



North Central U.S. Climate and Drought Outlook

17 December 2020

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General Information

- **Providing climate services to the Central Region**
 - *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**
 - *January 21 (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*
 - *Drought*
- Crops & Soils
- Snow, Fire, Rivers and Lakes
- Impacts and Notable Events
- Outlooks
 - *La Niña*
 - *Short-term*
 - *Winter season*



Recent Conditions

November Temperature and Precipitation Ranks

Autumn Temperature and Precipitation Ranks

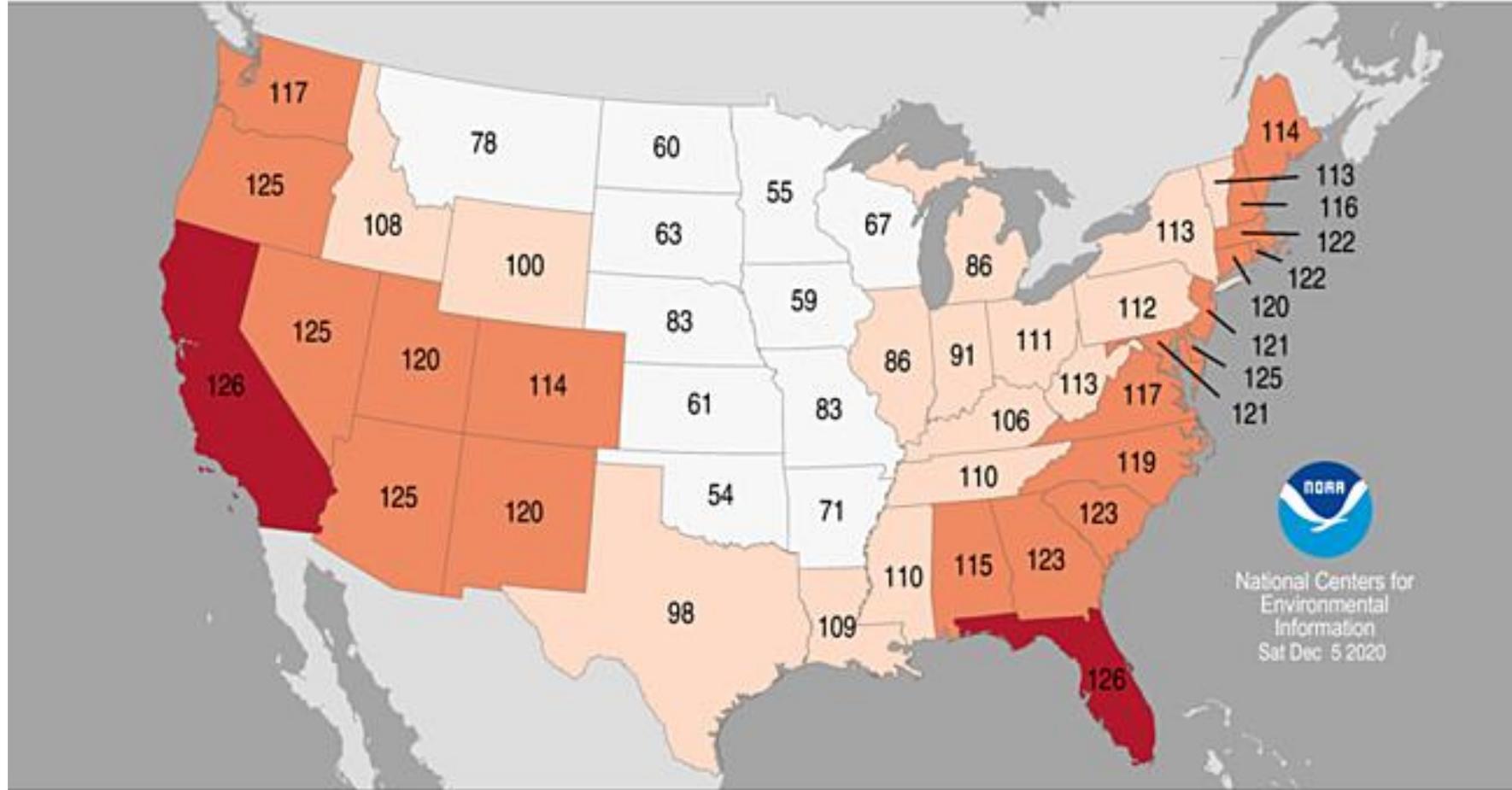
Departure from Normal Temperature and Precipitation

Soil Moisture, Streamflow and Drought

Statewide Average Temperature Ranks

September – November 2020

Period: 1895–2020



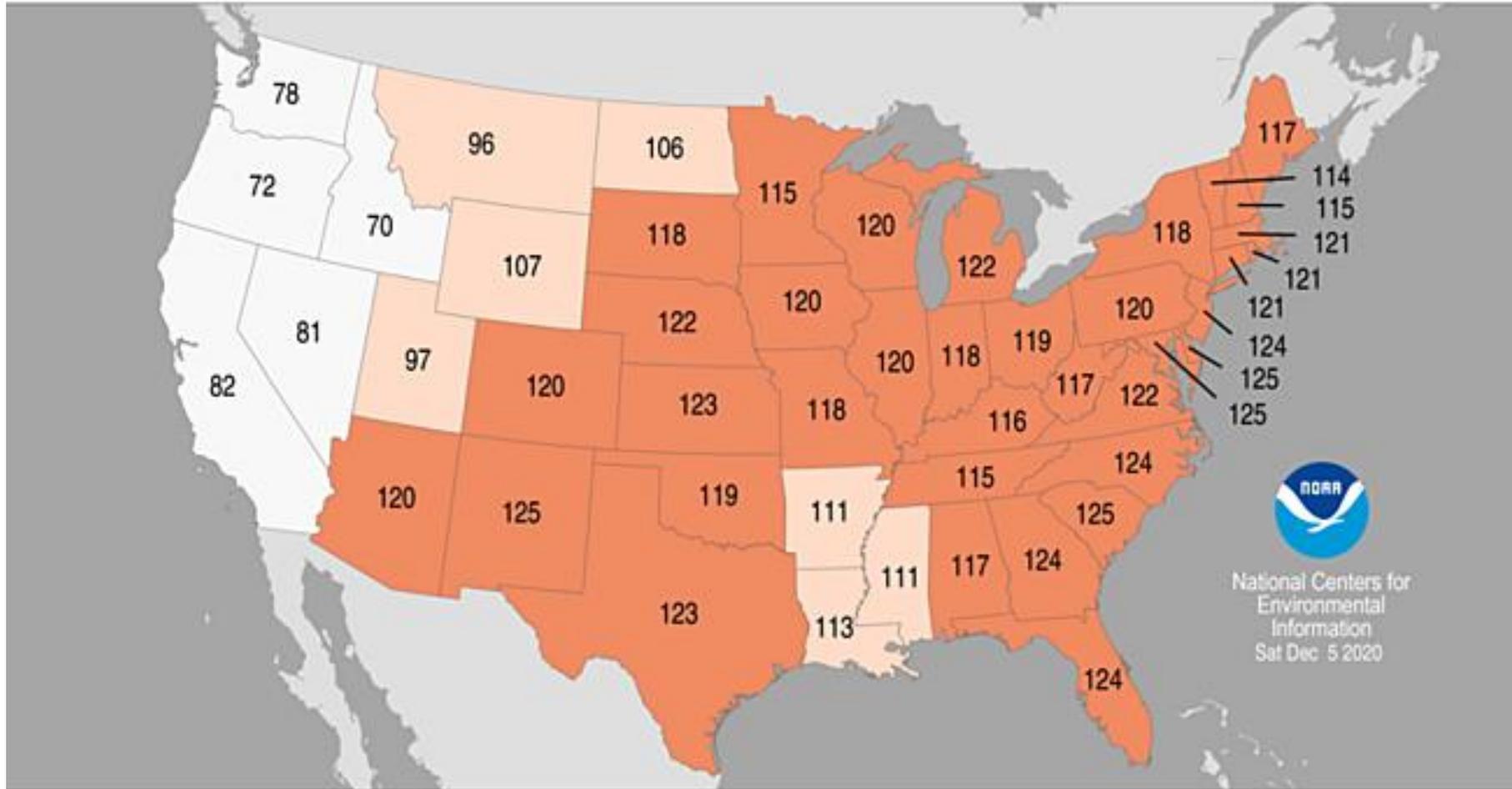
National Centers for Environmental Information
Sat Dec 5 2020



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

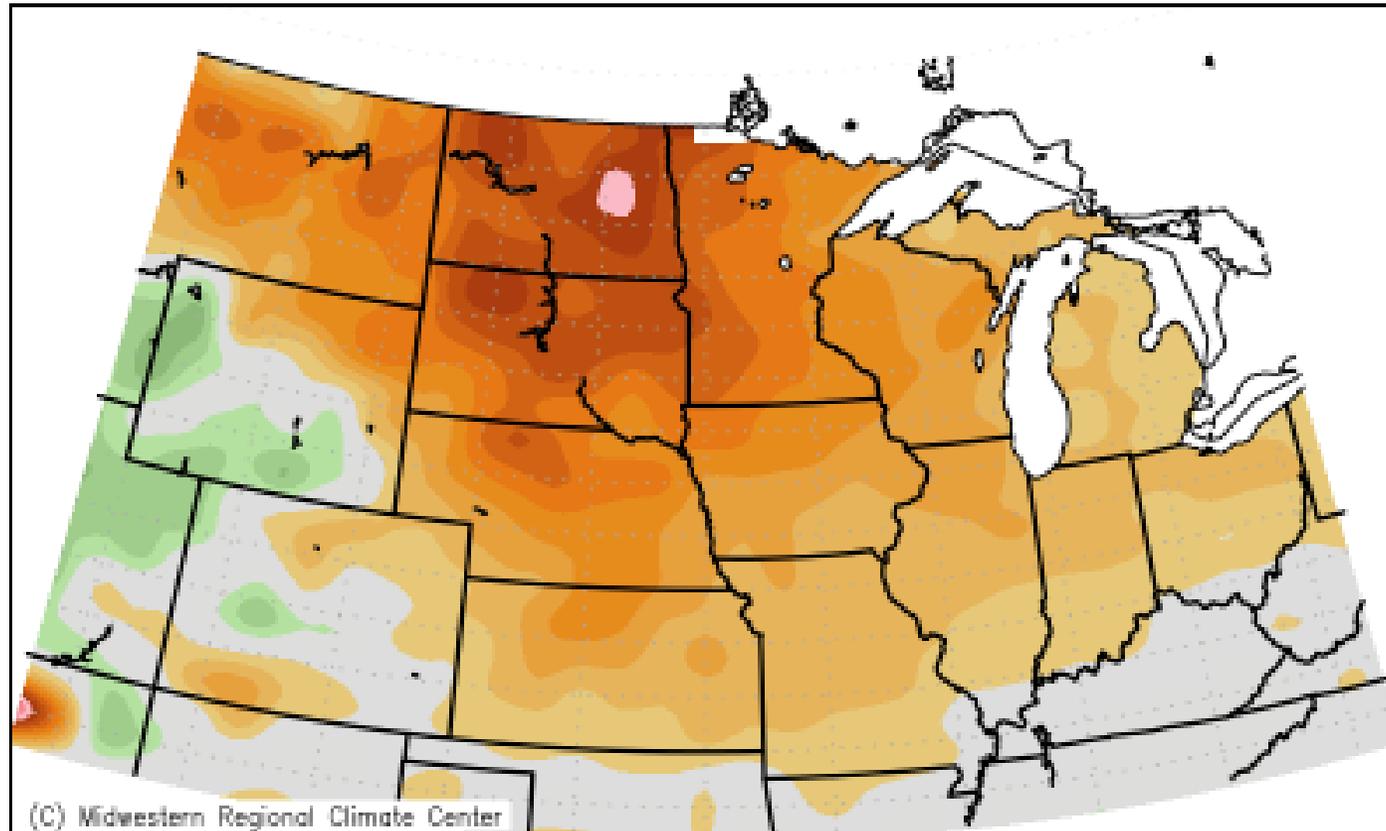
Statewide Average Temperature Ranks

November 2020
Period: 1895–2020

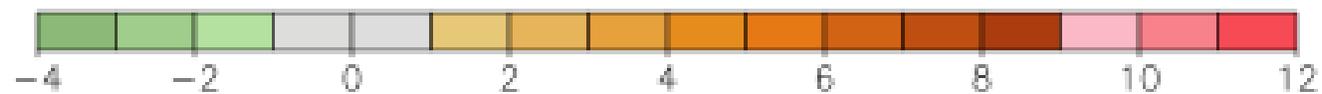


<http://www.ncdc.noaa.gov/temp-and-precip/us-maps/>

Average Temperature ($^{\circ}\text{F}$): Departure from Mean
November 17, 2020 to December 15, 2020



Mean period is 1981–2010.



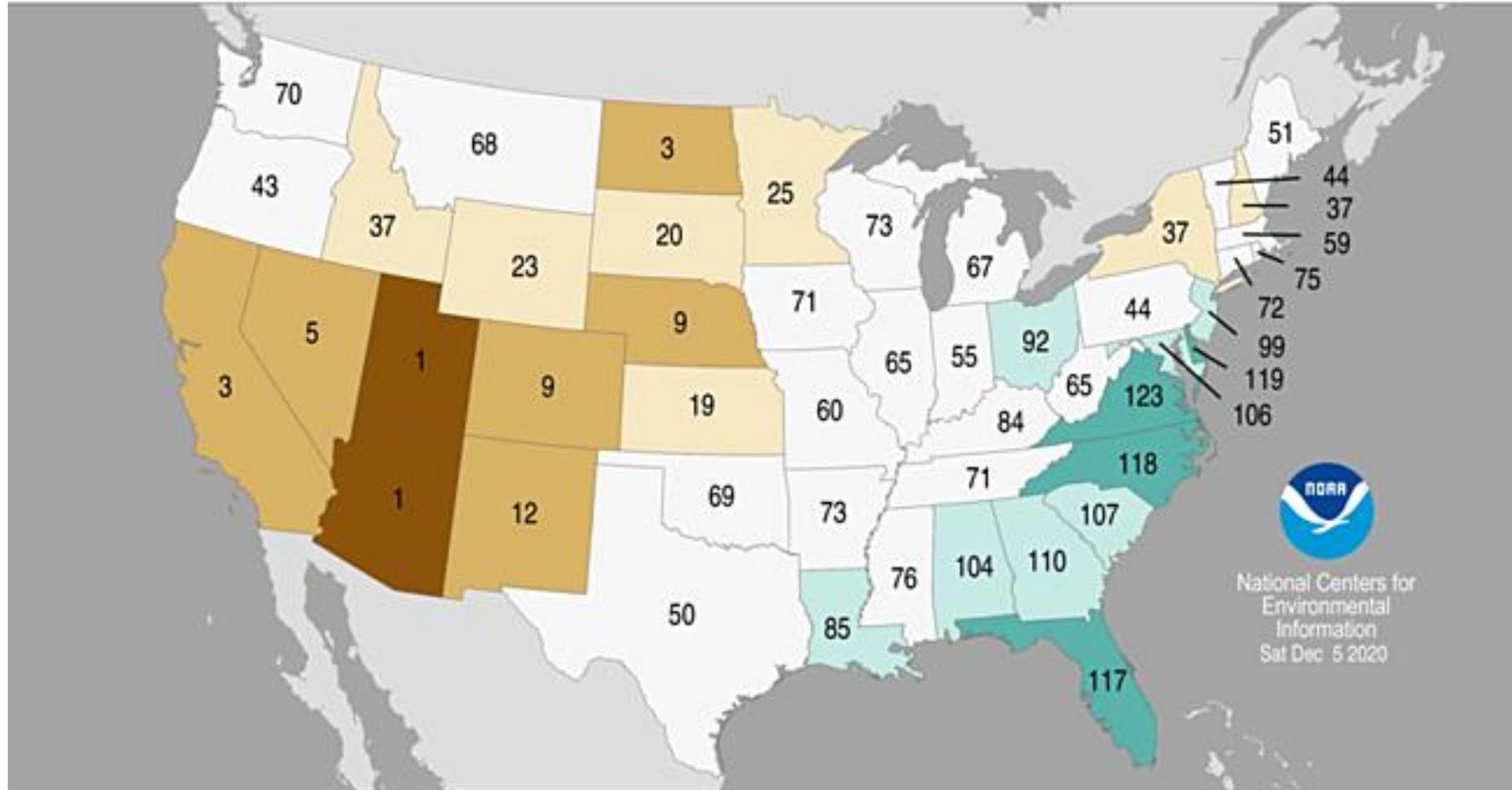
Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment

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

Statewide Precipitation Ranks

September – November 2020

Period: 1895–2020

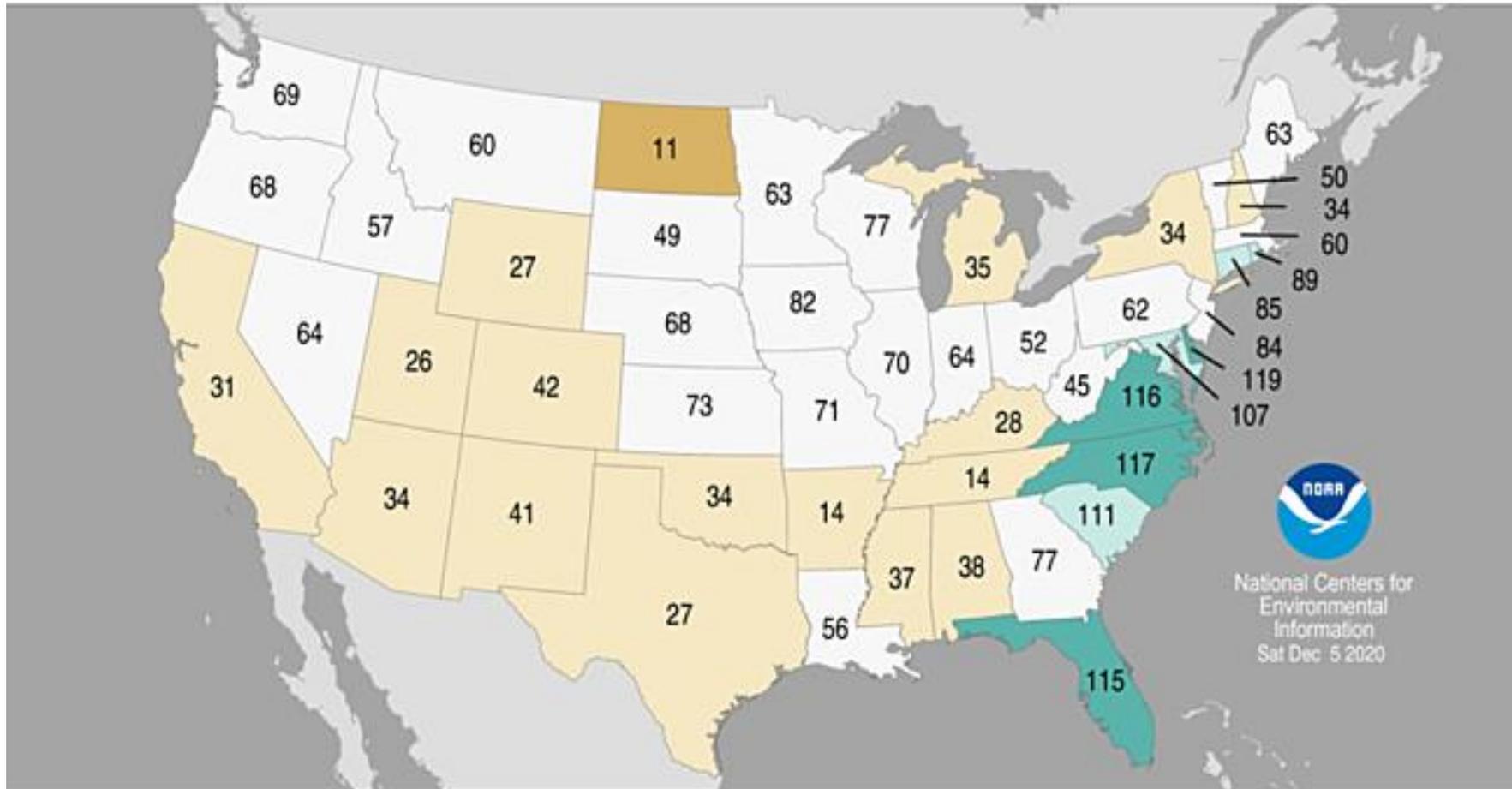


<http://www.ncdc.noaa.gov/temp-and-precip/us-maps/>

Statewide Precipitation Ranks

November 2020

Period: 1895–2020



Record Driest
(1)

