



North Center Central Climate and Drought Outlook

21 February 2019



Sun Dogs and other phenomena: near Hawley MN. Feb 8, 2019
Courtesy: Josh Prosocki MNDNR



United States Department of Agriculture
Midwest Climate Hub

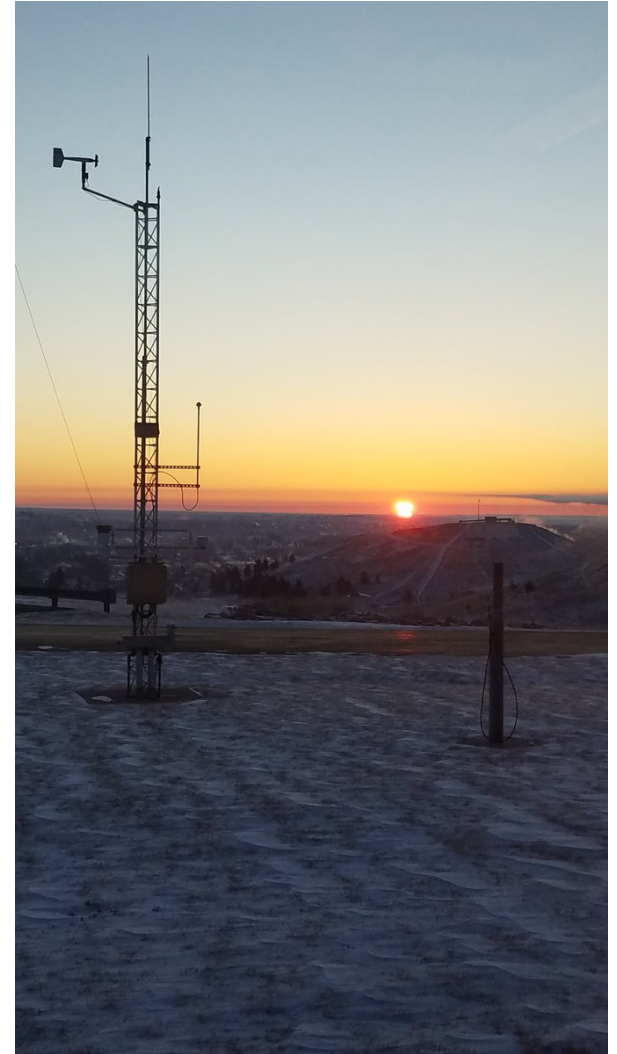
Pete Boulay, MNDNR State Climatology Office
Peter.Boulay@state.mn.us 651-296-4214

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 17, 2019 (1 PM CST): Presenter: TBD
- **Access to Future Climate Webinars and Information**
- <http://www.drought.gov/drought/content/regional-programs/regional-drought-webinars>
- **Recordings of Past Webinars**
- <http://mrcc.isws.illinois.edu/webinars.htm>
- <http://www.hprcc.unl.edu/webinars.php>
- **Open for questions at the end**

Presentation Outline

- Recent Conditions
 - Temperature and precipitation ranks
 - 30-day temperature and precipitation
 - Modeled soil moisture
 - Stream flow
 - Drought
 - Snow
- Impacts
- Outlooks
 - El Niño
 - Short-term
 - Winter season



“Tale of Two Winters”



January 17, 2019
U of M St. Paul
Snow Depth: Zero



February 14, 2019
U of M St. Paul
Snow Depth: 12 in.

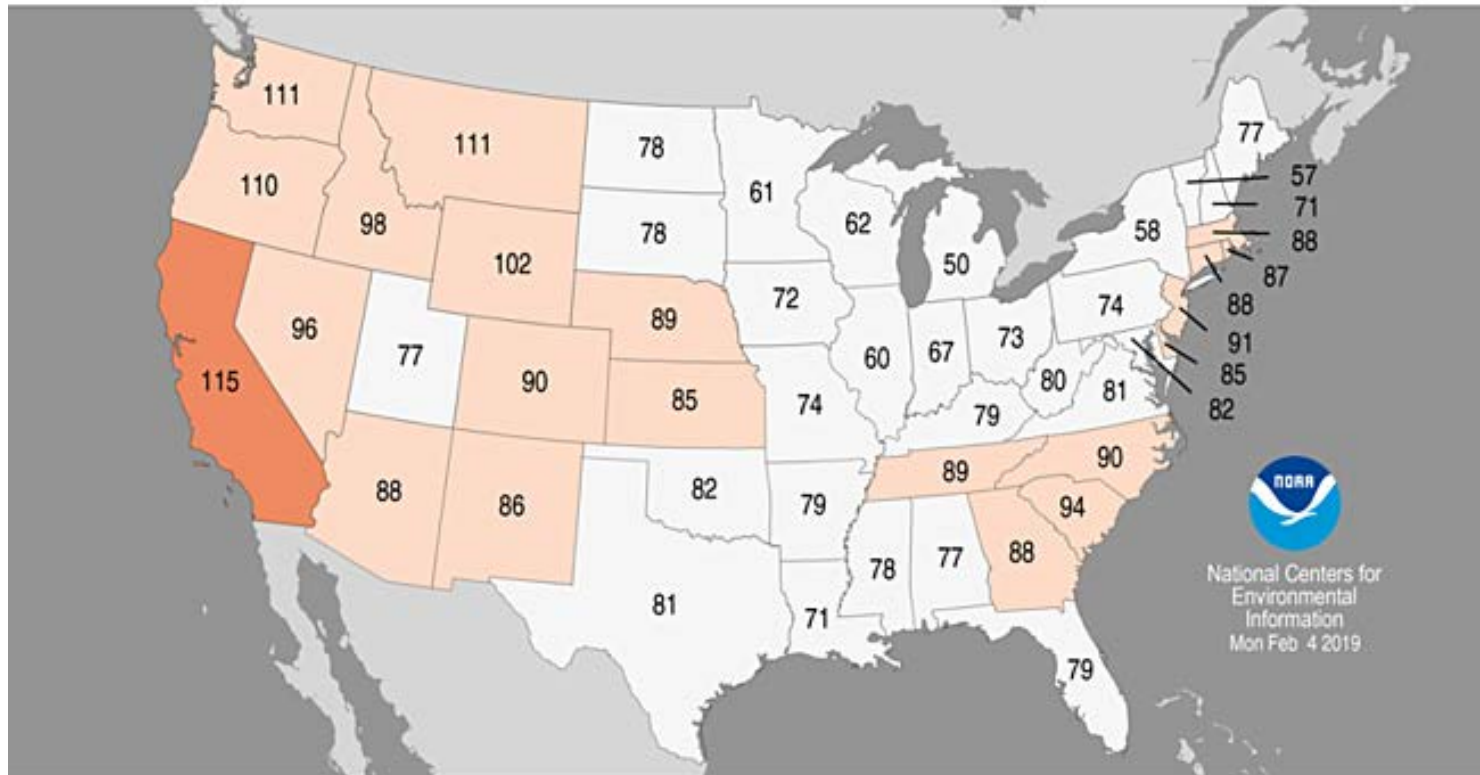
RECENT CONDITIONS

January Temperature Ranks

Statewide Average Temperature Ranks

January 2019

Period: 1895-2019



National Centers for
Environmental
Information
Mon Feb 4 2019

Record
Coldest
(1)

Much
Below
Average

Below
Average

Near
Average

Above
Average

Much
Above
Average

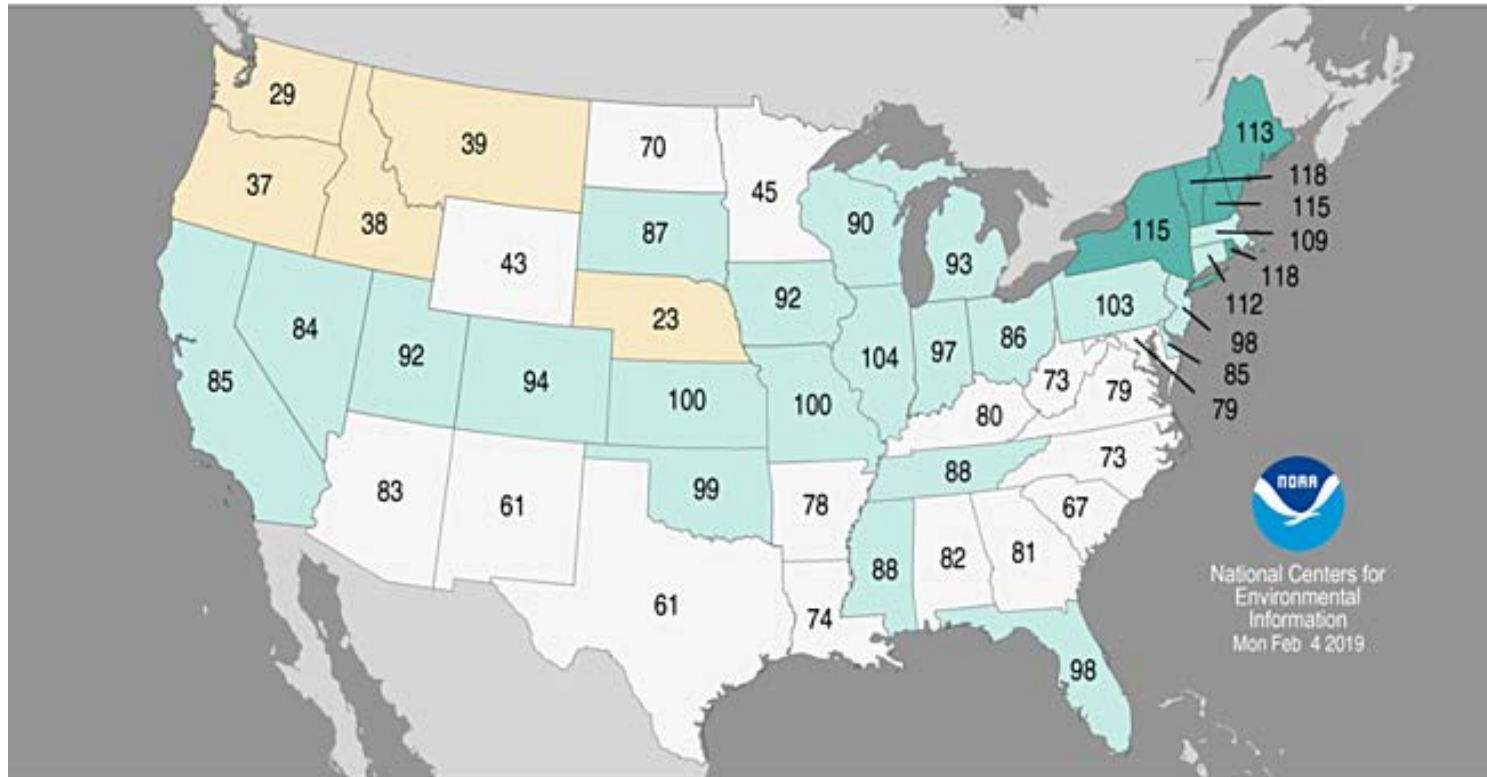
Record
Warmest
(125)

January Precipitation Ranks

Statewide Precipitation Ranks

January 2019

Period: 1895–2019



National Centers for
Environmental
Information
Mon Feb 4 2019

Record
Driest
(1)

Much
Below
Average

Below
Average

Near
Average

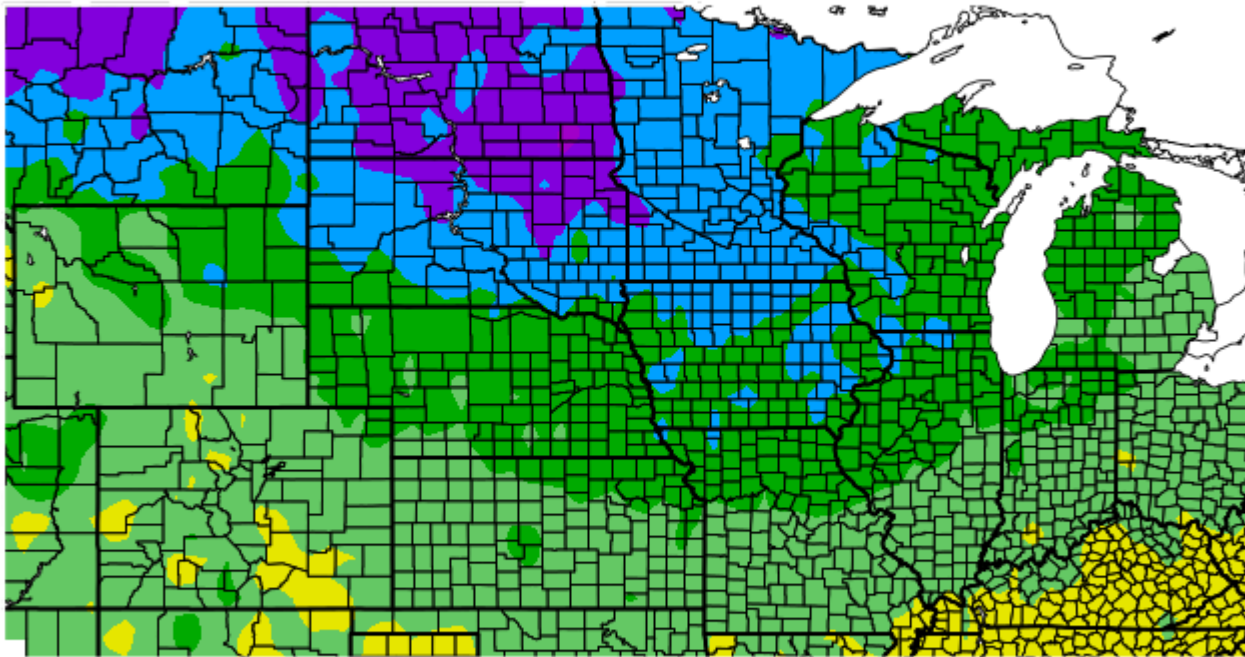
Above
Average

Much
Above
Average

Record
Wettest
(125)

The Return of Winter

Departure from Normal Temperature (F)
1/21/2019 – 2/19/2019



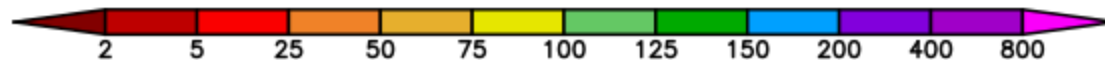
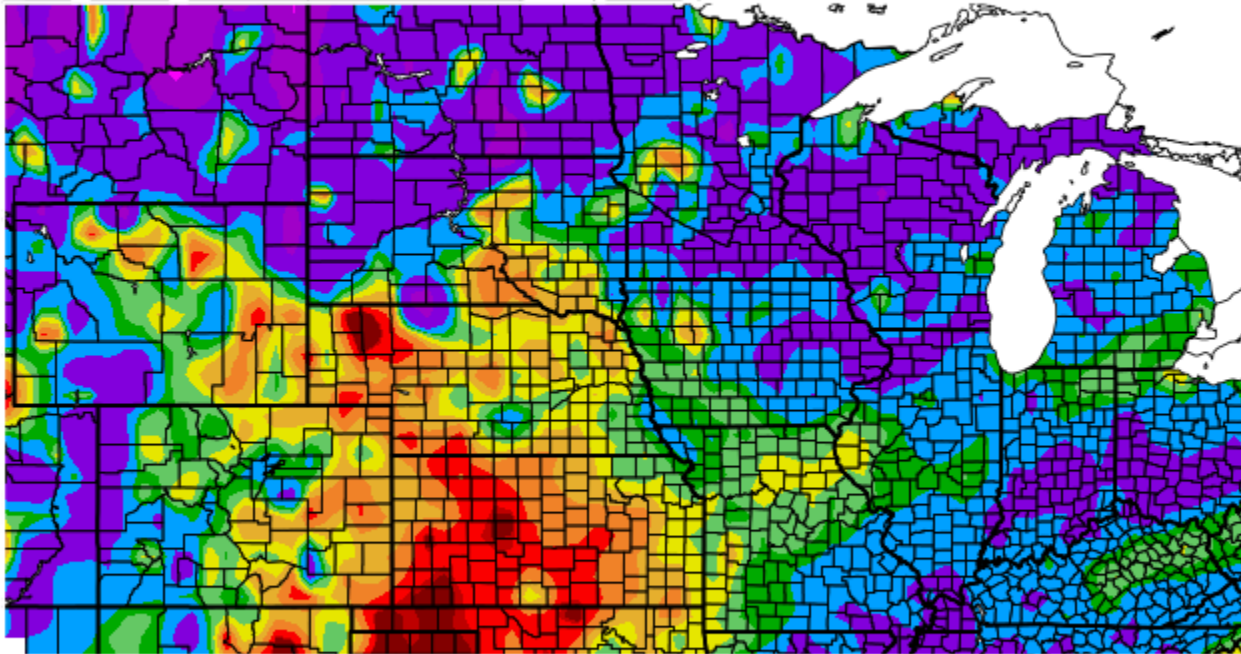
Generated 2/20/2019 at HPRCC using provisional data.

