

Central Region Climate & Drought Outlook

18 February 2021

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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 18, 2021 (1 PM CDT), Pat Guinan, State Climatologist, University of Missouri, MO Extension
- **Access to Future Climate Webinars and Information**
 - <http://www.drought.gov/drought/content/regional-programs/regional-drought-webinars>
- **Recordings of Past Webinars**
 - <https://mrcc.illinois.edu/multimedia/webinars.jsp>
 - <https://hprcc.unl.edu/webinars.php>
- **Open for questions at the end**

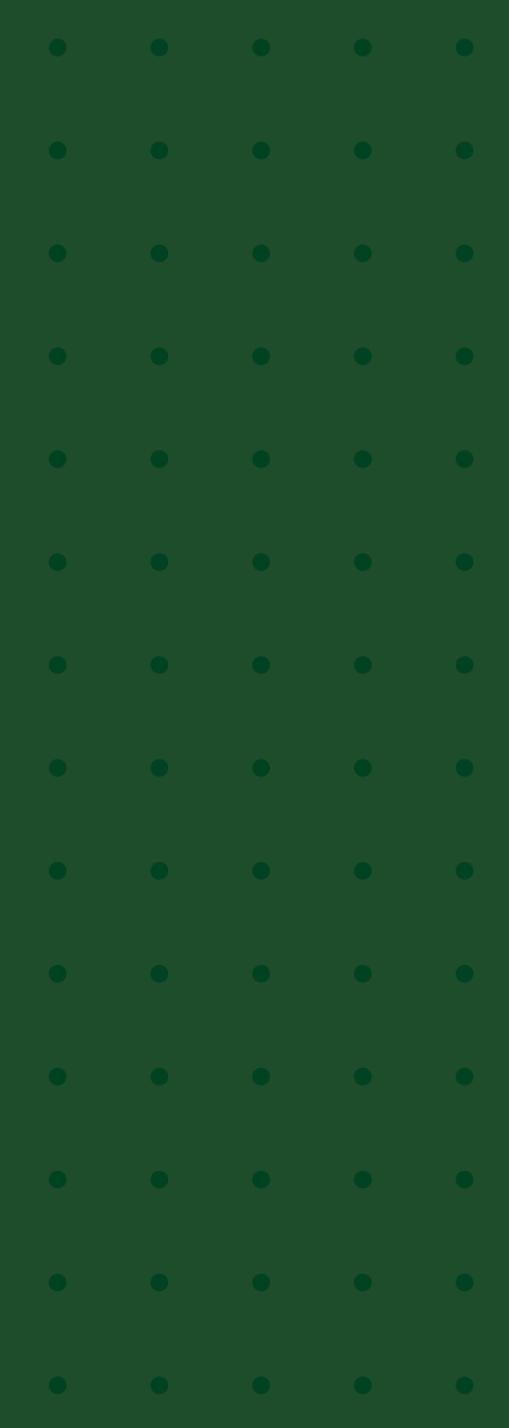


Today's Agenda

- **Recent Conditions**
 - January ranks
 - Extreme February cold
 - Snowpack, ice cover, soils
- **Impacts**
 - Extreme cold, snow, ice
 - Urban, hydrologic, ag
 - Drought impacts
- **Outlooks**
 - La Niña Continues
 - Spring and Potential Impacts

Up close snowflakes – Becky Bolinger

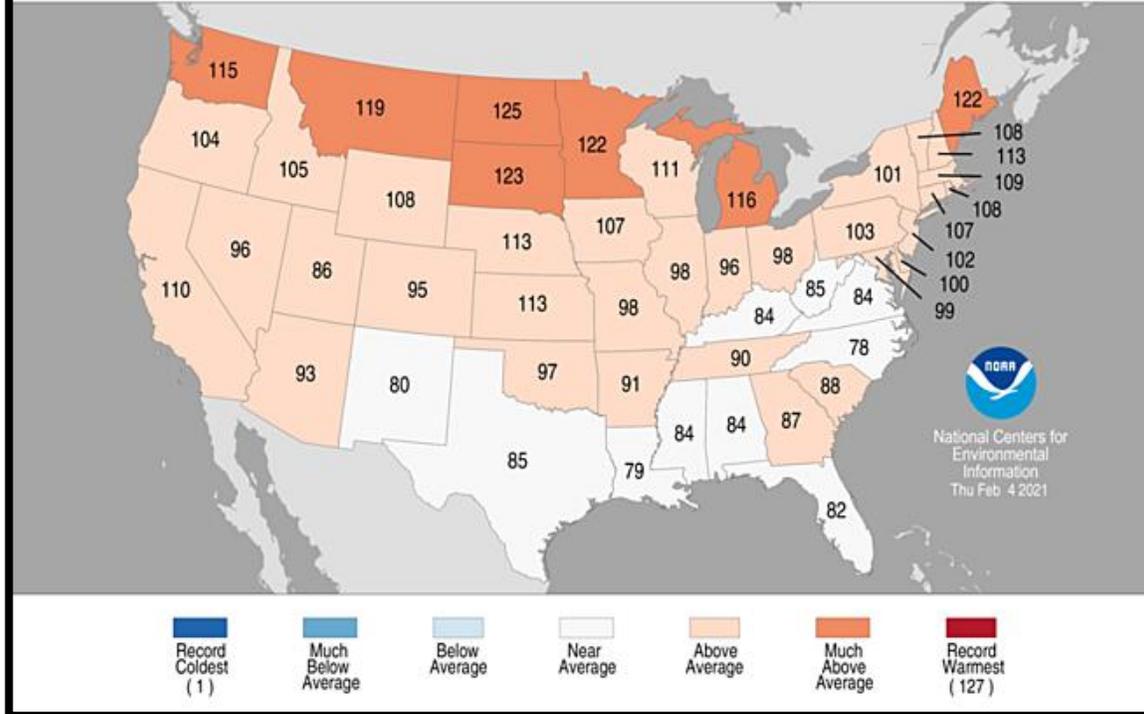




Recent Conditions...

Statewide Average Temperature Ranks

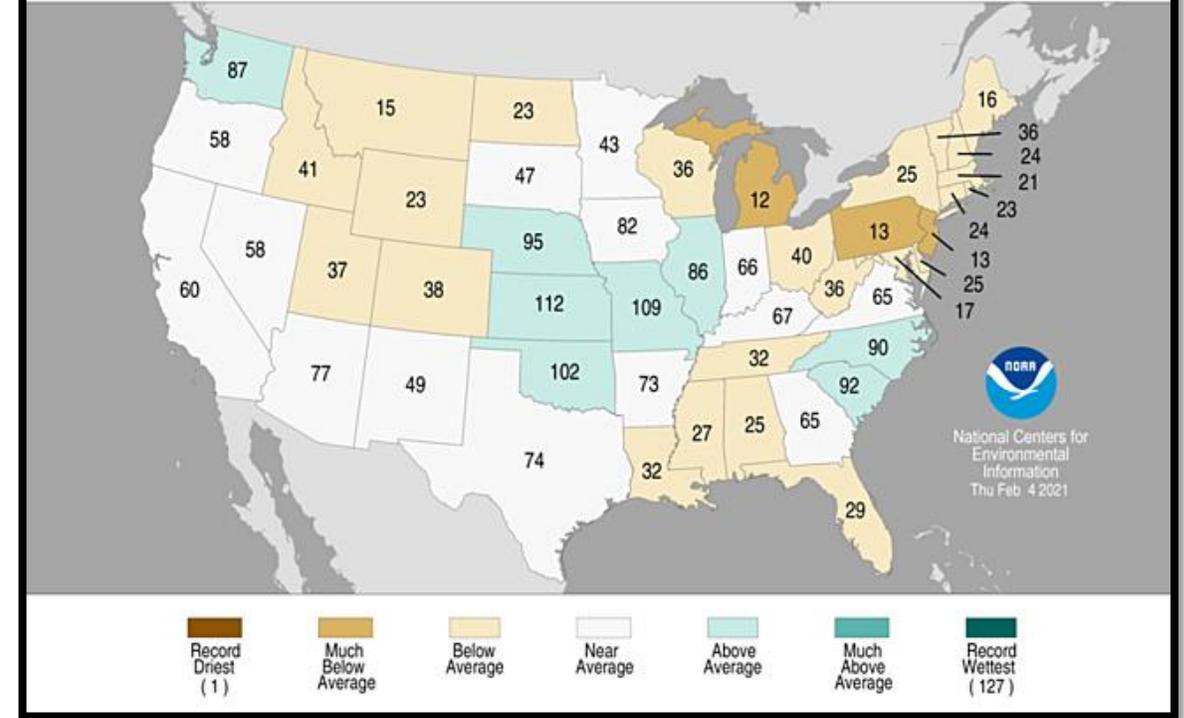
January 2021
Period: 1895–2021



9th warmest January on record for U.S.

Statewide Precipitation Ranks

January 2021
Period: 1895–2021

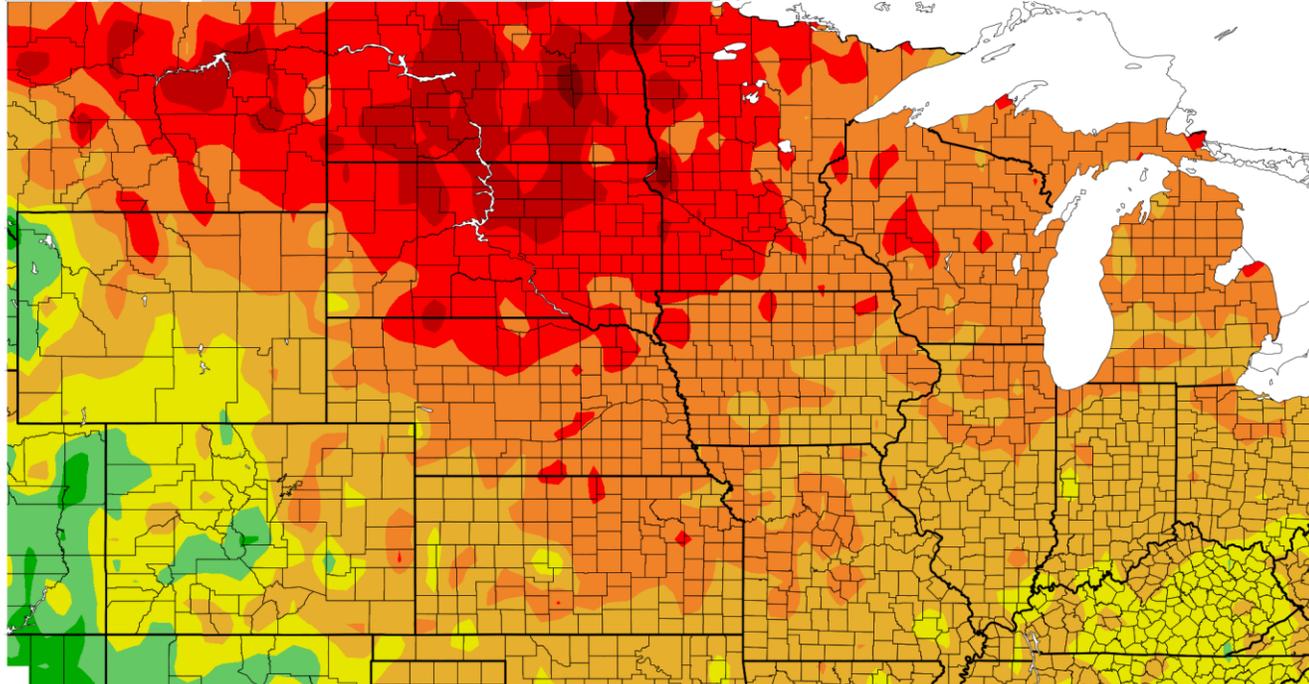


<http://www.ncdc.noaa.gov/temp-and-precip/us-maps/>



Much of the cold season has been warmer than average...

Departure from Normal Temperature (F)
11/1/2020 – 1/31/2021



Generated 2/10/2021 at HPRCC using provisional data.

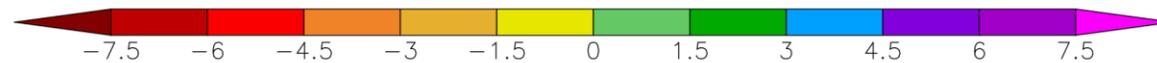
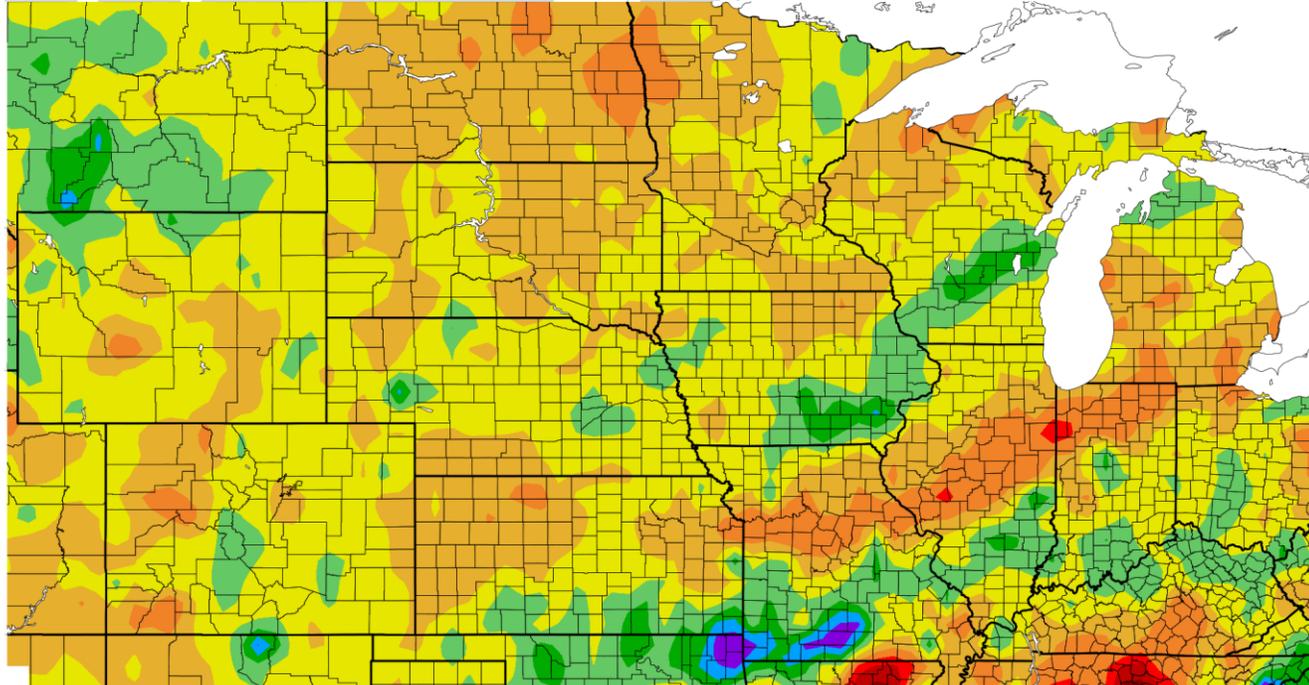
NOAA Regional Climate Centers

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



And a lot of the north central U.S. has been drier than average...

