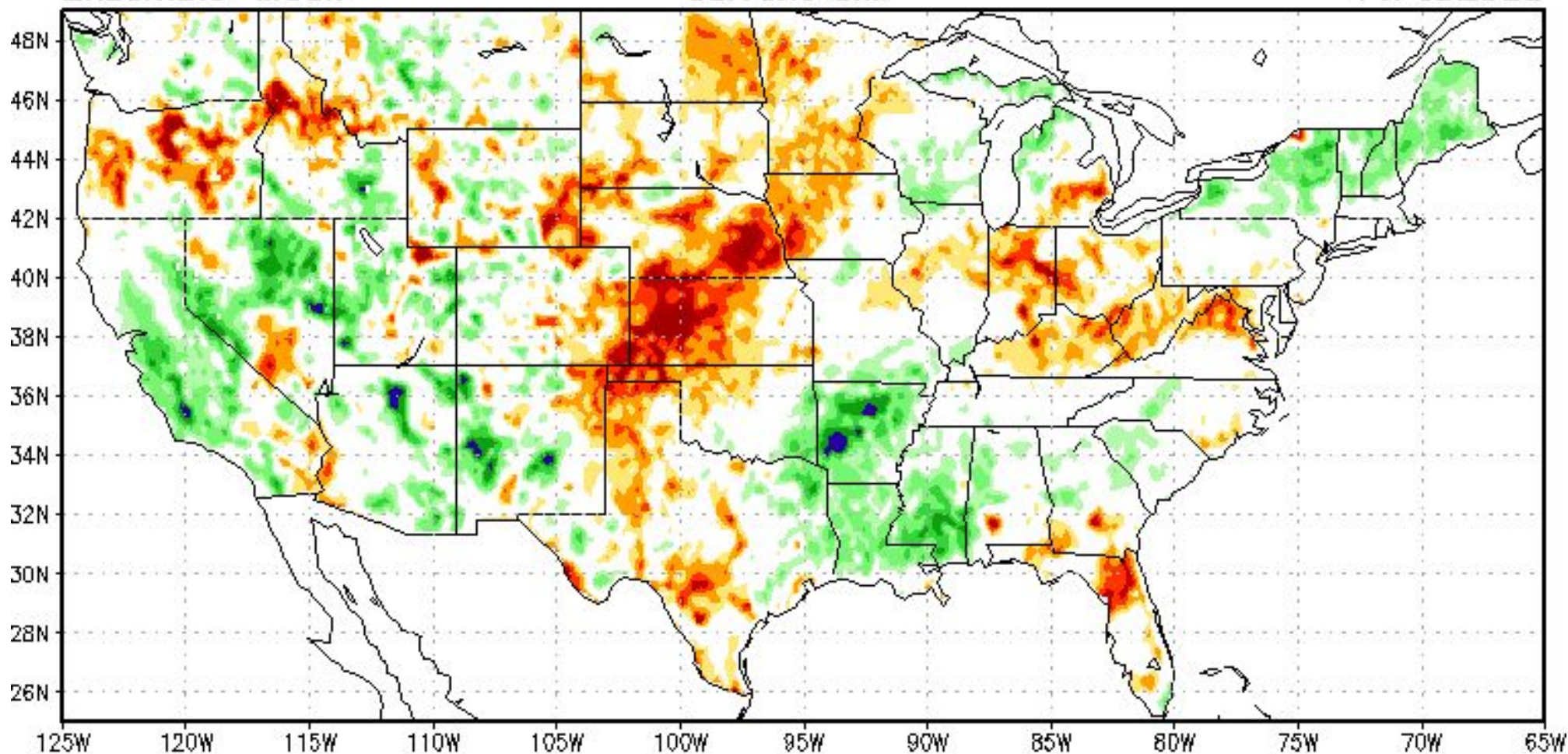
<https://www.nwd-mr.usace.army.mil/rcc/reports/snow.jpg>



Ensemble-Mean

Current SMP

11Feb2023

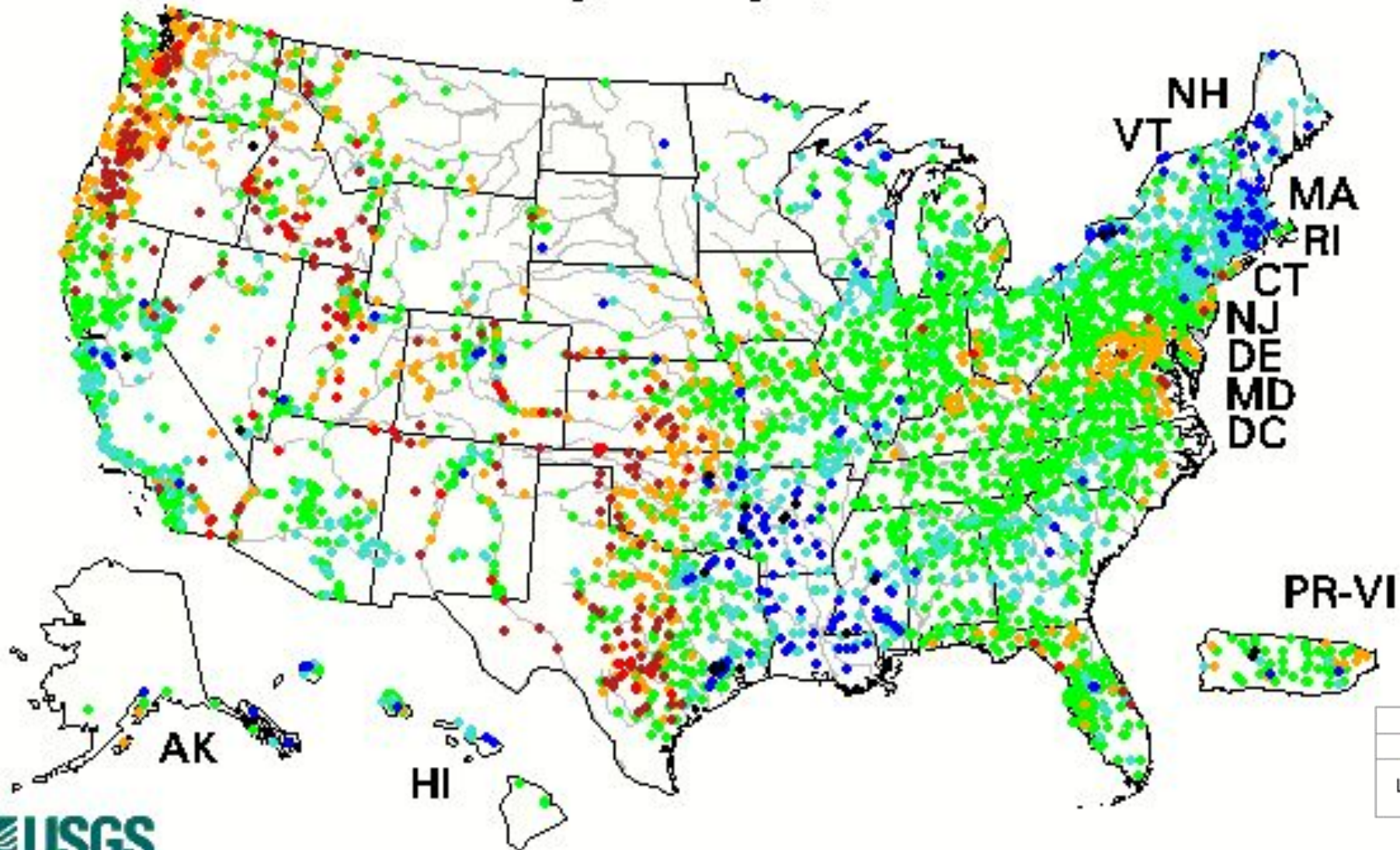


[https://www.cpc.ncep.noaa.gov/products/Drought/Monitoring/smp\\_new.shtml](https://www.cpc.ncep.noaa.gov/products/Drought/Monitoring/smp_new.shtml)



