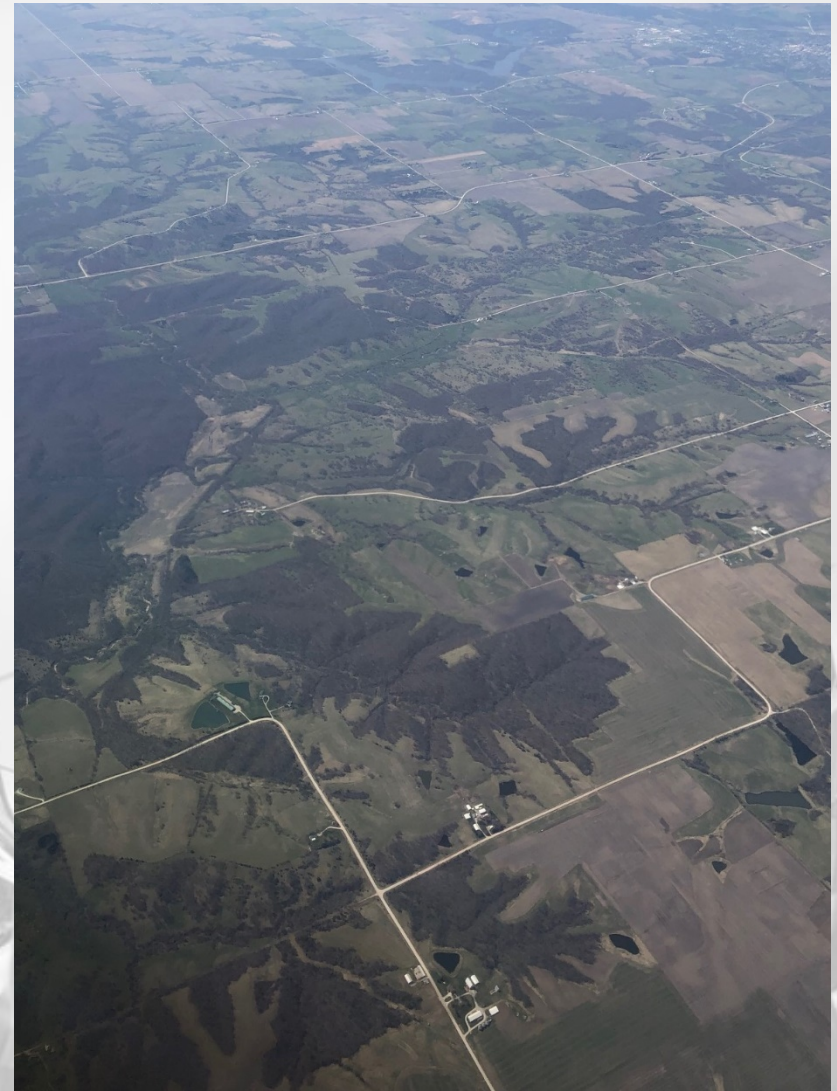


# Midwest and Great Plains Climate- Drought Outlook 18 April 2019

Dr. Dennis Todey  
Director – USDA Midwest  
Climate Hub  
Nat'l Lab. for Ag. and Env.  
Ames, IA  
dennis.todey@ars.usda.gov  
515-294-2013

Photo:  
Justin  
Glisan



United States Department of Agriculture  
Midwest Climate Hub

# General Information

- **Providing climate services to the Central Region**
  - Collaboration Activity Between:
    - NOAA NCEI/NWS/OAR/NIDIS/
    - USDA Climate Hubs
    - American Association of State Climatologists
    - Midwest and High Plains Regional Climate Centers
    - National Drought Mitigation Center
- **Next Regular Climate/Drought Outlook Webinar**
  - May 16, 2019 (1 PM CDT) Aaron Wilson– Ohio State Climate Office (OSU Ext.)
- **Access to Future Climate Webinars and Information**
- <http://www.drought.gov/drought/content/regional-programs/regional-drought-webinars>
- <https://mrcc.illinois.edu/multimedia/webinars.jsp>
- <http://www.hprcc.unl.edu/webinars.php>
- **Open for questions at the end**