Departure from Normal Precipitation (in)
10/1/2020 – 2/16/2021



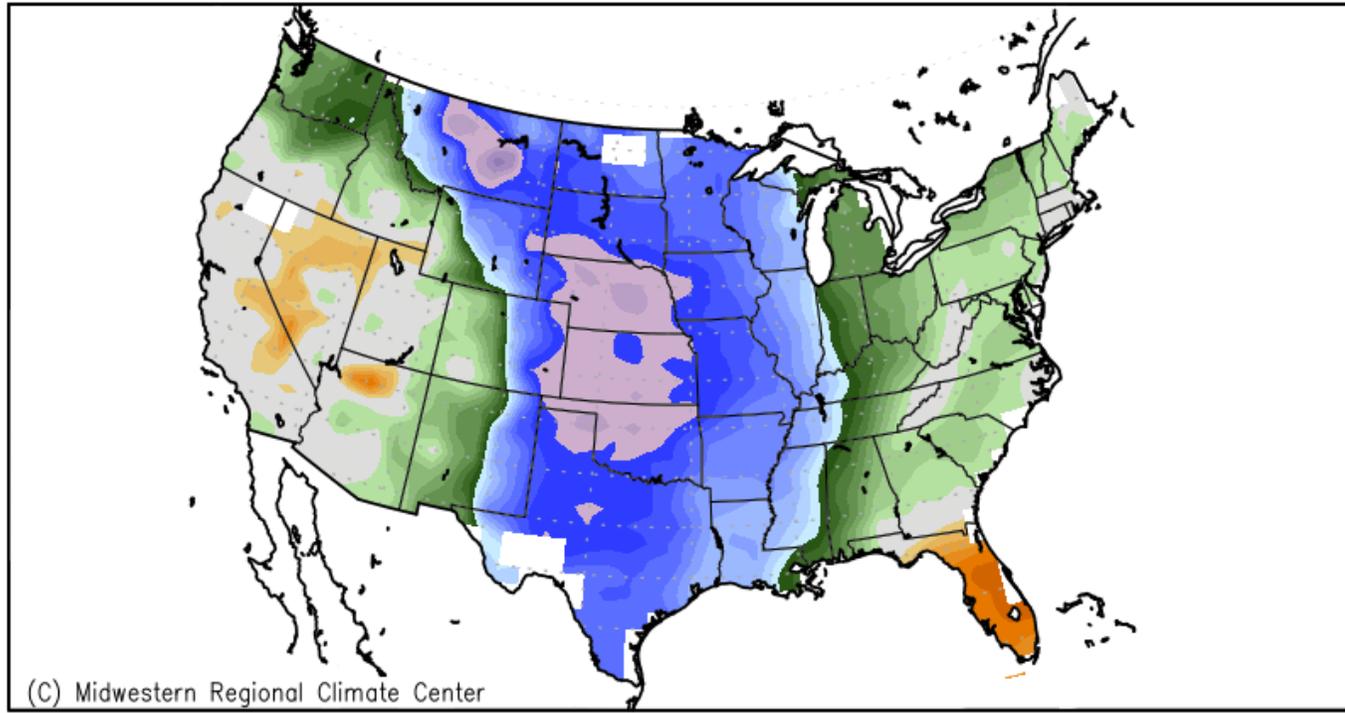
Generated 2/17/2021 at HPRCC using provisional data.

NOAA Regional Climate Centers

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



Average Temperature (°F): Departure from Mean February 12, 2021 to February 16, 2021



Mean period is 1981–2010.



Midwestern Regional Climate Center
Illinois State Water Survey, Prairie Research Institute
University of Illinois at Urbana–Champaign

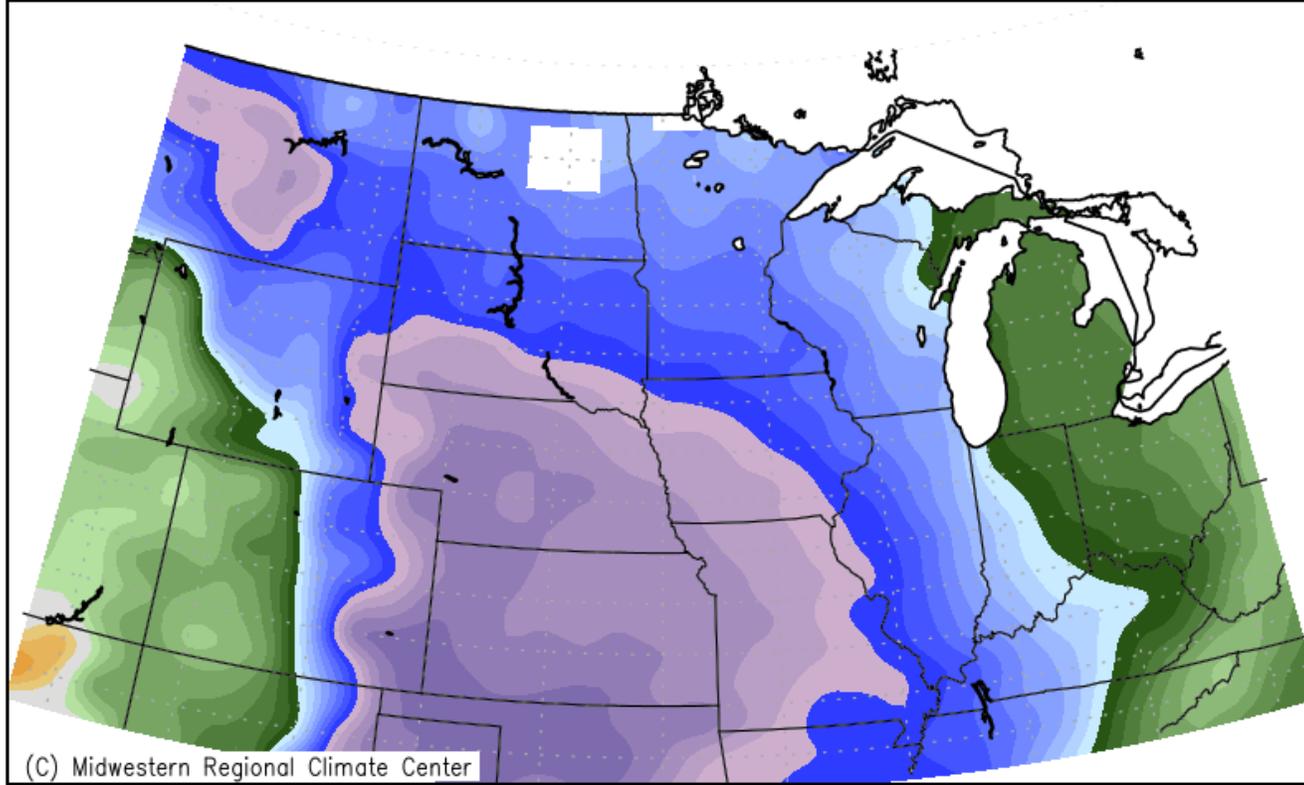
A major cold event swept across the country over the last week.

Cold extremes were observed across the entire Central Region.

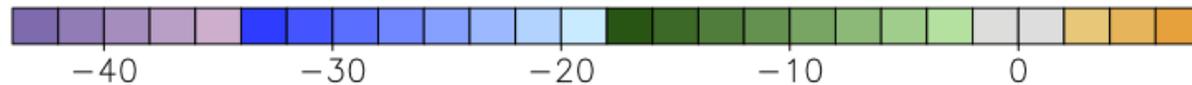
<https://mrcc.illinois.edu/CLIMATE/>



Average Maximum Temp. (°F): Departure from Mean February 12, 2021 to February 16, 2021



Mean period is 1981–2010.



Midwestern Regional Climate Center

Illinois State Water Survey, Prairie Research Institute

University of Illinois at Urbana–Champaign

Both maximum and minimum temperatures have been well below average for February.

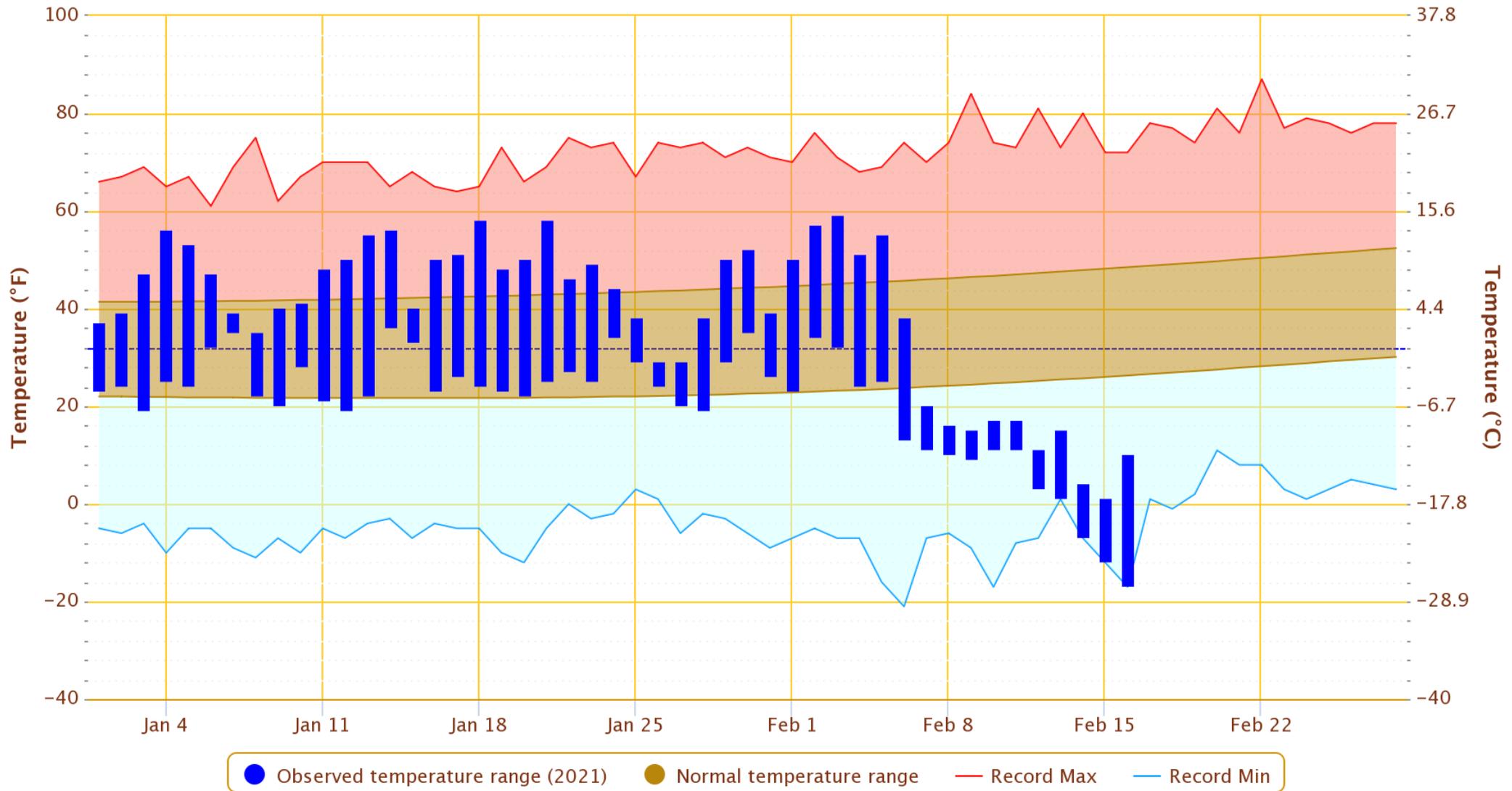
In the Central Region, maximum temperatures were as much as 40° below normal or more, averaged over the 4 days of February 12-16.

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



Daily Temperature Data – WICHITA DWIGHT D. EISENHOWER NATIONAL AIRPORT, KS

Period of Record – 1953-12-01 to 2021-02-16. Normals period: 1981-2010. Click and drag to zoom chart.

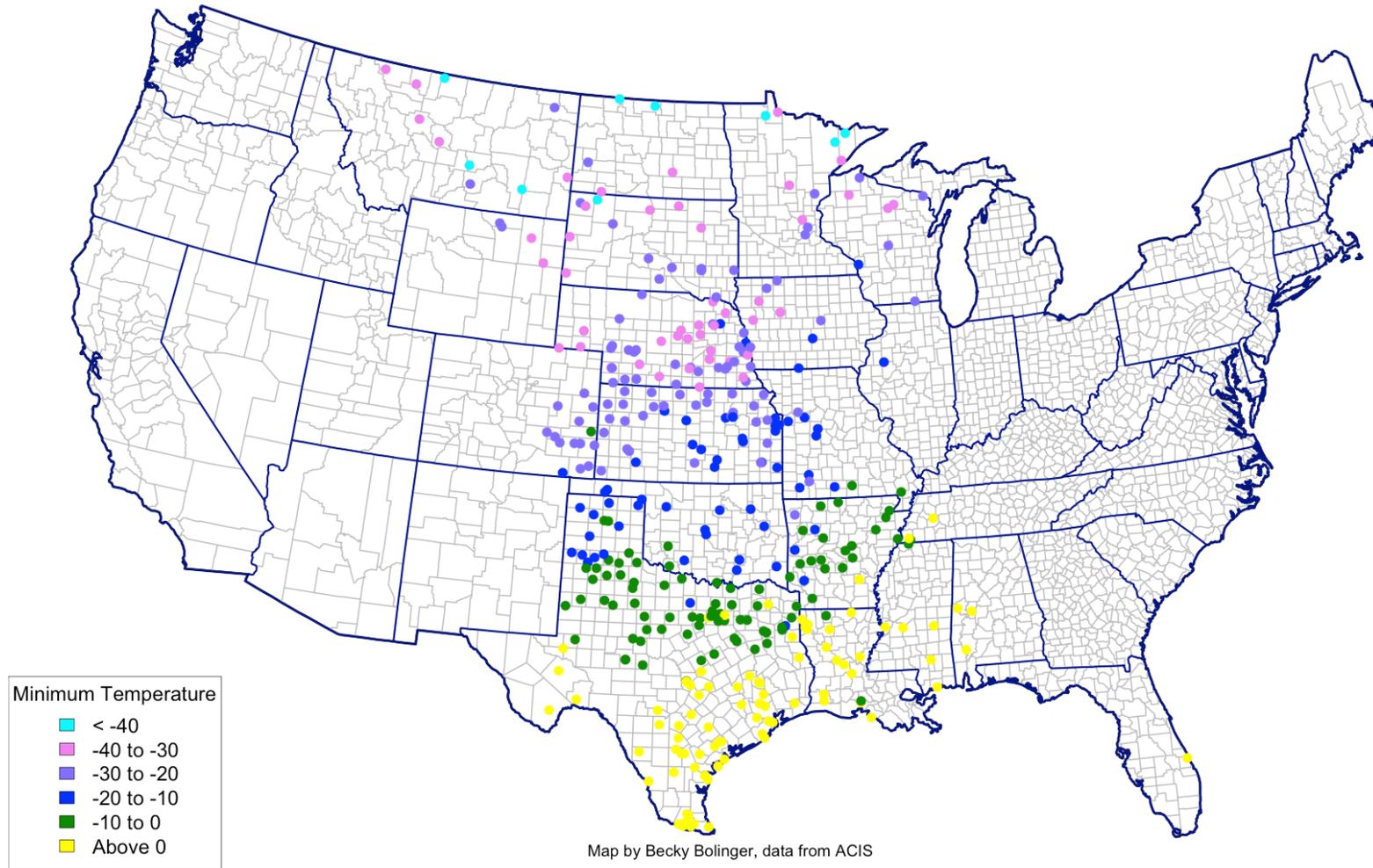


Powered by ACIS



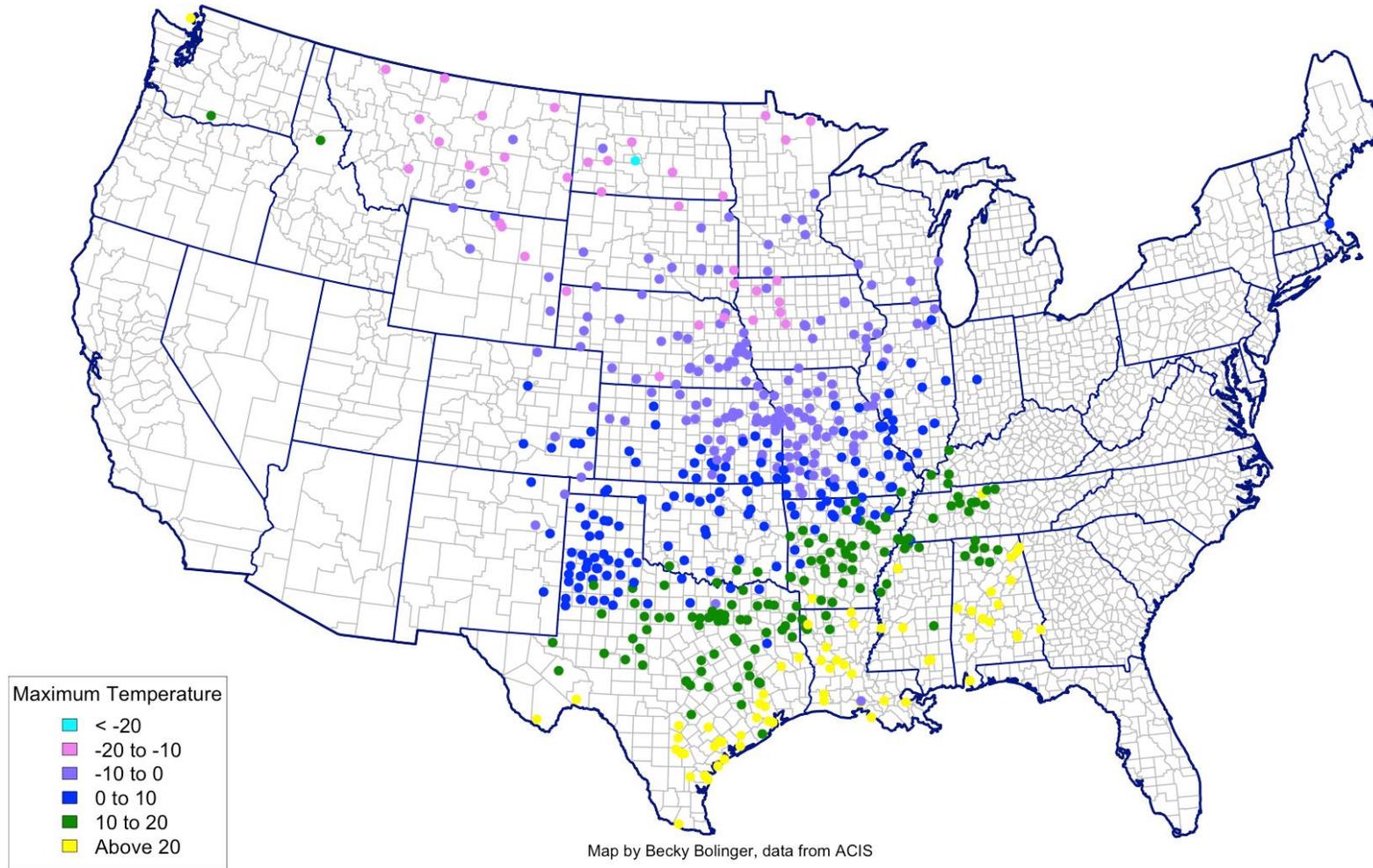
Was the cold record breaking?