NOAA Regional Climate Centers

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

The Return of Winter

Percent of Normal Precipitation (%)
1/21/2019 – 2/19/2019



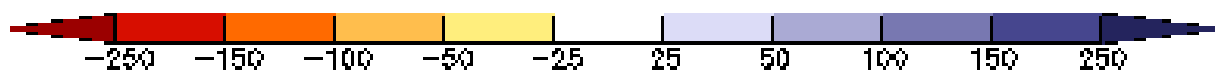
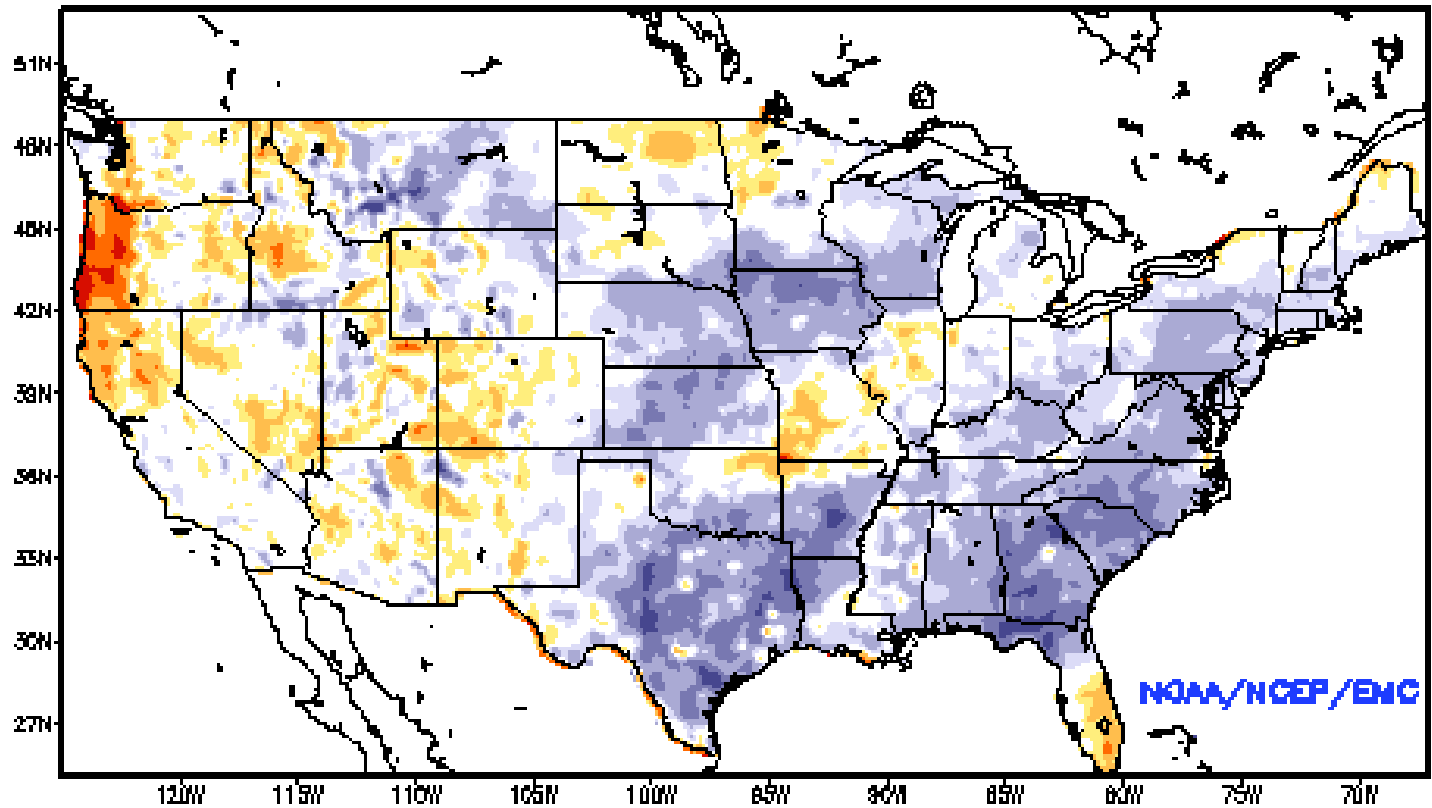
Generated 2/20/2019 at HPRCC using provisional data.

