



# Montana DWSAC Briefing



20 March 2018



**Weather-Ready Nation**  
National Oceanic and Atmospheric Administration



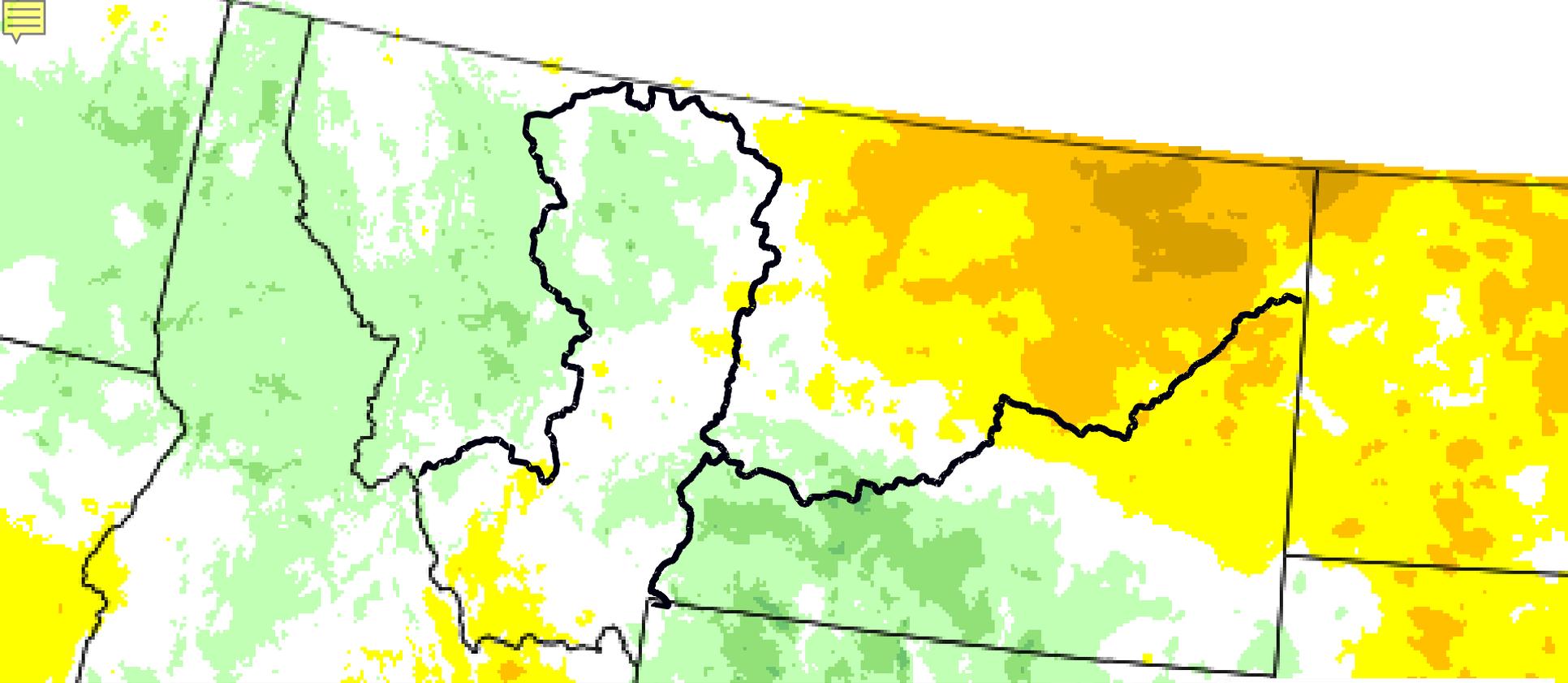
# Montana: Mar 2017 – Feb 2018

33<sup>rd</sup> Warmest on Record

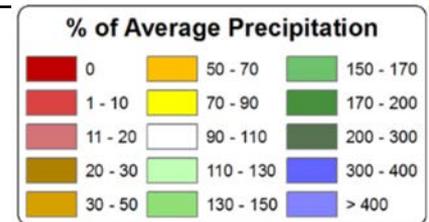
Avg Temp	20 <sup>th</sup> Century Average	Departure
42.6°F	41.1°F	1.5°F

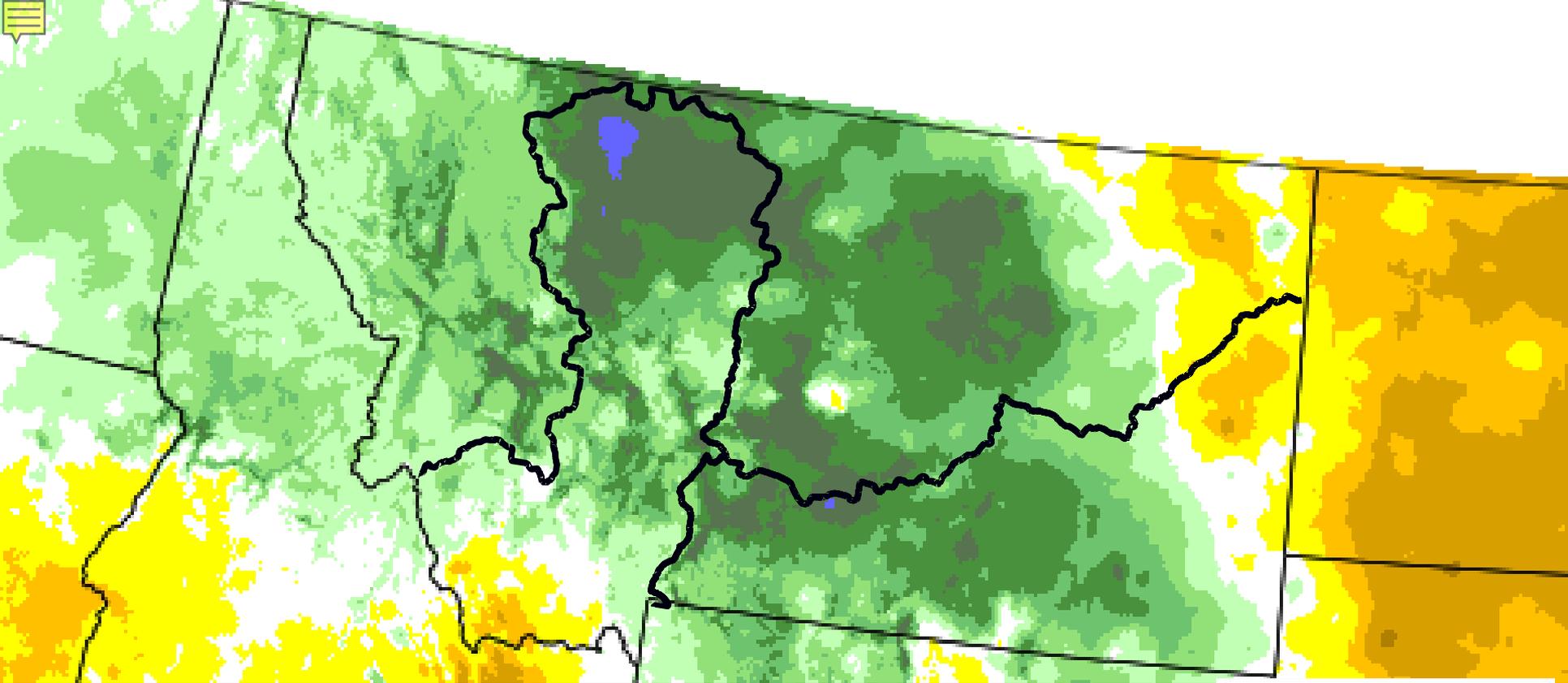
51<sup>st</sup> Driest on Record

Precip	20 <sup>th</sup> Century Average	Departure
17.96"	18.67"	-0.71"

