



**NATIONAL WEATHER SERVICE  
MISSOURI BASIN RIVER FORECAST CENTER**



**MISSOURI RIVER CORPS, COAST GUARD &  
NAVIGATORS MEETING**

**Spring 2019  
River Flood Potential**

**Kevin Low, P.E.  
13 February 2019**



*Building a Weather-Ready Nation*





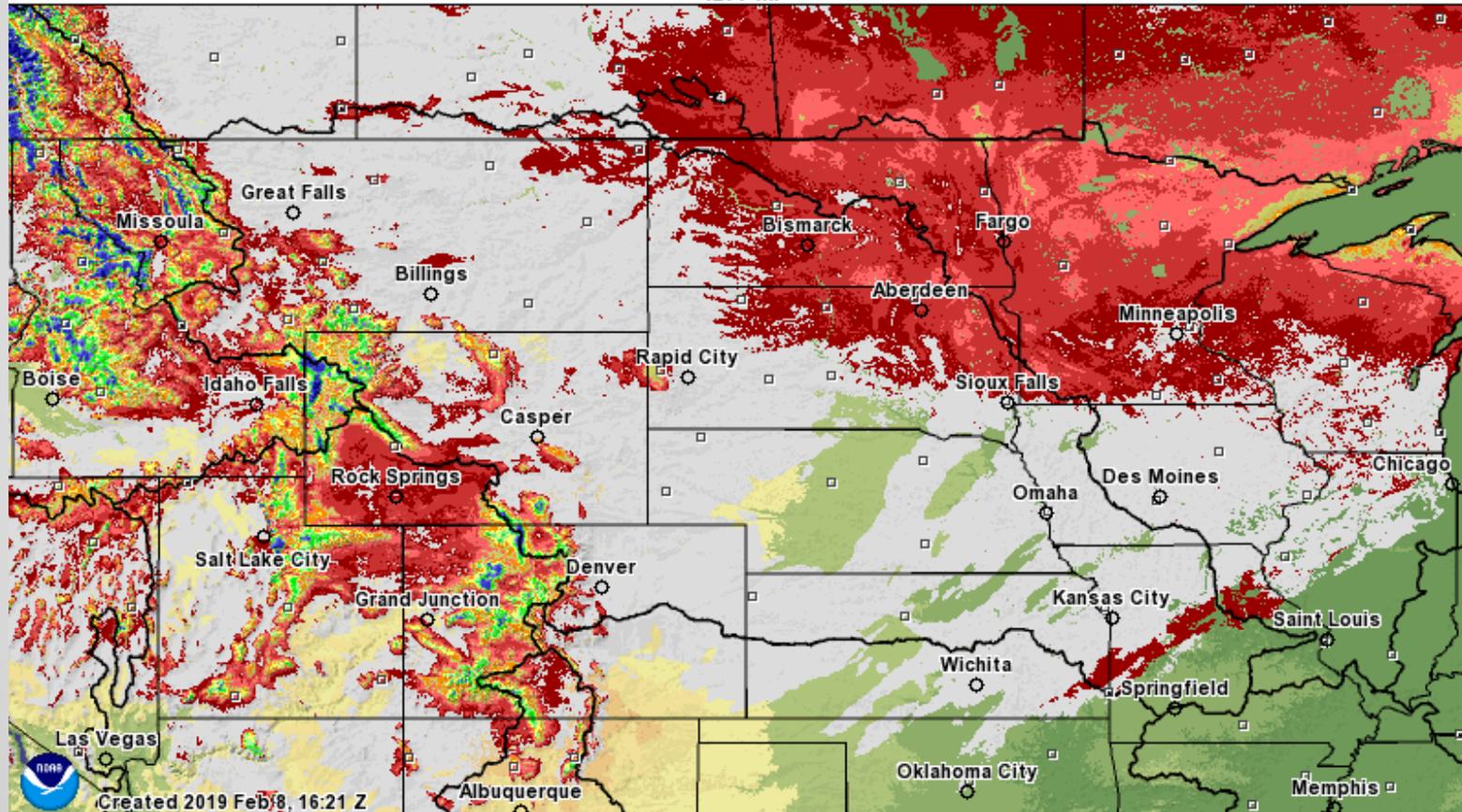
# NATIONAL WEATHER SERVICE MISSOURI BASIN RIVER FORECAST CENTER



## PLAINS SNOWPACK (as of 08 February)

Modeled Snow Water Equivalent forecasted for 2019 February 8, 18:00 UTC

1277 mi



Inches of water equivalent



Not Estimated

Elevation in feet



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Created 2019 Feb 8, 16:21 Z

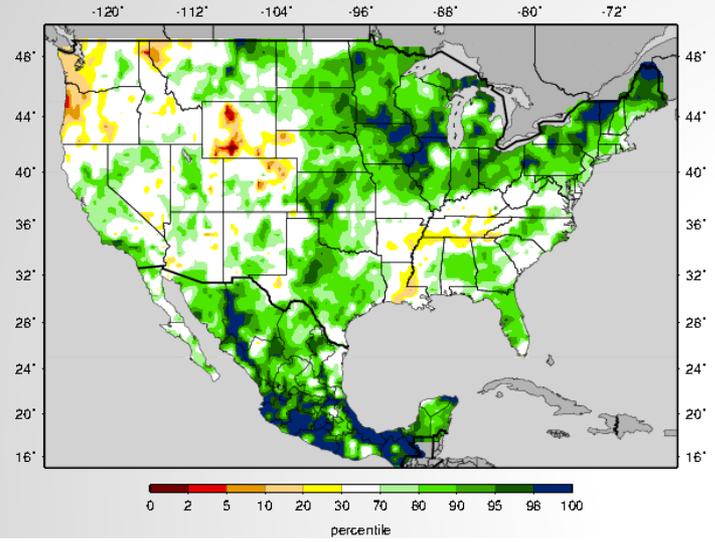


# NATIONAL WEATHER SERVICE MISSOURI BASIN RIVER FORECAST CENTER

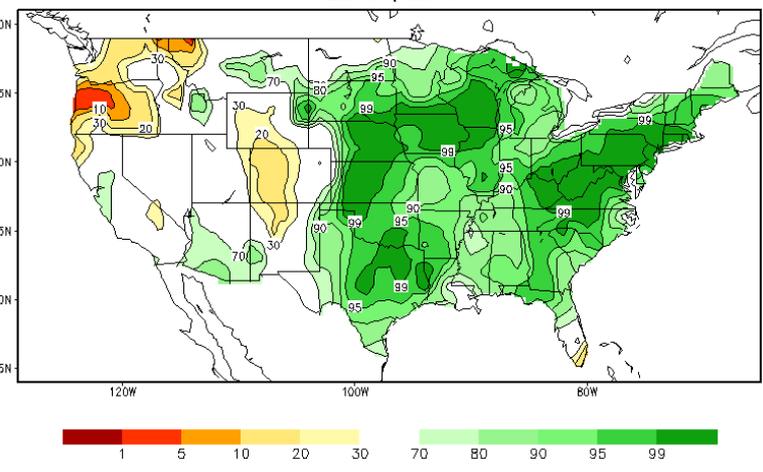


## SOIL MOISTURE CONDITIONS (as of first week of February)

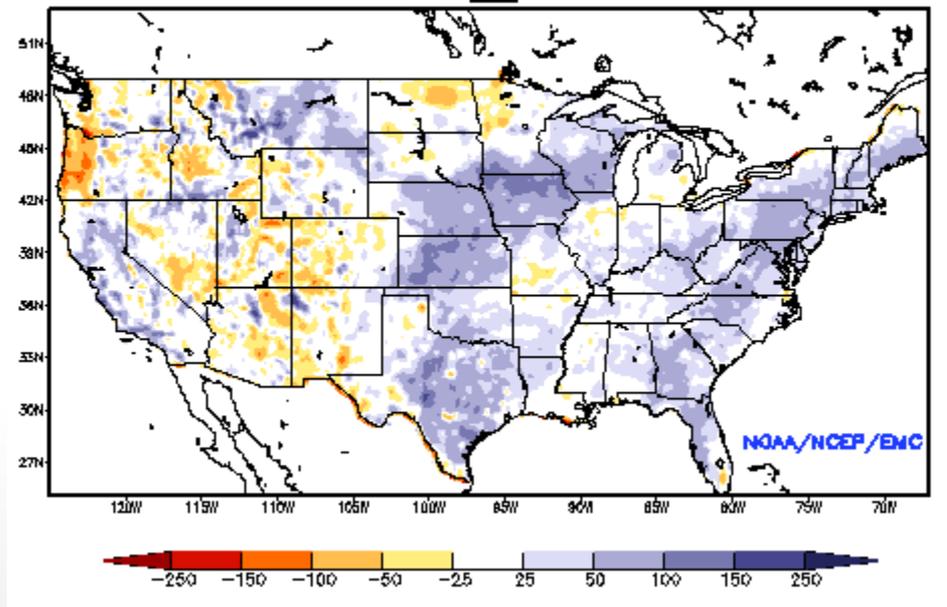
VIC Total Moisture Storage Percentiles (wrt/ 1916-2004)  
20190206