New February Record Low Minimum Temperature



Was the cold record breaking?

New February Record Low Maximum Temperature



Was the cold record breaking?

U.S. Daily Records Summary

PERIOD	HIGH MAX	HIGH MIN	LOW MAX	LOW MIN	PRECIPITATION	SNOWFALL	SNOW DEPTH
Last 7 Days	22	68	1954	809	219	138	0
Last 30 Days	514	876	3009	1217	1671	1092	0
Last 365 Days	32543	35599	21380	16254	20864	6592	0
Month to Date	366	492	2591	1036	668	608	0
Year to Date	1258	1783	3043	1251	2474	1376	0

<https://www.ncdc.noaa.gov/cdo-web/datatools/records>



Was the cold record breaking?

U.S. Daily Records Summary

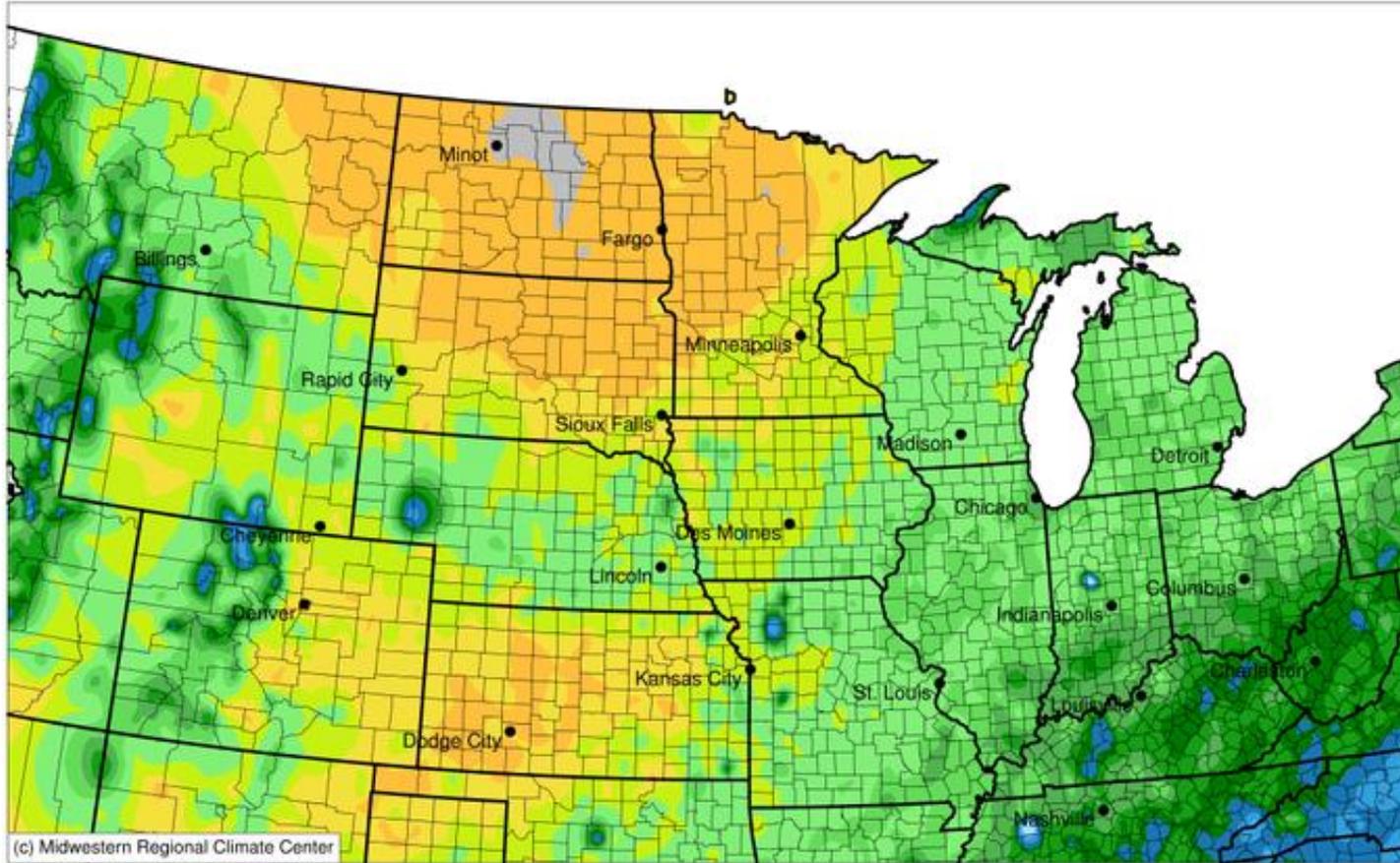
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<https://www.ncdc.noaa.gov/cdo-web/datatools/records>



Accumulated Precipitation (in)

February 01, 2021 to February 18, 2021



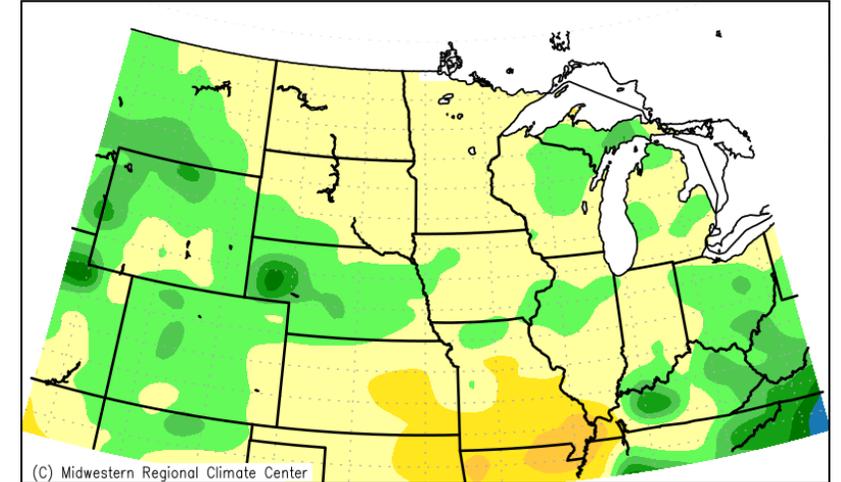
(c) Midwestern Regional Climate Center



0.01 0.1 0.25 0.5 1 1.5 2 2.5 3 4 5 6 8

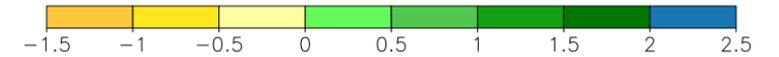
Stations from the following networks used: WBAN, COOP, FAA, GHCN, ThreadEx, CoCoRaHS, WMO, ICAO, NWSLI, Missouri FSA, Missouri Mesonet, Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment
Generated at: 2/18/2021 12:33:09 AM CST

Accumulated Precipitation (in): Departure from Mean
February 1, 2021 to February 18, 2021



(C) Midwestern Regional Climate Center

Mean period is 1981-2010.

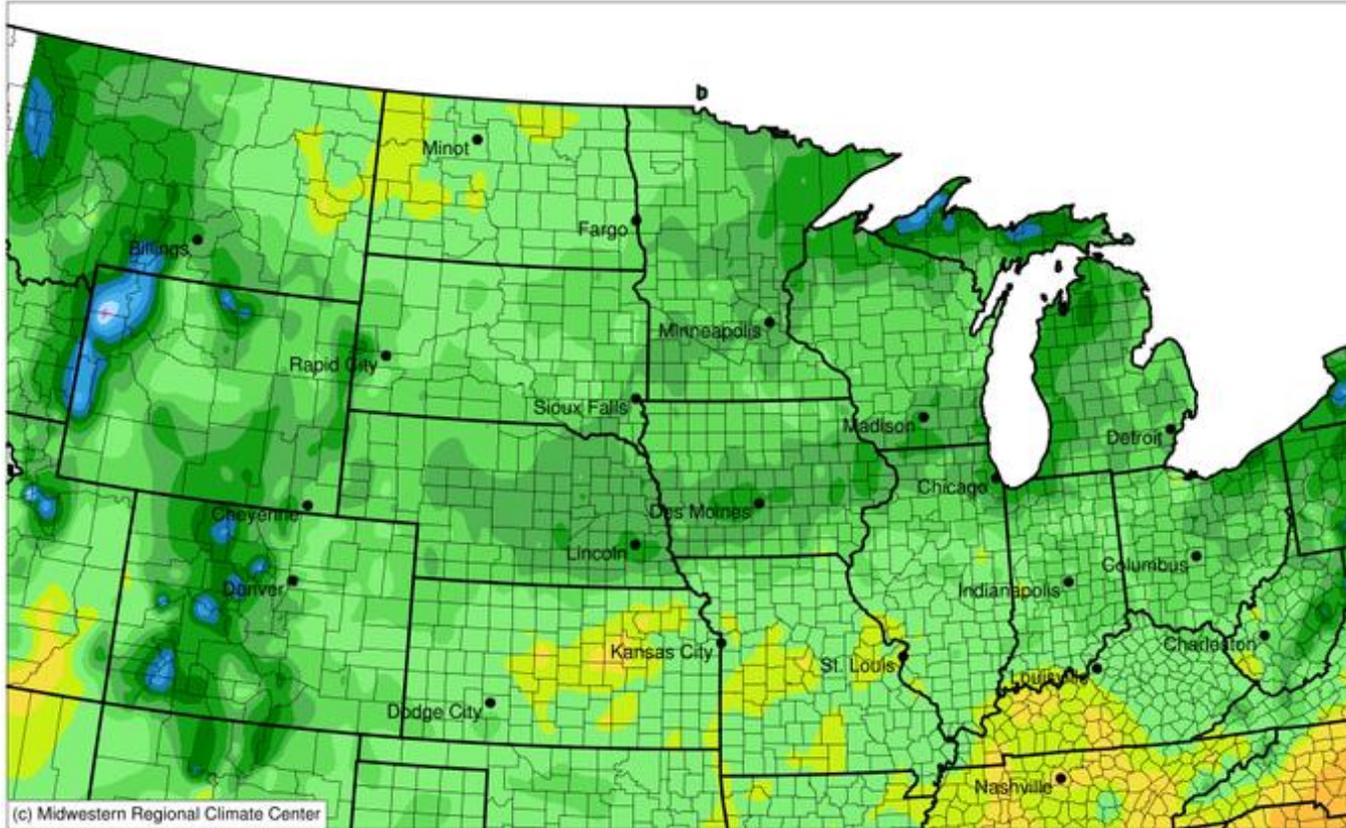


<https://mrcc.illinois.edu/CLIMATE/>



Accumulated Snowfall (in)

October 01, 2020 to February 18, 2021

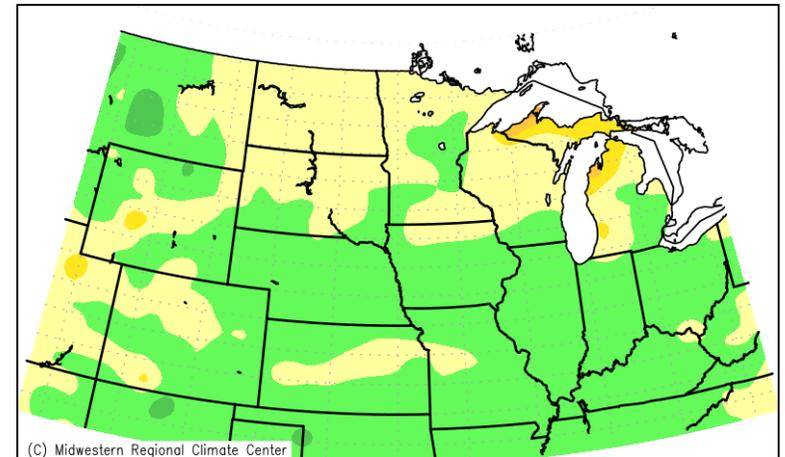


Recent snow has increased seasonal snowfall.

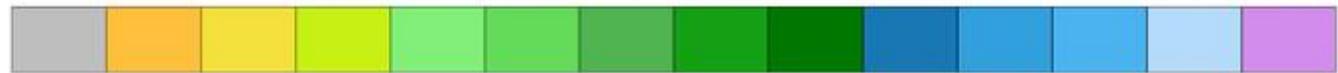
Areas in the dark green have ample seasonal snowfall totals compared to normal.

Snowfall in eastern CO is closer to average and a bit low in the Dakotas.

Accumulated Snowfall (in): Departure from Mean
October 1, 2020 to February 18, 2021



Mean period is 1981-2010.