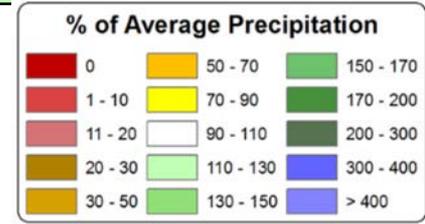


Mar 17 – Feb 18 Precip Anomaly



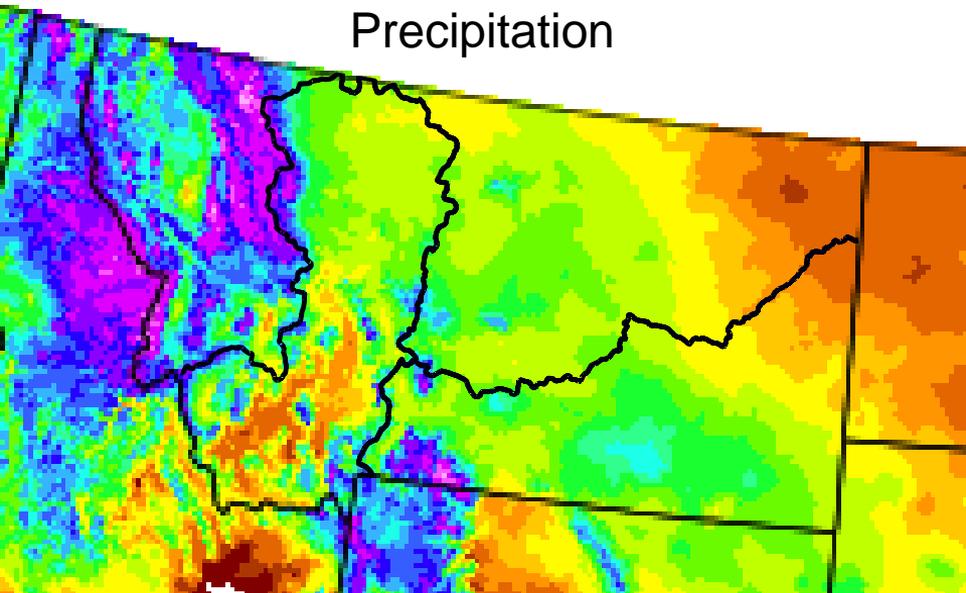


# 2018 Water Year Precip Anomaly

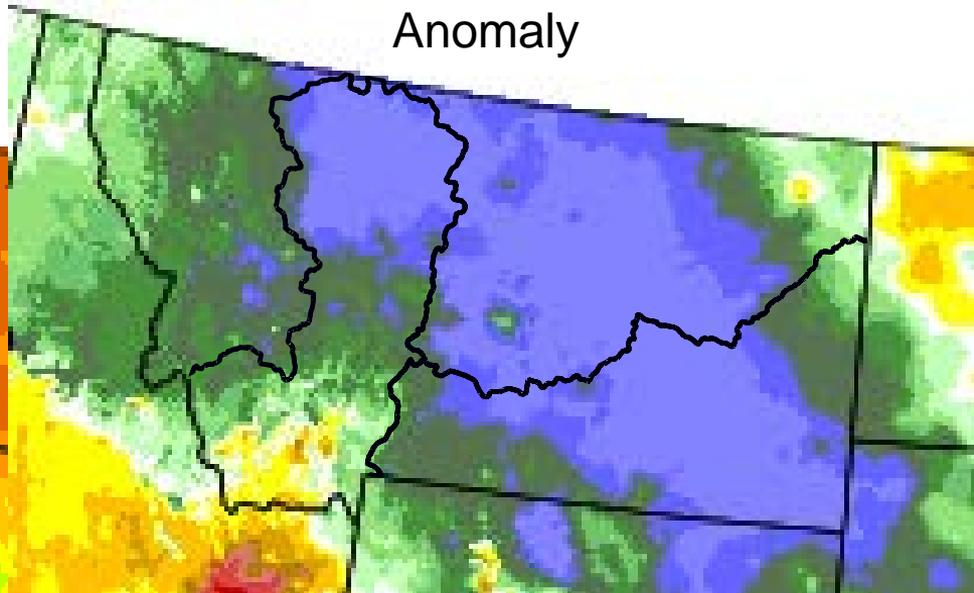


# Feb 2018 Precip vs Anomaly

Precipitation



Anomaly



Monthly Precipitation (in.)

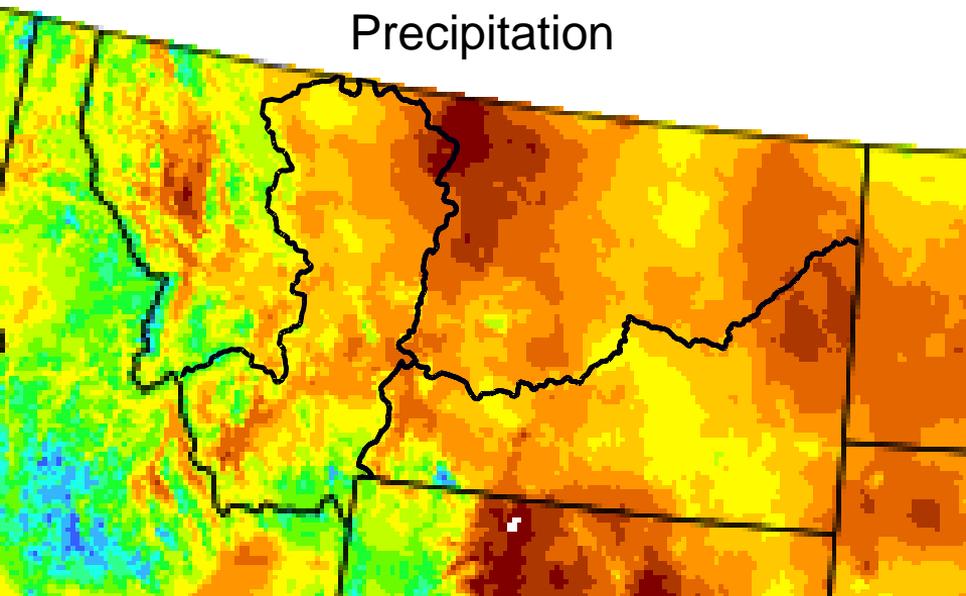


% of Average Precipitation

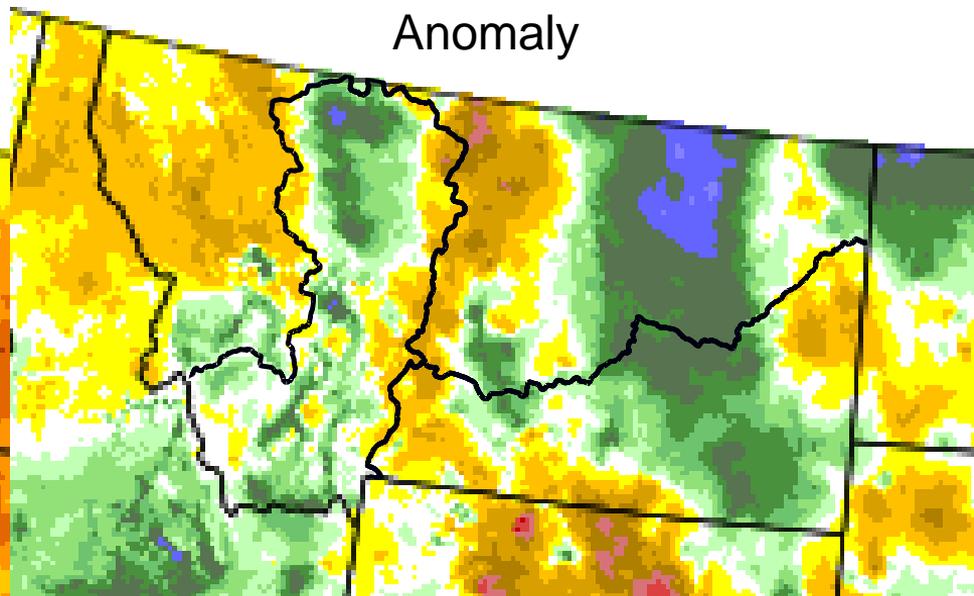


# March 2018 Precip vs Anomaly

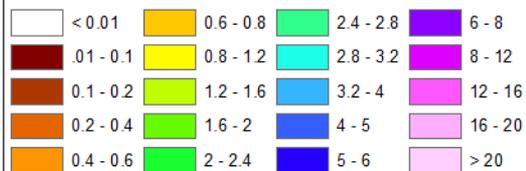
Precipitation



Anomaly



Monthly Precipitation (in.)



