North Central U.S. Climate Summary and Outlook Webinar
November 21, 2019

Western KS, early November
pic provided by Mary Knapp

Frankfort, KY, Chip Zimmer
Nov 12 2019

Columbia, MO, P. Guinan
October 31, 2019

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United States Department of Agriculture
Midwest Climate Hub

General Information

- **Providing climate services to the Central Region**
  - Collaboration Activity Between:
    - USDA Climate Hubs
    - American Association of State Climatologists
    - Midwest and High Plains Regional Climate Centers
    - NOAA NCEI/NWS/OAR/NIDIS
    - National Drought Mitigation Center

- **Next Climate/Drought Outlook Webinar**
  - Thursday, Dec 19, 2019, Adnan Akyüz, North Dakota State Climatologist

- **Access to Future Climate Webinars & Past Recordings can be found here:**
  - http://mrcc.isws.illinois.edu/multimedia/webinars.jsp
  - http://www.hprcc.unl.edu/webinars.php

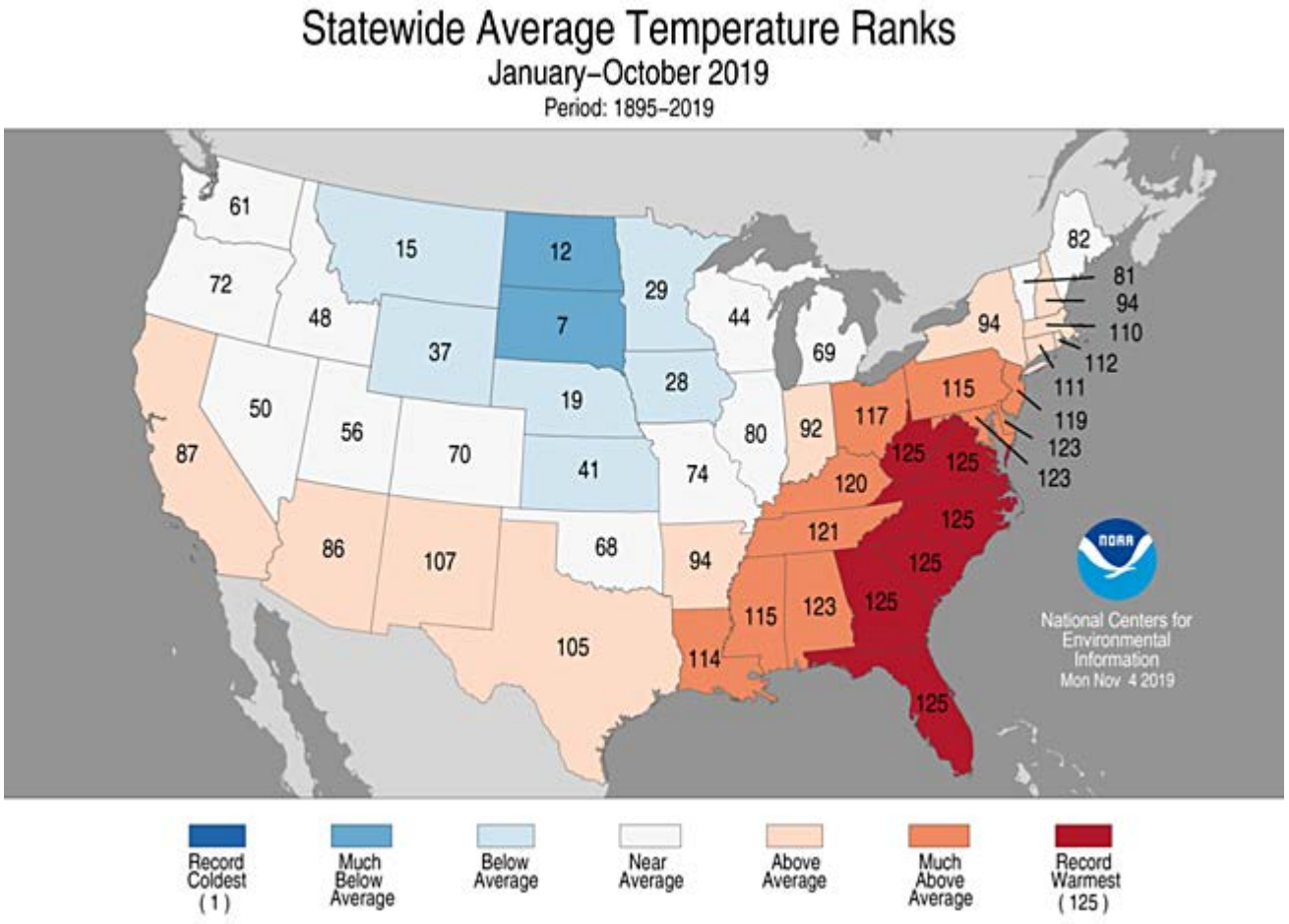
- **Open for questions at the end**

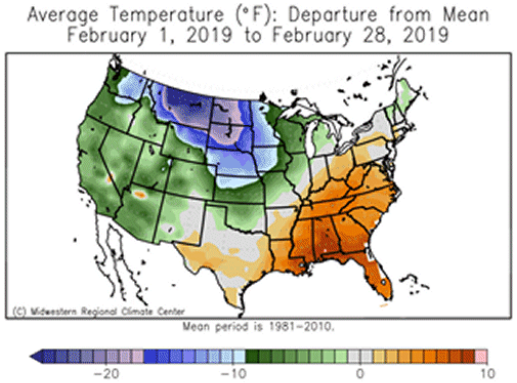
Agenda

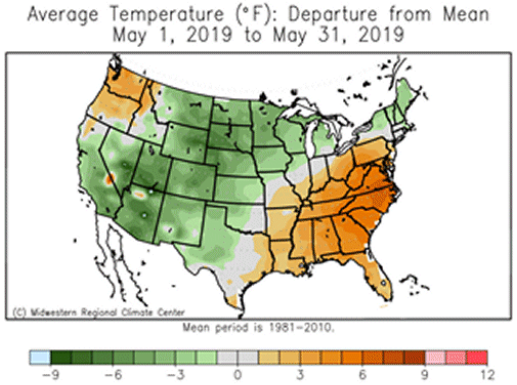
- **Jan-Oct and October Recap**
- **November Conditions**
- **Snow/Water/Flood/Drought**
- **Agriculture**
- **State Impacts**
- **Climate Outlooks**
- **Questions/Comments**

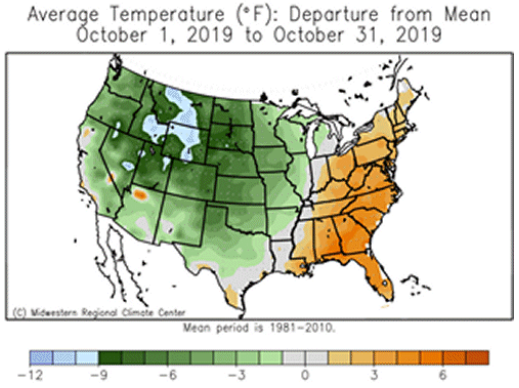
Jan-Oct Recap

The contiguous U.S. Jan-Oct temperature was 0.5°F above the 20th century average.



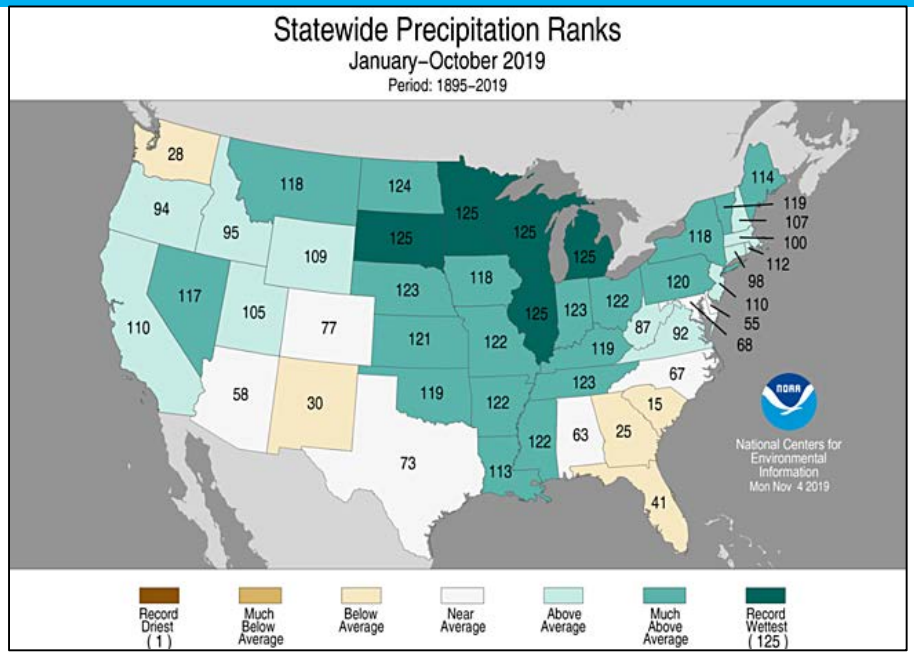






https://www.ncdc.noaa.gov/sotc/national/201910

The contiguous U.S. Jan-Oct precipitation was 30.25 inches, or 4.89 inches above the 20th century average, making it the wettest Jan-Oct in the 125-yr POR.



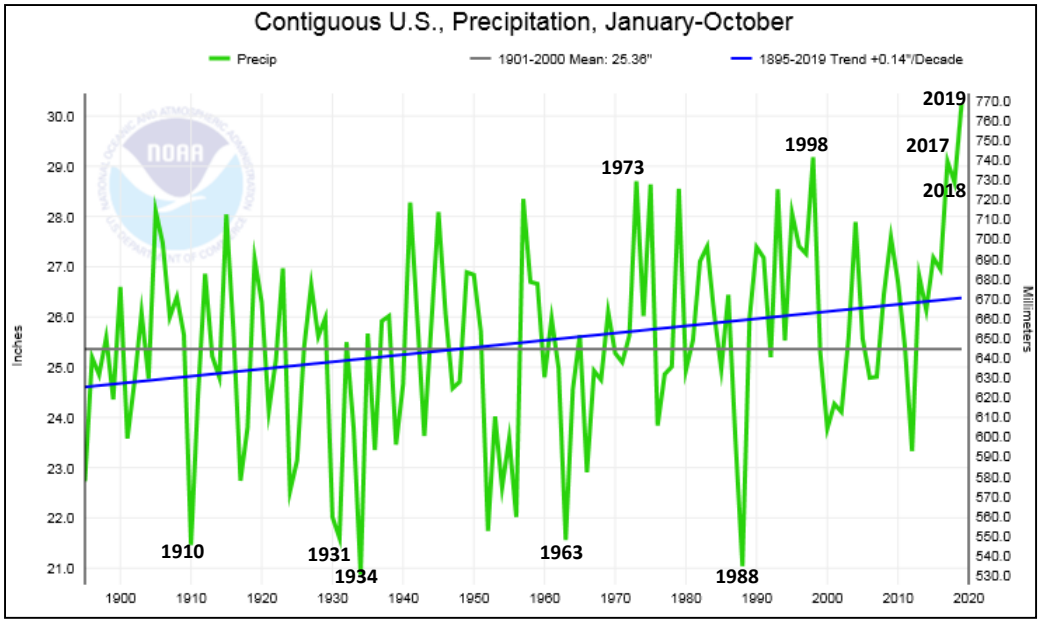
States with wettest Jan-Oct on record

- South Dakota
- Minnesota
- Wisconsin
- Illinois
- Michigan

Contiguous U.S. Top 5 wettest Jan-Oct on record

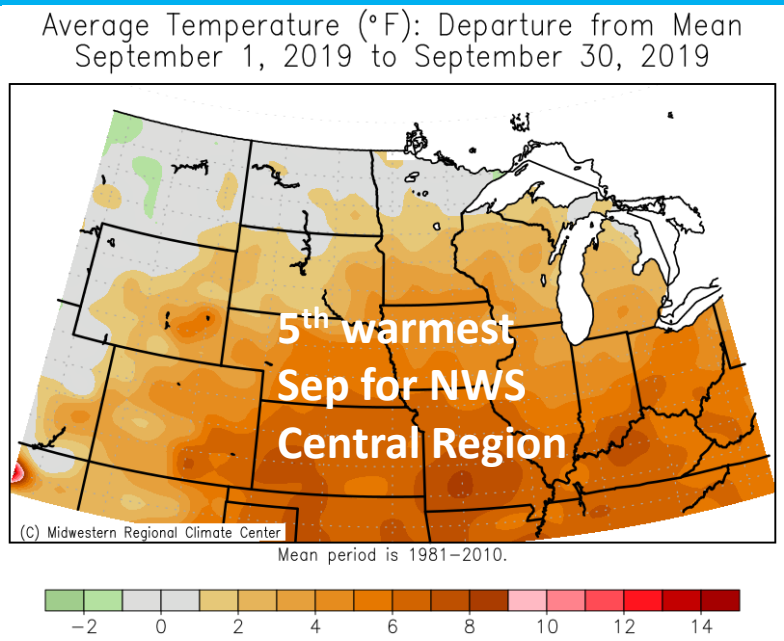
1. 2019
2. 1998
3. 2017
4. 1973
5. 2018

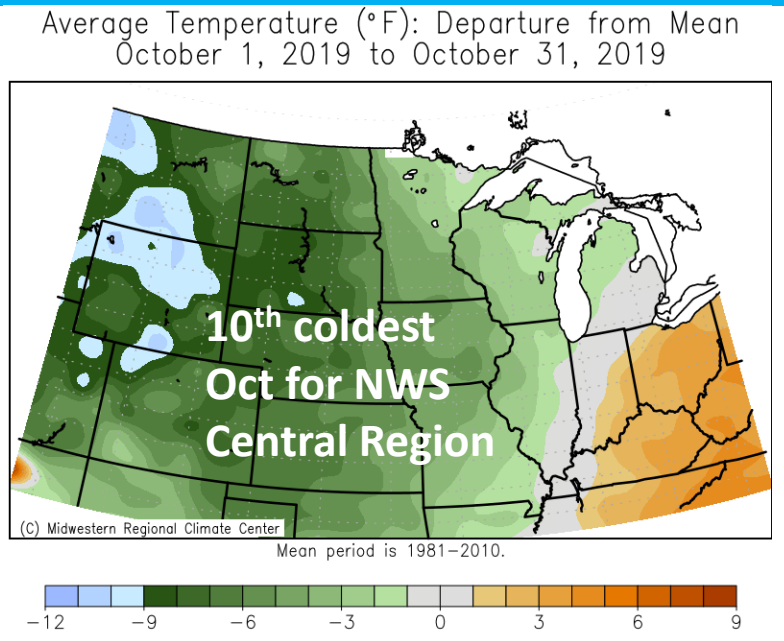
Period of record: 1895-2019



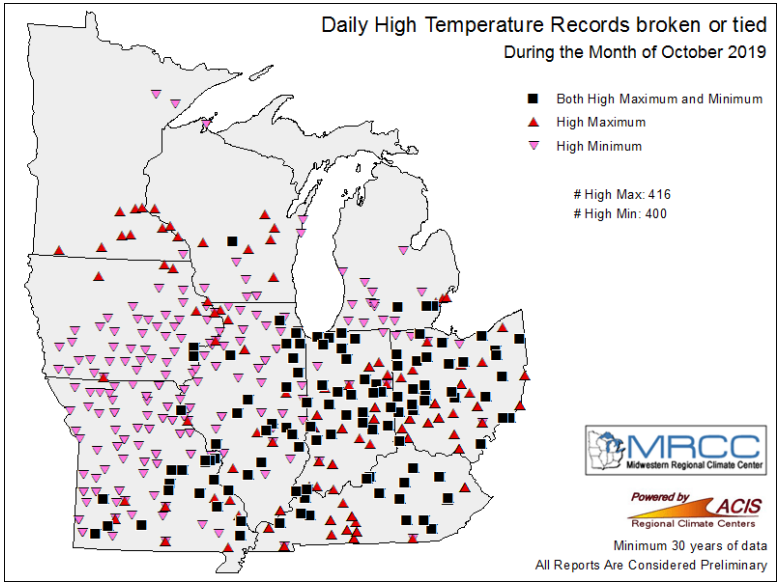
October Recap

Major pattern change from September into October

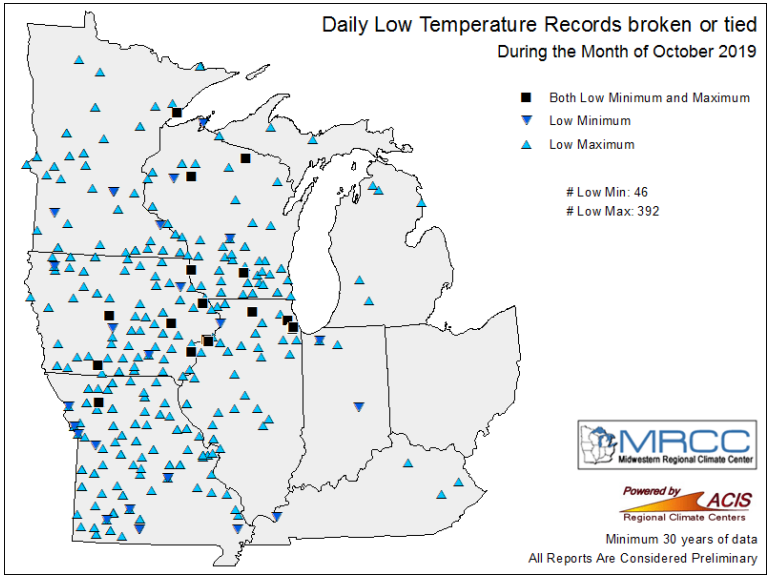




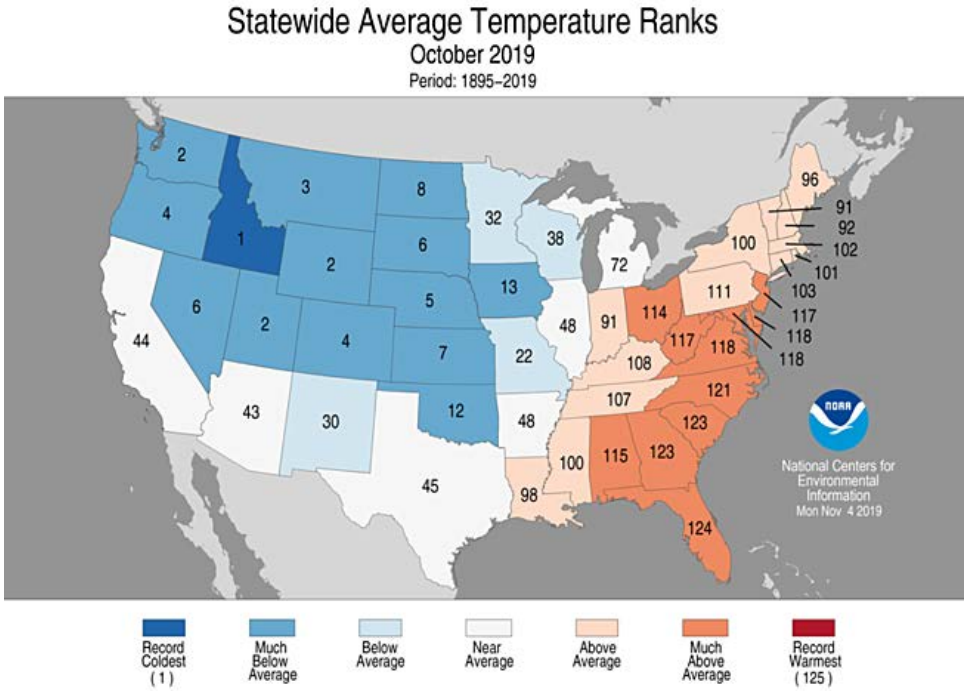
First week of October…



Last week of October…



The contiguous U.S. October temperature was 1.8°F below the 20th century average; it was the coolest October since 2009.

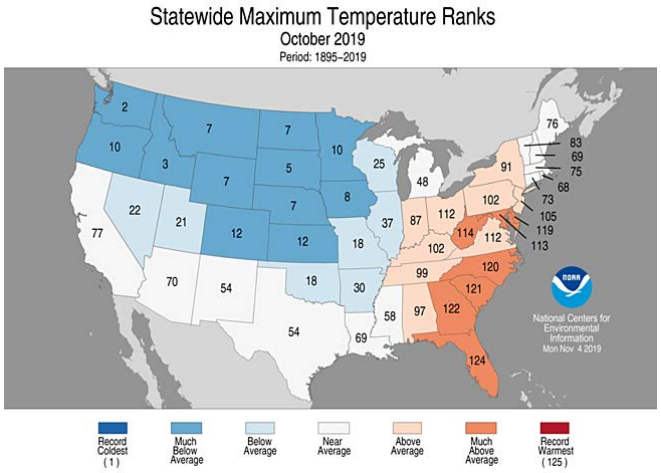


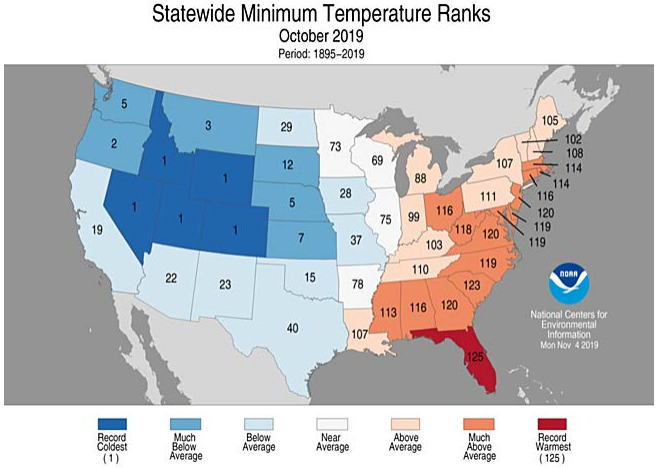
- Cooler than average from Pacific Northwest to generally west of the Mississippi River

- Warmer than average generally east of the Mississippi River.