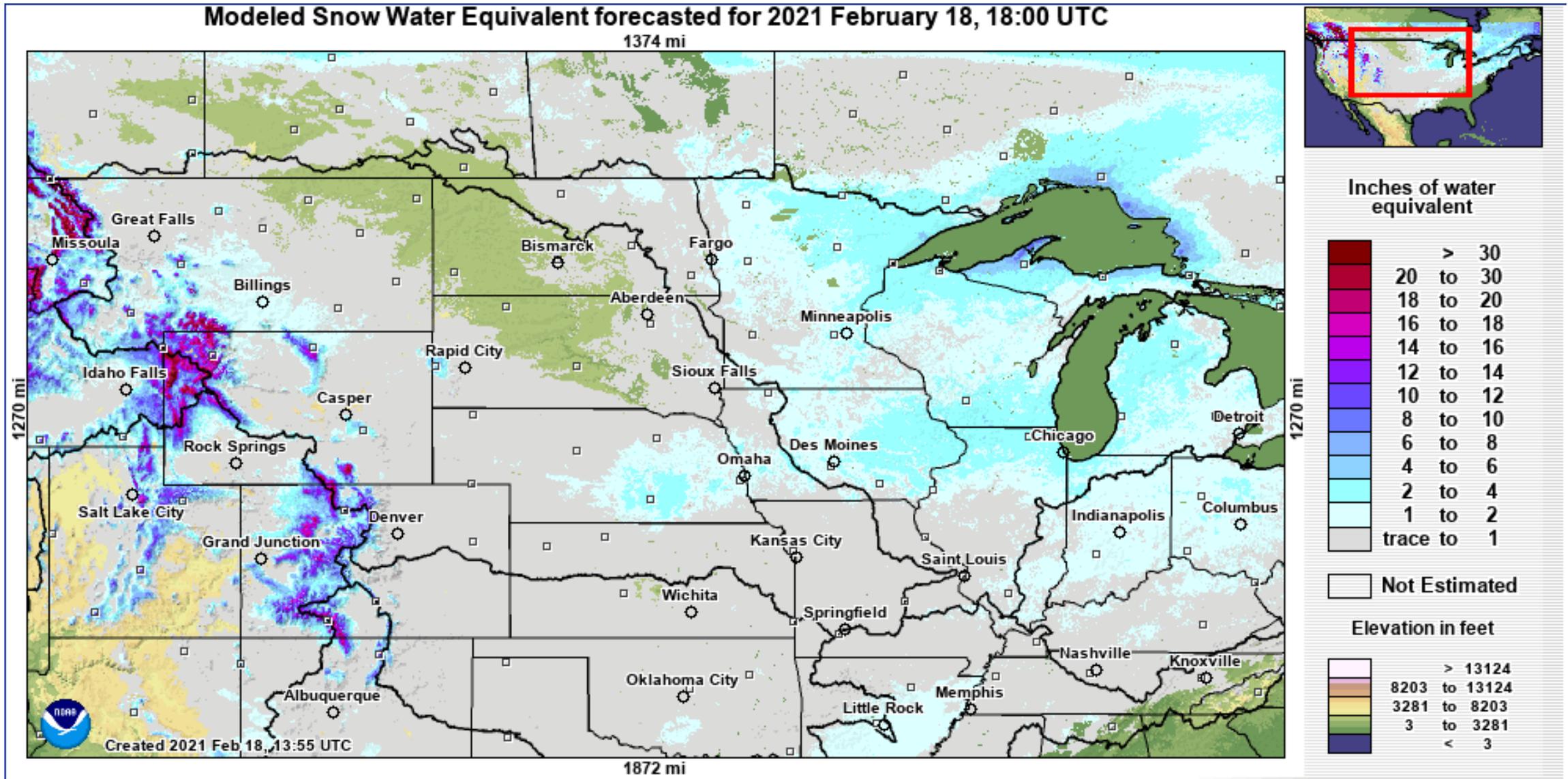
0.01 1 5 10 20 30 40 60 80 100 125 150 175

Stations from the following networks used: WBAN, COOP, FAA, GHCN, ThreadEx, CoCoRaHS, WMO, ICAO, NWSLI, Missouri FSA, Missouri Mesonet, Midwestern Regional Climate Center
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<https://mrcc.illinois.edu/CLIMATE/>

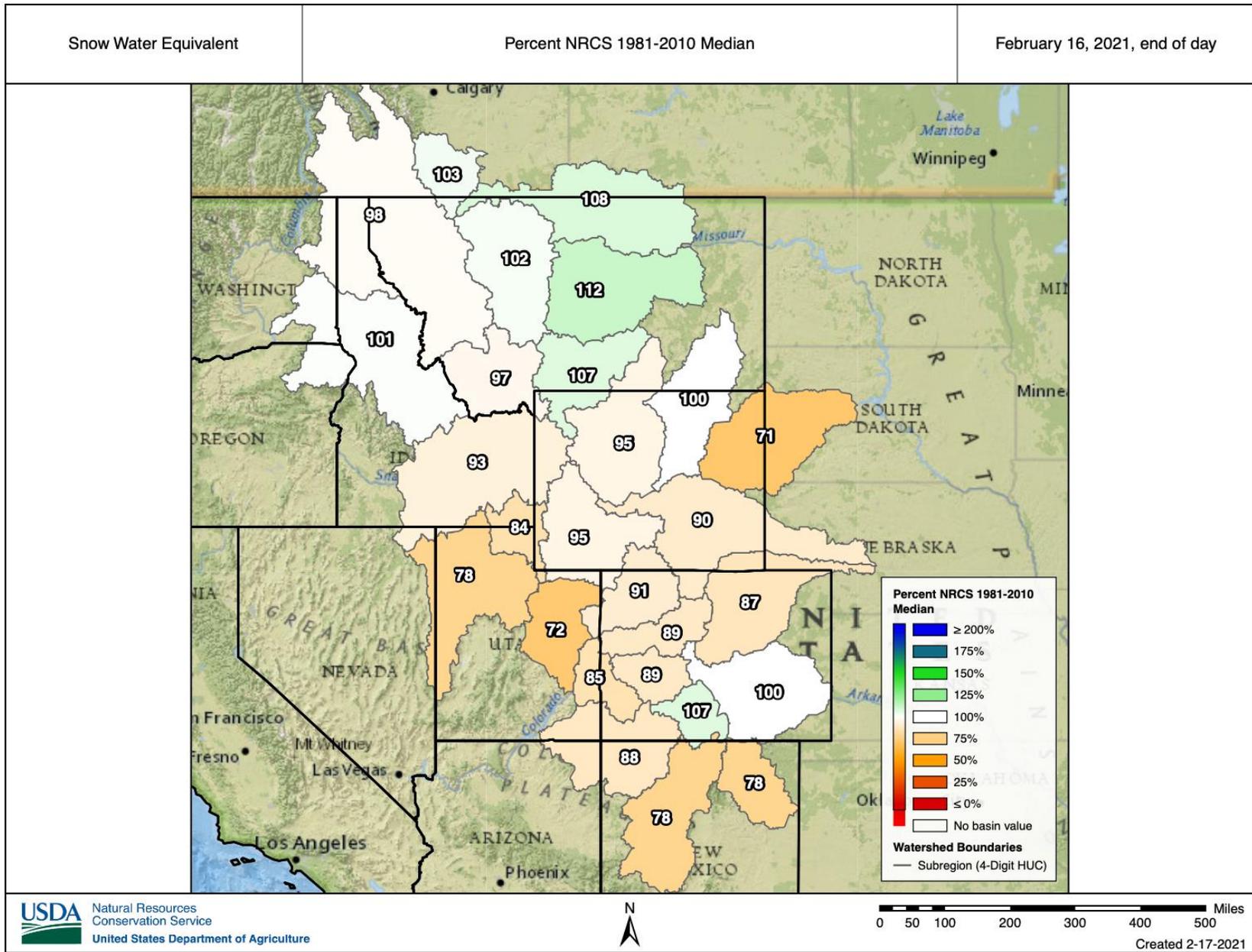


2-4 inches of snowpack in Upper Midwest, 10-20 inches in the Rockies



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



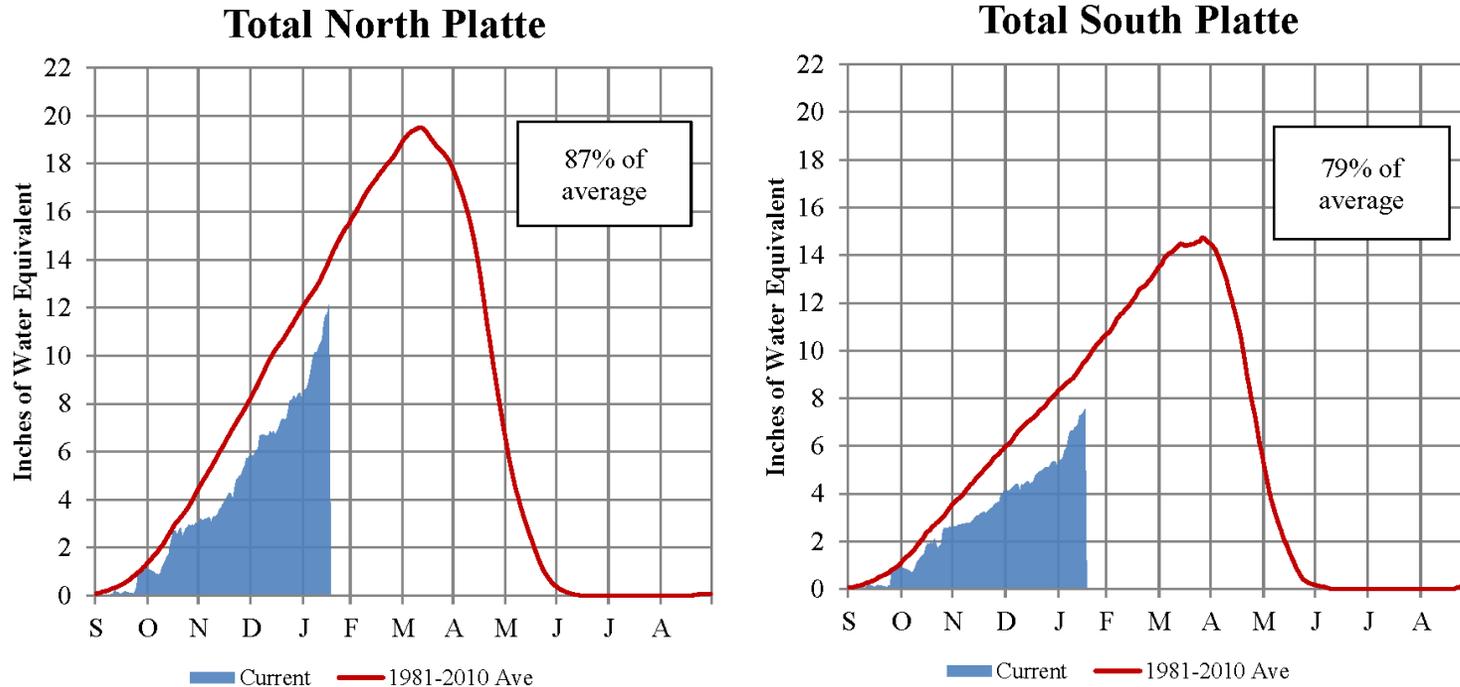


<https://www.nrcs.usda.gov/wps/portal/wcc/home/imap/>



Platte River Basin - Mountain Snowpack Water Content Water Year 2020-2021

February 16, 2021



The North and South Platte River Basin mountain snowpacks normally peak near April 15 and the end of April, respectively. As of February 15, 2021, the mountain snowpack SWE in the "Total North Platte" reach is currently 12.1", 87% of average. The mountain snowpack SWE in the "Total South Platte" reach is currently 7.5", 79% of average.

Source: USDA, Natural Resource Conservation Service

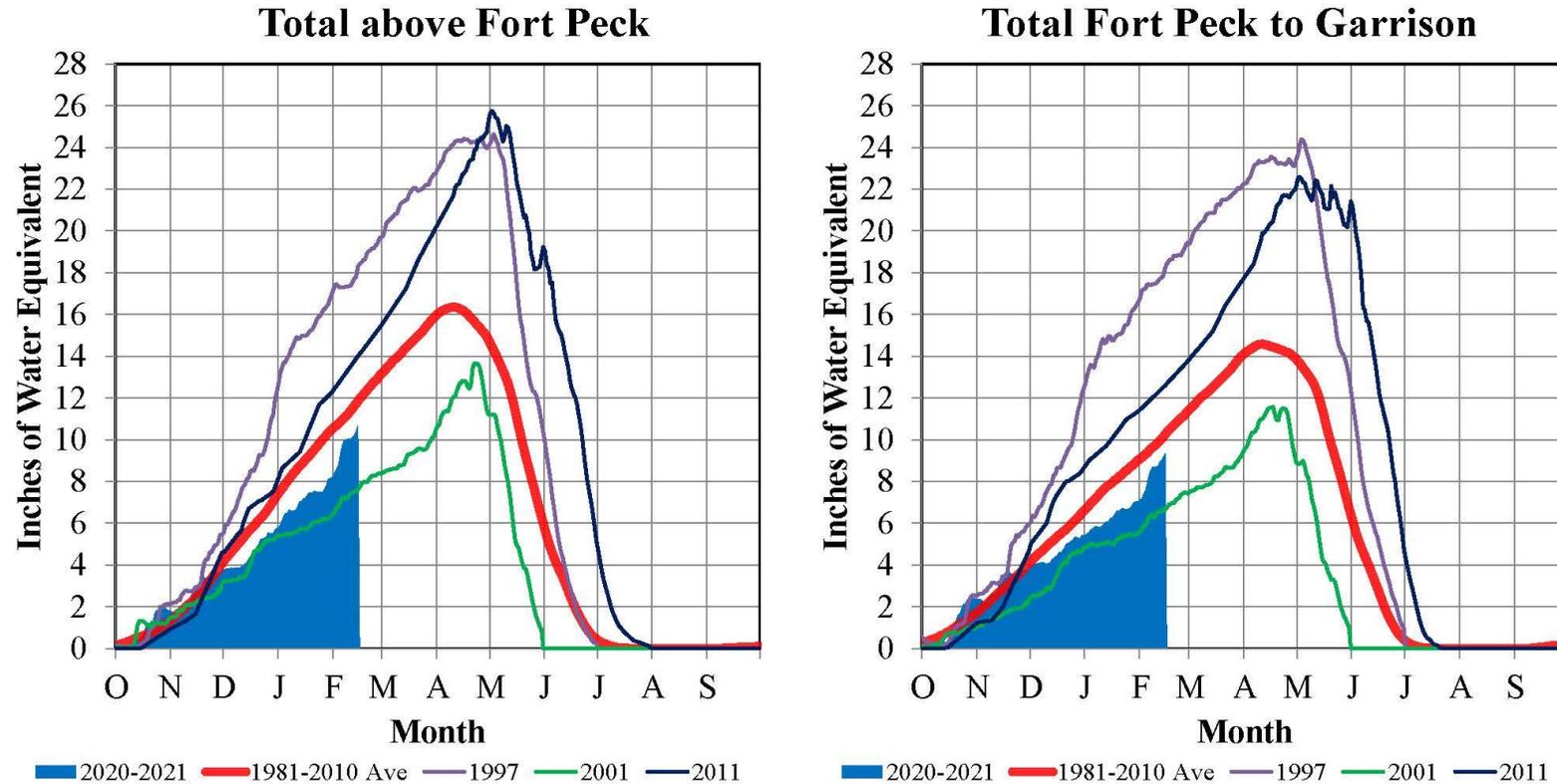
Provisional Data. Subject to Revision

https://www.nwd-mr.usace.army.mil/rcc/reports/platte_snow.png



Missouri River Basin – Mountain Snowpack Water Content 2020-2021 with comparison plots from 1997*, 2001*, and 2011

15-Feb-2021



On February 15, 2021 the mountain Snow Water Equivalent (SWE) in the “Total above Fort Peck” reach was 10.7”, 90% of the February 15, average. On February 15, 2021 the mountain SWE in the “Fort Peck to Garrison” reach was 9.3”, 91% of the February 15 average. The normal peak for both reaches is near April 15.