% of Average Precipitation



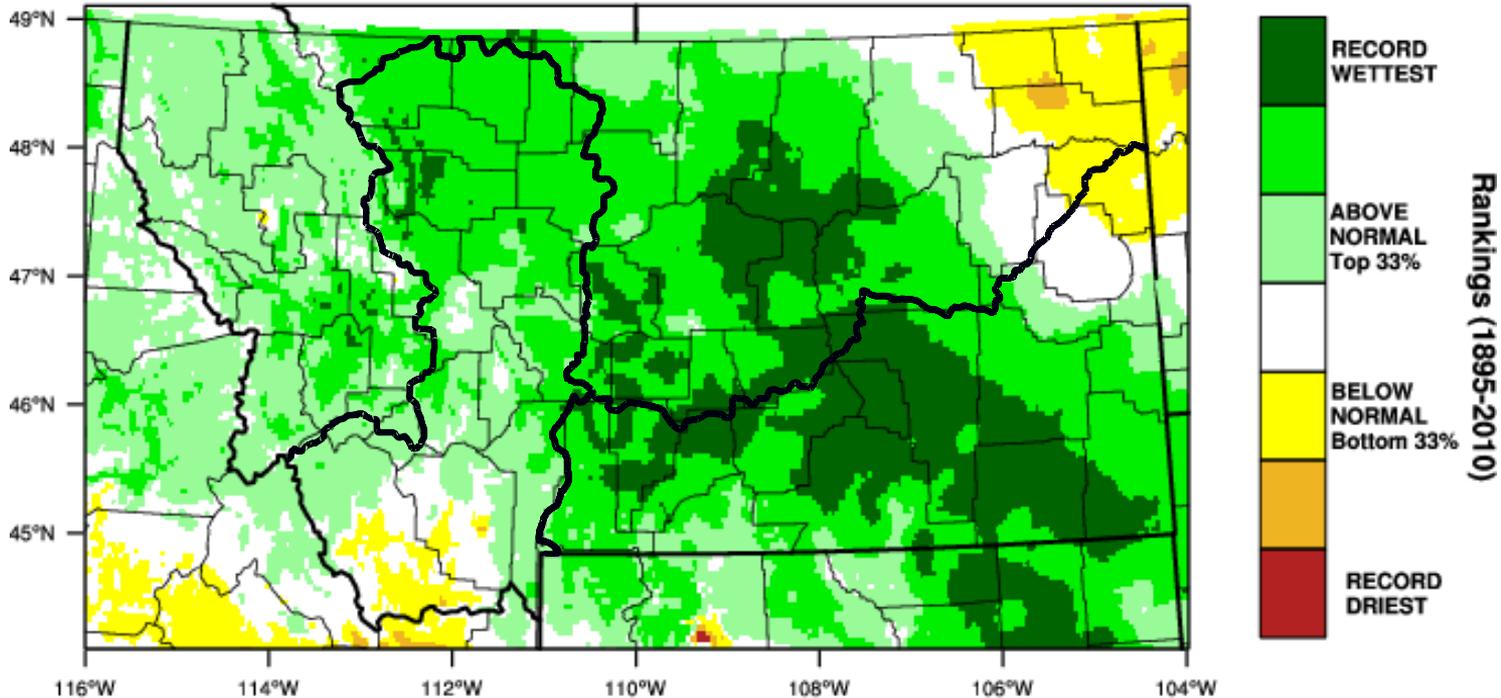


# Precipitation Ranking Calendar Year 2018



## Montana - Precipitation

January-February 2018 Percentile



116°W 114°W 112°W 110°W 108°W 106°W 104°W

WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 MAR 2018

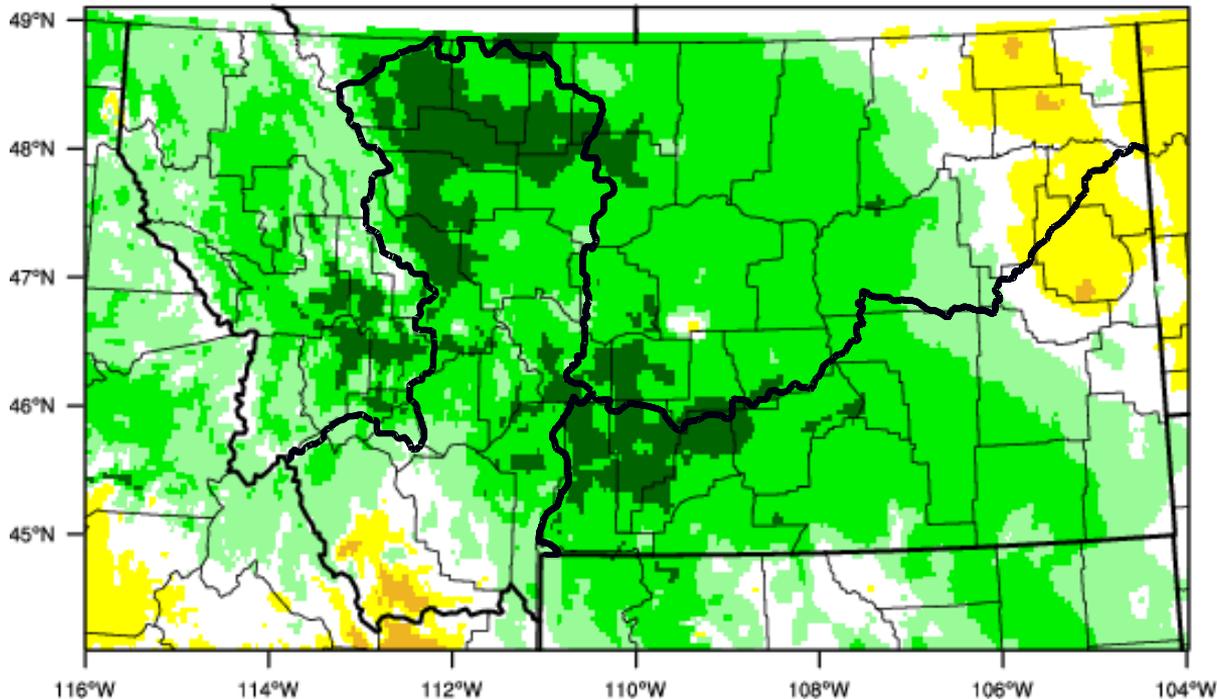


# Precipitation Ranking Water Year 2018



## Montana - Precipitation

October-February 2018 Percentile



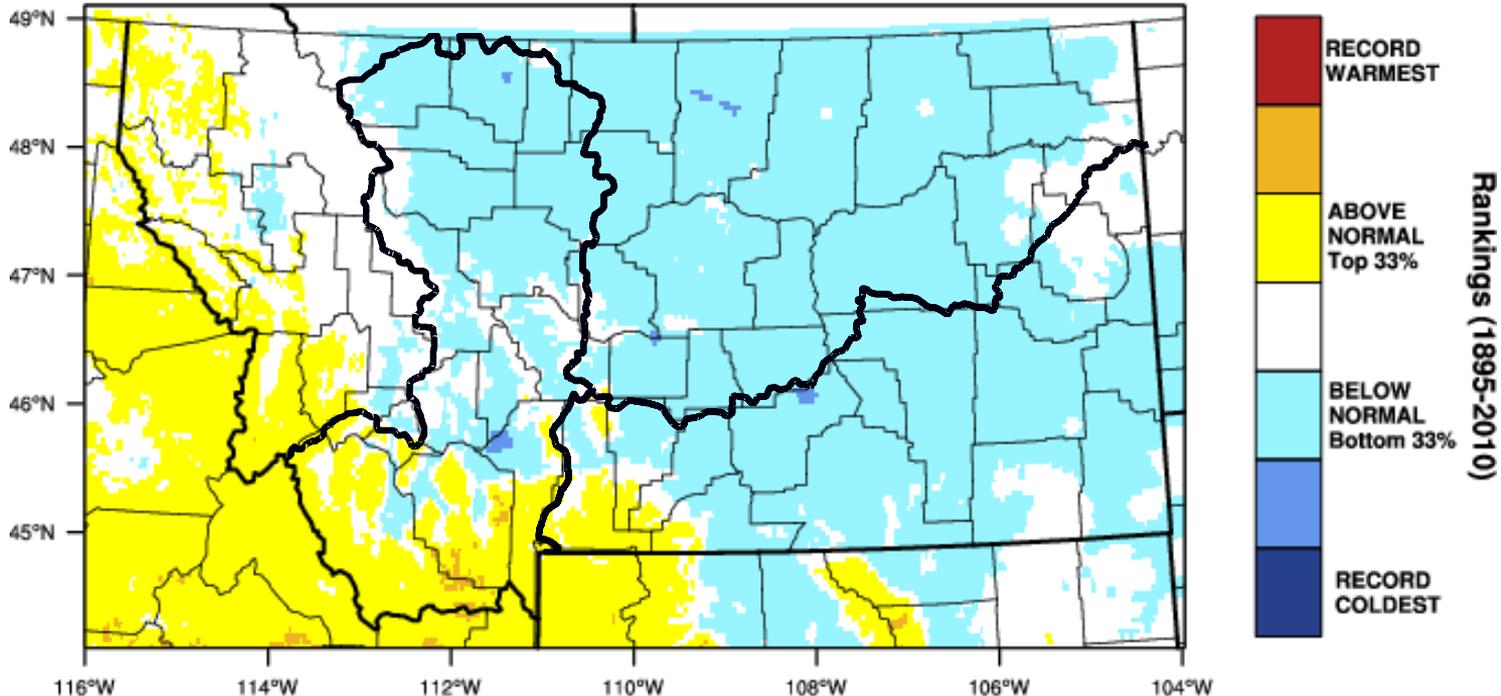
Rankings (1895-2010)