Calculated Soil Moisture Ranking Percentile  
FEB 07, 2019



Ensemble-Mean - Current Total Column Soil Moisture Anomaly (mm)  
NCEP NLDAS Products Valid: FEB 03, 2019





# NATIONAL WEATHER SERVICE MISSOURI BASIN RIVER FORECAST CENTER



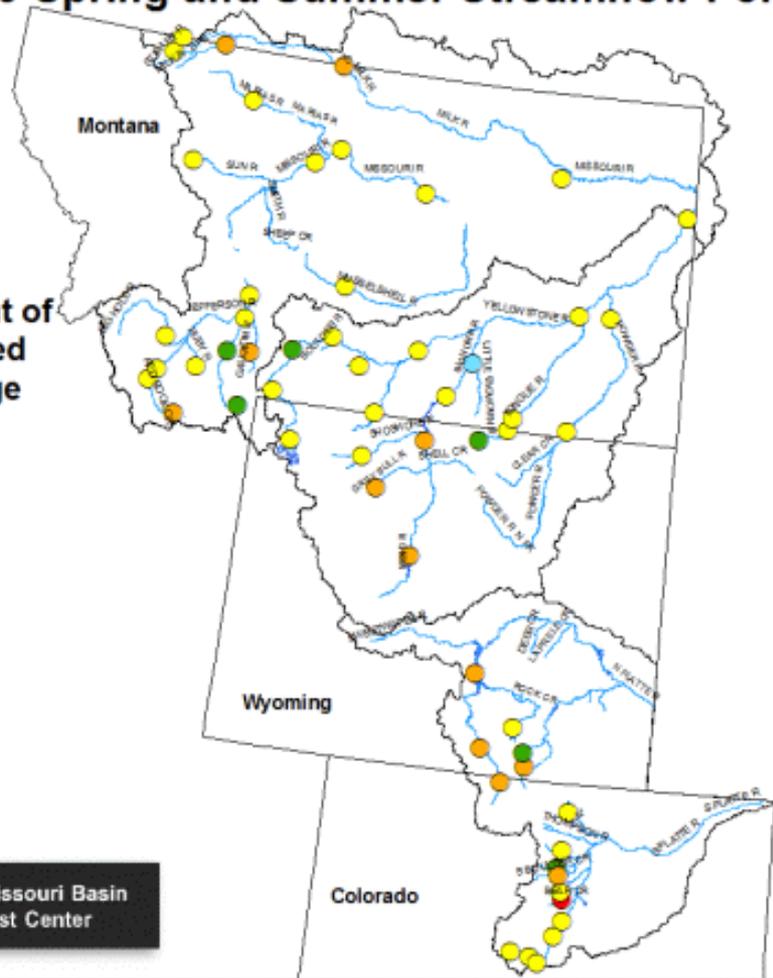
## January 2019 Spring and Summer Streamflow Forecast

Forecast as Percent of  
1979-2001 Modeled  
Historical Average

- > 180%
- 150% - 180%
- 130% - 149%
- 110% - 129%
- 90% - 109%
- 70% - 89%
- 50% - 69%
- 25% - 49%
- < 25%



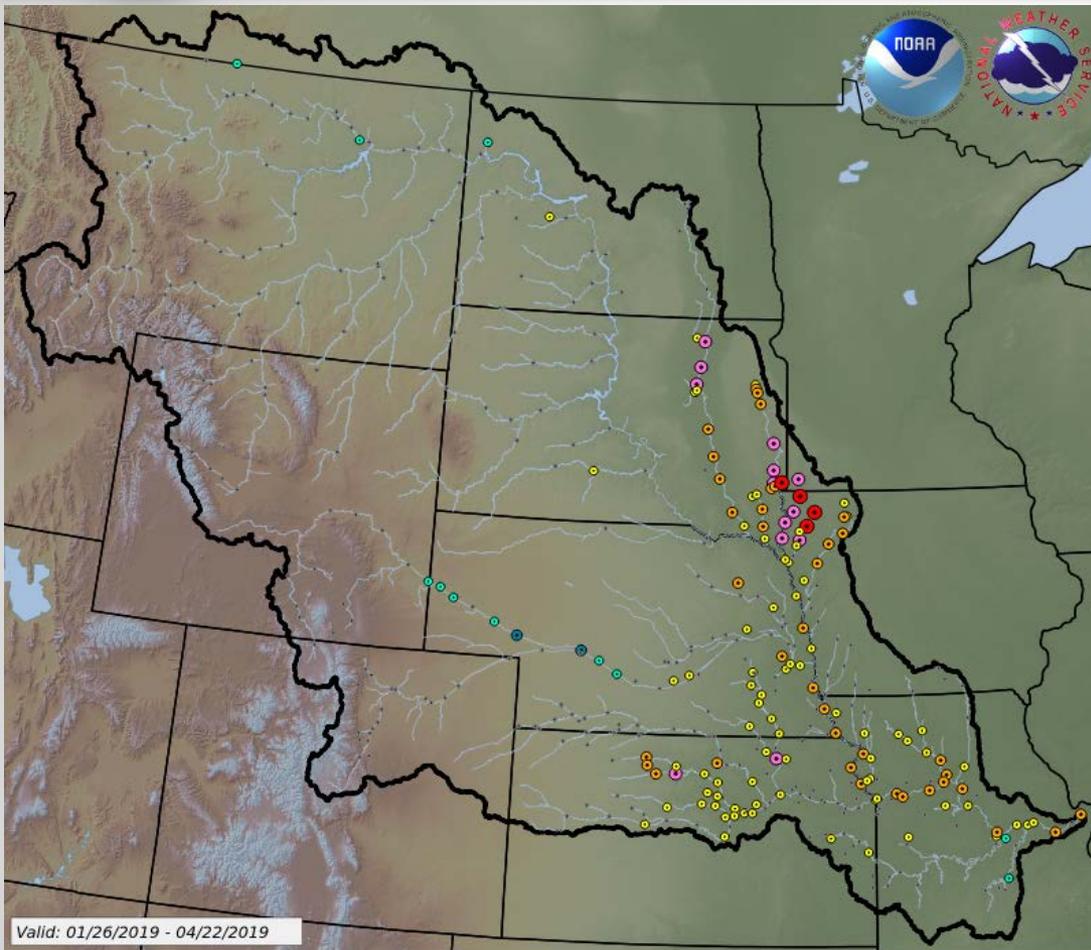
Issued by the Missouri Basin  
River Forecast Center



*Building a Weather-Ready Nation*



# MISSOURI BASIN FLOOD POTENTIAL OUTLOOK



## PERCENT DIFFERENCE MAP (chance today vs. historic norm)

Locations in the eastern third of the Missouri River basin have an increased chance (as compared to normal chances) to flood this Spring.

But, this does not mean we necessarily *expect* flooding to occur at any or all of these locations.

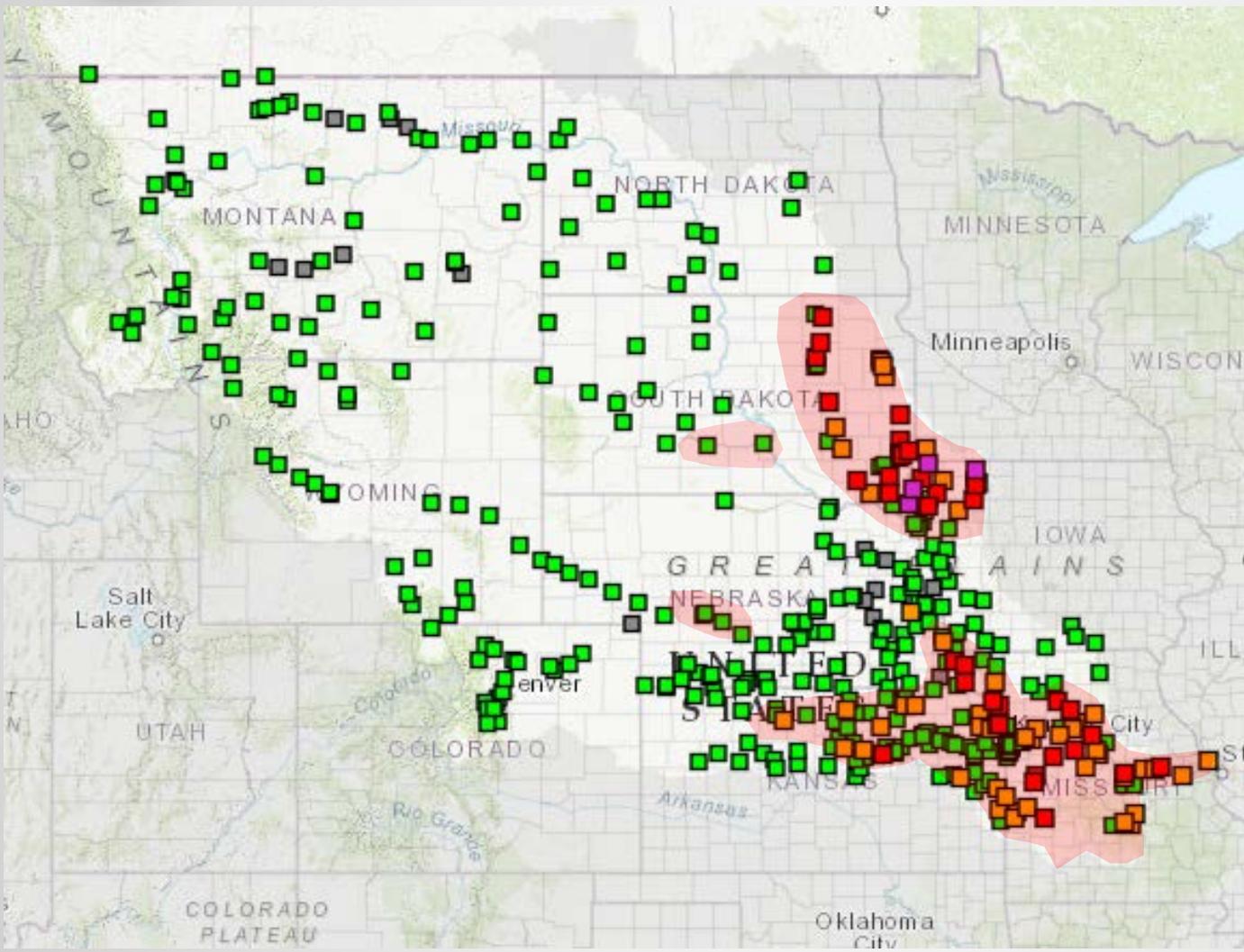
Percent Difference of Reaching Minor Flooding Compared to Historical Average