NOAA Regional Climate Centers

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

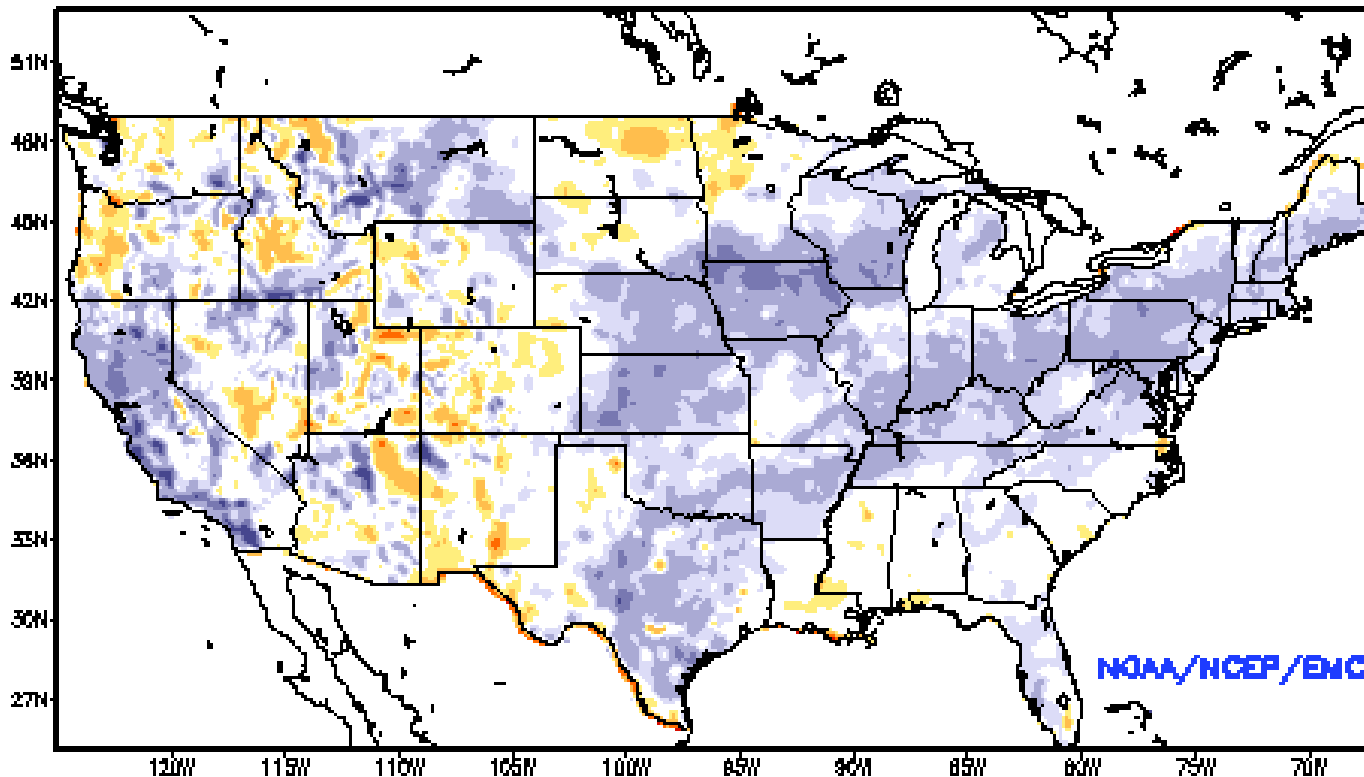
Soil Moisture: December 15, 2018

**Ensemble-Mean - Current Total Column Soil Moisture Anomaly (mm)
NCEP NLDAS Products ___ Valid: DEC 15, 2018**

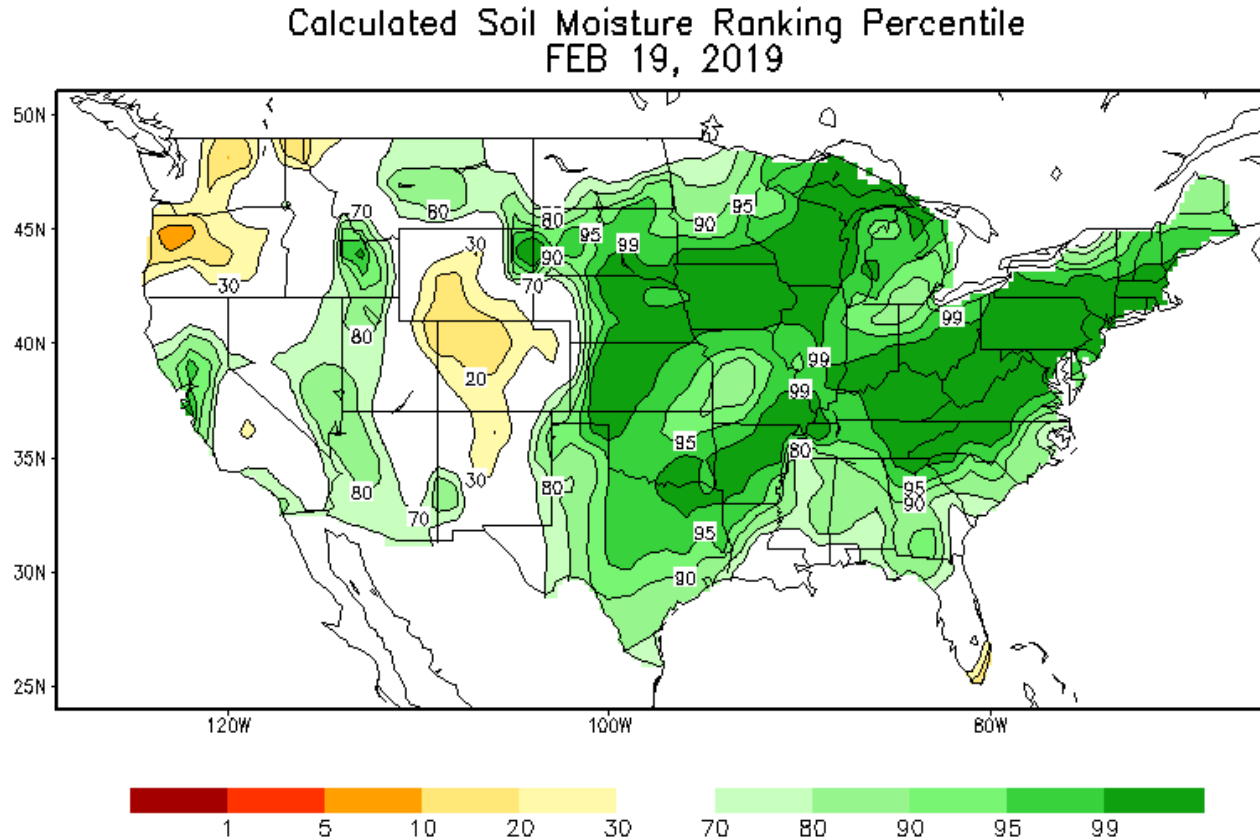


Soil Moisture: February 16, 2019

**Ensemble-Mean - Current Total Column Soil Moisture Anomaly (mm)
NCEP NLDAS Products ___ Valid: FEB 16, 2019**

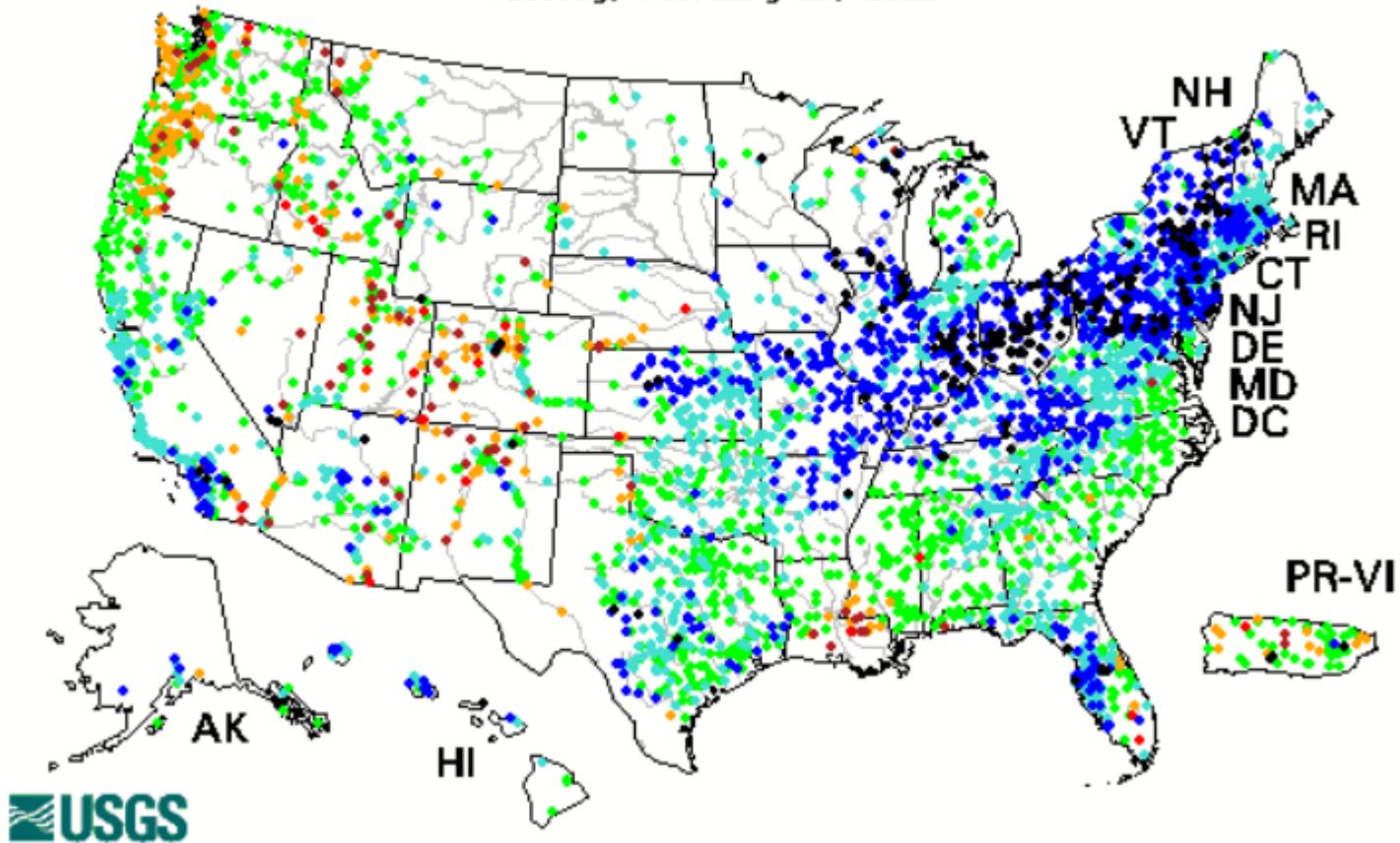


Calculated Soil Moisture Percentiles (valid 19 Feb.)



28-Day Average Streamflow

Tuesday, February 19, 2019

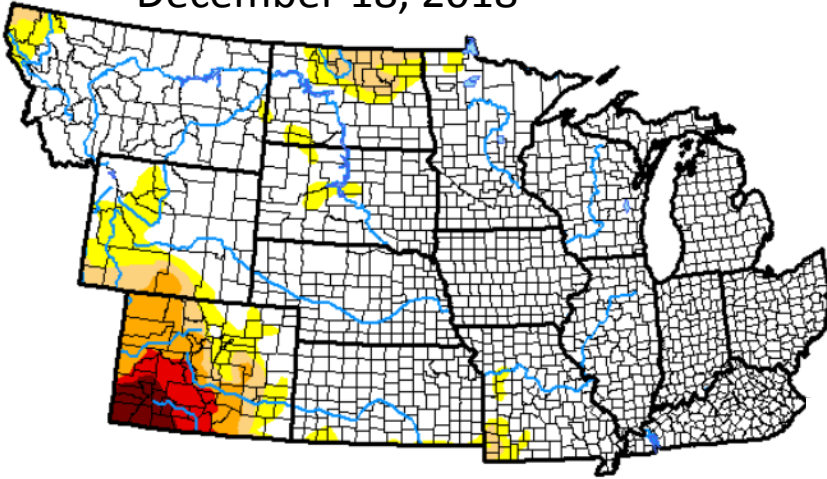


* Ice impacted lack of gauges in MN and Dakotas

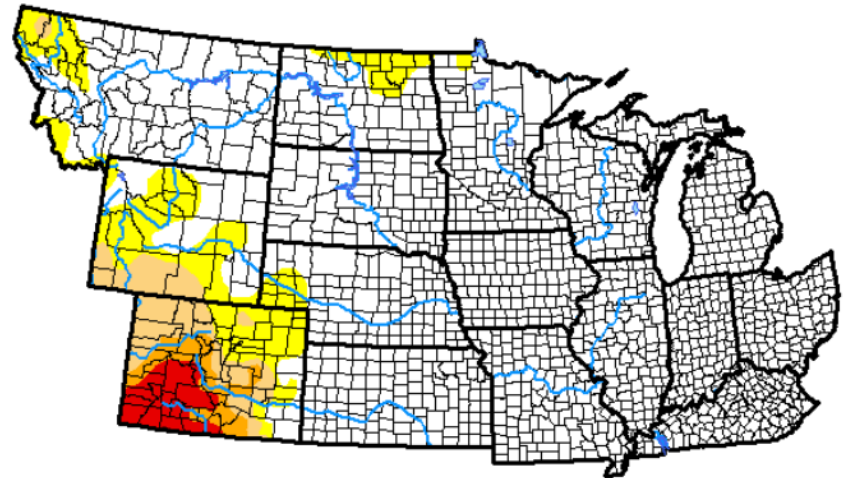
<https://waterwatch.usgs.gov/index.php?r=us&m=pa28d&w=map>

US Drought Monitor... Past Two Months

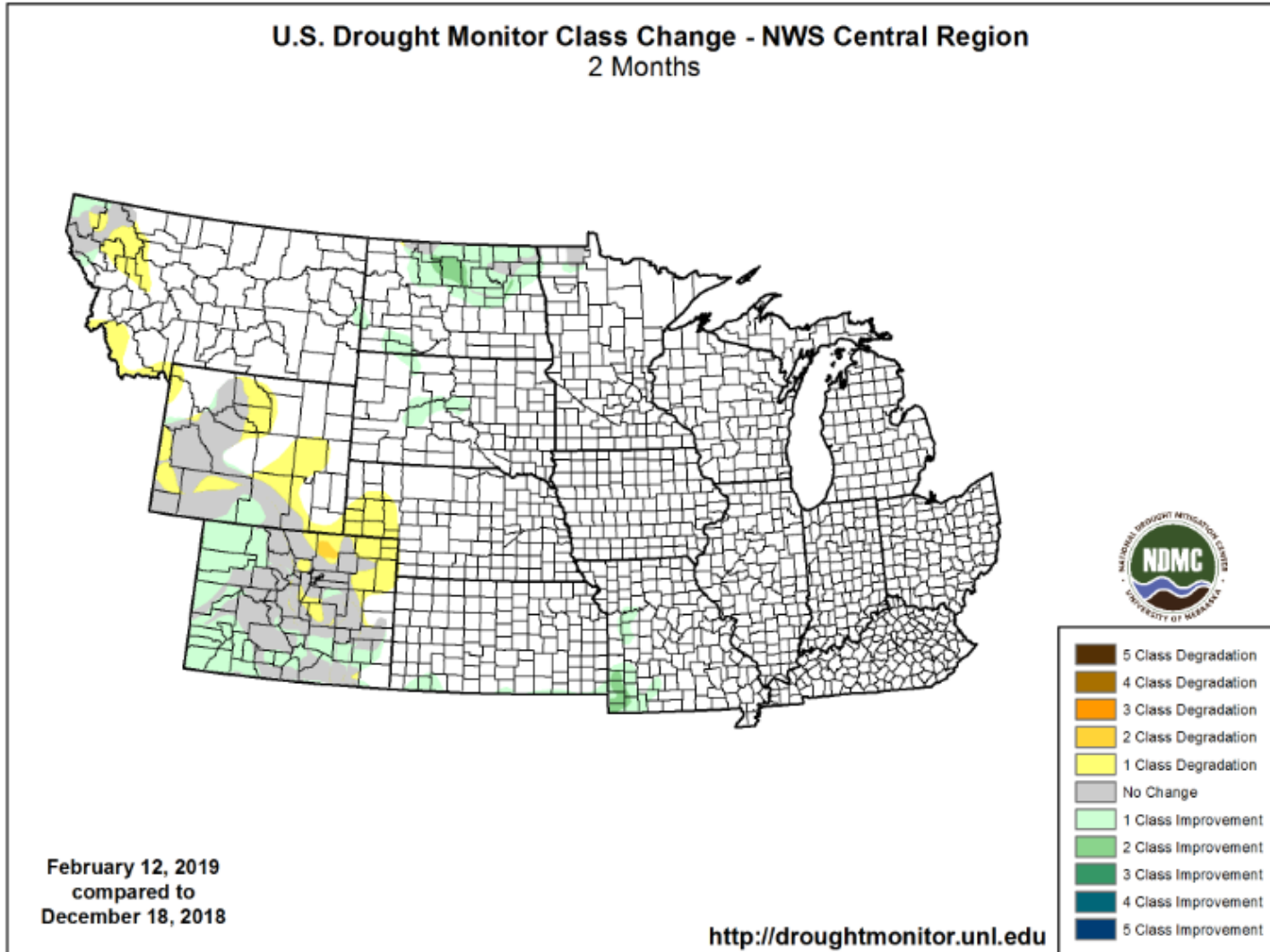
December 18, 2018



February 12, 2019



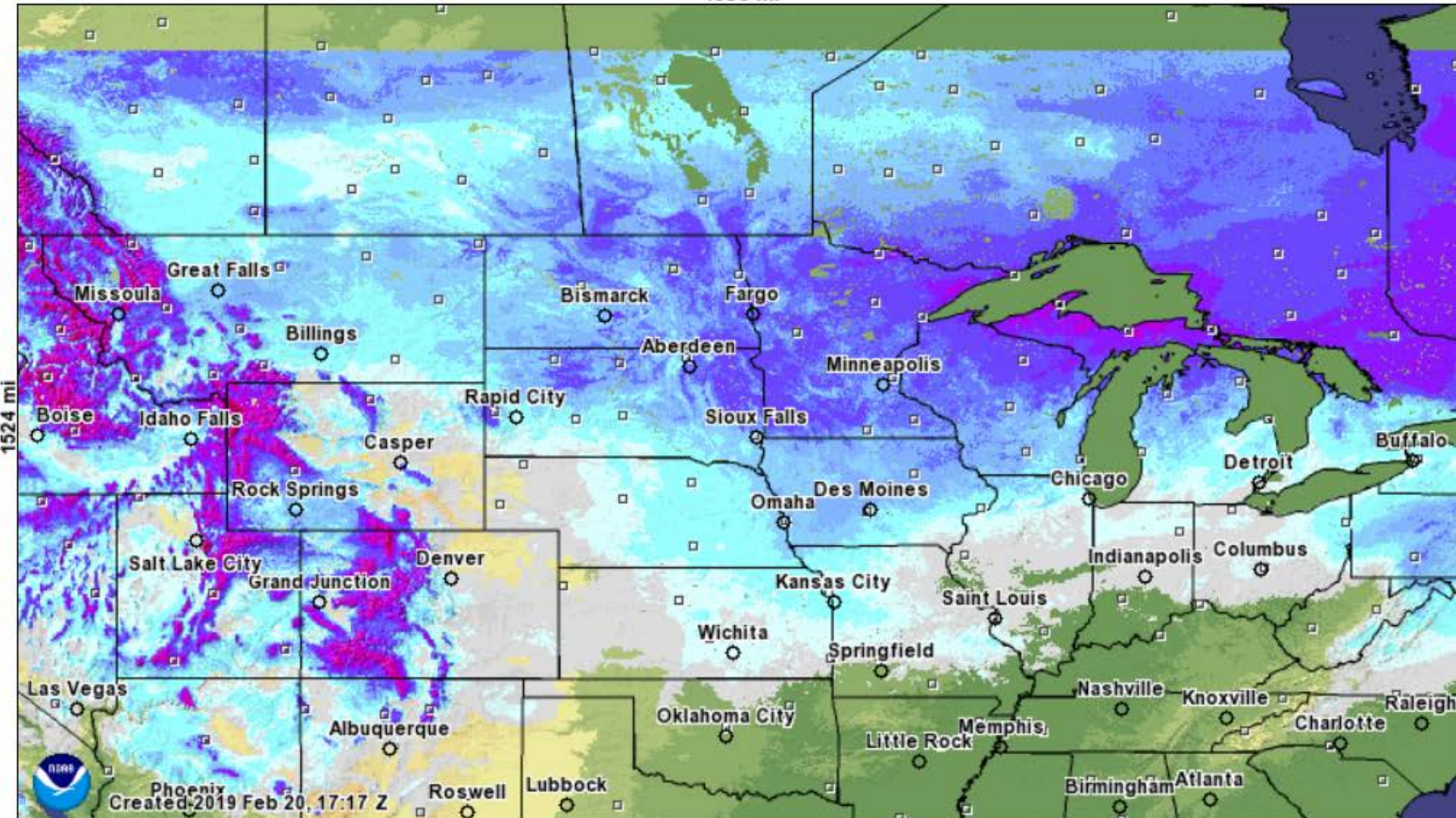
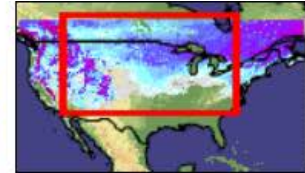
US Drought Monitor... Past Two Months



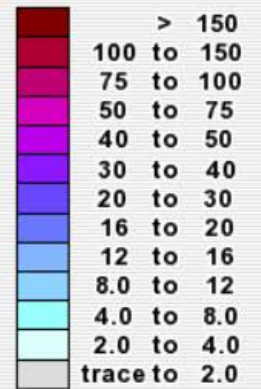
Snow Depth from National Operational Hydrologic Remote Sensing Center (NOHRSC)