Much Below Average

Below Average

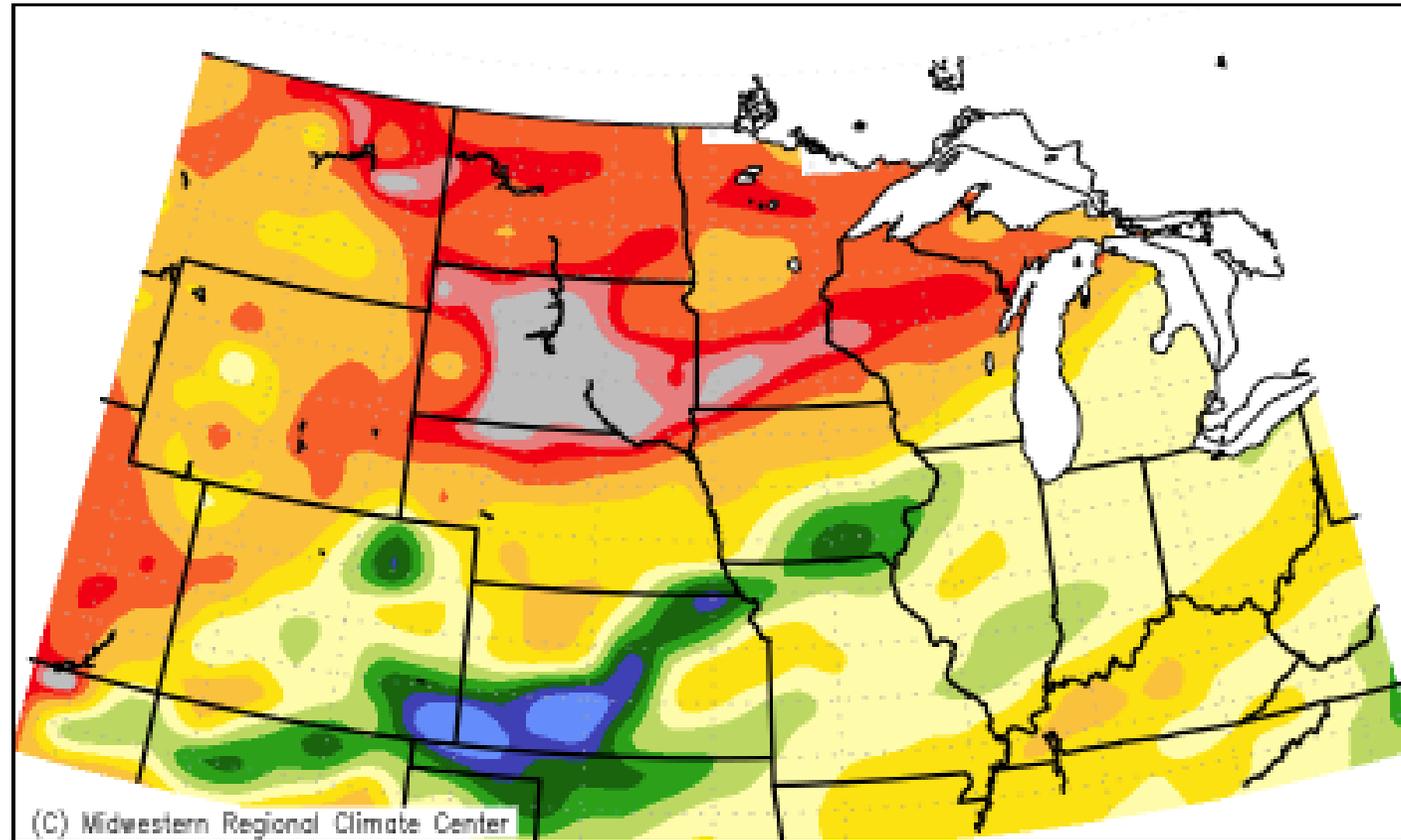
Near Average

Above Average

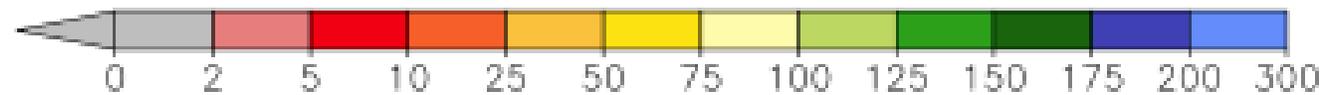
Much Above Average

Record Wettest
(126)

Accumulated Precipitation: Percent of Mean November 17, 2020 to December 16, 2020



Mean period is 1981–2010.



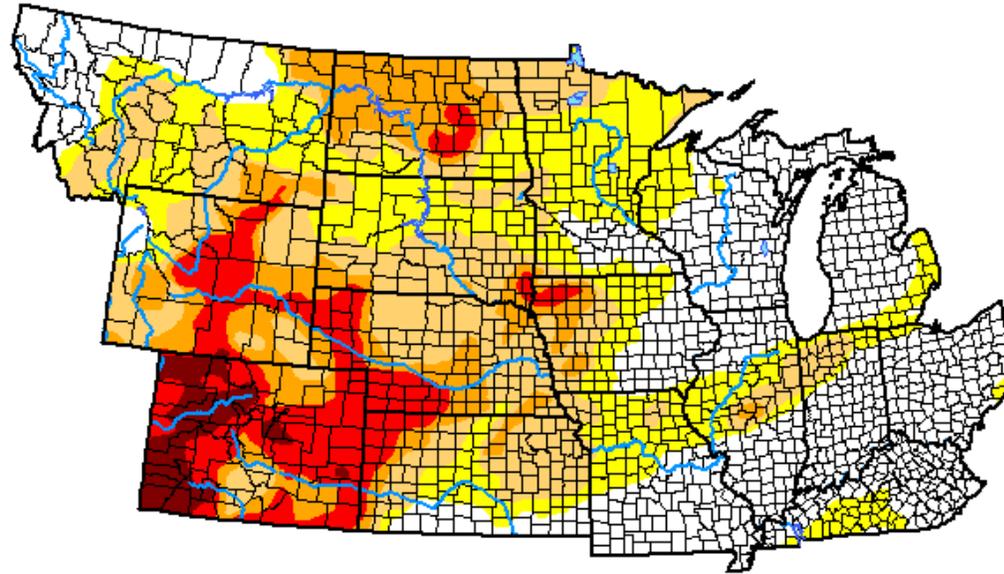
Midwestern Regional Climate Center

cli-MATE: MRCC Application Tools Environment

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

U.S. Drought Monitor NWS Central Region

December 15, 2020
(Released Thursday, Dec. 17, 2020)
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	32.43	67.57	45.27	24.23	12.18	2.52
Last Week <i>12-08-2020</i>	32.54	67.46	44.39	24.41	12.18	2.52
3 Months Ago <i>09-15-2020</i>	42.86	57.14	30.09	15.83	6.23	0.03
Start of Calendar Year <i>12-31-2019</i>	87.81	12.19	5.33	2.11	0.00	0.00
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>12-17-2019</i>	87.39	12.61	6.60	2.41	0.11	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>

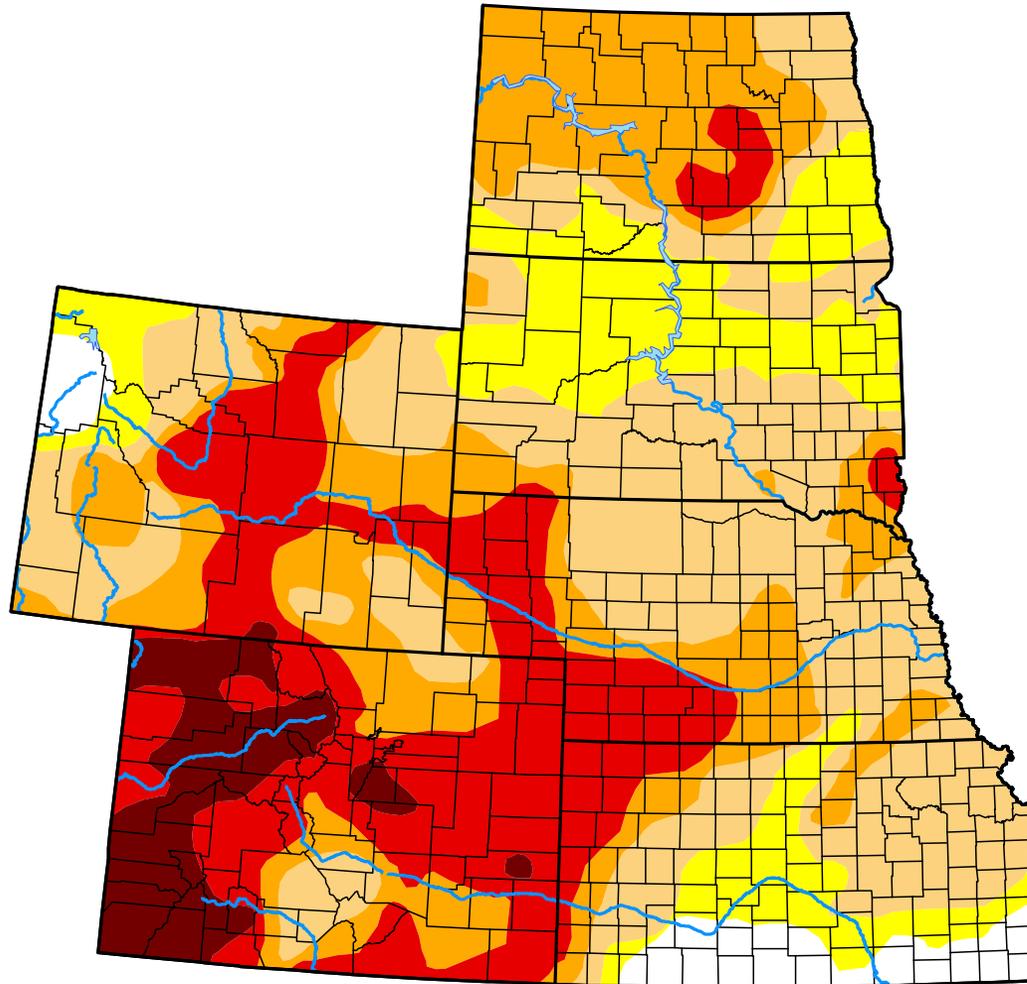
Author:

David Simeral
Western Regional Climate Center

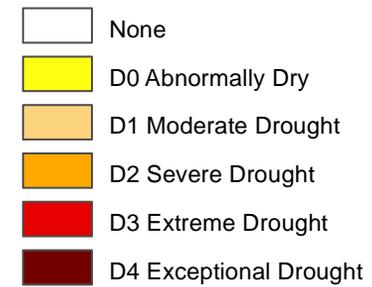


U.S. Drought Monitor High Plains

December 15, 2020
(Released Thursday, Dec. 17, 2020)
Valid 7 a.m. EST



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 Simeral
Western Regional Climate Center



droughtmonitor.unl.edu

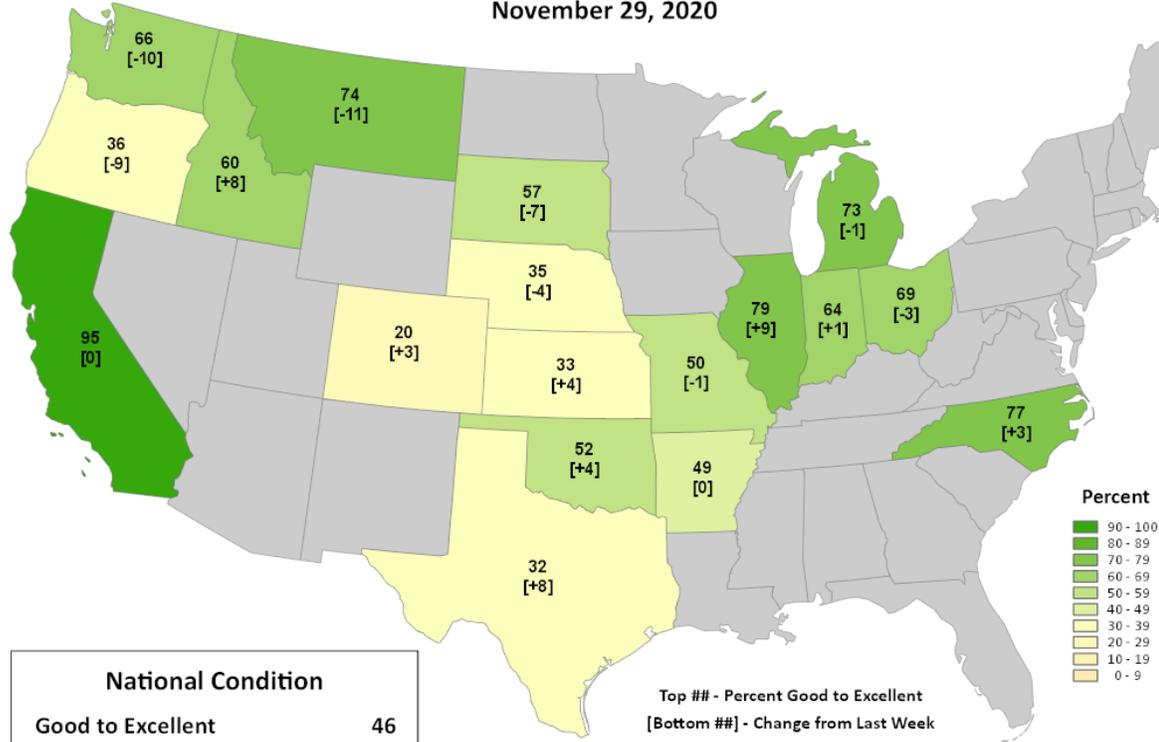
Crops & Soils

- Winter Wheat
- Topsoil moisture
- Soil moisture percentiles
- Soil temperatures

Winter Wheat Conditions

Percent Good to Excellent

November 29, 2020



National Condition	
Good to Excellent	46
Change from Last Week	+3

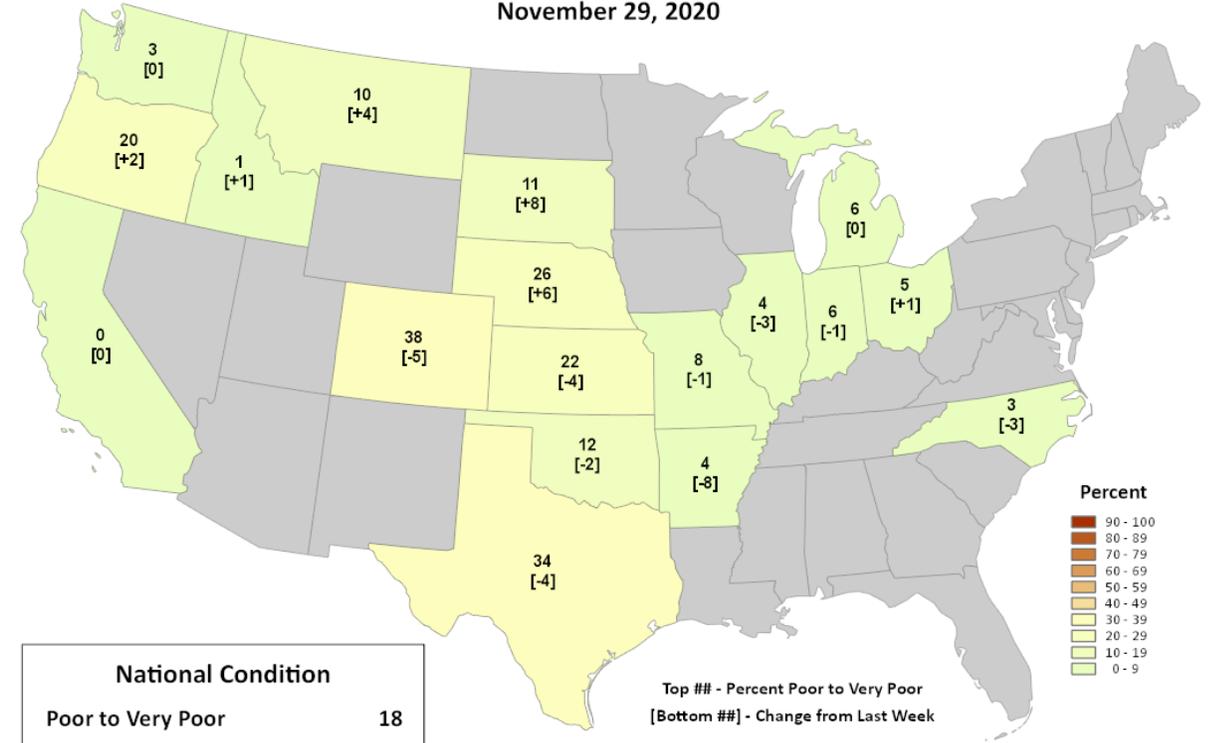
Top ## - Percent Good to Excellent
 [Bottom ##] - Change from Last Week

Data obtained from USDA National Agricultural Statistics Service weekly Crop Progress reports.

Winter Wheat Conditions

Percent Poor to Very Poor

November 29, 2020



National Condition	
Poor to Very Poor	18
Change from Last Week	-3

Top ## - Percent Poor to Very Poor
 [Bottom ##] - Change from Last Week

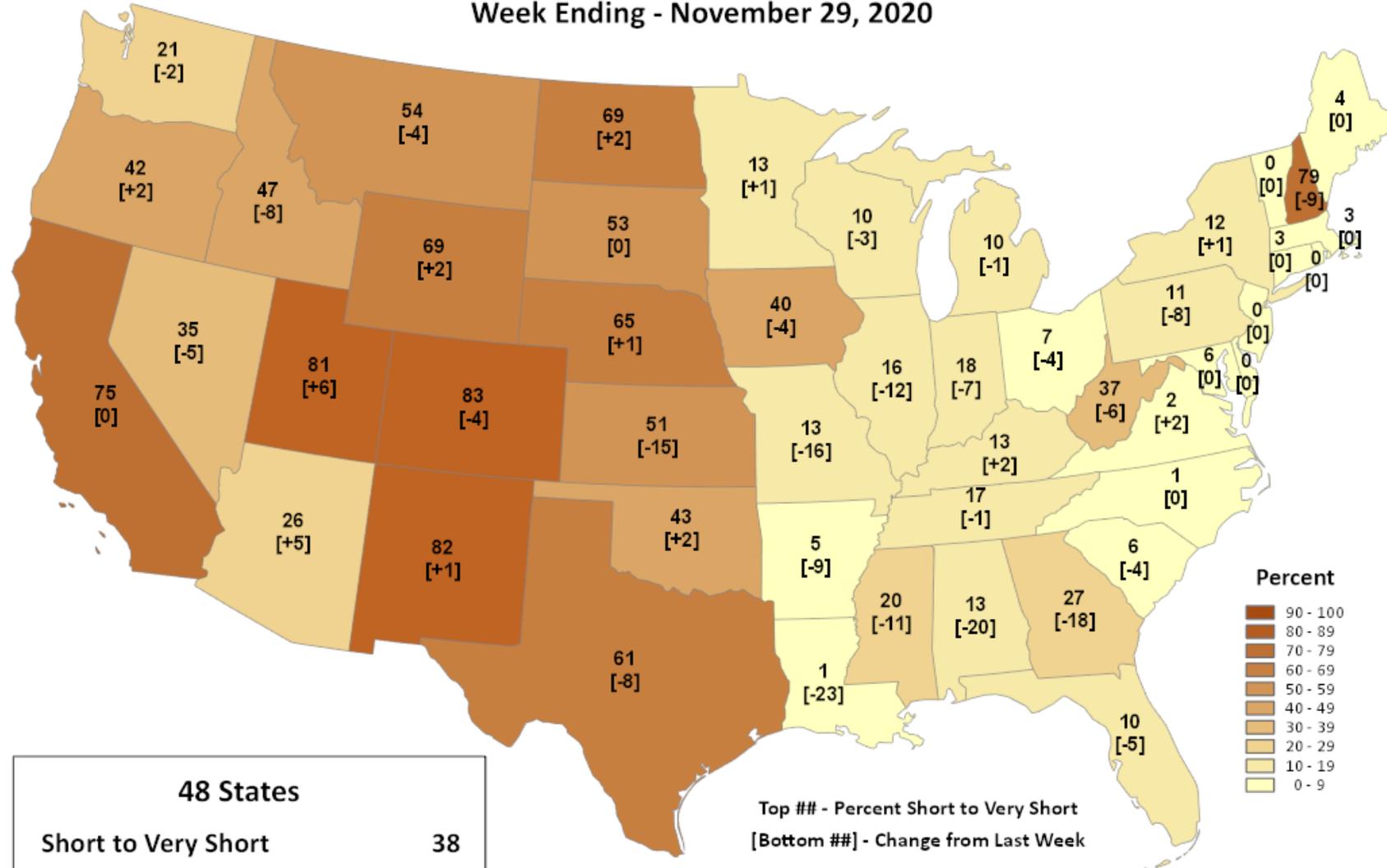
Data obtained from USDA National Agricultural Statistics Service weekly Crop Progress reports.