- Top 10 Coldest for NW quarter U.S. vs Top 10 Warmest for Mid-Atlantic/SE U.S.

- Coldest Oct on record for Idaho





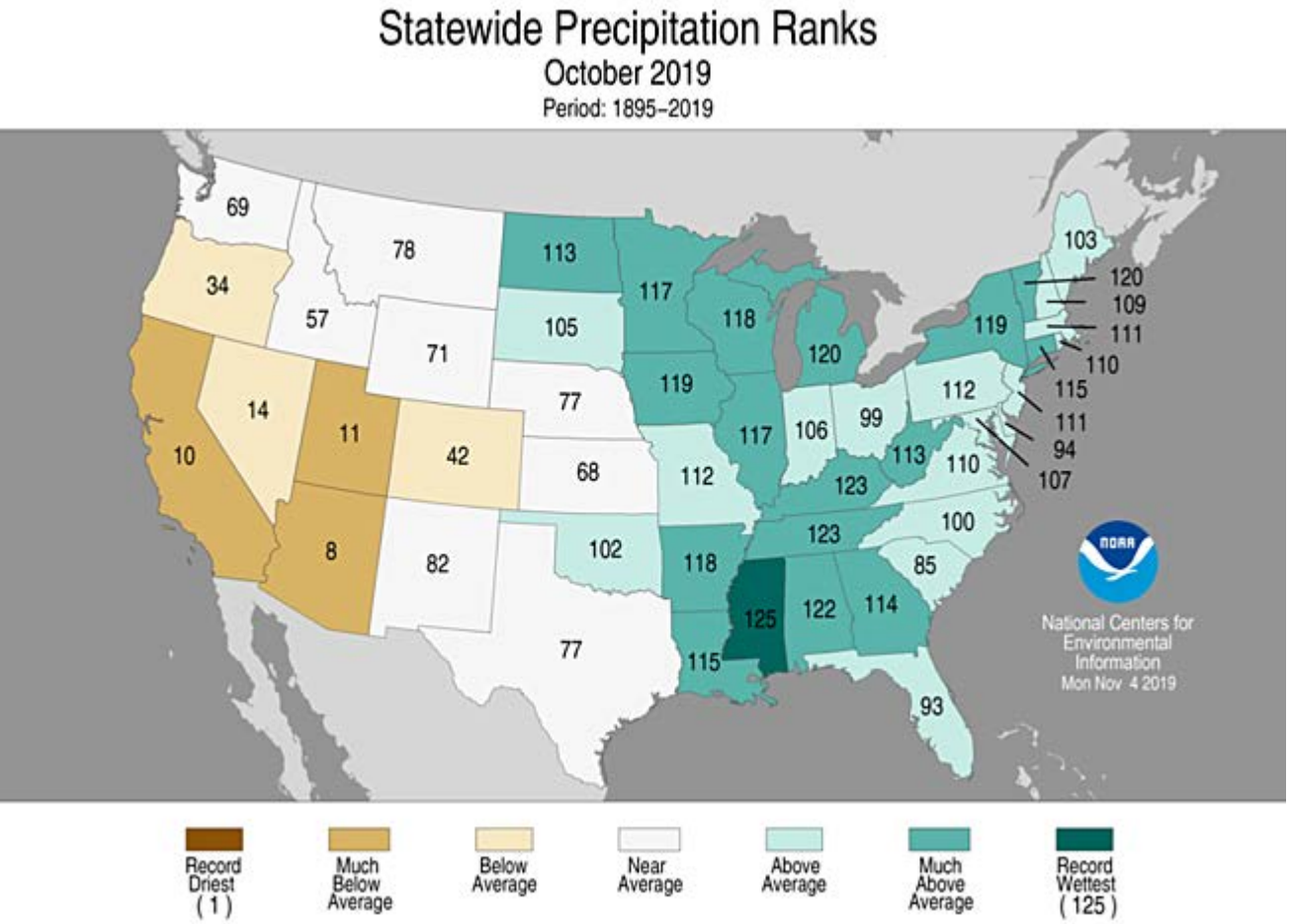
- Record cold min temps: ID, NV, WY, UT and CO

- Record warm min temp: Florida

# of Oct Daily Records	
Max Temp	Min Temp
2,620	4,479

https://www.ncdc.noaa.gov/temp-and-precip/us-maps/3/201910#us-maps-select

The contiguous U.S. October precipitation was 3.14 inches, or 0.98 inches above the 20th century average, making it the 8th wettest October in the 125-yr POR.



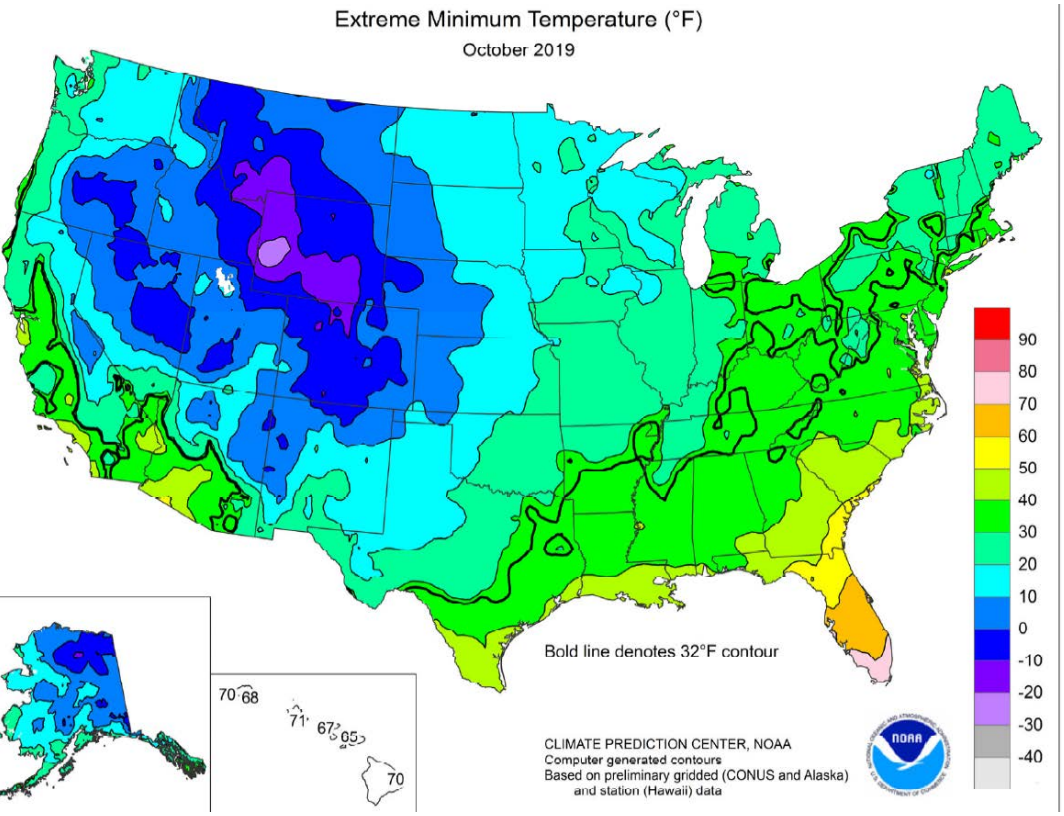
- **Above average precipitation across the eastern half of U.S. including the Dakotas & OK.**

- **Below average precipitation across the western U.S. including OR, CA, NV, UT, AZ and CO.**

- **Top 10 driest October for CA and AZ vs Top 10 wettest October for several states in eastern half of U.S. and wettest October on record for MS.**

https://www.ncdc.noaa.gov/temp-and-precip/us-maps/3/201910#us-maps-select

An early-season snowstorm across the Rockies and Midwest was accompanied by bitter cold temperatures during the last week of October. All-time low temperature records for October were set across the West with many locations from MT to NM dipping below zero.



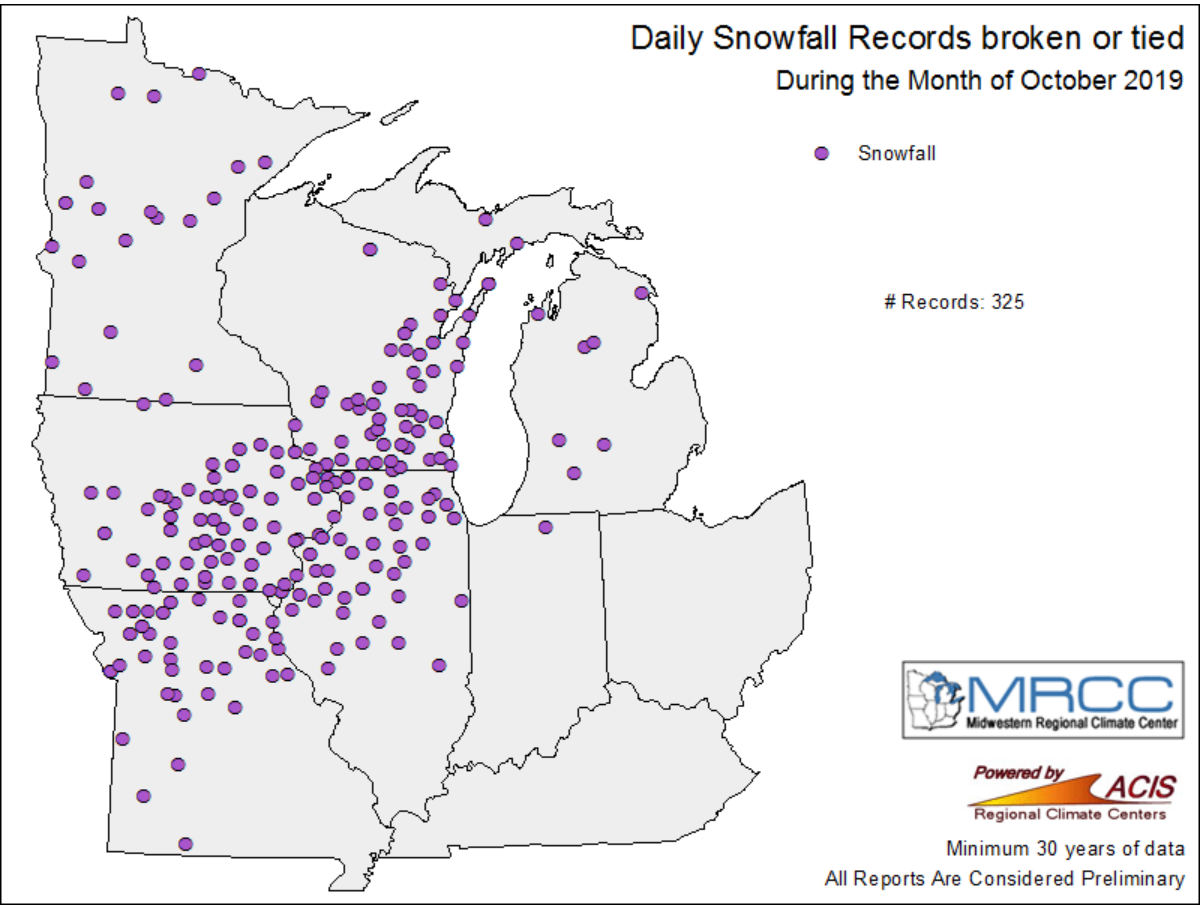
All-time State Daily Minimum Temperature Records for October

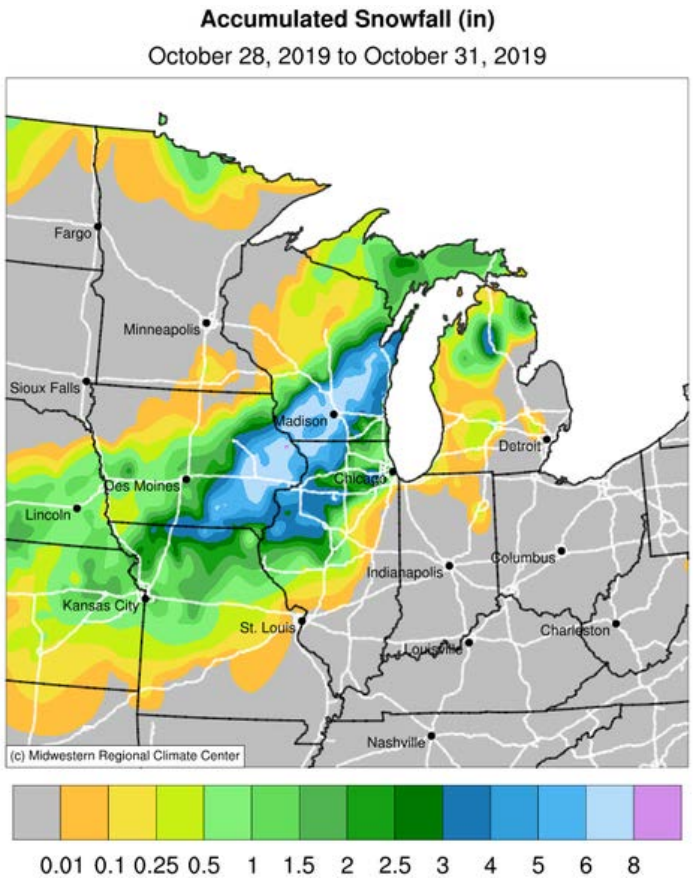
State	Location	Date	Min Temp (°F)
Utah	Peter Sink	30	-46*
Idaho	Daniel Fish Hatchery	30	-34

*Contiguous U.S. record for October

PUT SNOW PICTURE FROM WEST HERE!!

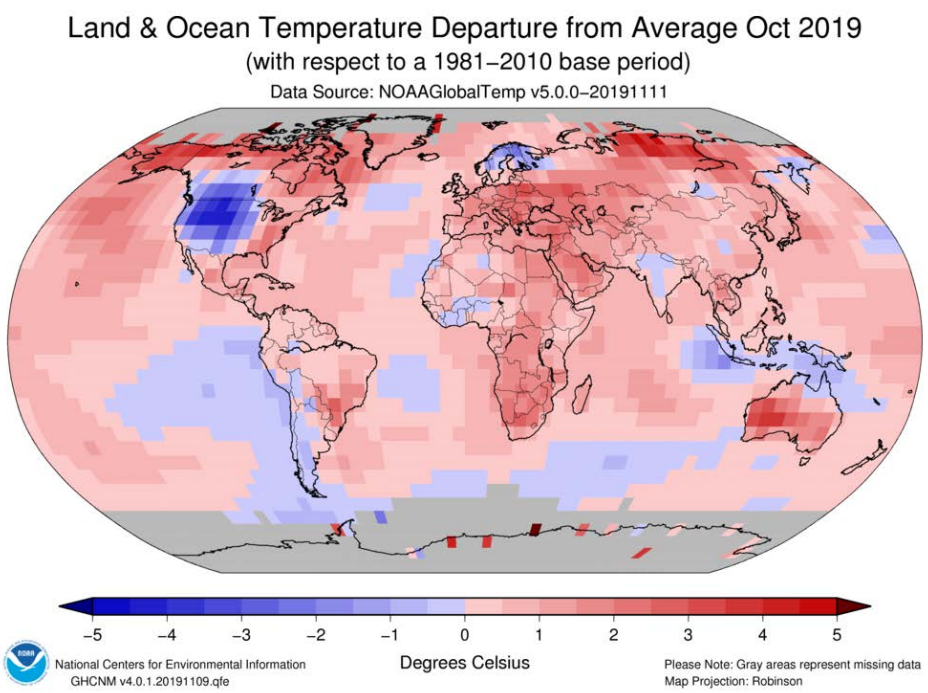
Unusual late October snowstorm across the Midwest





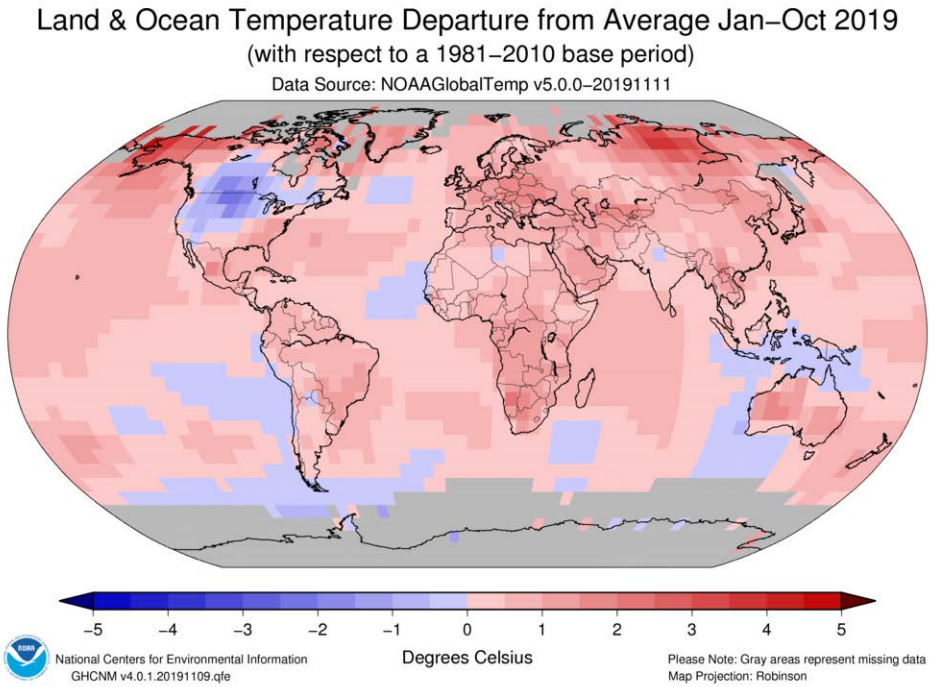
Global Recap

Global Temperature Departure from Average for October 2019



- **2nd warmest October on record for the globe (+1.76°F); 2015 is the warmest.**
- **The most notable cooler-than-average temperatures were found across the western half of the contiguous U.S. and southwestern Canada. (≤ -2.7°F)**

Global Temperature Departure from Average for January-October 2019



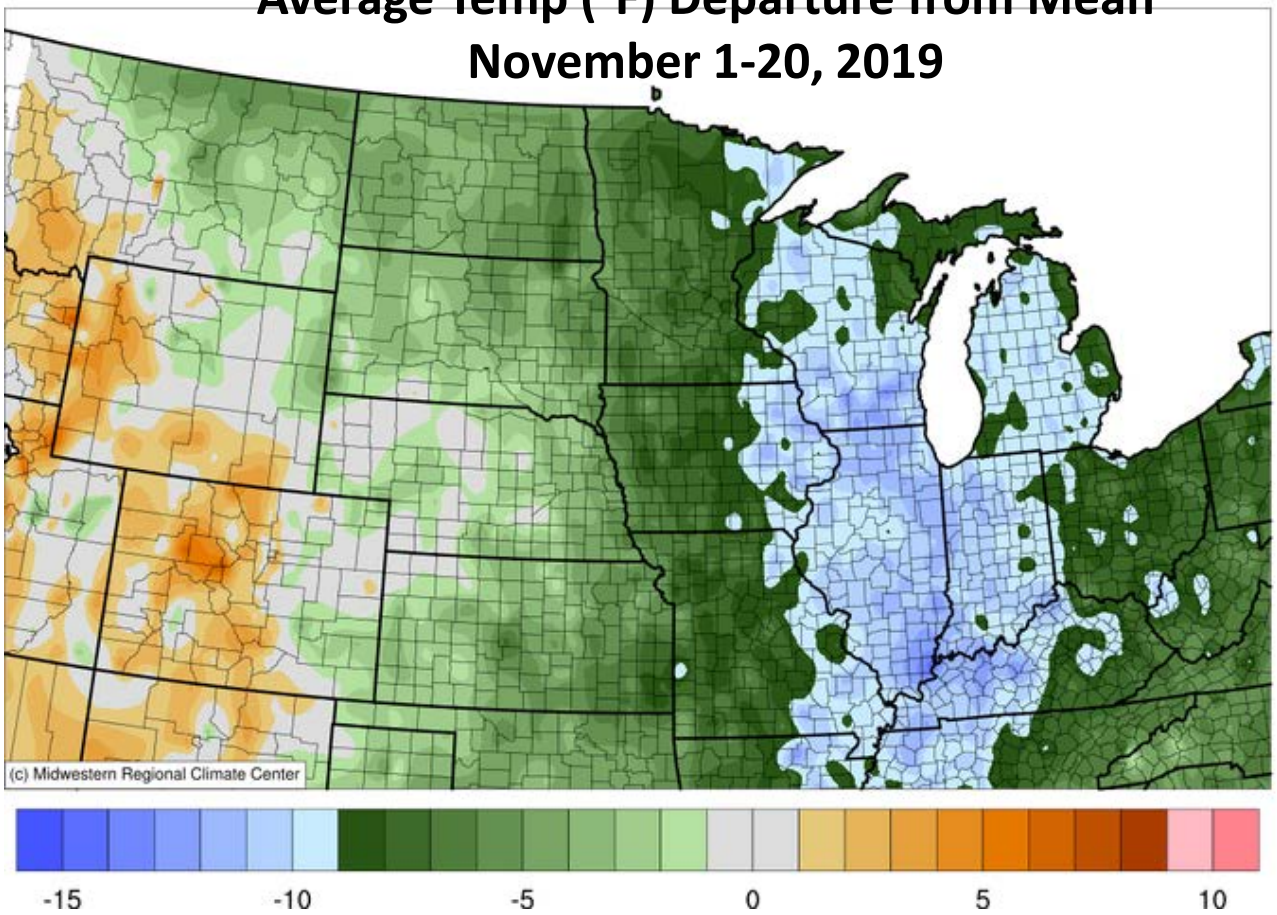
- **2nd warmest Jan-Oct on record for the globe (+1.69°F); 2016 is the warmest.**
- **The most notable cooler-than-average temperatures were found across the north central U.S. and south central Canada. (≤ -1.8°F)**

https://www.ncdc.noaa.gov/sotc/global/201910

November Conditions

The cold October conditions spilled into November across the North Central U.S.