Modeled Snow Depth forecasted for 2019 February 21, 14:00 UTC

1530 mi

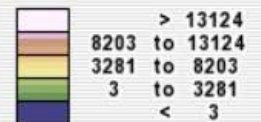


Inches of depth



Not Estimated

Elevation in feet



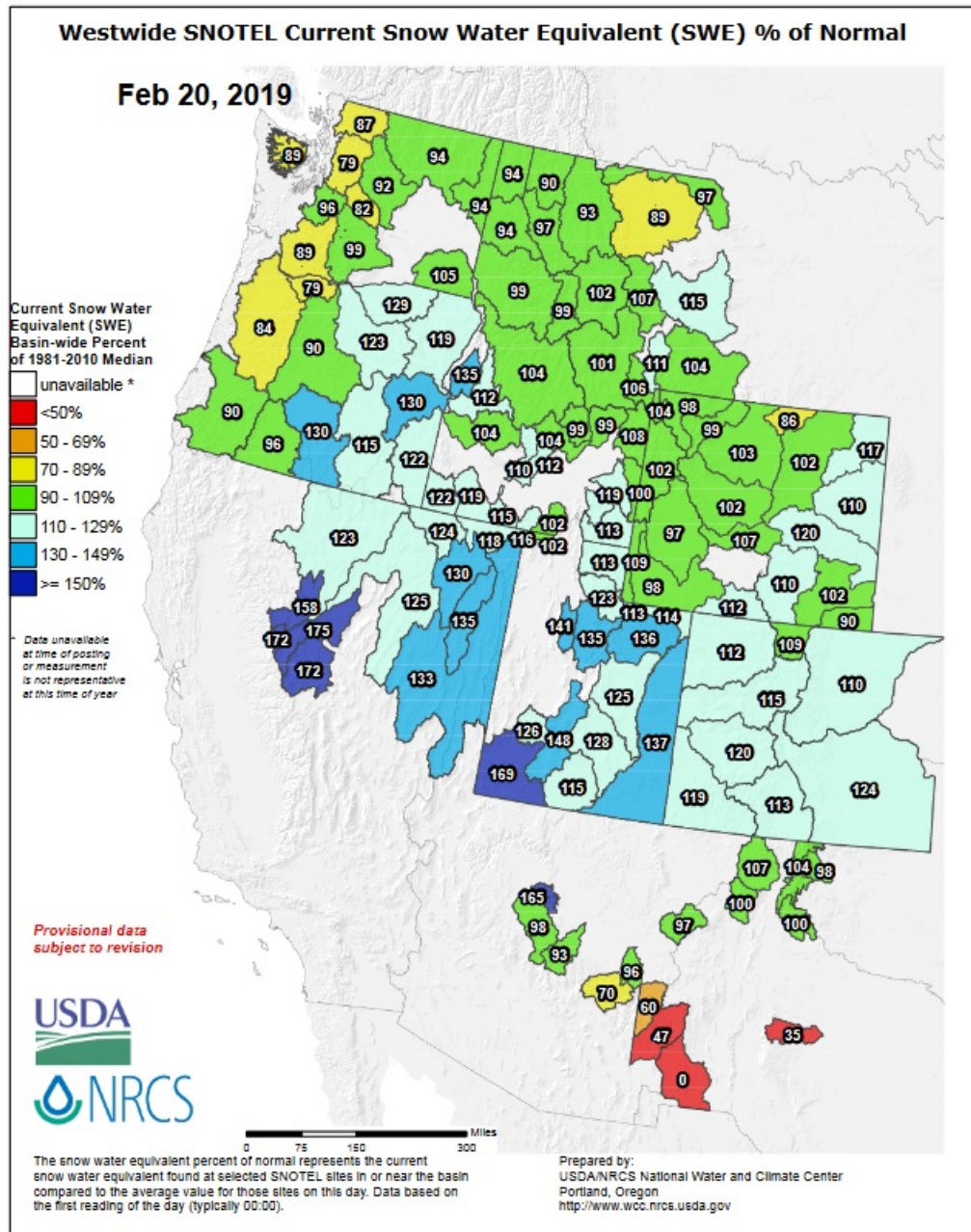
2261 mi

SWE % of normal has

 Increased

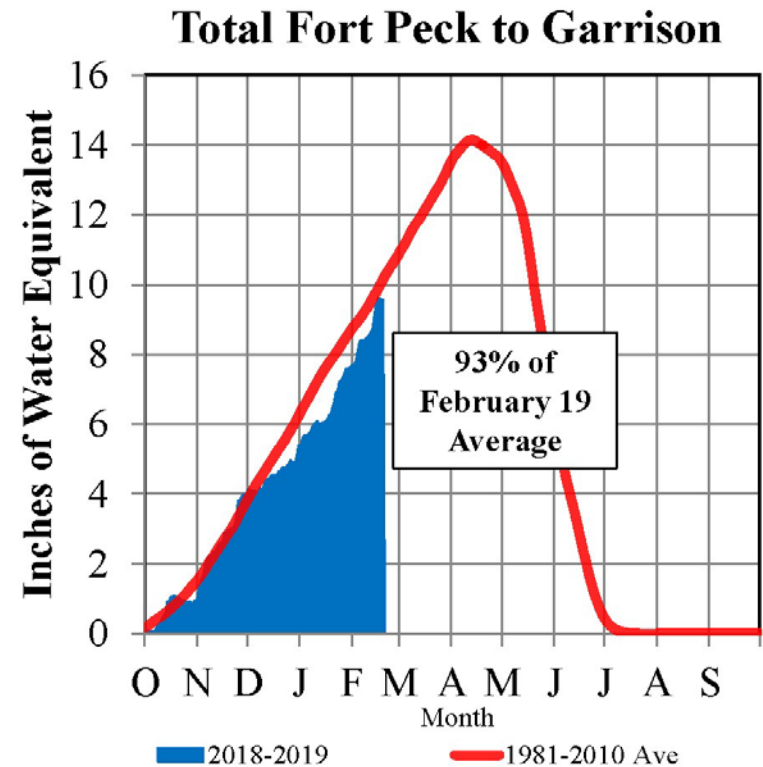
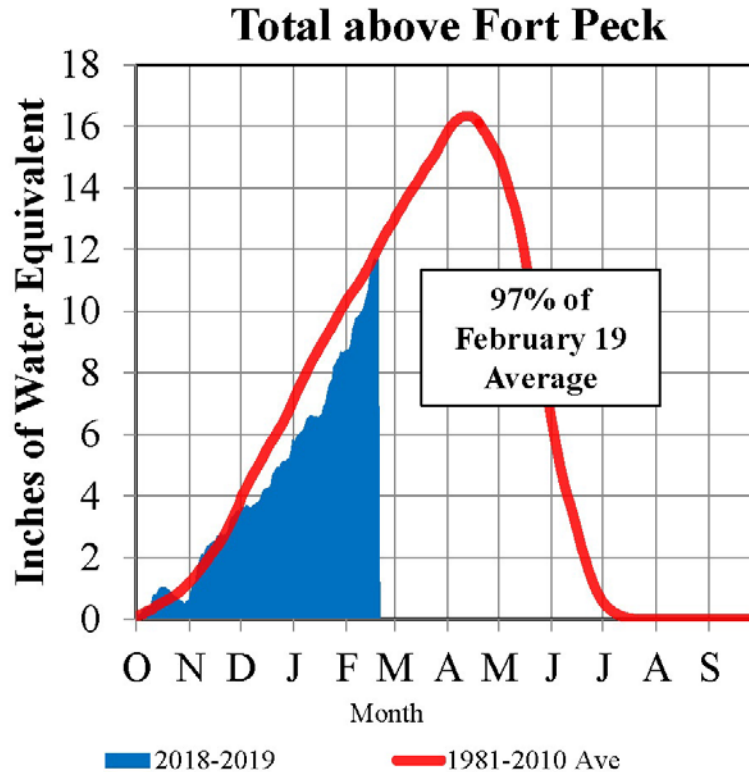
 since December

<https://www.wcc.nrcs.usda.gov>



Missouri River Basin Mountain Snowpack Water Content

February 19, 2019

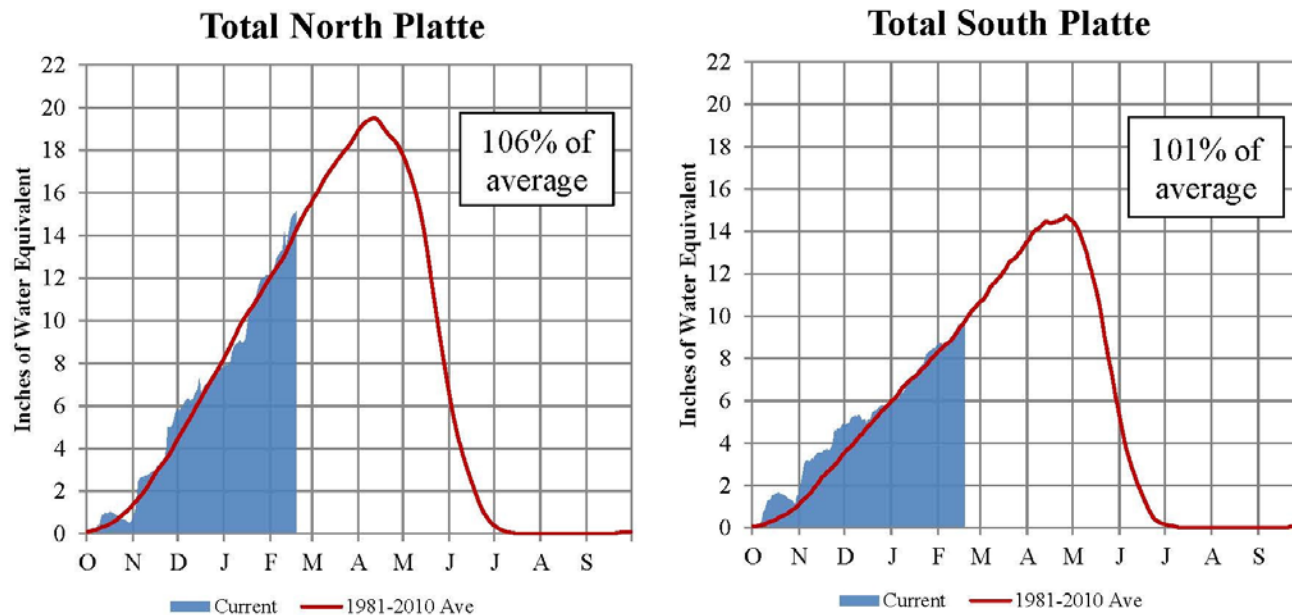


The Missouri River Basin mountain snowpack normally peaks near April 15.

Platte River Basin - Mountain Snowpack Water Content

Water Year 2018-2019

February 19, 2019



The North and South Platte River Basin mountain snowpacks normally peak near April 15 and the end of April, respectively. As of February 19, 2019, the mountain snowpack SWE in the "Total North Platte" reach is currently 15.1", 106% of average. The mountain snowpack SWE in the "Total South Platte" reach is currently 9.8", 101% of average.

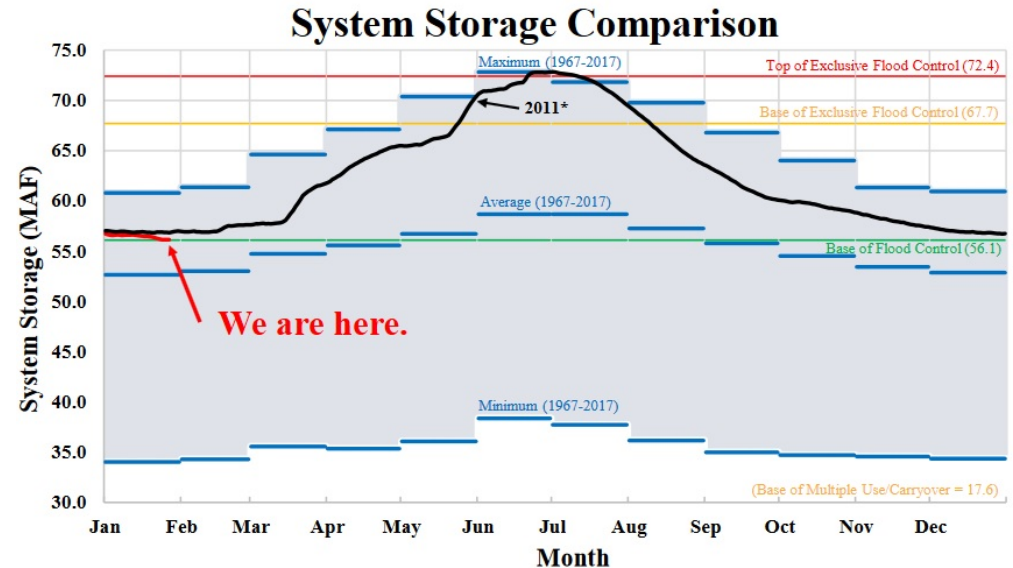
Source: USDA, Natural Resource Conservation Service

Provisional Data. Subject to Revision

Missouri River

Missouri Mainstem Reservoir Status (as of 1/28/19):

- System storage reached 56.1 MAF, the base of the Annual Flood Control and Multiple Use Zone, on January 28, 2019. This means that all stored flood waters from 2018 have been evacuated.



*In January 2011, the Base of Flood Control was 56.8 MAF, and the Top of Exclusive Flood Control was 73.1 MAF.

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

GREAT LAKES SURFACE ENVIRONMENTAL ANALYSIS (GLSEA)