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

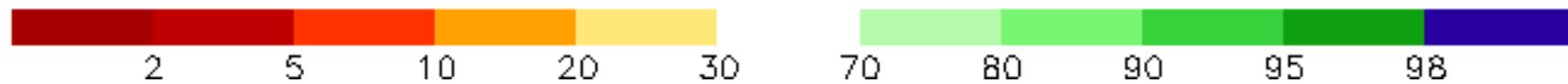
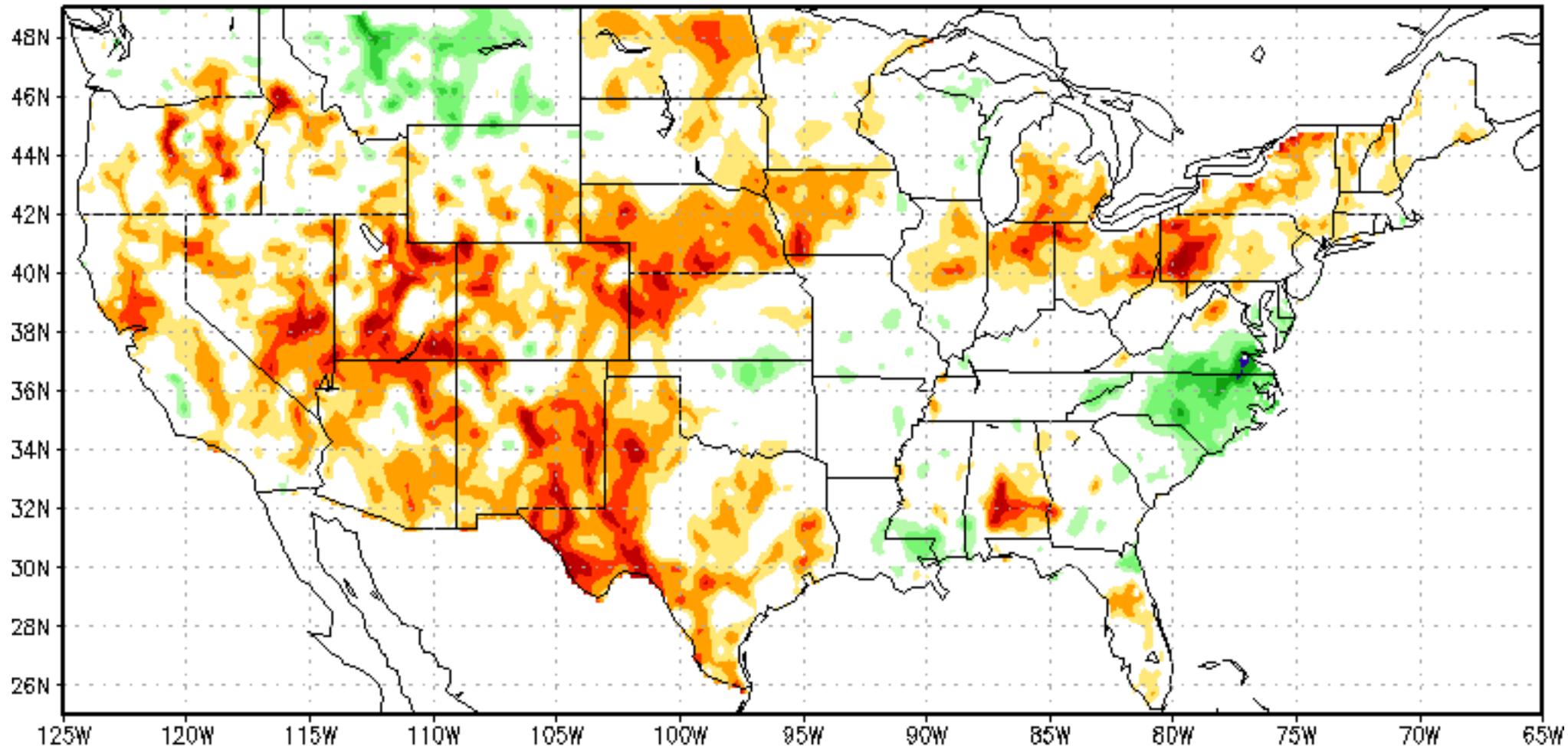
Provisional data. Subject to revision.



Ensemble-Mean

Current SMP

13Feb2021

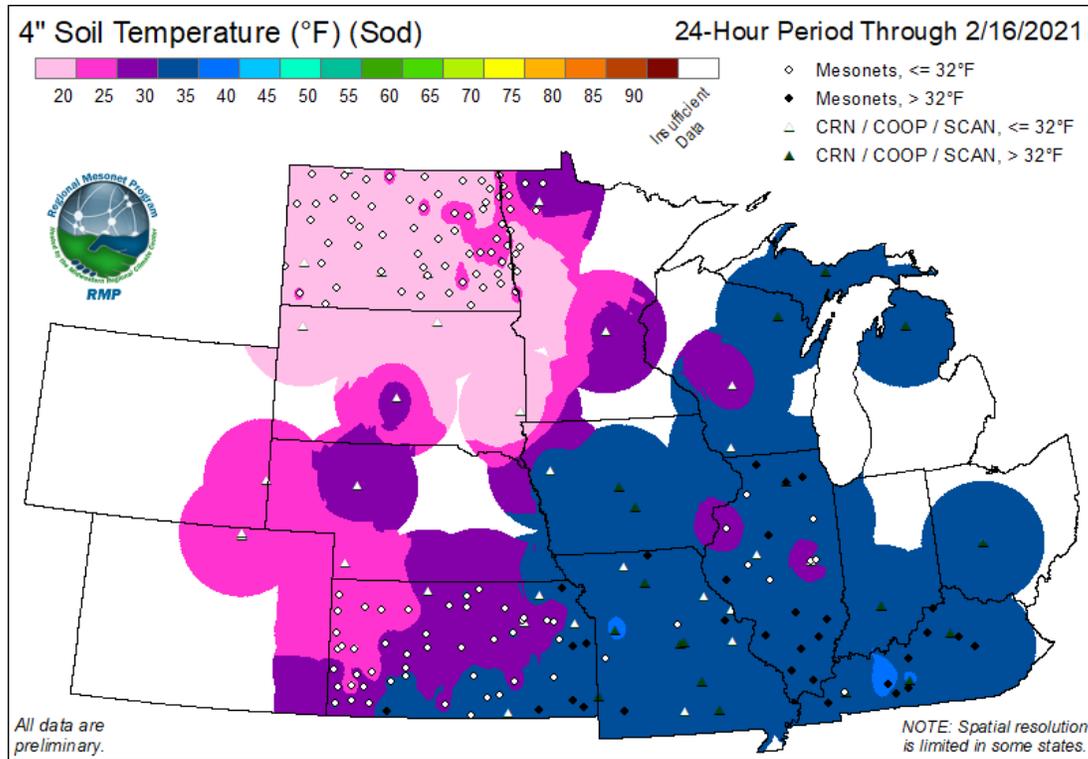


https://www.cpc.ncep.noaa.gov/products/Drought/Monitoring/smp_new.shtml

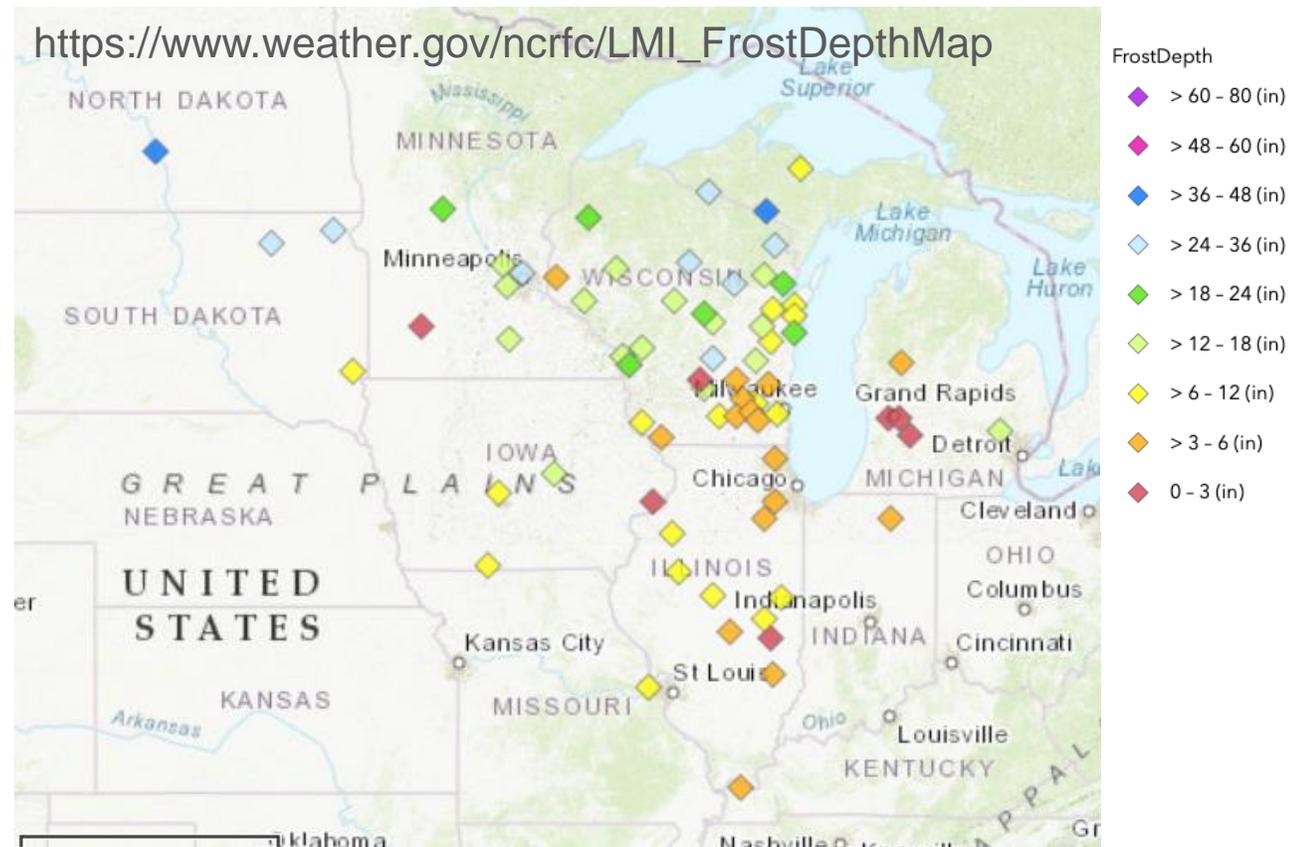


Widespread increases in frost depth across the Midwest.

Soil temperatures have cooled, with more significant coverage of frozen soils.



<https://mrcc.illinois.edu/RMP/currentMaps.html#banner>

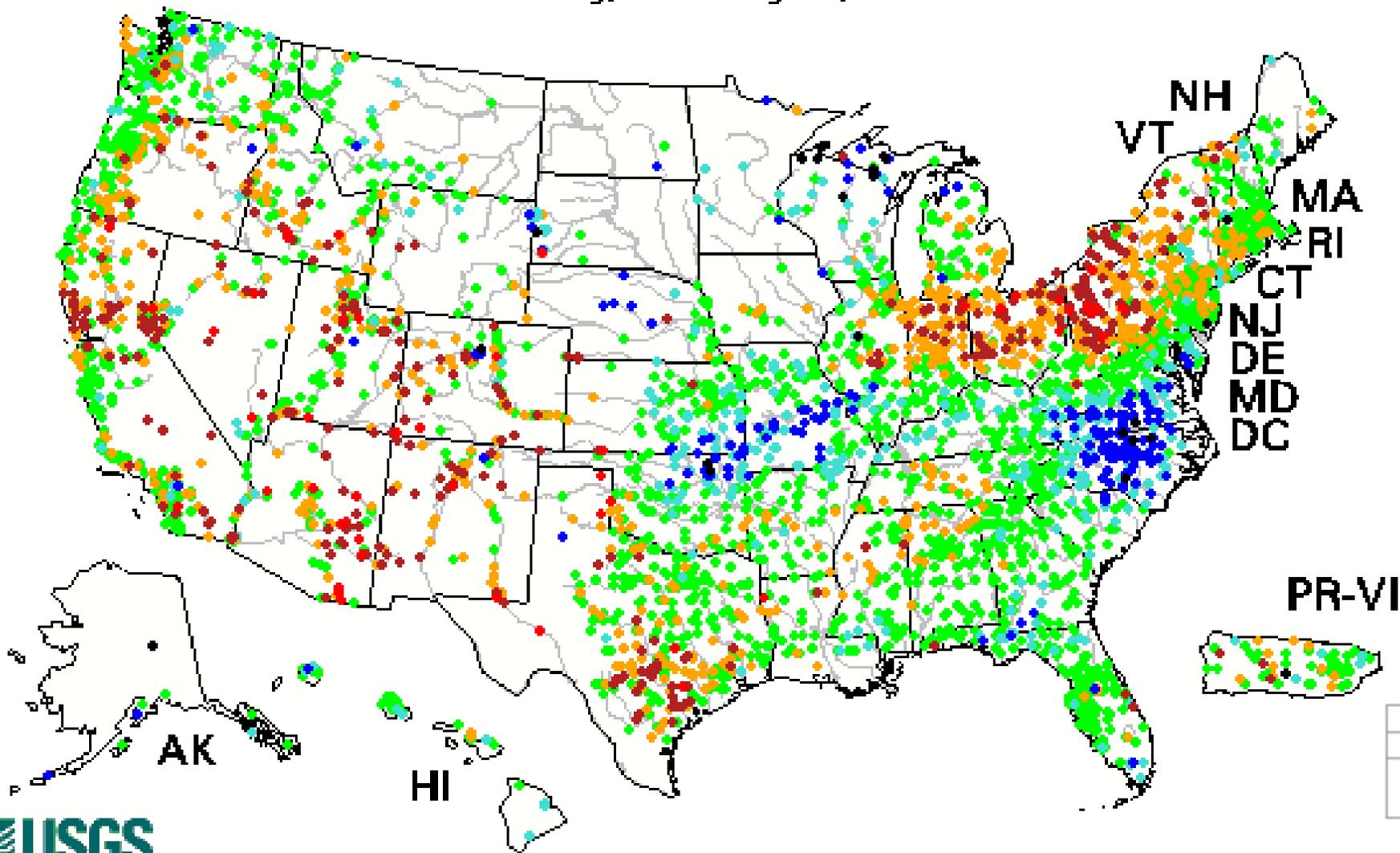


Precipitation events are more likely to result in runoff, instead of infiltrating soils.

More risk of flooding in areas, less potential for soil recharge in drought areas.

28-day averaged streamflow

Wednesday, February 17, 2021



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 032 02/01/2021

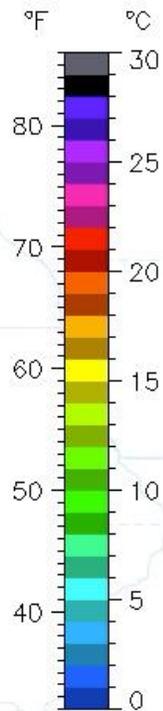
Percent Pixels with Data within +/-10 Days: 93.2%

Date of last ice analysis: 2/1/2021

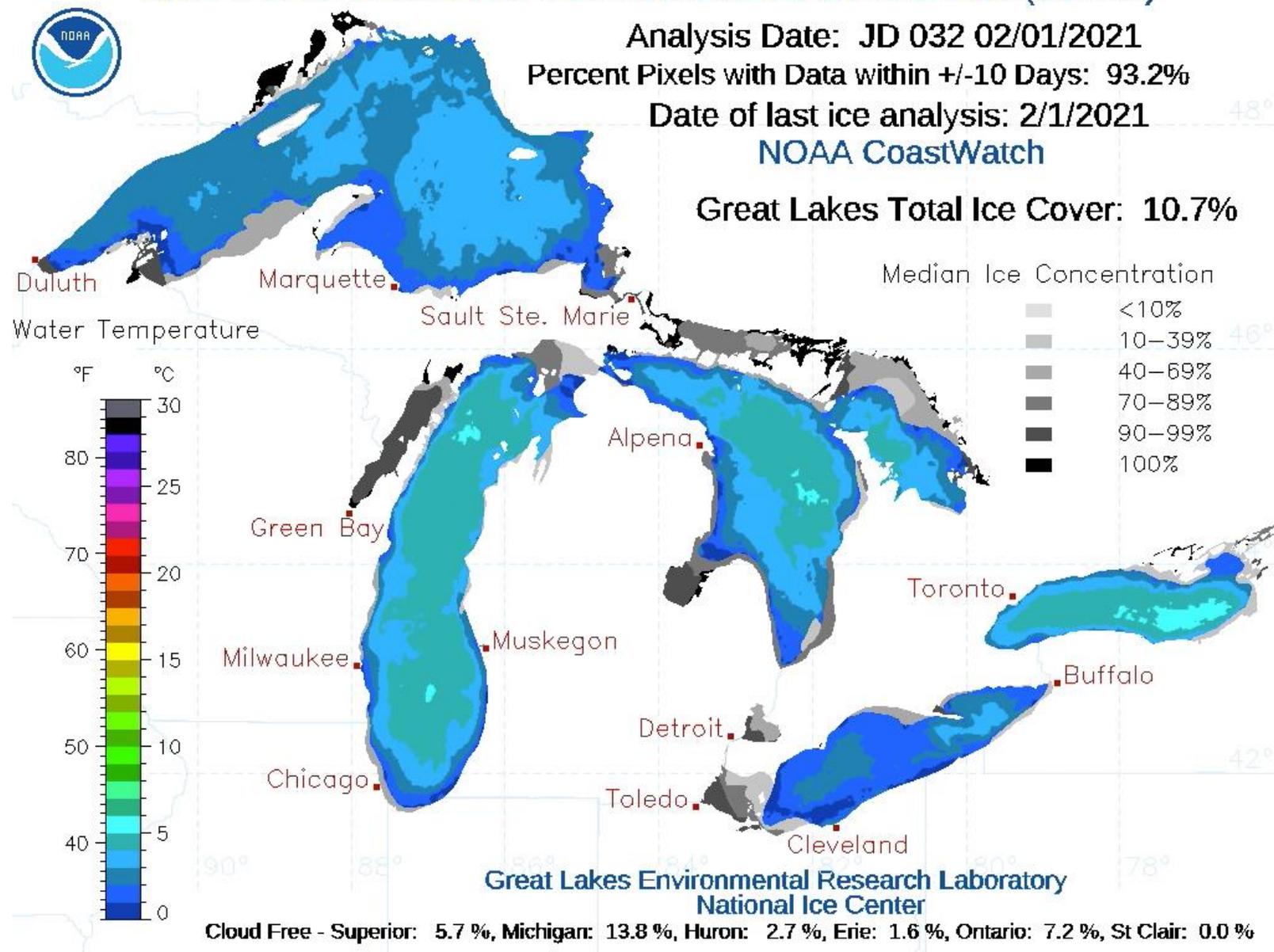
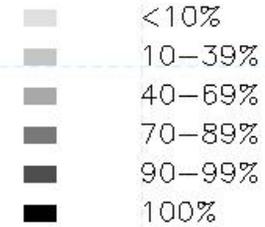
NOAA CoastWatch