# 28-day averaged streamflow

Tuesday, February 14, 2023



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>



# GREAT LAKES SURFACE ENVIRONMENTAL ANALYSIS (GLSEA)



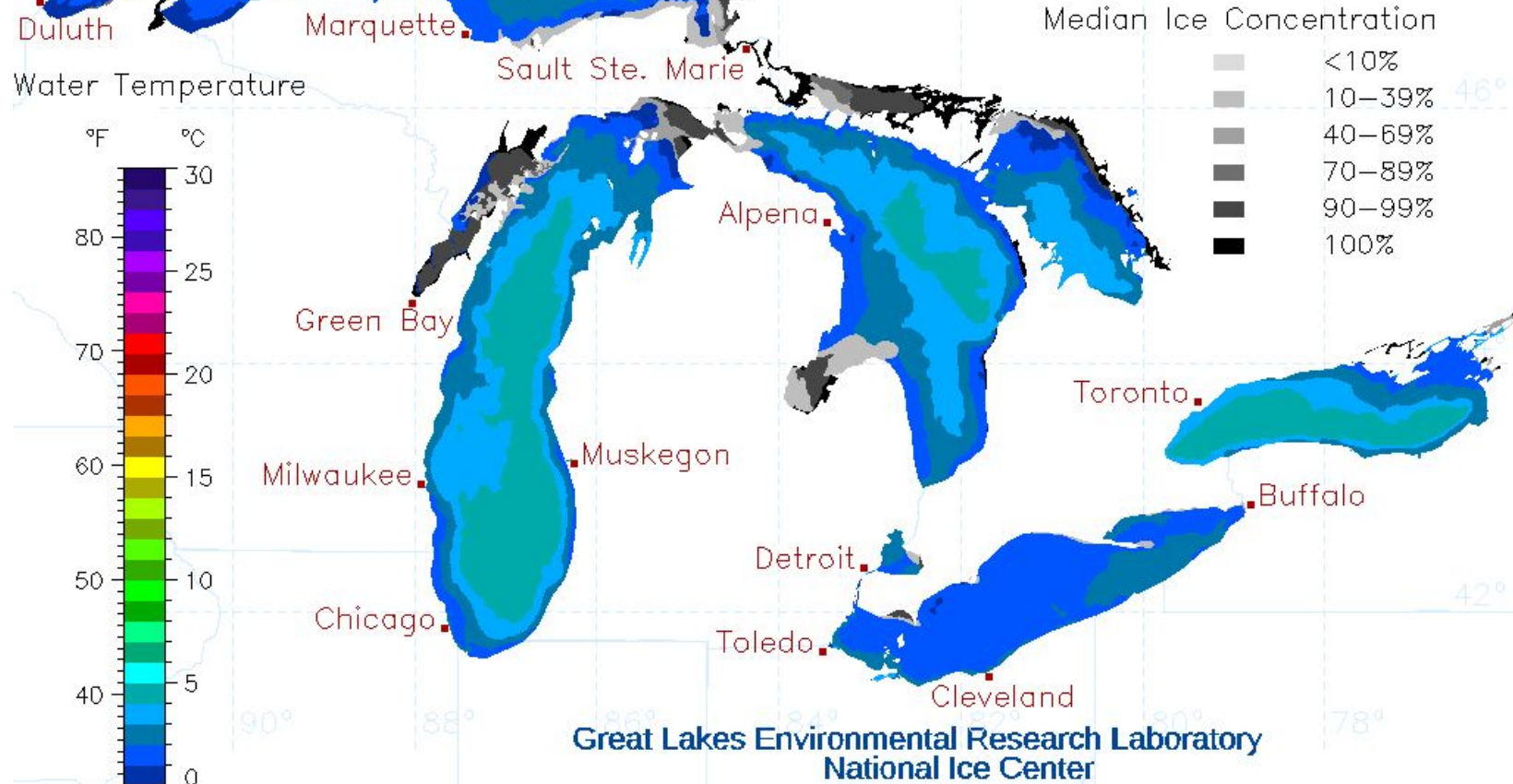
Analysis Date: JD 045 02/14/2023

Percent Pixels with Data within +/-10 Days: 94.7%

Date of last ice analysis: 2/14/2023

NOAA CoastWatch

Great Lakes Total Ice Cover: 6.6%



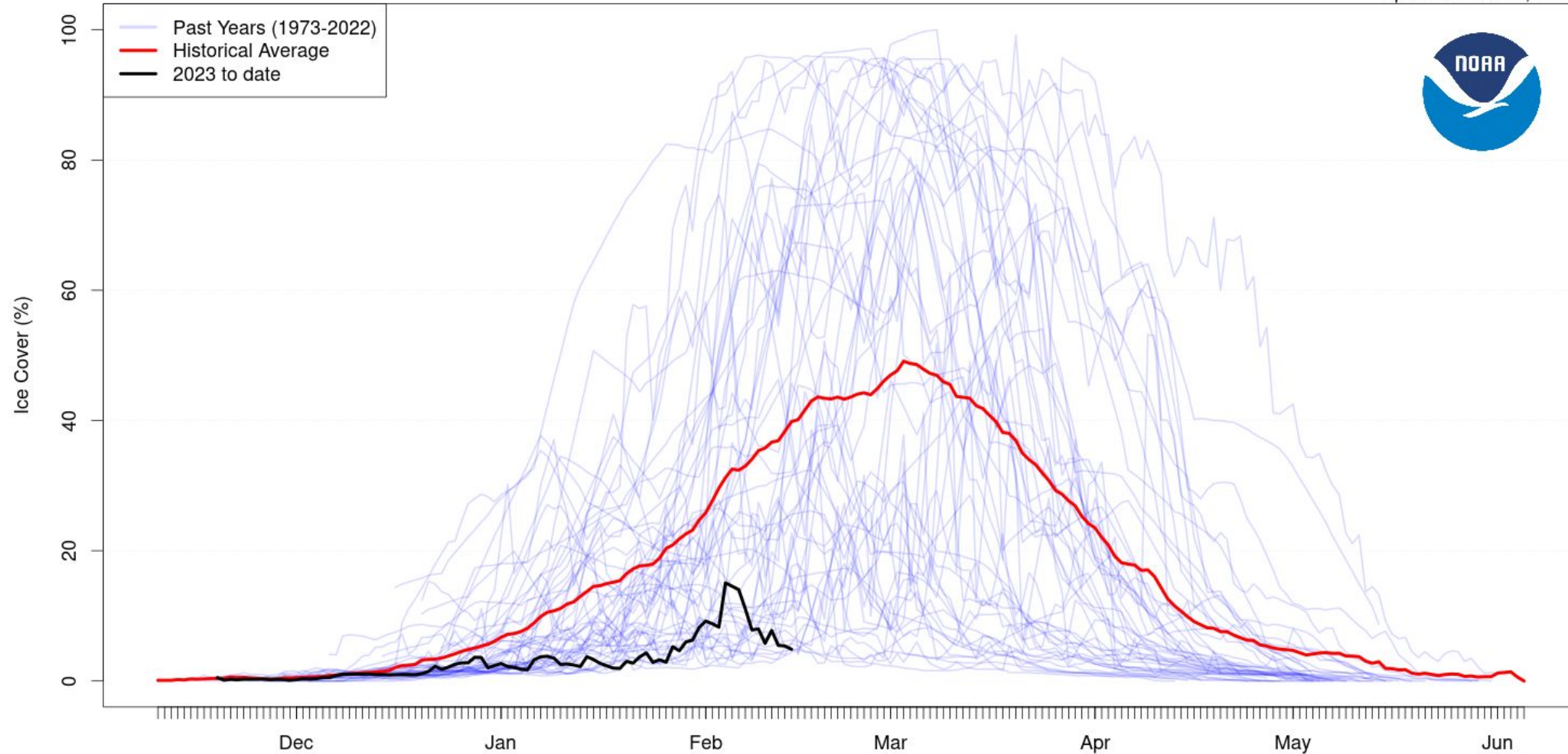
AVG Cloud Free - Superior: 17.1 %, Michigan: 28.7 %, Huron: 45.2 %, Erie: 39.4 %, Ontario: 49.1 %, St Clair: 16.6 %

<https://www.glerl.noaa.gov/data/ice/>



# Lake Superior Average Ice Cover

updated: Feb 14, 2023

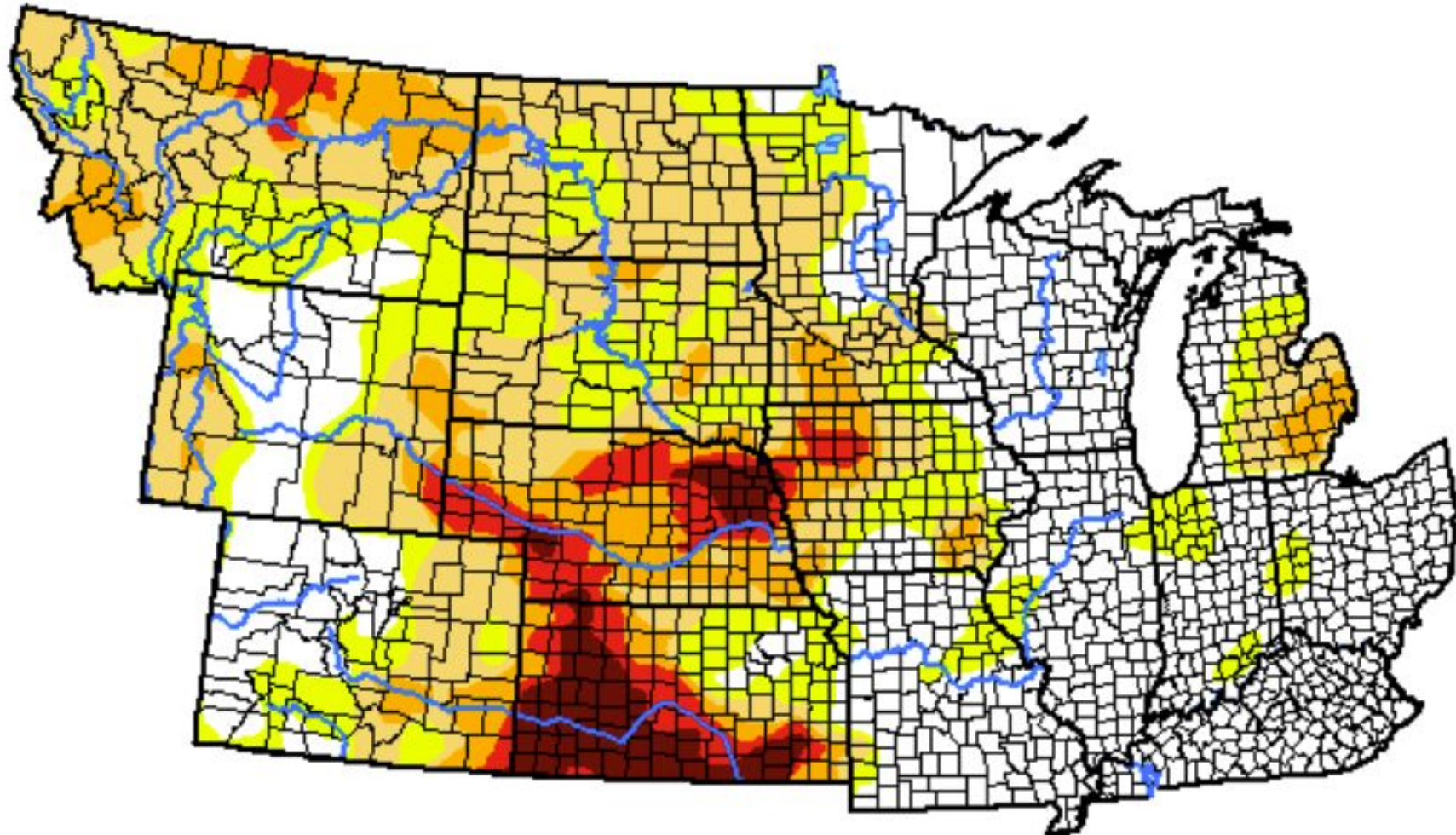


[https://www.glerl.noaa.gov/data/ice/spaghetti/sup\\_ice\\_compare.png](https://www.glerl.noaa.gov/data/ice/spaghetti/sup_ice_compare.png)