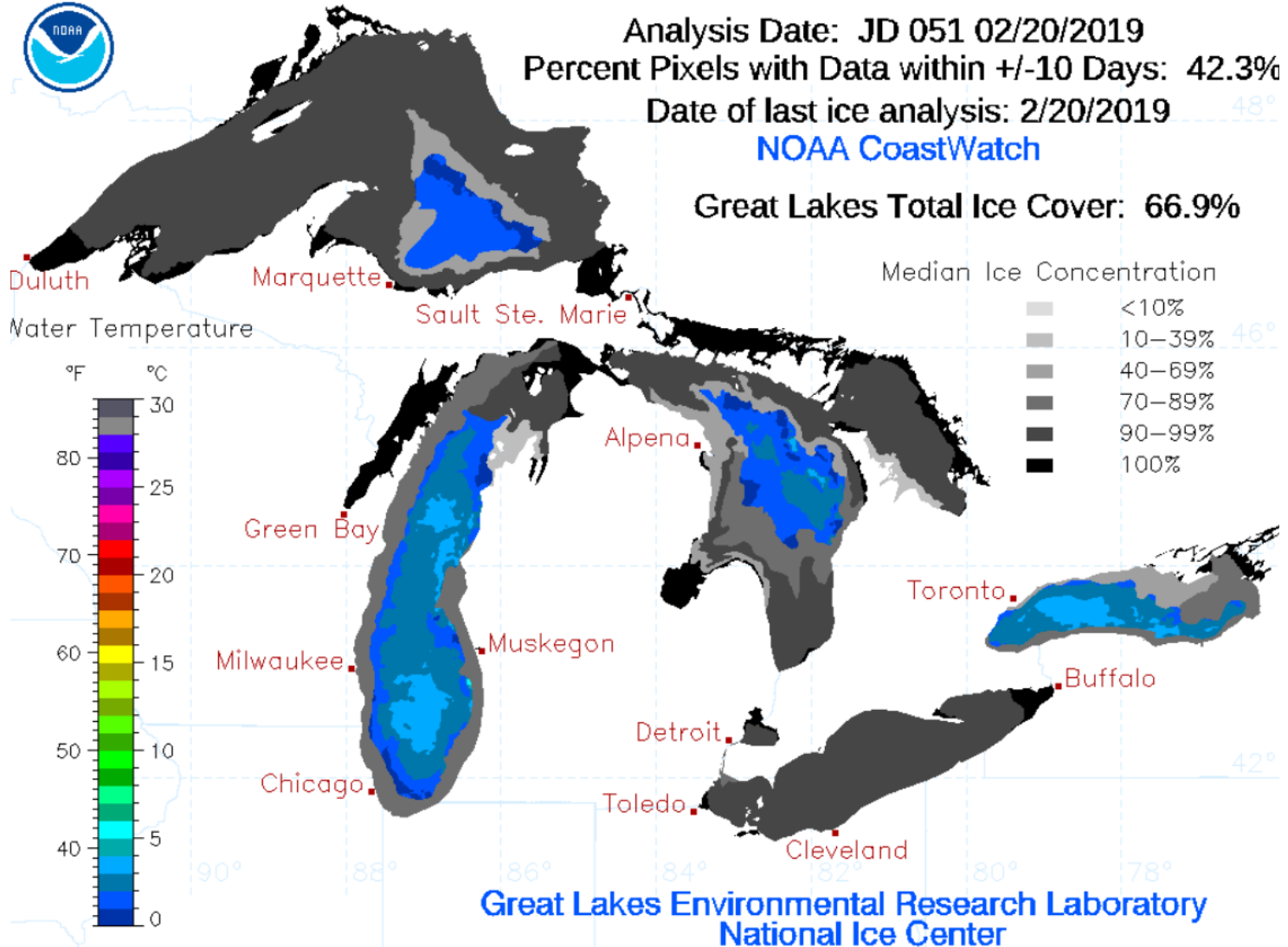
Analysis Date: JD 051 02/20/2019

Percent Pixels with Data within +/-10 Days: 42.3%

Date of last ice analysis: 2/20/2019 48°

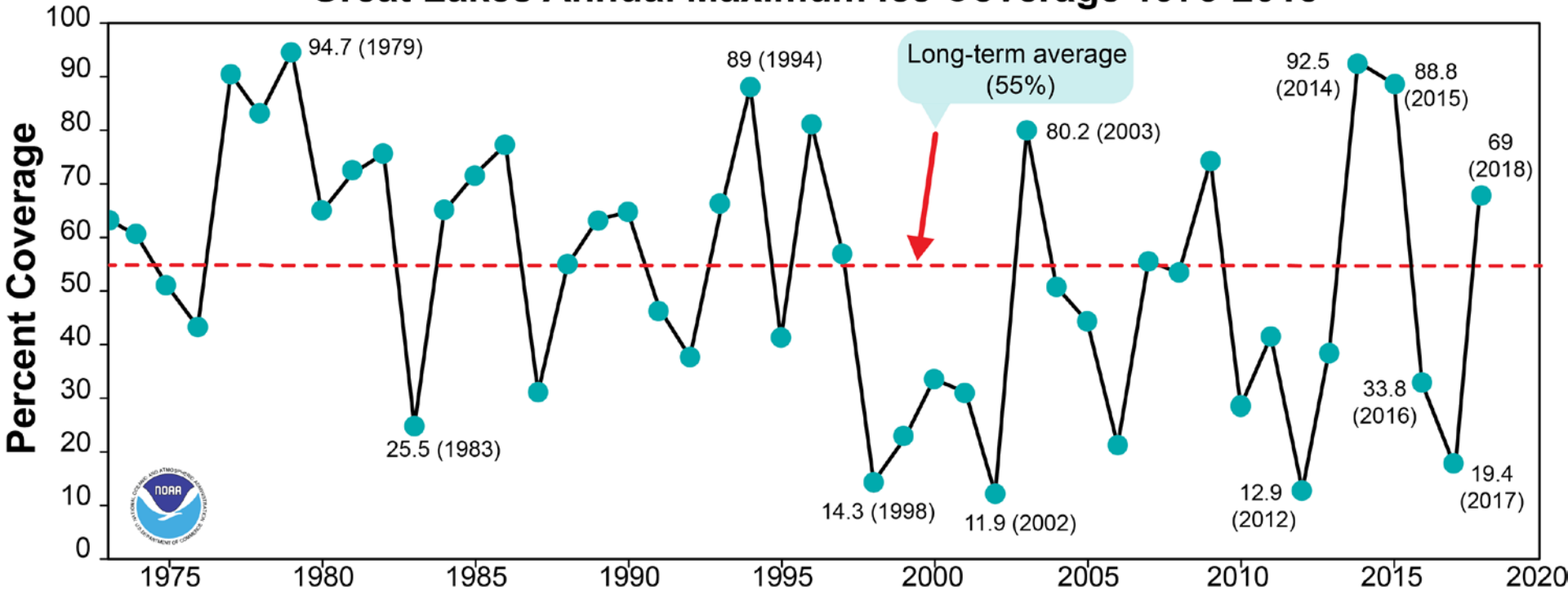
NOAA CoastWatch

Great Lakes Total Ice Cover: 66.9%



Great Lakes Ice cover

Great Lakes Annual Maximum Ice Coverage 1973-2018



- Very close to the same maximum coverage as last year, ice cover is still increasing. (Currently at 66%)

State Impacts



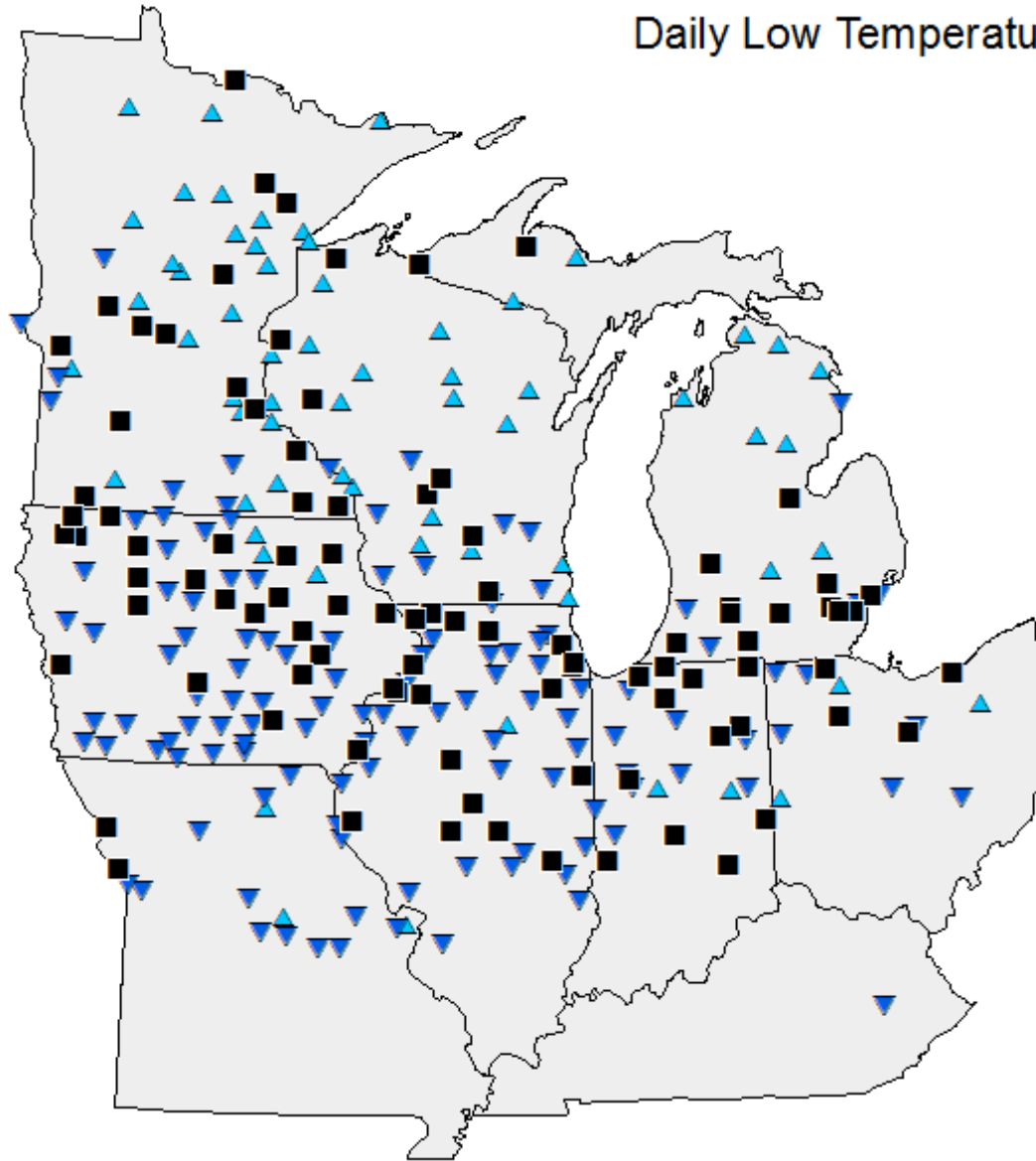
Arctic Sunrise at the Davenport, IA NWS
-Courtesy Ray Wolf

- Extreme Cold: January 27-31 “Polar Vortex”
 - For many, the coldest air since 1990’s.
 - Coldest wind chill readings (MN) in 30 years.
 - End of Line gas shortages (MN)
 - US Postal Service stopped (nine states)
 - Potential state Record Low in IL (-38 F at Mt. Carroll)
 - -56 F at Cotton MN (-60 F is state record)
 - Historic wind chills web page had 11,000 views on Jan 29 (MNSCO)

Courtesy: Duluth National Weather Service



Daily Low Temperature Records broken or tied on 1/30/2019



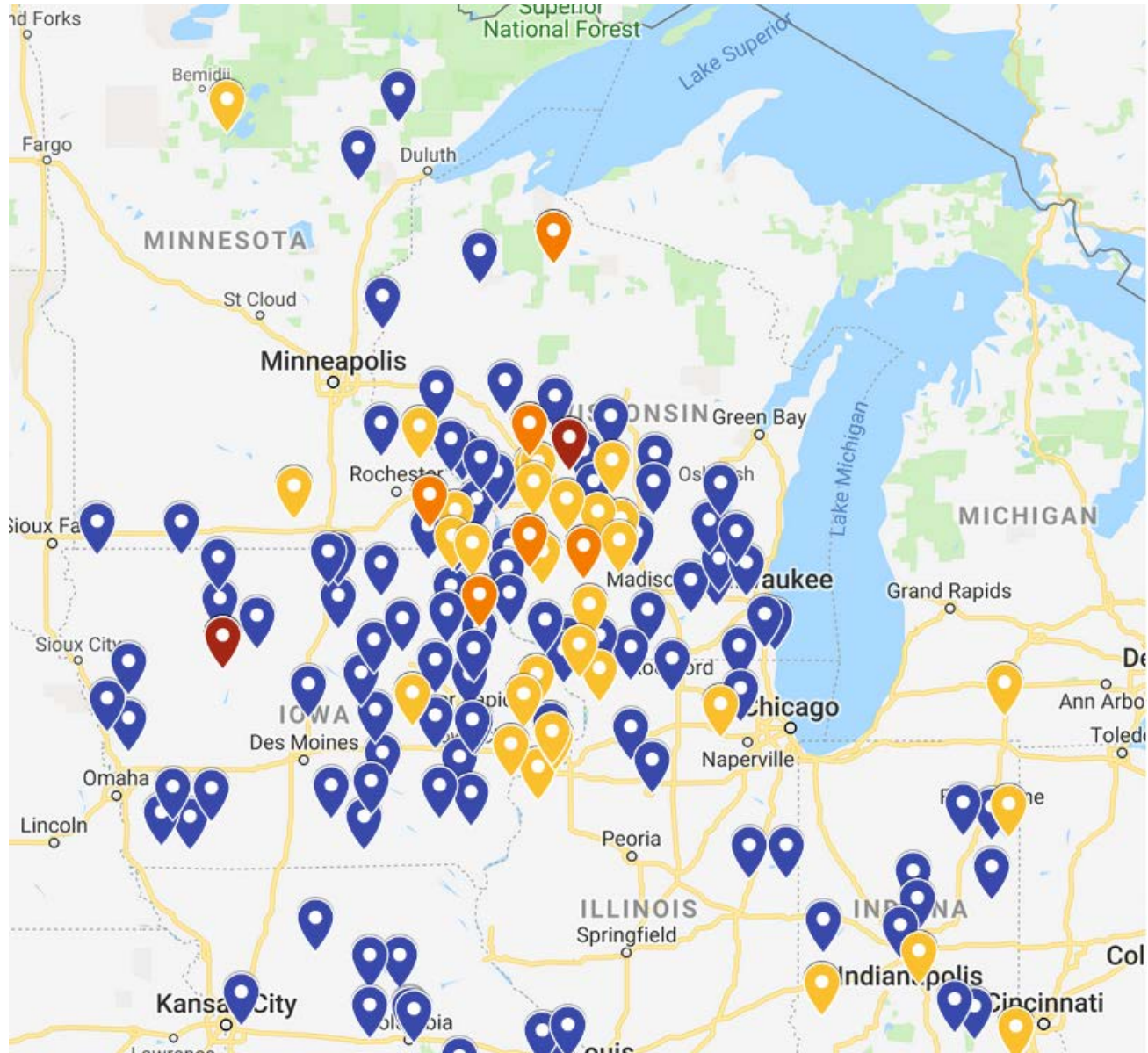
- Both Low Minimum and Maximum
- ▼ Low Minimum
- ▲ Low Maximum



Minimum 30 years of data
All Reports Are Considered Preliminary

Courtesy: Midwest Regional Climate Center

Extreme Temperature Changes January 29-February 4, 2019



Differences between low minimum temperature and highest maximum temperature (°F) during the period of January 29 through February 4, 2019.