Great Lakes Total Ice Cover: 10.7%

Water Temperature



Median Ice Concentration



Great Lakes Environmental Research Laboratory
National Ice Center

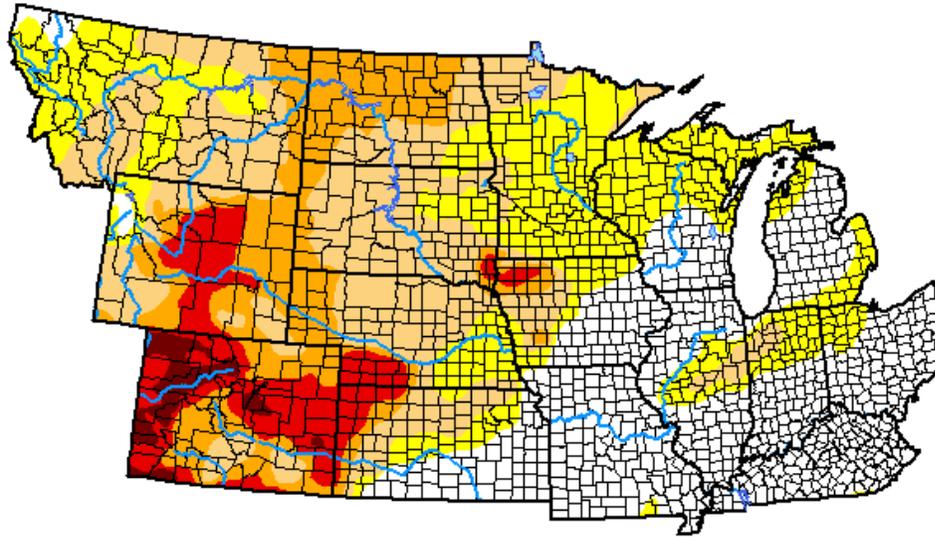
Cloud Free - Superior: 5.7 %, Michigan: 13.8 %, Huron: 2.7 %, Erie: 1.6 %, Ontario: 7.2 %, St Clair: 0.0 %

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



U.S. Drought Monitor NWS Central Region

February 16, 2021
(Released Thursday, Feb. 18, 2021)
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	28.50	71.50	47.39	22.73	9.02	1.60
Last Week <i>02-09-2021</i>	30.74	69.26	48.11	24.89	11.41	2.23
3 Months Ago <i>11-17-2020</i>	34.86	65.14	41.95	22.93	10.20	2.48
Start of Calendar Year <i>12-29-2020</i>	30.52	69.48	46.07	24.23	12.18	2.52
Start of Water Year <i>09-29-2020</i>	29.60	70.40	37.34	17.96	7.13	0.24
One Year Ago <i>02-18-2020</i>	90.39	9.61	4.59	0.66	0.00	0.00

Intensity:



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 Miskus
NOAA/NWS/NCEP/CPC



droughtmonitor.unl.edu



Impacts



Some cold stats....

Des Moines, Iowa – 66 hours spent below zero, ranks in the top 5

Chicago broke the record for consecutive days of measurable snowfall with 9 days.

Twin Cities in Minnesota – 3rd place all time for total number of hours at or below zero. Streak of 116 consecutive hours

Currently, Austin TX has more snow on the ground than Aberdeen SD!

-31°F in Lincoln Nebraska on February 16 comes in 2nd place for their all-time coldest temperature.

February Consecutive Hours at or below 0°F (through the 16th)
South Dakota Mesonet
mesonet.sdstate.edu

Station	End	Hours
Webster	17th 11:20AM	279.6
Lemmon	15th 11:25AM	229.2
South Shore	17th 10:05AM	198.7
Oak Lake	17th 10:15AM	175.2
Britton	17th 9:35AM	160.5
Colton	17th 9:05AM	159.7
Flandreau	17th 8:45AM	159.4
Volga	17th 8:30AM	159.2
Baltic	17th 8:30AM	158.6
Brookings	17th 8:00AM	158.5
SF Landfill	17th 8:10AM	149.9
Groton	16th 2:05PM	140.1
Redfield	16th 1:00PM	137.4
White Lake	17th 3:30AM	133.8
Sioux Falls	17th 6:10AM	133.2
Beresford	17th 5:30AM	132.7

Station	End	Hours
Parkston	16th 11:10 PM	125.0
Rosebud	16th 1:00 PM	117.2
Gettysburg	15th 3:00 PM	117.0
McIntosh	15th 11:55 AM	115.4
Hamill	16th 12:35 PM	115.1
McLaughlin	15th 12:00 PM	115.1
Bison	15th 10:50 AM	114.6
Mound City	15th 12:10 PM	114.3
Jewel Cave	15th 8:35 AM	111.8
Nisland	15th 11:40 AM	109.9
Sturgis	15th 11:20 AM	106.0
Cottonwood	15th 12:40 PM	102.3
Oral	15th 12:10 PM	100.1
Antelope	14th 3:00 PM	94.8
Eagle Butte	14th 2:25 PM	93.3
Dakota Lakes	15th 12:25 PM	63.8



Cold, snow, ice impacts - Urban

- ❑ Rolling blackouts reported in Nebraska, Iowa, Kansas due to extreme cold temperatures
- ❑ Water-main breaks in Illinois and Indiana
- ❑ Tens of thousands in Kentucky without power, trees downed, from ice storm
- ❑ Concern sheltering homeless, Chicago shelters at capacity
- ❑ Building collapses from snow
- ❑ Large pileup on Interstate 80 in Iowa, approx 40 vehicles.

I-80 @ MM163 (NWTV02) 02/04/21 13:31:40



Iowa Dept. of Transportation



<https://chicago.suntimes.com/news/2021/2/16/22285901/building-collapse-snow>



Cold, snow, ice impacts - Hydrologic

- ❑ Army Corps has increased releases to help alleviate ice conditions
- ❑ Ice jam on February 17 near Jefferson City Missouri
- ❑ Some ice jams on the Platte in Nebraska, but pretty typical for this time of year
- ❑ Further north, ice jams not yet an issue, because it's too cold

- ❑ Potential Future Impacts:
 - ❑ Waiting game right now
 - ❑ Fast warmup will result in more problematic ice jams
 - ❑ A rain event would also increase ice break up and jams
 - ❑ Risk of flooding in the Ohio River basin

Missouri River ice jam 'not an immediate threat'

-  Tweet
-  Share
-  Google+
-  Email

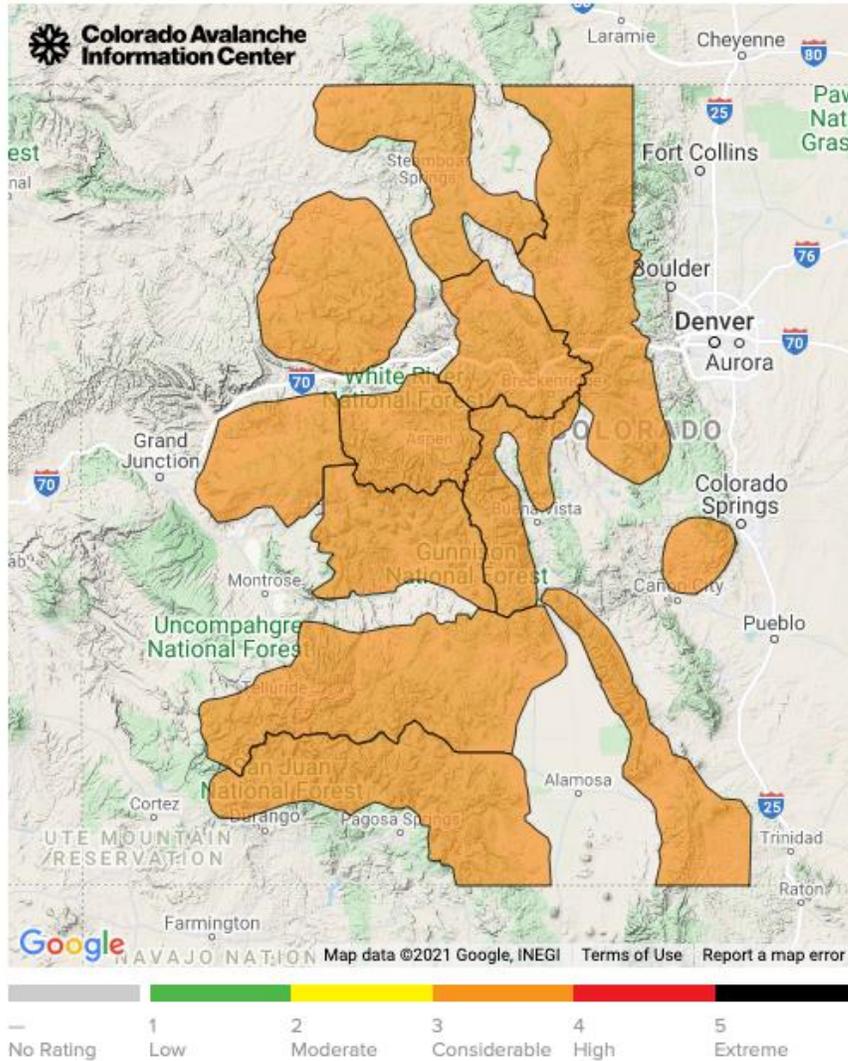


Missouri River ice in the Bismarck-Mandan area. Photo courtesy William Prokopyk

<https://news.prairiepublic.org/post/missouri-river-ice-jam-not-immediate-threat>



Mountain Avalanches



<https://avalanche.state.co.us>

Utah mountain region seeing unprecedented level of avalanche danger

<https://abcnews.go.com/US/utah-mountain-region-unprecedented-level-avalanche-danger/story?id=75952229>

“So far this winter season, 25 people have died in avalanches in the U.S., according to the [Colorado Avalanche Information Center](#). The deadliest was Feb. 6 in Utah, when [four people died](#) while skiing in the Salt Lake backcountry.”

An elementary school principal was killed in an avalanche in Montana on Valentine’s Day

<https://www.cnn.com/2021/02/16/us/montana-principal-avalanche-death/index.html>

“This year’s avalanche season has likely been more active because of a “persistent weak layer” of snow, according to [Champion](#).” (Nikki Champion of the Utah Avalanche Forecast Center)



Potential for Agriculture Impacts from Cold

- ❖ Deep cold was well forecast so only minor impacts on livestock and calving
- ❖ Iowa fruit trees impacted by cold – 18° below zero is killing for peach blossoms, not expecting a good peach crop this year
- ❖ Fruit trees in Michigan have reached their chilling requirements, so they can break dormancy when the temperature warms
- ❖ Winter wheat is still dormant, but extreme cold with little snow cover for protection is likely to cause widespread damage. Won't know the extent until the spring.



Impacts from Drought

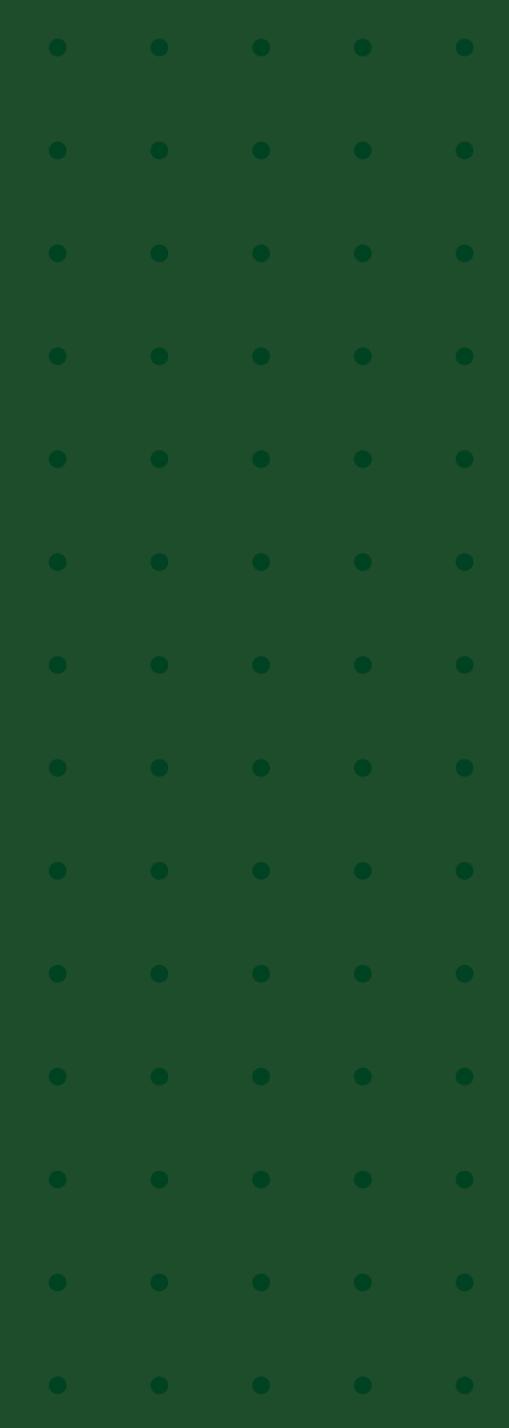
❖ Agricultural

- ❖ Lack of deep moisture profiles in soils from 2020 drought
- ❖ Expect winter wheat damage from drought conditions, will be difficult to separate damage from cold vs. damage from drought
- ❖ Lack of adequate pasture and forage is expected in drought-stricken areas

❖ Fire

- ❖ Extended dry conditions and high winds increased fire danger in parts of Colorado and Kansas in early February
- ❖ Brush fire near the Denver Metro area resulted in an evacuation of neighborhoods nearby
- ❖ Extended drought combined with upcoming windy season in March-April – expect high fire danger on the plains in Eastern CO and western KS.