# Mean Temperature Ranking Water Year 2018



Montana - Mean Temperature  
October-February 2018 Percentile



116°W 114°W 112°W 110°W 108°W 106°W 104°W

WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 MAR 2018

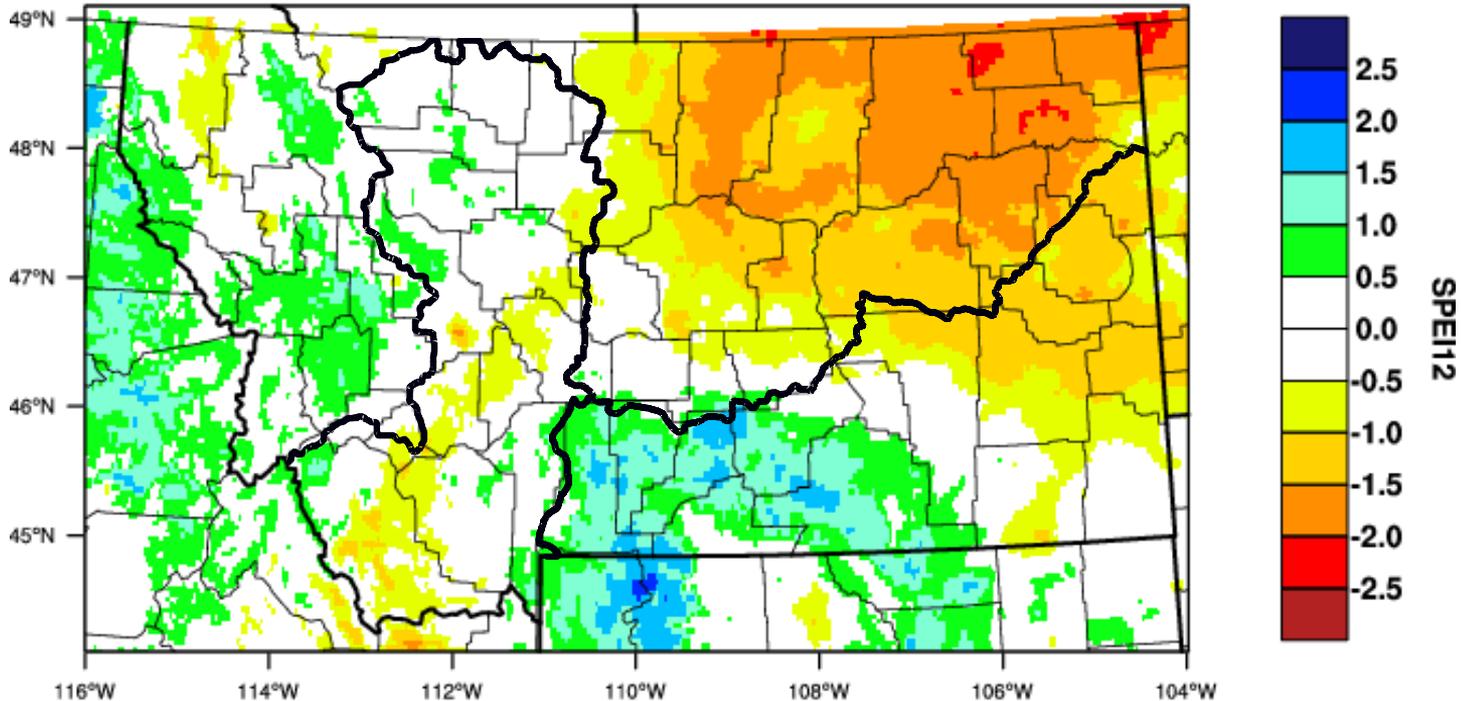


# PRISM SPEI

## Water Year 2018

Montana - 12 month SPEI

February 2018



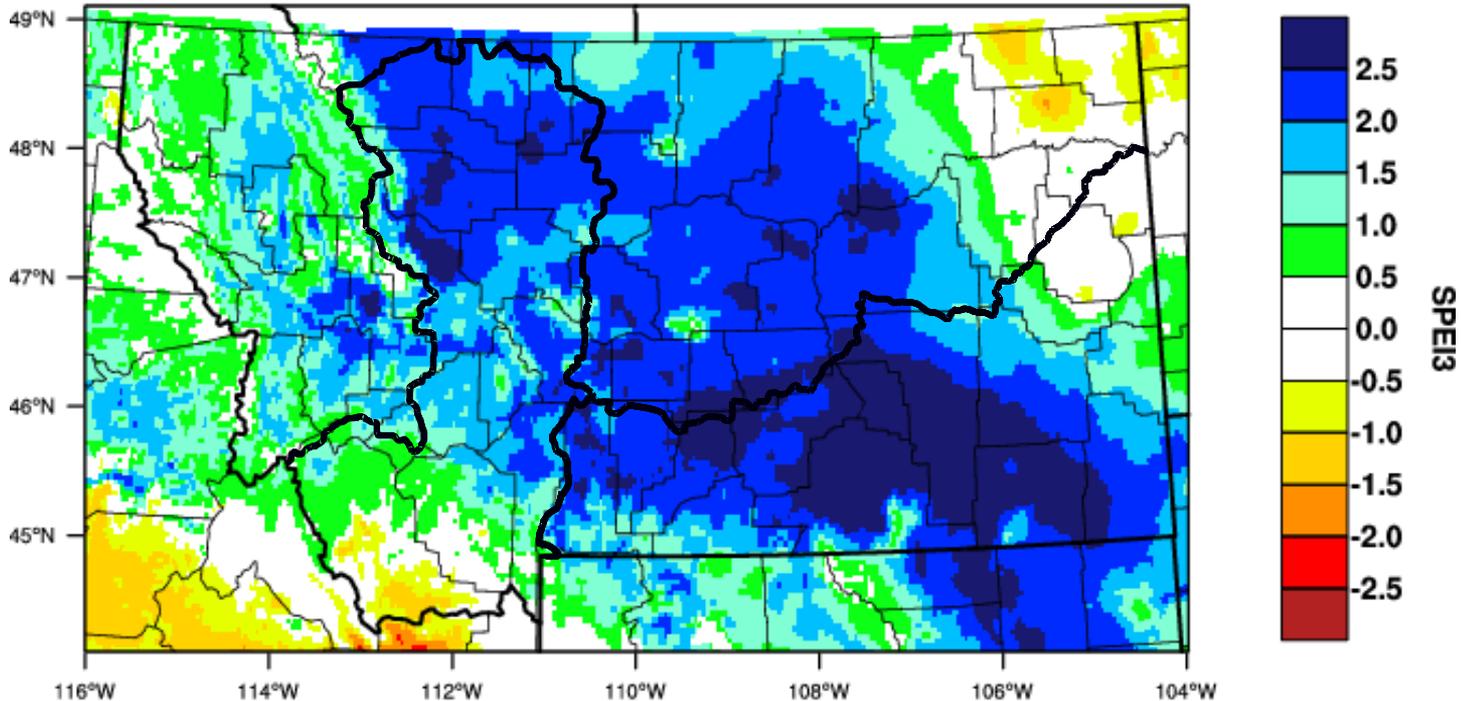
WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 MAR 2018



# PRISM SPEI

## February 2018

Montana - 3 month SPEI  
February 2018



WestWide Drought Tracker, U Idaho/WRCC Data Source: PRISM (Prelim), created 16 MAR 2018

# EDDI

What is the Evaporative Demand Drought Index (EDDI)?

An EDDI month is 30 days, so this 1-month EDDI map is based on  $E_0$  from Feb 7 - Mar 8 (30 days).