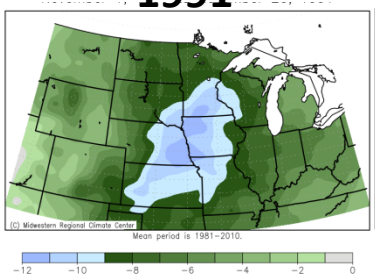
Average Temp (°F) Departure from Mean
November 1-20, 2019



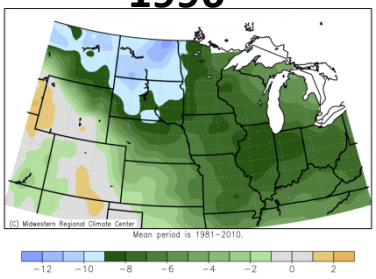
- Coldest departures across eastern half of the NWS Central Region.
- Seasonably mild temperatures in the northern and central Rockies.

Cold Nov 1-20 periods over the past 30 years…

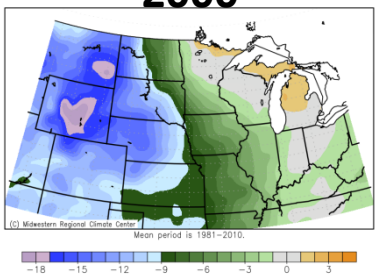
1991



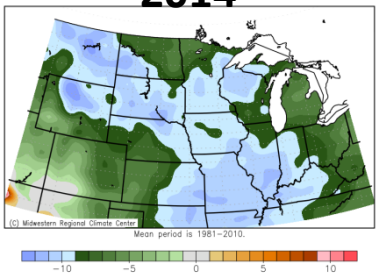
1996



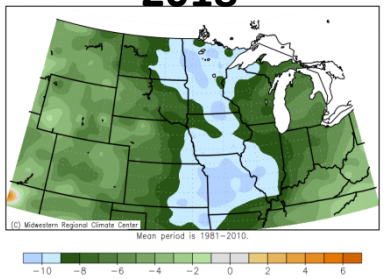
2000



2014

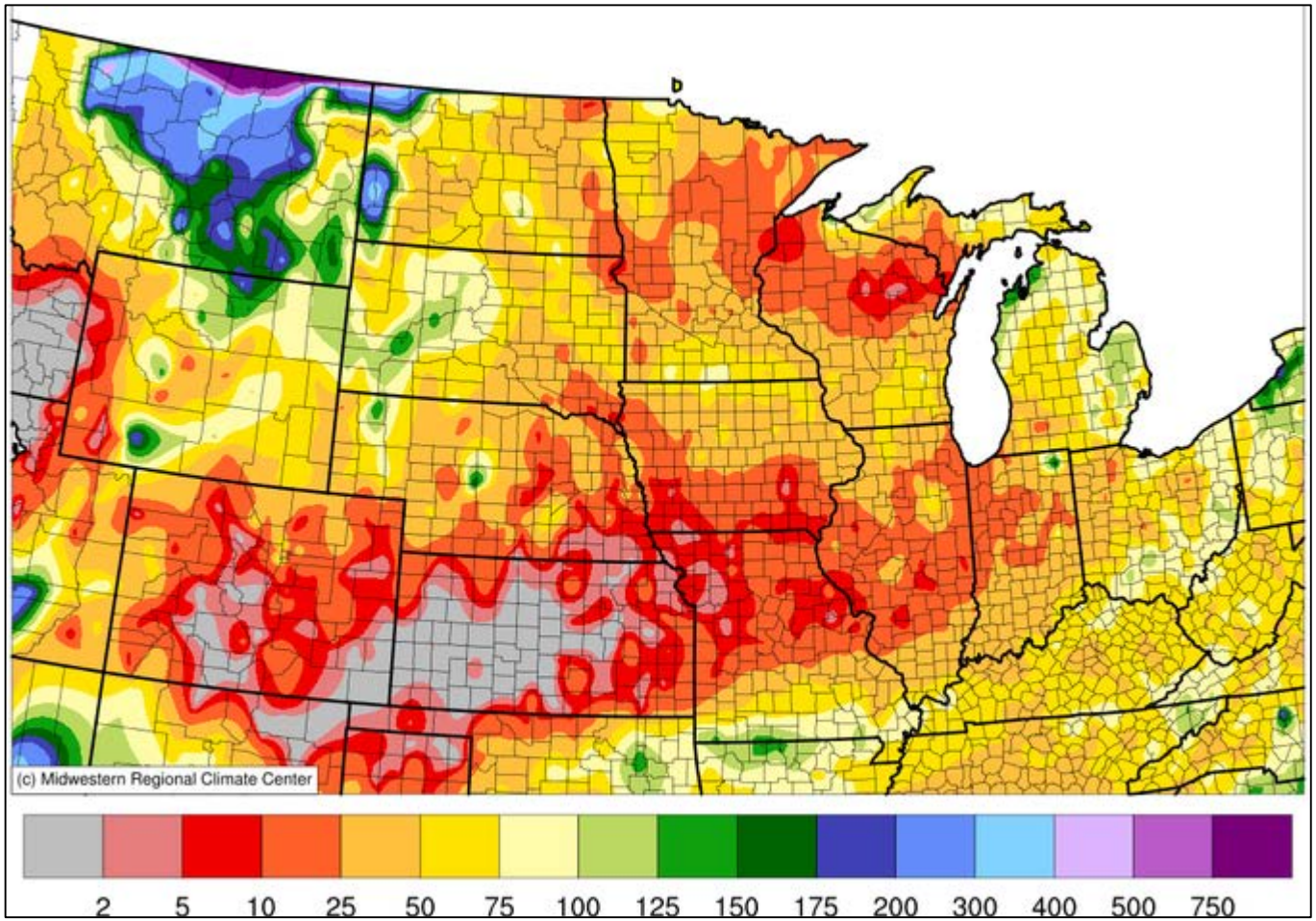


2018



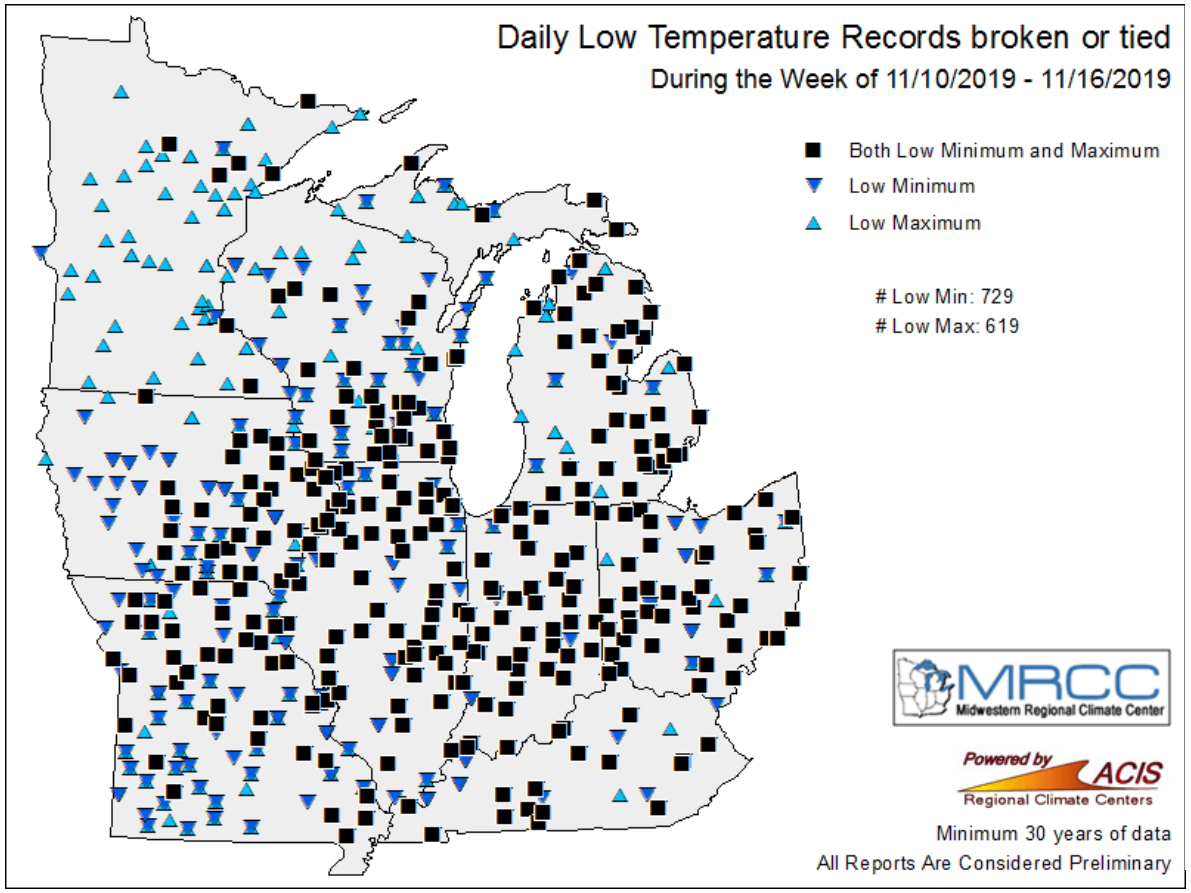
Dry conditions have prevailed in November across the North Central Region.

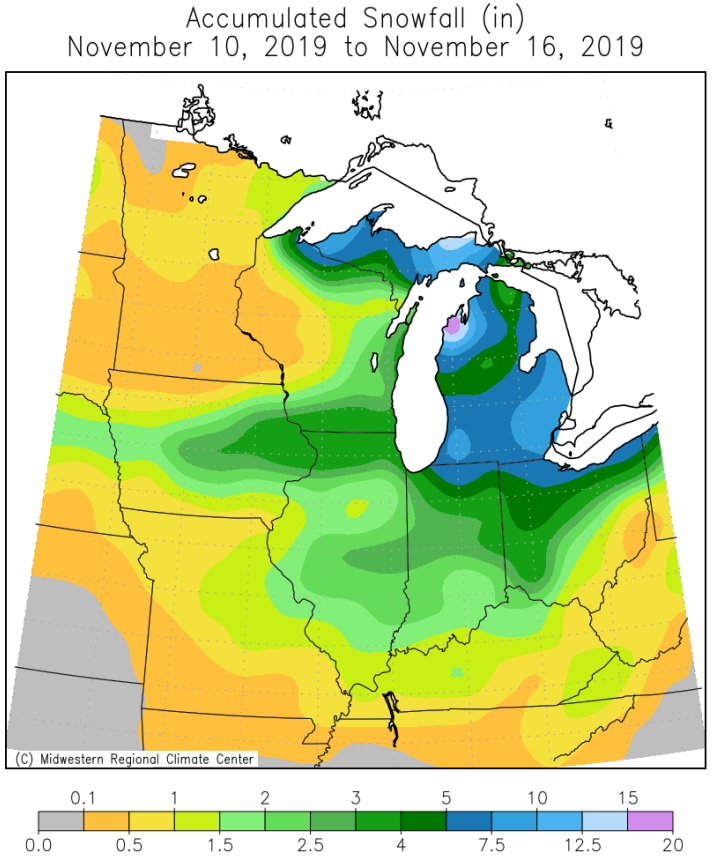
Precipitation Percent of Mean
November 1-20, 2019



- Below average precipitation over much of the North Central Region.
- Pockets of wetter conditions in MT, north central WY, western ND

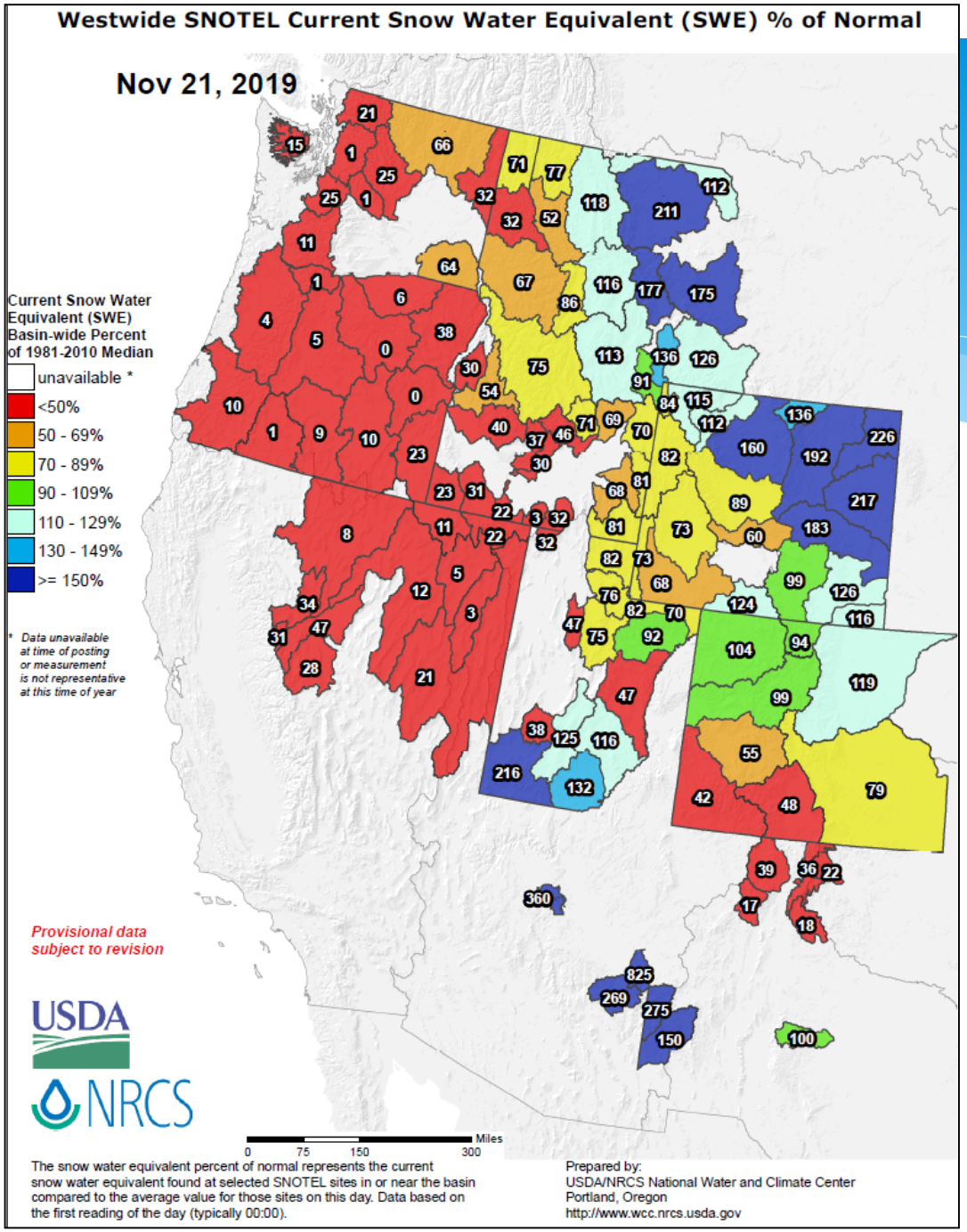
Cold and Snowy November period





Snow/Water

NRCS Snow Water Equivalent



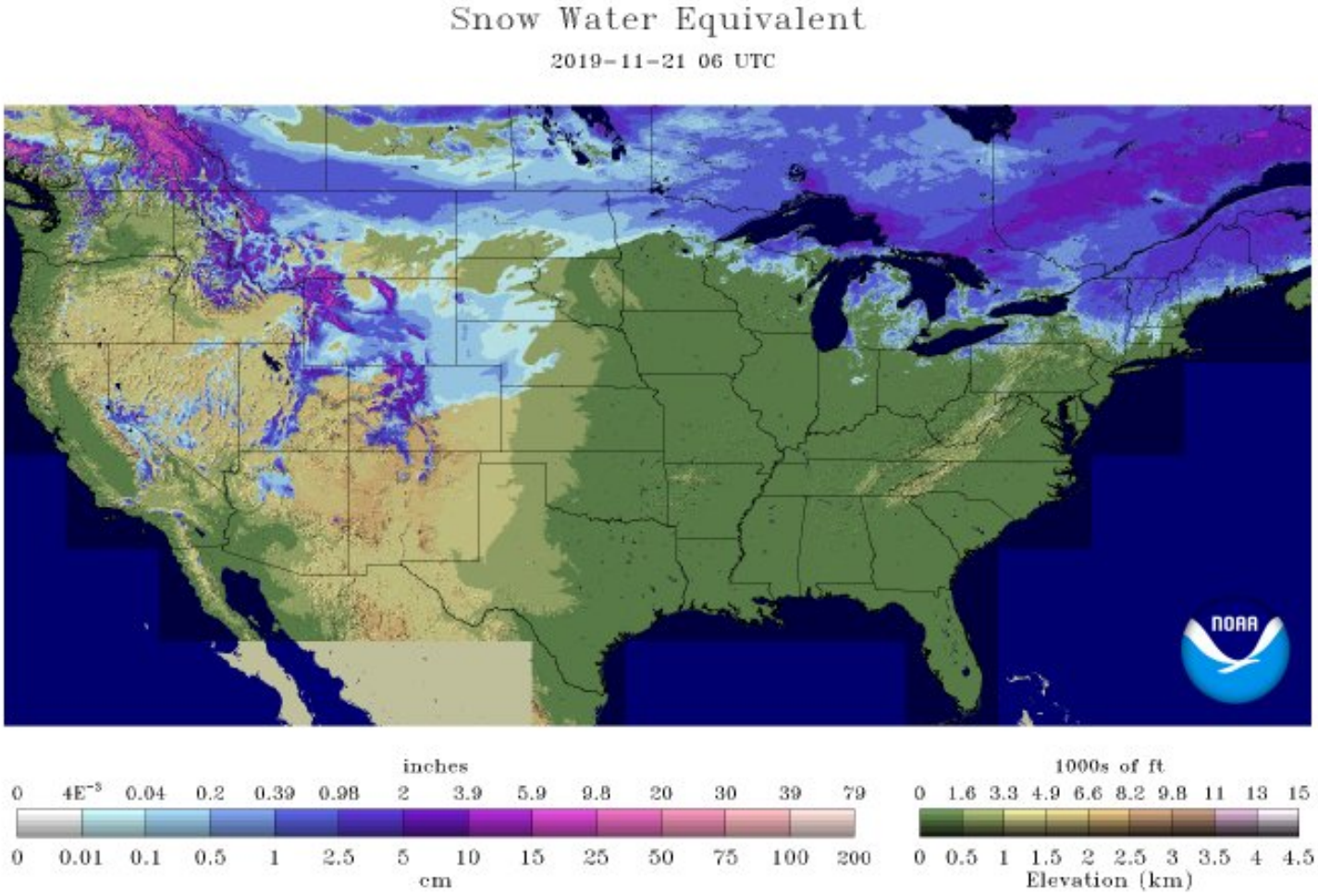
- **Some watersheds in western MT, northern and eastern WY and north central CO are in excess of 100% SWE**
- **Less than 50% SWE for the Pac NW, Great Basin, and southwestern Colorado**

https://www.wcc.nrcs.usda.gov/ftpref/data/water/wcs/gis/maps/west_swepctnormal_update.pdf