# Agenda

- **Current Context**
- **Major storm events**
- **Impacts**
  - Ag
  - Snow/water
  - Other
- **Outlooks**
  - El Niño here
  - Planting/summer





James River SD  
30 March 2019

Laura Edwards, SD State  
Climatologist (SDSU  
Extension)

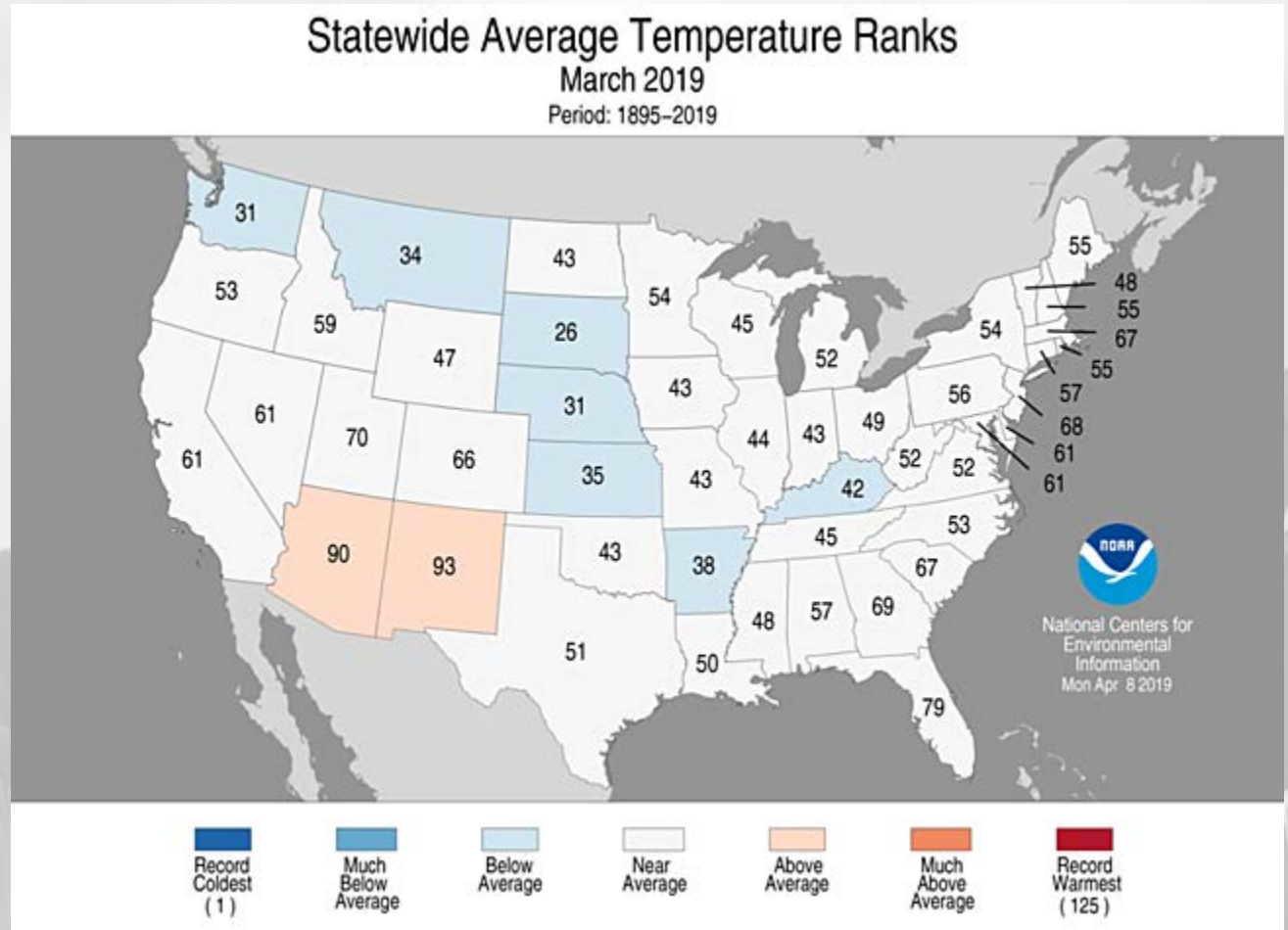


**REVIEW/CURRENT CONDITIONS**



# March Temperature Recap

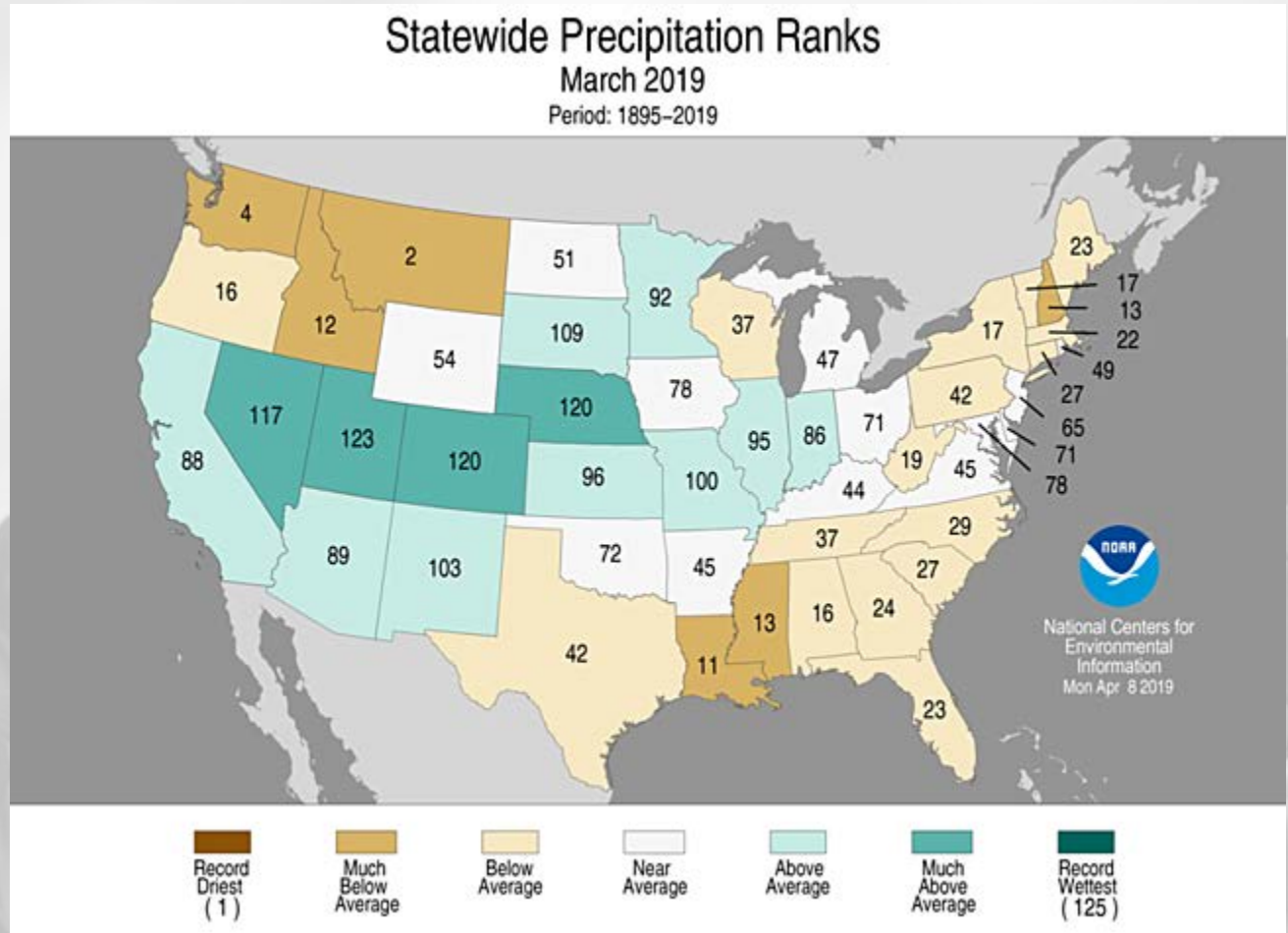
Mostly moderate to colder than average in the region