Courtesy: Midwest Regional Climate Center

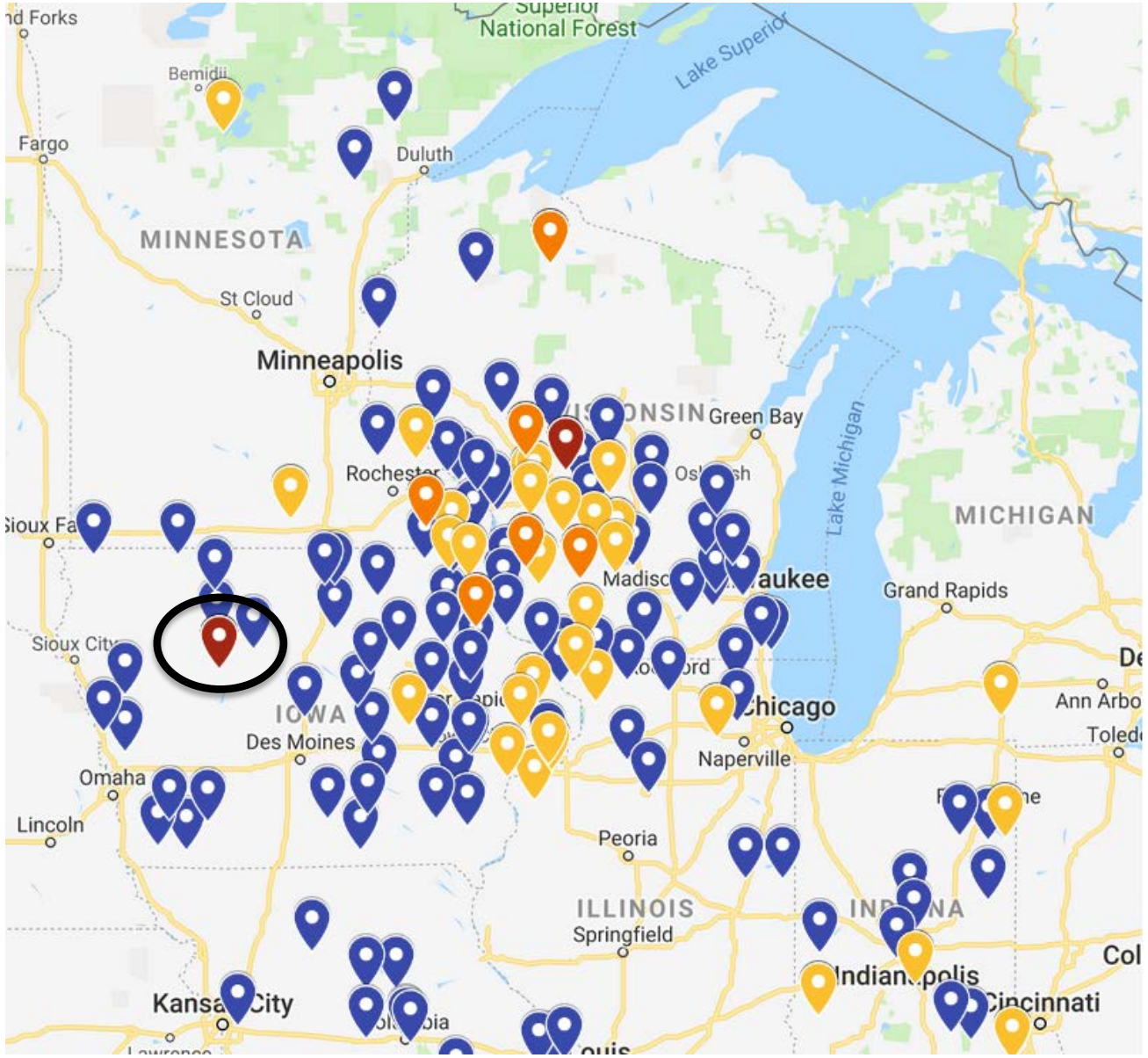
Extreme Temperature Changes January 29-February 4, 2019



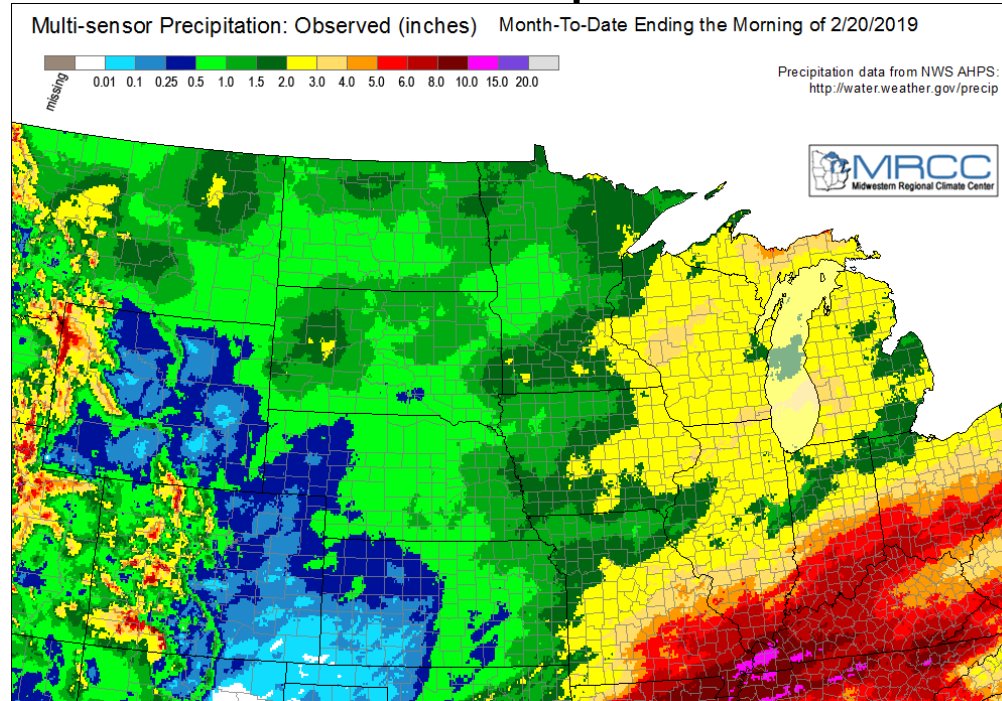
Differences between low minimum temperature and highest maximum temperature (°F) during the period of January 29 through February 4, 2019.

Courtesy: Midwest Regional Climate Center

(winner is Rockwell City Iowa with 94 degrees (-35 to 59)



- Kentucky: Wetness continues
 - February precipitation 200-300% of mean
 - Saturated soils and mucky in fields
 - Perception is that it is cold and damp despite some recent warm temperature records.



- Drought Improvement in Wyoming and Colorado
 - First time in a long time all basins above average for snow pack (near normal in WY)
 - Temperatures warm enough to keep snow at middle and lower elevations (CO)
 - Some brush fires in past week. Will need to keep an eye in windy season (CO)

Monarch Pass: Late January 2019

Courtesy: Becky Bolinger, Colorado Climate Center



- Snow a Boon to Winter Recreation... but
 - Colorado ski locations are busy
 - Lots of snowmobile activity SD
 - Ice fishing, Skiing in MN
 - Kansas City, MO has spent 20 million on snow removal so far. Record is 23 million.
 - Concern about roof ice dams

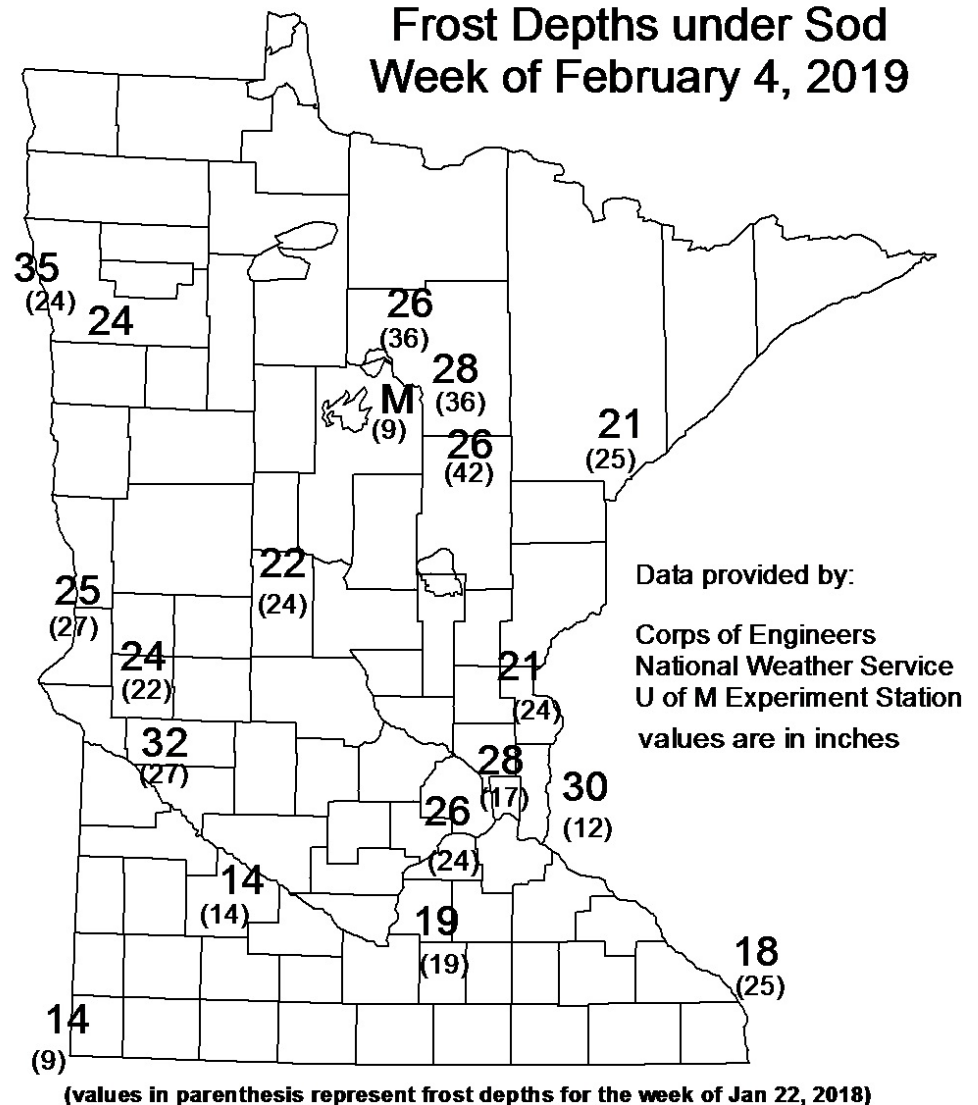
New Winter Recreation Activity: Feb 20, 2019
Courtesy: MNDNR State Climatology Office



- North Dakota
 - ND broke or tied 16 lowest daily max and 26 lowest daily min temperatures in January.
 - Lisbon ND broke an all-time new min temp of -47 degree that occurred on Jan 31.
 - Snowpack ended the last remains of the 2017-2018 drought in the first week of February.
 - Frost depths range from a minimum of 31” in Bowman (SW ND) to a maximum of 59” in Minot (NW ND).

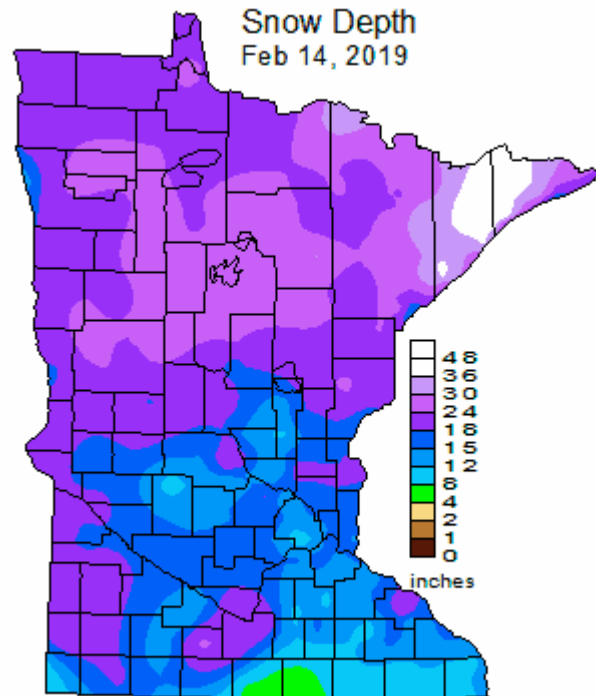
Fairly Deep frost in MN – but varies.

- Depths of 12-36 inches common historically
 - Mixed depths depending on snow cover.
 - Shallower in Mississippi Headwaters. Very deep in Western Wisconsin.
- Max depth typically occurs late February to early March

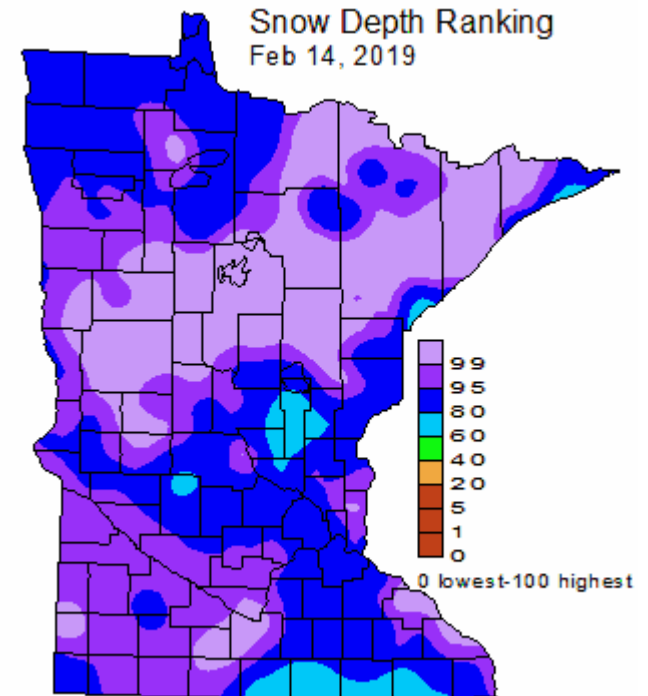


Deepening Snow Pack: Winter 18-19

- Bulk of snowfall since January 18 (adding 20+ inches)
- Some of the highest snow depth ranking compared to history in the Mississippi Headwaters
- Next map this afternoon (with even deeper snow)



DNR EcoWat - State Climatology Office, 02-14-2019



DNR EcoWat - State Climatology Office, 02-14-2019

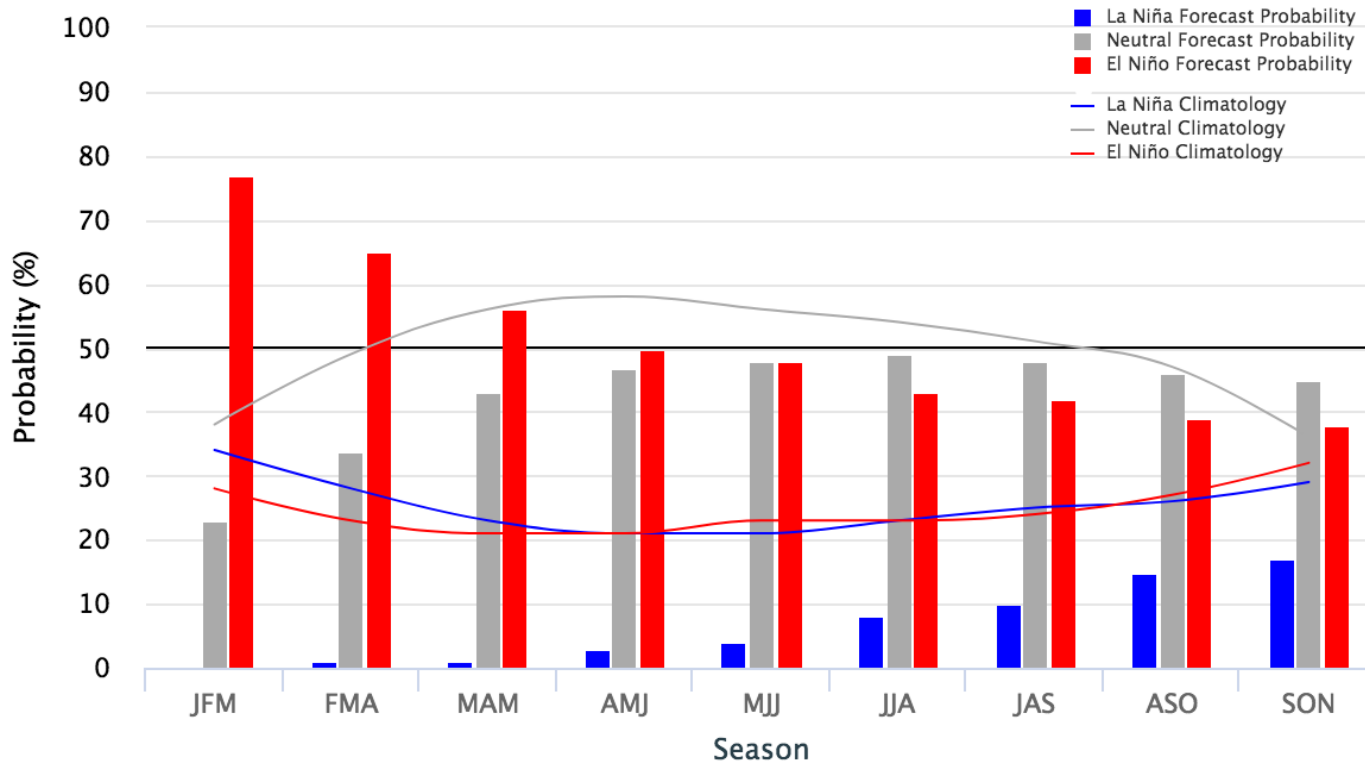
Weak El Niño is here

- Weak El Niño conditions are present and are expected to continue through the Northern Hemisphere spring 2019 (~55% chance)
- Due to the expected weak strength, widespread or significant global impacts are not anticipated.
- Some impacts may occur over the next several months.