Figure Credit: Brad Rippey – USDA
 OCE/USDA NASS data

Topsoil Moisture

Percent Short to Very Short

Week Ending - November 29, 2020



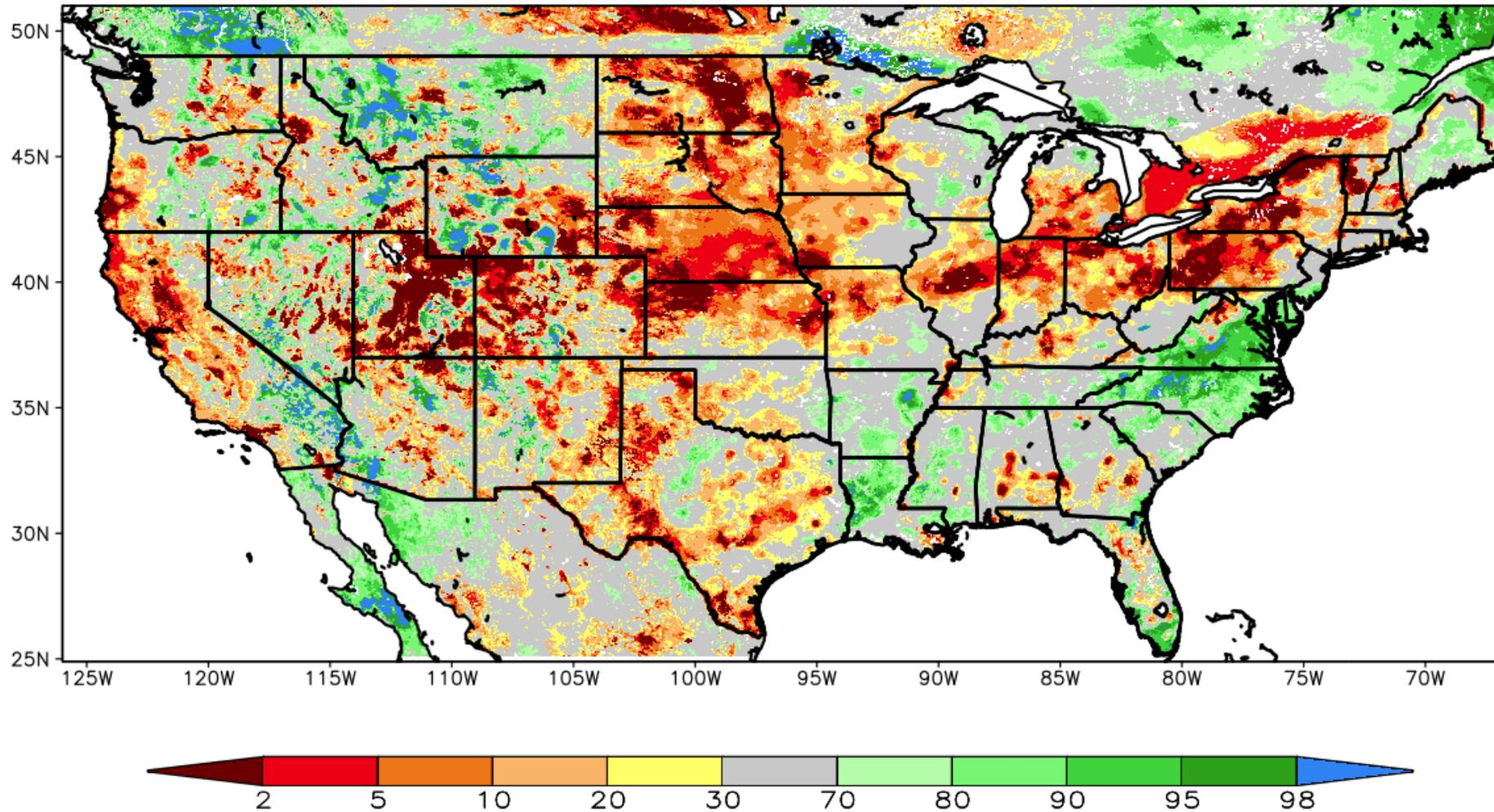
48 States
Short to Very Short **38**
Change from Last Week **-4**

Top ## - Percent Short to Very Short
[Bottom ##] - Change from Last Week

Data obtained from USDA National Agricultural Statistics Service weekly Crop Progress reports.

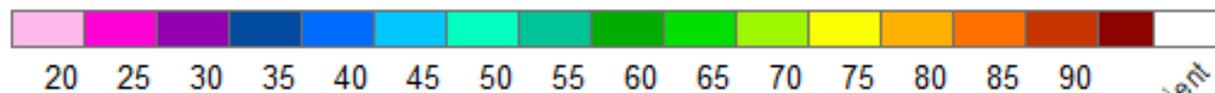
Figure Credit: Brad Rippey – USDA OCE/USDA NASS Data

SPoRT-LIS 0-200 cm Soil Moisture percentile valid 16 Dec 2020



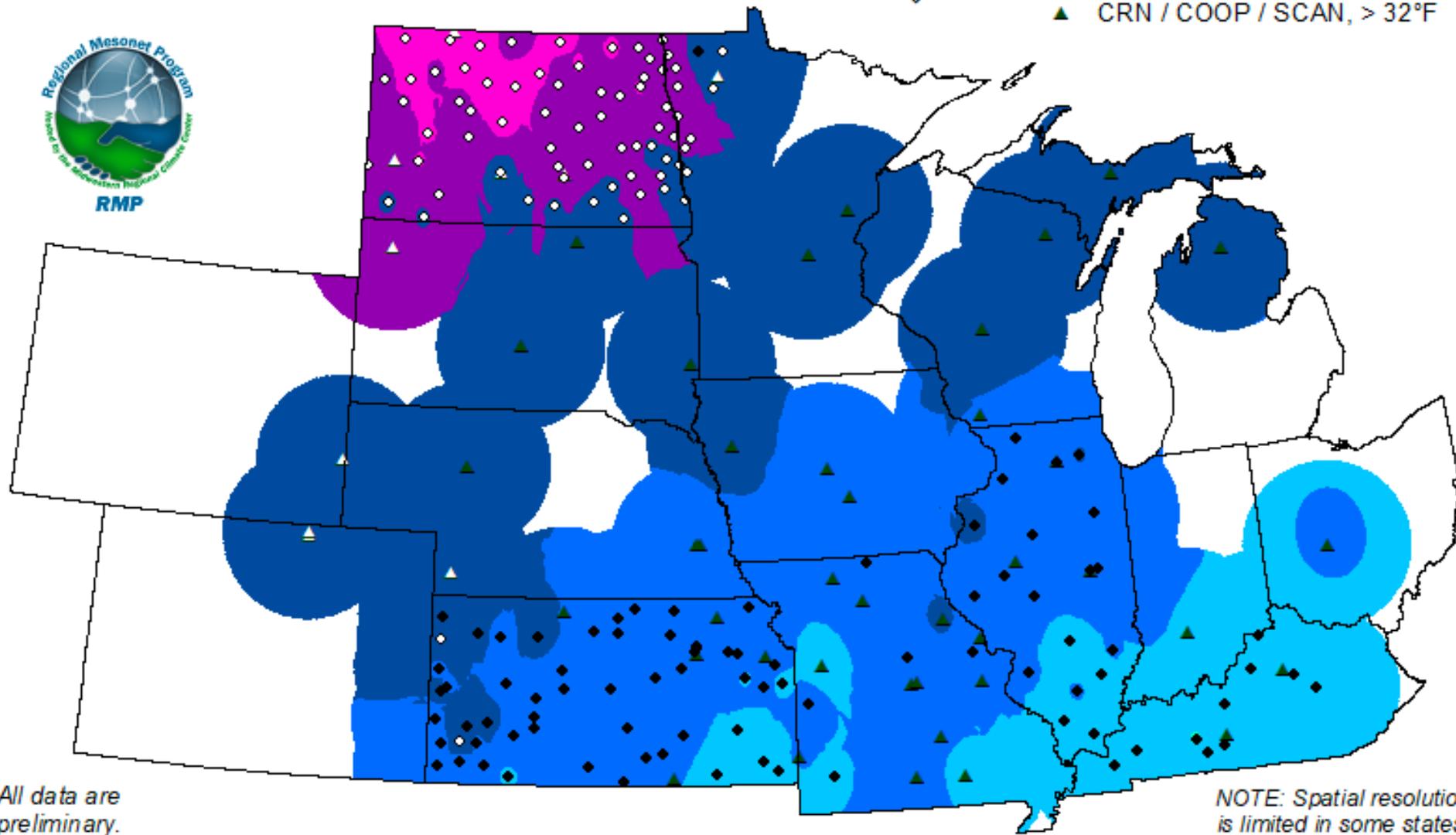
4" Soil Temperature (°F) (Sod)

24-Hour Period Through 12/15/2020



Insufficient Data

- ◇ Mesonets, ≤ 32°F
- ◆ Mesonets, > 32°F
- △ CRN / COOP / SCAN, ≤ 32°F
- ▲ CRN / COOP / SCAN, > 32°F



All data are preliminary.

NOTE: Spatial resolution is limited in some states.

Snow, Fire, Rivers and Lakes



Photo credit: Karen Nicolas

Accumulated Winter Season Severity Index (AWSSI)

AWSSI Category

- Extreme
- Severe
- Average
- Moderate
- Mild
- Not current
- Record

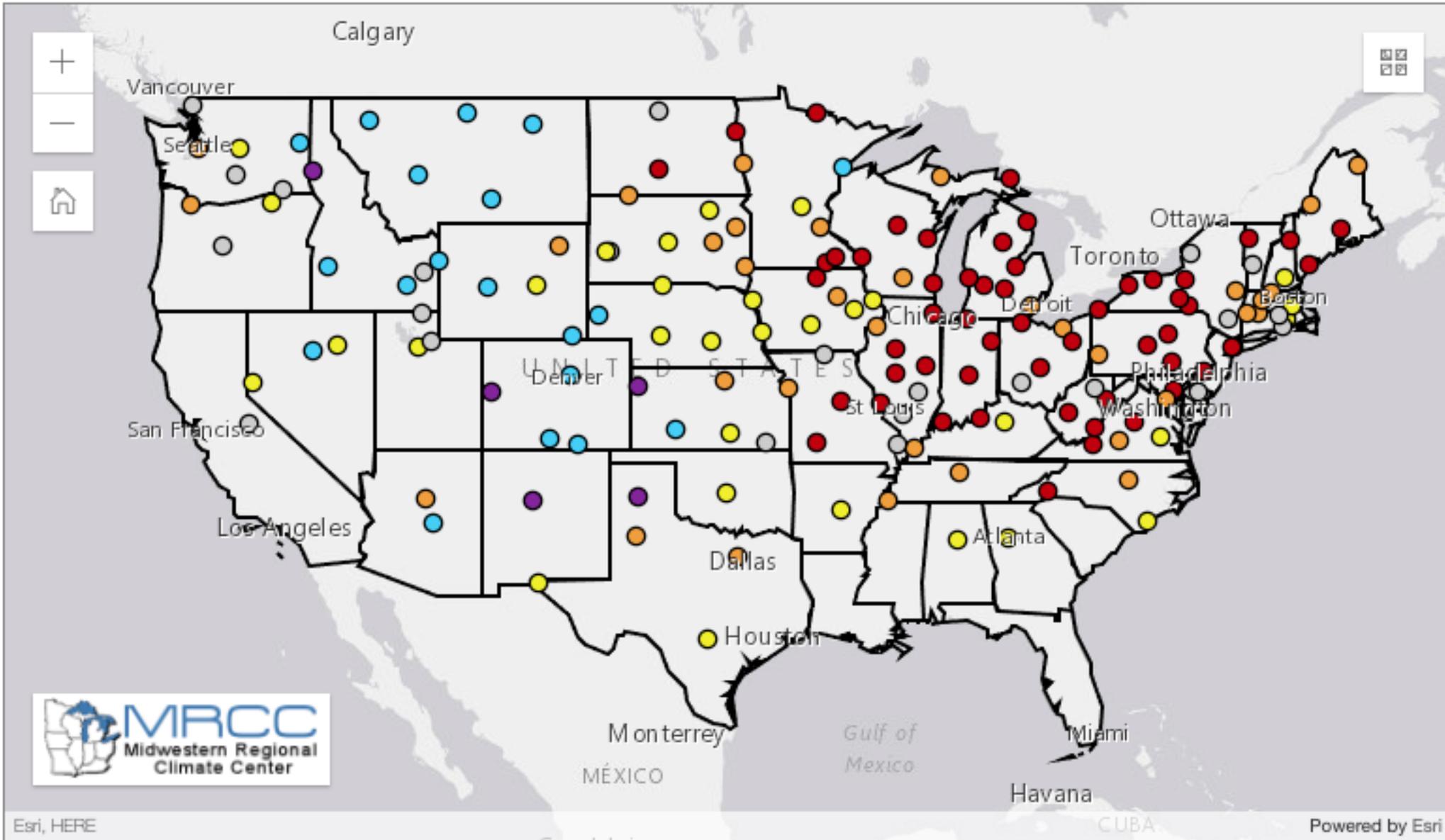
Data Last Updated:
12/16/2020 16:20 CST

Pan/Zoom to Alaska

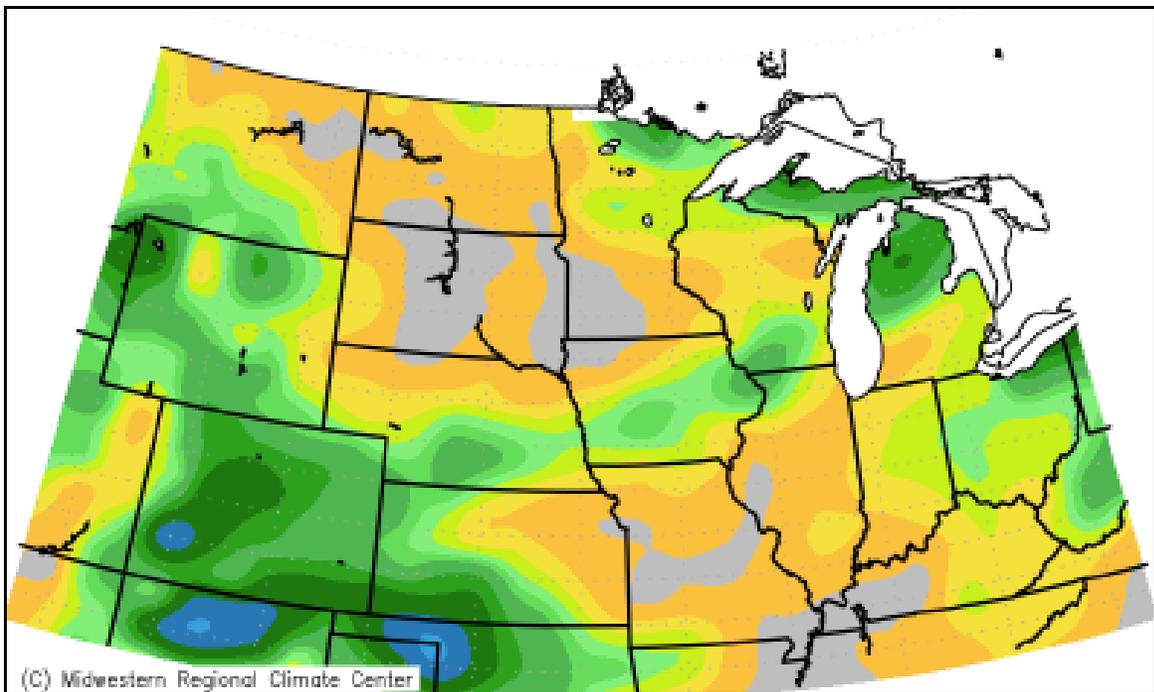


MRCC
Midwestern Regional
Climate Center

Esri, HERE



Accumulated Snowfall (in)
November 17, 2020 to December 16, 2020

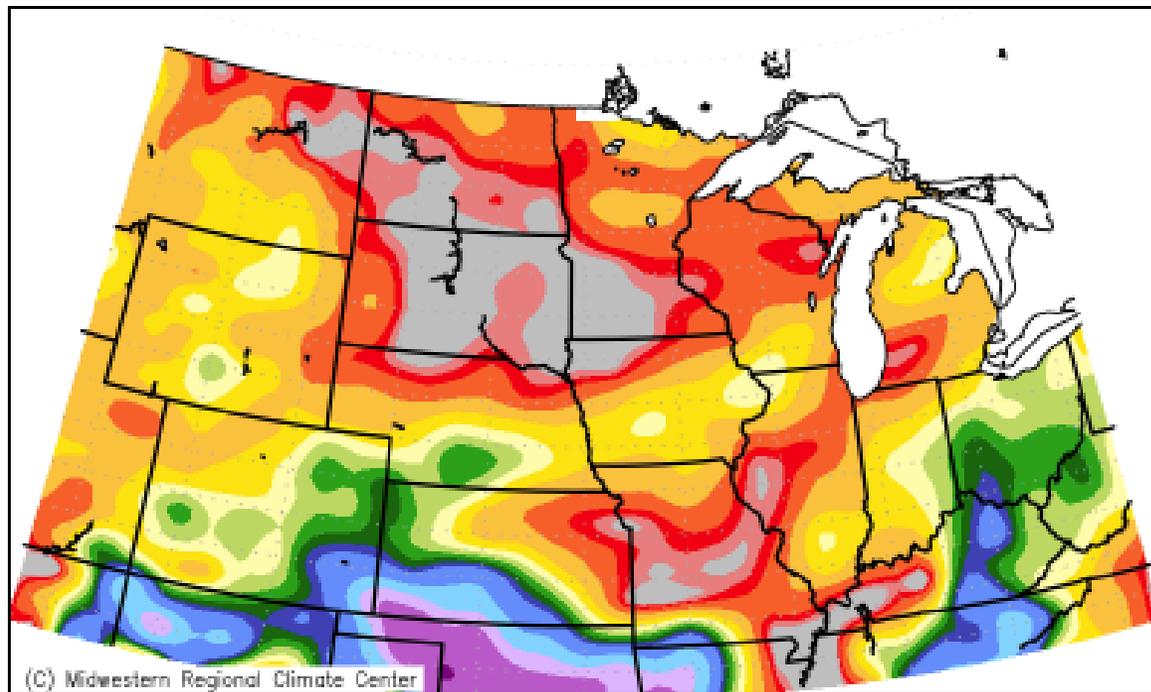


(C) Midwestern Regional Climate Center



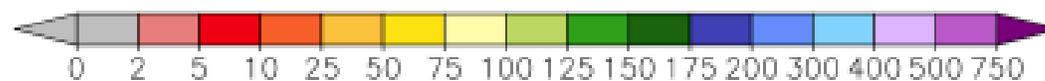
Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment

Accumulated Snowfall: Percent of Mean
November 17, 2020 to December 16, 2020



(C) Midwestern Regional Climate Center

Mean period is 1981–2010.