# March Precipitation Recap

Wet storm track  
from Intermountain  
west to central  
plains

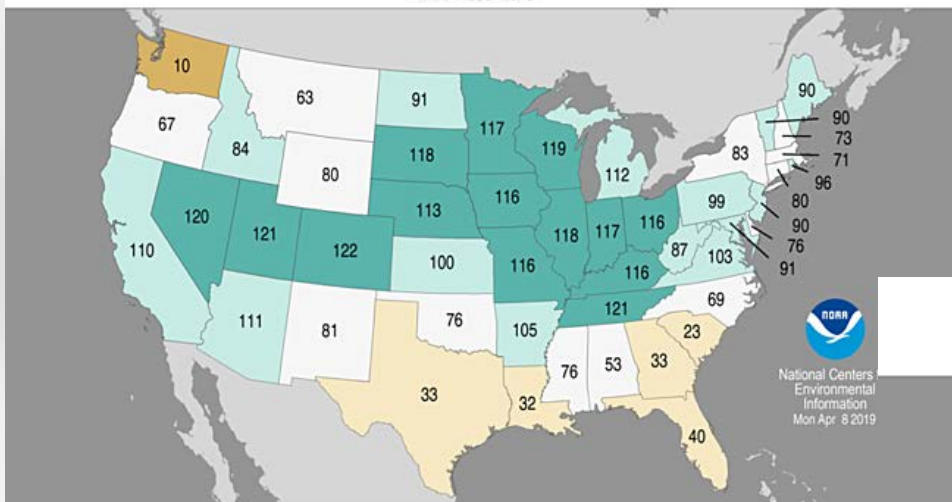
Drier far NW and  
east



# Statewide Precipitation Ranks

January–March 2019

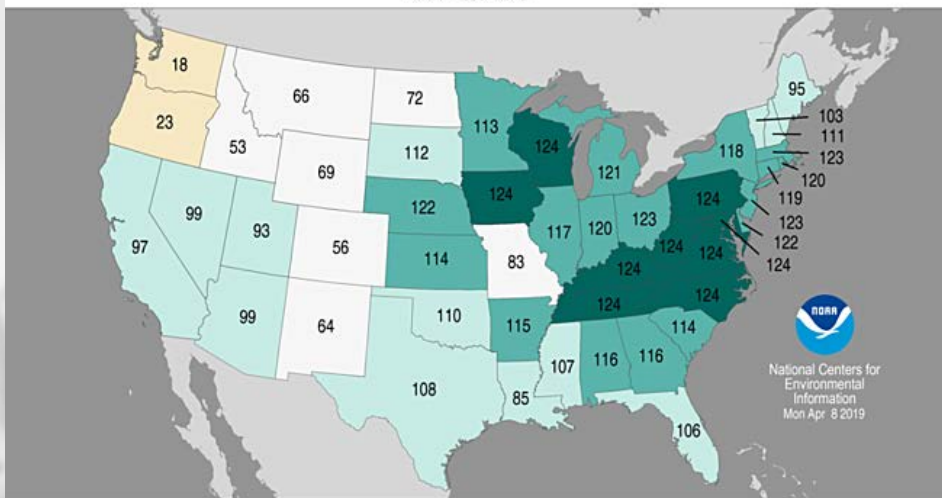
Period: 1895–2019



# Statewide Precipitation Ranks

April 2018–March 2019