Current Snow Water Equivalent November 21, 2019

National Snow Analysis 2018-2019

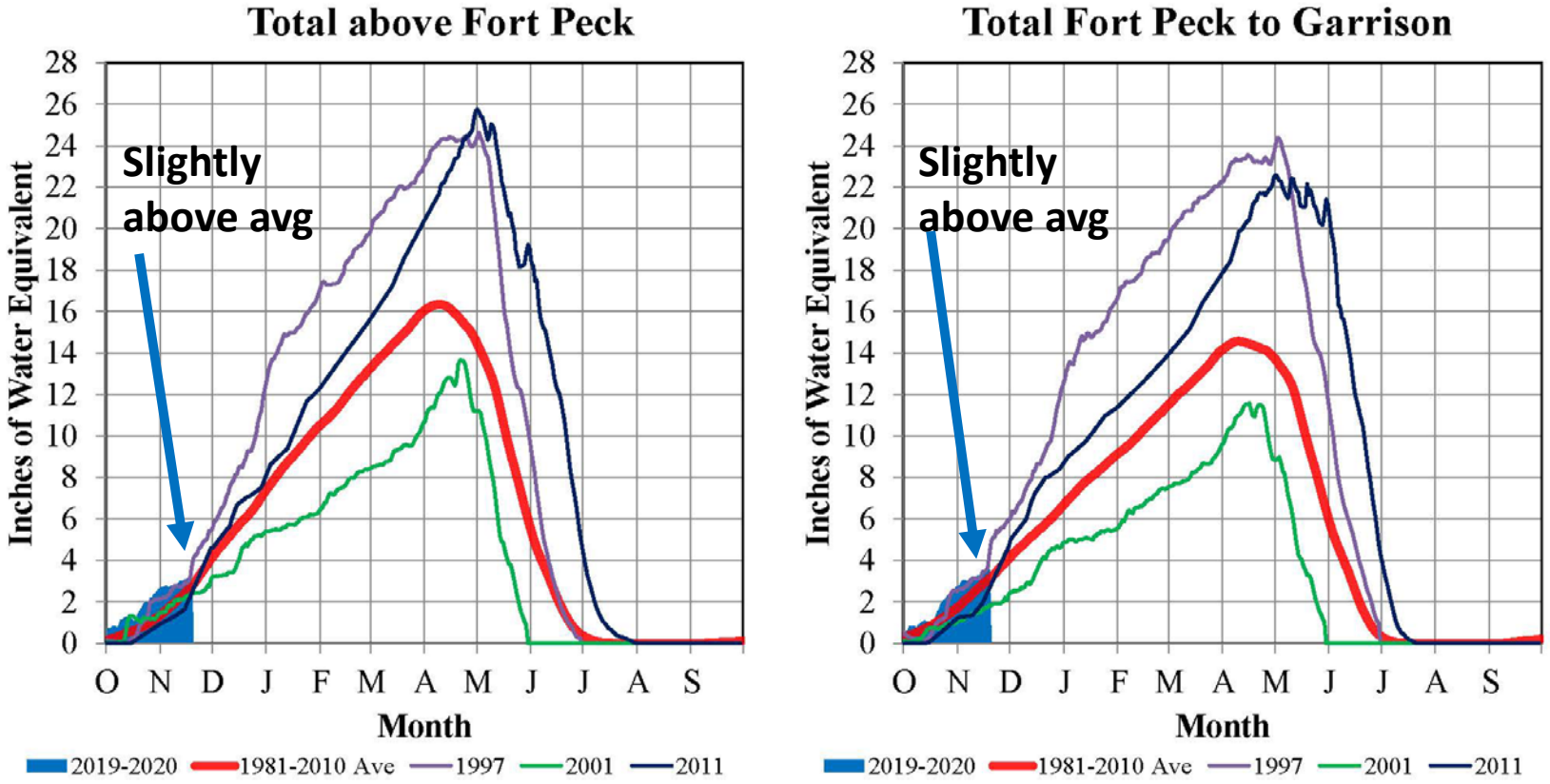
OWP | OFFICE OF WATER PREDICTION



http://www.nohrsc.noaa.gov/nsa/

Missouri River Basin – Mountain Snowpack Water Content 2019-2020 with comparison plots from 1997*, 2001*, and 2011

19-Nov-2019



The Missouri River Basin mountain snowpack normally peaks near April 15. On November 19, the mountain Snow Water Equivalent (SWE) in the "Total above Fort Peck" reach was 3.3 inches. On November 19, the mountain SWE in the Fort Peck to Garrison reach was 3.5 inches.

*Generally considered the high and low year of the last 20-year period, respectively

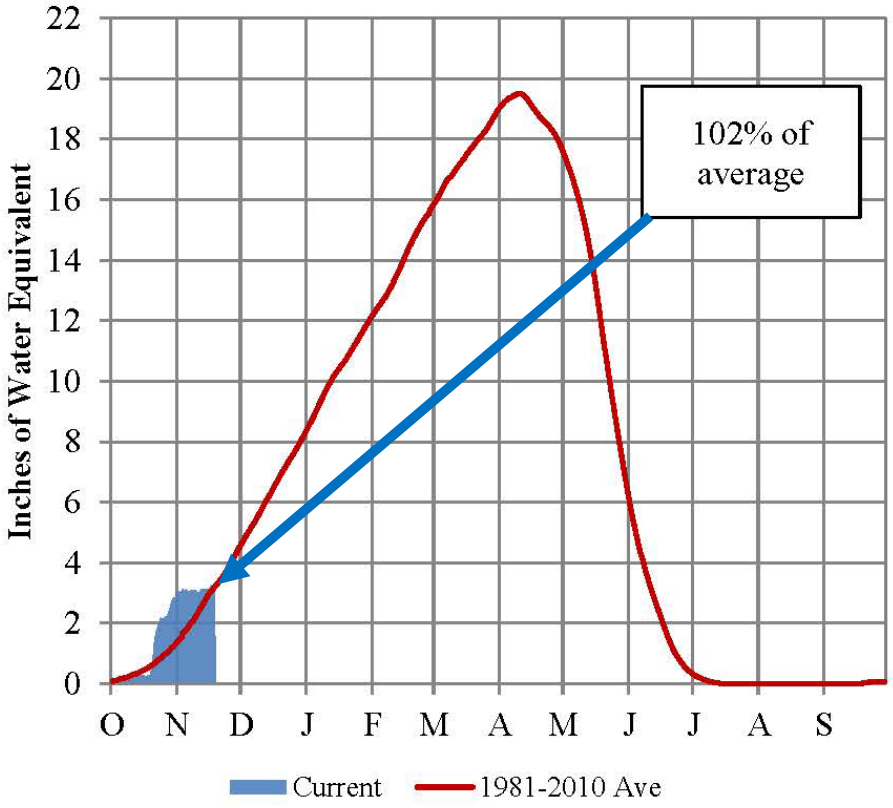
Provisional data. Subject to revision.

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

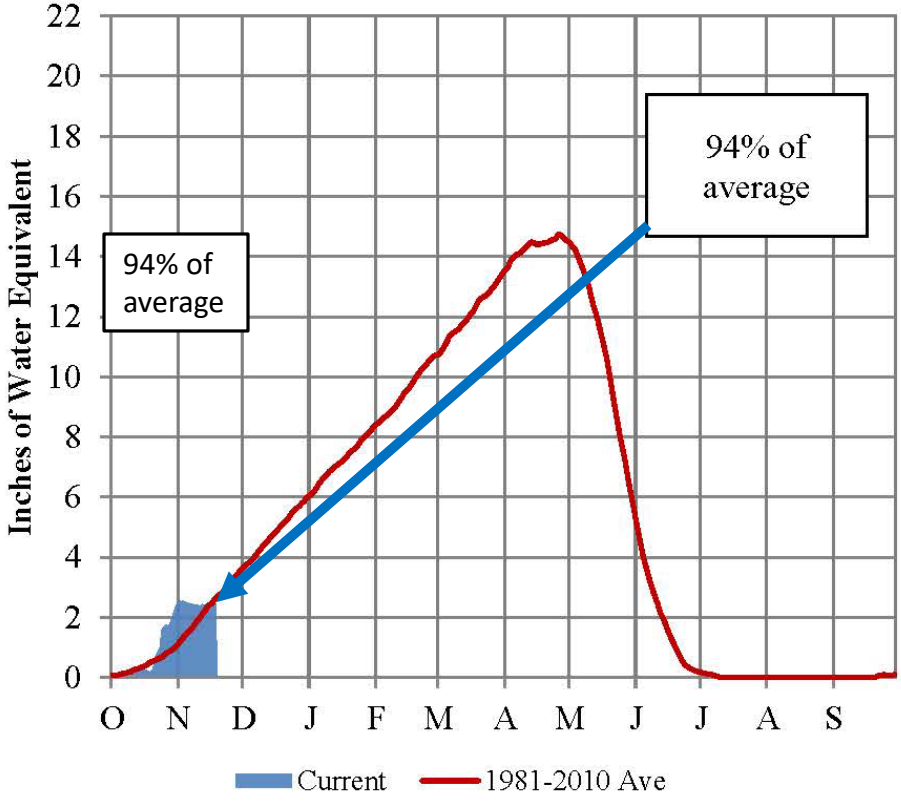
Platte River Basin - Mountain Snowpack Water Content
Water Year 2018-2019

November 19, 2019

Total North Platte



Total South Platte



The North and South Platte River Basin mountain snowpacks normally peak near April 15 and the end of April, respectively. As of November 18, 2019, the mountain snowpack SWE in the "Total North Platte" reach is currently 3.2", 102% of average. The mountain snowpack SWE in the "Total South Platte" reach is currently 2.5", 94% of average.

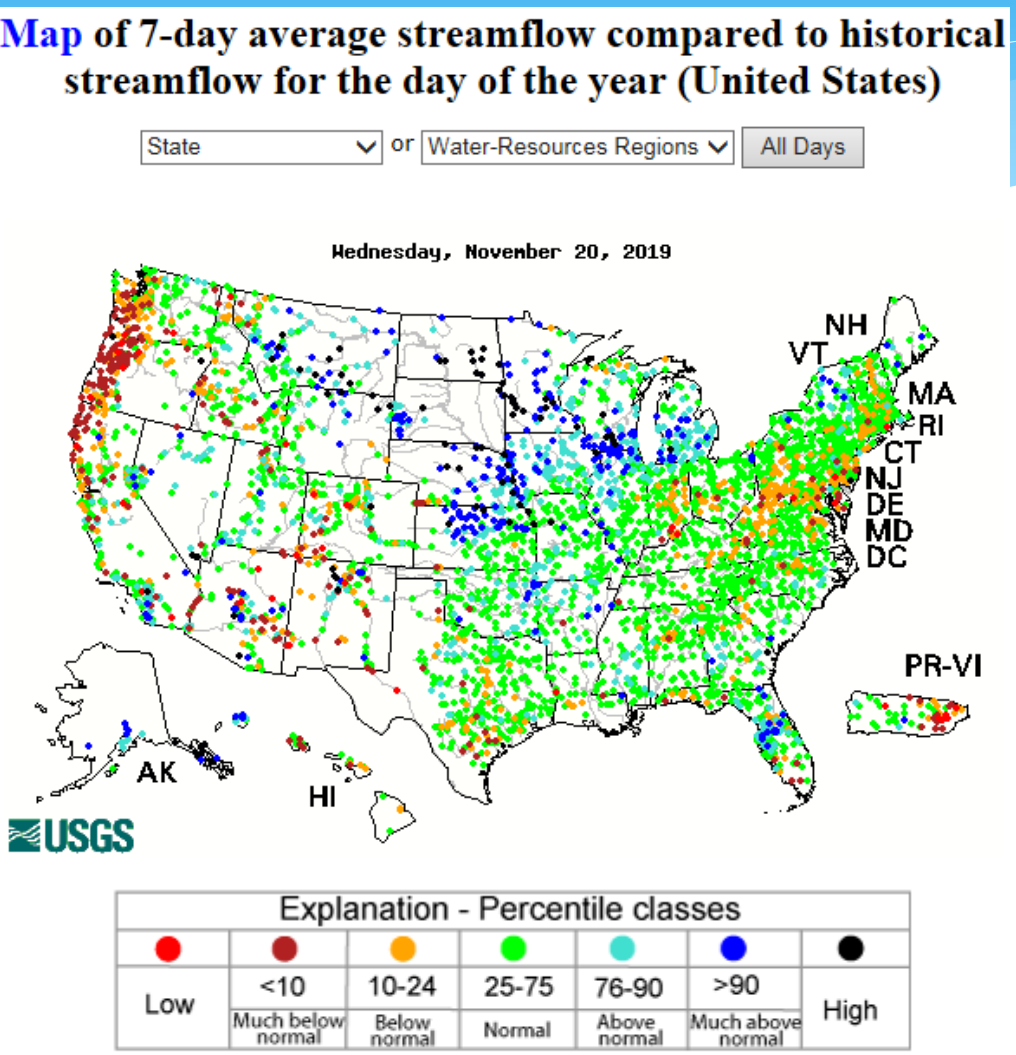
Source: USDA, Natural Resource Conservation Service

Provisional Data. Subject to Revision

7-Day Average Streamflow

Wednesday, Nov 20, 2019

- **Generally above to much above average streamflows across the Missouri and Upper Mississippi River Basins.**
- **Near to below average streamflows in Colorado SW NE, and the Ohio River Basin.**
- **Several ongoing record streamflows from MT to NE to WI.**



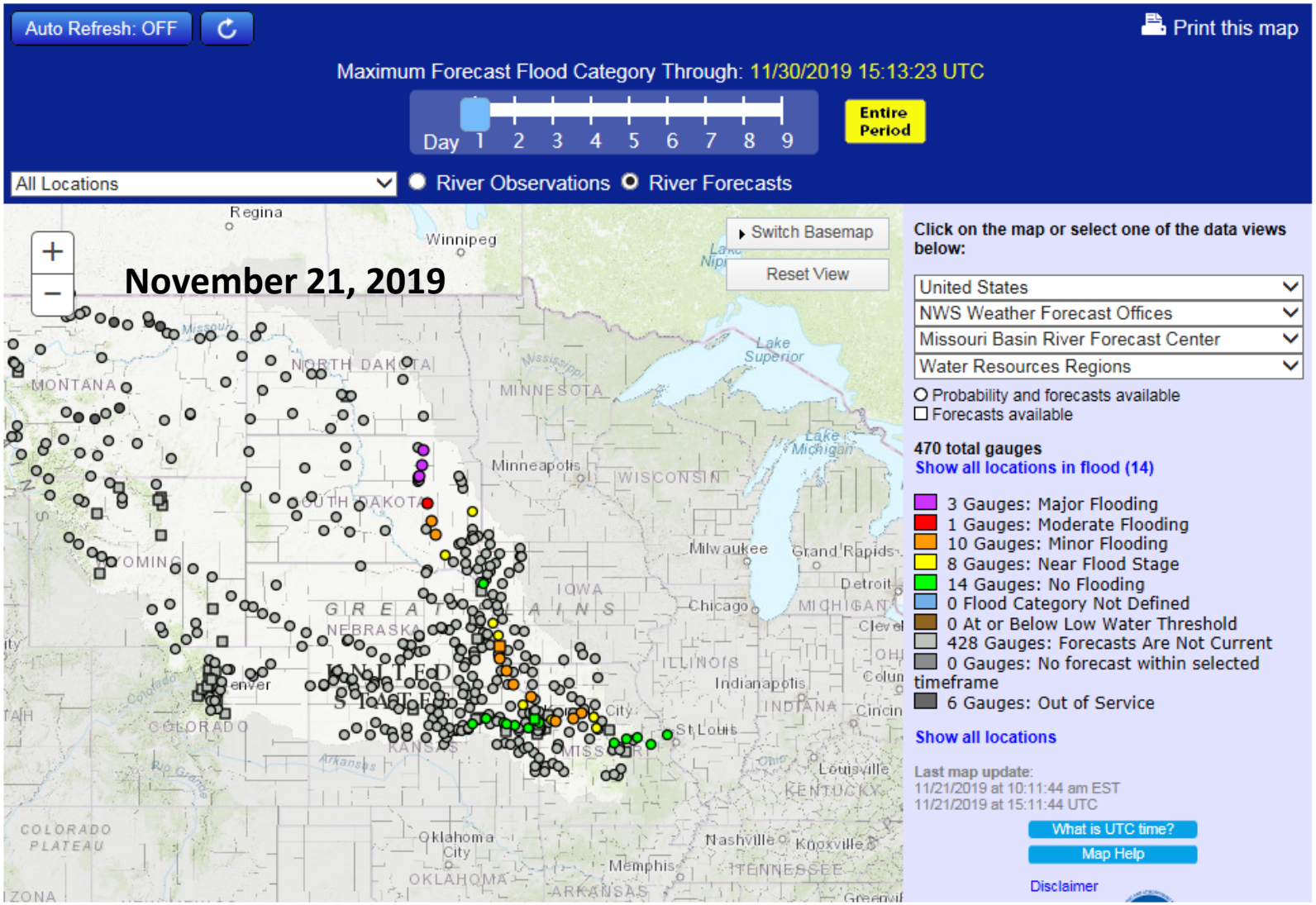
https://waterwatch.usgs.gov/?id=pa07d

NWS- Missouri Basin River Forecast Center

Weather.gov > Missouri Basin, Pleasant Hill

Missouri Basin, Pleasant Hill
River Forecast Center

River Observations and Forecasts | Weather Observations and Forecasts | Water Supply | Climate and History | Seasonal Interest | Local Information



https://www.weather.gov/mbrfc/

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

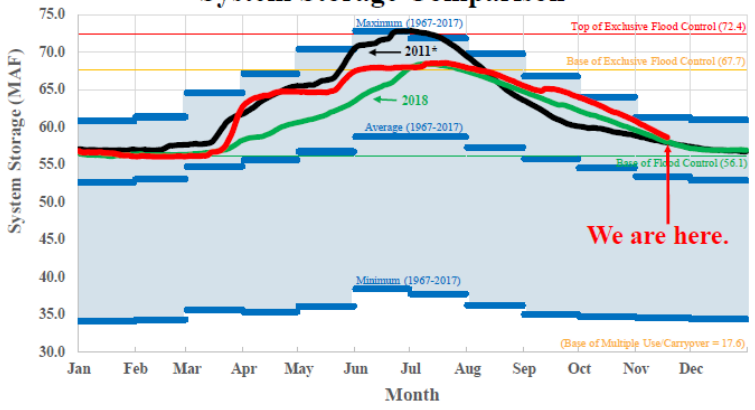
Missouri River Basin – Update – 19 November 2019

Mainstem Reservoir Status:

- System storage is 58.6 MAF; 2.5 MAF of the 16.3 MAF of flood control storage is occupied. About 15% of the flood control storage remains to be evacuated over the next 3 weeks and the winter.
- Gavins Point releases are currently 80,000 cfs, and are expected to remain at that level until the weekend, when the drawdown to the winter release rate begins. The drawdown schedule is shown in the bottom right quadrant. Basin and river conditions will continue to be monitored, and System regulation will be adjusted as necessary.
- Refer to the 3-Week Forecast (click here) for the most up-to-date System information – pool levels, inflows and releases.
- The Gavins Point release schedule and forecasted Missouri River flows and stages can be found here:

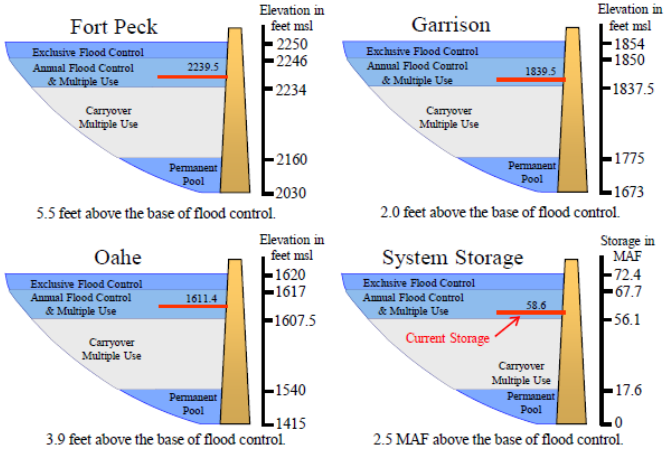
Click Here for Missouri River releases, flows & stages

System Storage Comparison



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

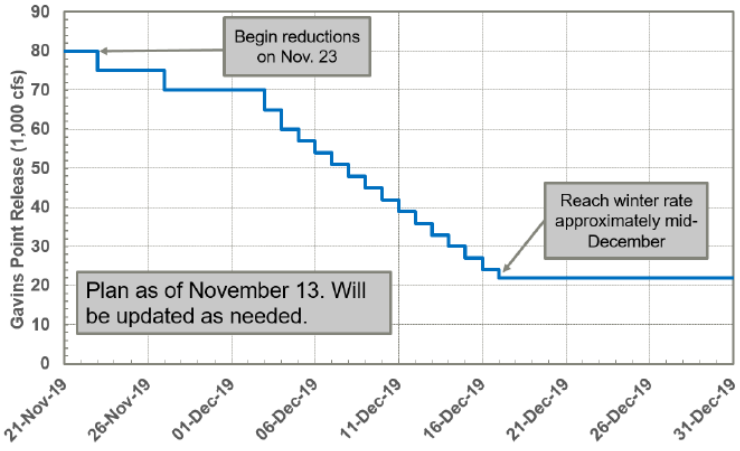
Current Reservoir Levels



Click Here for Latest 3-Week Forecast

Click Here for Comparison Plots

Gavins Point Release Forecast



The Corps is slightly ahead of schedule in evacuating the flood control storage of the Missouri River Mainstem System. This is allowing the Corps to reduce releases slightly at the end of November (lower right of attachment). Even with the slightly reduced reservoir releases, the Corps will evacuate all stored floodwaters by the beginning of the next runoff season (approximately March 1), and the flood storage capacity will be available (emptied) for the 2020 runoff season.