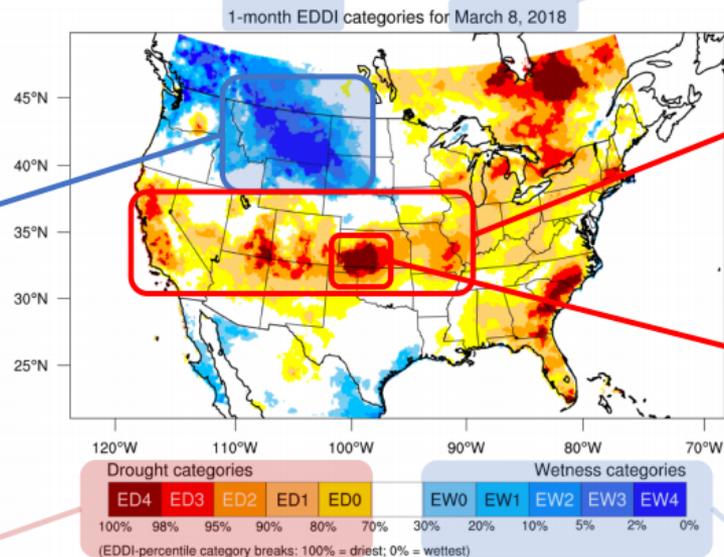
There are 24 time scales: 1-12 weeks, 1-12 months.

Lag of ~ 5 days, so this map was released on March 13

$E_0$  is unusually low in the Northern Great Plains and Rockies, indicating wetter-than-normal surface conditions and atmosphere.

$E_0$  is unusually high across the Southwest in the Southern Great Plains, indicating drier-than-normal surface conditions and atmosphere.

ED4 in OK/KS means that such dry conditions are expected only 2% of Feb 2 - Mar 3 periods. EDDI picked up this dryness one month (Feb 8) before USDM (Mar 6)



Names, colors, and %ile breaks for EDDI drought categories reflect those of the US Drought Monitor.

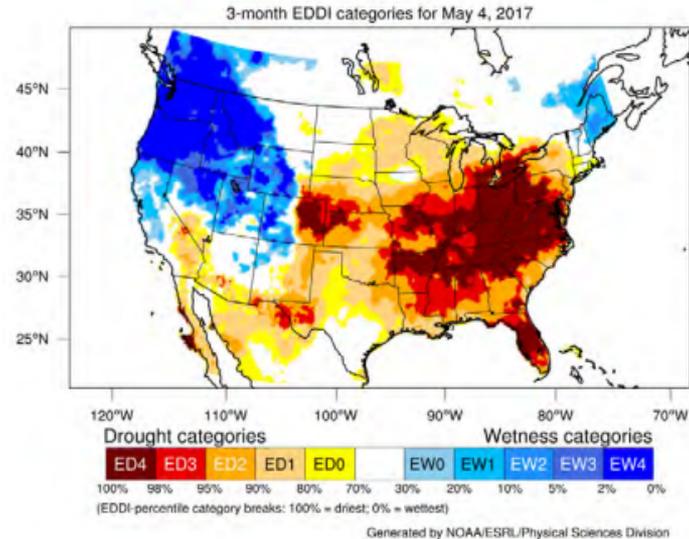
Wetness and dryness categories mirror each other, so ED2 and EW2 have identical expected frequency.

The anomaly in evaporative demand at a specified timescale, for a given location, expressed as a percentile.

# EDDI

## EDDI in a nutshell

- EDDI is a drought index based on the “thirst” of the atmosphere—which leads to the drying of soils and vegetation, and also reflects that drying
- More technically: EDDI shows the anomaly\* in daily **evaporative demand** aggregated over a specified time window, at a given location
- EDDI is calculated from observations of the atmosphere near the land surface: temperature, humidity, windspeed, and solar radiation
- EDDI can provide added value to other drought indicators, especially for early warning and flash drought detection



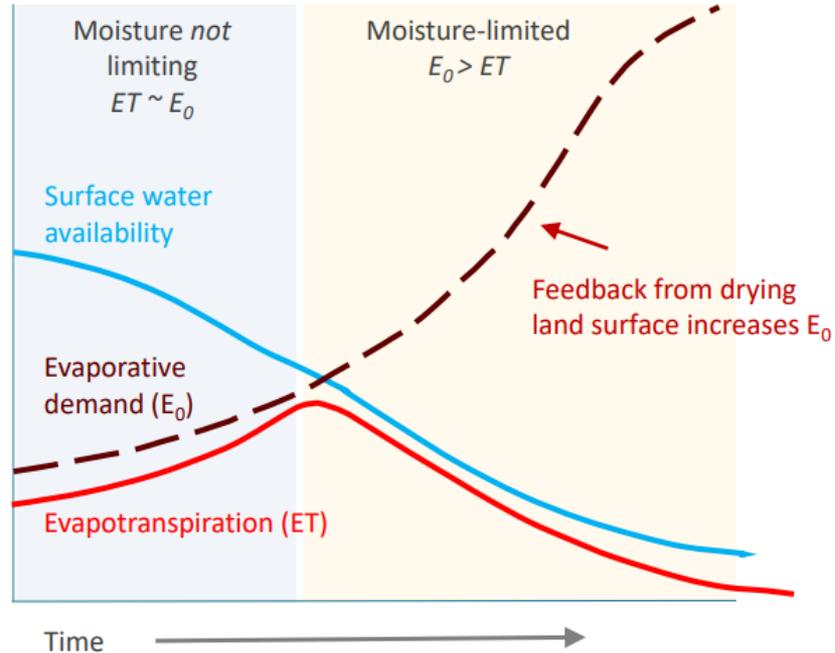
# EDDI

Background: Relevance of  $E_0$  to drought

Relationship between  $E_0$  and  $ET$  changes as land surface dries out



- When surface moisture is sufficient, rising  $E_0$  leads to rising  $ET$
- When moisture is limited,  $ET$  declines, while  $E_0$  rises even more steeply