# U.S. Drought Monitor NWS Central

**February 14, 2023**  
(Released Thursday, Feb. 16, 2023)  
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	38.25	61.75	43.40	18.15	7.75	3.37
<b>Last Week</b> <i>02-07-2023</i>	34.84	65.16	44.90	19.10	8.35	3.38
<b>3 Months Ago</b> <i>11-15-2022</i>	15.61	84.39	61.79	29.87	12.73	3.70
<b>Start of Calendar Year</b> <i>01-03-2023</i>	25.76	74.24	48.98	24.27	9.90	3.48
<b>Start of Water Year</b> <i>09-27-2022</i>	27.00	73.00	47.70	23.08	8.80	2.73
<b>One Year Ago</b> <i>02-15-2022</i>	27.11	72.89	54.84	28.60	8.68	0.72

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:

Brian Fuchs  
National Drought Mitigation Center



[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)





# Impacts

# Warm Impacts

- ❑ Early snowmelt led to flooding a culvert where a bear was hibernating in Minnesota
- ❑ Heavy rain on snow in northern Wisconsin impacting recreation
- ❑ Early bud swelling, vegetation coming out of dormancy – could be at risk from late freezes!
- ❑ Winter wheat planting in Indiana challenged by lack of frozen ground
- ❑ Mud challenges
- ❑ Early maple production in Ohio



Minnesota Department of Natural Resources

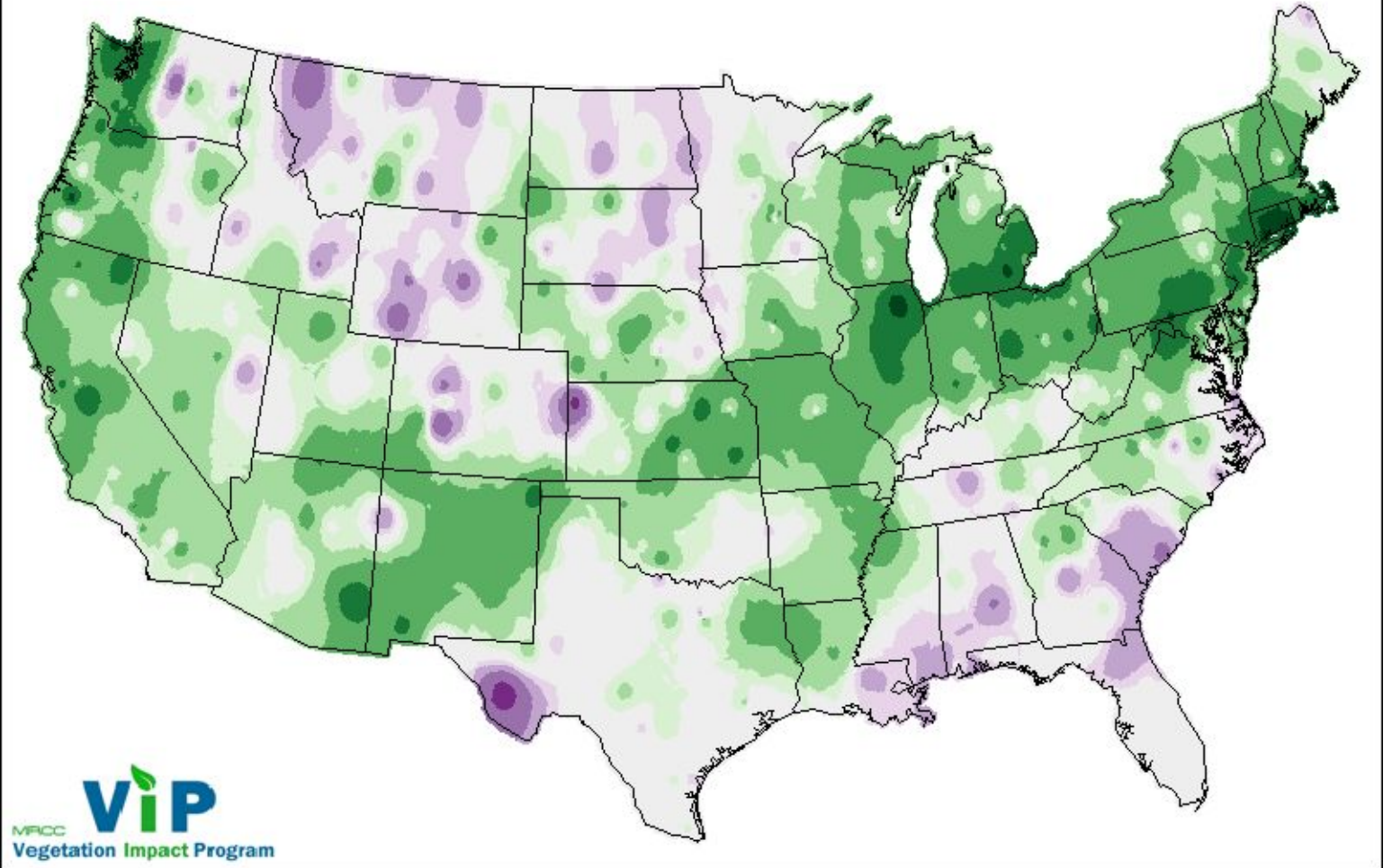
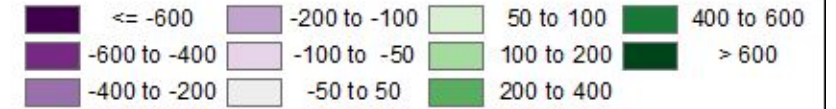


Chilling hours are well above average for this time of year.

More chilling hours means fruits can break dormancy earlier, possibly before last spring freeze.

Some areas 3 weeks ahead of schedule

Chilling Hours Departures  
(1986/87 - 2015/16 Average)  
10/1/2022 through 2/14/2023



<https://mrcc.purdue.edu/VIP/indexChillHours.html>



# Flooding impacts

- ❑ Dry conditions in southern IL, followed by 4-6 inches above normal rainfall resulted in localized flooding
- ❑ Typical flooding issues this type of year, near normal flood risk heading into spring for Mississippi
- ❑ Long-term drought in some areas of Missouri basin helping to lower flood risk this spring
- ❑ Flood risks could increase if more precipitation falls in the short-term

Flood rescue in southern IL  
courtesy Hamilton County Sheriff's Office



# Other impacts

- ❑ Lack of snow cover exposes ground in Kansas
- ❑ Deep snowpack in western Nebraska required supplemental feeding for livestock
- ❑ Increasing risk of wetness and delayed planting in eastern corn belt
- ❑ Damage to fruit crops with cold snaps in Illinois and Ohio, possibly elsewhere