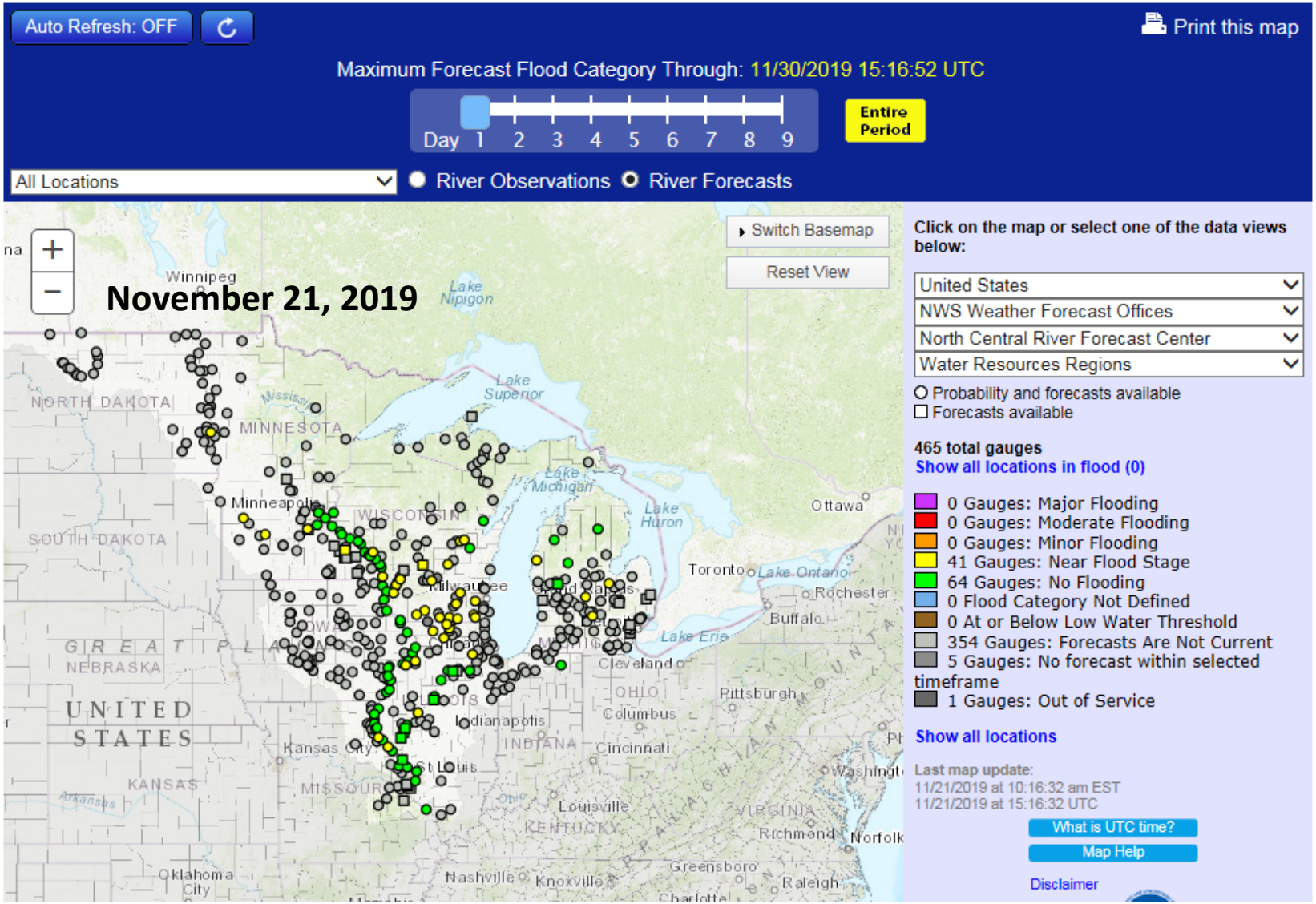
The forecasted calendar year runoff as of the Nov. 1 forecast is 60.2 million acre feet (238%) and will be the second highest runoff year in the upper Missouri Basin above Sioux City (1898-2018), behind 61.0 million acre feet in 2011

NWS North Central River Forecast Center

Weather.gov > North Central River Forecast Center

North Central River Forecast Center
River Forecast Center

River Observations and Forecasts | Weather Observations and Forecasts | Water Supply | Climate and History | Seasonal Interest | Local Information



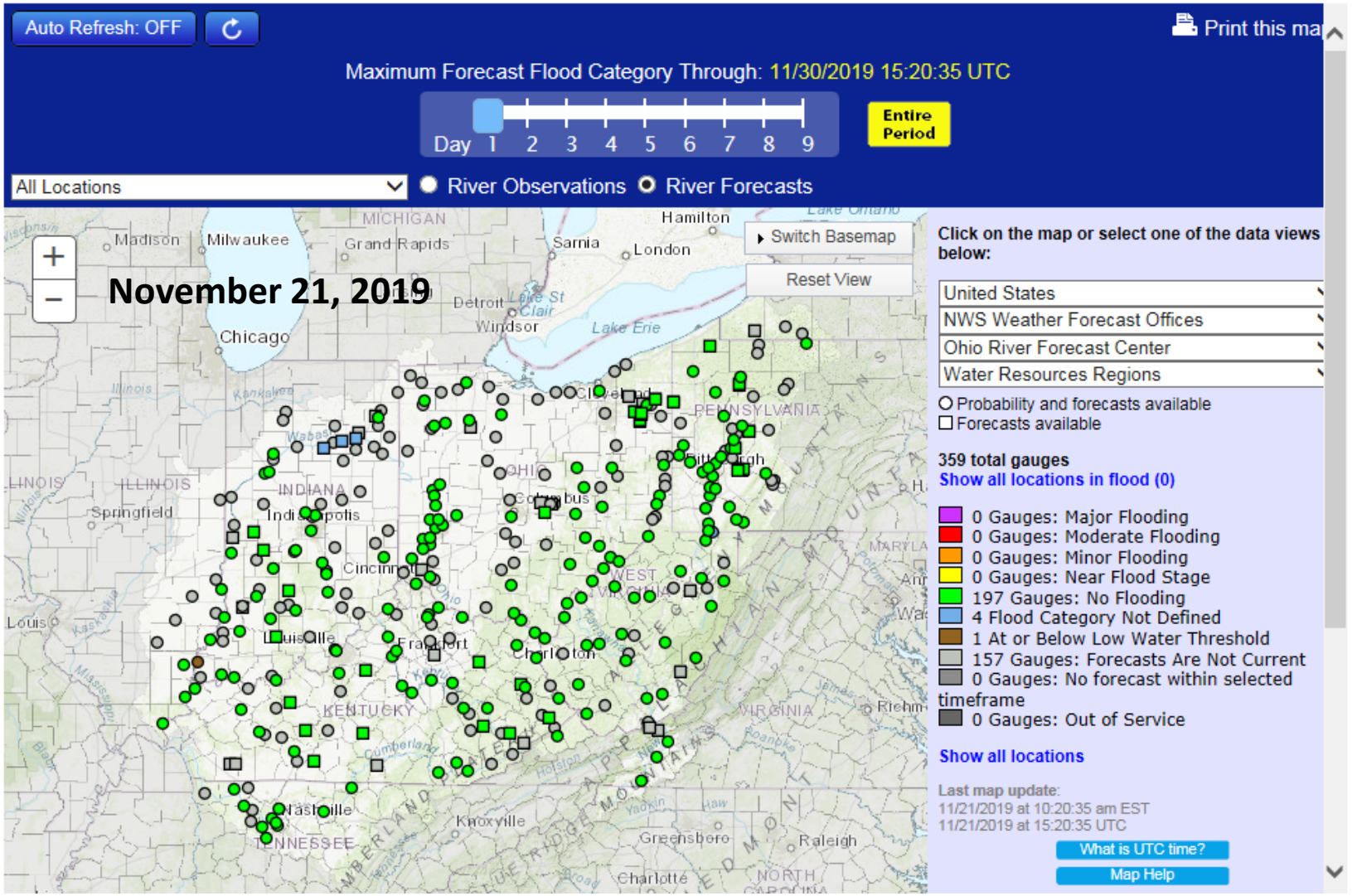
https://www.weather.gov/ncrfc/

NWS Ohio River Forecast Center

Weather.gov > Ohio RFC

Ohio RFC
River Forecast Center

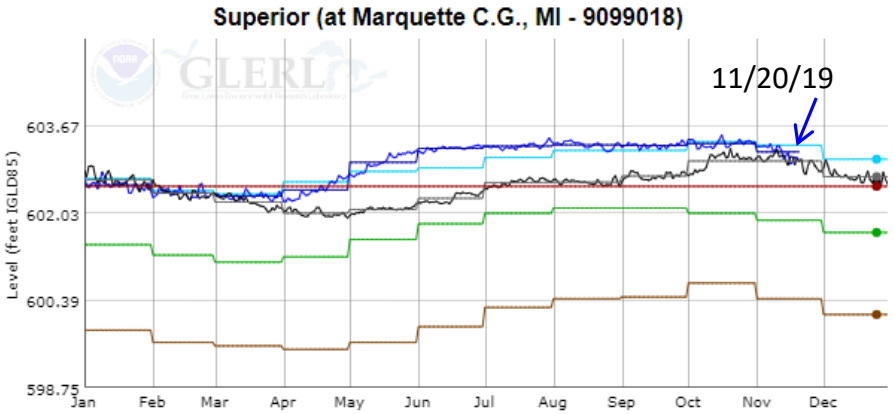
River Observations and Forecasts | Weather Observations and Forecasts | Water Supply | Climate and History | Seasonal Interest | Additional Info

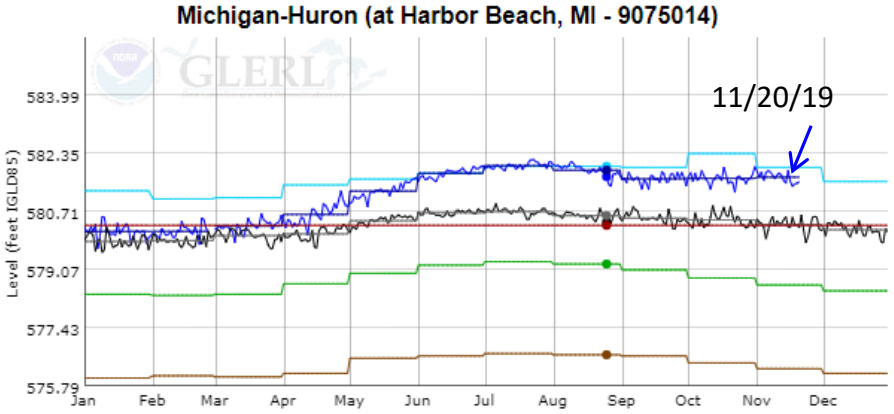


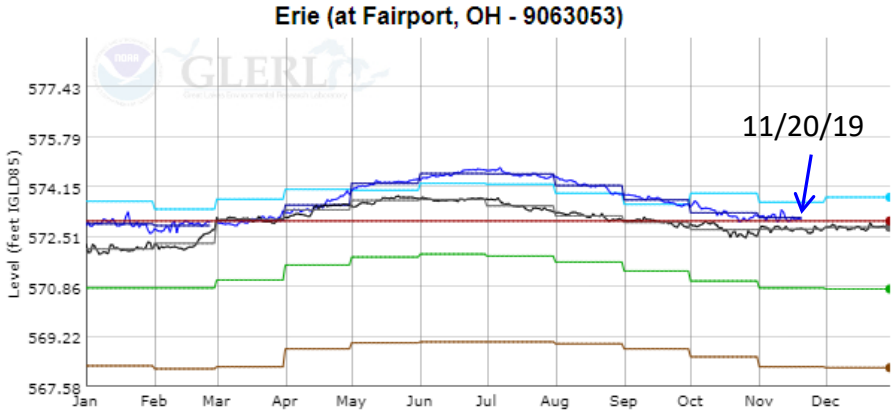
https://www.weather.gov/ohrfc/

Great Lakes Water Level

GLERL
NOAA - Great Lakes Environmental Research Laboratory







Record hi daily lake levels

2019 daily lake levels

Average daily lake levels

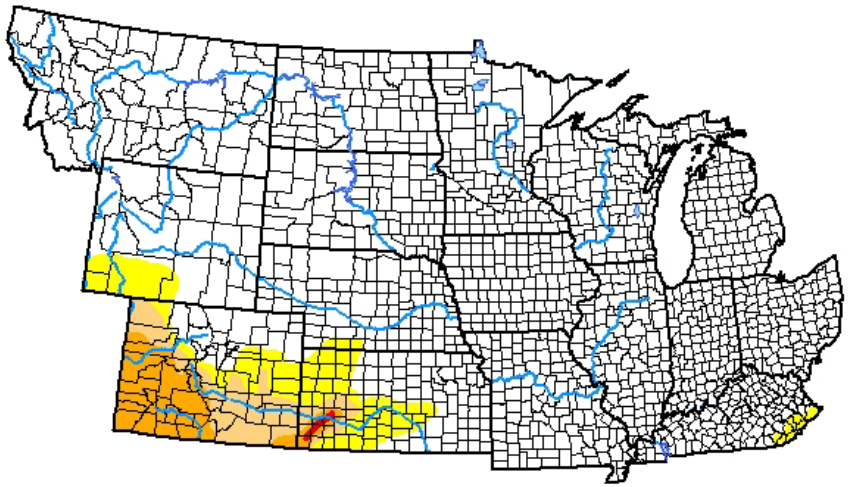
Record low daily lake levels

https://www.glerl.noaa.gov/data/wlevels/levels.html#observations

US Drought Monitor

U.S. Drought Monitor

NWS Central Region



November 19, 2019

(Released Thursday, Nov. 21, 2019)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	88.39	11.61	6.18	3.23	0.11	0.00
Last Week *11-12-2019*	89.27	10.73	5.70	3.08	0.00	0.00
3 Months Ago *08-20-2019*	81.89	18.11	2.04	0.04	0.00	0.00
Start of Calendar Year *01-01-2019*	85.98	14.02	8.17	5.23	2.44	1.01
Start of Water Year *10-01-2019*	79.05	20.95	8.02	2.19	0.14	0.00
One Year Ago *11-20-2018*	82.70	17.30	9.22	5.22	3.08	1.20

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:

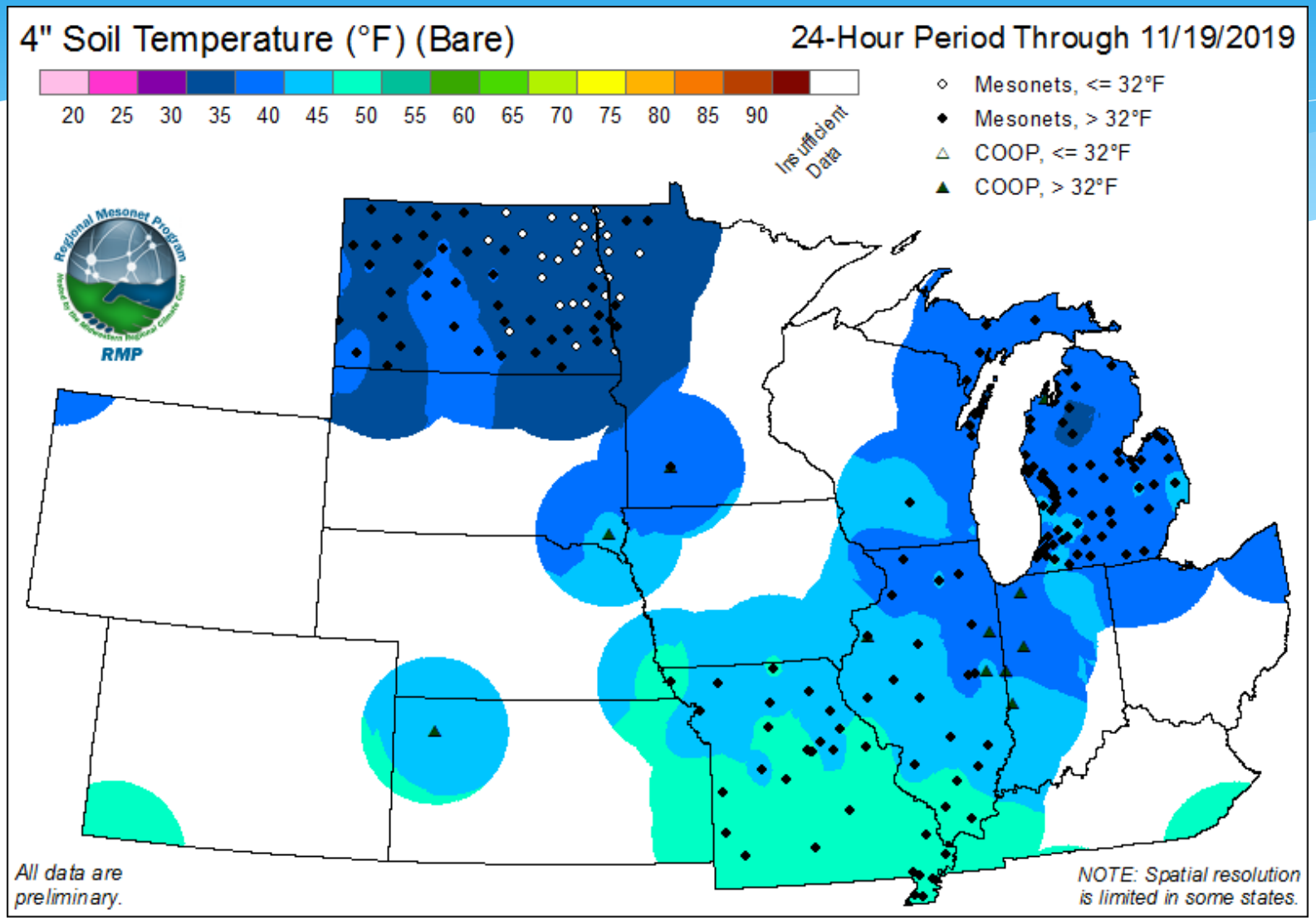
Brad Rippey

U.S. Department of Agriculture

droughtmonitor.unl.edu

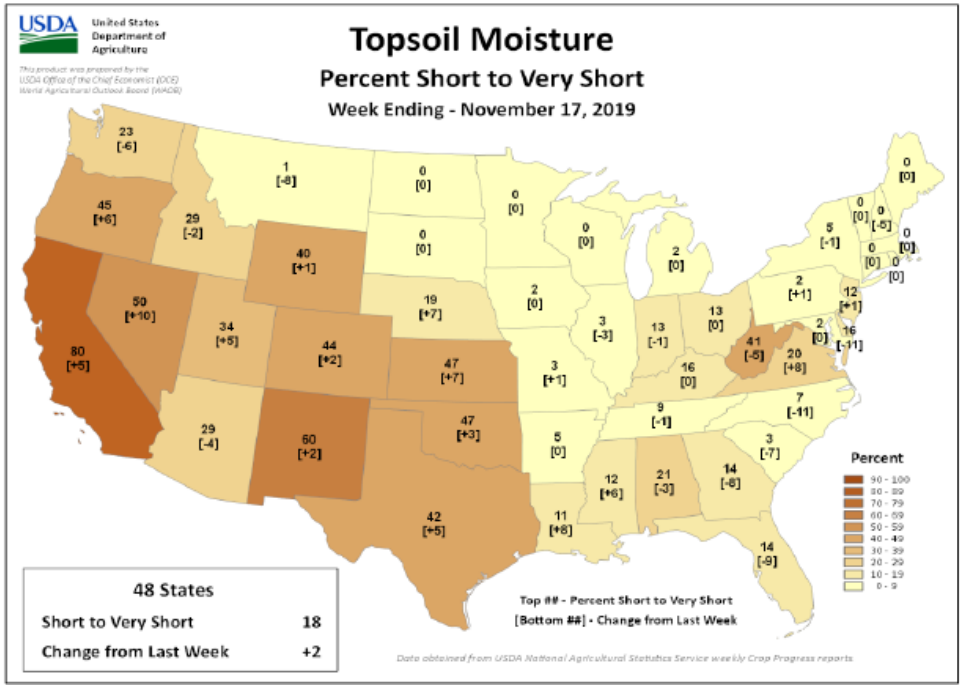
Agriculture

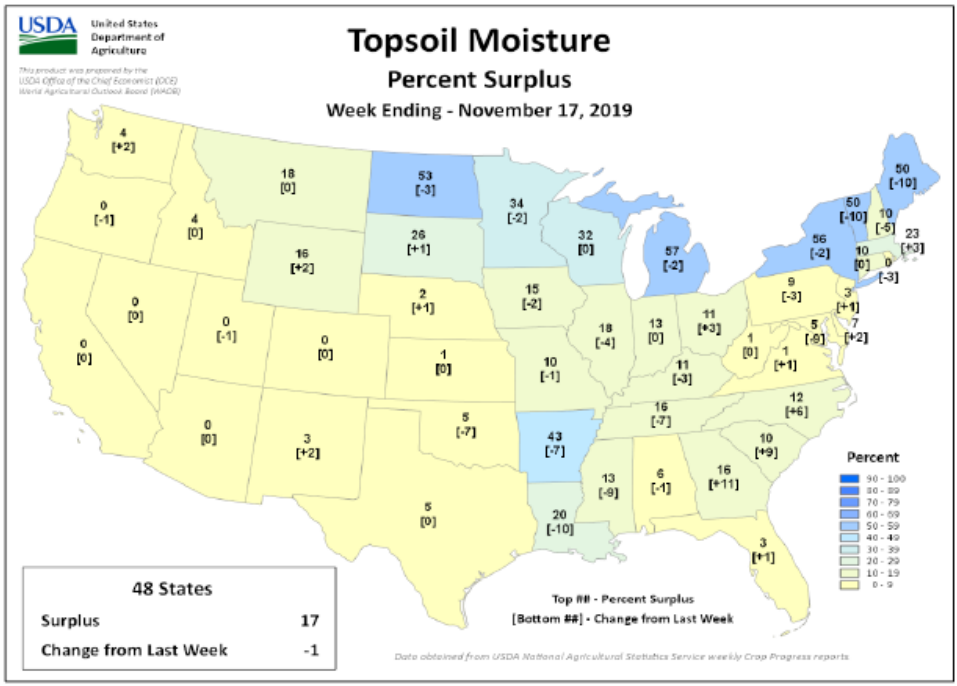
4-in Bare Soil Temperatures



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

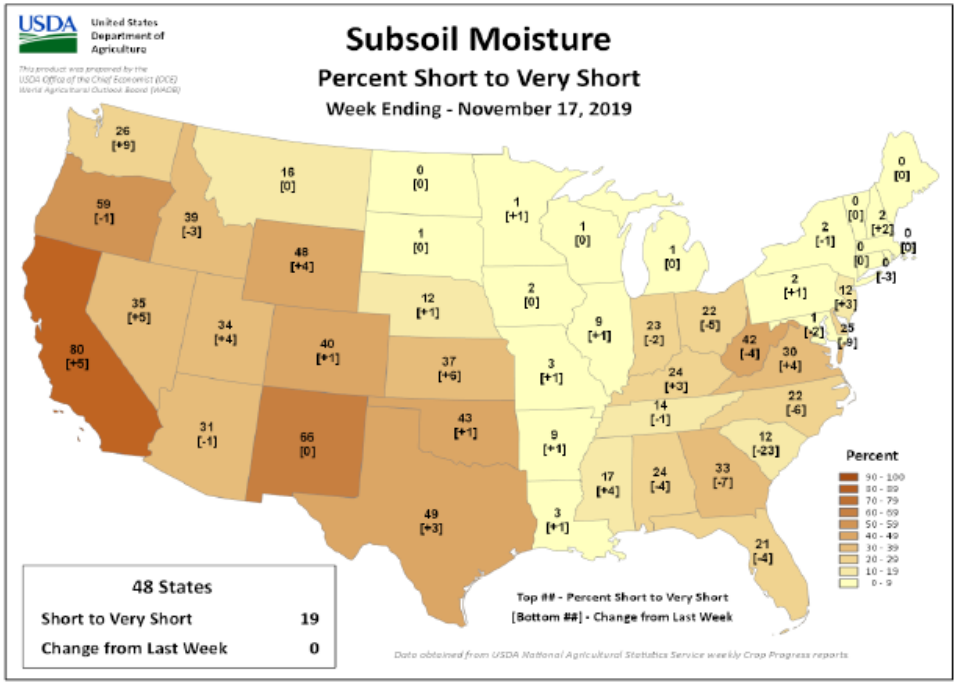
NASS Topsoil moisture

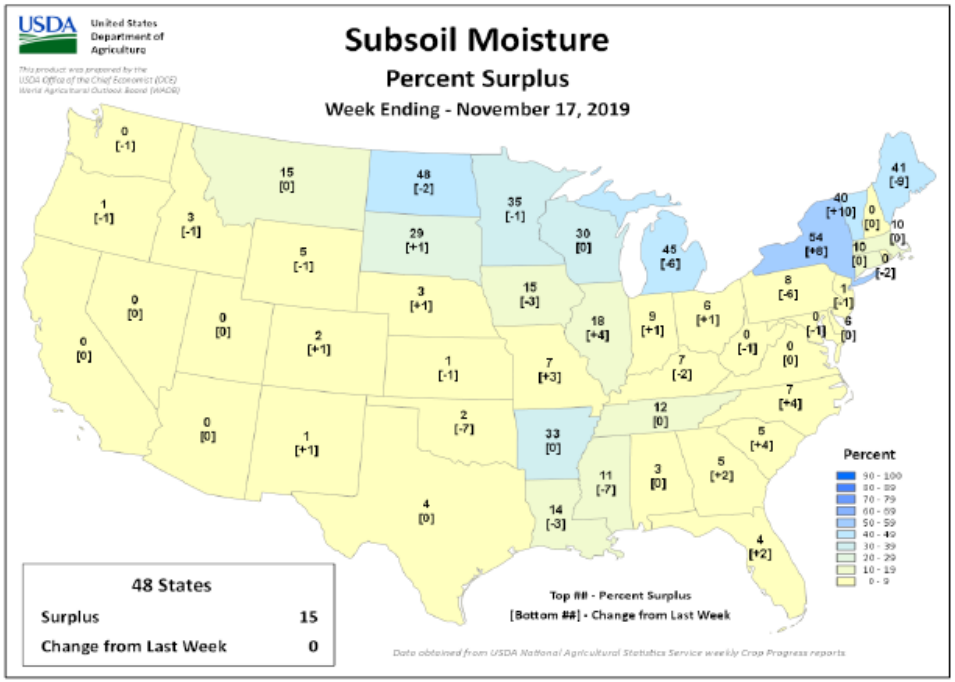




https://www.usda.gov/oce/weather/pubs/Weekly/Wwcb/wwcb.pdf

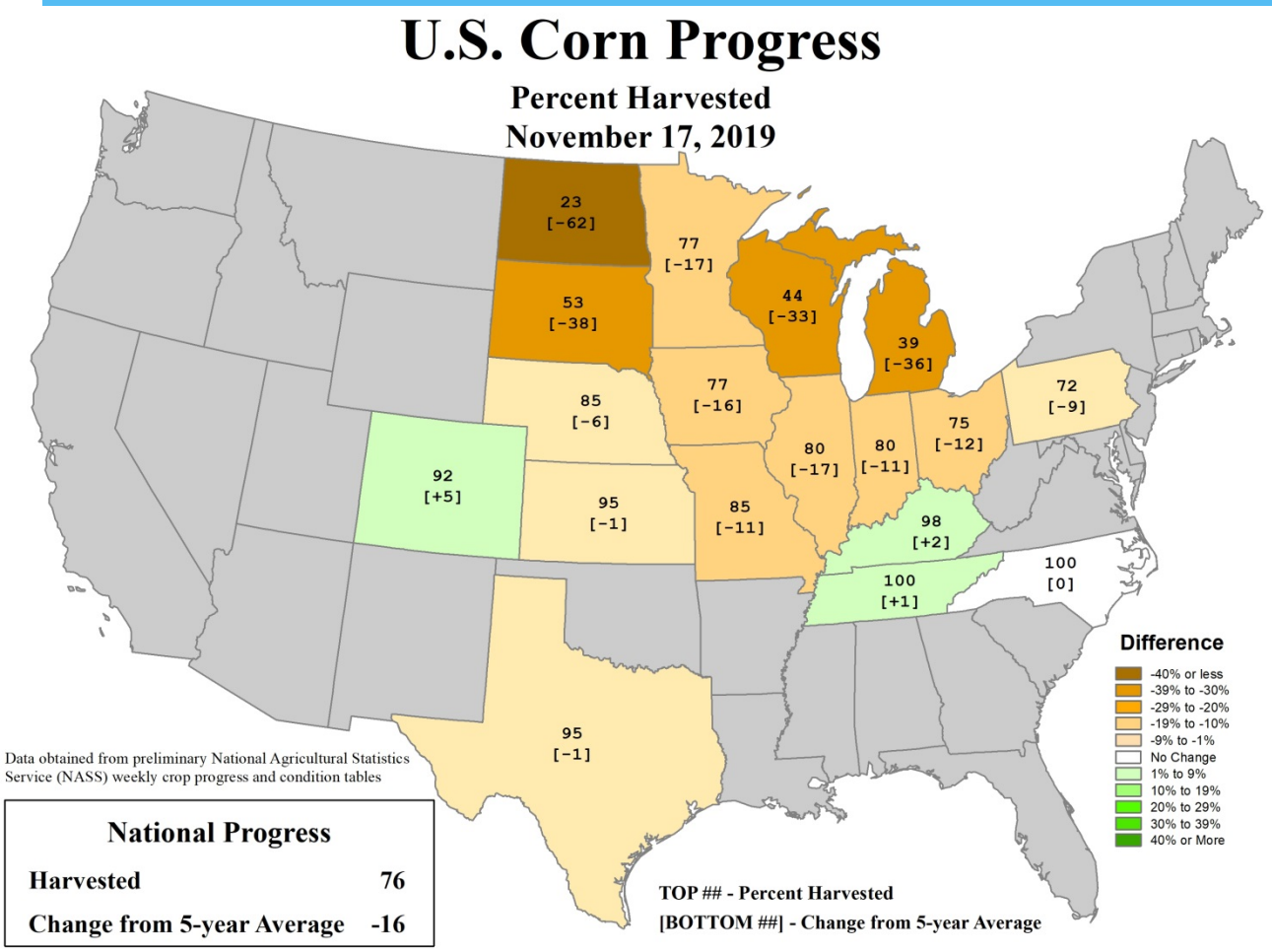
NASS Subsoil moisture





https://www.usda.gov/oce/weather/pubs/Weekly/Wwcb/wwcb.pdf

Corn Progress



2nd slowest corn harvest (through Nov. 17) in the last 25 years. Only 2009 was slower.

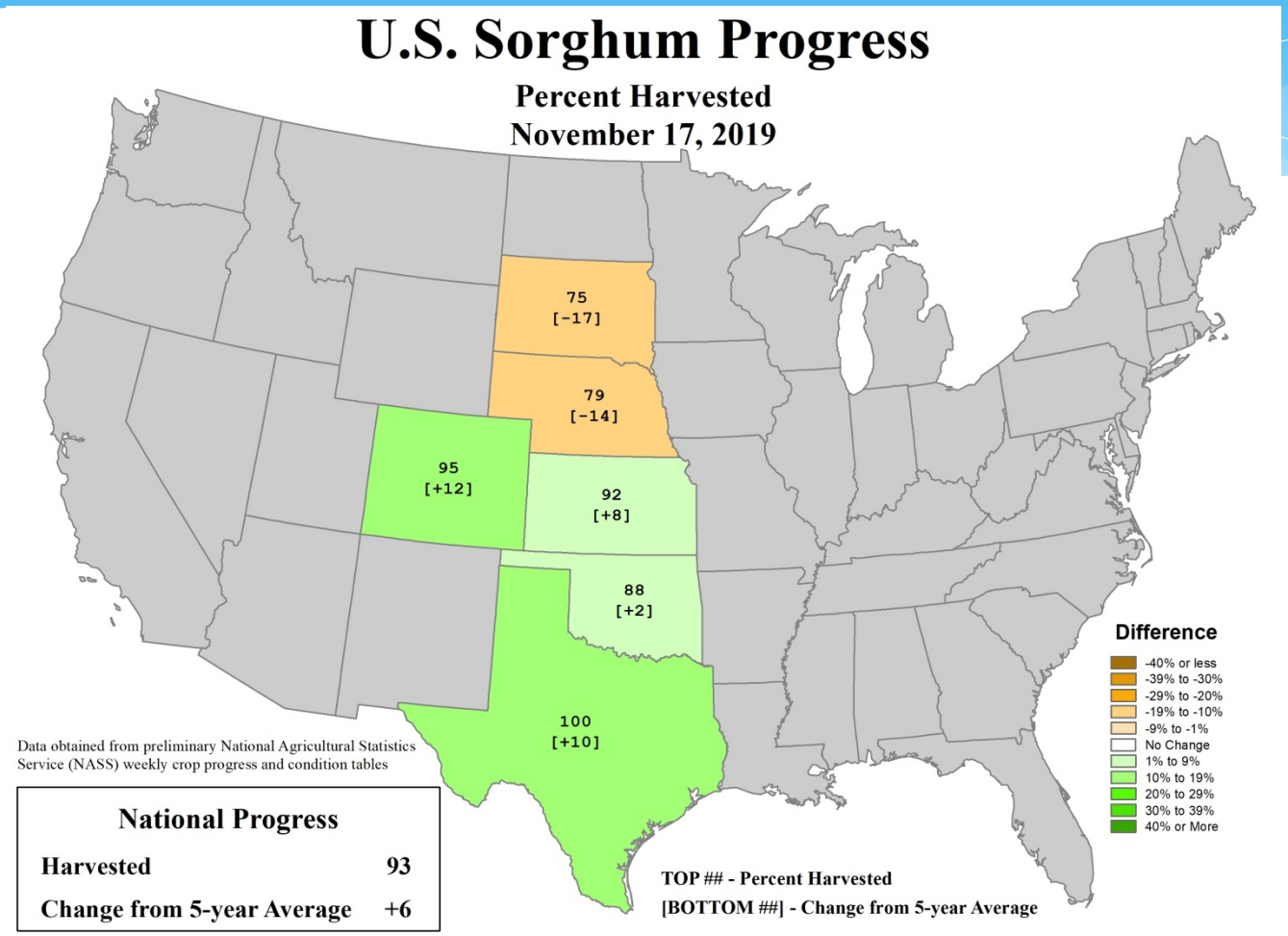
Least Amount of U.S. Corn Harvested by Nov. 17

Year	Percent
2009	58%
2019	76%
2008	80%

Period: 1995-2019

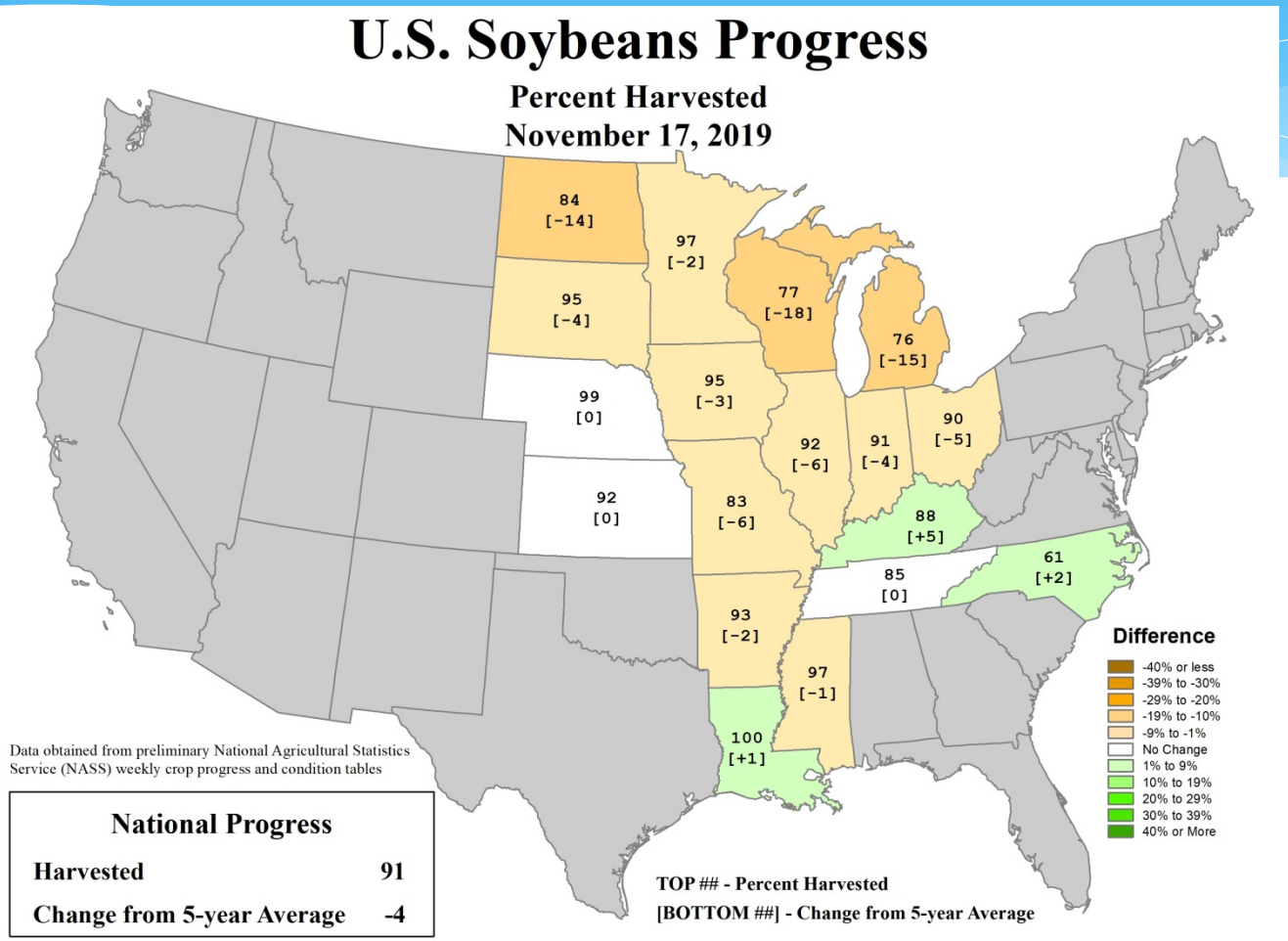
Slides courtesy of Brad Rippey, USDA/OCE

Sorghum Progress



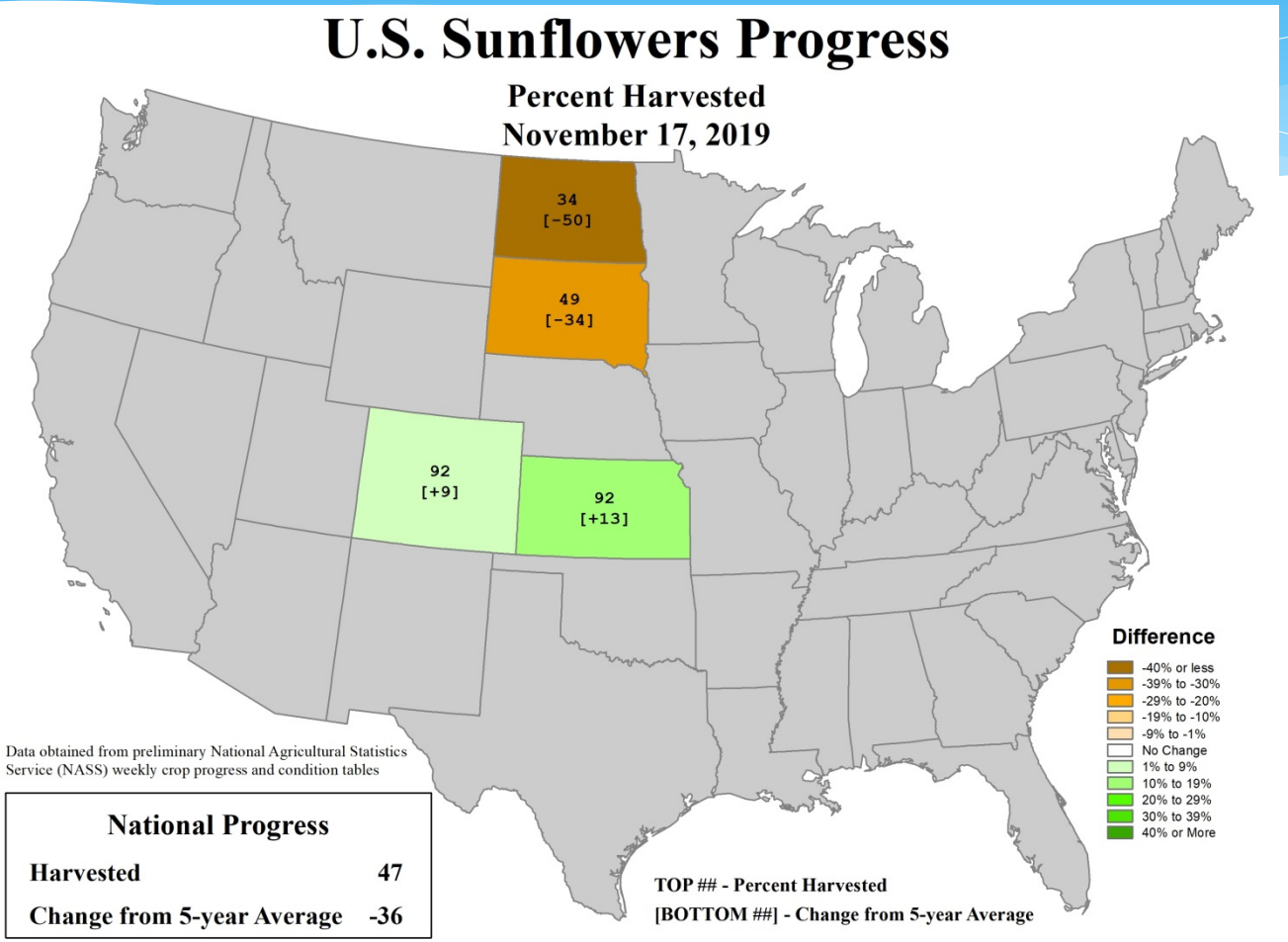
Slides courtesy of Brad Rippey, USDA/OCE