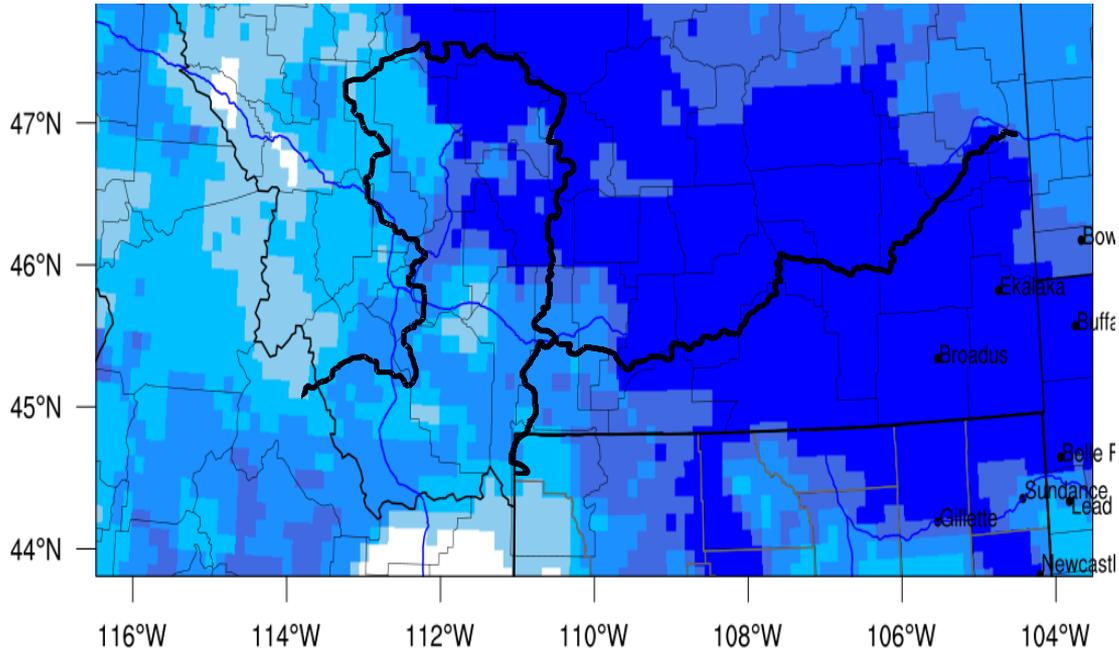


**Evaporative demand rises in all forms of drought.**



# EDDI

## 1-Month 14 March 2018



Drought categories



100% 98% 95% 90% 80% 70%

Wetness categories



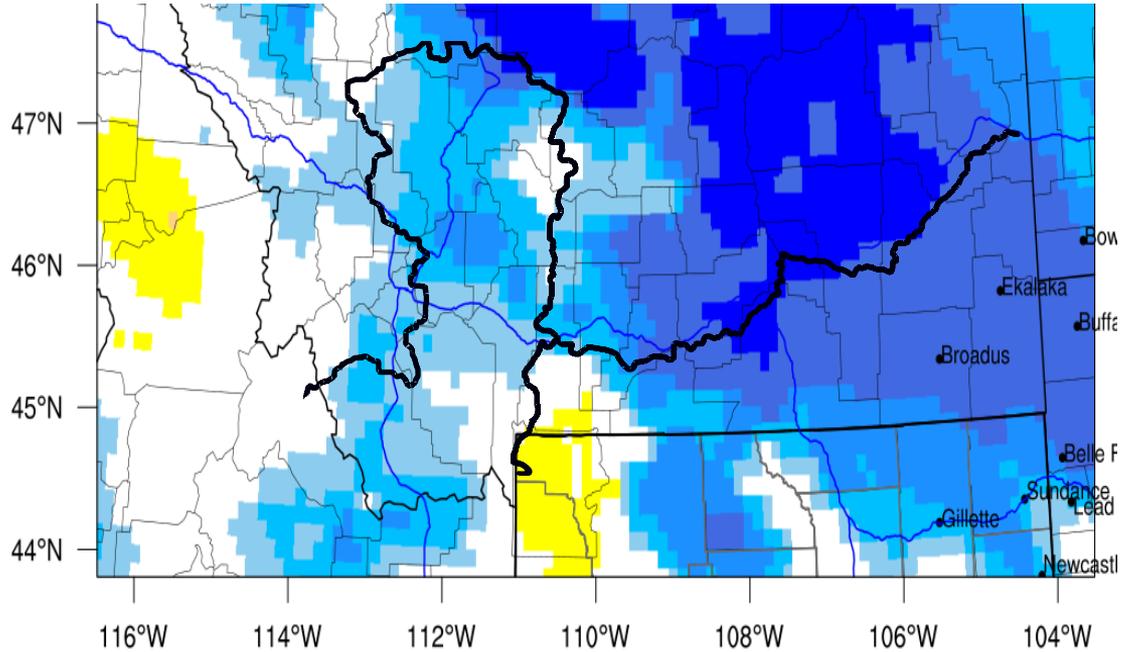
30% 20% 10% 5% 2% 0%

(EDDI-percentile category breaks: 100% - driest; 0% - wettest)



# EDDI

## 2-Week 14 March 2018



Drought categories



Wetness categories



100% 98% 95% 90% 80% 70% 30% 20% 10% 5% 2% 0%

(EDDI-percentile category breaks: 100% = driest; 0% = wettest)

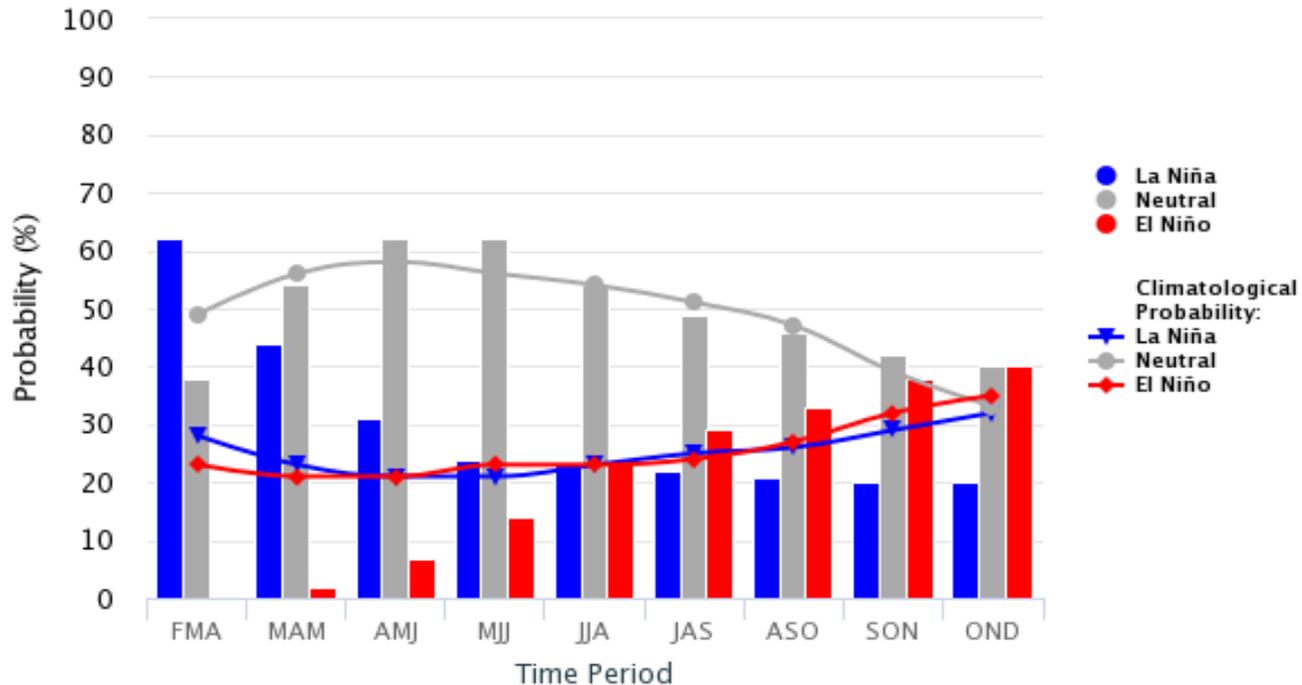


# ENSO

## La Nina Declining

Early-Mar CPC/IRI Official Probabilistic ENSO Forecasts

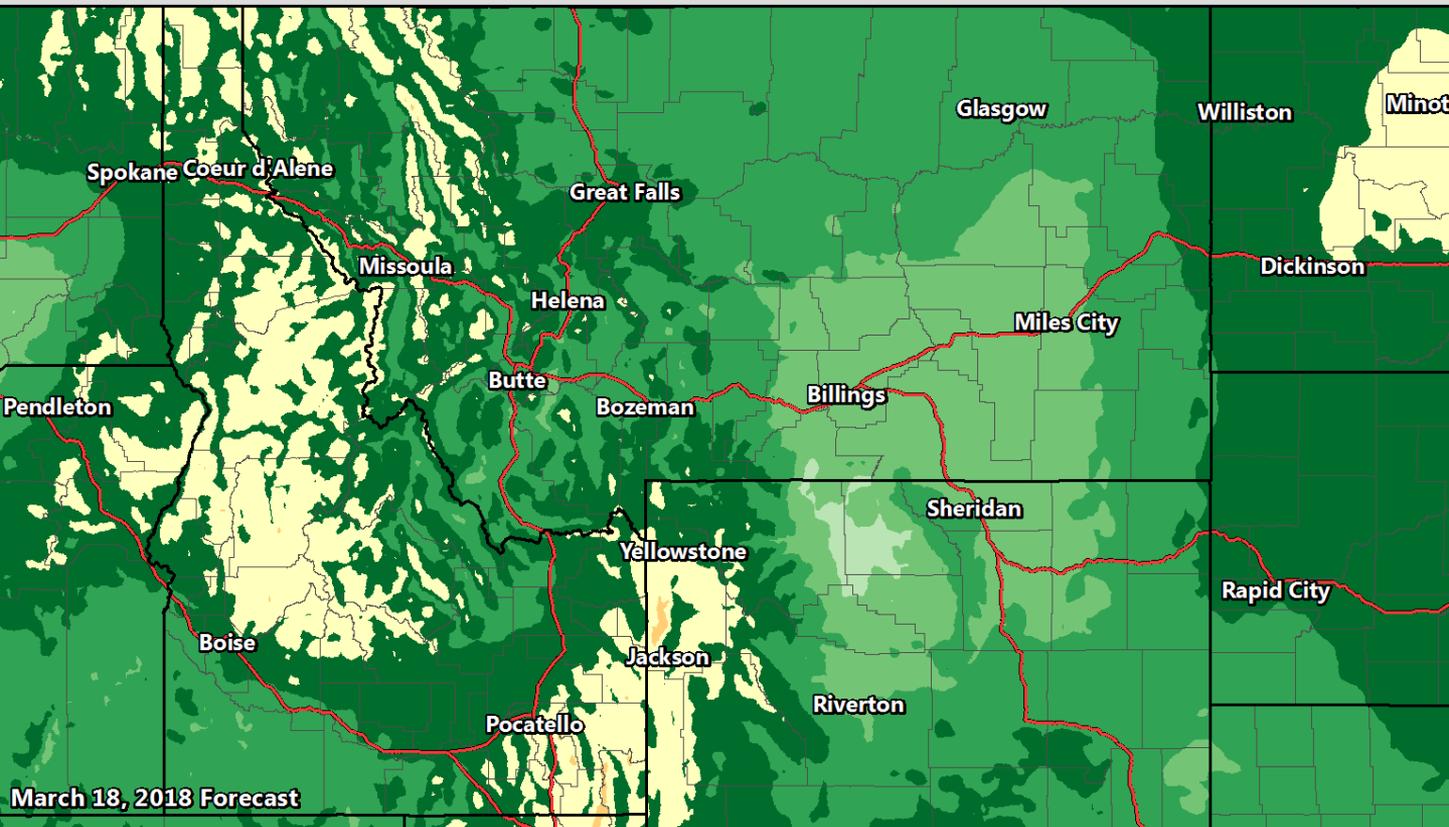
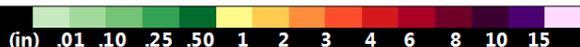
ENSO state based on NINO3.4 SST Anomaly  
Neutral ENSO:  $-0.5\text{ }^{\circ}\text{C}$  to  $0.5\text{ }^{\circ}\text{C}$