Period: 1895–2019

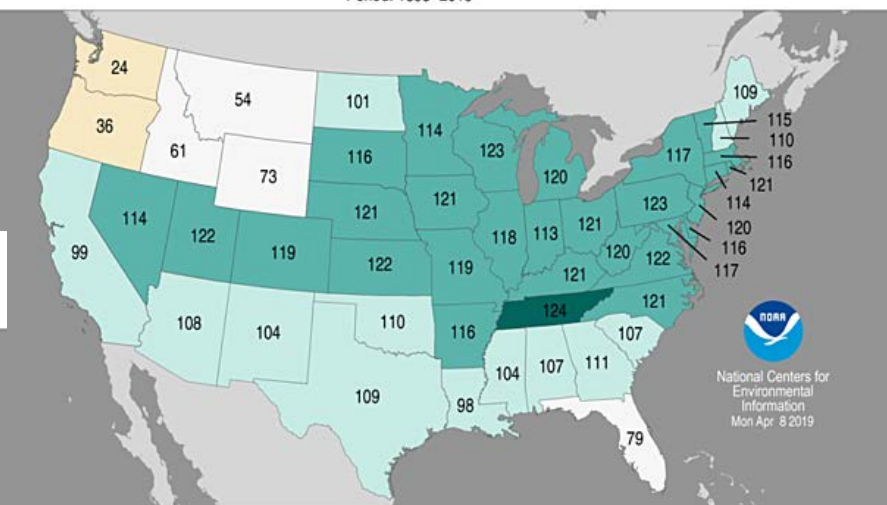


# Precipitation rankings 3, 6, 12 month

## Statewide Precipitation Ranks

October 2018–March 2019

Period: 1895–2019

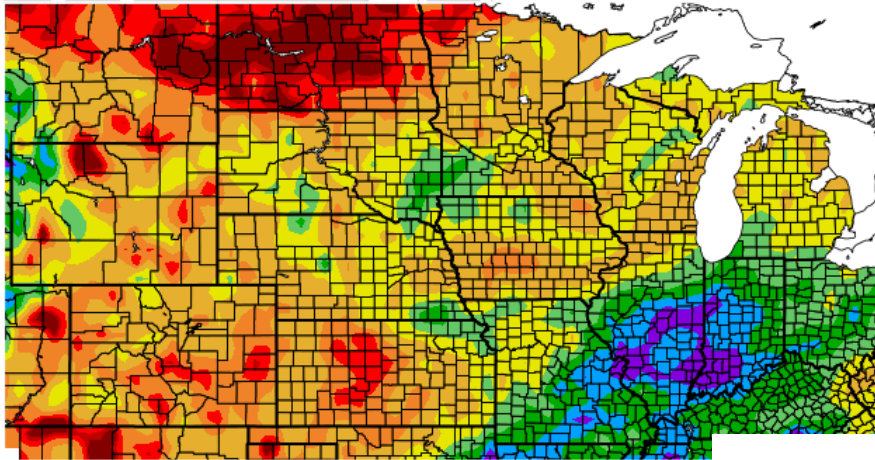


**Wet all time scales in region**  
**Moderate in MO and wrn plains**



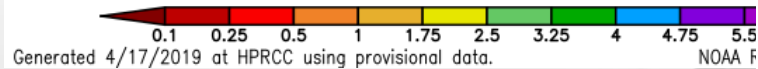