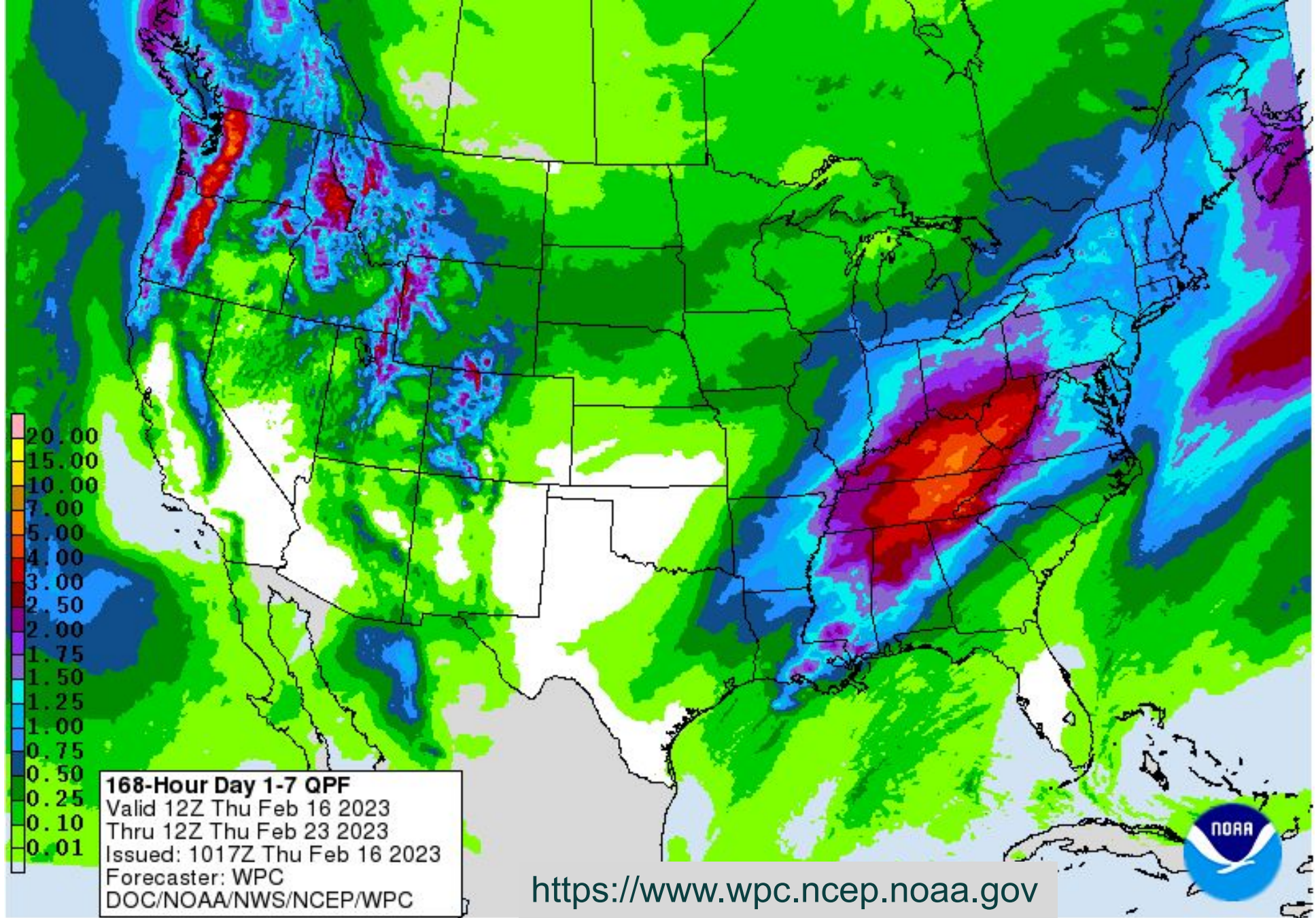
Kansas winter wheat, photo courtesy Chip Redmond





# Outlook

# 7-day Precip Forecast

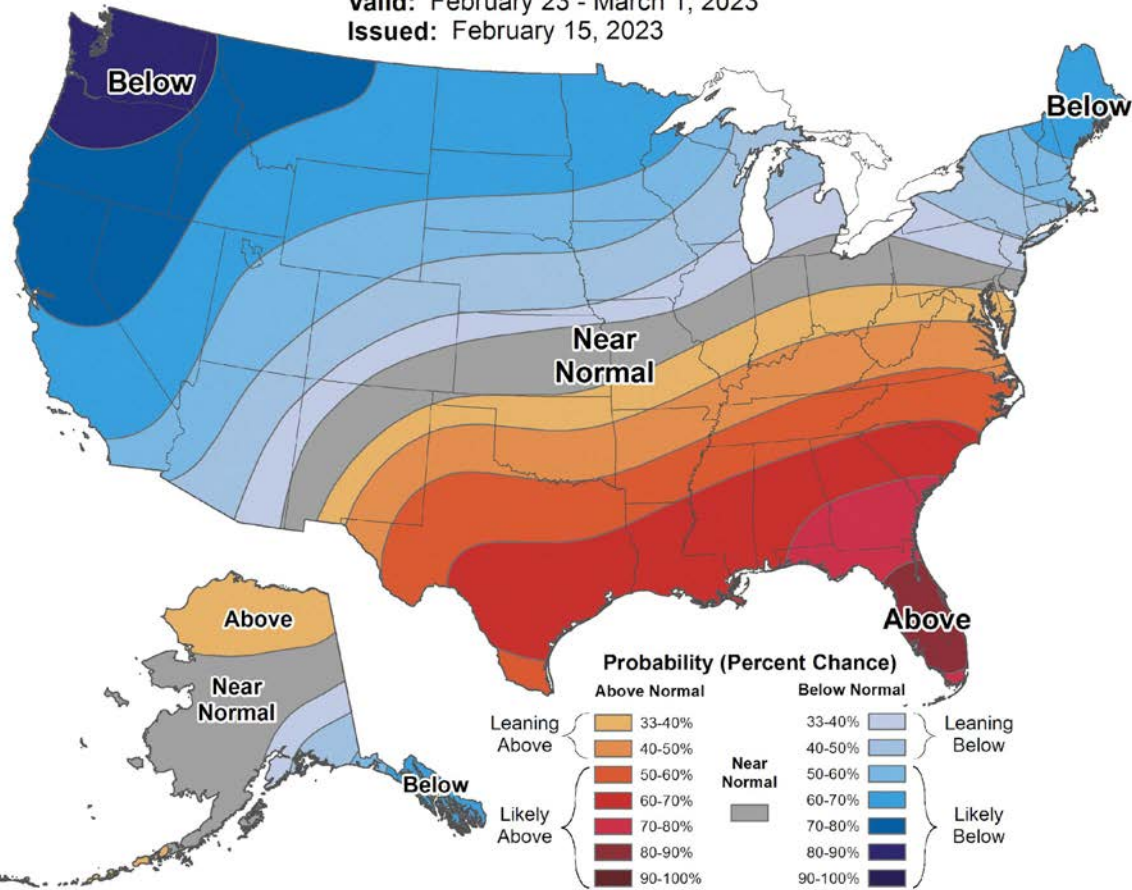




## 8-14 Day Temperature Outlook



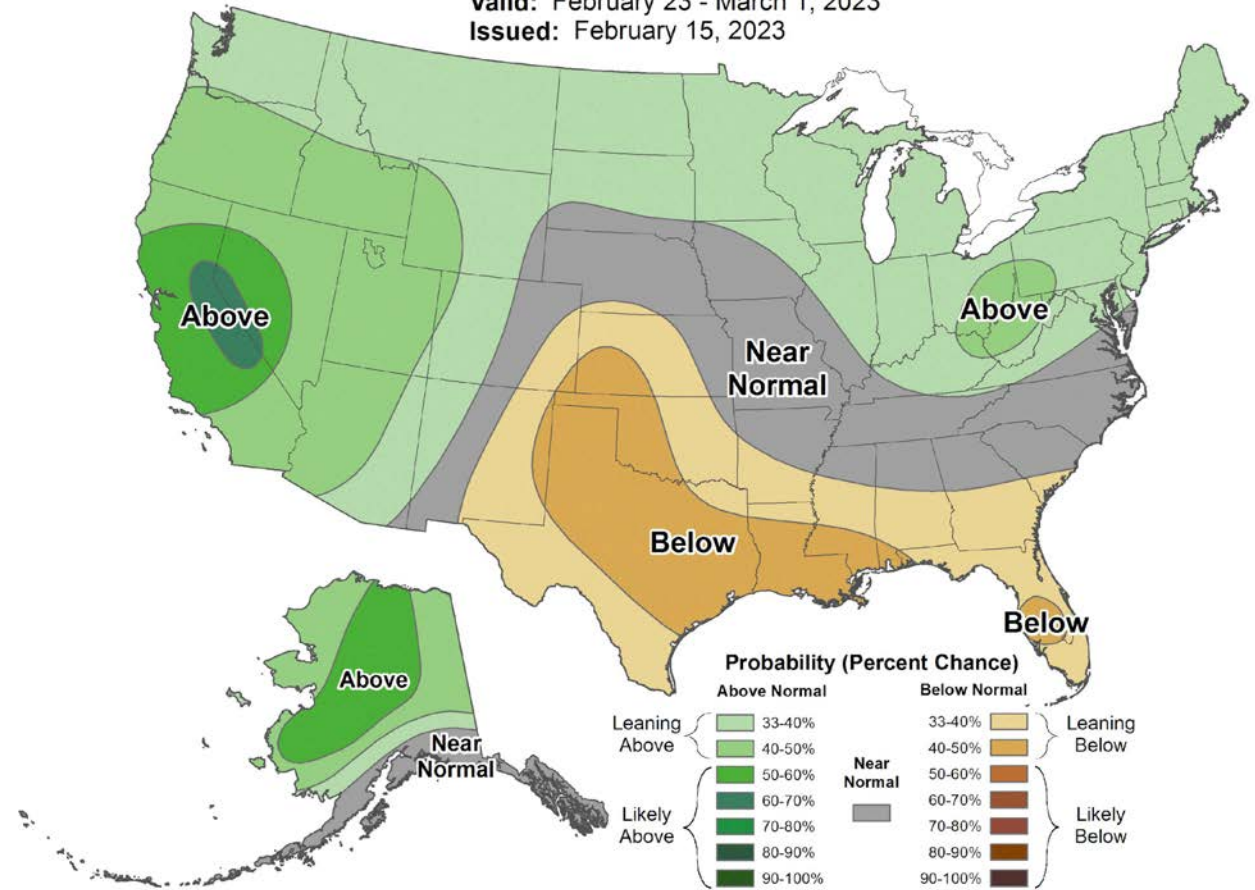
Valid: February 23 - March 1, 2023  
 Issued: February 15, 2023