# 7-Day Precipitation Forecast

Through 6AM 03/25/2018



March 18, 2018 Forecast



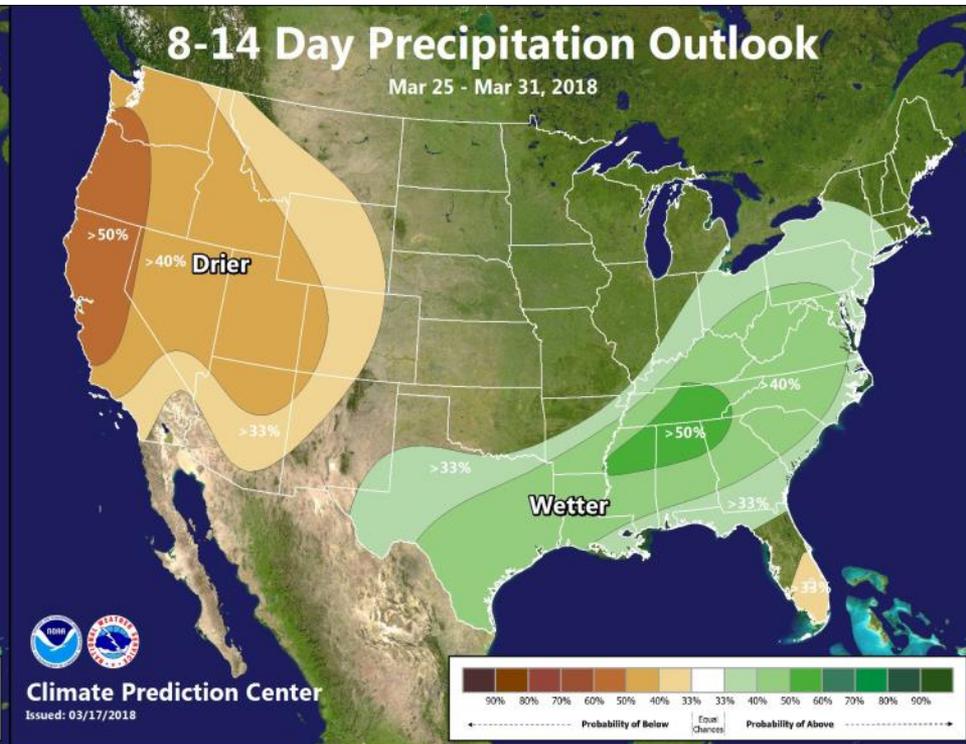
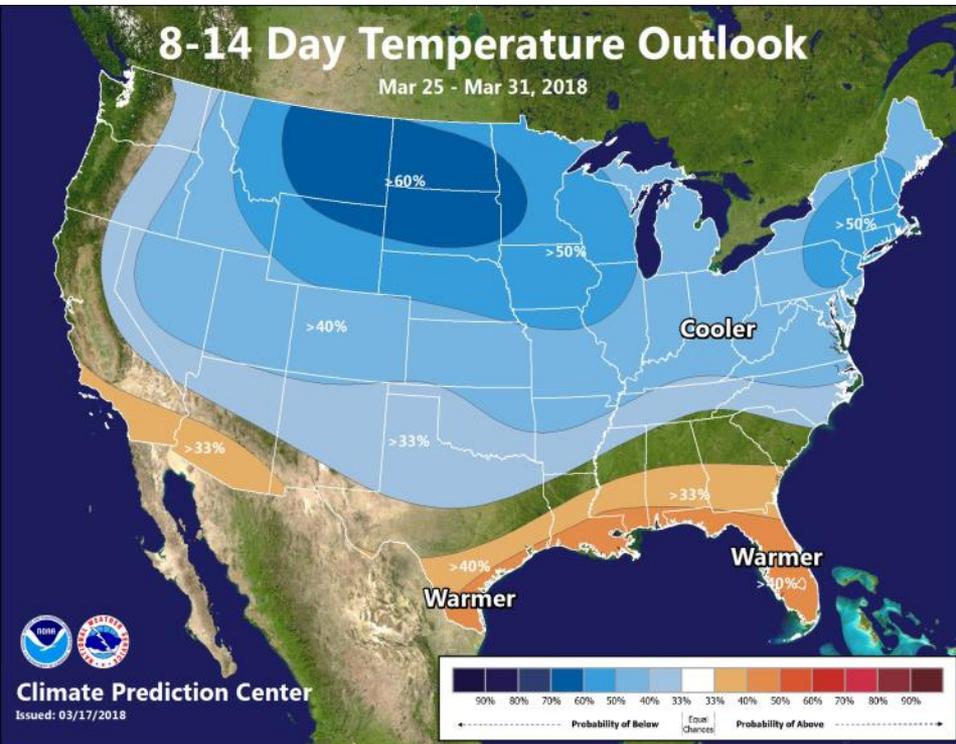
## 7 Day Precipitation Forecast