Soybean Progress



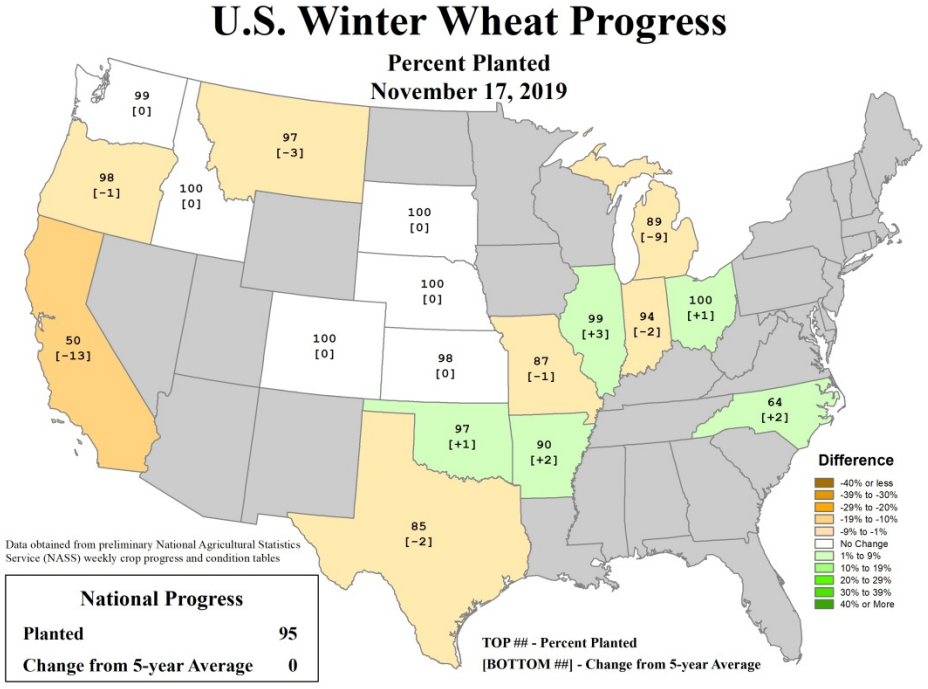
Slides courtesy of Brad Rippey, USDA/OCE

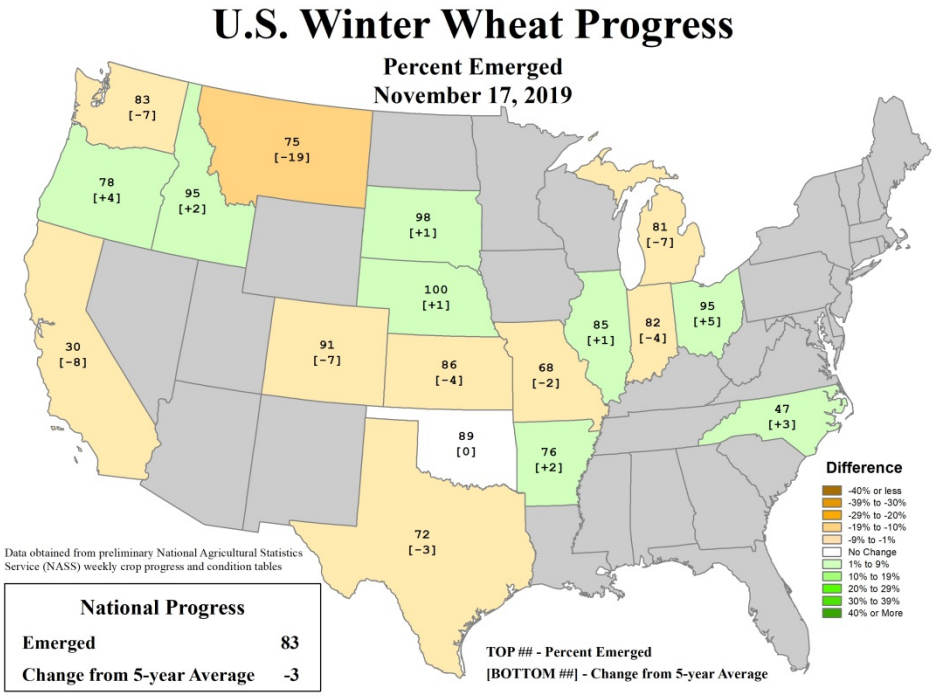
Sunflower Progress



Slides courtesy of Brad Rippey, USDA/OCE

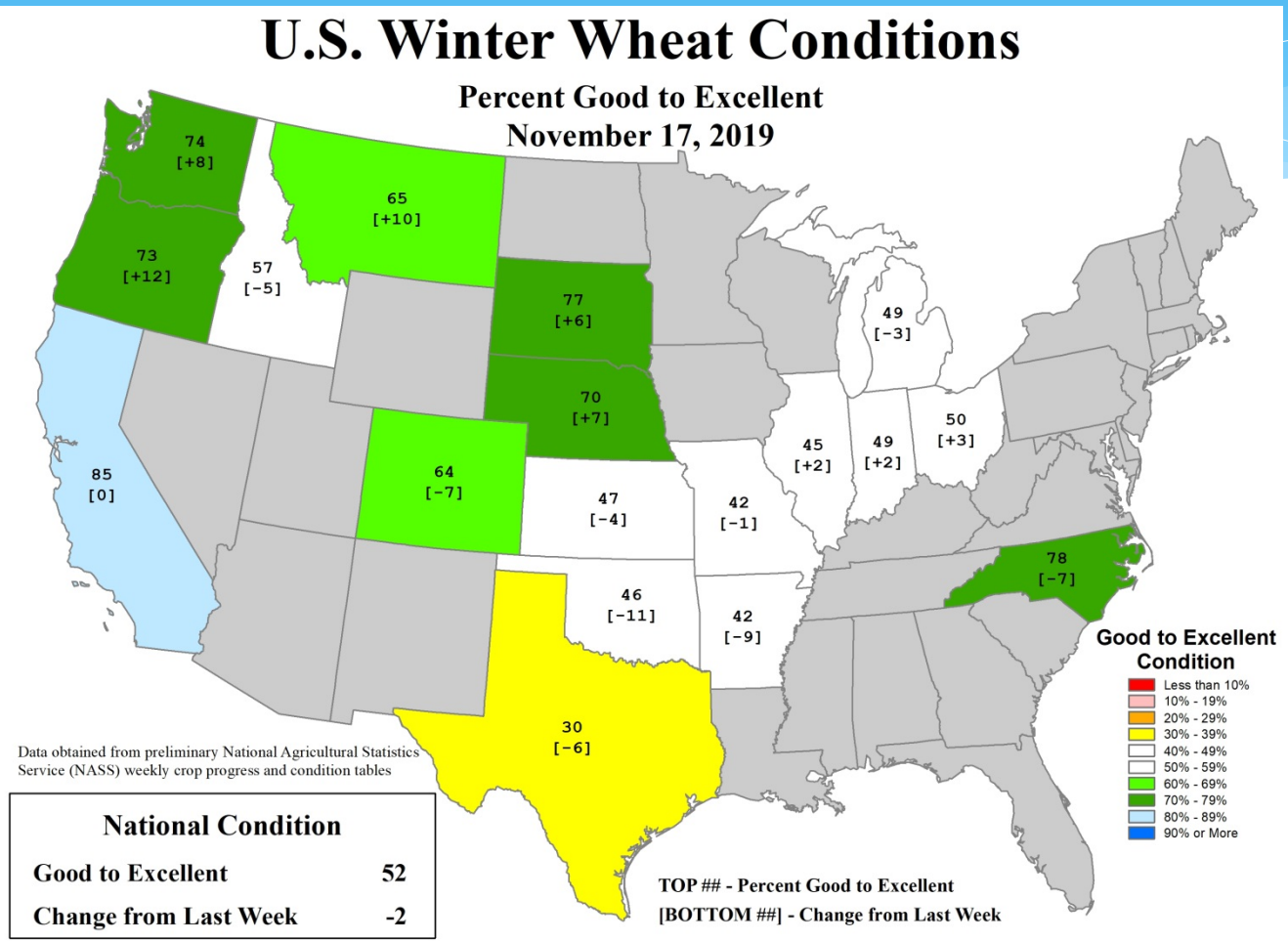
Winter Wheat Progress





Slides courtesy of Brad Rippey, USDA/OCE

Winter Wheat Conditions



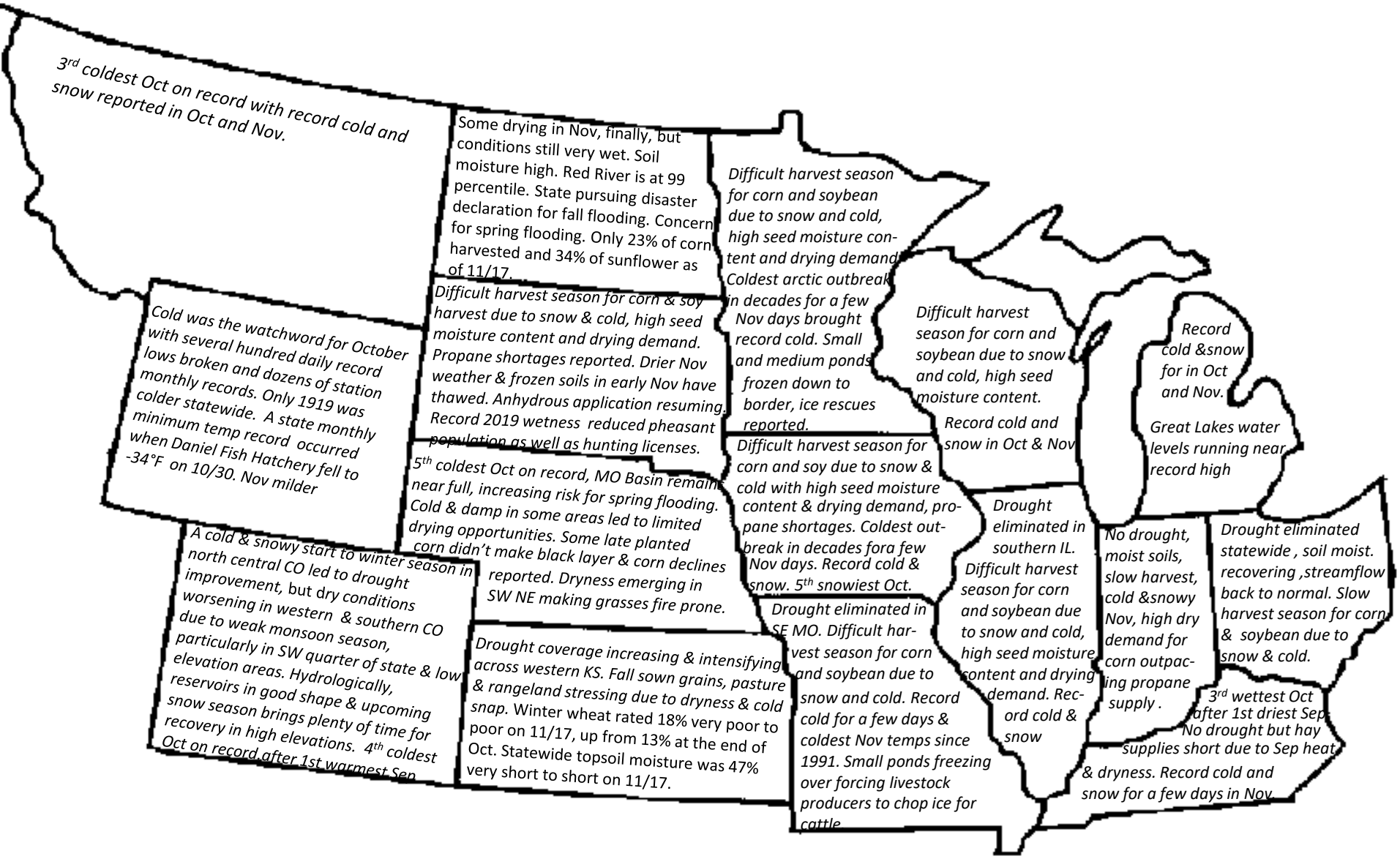
Slides courtesy of Brad Rippey, USDA/OCE

Impacts

Cold Oct-Nov conditions across the region in combination with wet and snowy periods have made it challenging for farmers this year. Crop harvest was running several weeks behind normal across the region and the extreme wetness was creating other problems related to crop disease, grain dry down, stalk lodging, winter wheat planting, compaction, and fieldwork preparation for next year.

Reports of propane shortages and propane distribution problems in region with grain drying and livestock in some states. Cold and wet conditions have led to high moisture content in seed, and slowing natural drydown in fields.

State Impacts

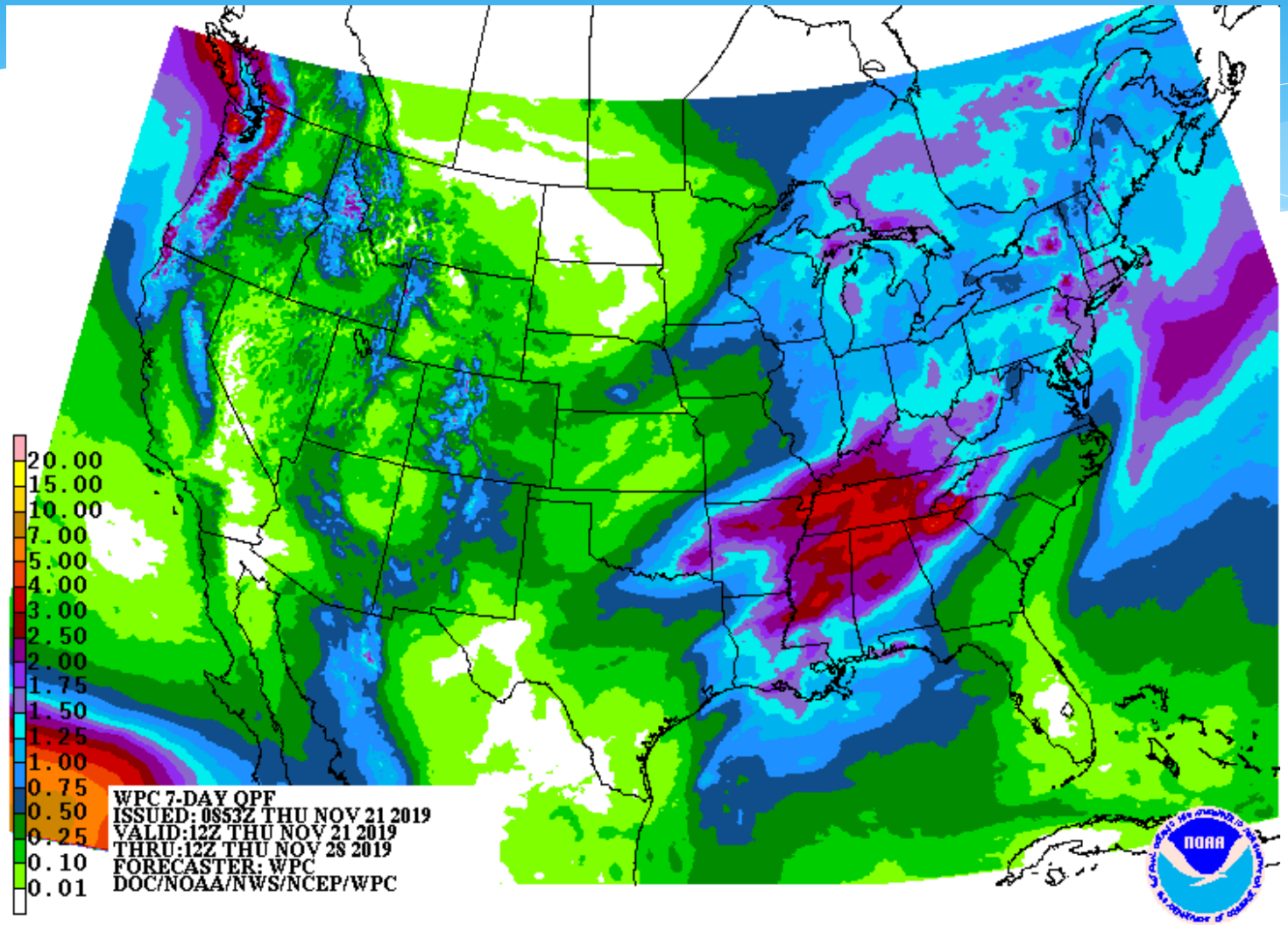


Climate Outlooks

* 7-day precipitation forecast
* 6-10 day outlook
* ENSO Predictions
* December
* Dec-Jan-Feb
* Jan-Feb-Mar

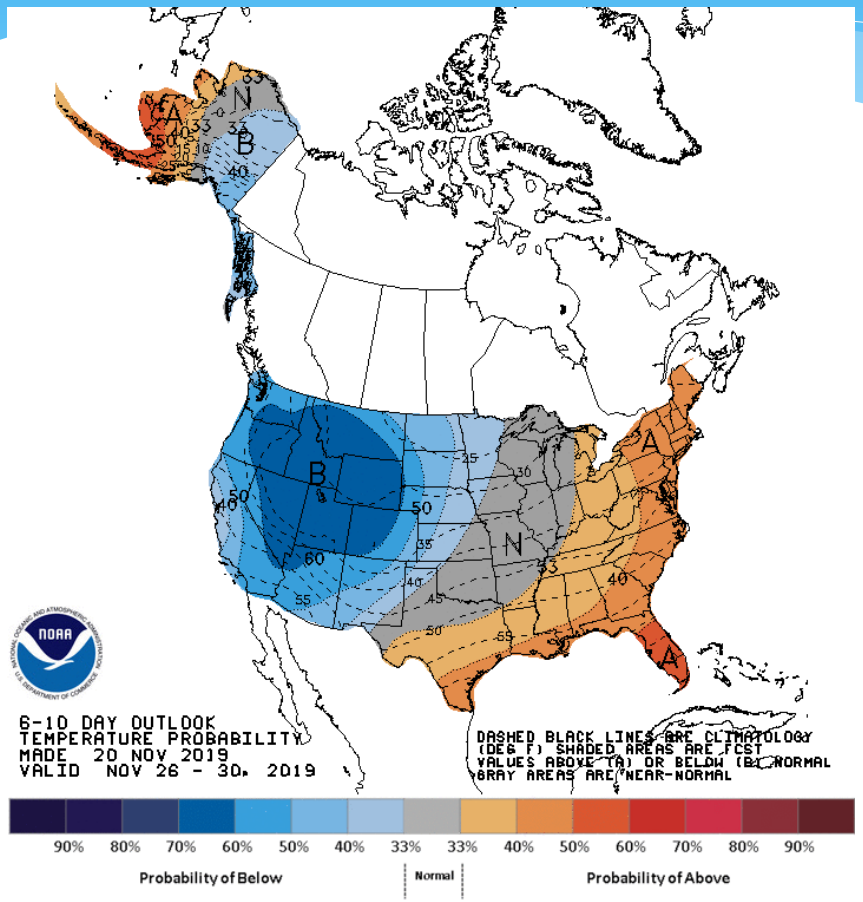
7-day Quantitative Precipitation Forecast