- -100% to -70%
- -29% to -10%
- 30% to 49%
- -69% to -50%
- -9% to 9%
- 50% to 69%
- -49% to -30%
- 10% to 29%
- 70% to 100%





# MISSOURI BASIN FLOOD POTENTIAL OUTLOOK



**South Dakota:** Flooding possible along James, Big Sioux, Vermillion, White.

**Iowa:** Flooding possible along Big Sioux, Little Sioux, Floyd.

**Nebraska:** Flooding possible along the lower reach of the North Platte, few small tribs in east.

**Kansas:** Flooding possible in Big Blue, Smoky Hill, Republican, and Marais des Cygnes basins.

**Missouri:** Flooding possible within the Platte, Grand, and the Osage basins. Flooding along some of the smaller tributaries possible also.

**Missouri River below Gavins:** Flooding possible from Nebraska City to the mouth.





# MISSOURI BASIN

## Spring Flood Potential Summary



- **Mountain snowpack generally about average in the mountains. Just over the 60% mark in the accumulation period.**
- **Plains snow is concentrated in Dakotas (generally 1-3 inches SWE, some 4+ max's)**
- **Significant flooding due to mountain snow runoff alone is not likely.**
- **Soils in the eastern portion of the basin are wet. Likelihood of tributary flooding is heightened. And we do expect tributary flooding to occur.**
- **Freeze-up ice jams have already occurred (no major impacts reported). Will monitor for break-up jamming this Spring.**
- **Flooding likely in lower third of the basin (southern IA, eastern KS, MO), due to local thunderstorm activity. This is typical.**
- **First official NWS Spring Flood Outlook issued Thursday, 21 February.**
  - <http://www.weather.gov/mbrfc/ensemble>
  - [http://water.weather.gov/ahps/long\\_range.php](http://water.weather.gov/ahps/long_range.php)





# Climate Summary and Outlook for the Missouri Basin

Missouri Basin Navigator's Meeting (2019)

Doug Kluck

Regional Climate Services Director

NOAA's National Centers for Environmental Information

[Doug.kluck@noaa.gov](mailto:Doug.kluck@noaa.gov)

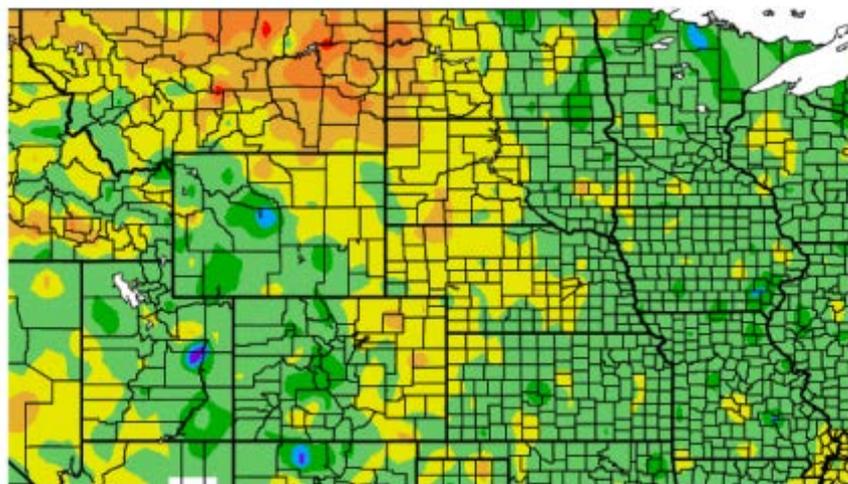
816-994-3008

NOAA Satellite and Information Service | National Centers for Environmental Information

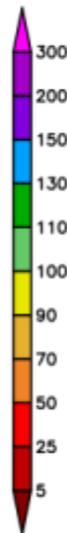
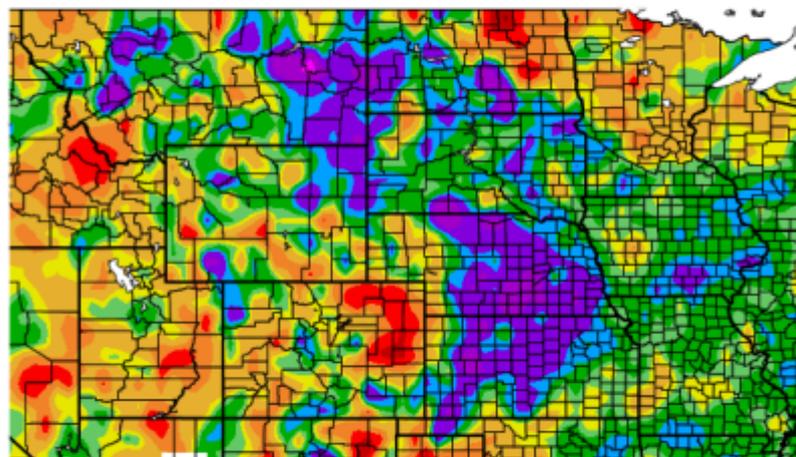


# Conditions Last 3 Months: November - January

Departure from Normal Temperature (F)  
11/1/2018 - 1/31/2019

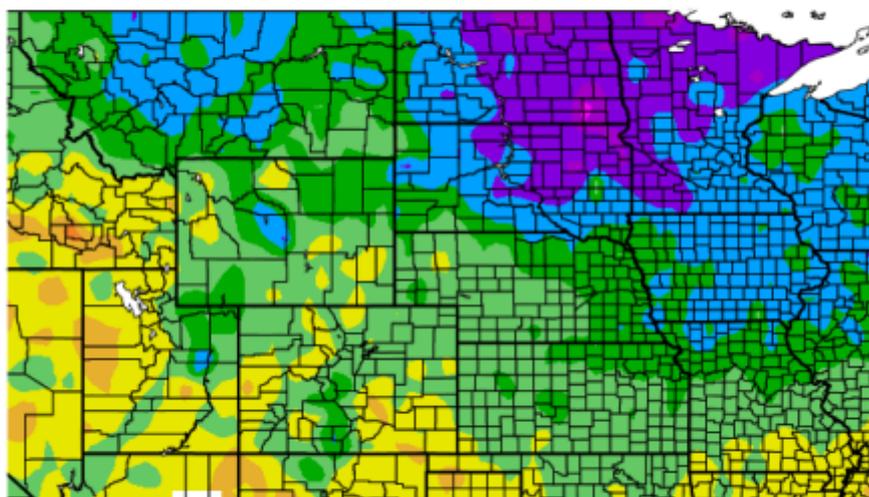


Percent of Normal Precipitation (%)  
11/1/2018 - 1/31/2019

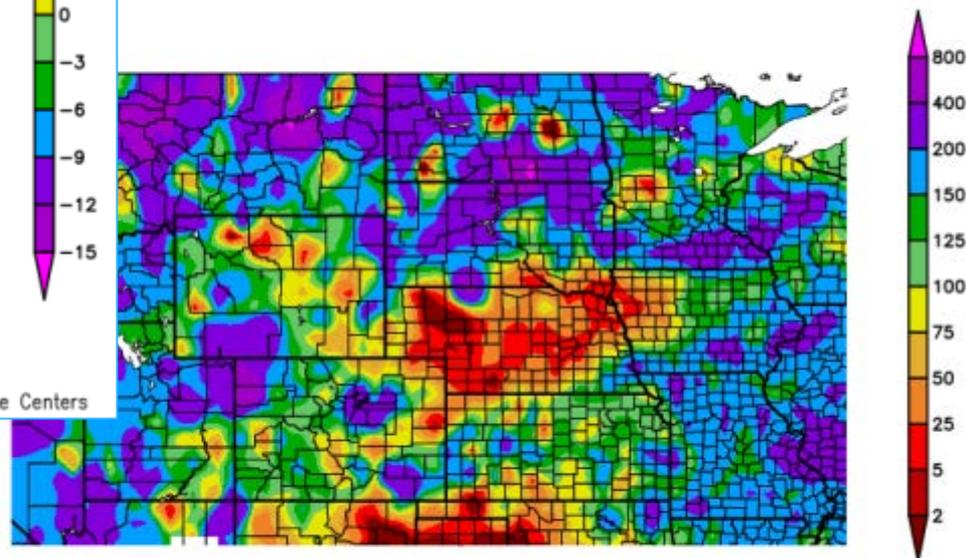


# Conditions – Last 30 days

Departure from Normal Temperature (F)  
1/12/2019 – 2/10/2019



Percent of Normal Precipitation (%)  
1/12/2019 – 2/10/2019



Generated 2/11/2019 at HPRCC using provisional data.