ENSO Probabilities

Early-February 2019 CPC/IRI Official Probabilistic ENSO Forecasts

ENSO state based on NINO3.4 SST Anomaly
 Neutral ENSO: $-0.5\text{ }^{\circ}\text{C}$ to $0.5\text{ }^{\circ}\text{C}$

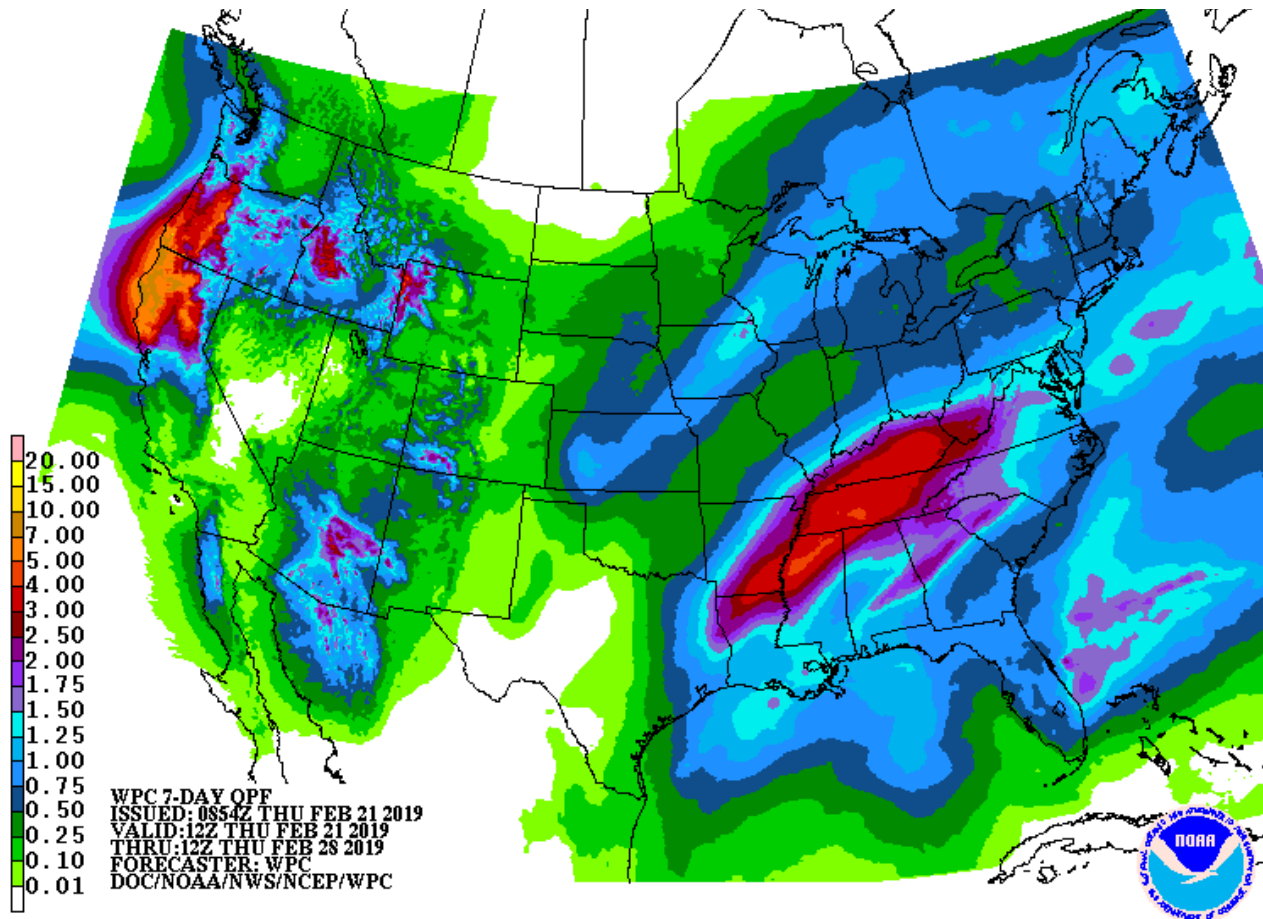


Climate Outlooks

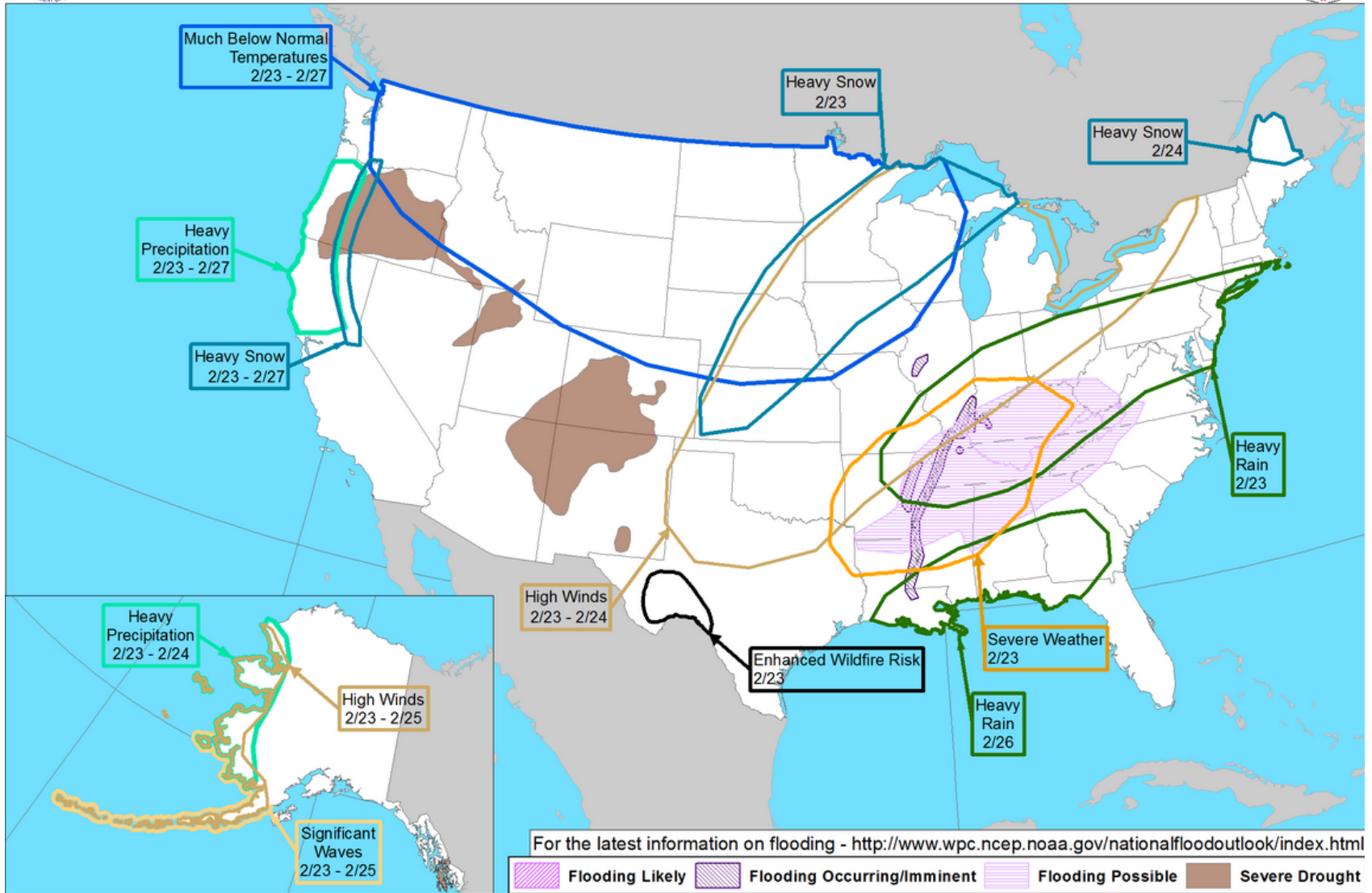
- 7-day QPF
- U.S. Hazard Outlooks
- 6-10 day outlook
- Weekend Storm System
- March temperature and precipitation
- MAM temperature and precipitation
- AMJ temperature and precipitation

7-day Quantitative Precipitation Forecast

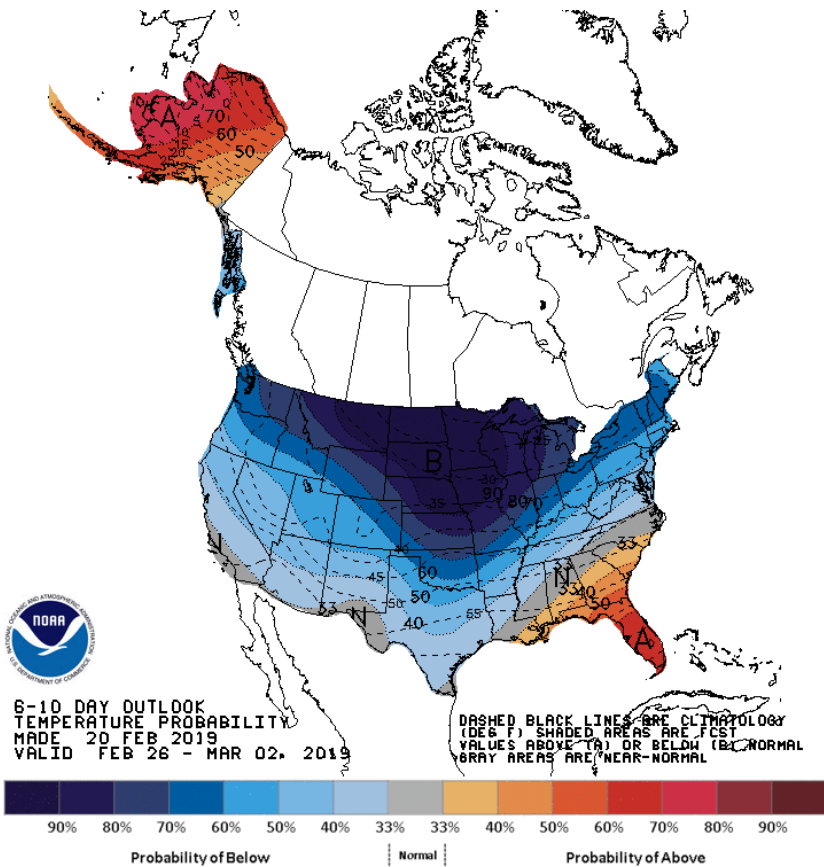
Valid: 21 Feb. – 28 Dec.



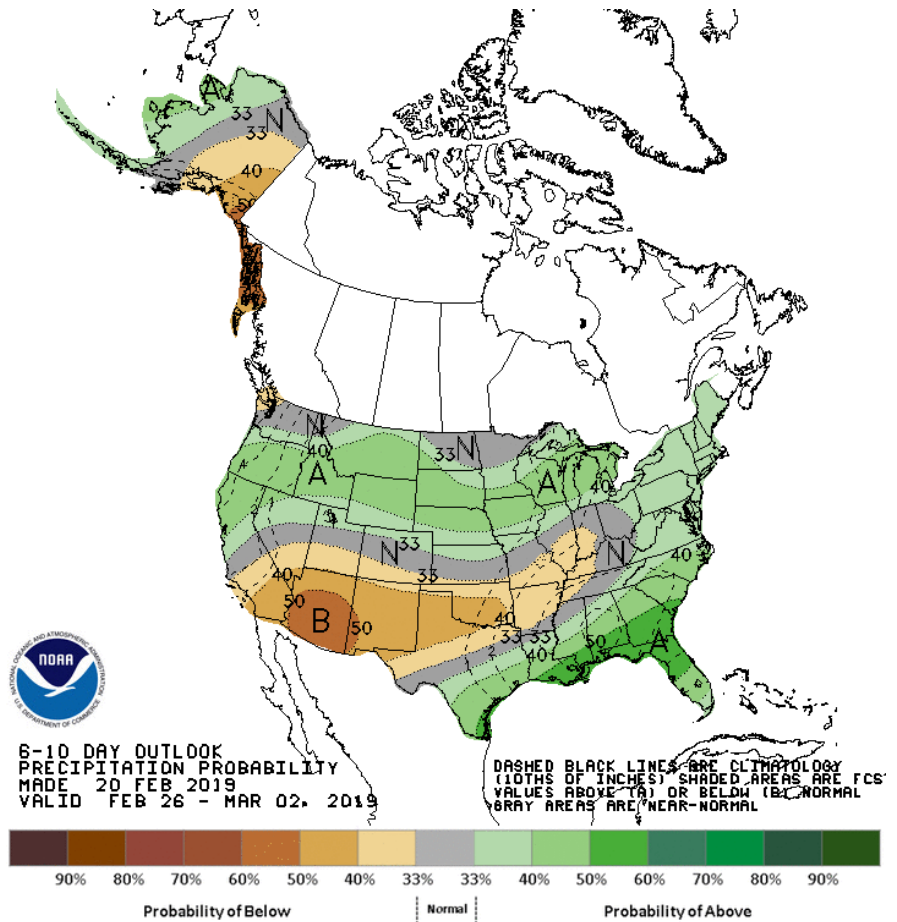
Day 3-7 U.S. Hazards Outlook Valid: 02/23/2019-02/27/2019