## 8-14 Day Precipitation Outlook



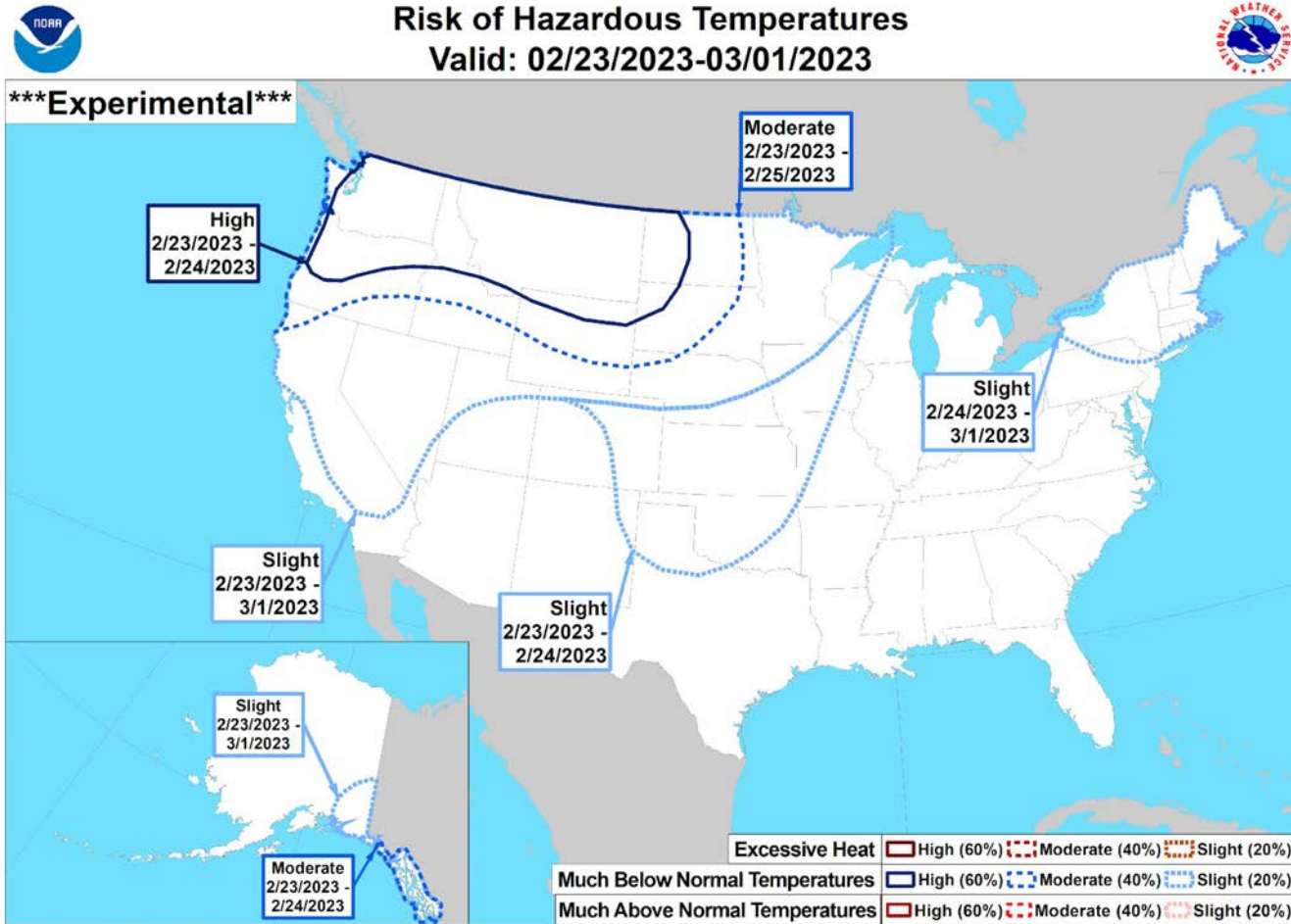
Valid: February 23 - March 1, 2023  
 Issued: February 15, 2023





## Risk of Hazardous Temperatures

Valid: 02/23/2023-03/01/2023



Climate Prediction Center

Made: 02/15/2023 3PM EST

Follow us:  

[www.cpc.ncep.noaa.gov](http://www.cpc.ncep.noaa.gov)



# Hazards Outlook

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

## Risk of Hazardous Temperatures

Valid: 02/23/2023-03/01/2023

## Risk of Heavy Precipitation

Valid: 02/23/2023-03/01/2023

\*\*\*Experimental\*\*\*

\*\*\*Experimental\*\*\*

Slight  
2/23/2023 - 3/1/2023

Slight  
2/23/2023 - 2/24/2023  
2/26/2023 - 2/28/2023

NO HAZARDS POSTED

High (60%) Moderate (40%) Slight (20%)

Climate Prediction Center

Made: 02/15/2023 3PM EST

Follow us:  

[www.cpc.ncep.noaa.gov](http://www.cpc.ncep.noaa.gov)

Climate Pre

Made: 02/15/2



Risk of Heavy Snow  
Valid: 02/23/2023 - 03/01/2023



Risk of Heavy Snow  
Valid: 02/23/2023 - 03/01/2023



\*\*\*Experimental\*\*\*

\*\*\*Experimental\*\*\*

\*\*\*Experimental\*\*\*

Slight  
2/23/2023 - 3/1/2023

Slight  
2/23/2023 - 3/1/2023

Slight  
2/23/2023 - 2/24/2023  
2/26/2023 - 2/28/2023

NO HAZARDS POSTED

NO HAZARDS POSTED

High (60%) Moderate (40%) Slight (20%)

Climate Prediction Center  
Made: 02/15/2023 3PM EST

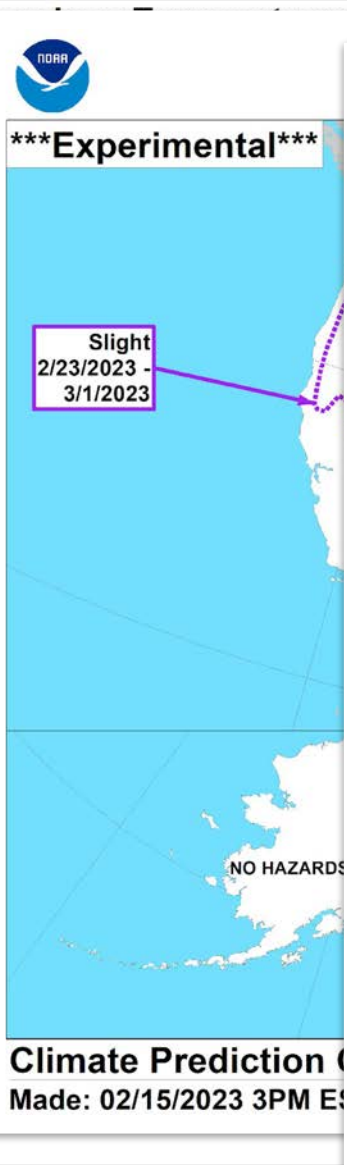
Climate Prediction Center  
Made: 02/15/2023 3PM EST

Climate Prediction Center  
Made: 02/15/2023 3PM EST

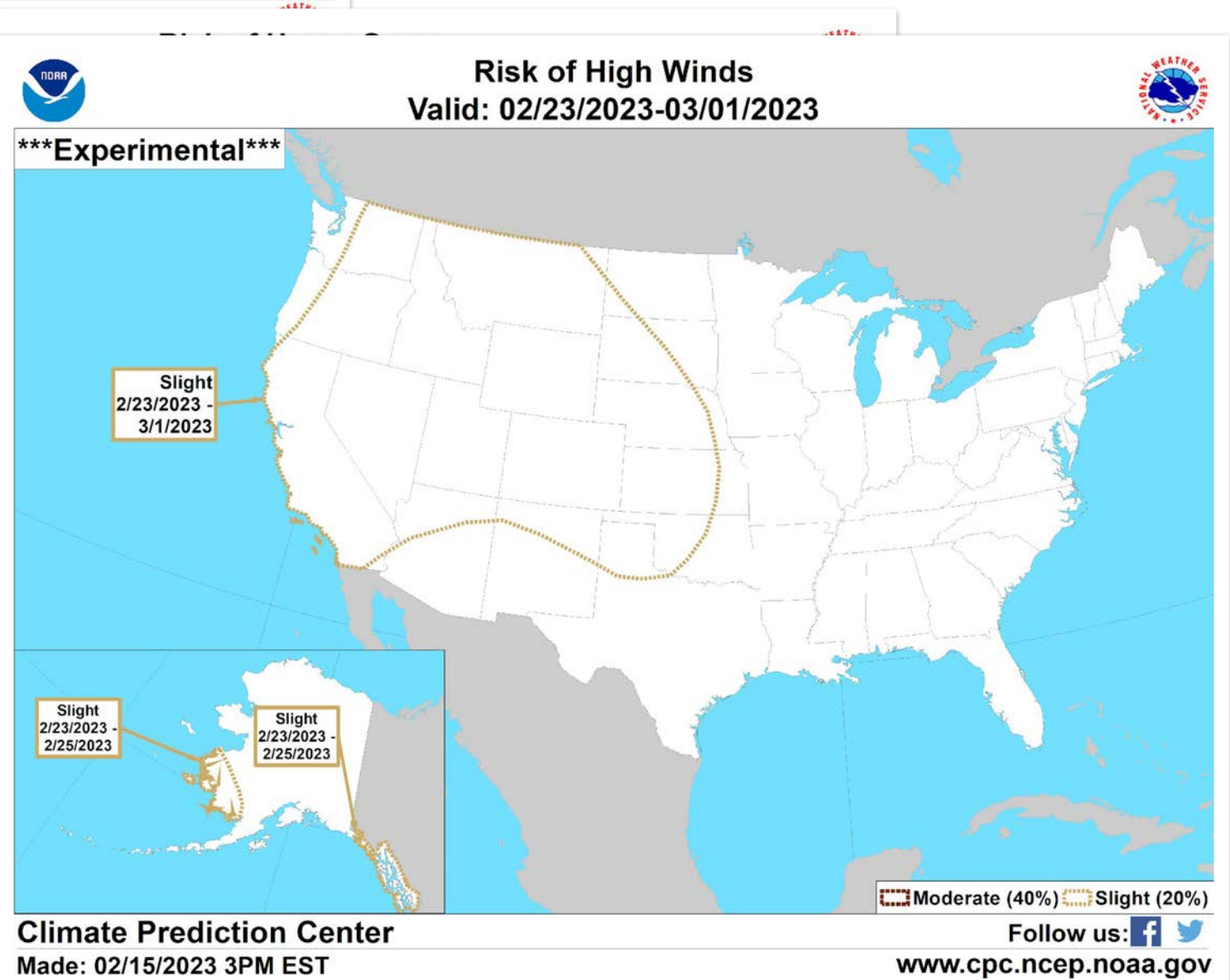
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[www.cpc.ncep.noaa.gov](http://www.cpc.ncep.noaa.gov)