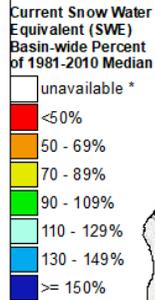
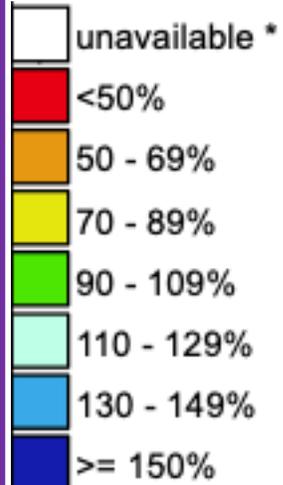


Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment

Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Normal

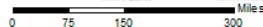
Dec 16, 2020

Current Snow Water Equivalent (SWE) Basin-wide Percent of 1981-2010 Median



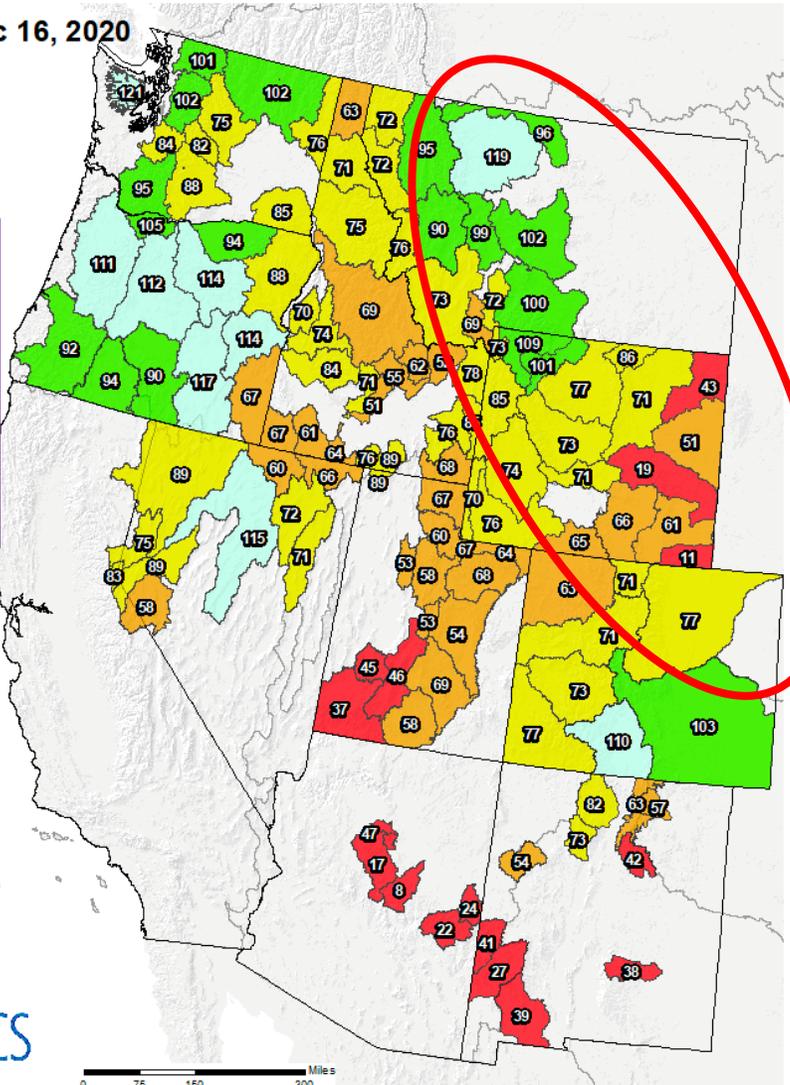
* Data unavailable at time of posting or measurement is not representative at this time of year

Provisional data subject to revision



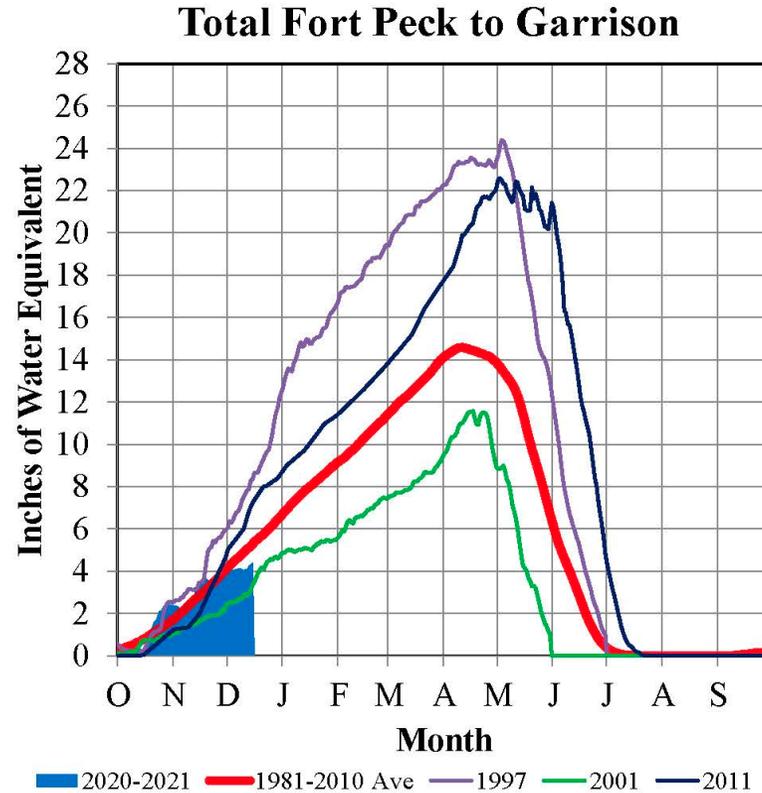
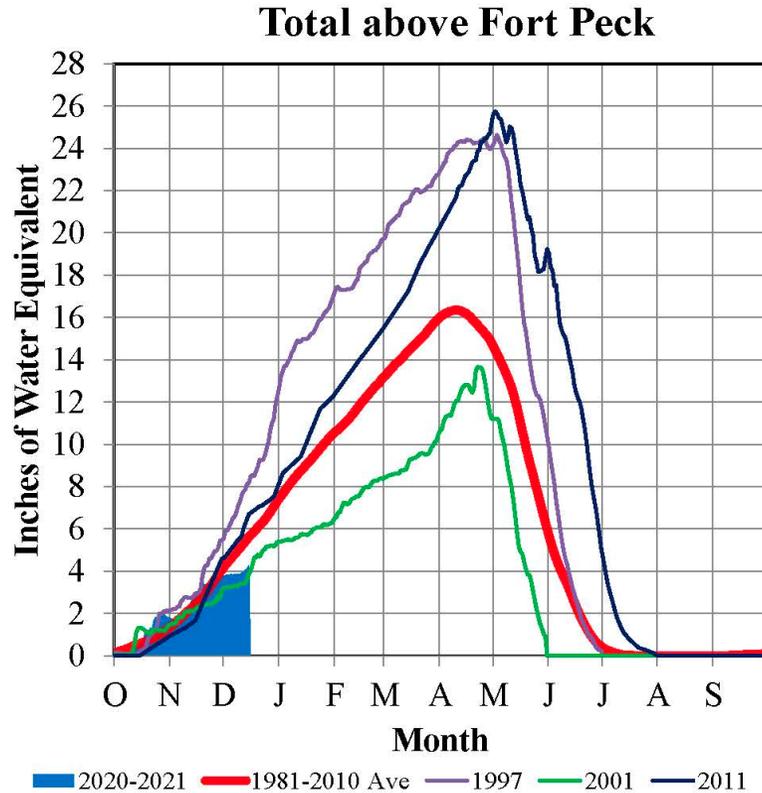
The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

Prepared by:
USDA/NRCS National Water and Climate Center
Portland, Oregon
<http://www.wcc.nrcs.usda.gov>



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

15-Dec-2020



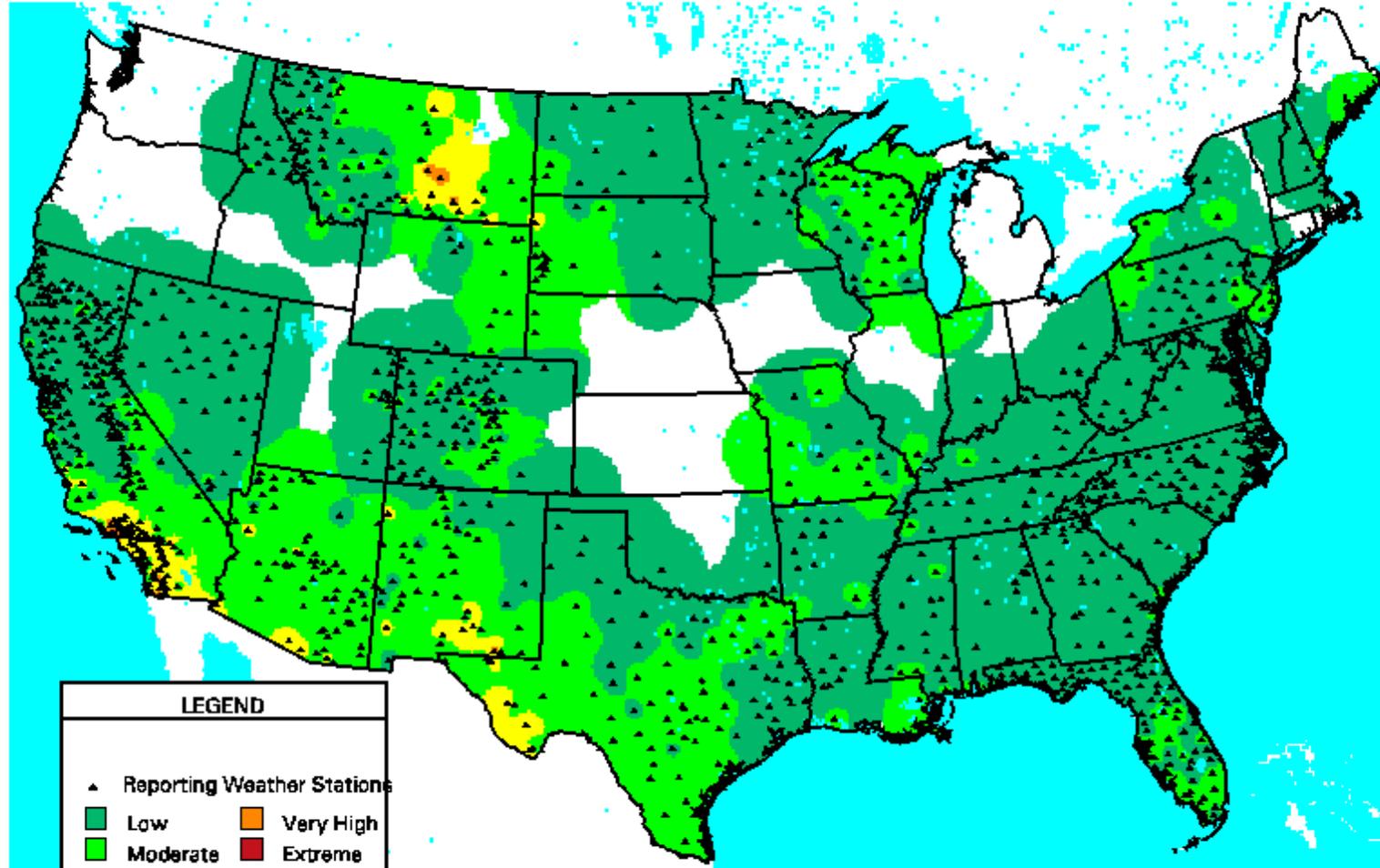
- Still early in season
- Tracking slightly below normal

On December 15, 2020 the mountain Snow Water Equivalent (SWE) in the “Total above Fort Peck” reach was 4.3”, 76% of the December 15 average. On December 15, 2020 the mountain SWE in the “Fort Peck to Garrison” reach was 4.4”, 83% of the December 15 average. The normal peak for both reaches is near April 15.

*Generally considered the high and low year of the last 25-year period, respectively

Provisional data. Subject to revision.

Forecast Fire Danger Class: 16-DEC-20



LEGEND	
▲ Reporting Weather Stations	
Low	Very High
Moderate	Extreme
High	Water

(Inv. Dist.² Interp.)

WFAS-MAPS Graphics FIRE BEHAVIOR RESEARCH MISSOULA, MT

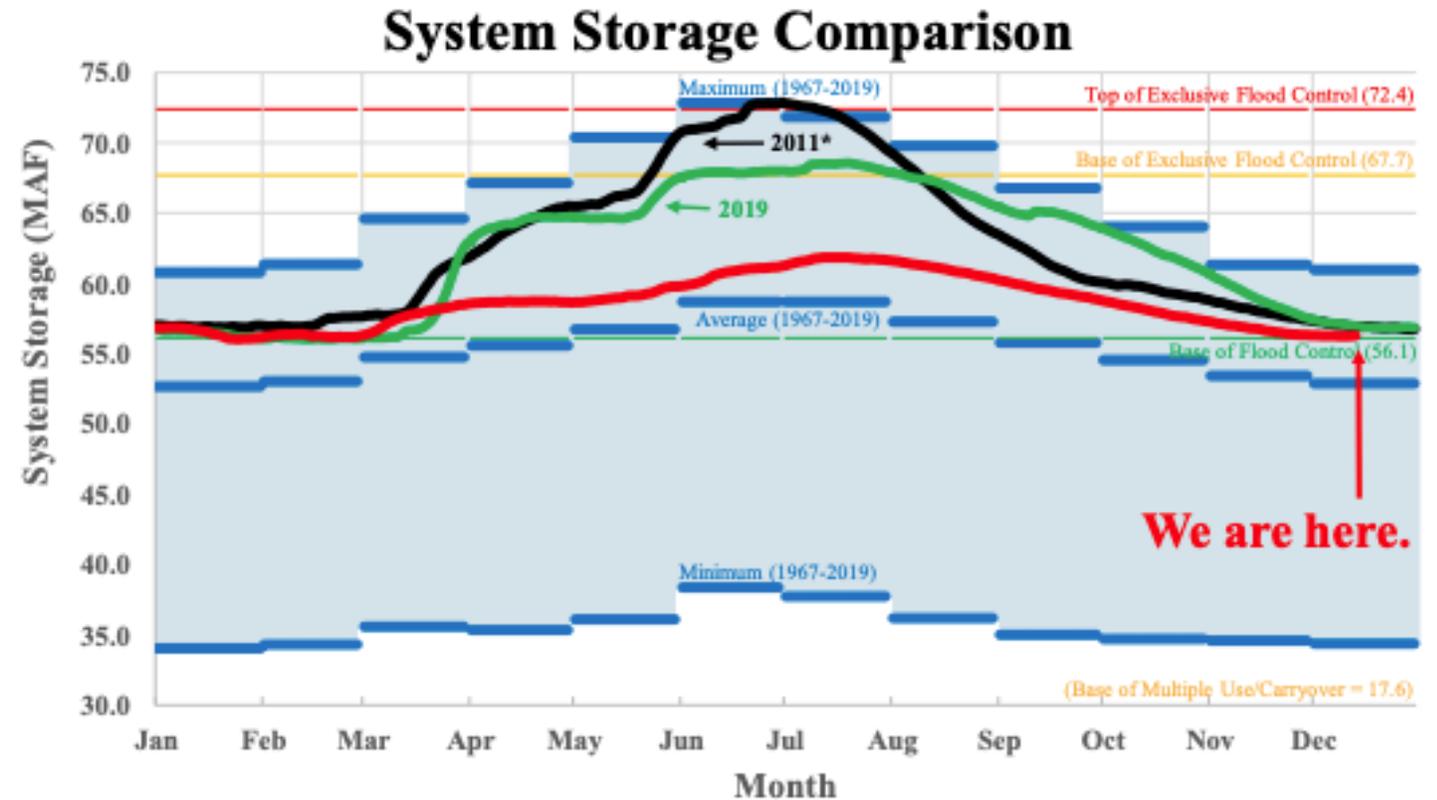


- Low-Moderate fire danger
- Dry, windy conditions could cause erratic fire behavior

Missouri River

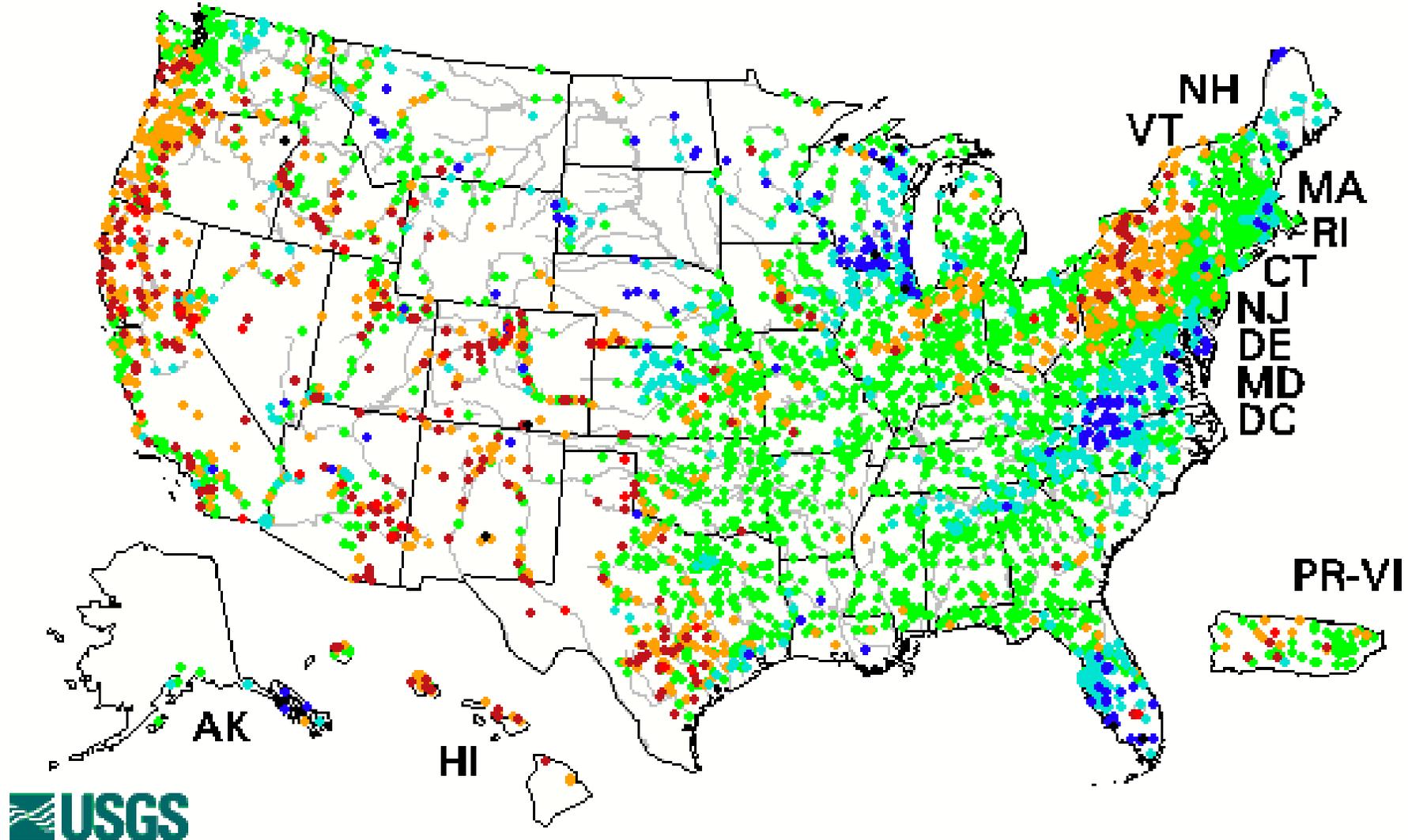
Missouri Mainstem Reservoir Status (as of 12/15/20):