6-10 Day Outlook

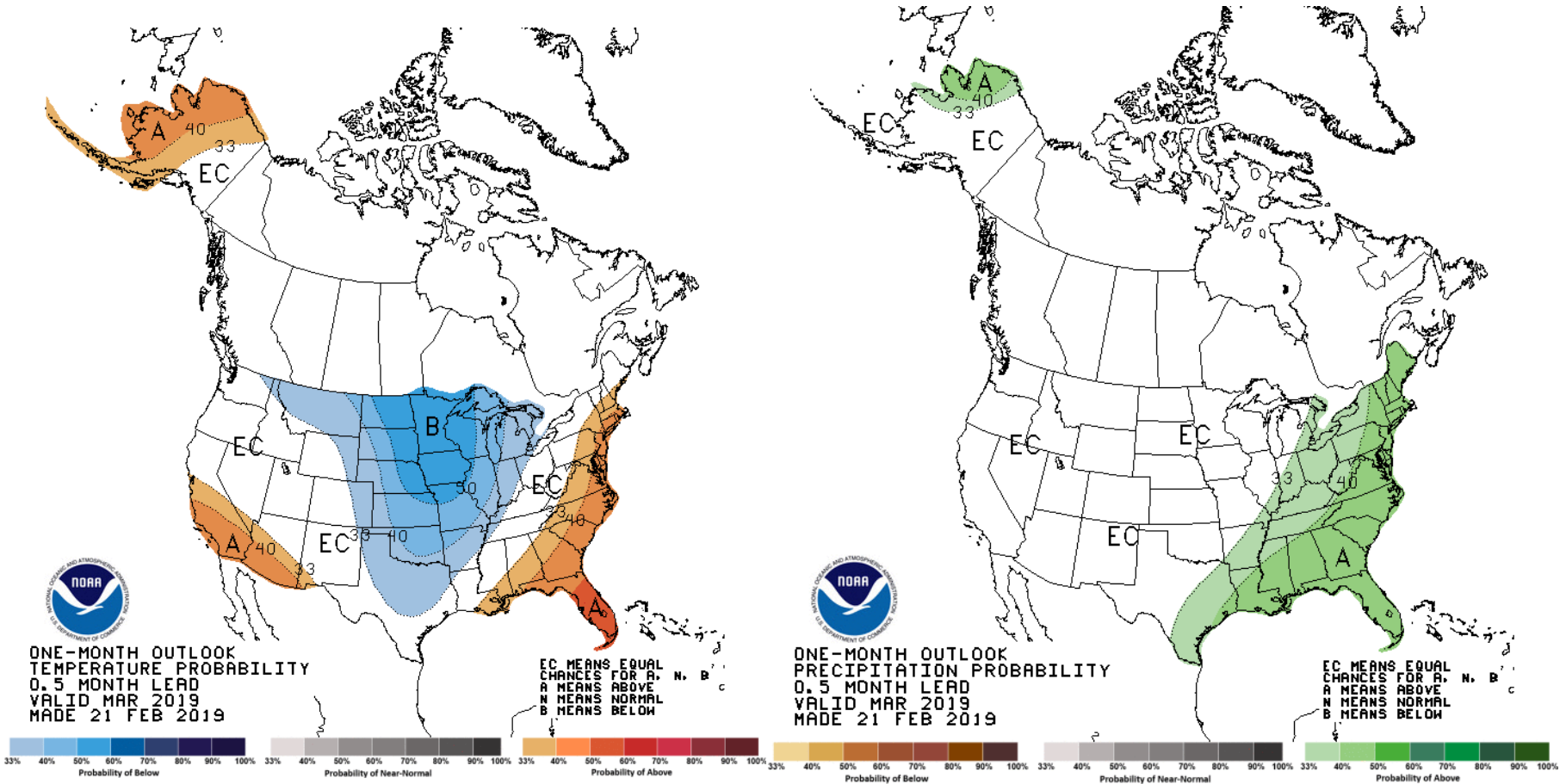


Temperature



Precipitation

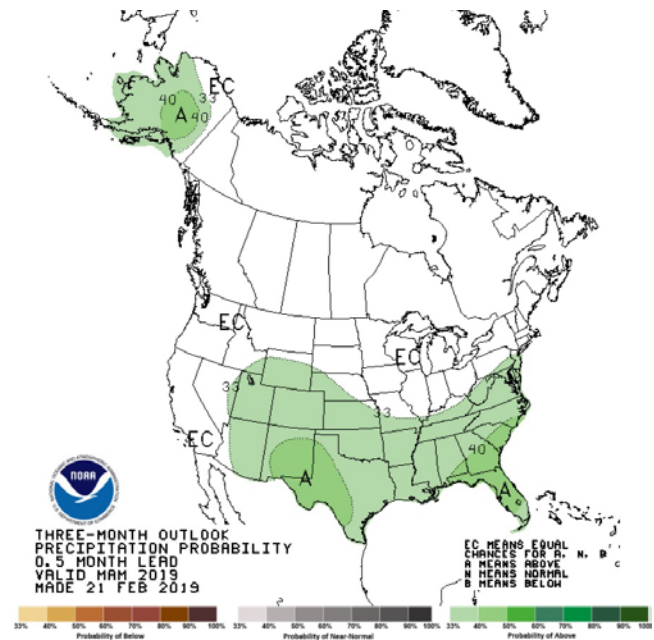
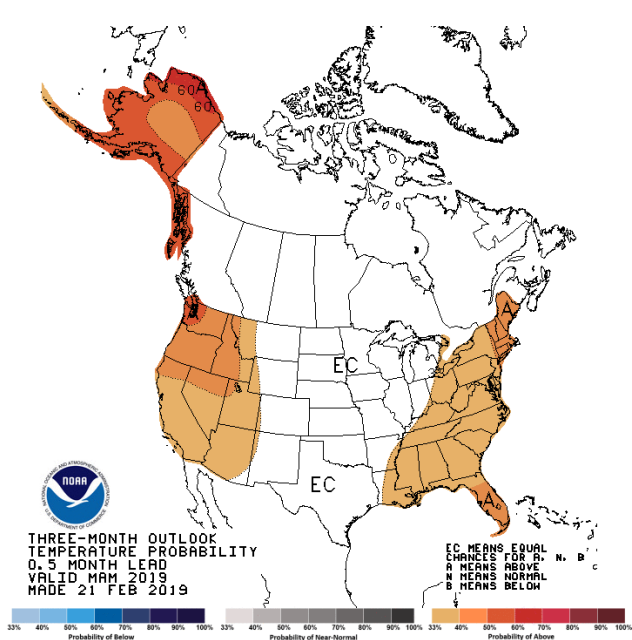
March Outlook



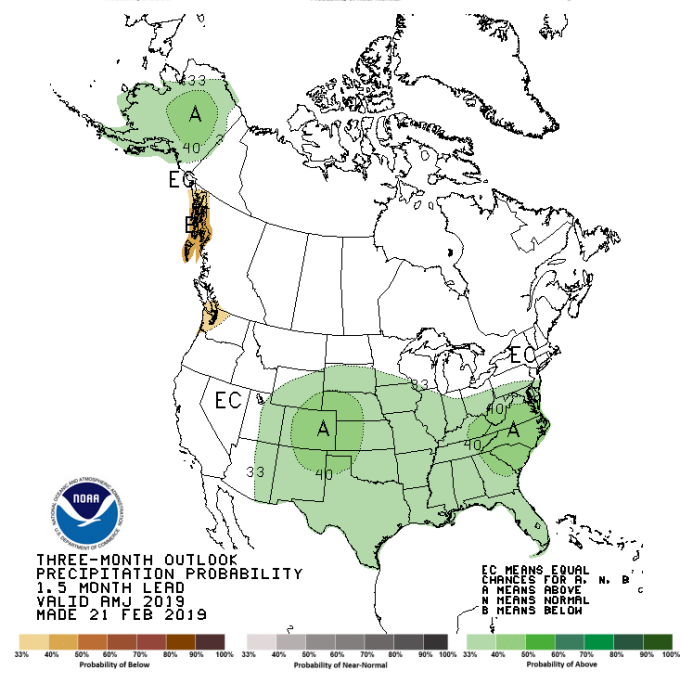
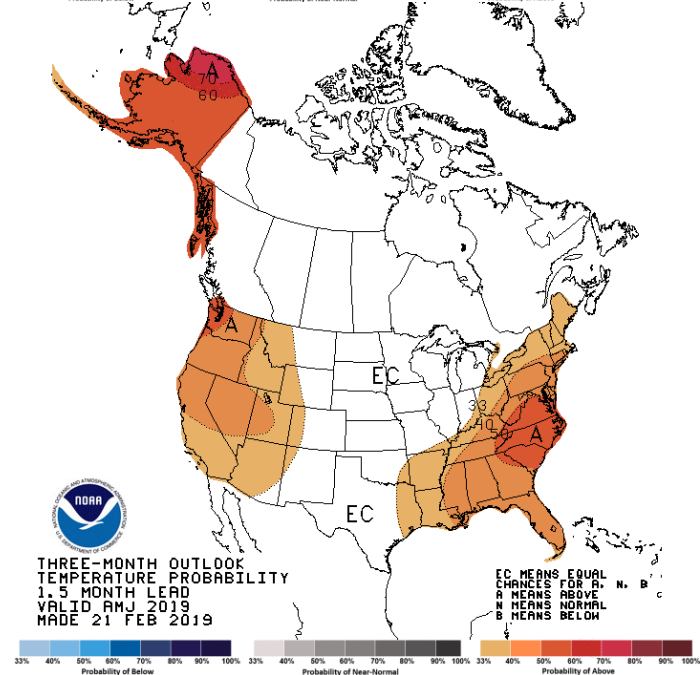
Temperature

Precipitation

MAM



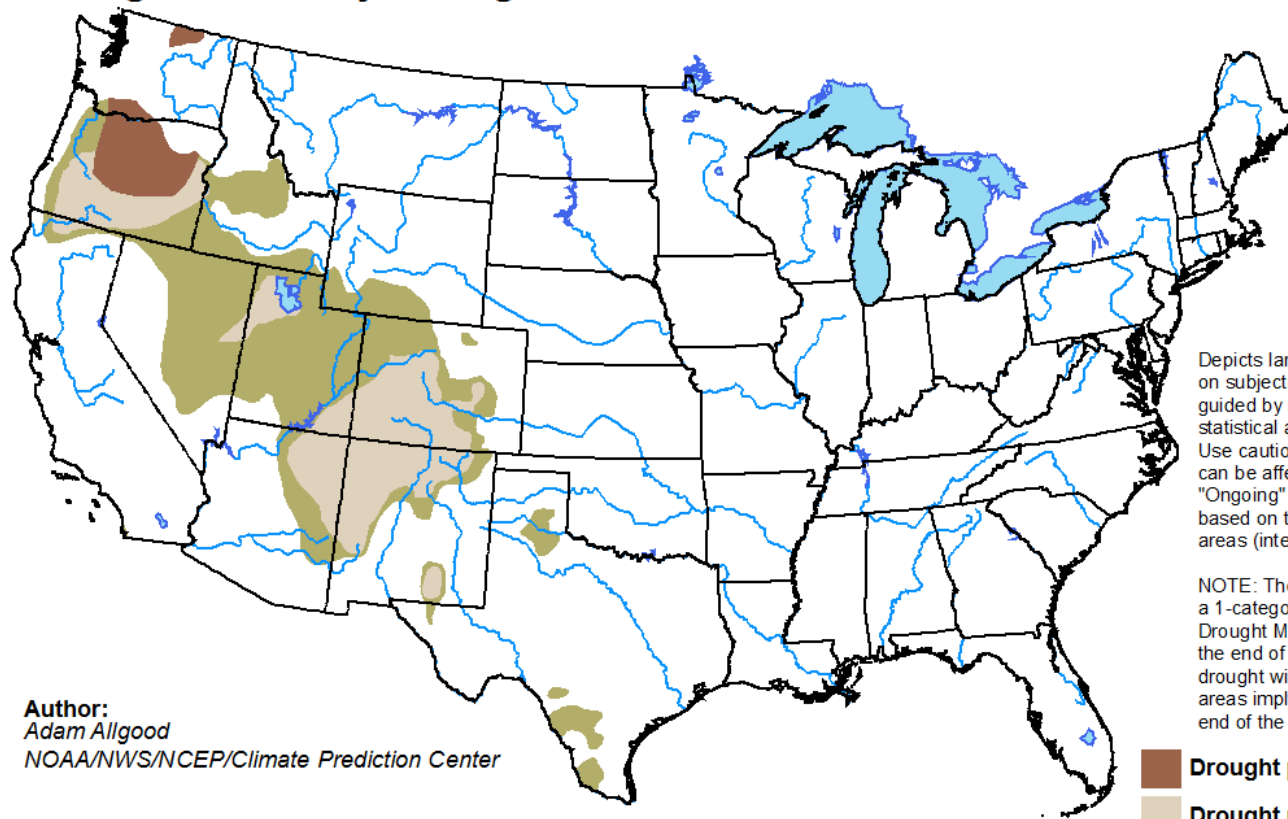
AMJ



Seasonal Drought Outlook

U.S. Seasonal Drought Outlook Drought Tendency During the Valid Period





Valid for February 21 - May 31, 2019
Released February 21

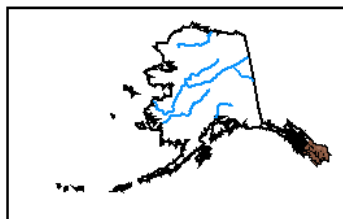


Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

Author:
Adam Allgood
NOAA/NWS/NCEP/Climate Prediction Center

-  Drought persists
-  Drought remains but improves
-  Drought removal likely
-  Drought development likely



<http://go.usa.gov/3eZ73>

Outlook Summary

- Weak El Niño this spring and uncertainty after that.
- Significant storm this weekend.
- Below normal temperatures to persist into March.
- Equal chances for below, normal and above normal temperatures this spring. Above normal temp and pre. Ohio and Kentucky.

Further Information - Partners

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

Thank You and Questions?

- Questions:
 - **Climate:**
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 - Justin Glisan: justin.glisan@iowaagriculture.gov , 515-281-8981
 - Dennis Todey: dennis.todey@ars.usda.gov , 515-294-2013
 - Doug Kluck: doug.kluck@noaa.gov, 816-994-3008
 - Mike Timlin: mtimlin@illinois.edu; 217-333-8506
 - Natalie Umphlett: numphlett2@unl.edu ; 402-472-6764
 - Brian Fuchs: bfuchs2@unl.edu 402-472-6775

- **Weather:**
- crhroc@noaa.gov