Valid: 7 AM Thu, Nov 21– 7 AM, Thu, Nov 28, 2019

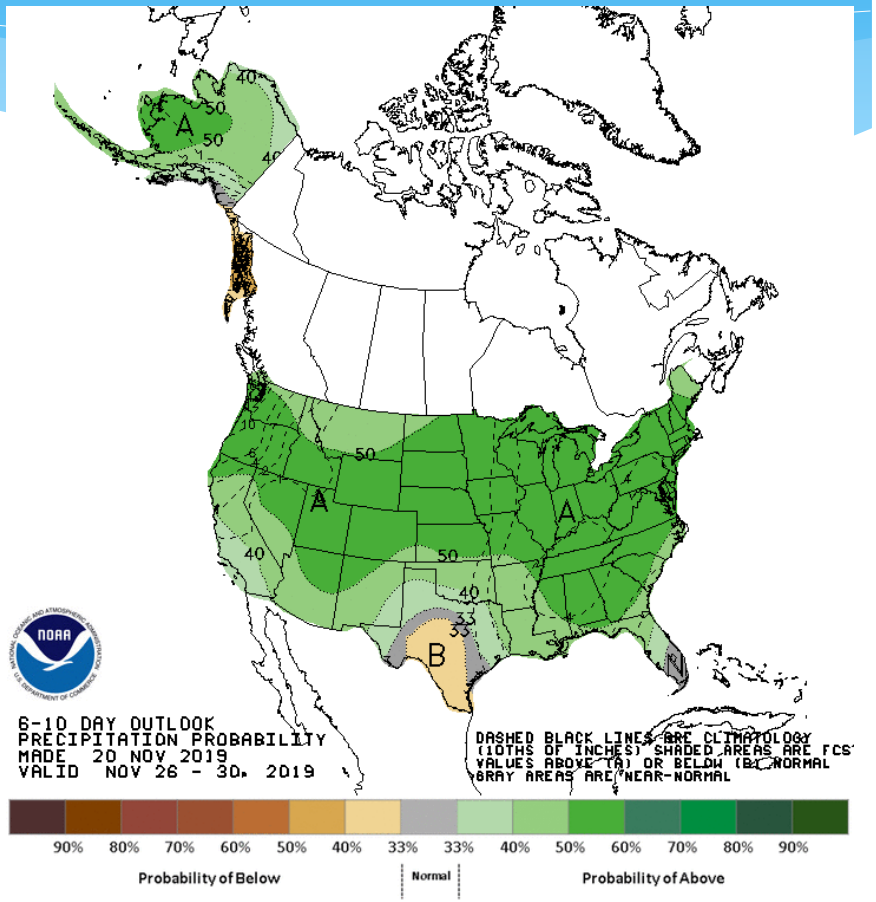


http://www.wpc.ncep.noaa.gov/qpf/day1-7.shtml

Temperature and Precipitation Probabilities for Nov 26-30, 2019



Temperature



Precipitation

http://www.cpc.ncep.noaa.gov/products/predictions/610day

ENSO Forecast

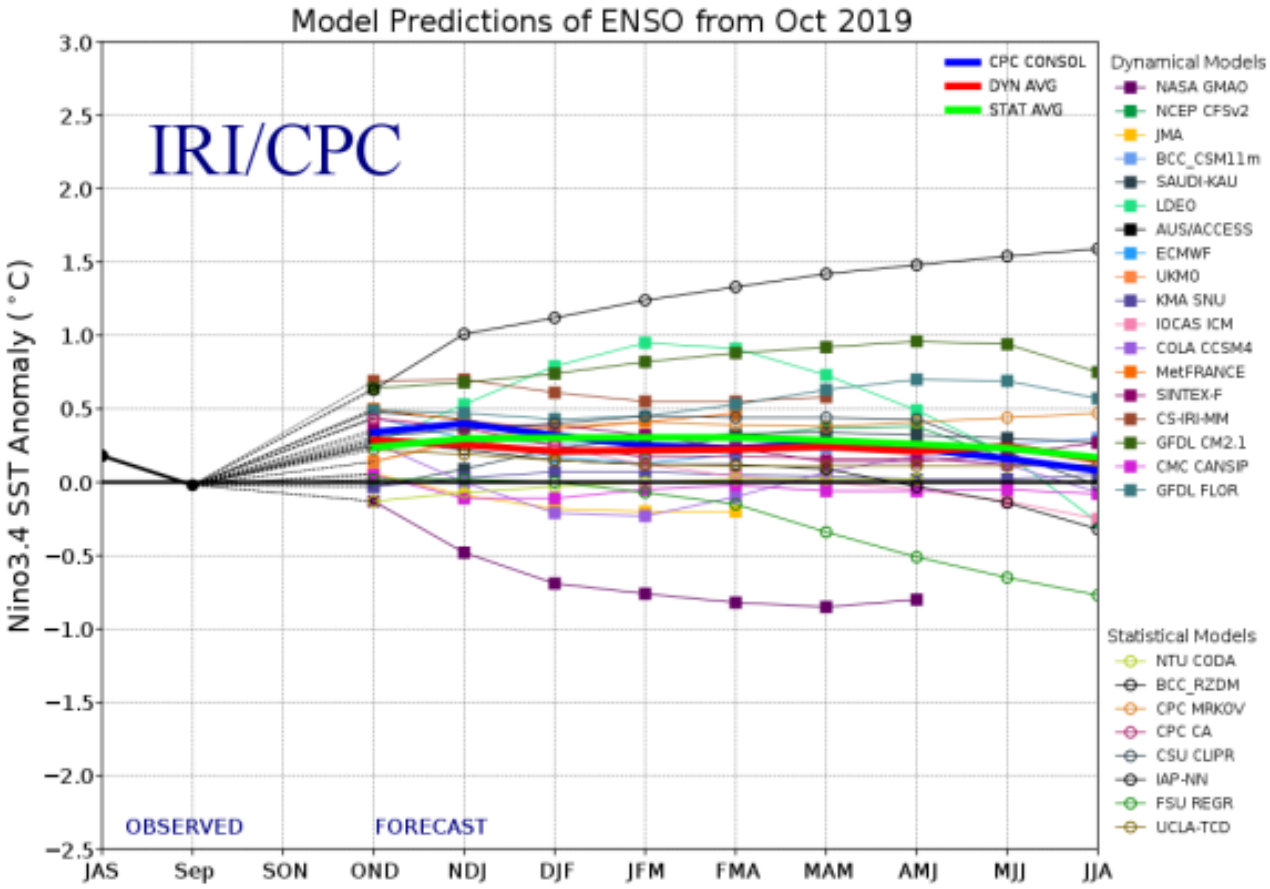


Figure 6. Forecasts of sea surface temperature (SST) anomalies for the Niño 3.4 region (5°N-5°S, 120°W-170°W). Figure updated 18 October 2019.

ENSO Diagnostic Discussion updated on November 14, 2019

CPC/NCEP/NWS and IRI

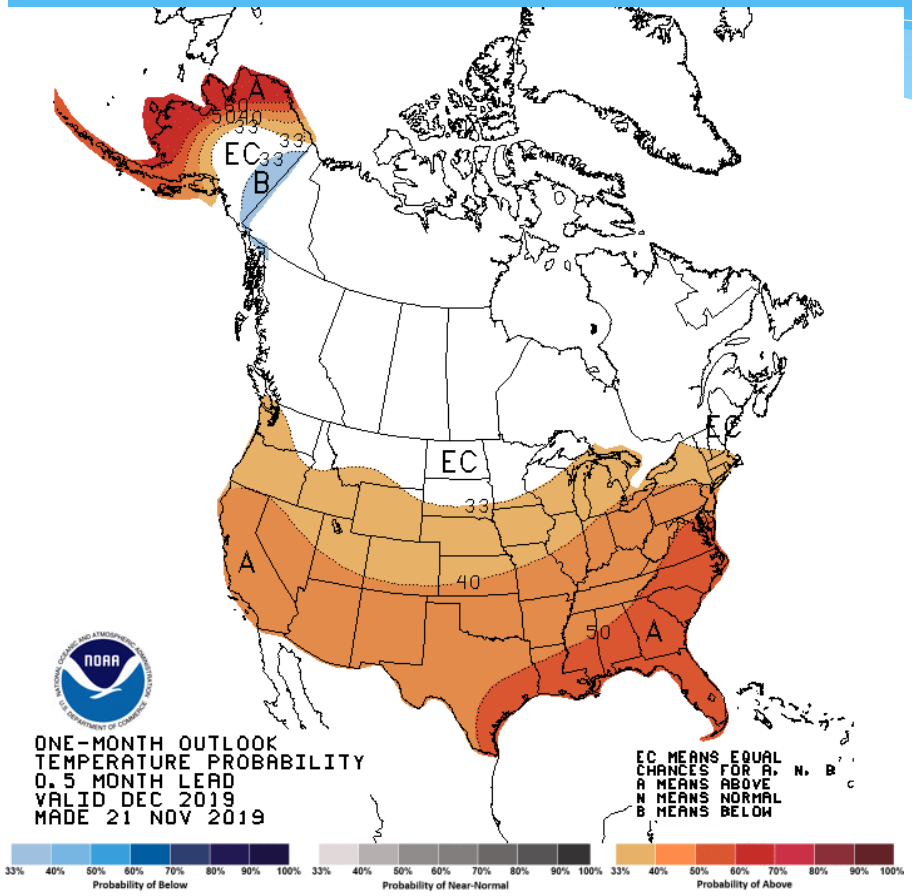
- ENSO Alert System: Not Active

- ENSO-neutral is favored during the Northern Hemisphere winter 2019-20 (~70% chance), continuing through spring 2020 (60 to 65% chance)

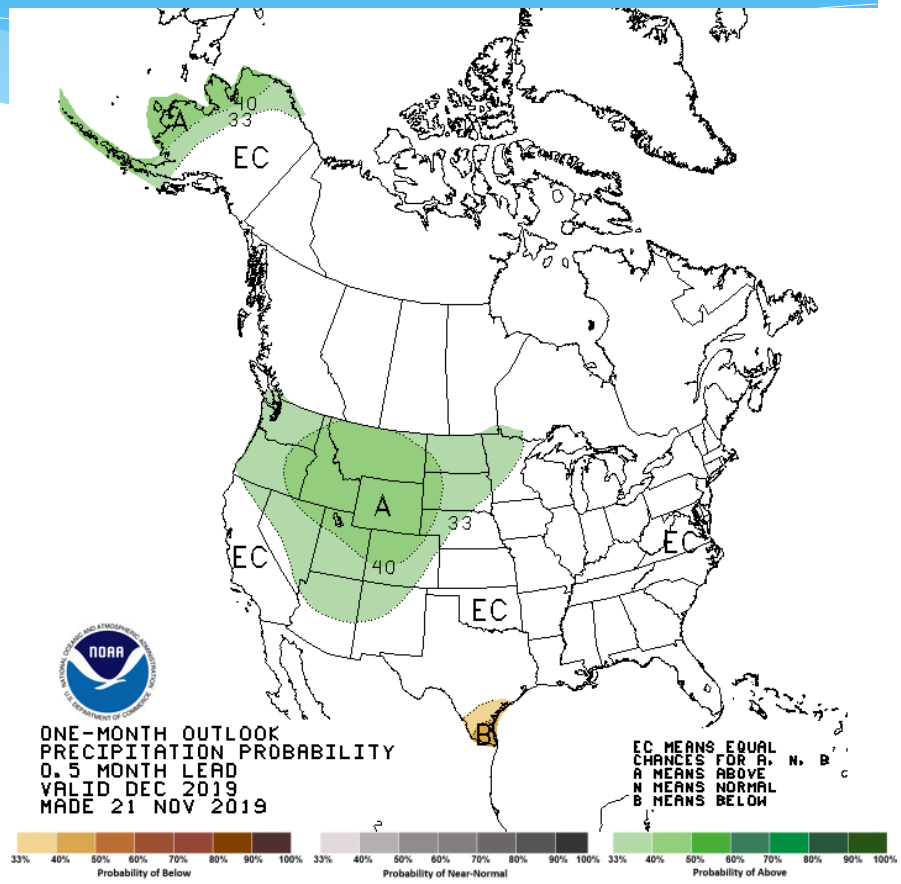
-The majority of models in the IRI/CPC plume (Fig. 6) continue to favor ENSO-neutral (Niño-3.4 index between -0.5°C and +0.5°C) through the Northern Hemisphere spring.

https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/ensodisc.pdf

December Temperature and Precipitation Probabilities



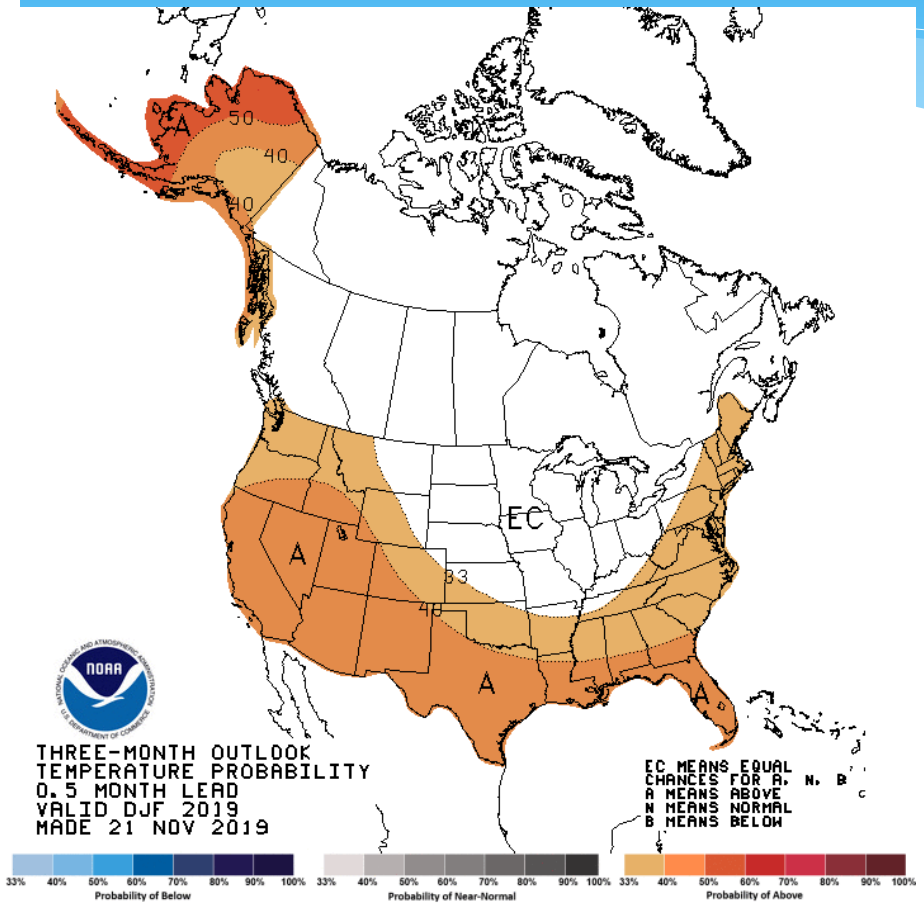
Temperature



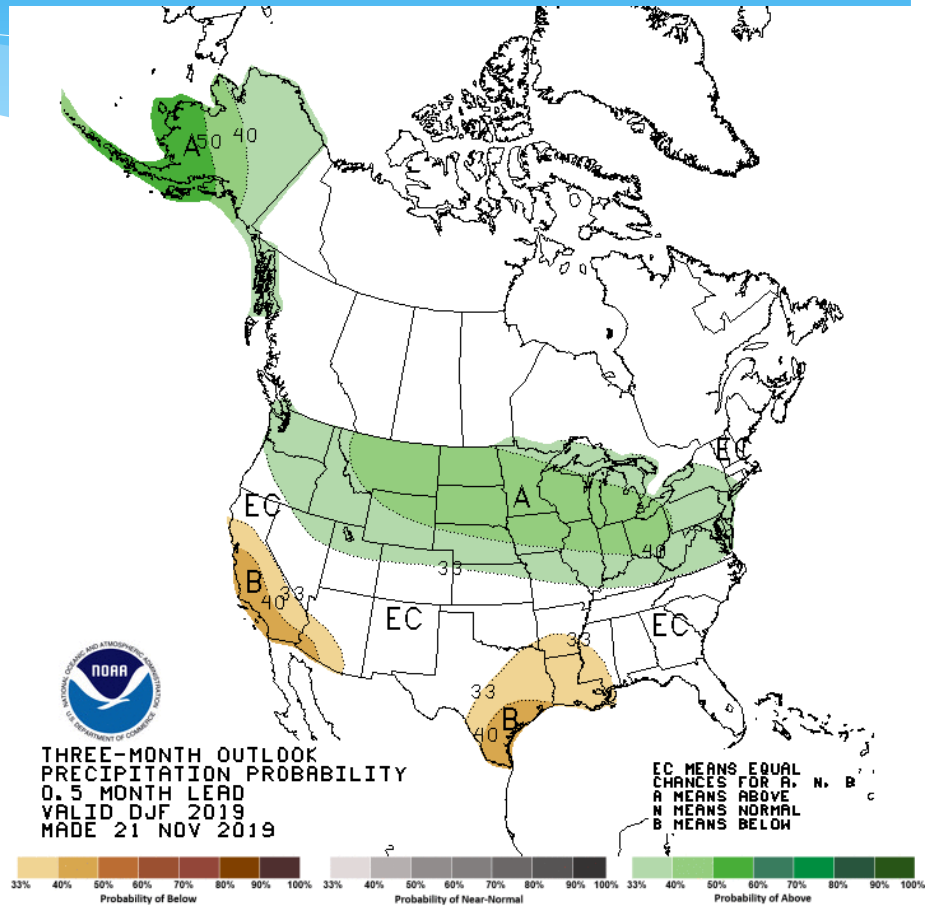
Precipitation

http://www.cpc.ncep.noaa.gov/products/predictions/30day

Dec-Jan-Feb Temperature and Precipitation Probabilities



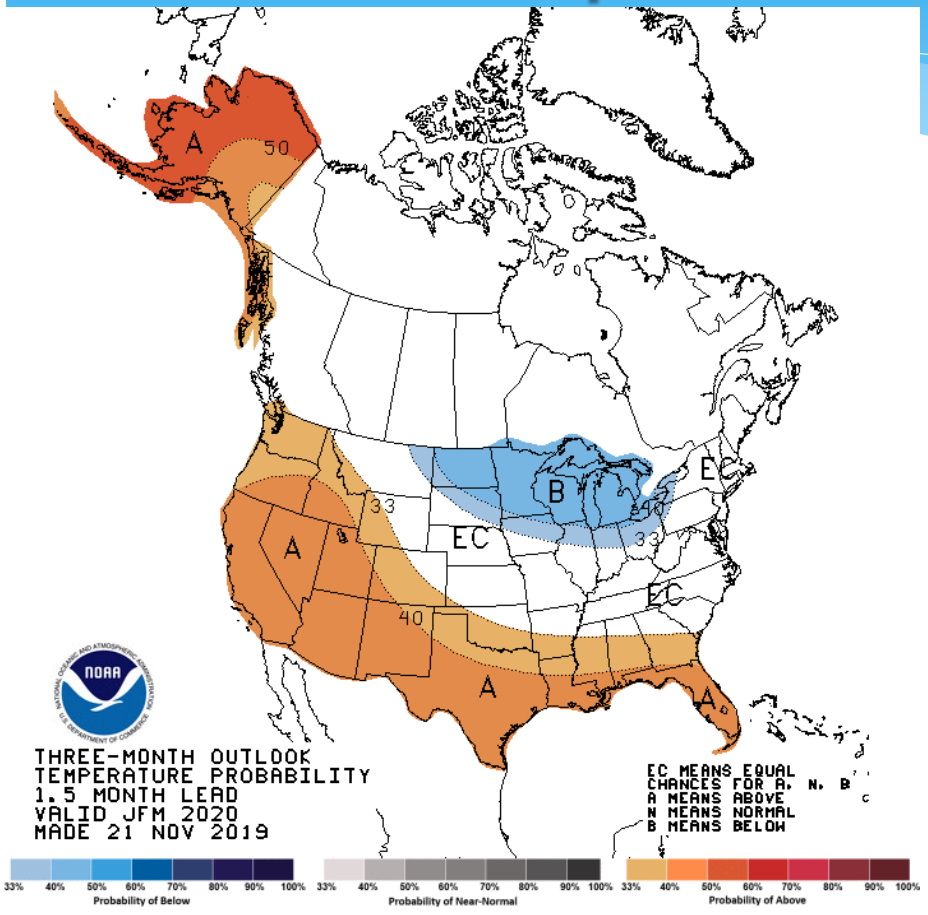
Temperature



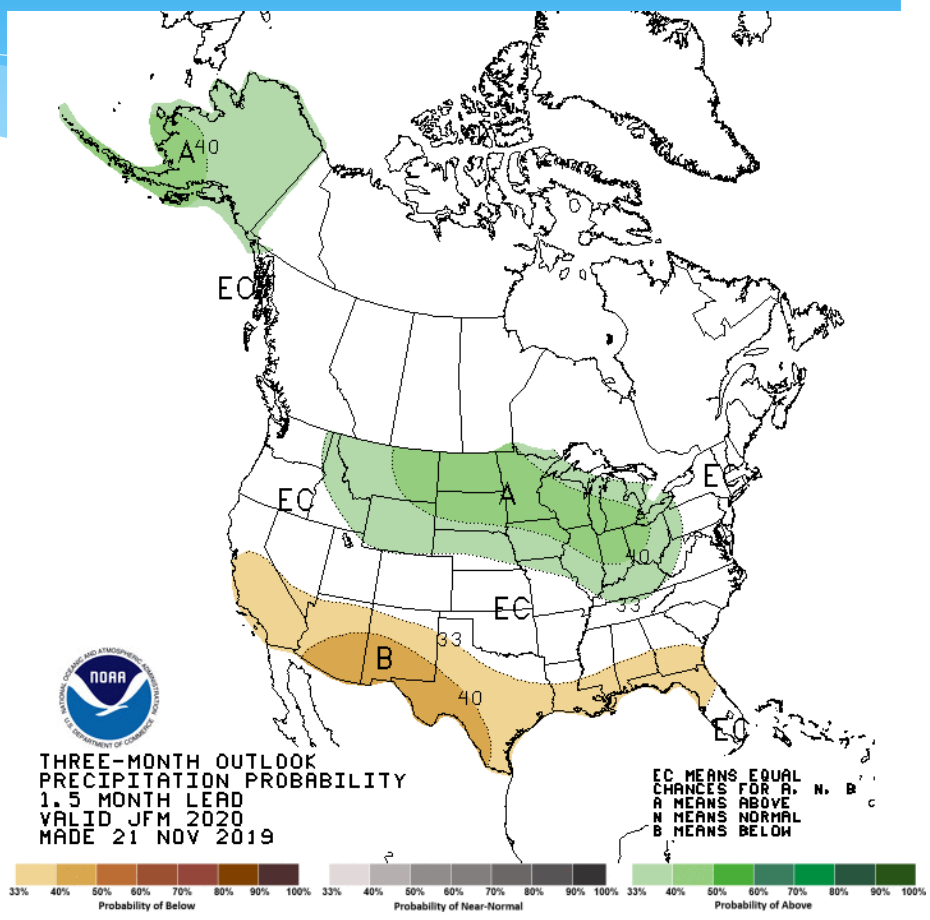
Precipitation

http://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=2

Jan-Feb-Mar Temperature and Precipitation Probabilities



Temperature



Precipitation

http://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=2

Summary

* **Much of the region experienced cold and wet October and first half of November making it very challenging for agriculture.**
* **Concerns for rivers freezing above flood stage as we go into winter;**
* **Ice jams;**
* **Dryness concerns for SW WY, CO, western KS, southwestern NE**
* **Spring flood concerns for Missouri & Mississippi River Basins and potential delay in spring fieldwork preparation and planting.**

Further Information - Partners

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

Thank You and Questions?

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  * Dennis Todey: dennis.todey@ars.usda.gov , 515-294-2013
  * Doug Kluck: doug.kluck@noaa.gov, 816-994-3008
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  * Mike Timlin: mtimlin@illinois.edu; 217-333-8506
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