NOAA Regional Climate Centers

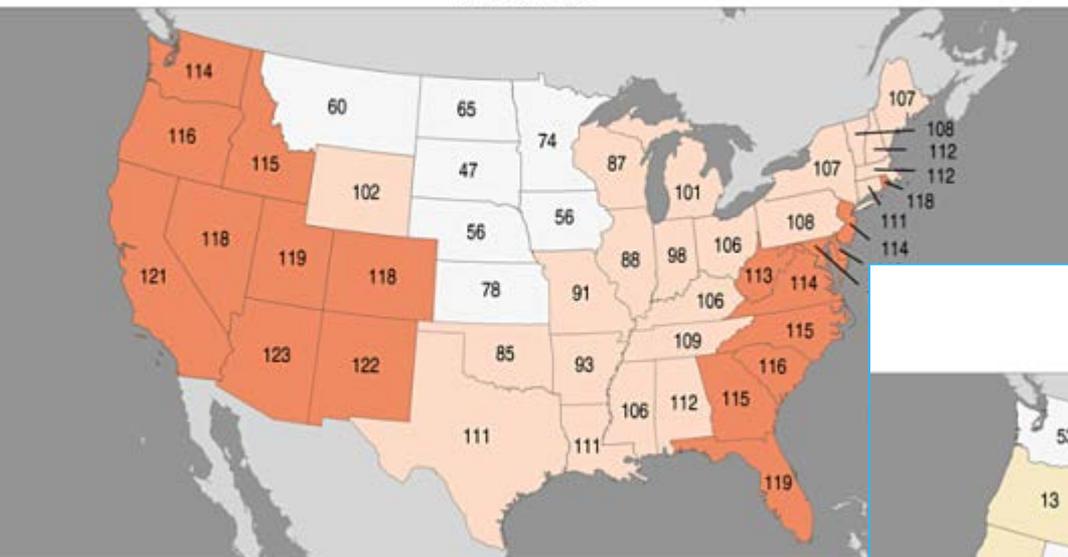
3

# 2018 Annual Conditions

## Statewide Average Temperature Ranks

January–December 2018

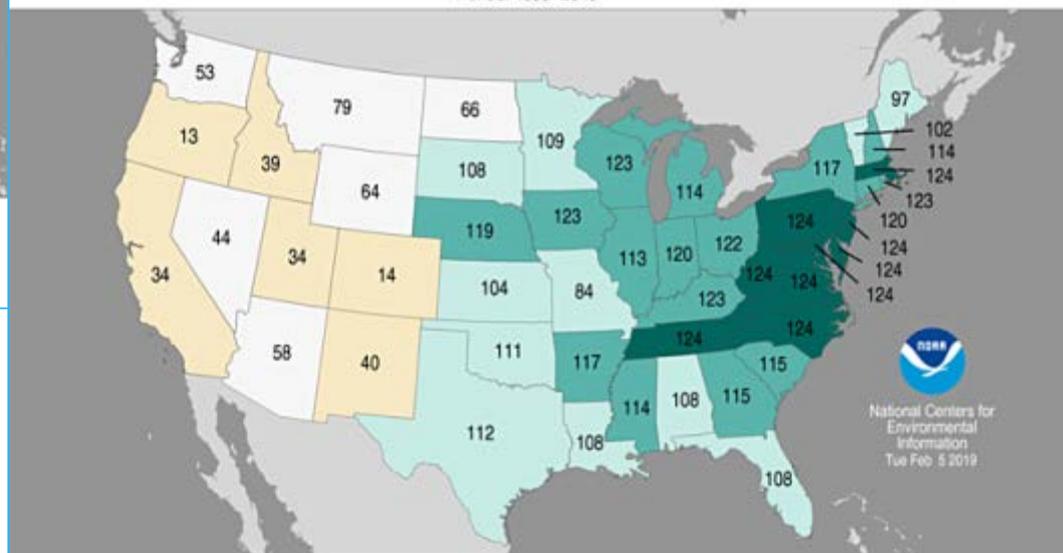
Period: 1895–2018



## Statewide Precipitation Ranks

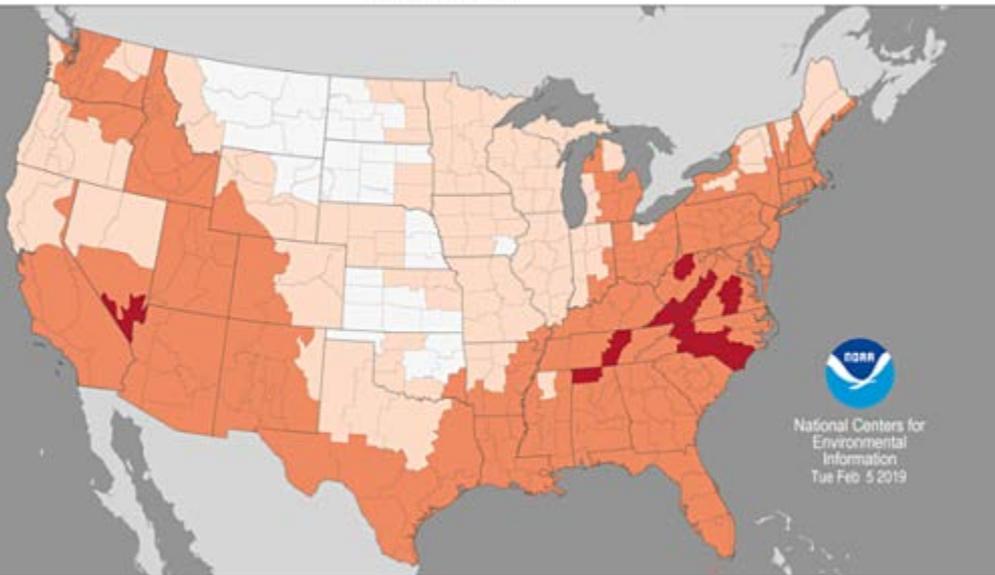
January–December 2018

Period: 1895–2018



# 2018 Temps and Precip (locally)

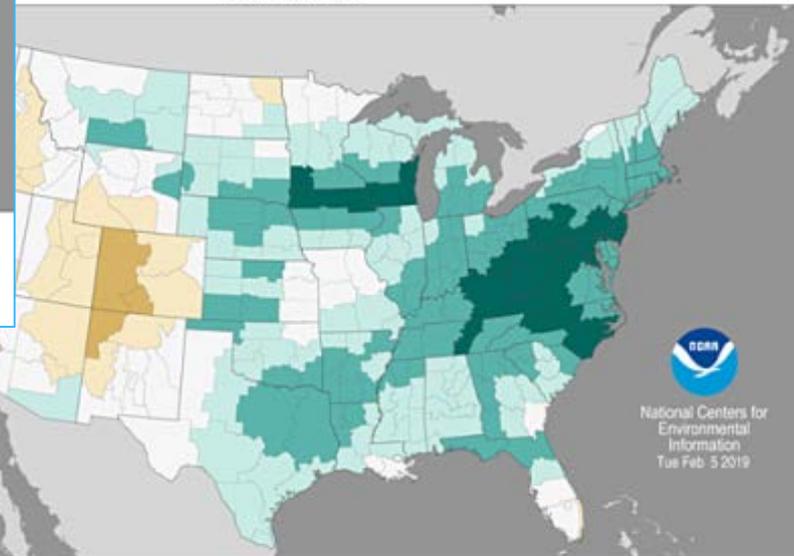
Divisional Minimum Temperature Ranks  
January–December 2018  
Period: 1895–2018