Risk of Ha  
Valid: 0



Risk of High Winds  
Valid: 02/23/2023-03/01/2023

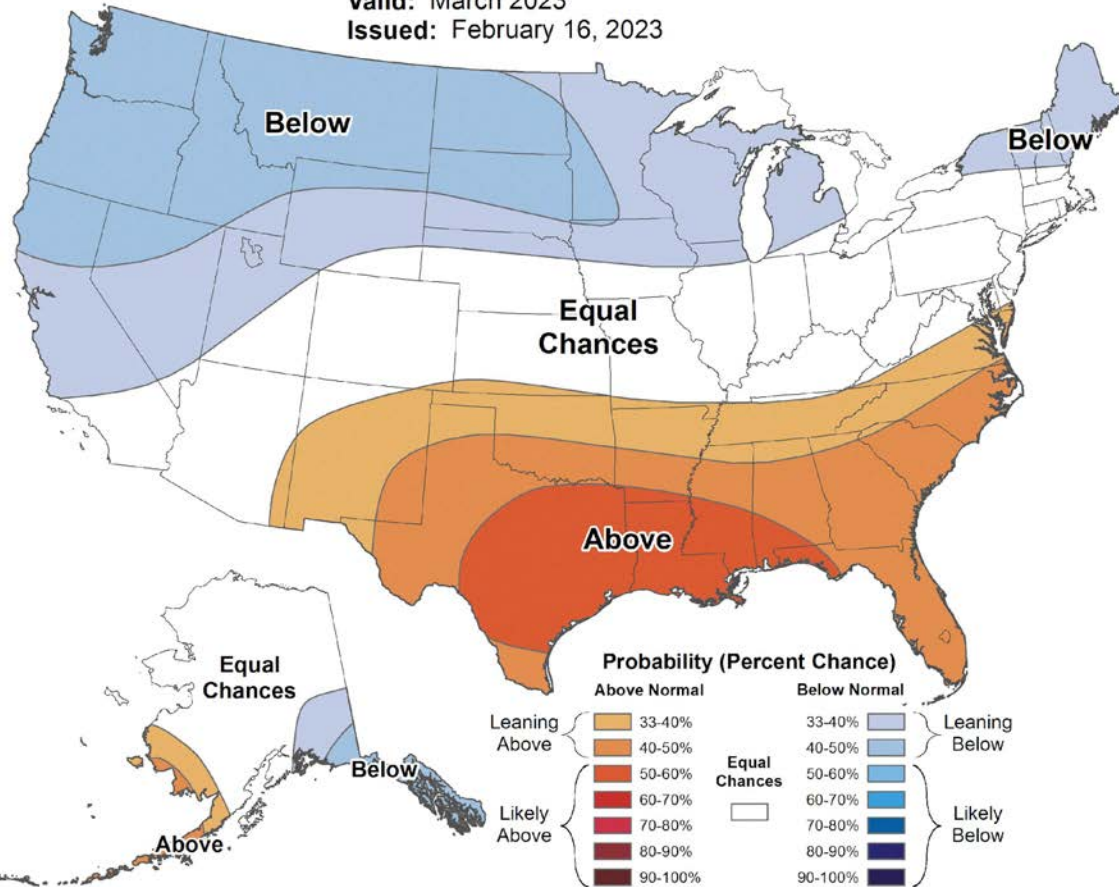




## Monthly Temperature Outlook



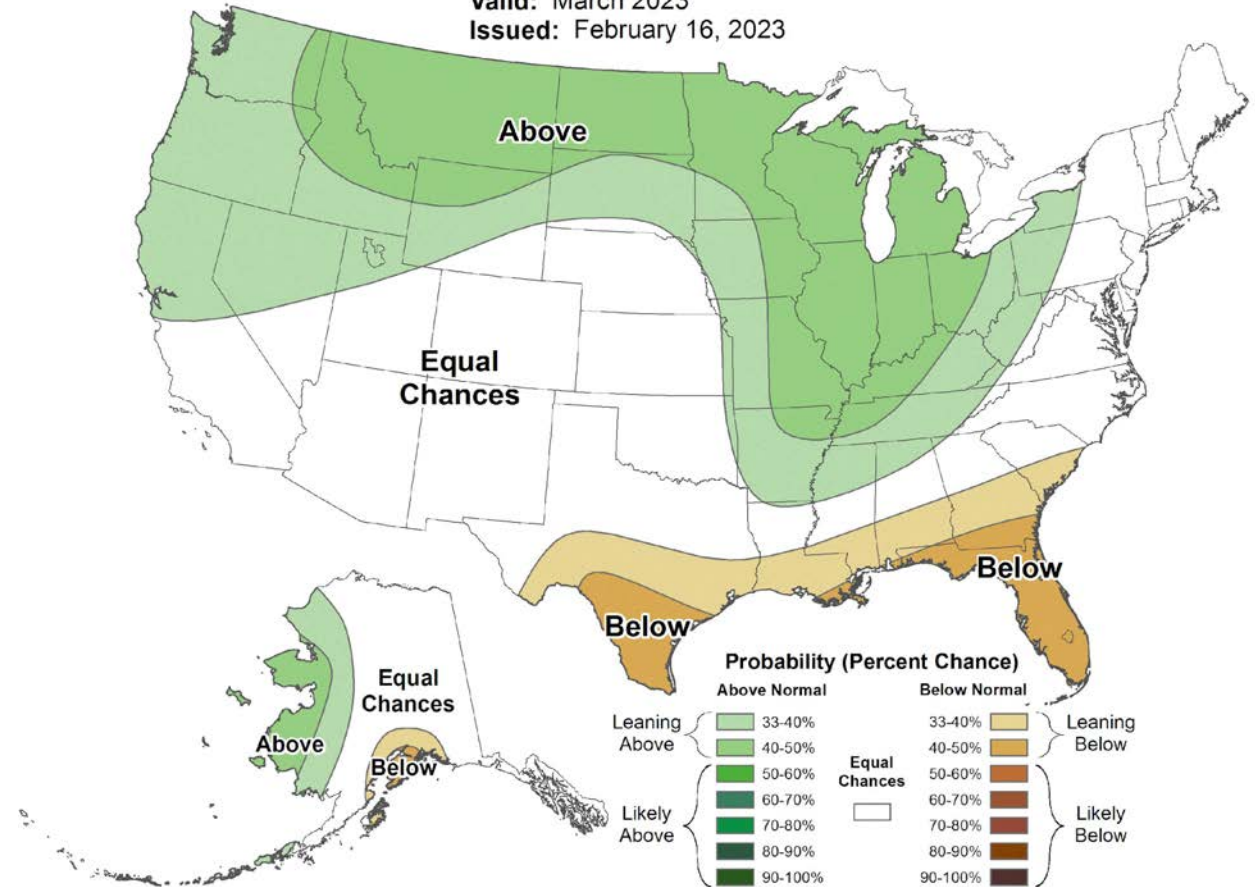
Valid: March 2023  
Issued: February 16, 2023