- System storage is 56.2 million-acre feet
- Mountain snowpack is below average



28-day Average Streamflow

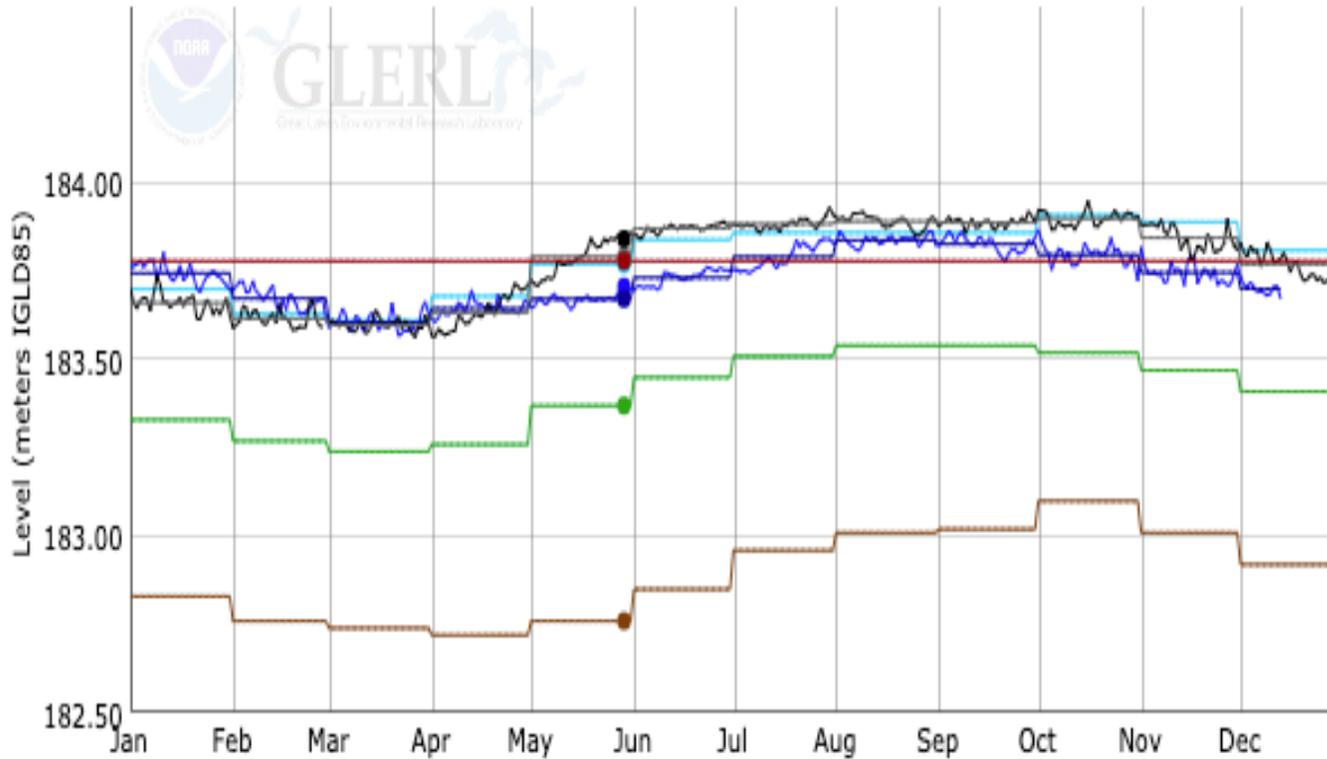
Tuesday, December 15, 2020



<http://waterwatch.usgs.gov/index.php?id=pa07d>

Great Lakes Water Levels

Superior (at Marquette C.G., MI - 9099018)

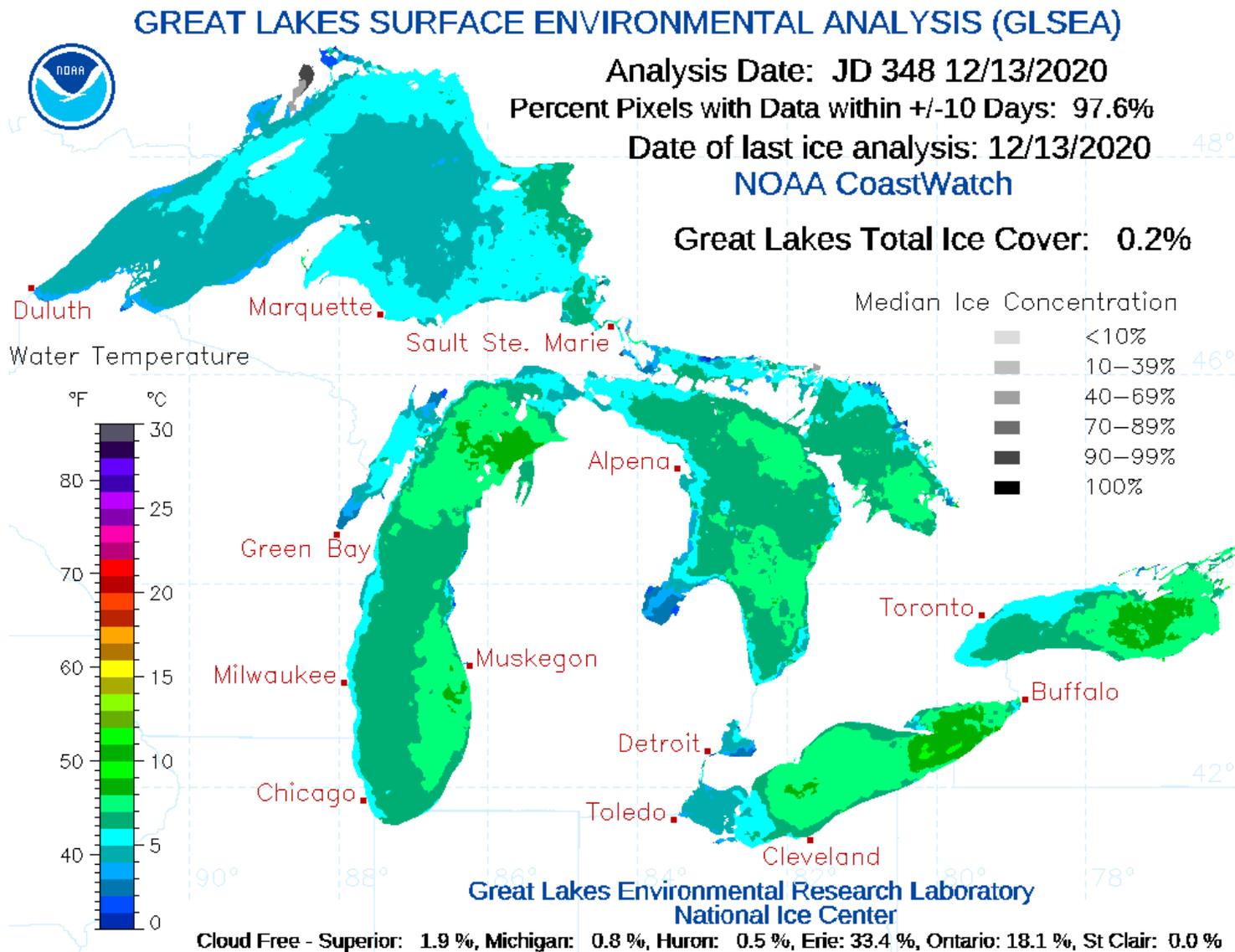


- All Great Lakes running well above their long-term averages
- Recently dropped from record levels in 2018-2019
- Forecasted levels over the next six months should remain above the long-term average
- Lake Ontario only lake with near-normal levels

Legend:
Record Highs
The Month's Mean
Record Lows
Daily Levels 2020
Monthly Levels 2020
Daily Levels 2019
Monthly Levels 2019
Average Level 2019

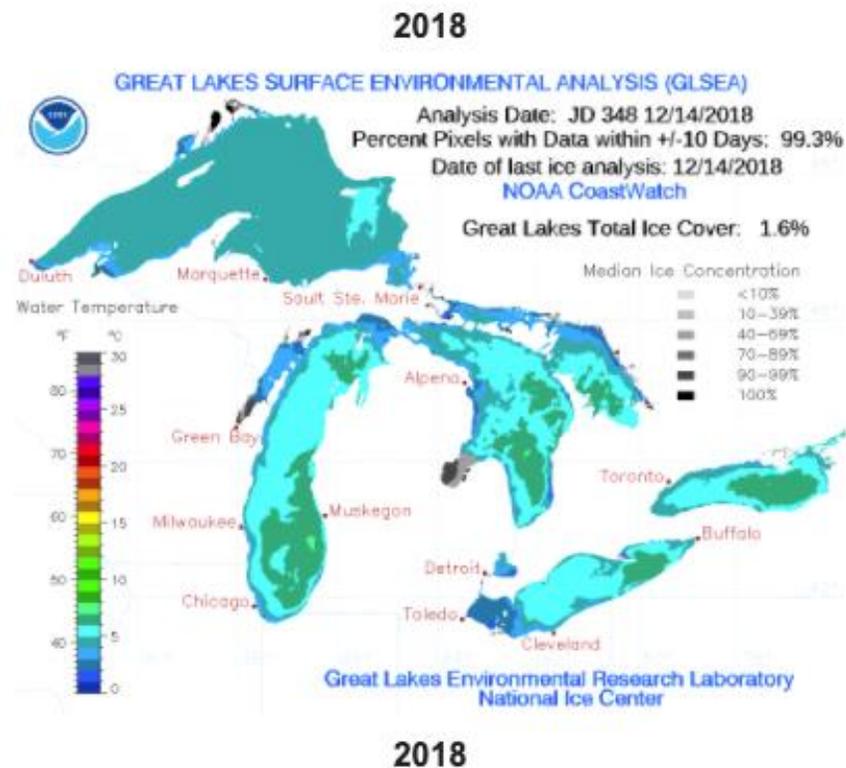
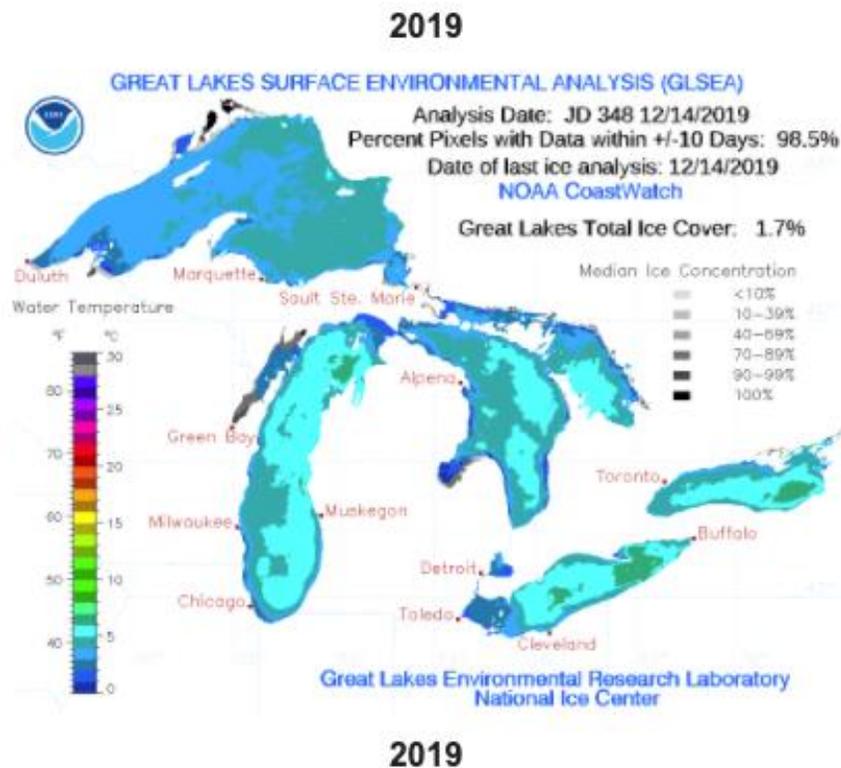
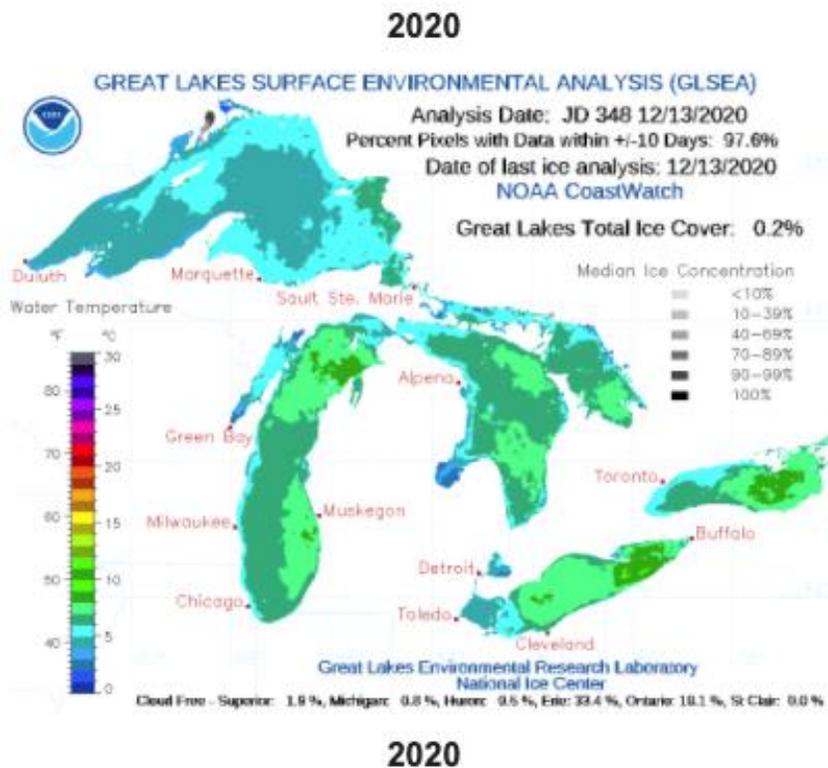
<https://www.glerl.noaa.gov/data/wlevels/data/superiorLevelsFeet.png>

Great Lakes Temperatures



- All Great Lakes running warmer than their long-term averages
- Ice coverage slightly behind recent years

Great Lakes Temperatures

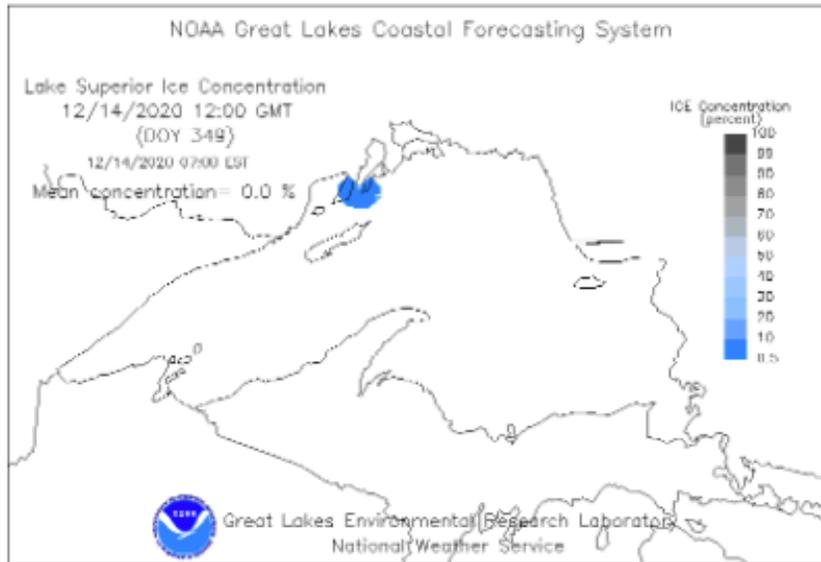


Great Lakes Ice Coverage

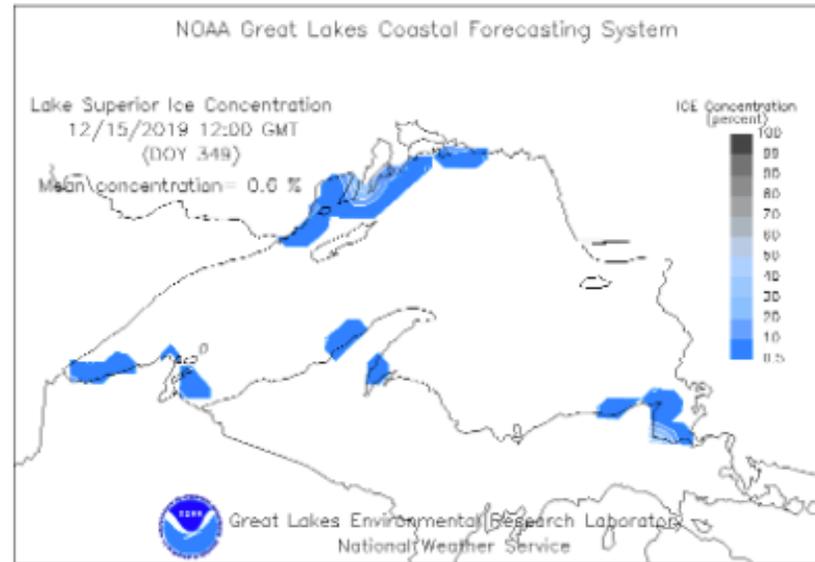
2020

2019

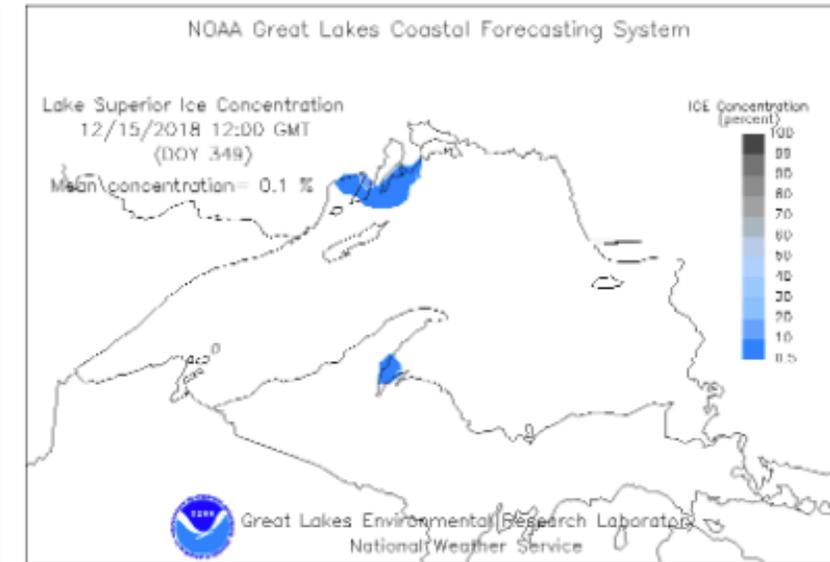
2018



Last updated: Mon Dec 14 12:24:45 2020 GMT



Last updated: Sun Dec 15 12:25:10 2019 GMT



Last updated: Sat Dec 15 12:24:22 2018 GMT

https://www.glerl.noaa.gov/res/glcfs/compare_years/2020_349_glsea.png

Impacts and Notable Events



State Impacts

- Water conservation requested in **Illinois** due to drought
- Drought lowered soybean yields by 10-15 bushels in northern **Illinois**
- Large fire 'leftovers' (**WY & CO**)
- Low sub-soil moisture raises concerns for spring preparations in **Iowa**