National Centers for  
Environmental  
Information  
Tue Feb 5 2019



Divisional Precipitation Ranks  
January–December 2018  
Period: 1895–2018

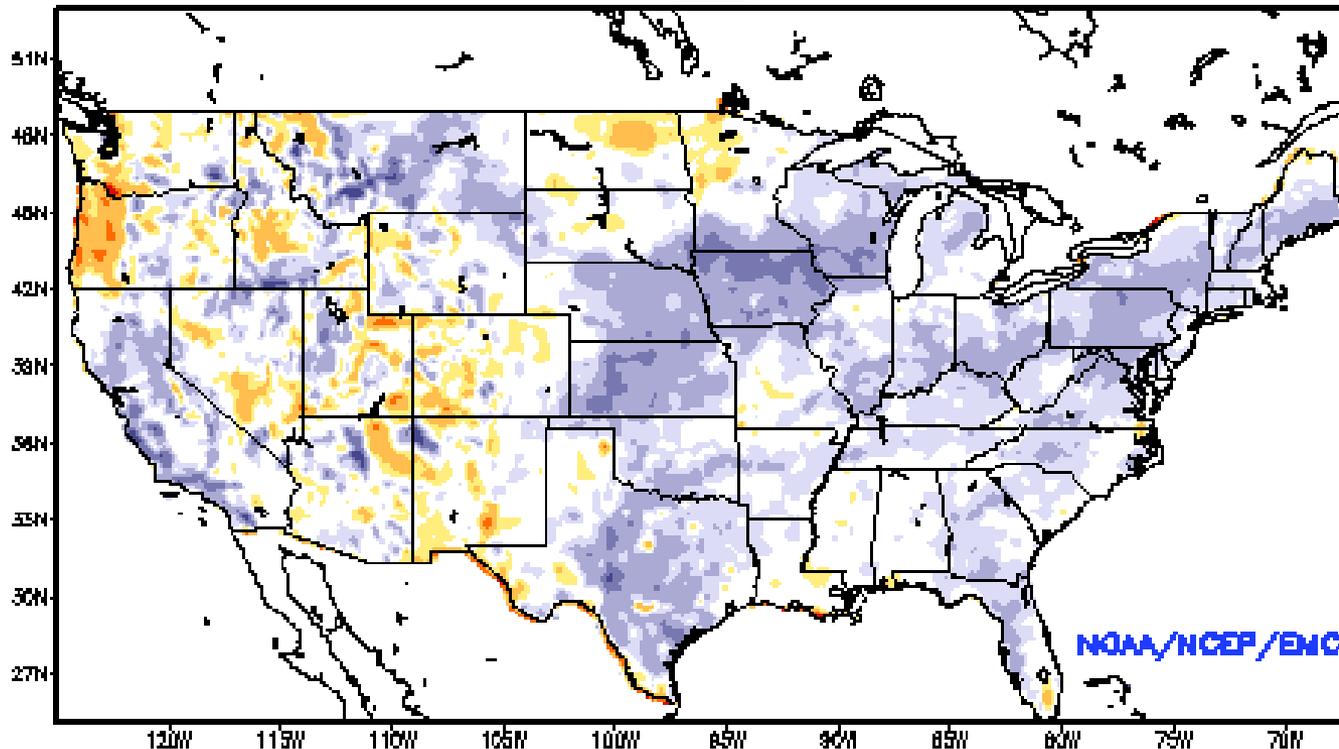


National Centers for  
Environmental  
Information  
Tue Feb 5 2019



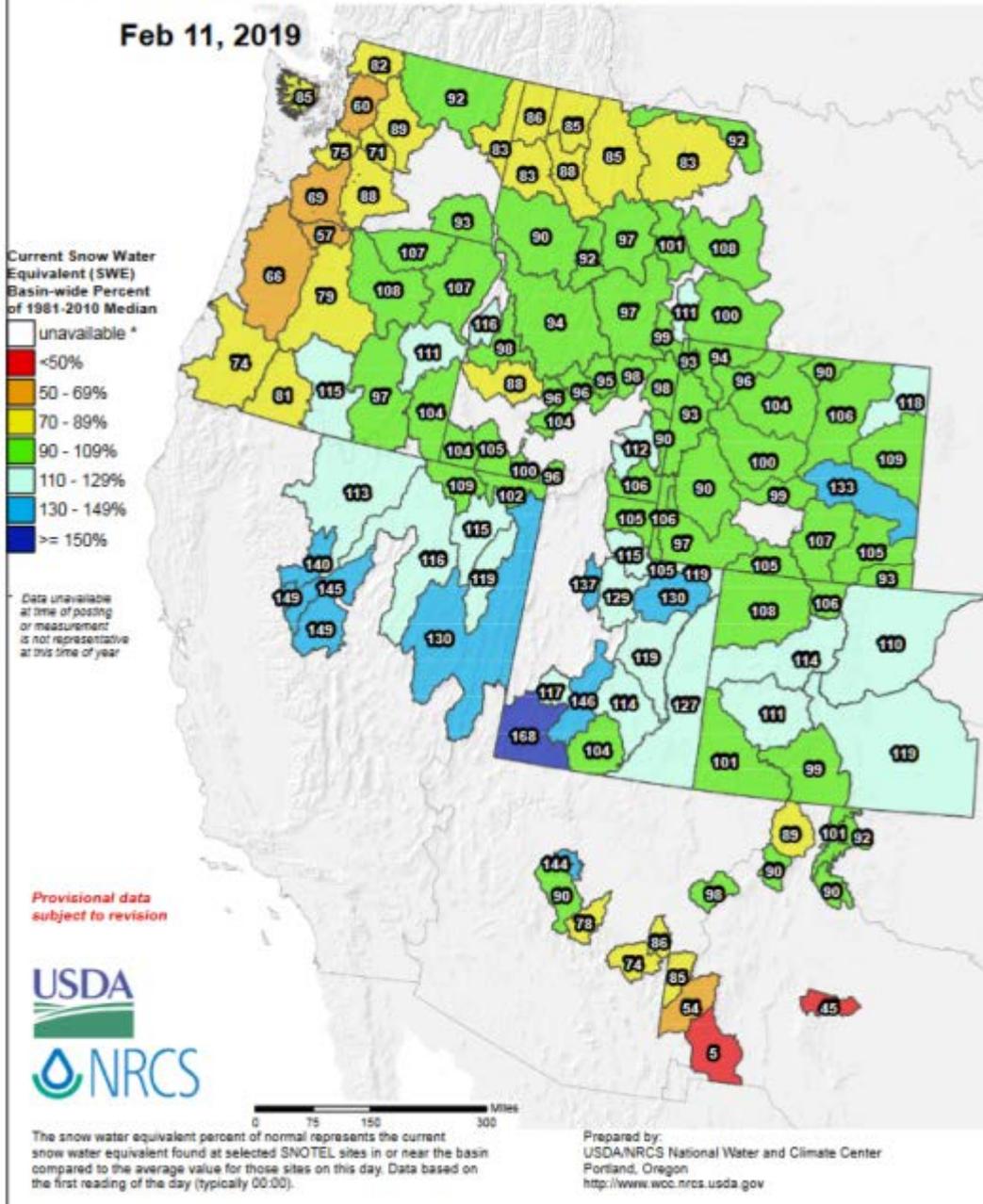
# Soil Moisture

Ensemble-Mean - Current Total Column Soil Moisture Anomaly (mm)  
NCEP NLDAS Products Valid: FEB 07, 2019