Created  
March 18



# 8-14 Day Outlook

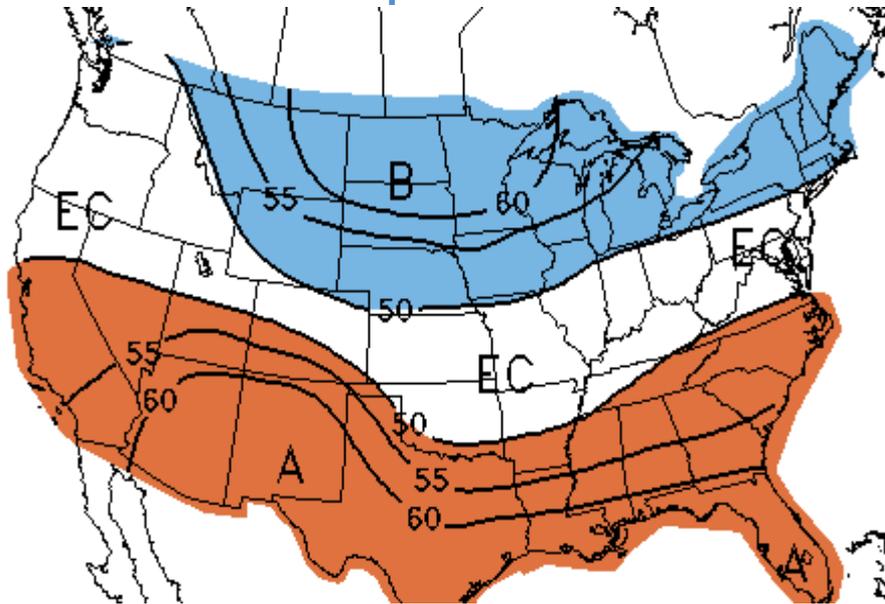
Created 17 March 2018



# Experimental Week 3-4 Outlook

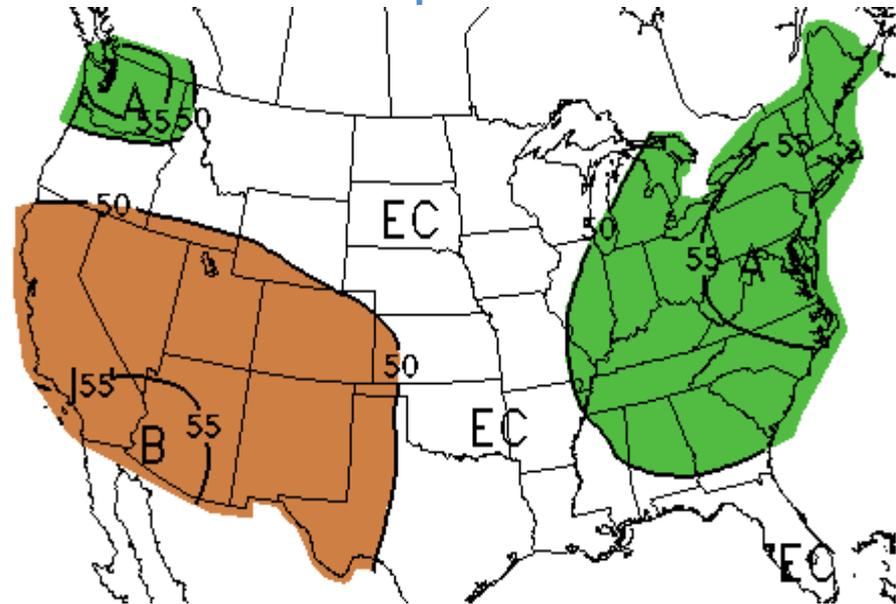
Created March 16

## Temperature



50% or greater chance of below normal temperatures across Montana

## Precipitation



Equal chances for above, below or near normal precipitation

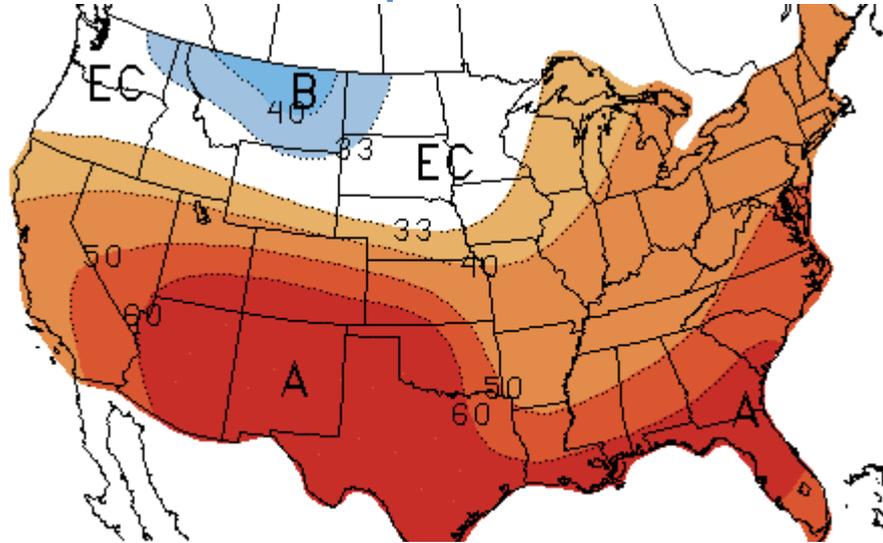


# Apr-Jun Outlook

Created March 15

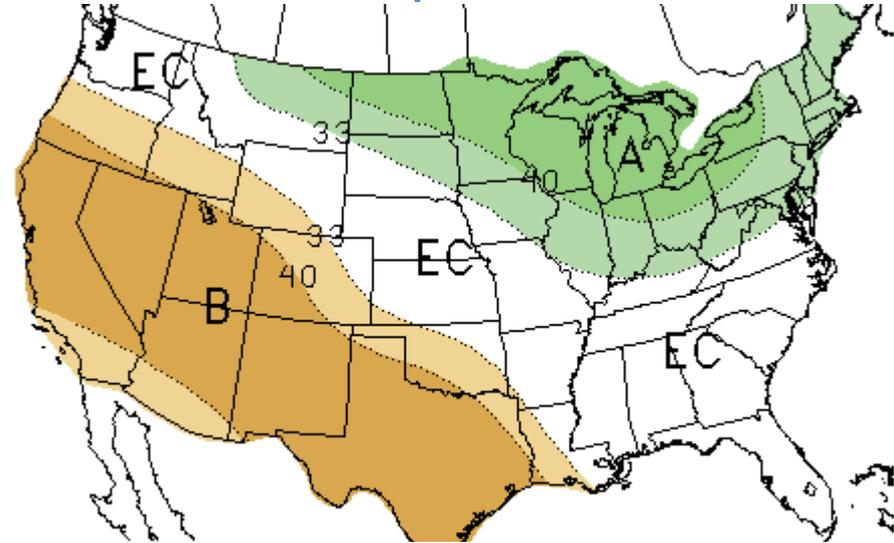


## Temperature



33% to 40% chance of below normal temperatures across most of Montana

## Precipitation



Greater than 33% chance of above normal precipitation north-central and eastern Montana

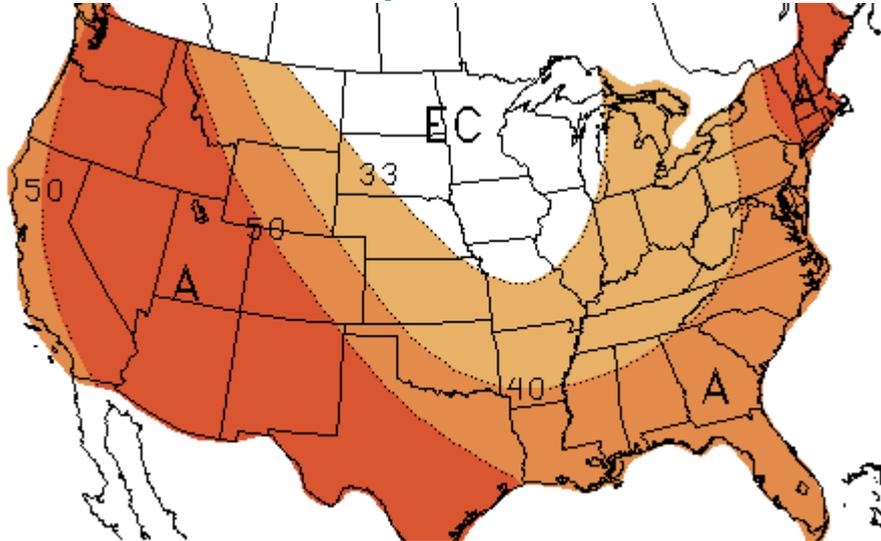


# Jul-Aug Outlook

Created March 15

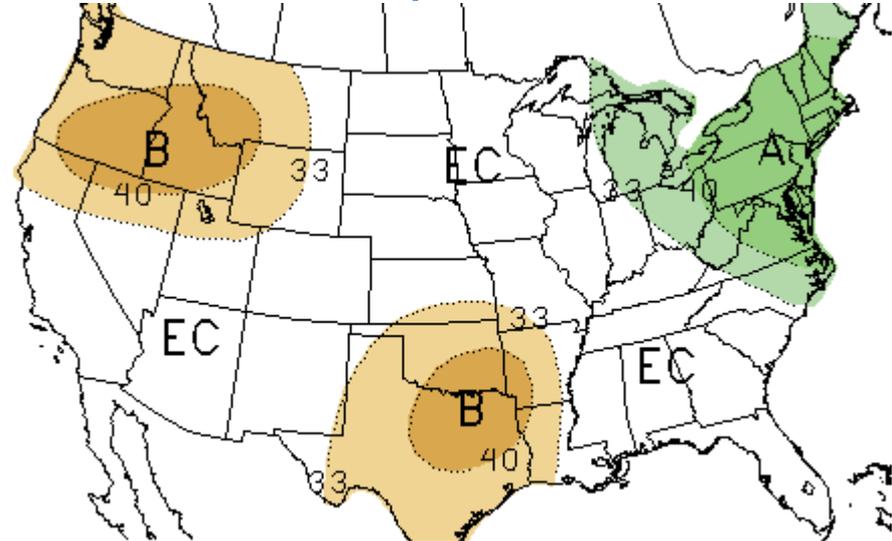


## Temperature



33% to 50% chance of above normal temperatures over most of Montana, equal chances over northeast Montana

## Precipitation



33% to 40% chance of below normal precipitation over most of Montana, equal chances eastern Montana



[weather.gov](https://weather.gov)

[weather.gov/billings](https://weather.gov/billings)

[weather.gov/glasgow](https://weather.gov/glasgow)

[weather.gov/missoula](https://weather.gov/missoula)

[weather.gov/greatfalls](https://weather.gov/greatfalls)



**Weather-Ready Nation**

National Oceanic and Atmospheric Administration