Photo Credit: Greg Sanders via Medicine Bow-Routt National Forest

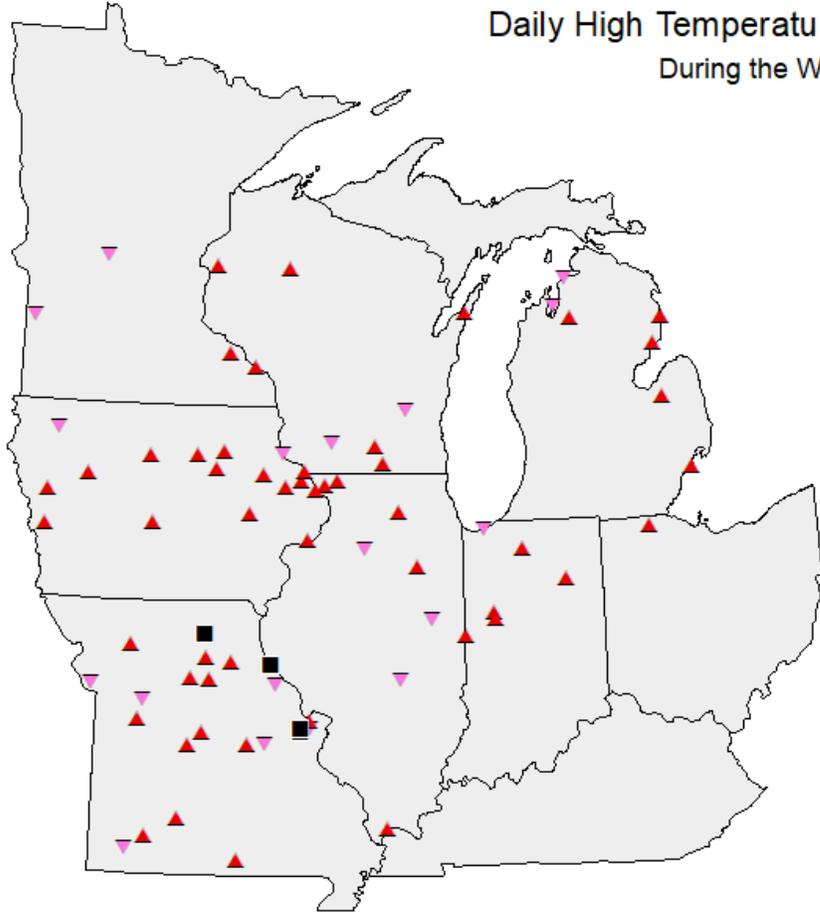


State Impacts

- **Great Plains** - Winter wheat in poor condition; little pasture available
 - *Some hay/water hauling*
- Drought and warmth are causing stock ponds to evaporate, lower – **High Plains**
- **MN** – lack of snow for recreation
- Many small to medium lakes in **MN** froze over from Nov 30 – Dec 3

Wild ice on Clearwater lake in the BWCA (Kjersti Vick, Visit Cook County)

Daily High Temperature Records broken or tied
During the Week of 11/17/2020 - 11/23/2020



- Both High Maximum and Minimum
- ▲ High Maximum
- ▼ High Minimum

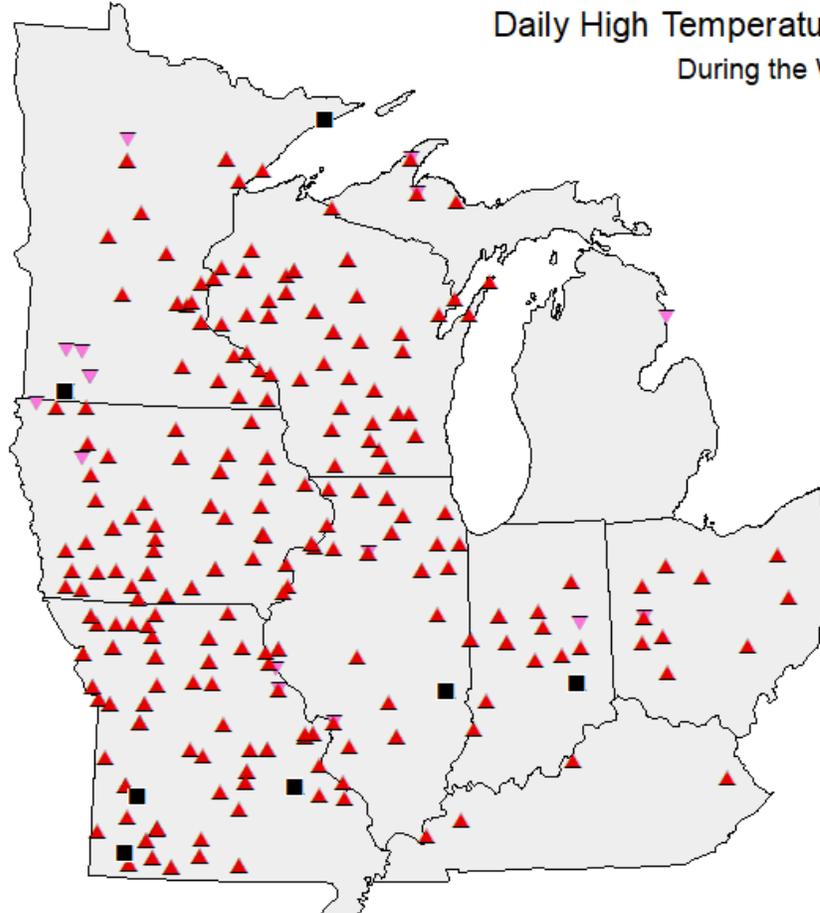
High Max: 56
High Min: 22



Powered by **ACIS**
Regional Climate Centers

Minimum 30 years of data
All Reports Are Considered Preliminary

Daily High Temperature Records broken or tied
During the Week of 12/8/2020 - 12/14/2020



- Both High Maximum and Minimum
- ▲ High Maximum
- ▼ High Minimum

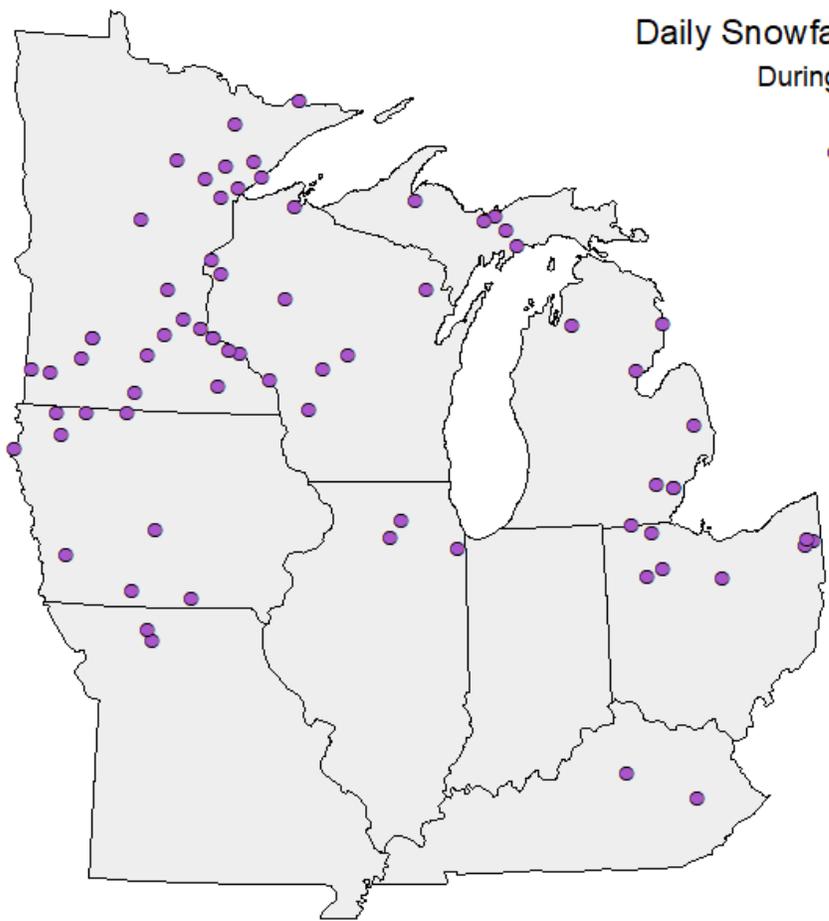
High Max: 277
High Min: 25



Powered by **ACIS**
Regional Climate Centers

Minimum 30 years of data
All Reports Are Considered Preliminary

Daily Snowfall Records broken or tied During the Month of November 2020



● Snowfall

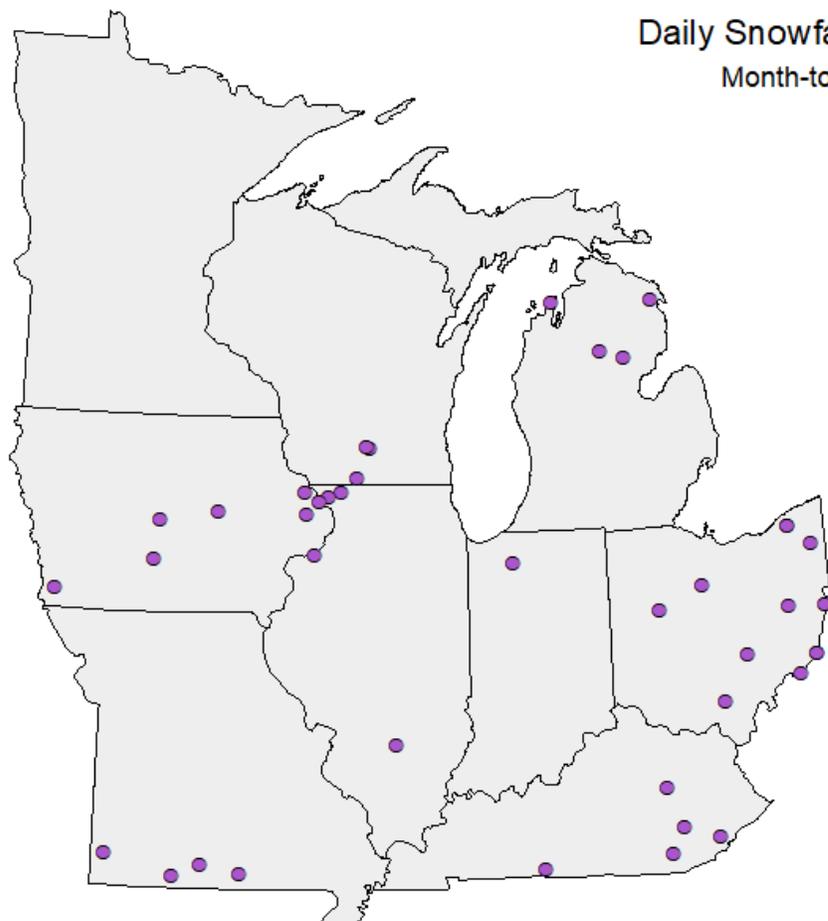
Records: 71



Powered by **ACIS**
Regional Climate Centers

Minimum 30 years of data
All Reports Are Considered Preliminary

Daily Snowfall Records broken or tied Month-to-Date: 12/1/2020 - 12/16/2020



● Snowfall

Records: 40



Powered by **ACIS**
Regional Climate Centers

Minimum 30 years of data
All Reports Are Considered Preliminary

Station Extremes:

- Widespread snow event Nov 30 – Dec 2 – Lake effect snow
- Waseca, MN – 33+ days without precipitation

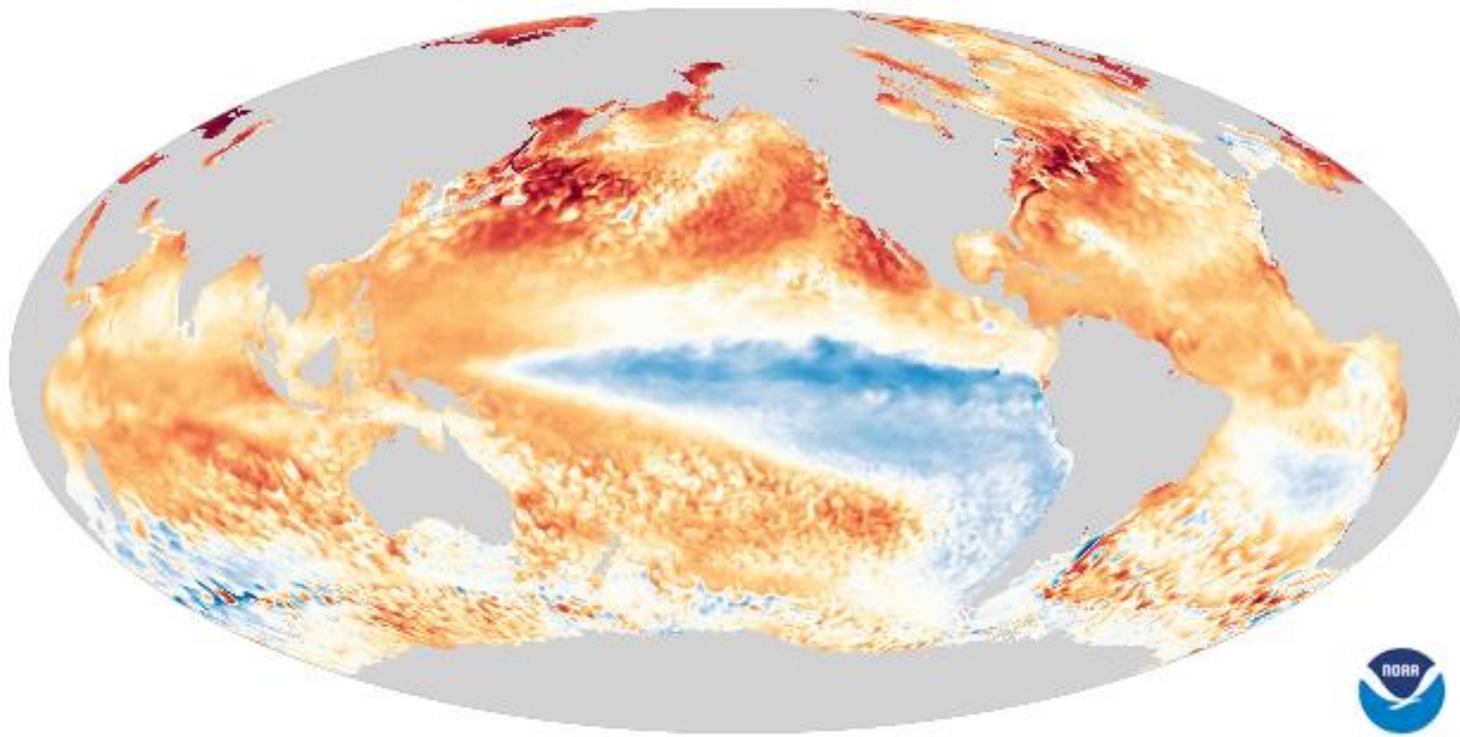


*Geauga County, Ohio
Photo courtesy of Les Ober*

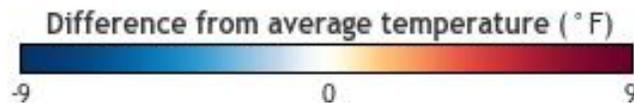
Climate Outlooks

- La Niña
 - 7-day Precipitation Forecast
 - 8 – 14 day Outlook
- December temperature and precipitation
 - JFM temperature and precipitation
 - AMJ temperature and precipitation

La Niña Advisory



October 2020
Compared to 1981-2010



NOAA NNVL
Data: NCEI

- La Niña is likely to continue across the Northern Hemisphere 2020-21 winter
 - ~95% chance during January-March and into spring 2021
 - ~50% chance of Neutral during April-June
- A LOT of variability for T and Precip with La Ninas

<https://www.climate.gov/news-features/blogs/enso/november-2020-la-ni%C3%B1a-update-just-us-chickens>

ENSO Probabilities

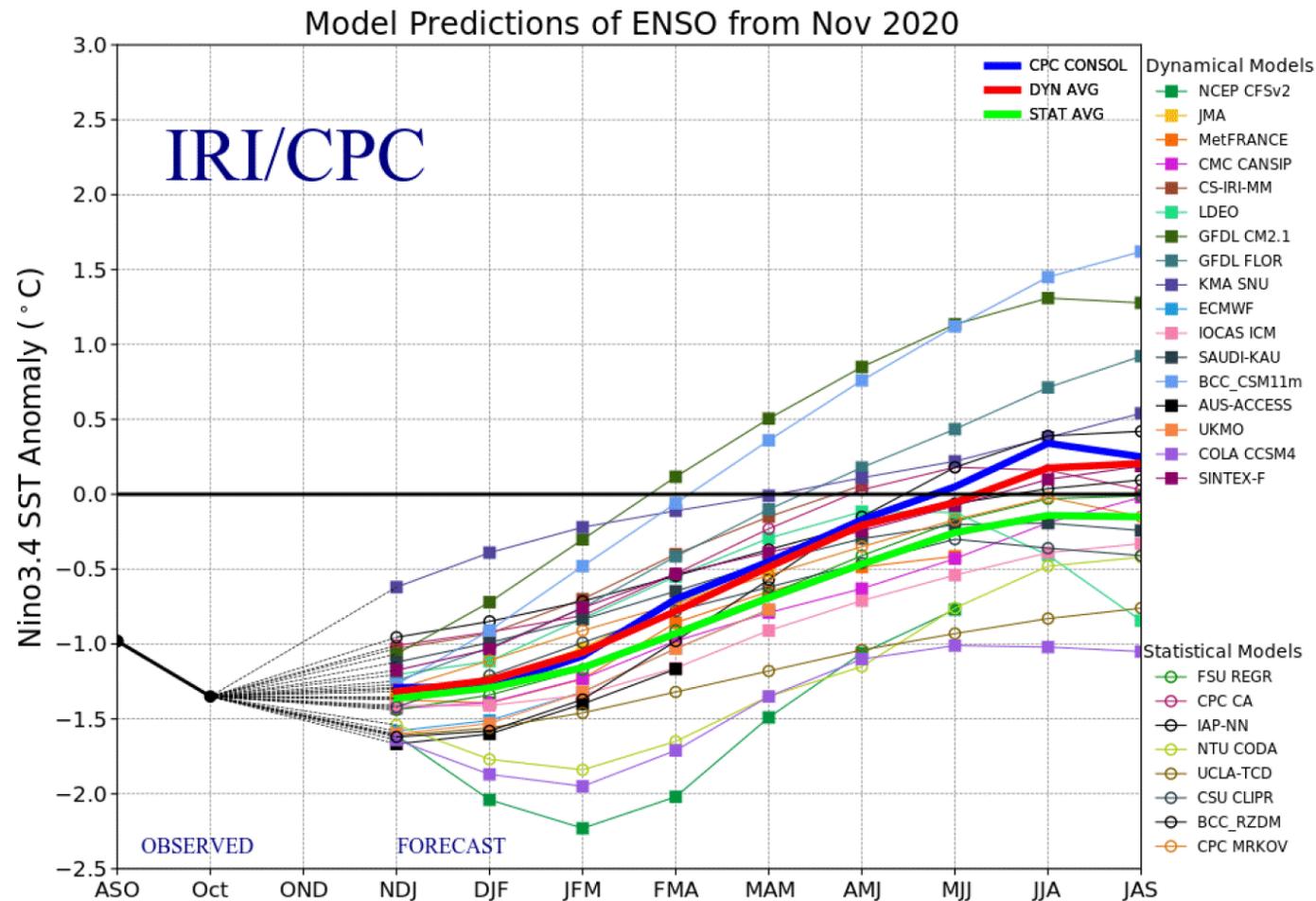
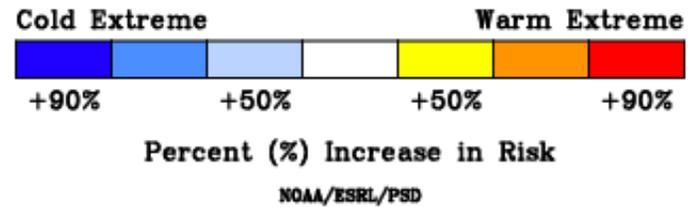
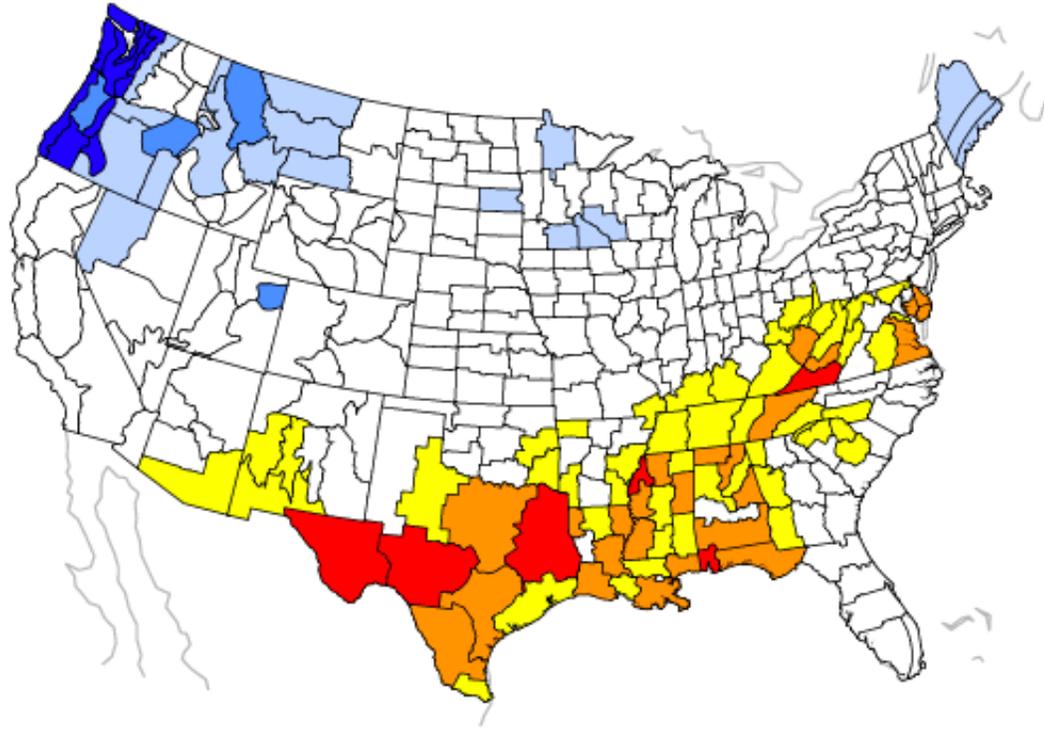
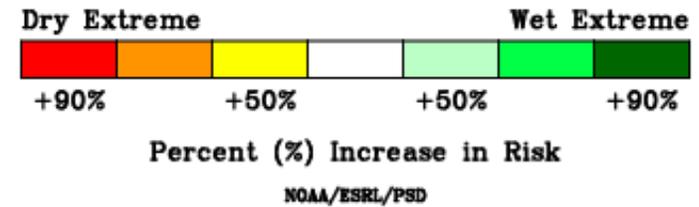
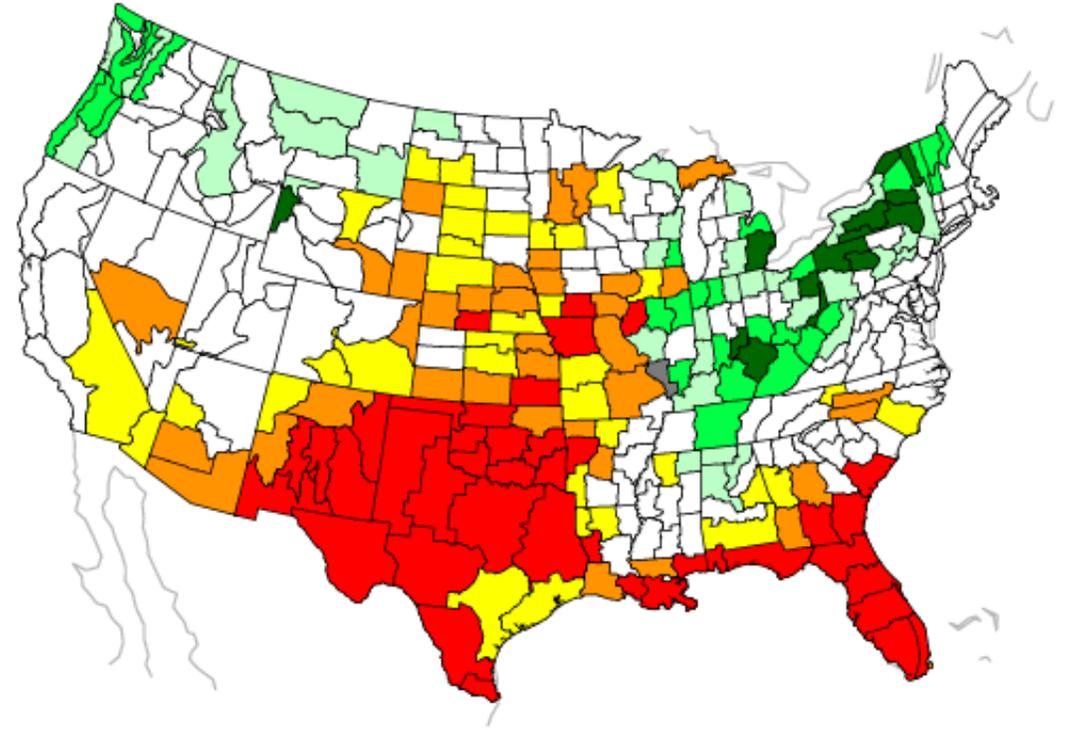