## Monthly Precipitation Outlook



Valid: March 2023  
Issued: February 16, 2023

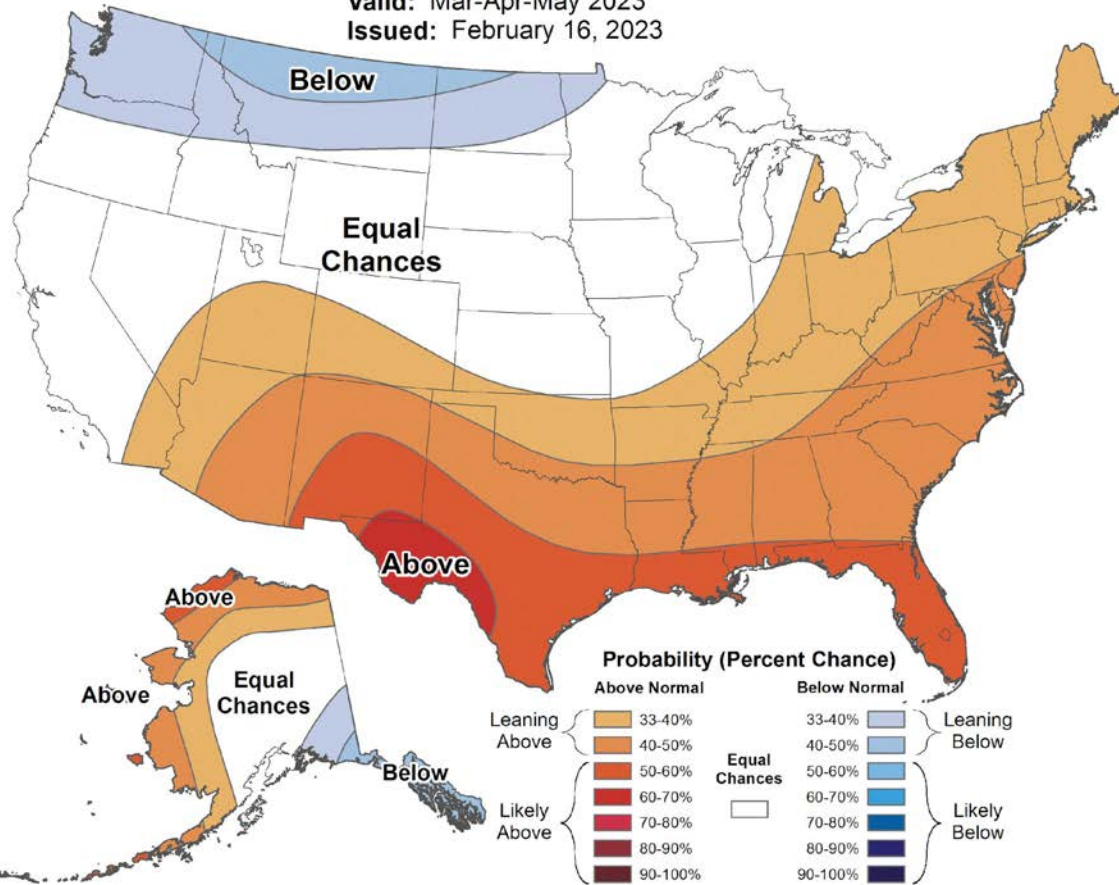




## Seasonal Temperature Outlook



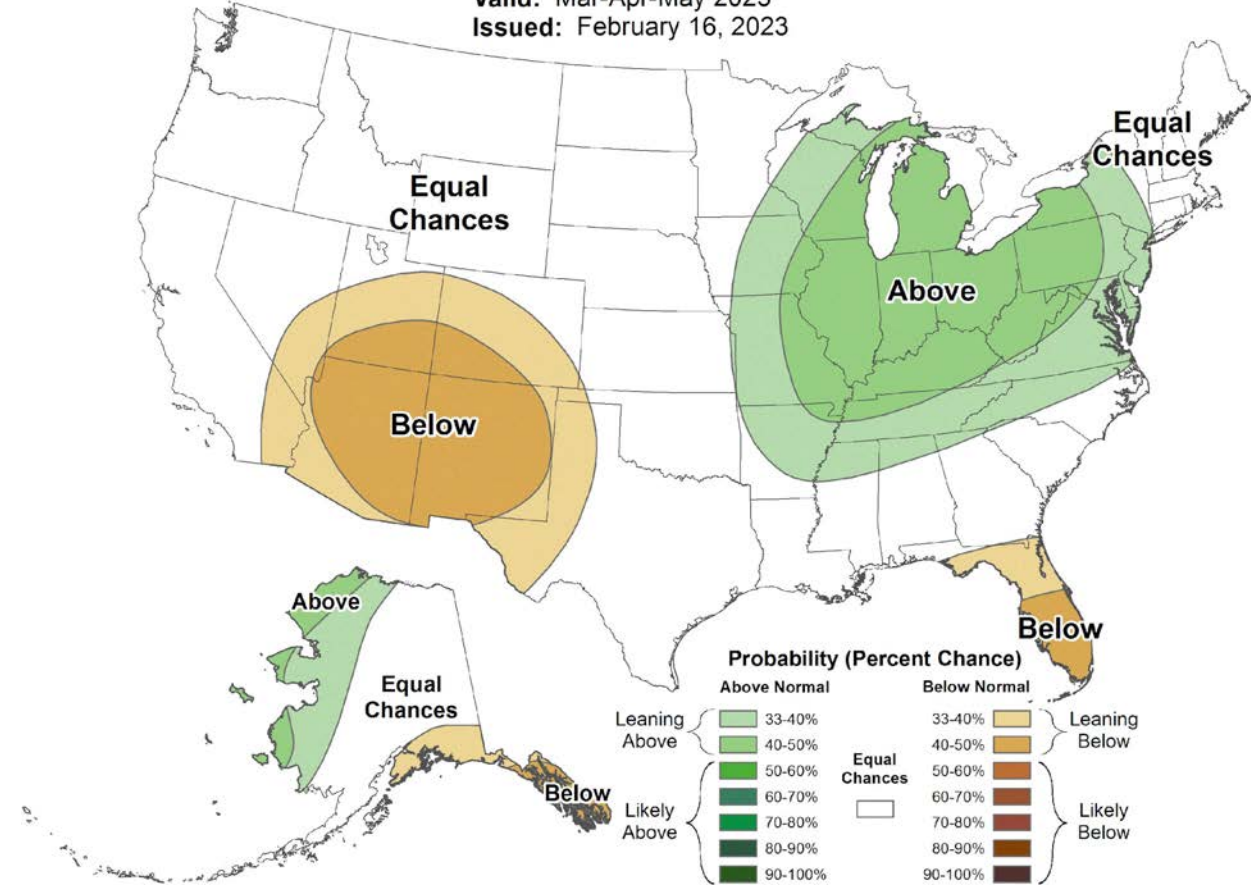
Valid: Mar-Apr-May 2023  
Issued: February 16, 2023



## Seasonal Precipitation Outlook



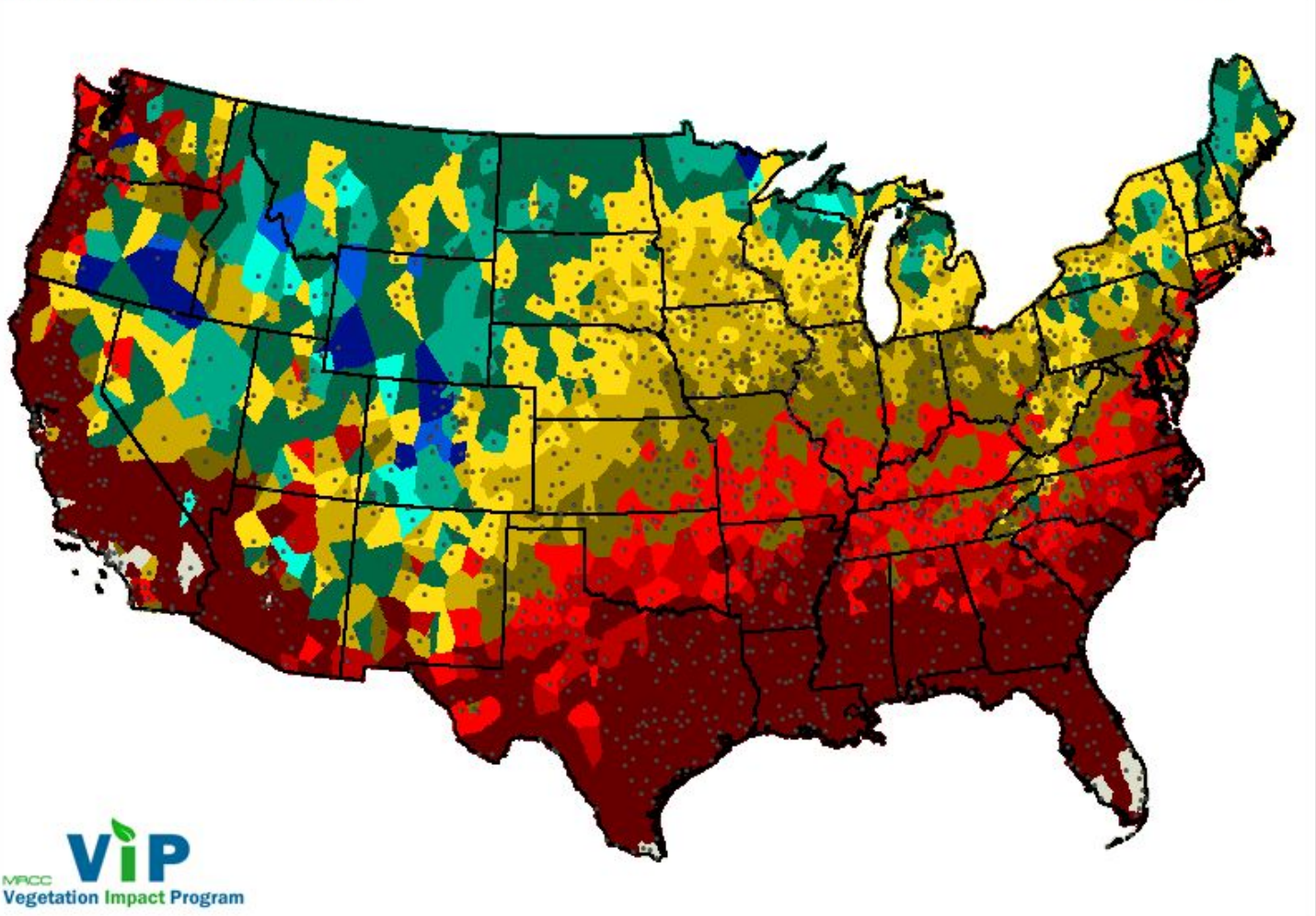
Valid: Mar-Apr-May 2023  
Issued: February 16, 2023