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

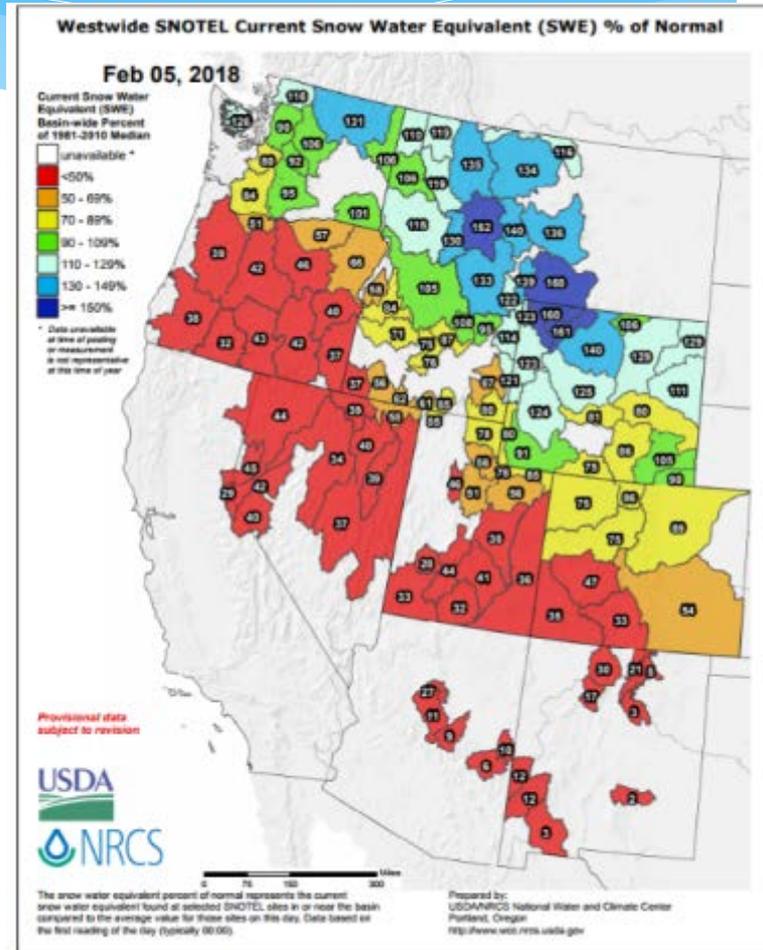
Feb 11, 2019



# Mountain Snowpack (snow water equivalent % of normal)

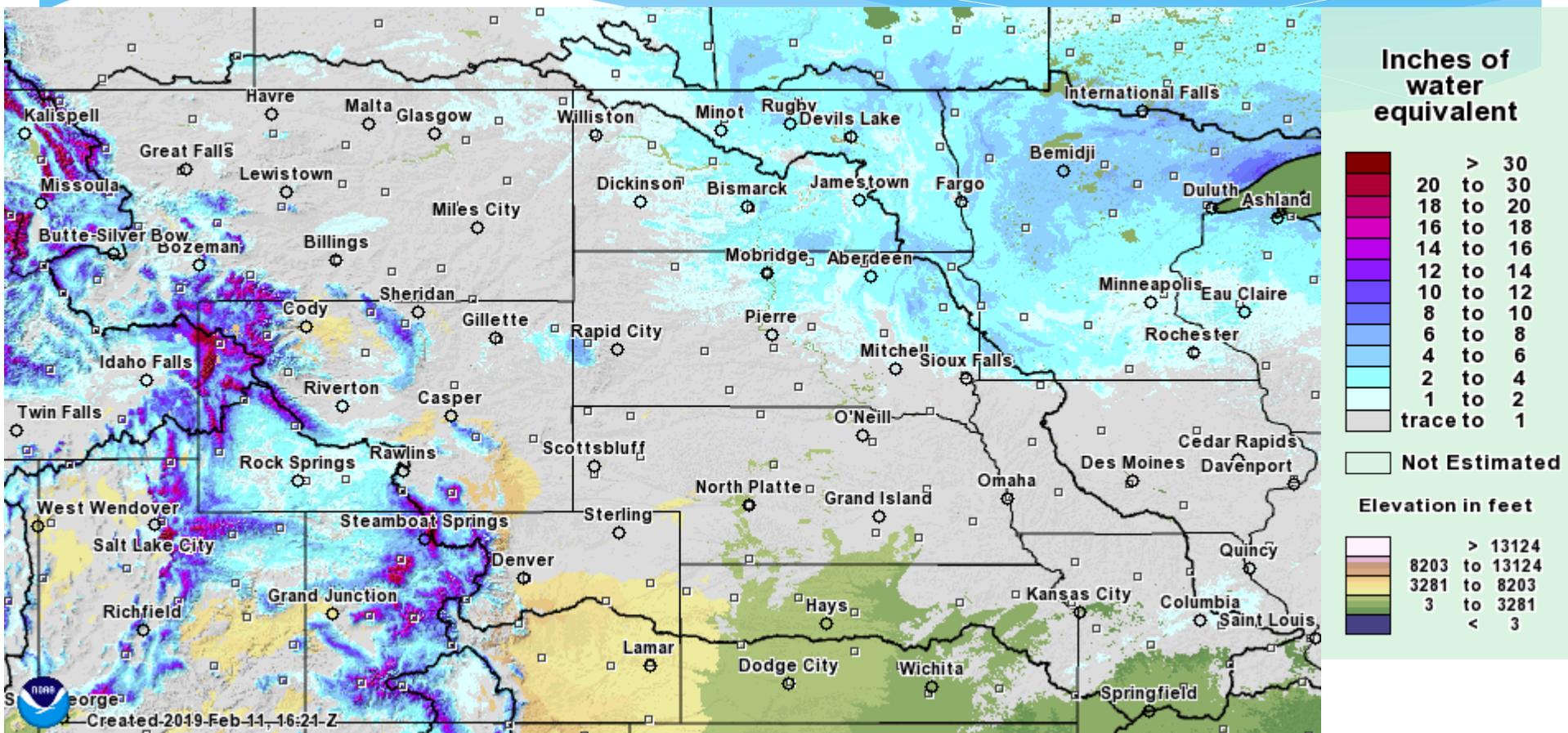
Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Feb 05, 2018



# Plains Snowpack (February 6th, 2019)

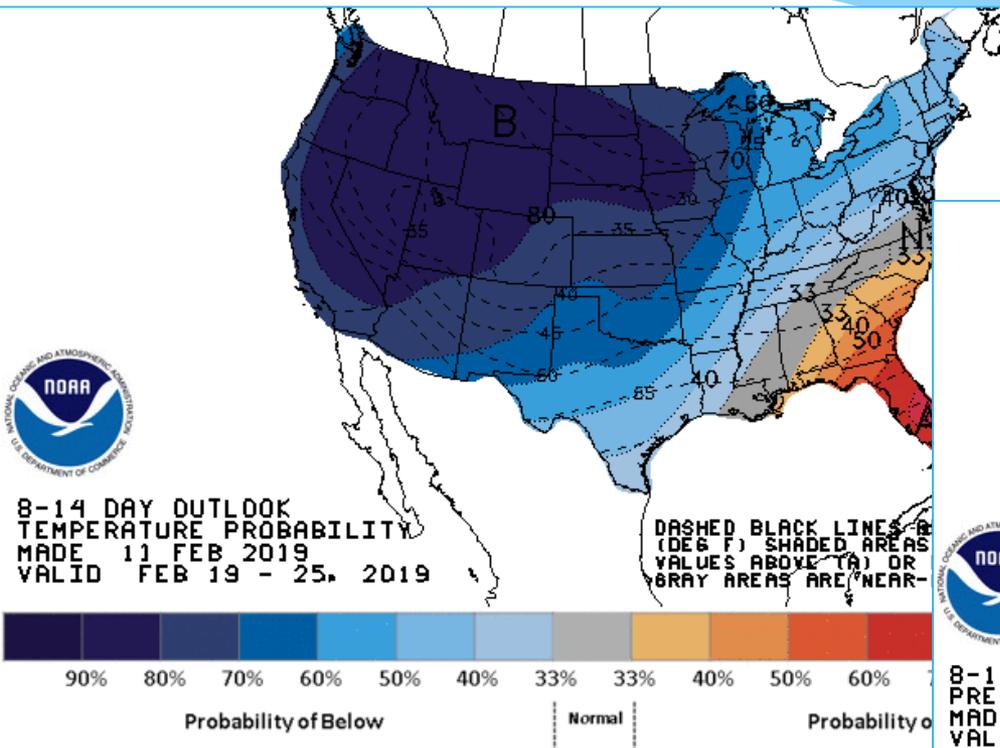
(snow water equivalent)