Figure 6. Forecasts of sea surface temperature (SST) anomalies for the Niño 3.4 region (5°N-5°S, 120°W-170°W). Figure updated 19 November 2020.

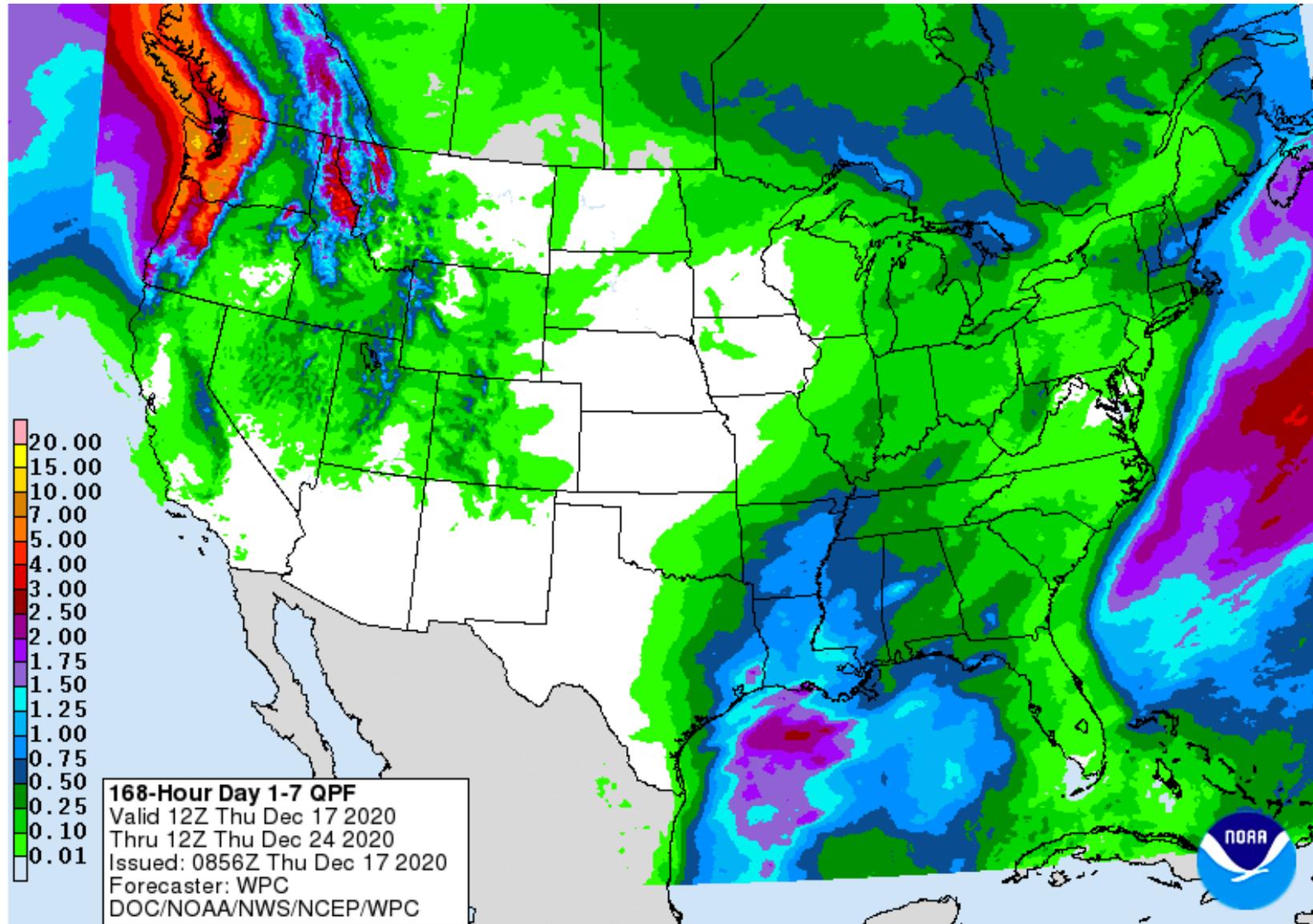
JFM Temperature During La Nina
Increased Risk of Warm or Cold Extremes