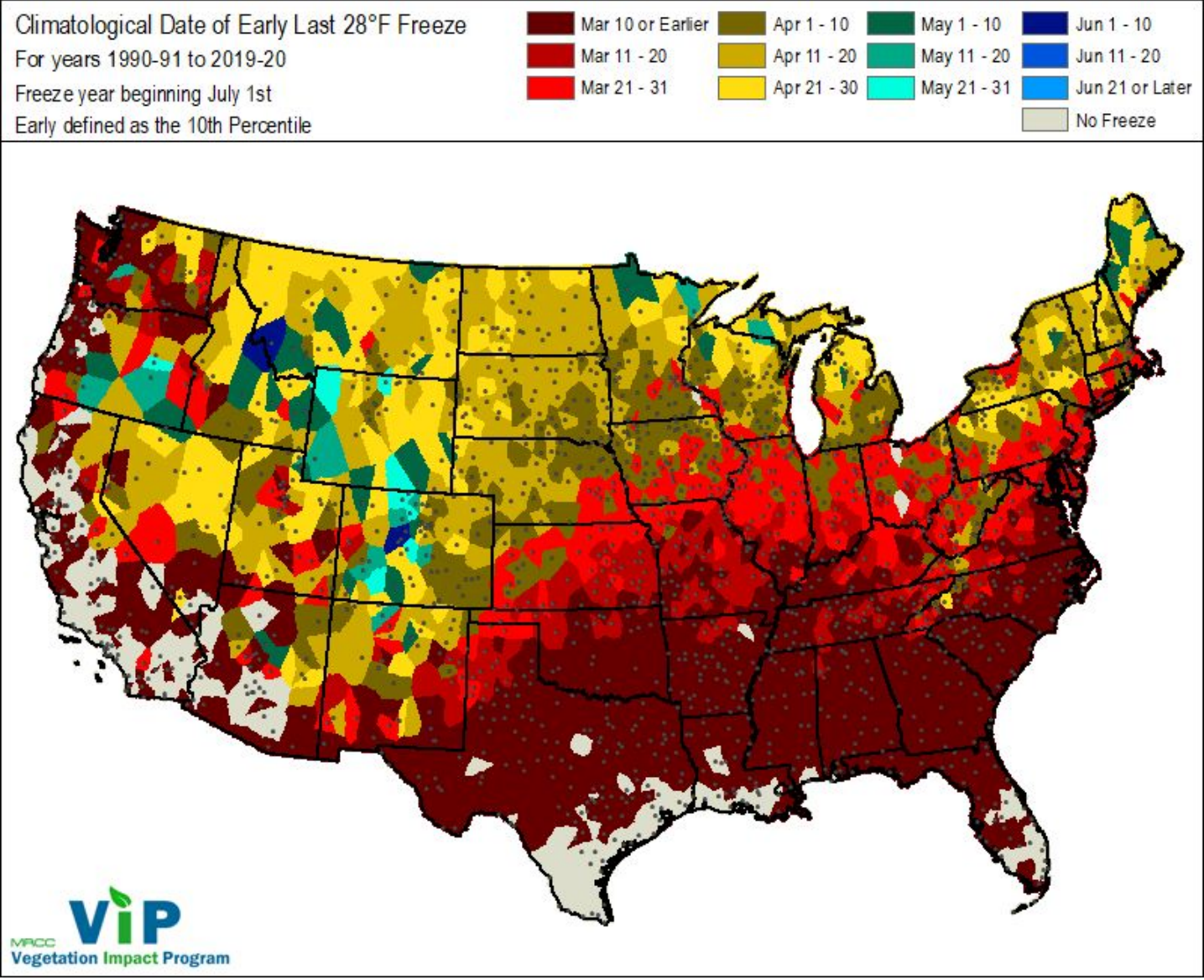
# Typical last freeze dates

Climatological Date of Median Last 28°F Freeze  
For years 1990-91 to 2019-20  
Freeze year beginning July 1st  
Median defined as the 50th Percentile

Mar 10 or Earlier	Apr 1 - 10	May 1 - 10	Jun 1 - 10
Mar 11 - 20	Apr 11 - 20	May 11 - 20	Jun 11 - 20
Mar 21 - 31	Apr 21 - 30	May 21 - 31	Jun 21 or Later
			No Freeze



# Early last freeze dates

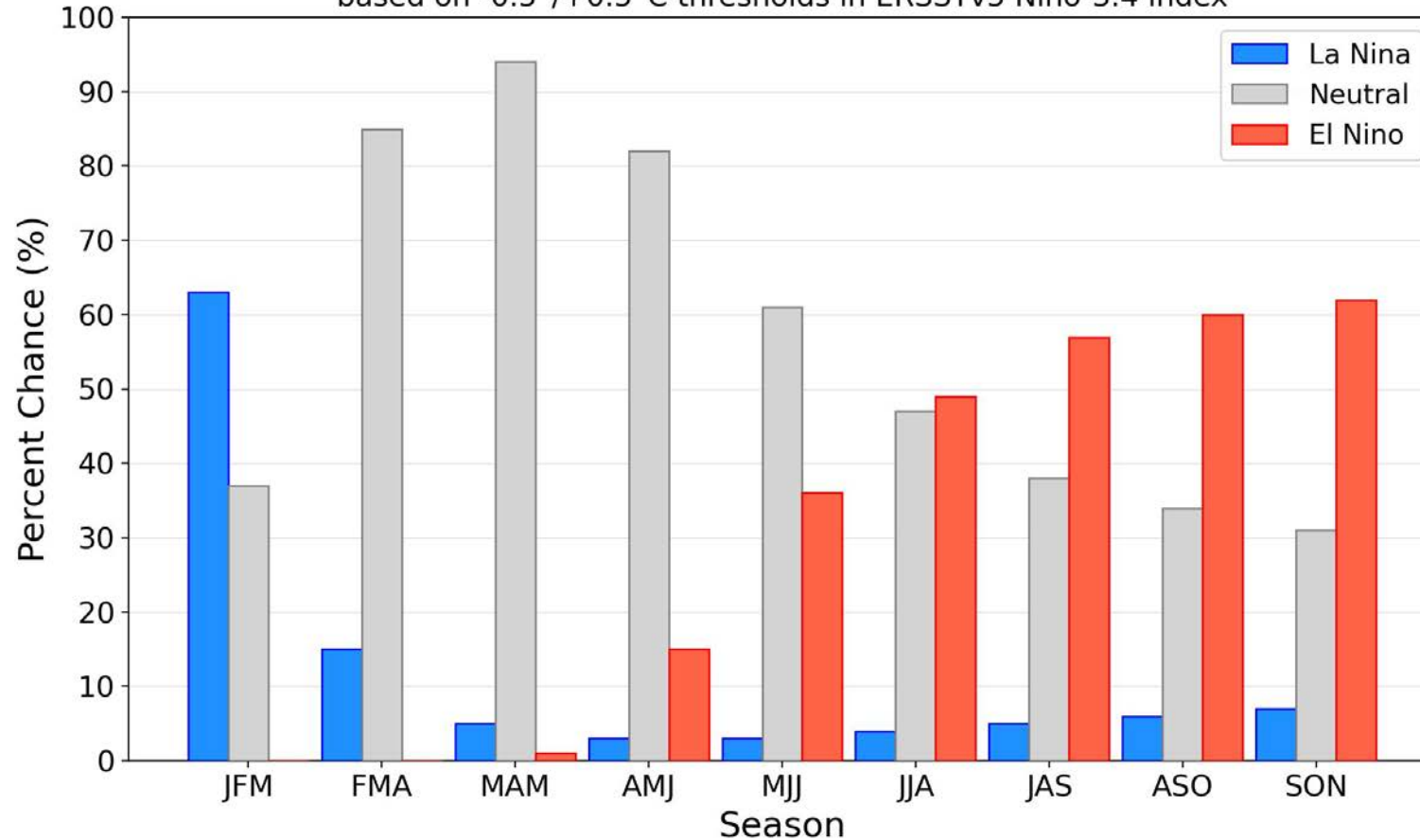




# La Niña is expected to weaken, signs of El Niño making an entrance

## Official NOAA CPC ENSO Probabilities (issued Feb. 2023)

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



IRI/CPC ENSO Forecasts:

<https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/>



# Spring Outlook Key Messages

- ❑ Wetter than average conditions expected over much of the Midwest and Great Lakes region
- ❑ La Niña is weakening and expect a transition to neutral conditions sometime in the spring
- ❑ Late season cold snaps will be a risk, even in the midst of generally warmer than average conditions
- ❑ While flood risk is normal right now, more wet conditions could increase those risks for the eastern half of the region
- ❑ Greater Mississippi Hydrologic Spring Outlook Webinar (Feb 23):  
<https://attendee.gotowebinar.com/register/1233751431124562006>



# Further Information - Partners

- **Today's and Past Recorded Presentations:**
  - <https://mrcc.purdue.edu/multimedia/webinars.jsp>
  - <https://hprcc.unl.edu/webinars.php>
- NOAA's National Centers for Environmental Information: [www.ncdc.noaa.gov](http://www.ncdc.noaa.gov)
  - Monthly climate reports (U.S. & Global): [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)
- Climate Portal: [www.climate.gov](http://www.climate.gov)
- U.S. Drought Portal: [www.drought.gov](http://www.drought.gov)
- National Drought Mitigation Center: <https://drought.unl.edu/>
- State climatologists: <https://www.stateclimate.org>
- Regional climate centers
  - <https://mrcc.purdue.edu>
  - <https://hprcc.unl.edu>





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- **Weather**

- [chroc@noaa.gov](mailto:chroc@noaa.gov)

# Thank you

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