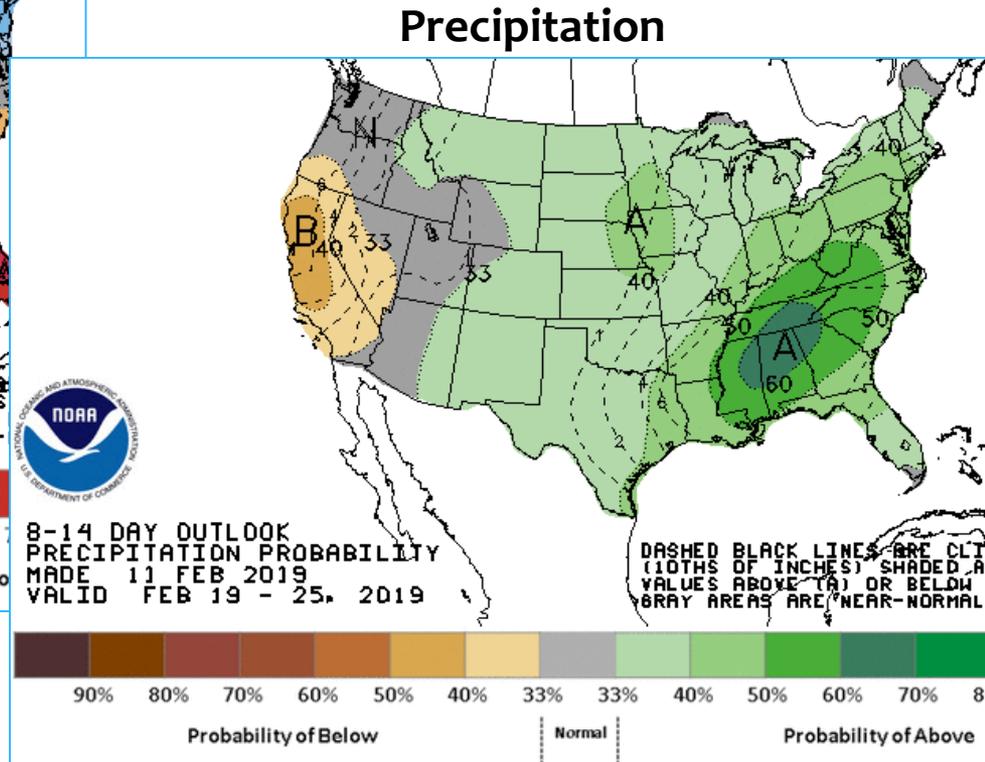
# Outlooks



# Temperature and Precipitation Probabilities (2/19-25/19)

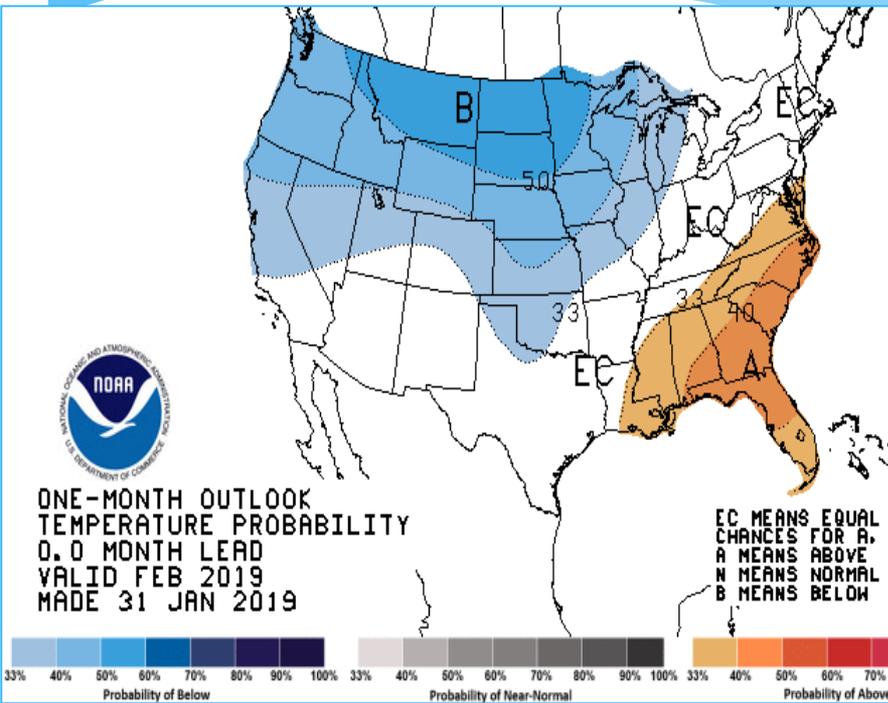


Temperature

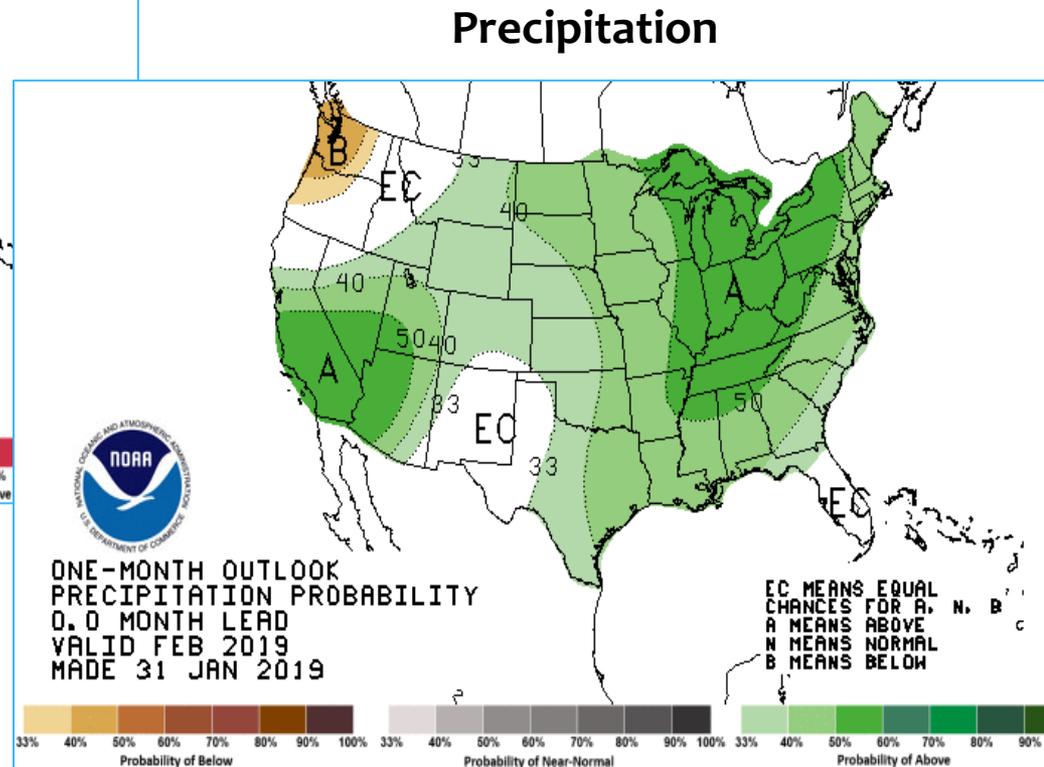


# February 2019 Outlook

## Temperature and Precipitation Probabilities

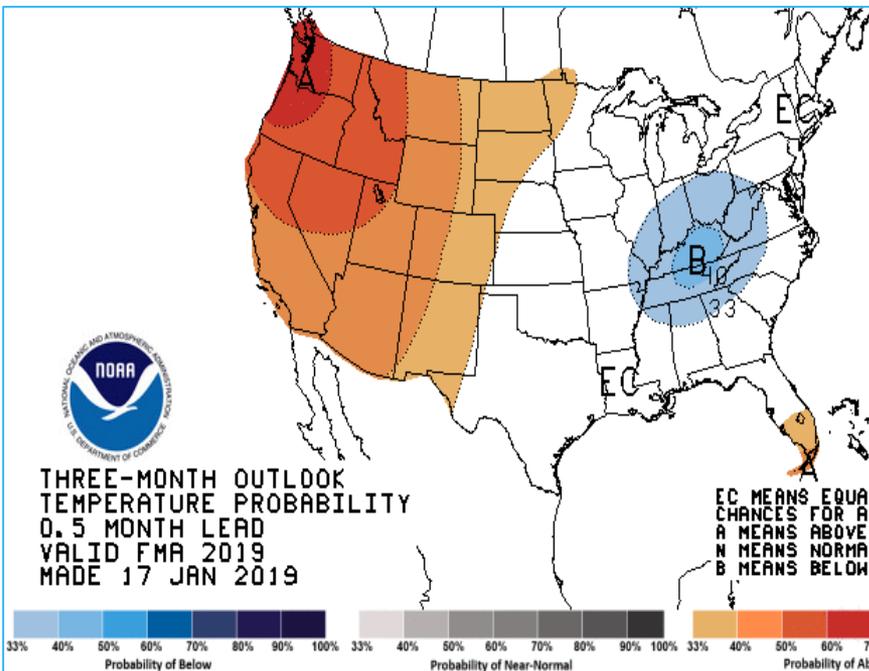


Temperature

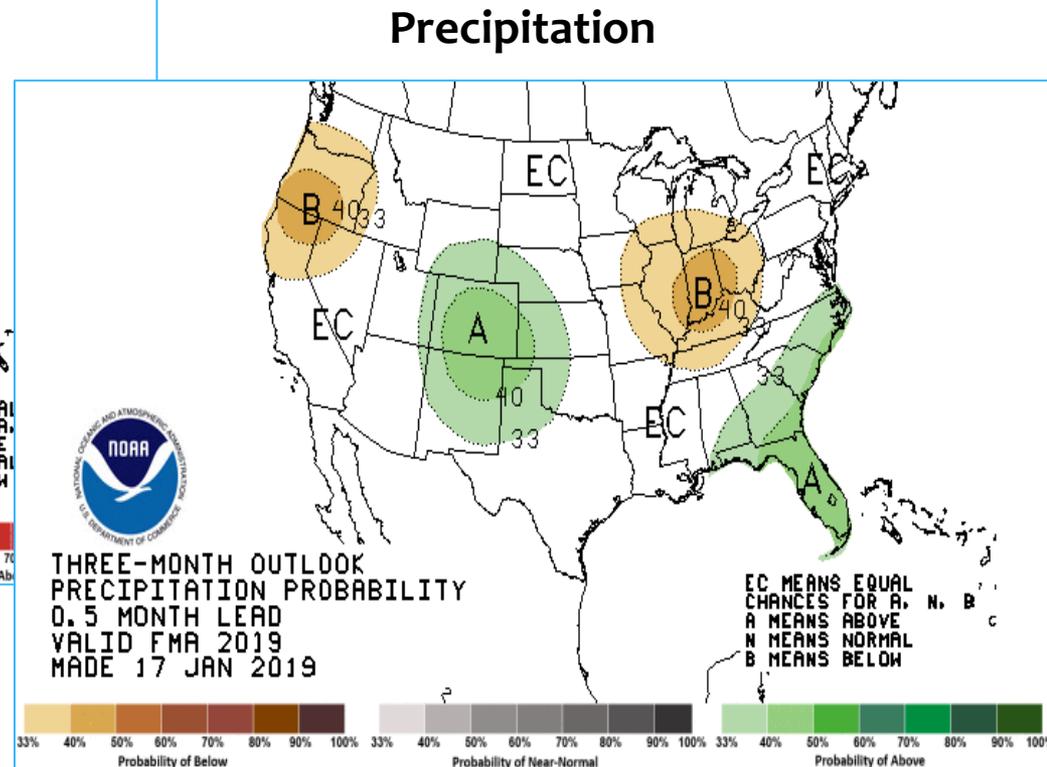


Precipitation

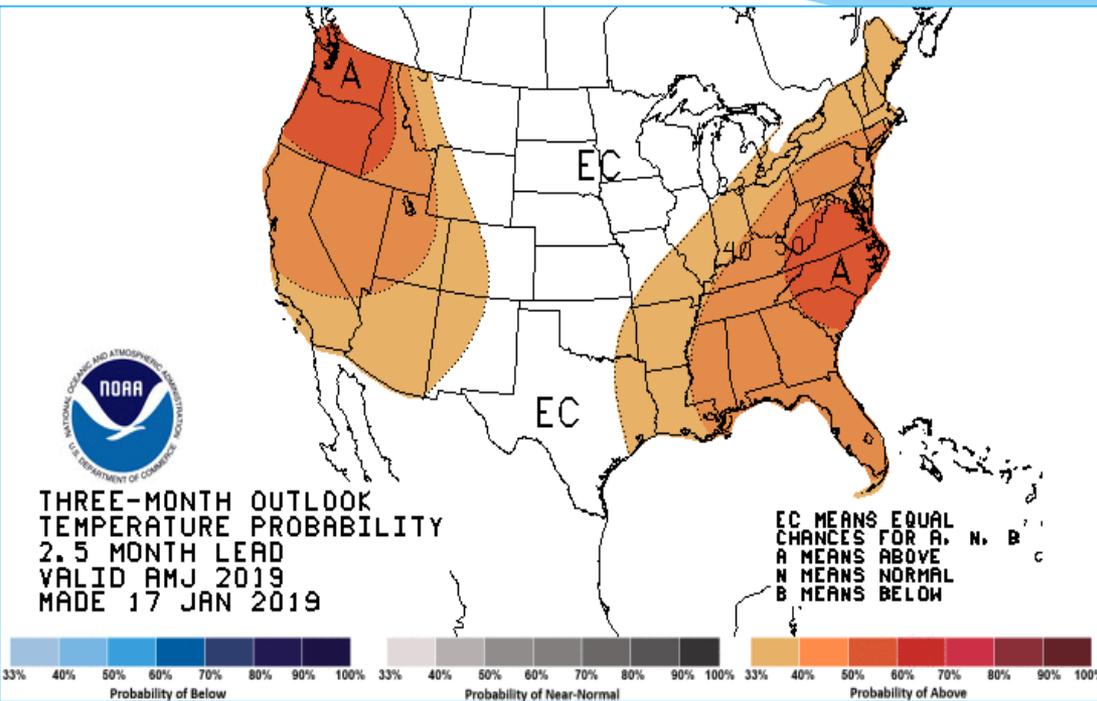
# 3 Month Temperature and Precipitation Probabilities (February - March - April, 2019)



Temperature

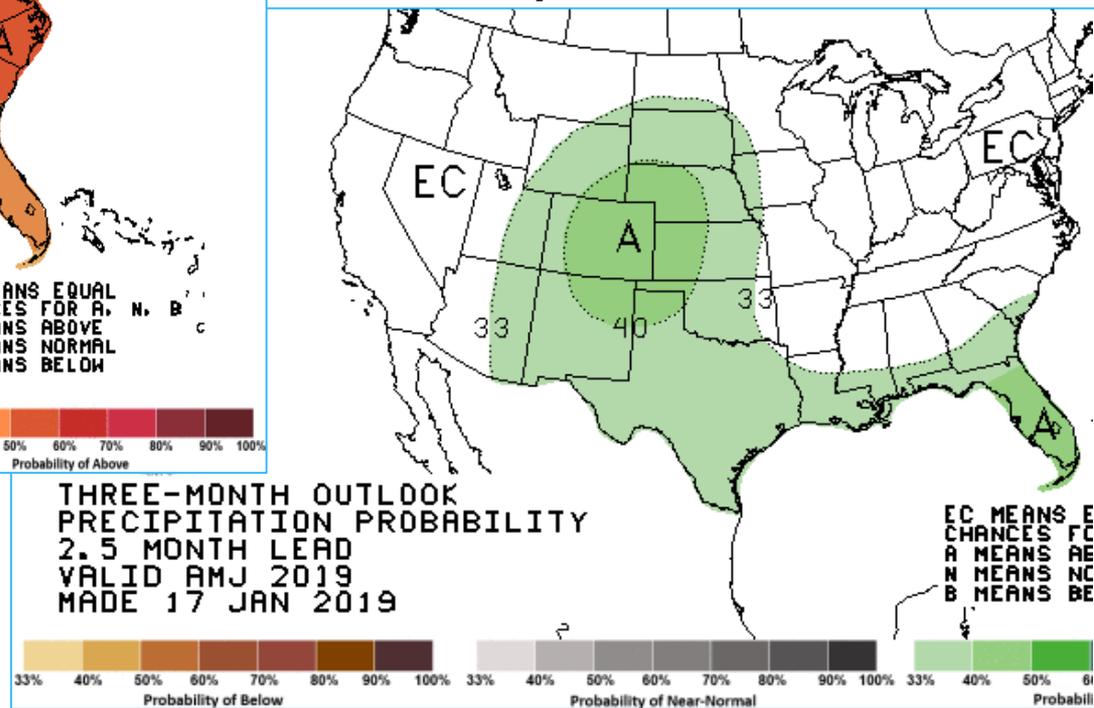


# 3 Month Temperature and Precipitation Probabilities (April – May – June, 2019)



Temperature

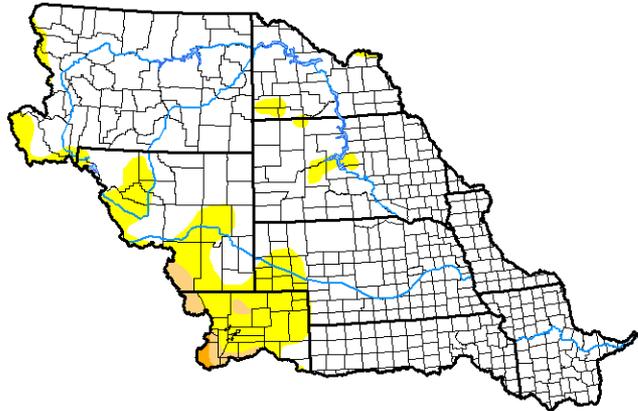
Precipitation



Precipitation

**U.S. Drought Monitor**  
**Missouri Watershed**

**February 5, 2019**  
 (Released Thursday, Feb. 7, 2019)  
 Valid 7 a.m. EST



**Intensity:**

- 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. See accompanying text summary for forecast statements.*

**Author:**

Richard Tinker  
 CPC/NOAA/NWS/NCEP

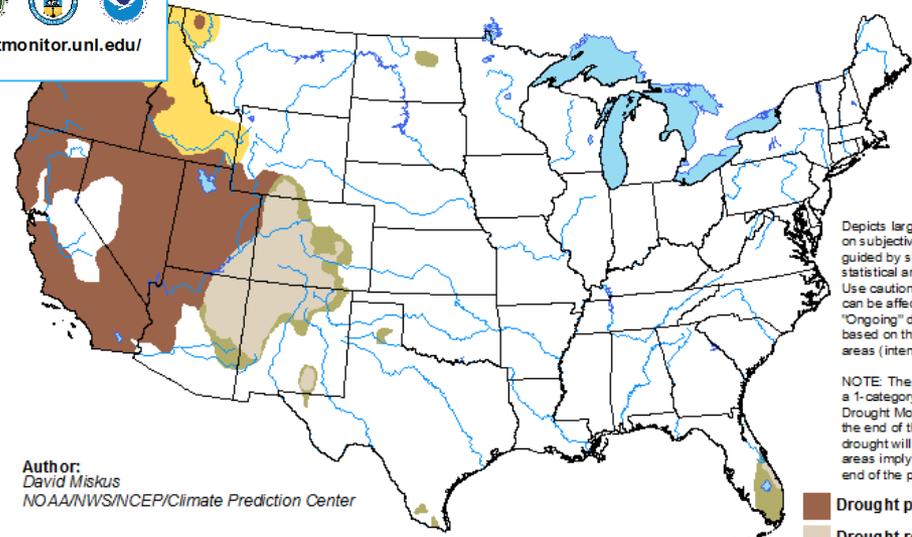


<http://droughtmonitor.unl.edu/>

# Drought Update

## Seasonal Drought Outlook Dependency During the Valid Period

Valid for January 17 - April 30, 2019  
 Released January 17



**Author:**  
 David Miskus  
 NOAA/NWS/NCEP/Climate Prediction Center

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).

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



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

<https://www.drought.gov/drought/>

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



# Summary

## \* **Current Conditions**

- \* Current ENSO condition – hedging on El Niño but not quite there
- \* Plains snowpack – widespread, not outstanding
  - \* Eastern ND & SD snowpack up to 4-6” of water
- \* Mountain snowpack mainly average (long way to go)

## \* **Predictions**

- \* El Niño may not officially occur this year thus a “neutral” year
- \* Likely continued cold basin-wide through February
- \* Leaning towards warmer west than normal conditions (March-April)
- \* **Precipitation** into spring
  - \* Rest of February leans wet basin wide (except NW Montana)
  - \* Generally equal chances of above, below, near normal during March & April. Slightly better chances of above normal SW portions of the basin.

# Thank You

- \* Monthly Climate and Drought Summary and Outlook Webinar Series (3<sup>rd</sup> Thursday of each month)
  - \* Next one will be February 21<sup>st</sup> at 1pm
  - \* <https://attendee.gotowebinar.com/register/772364433168566797>
  - \* Or email me (doug.kluck@noaa.gov)