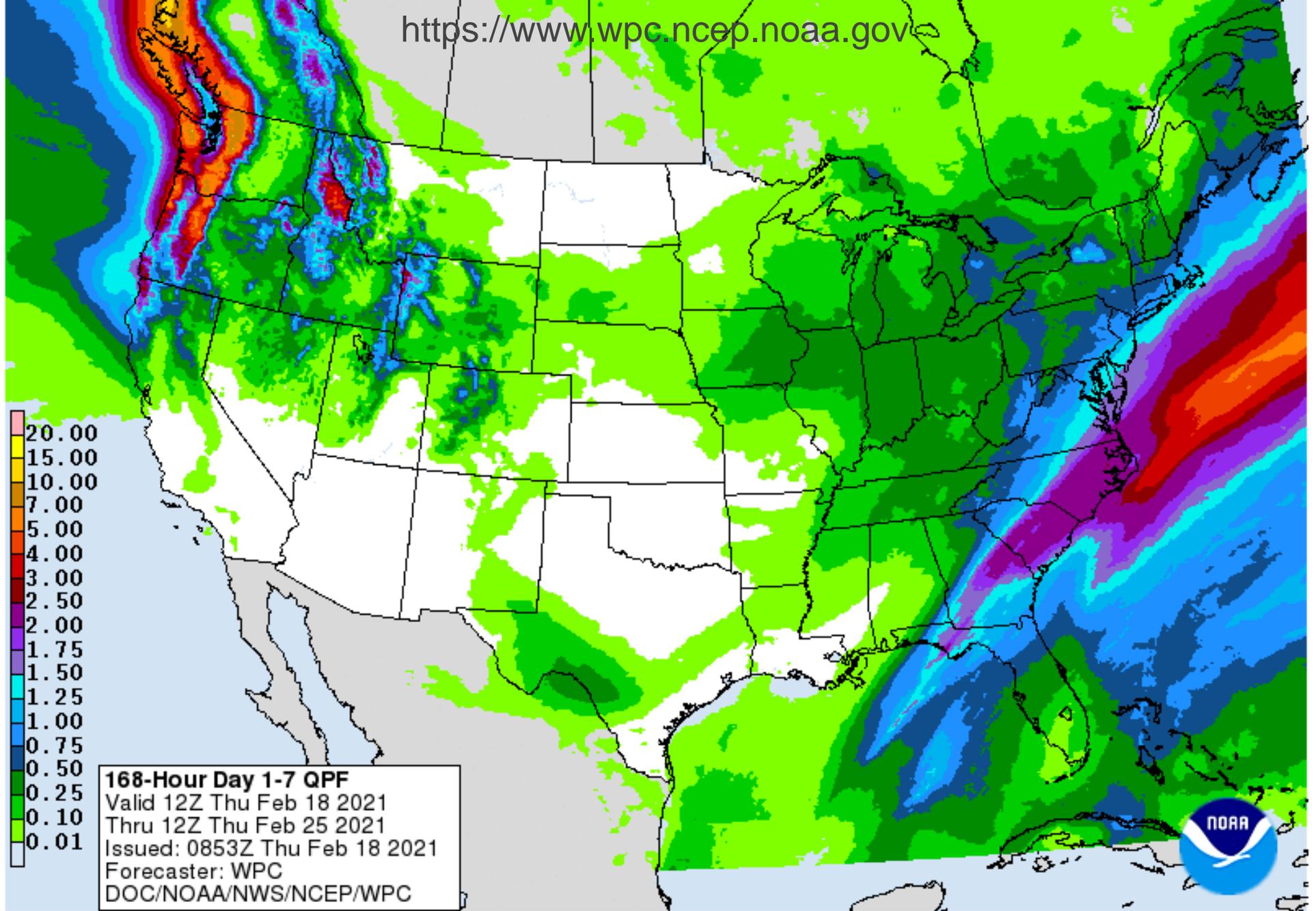




Outlook

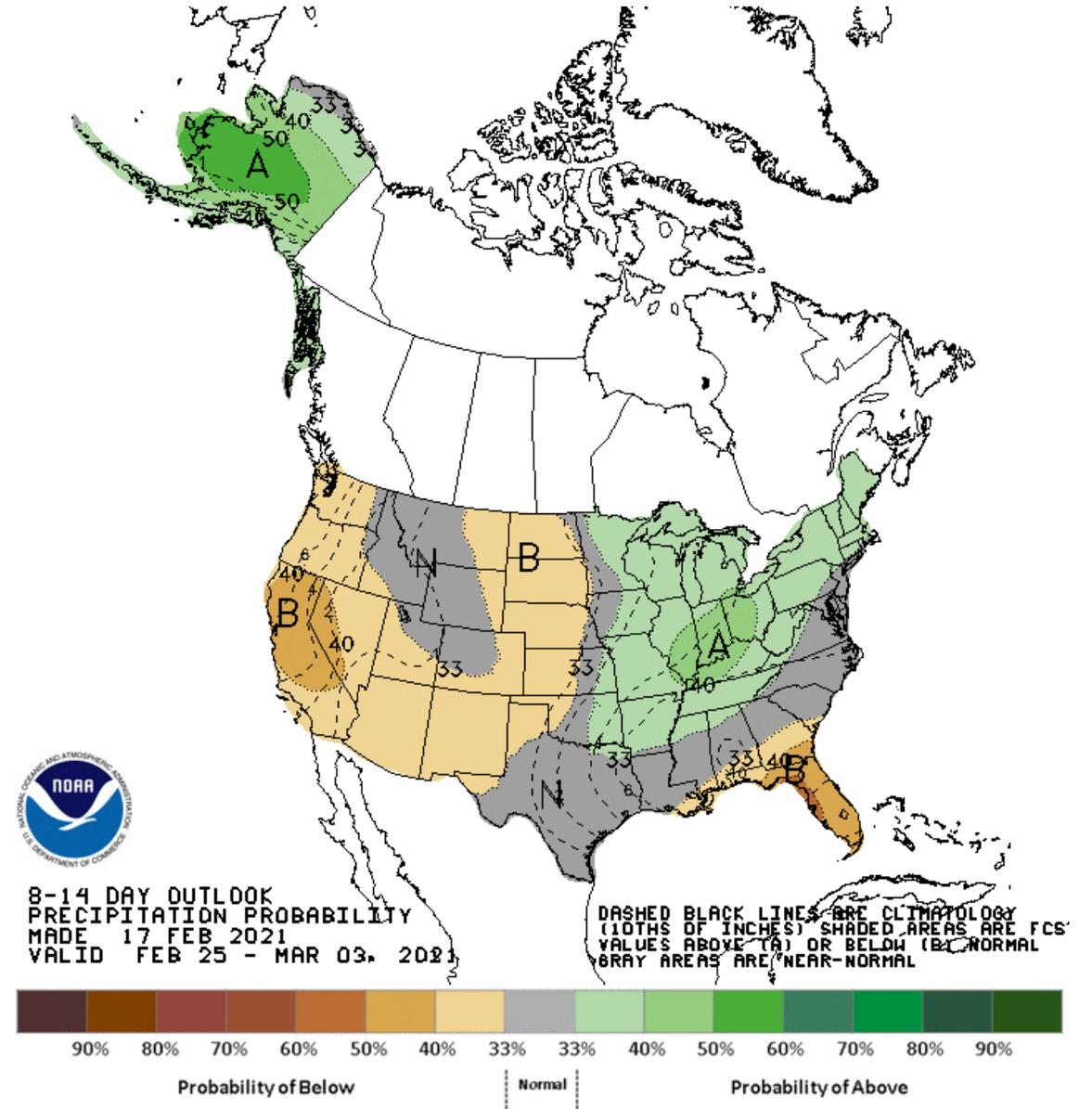
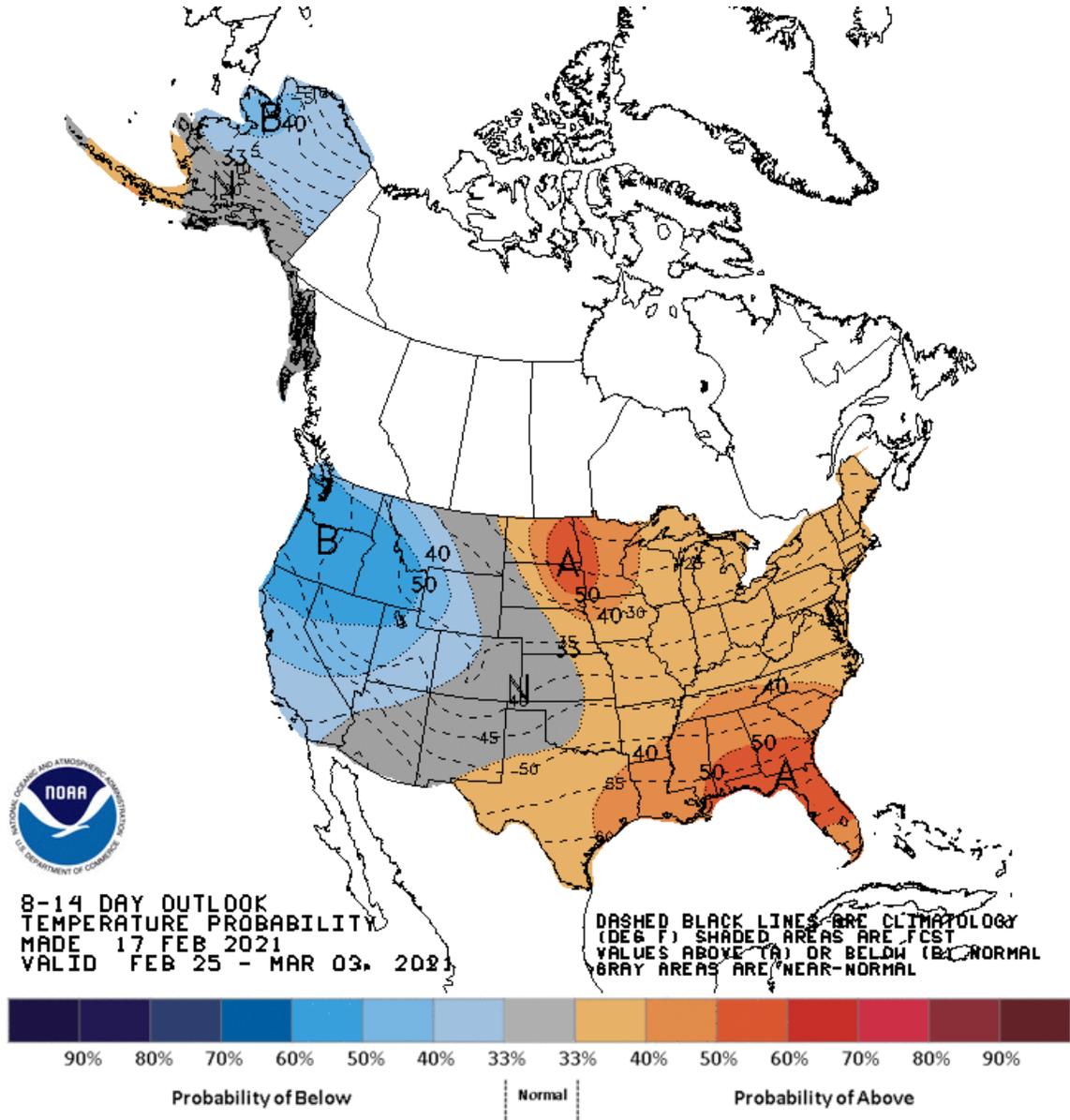
7-day Precip Forecast

Expect colder temperatures through the end of this week, with some warmer, or more seasonal, temperatures early next week.



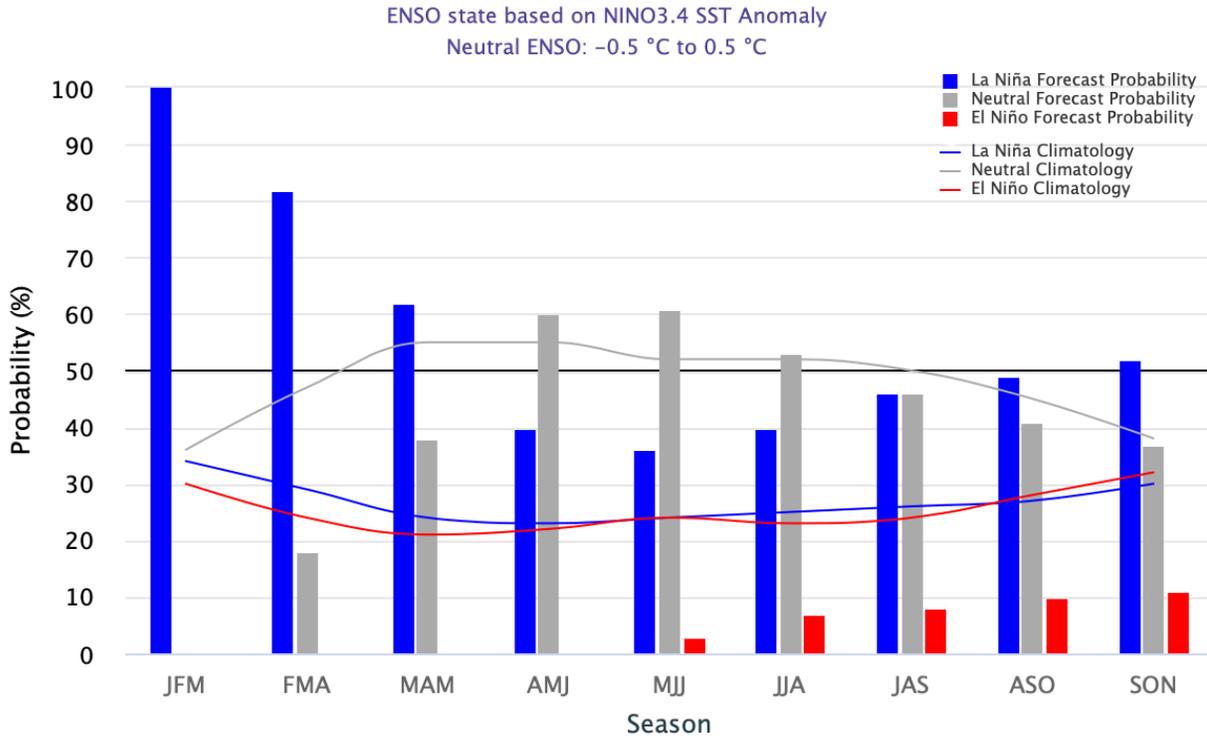
8-14 Day Outlook

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

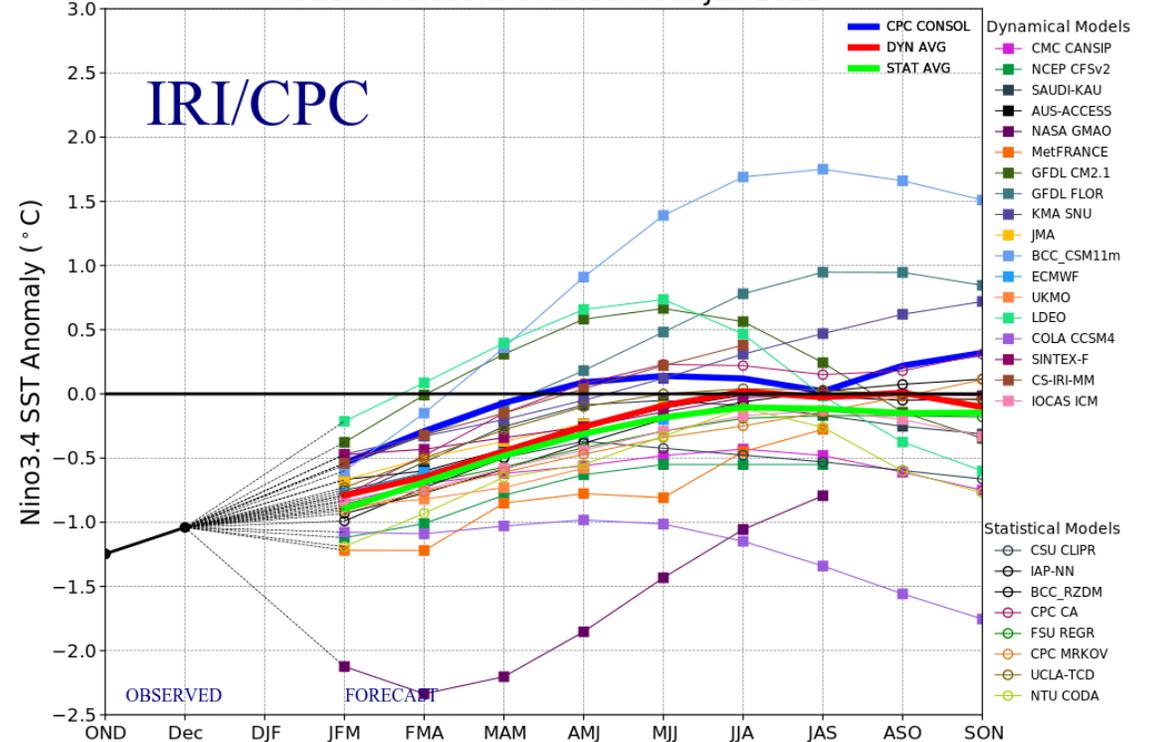


La Niña is expected to continue through the spring...