JFM Precipitation During La Nina
Increased Risk of Wet or Dry Extremes

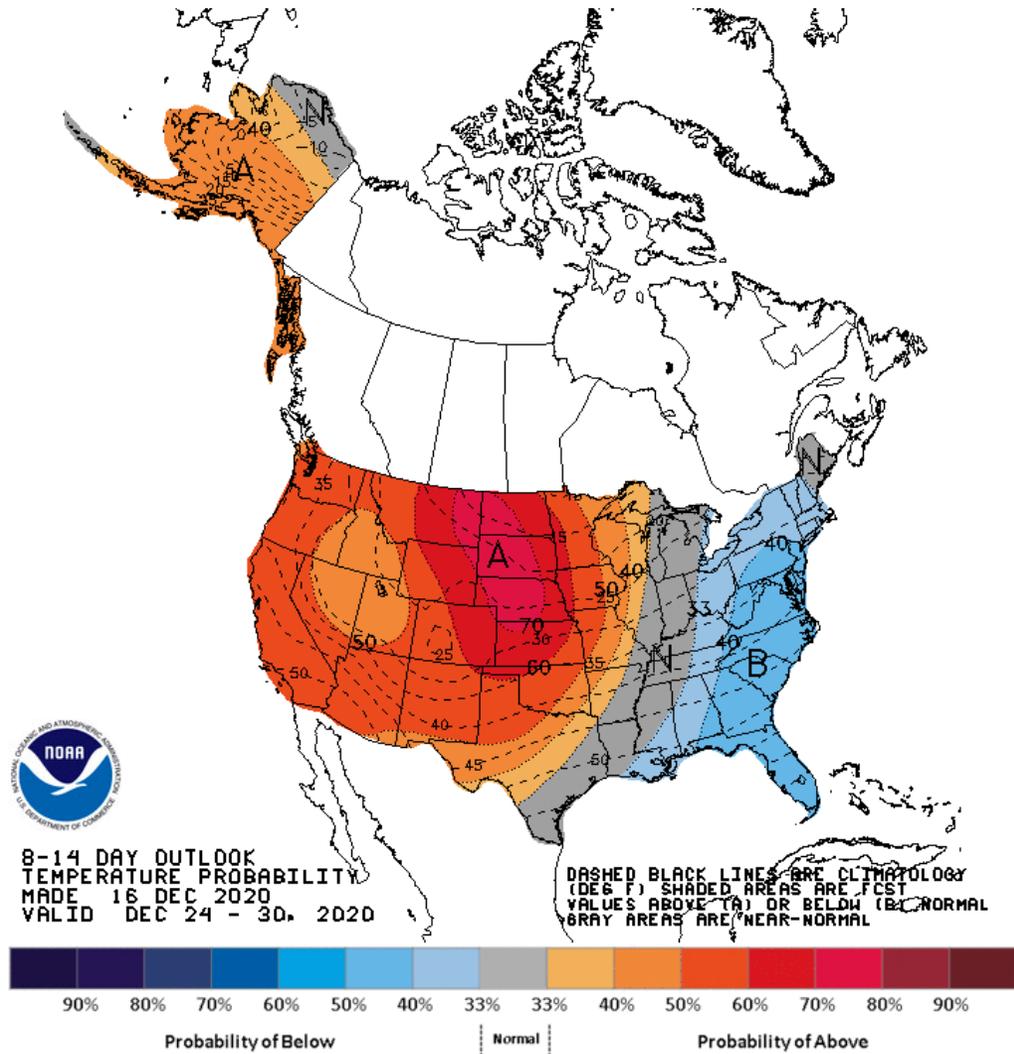


7-day Quantitative Precipitation Forecast

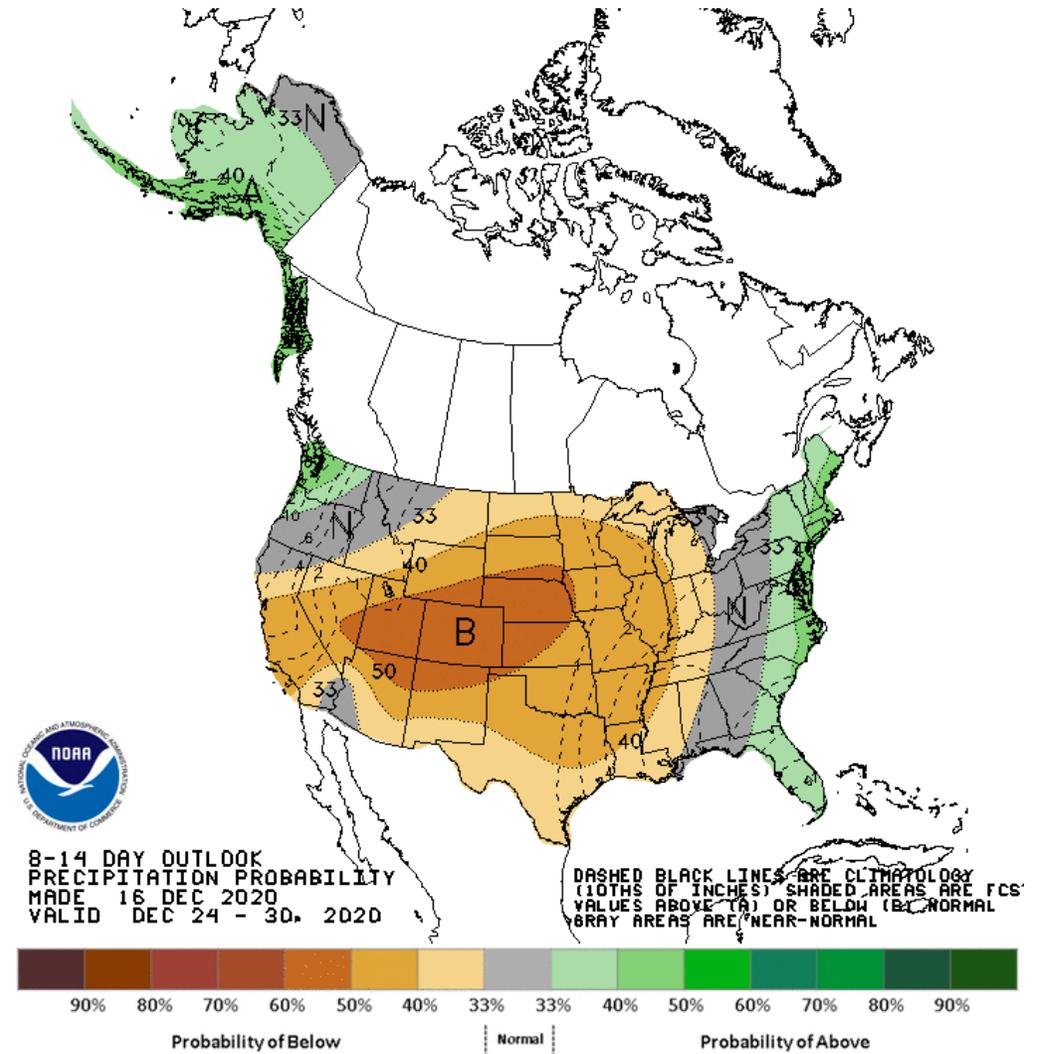


<https://www.wpc.ncep.noaa.gov/qpf/day1-7.shtml>

8-14-Day Outlook

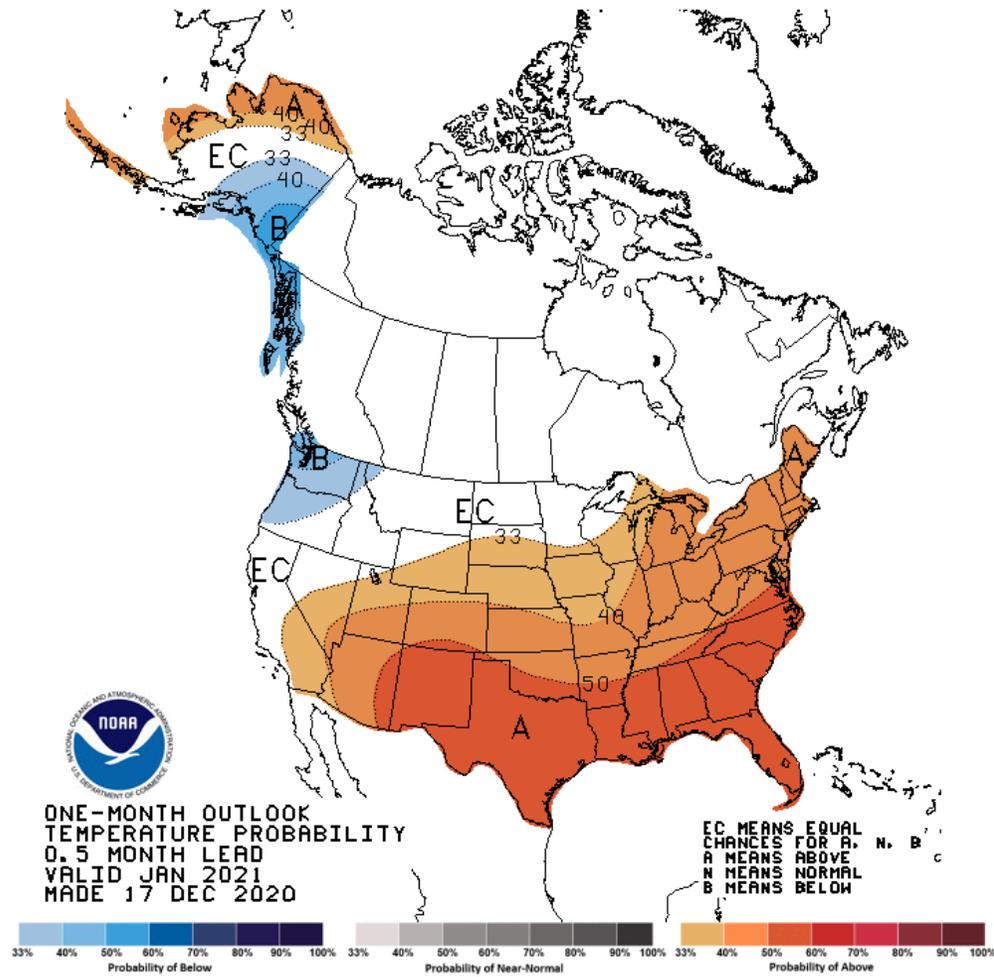


Temperature

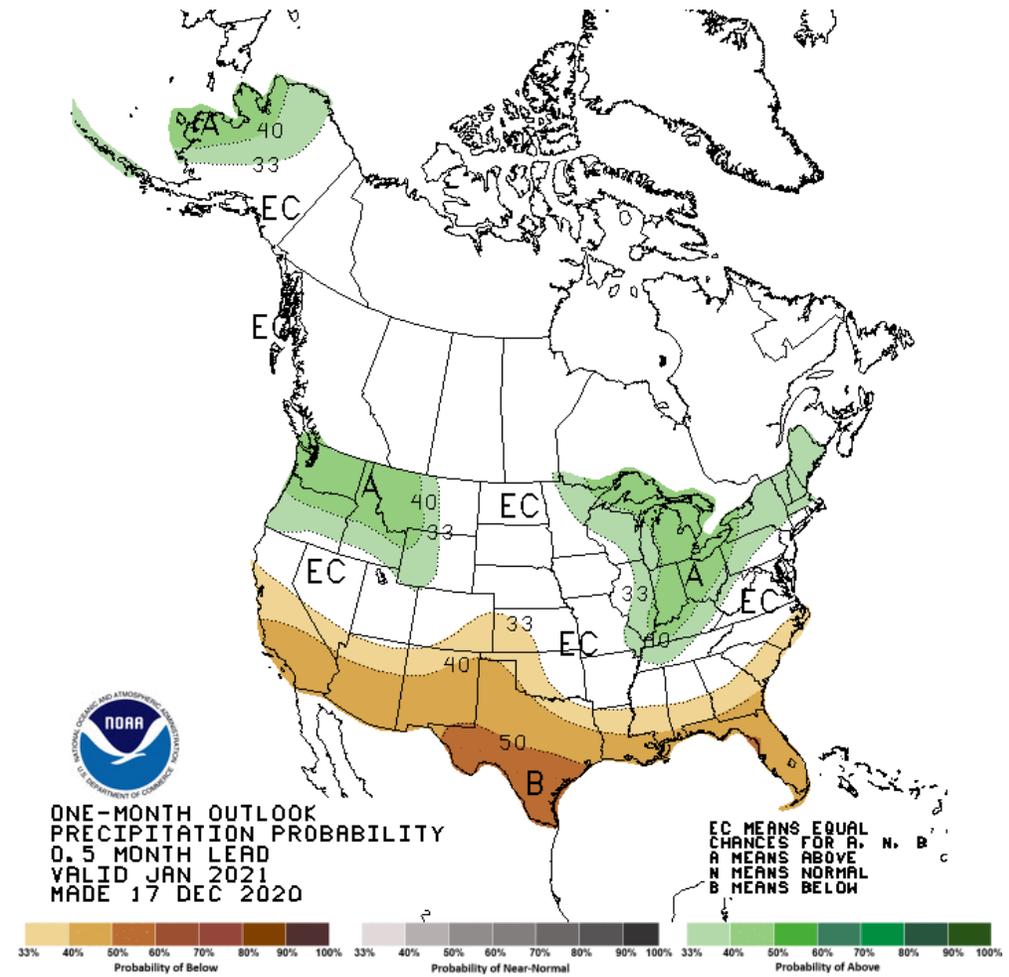


Precipitation

January Outlook

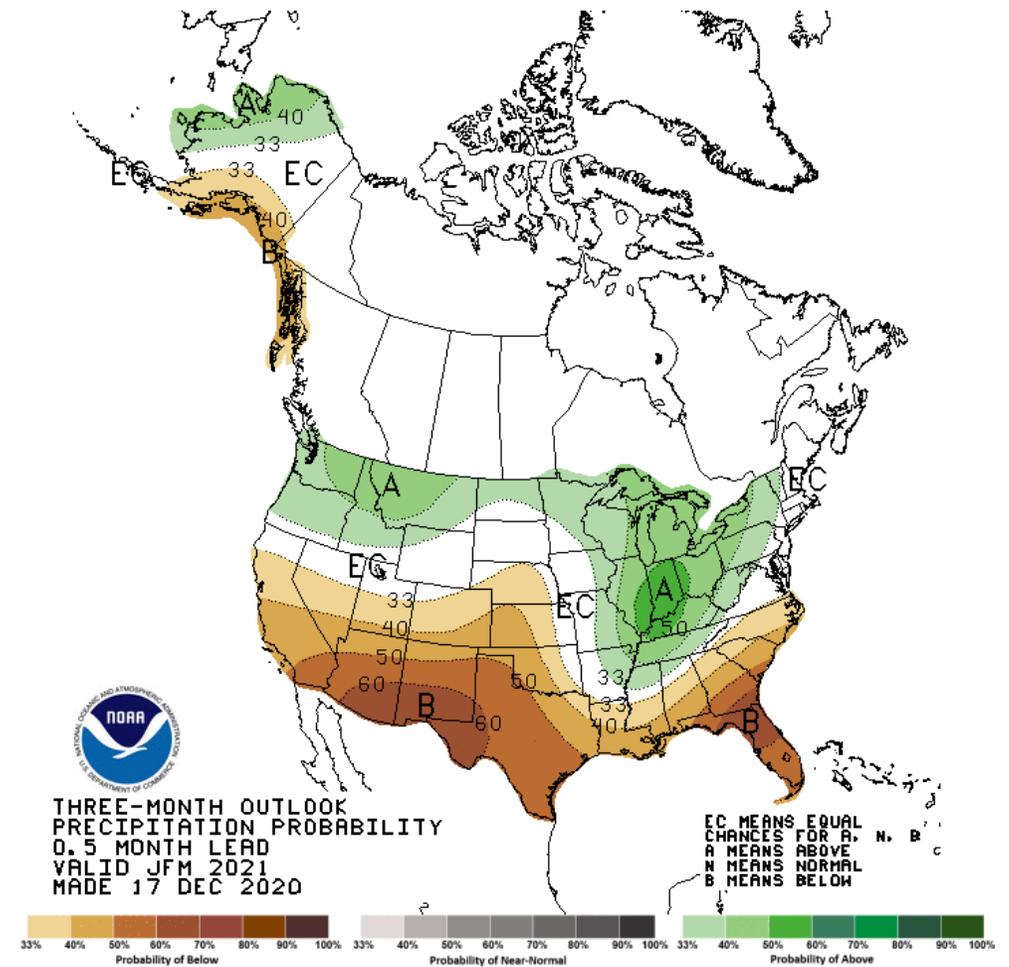
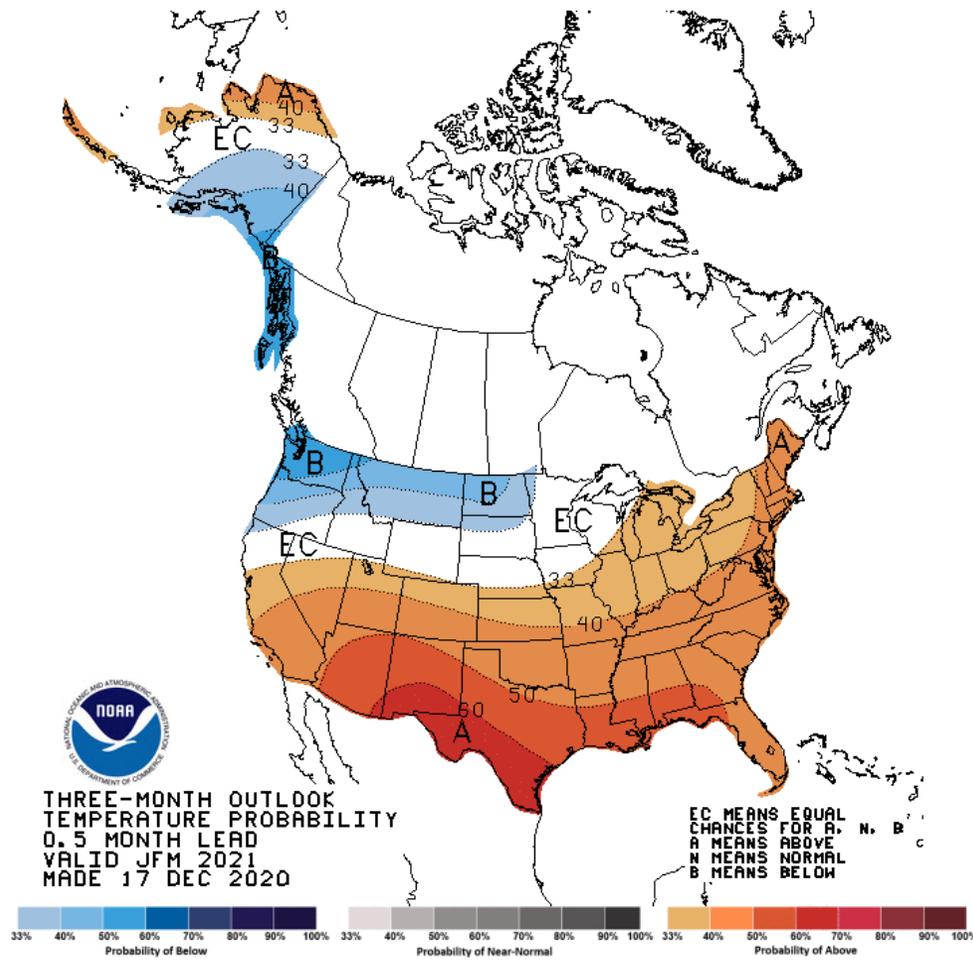


Temperature



Precipitation

JFM 2021 Outlooks

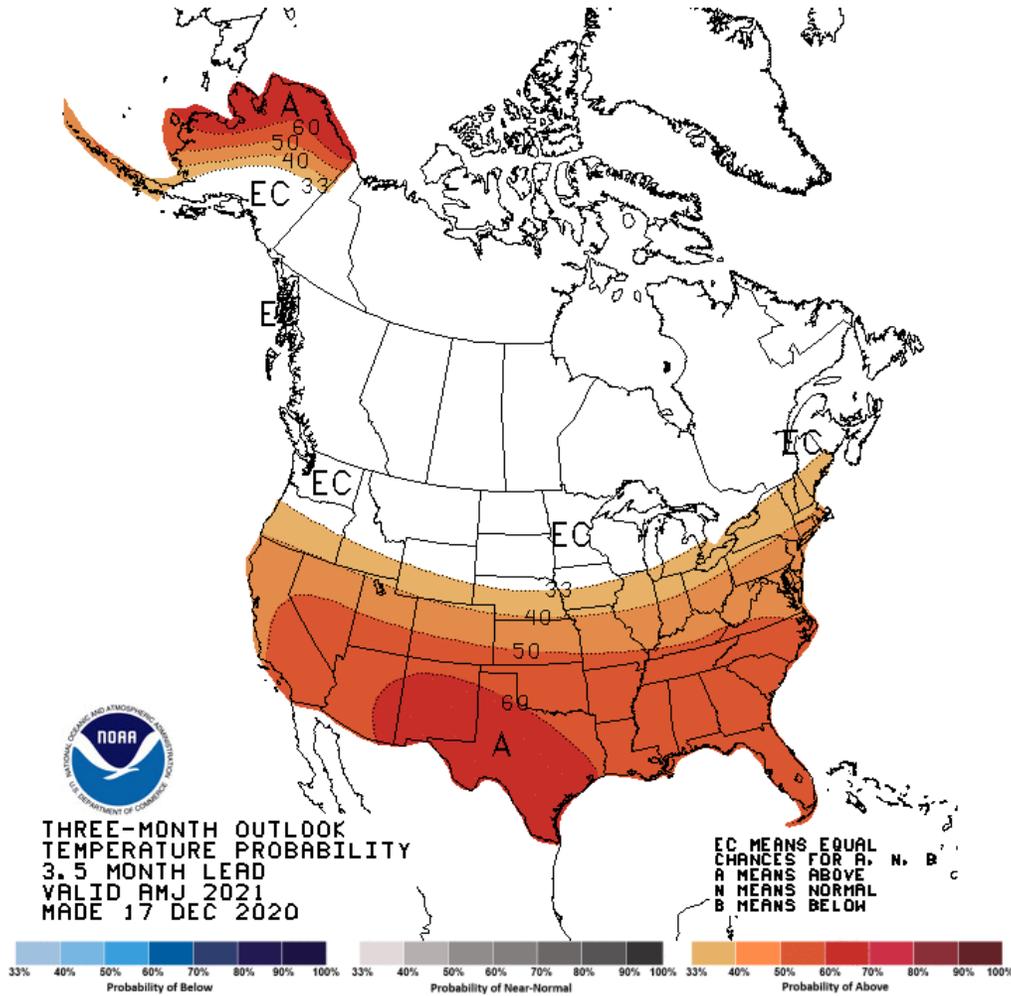


Temperature

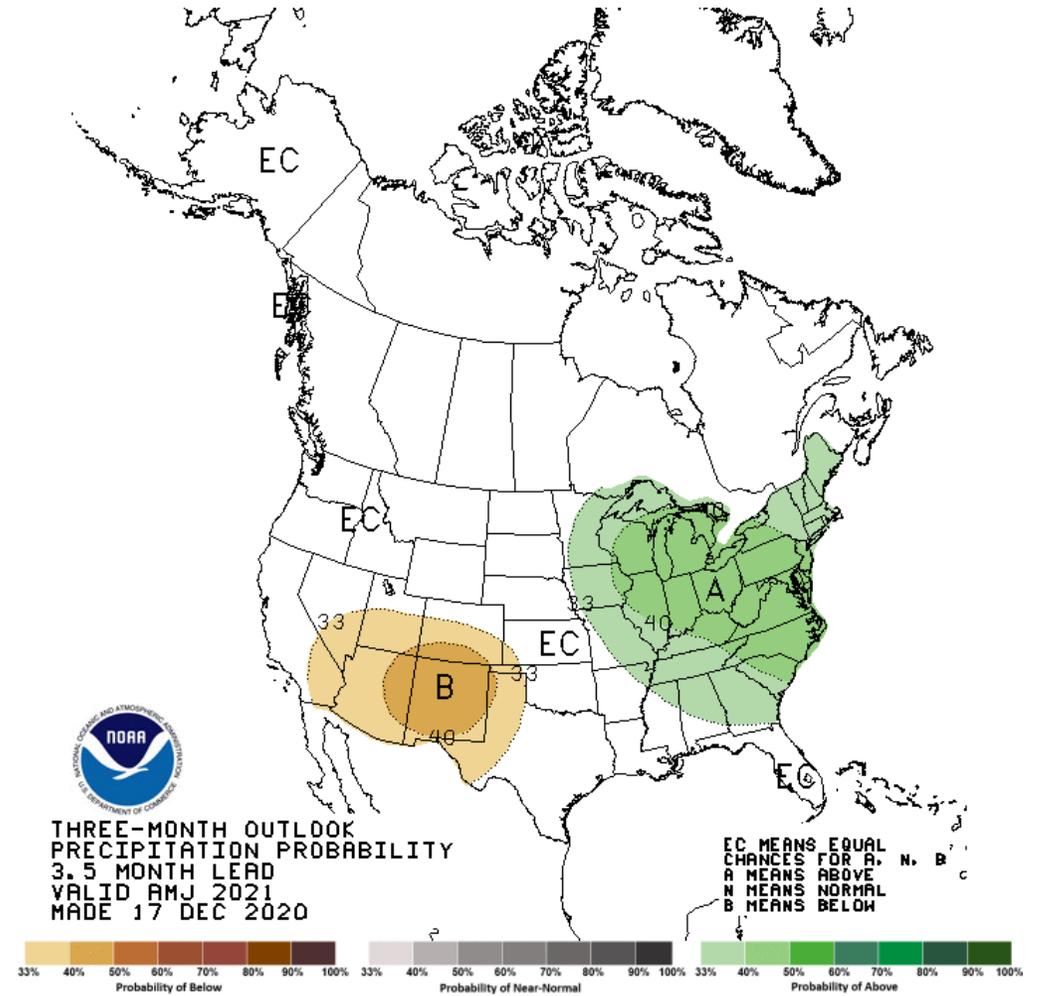
https://www.cpc.ncep.noaa.gov/products/predictions/long_range/

Precipitation

AMJ 2021 Outlooks



Temperature

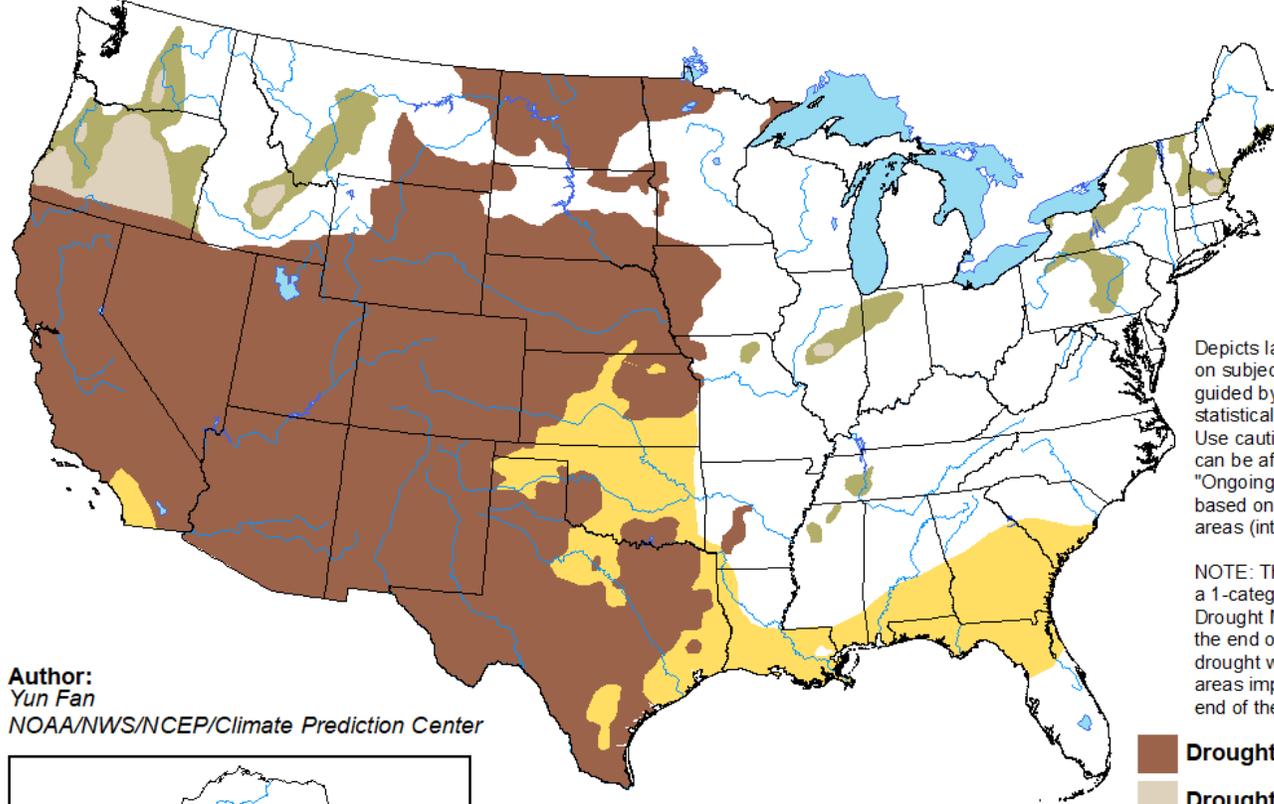


Precipitation

Seasonal Drought Outlook

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

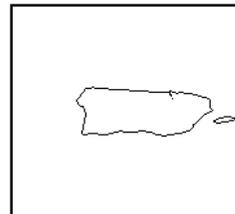
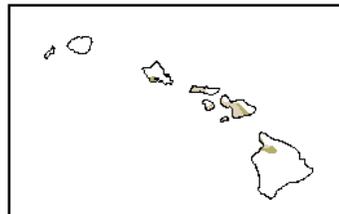
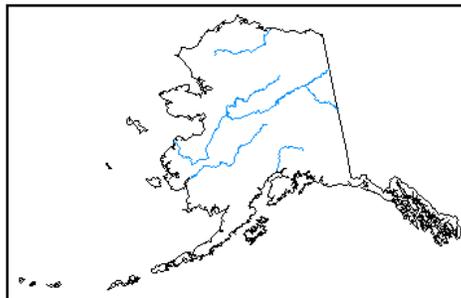
Valid for December 17, 2020 - March 31, 2021
Released December 17, 2020



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:
Yun Fan
NOAA/NWS/NCEP/Climate Prediction Center



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



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

http://www.cpc.ncep.noaa.gov/products/expert_assessment/season_drought.png

Outlook Summary

- **Short-term** outlooks showing high probabilities of:
 - Above average temperatures – more records broken?
 - Below-average precipitation
- **Winter**
 - Enhanced changes for above-normal temperatures -- Lower MO, MS, and OH basins
 - Leaning toward above-average precipitation -- Ohio and Great Lakes areas
- **Continued drought** across High Plains = Soil moisture likely to stay low heading into spring
- Classic **La Niña signal** showing in updated monthly and seasonal outlooks
 - *High probability of a moderate/strong La Niña*
 - *Analog years show high variability in temperature and precipitation vs. El Niño phase*
 - *Some of the biggest signals from La Niña will be late winter and early spring, especially across the Ohio Valley and Great Lakes – wet.*

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 & Questions?

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Photo credit: Laura Edwards