Early-February 2021 CPC/IRI Official Probabilistic ENSO Forecasts



Model Predictions of ENSO from Jan 2021



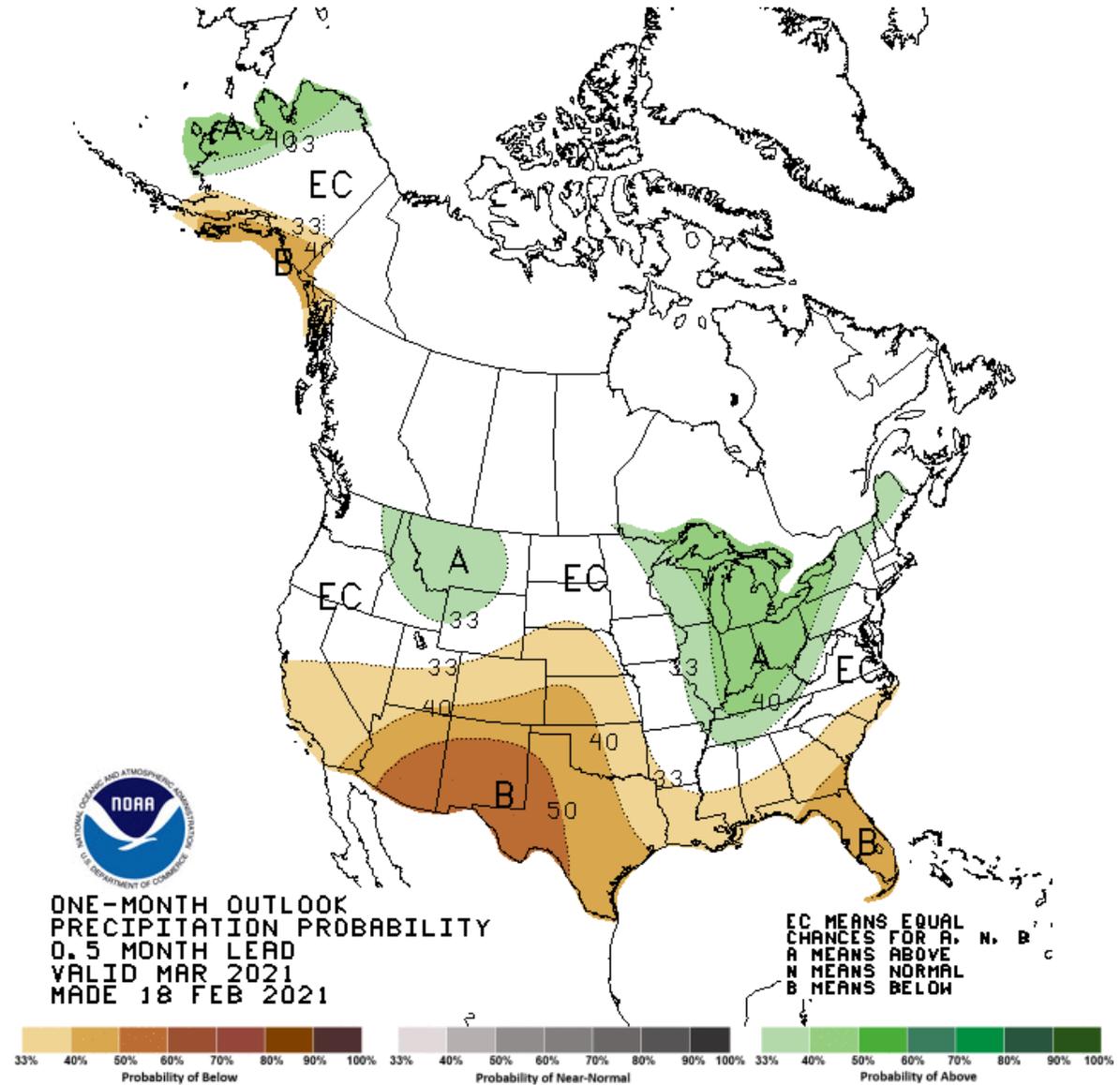
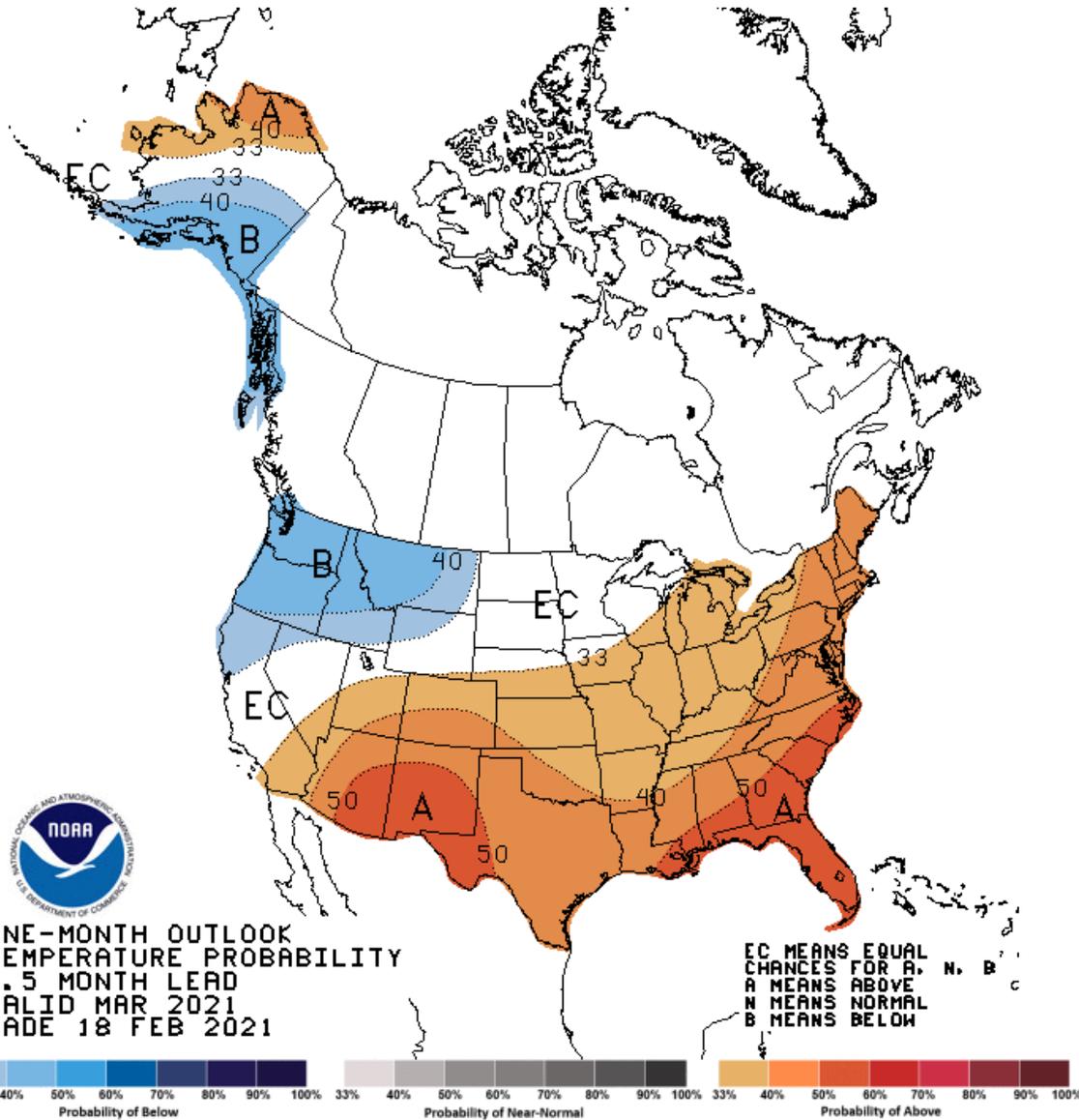
IRI/CPC ENSO Forecasts:

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



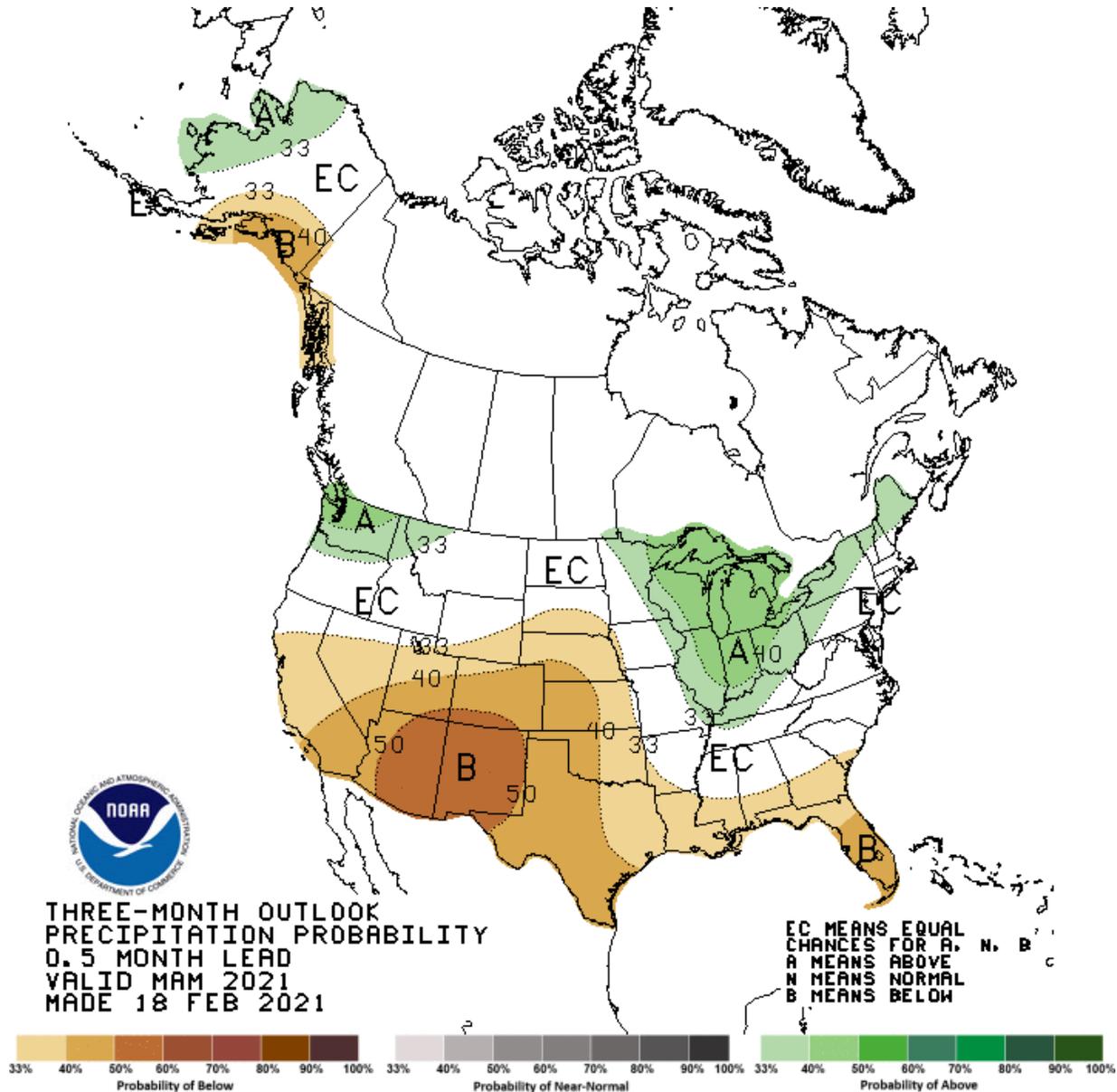
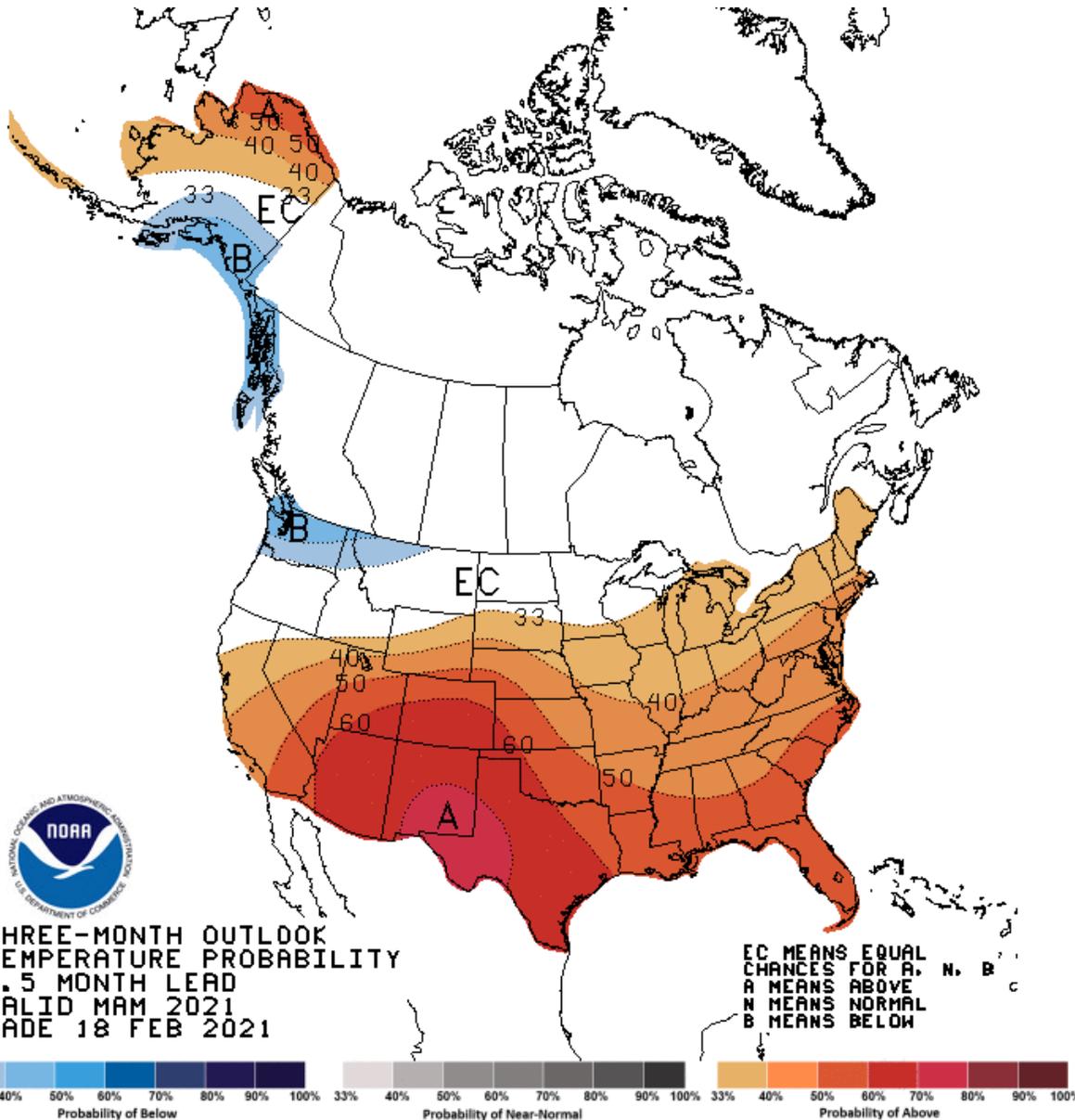
March Outlook

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



Seasonal Outlook – Mar-Apr-May

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



Further Information - Partners

- **Today's and Past Recorded Presentations:**
 - <https://mrcc.illinois.edu/multimedia/webinars.jsp>
 - <https://hprcc.unl.edu/webinars.php>
- 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: <https://drought.unl.edu/>
- State climatologists: <https://www.stateclimate.org>
- Regional climate centers
 - <https://mrcc.illinois.edu>
 - <https://hprcc.unl.edu>





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- **Weather**

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Thank you