Precipitation (in)  
3/18/2019 - 4/16/2019

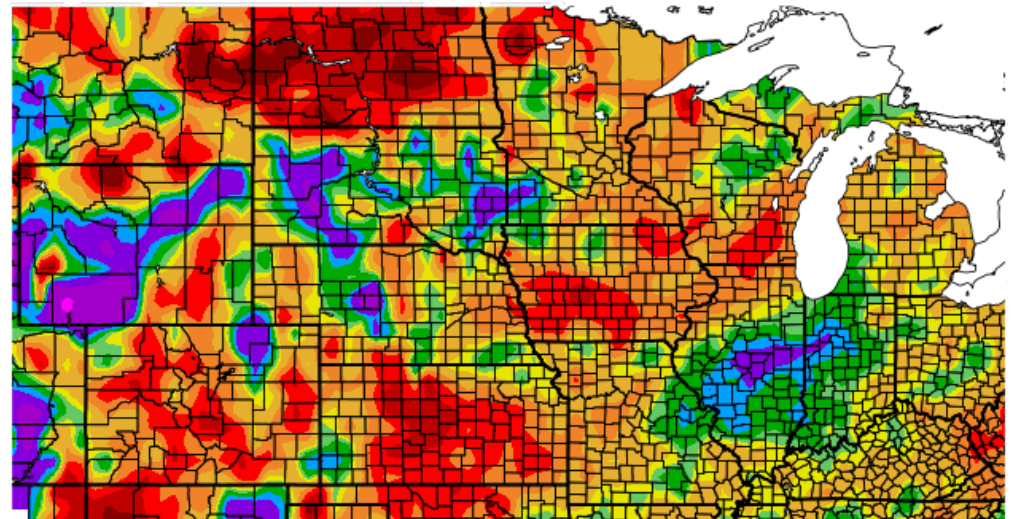


# Last 30 days Precipitation

Percent of Normal Precipitation (%)  
3/18/2019 - 4/16/2019

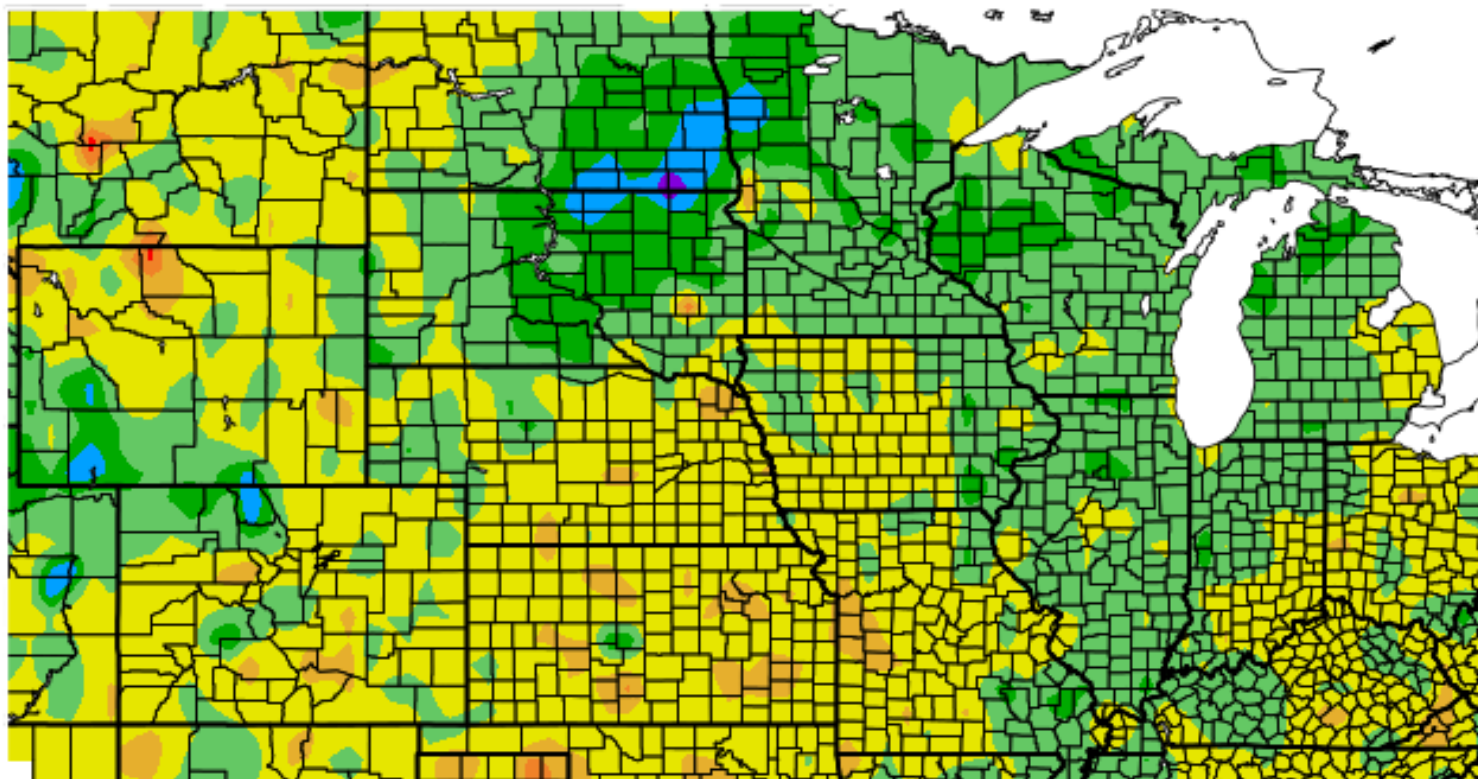


- Most region drier than avg. last 30 days
- Pockets wetter than avg.



# Departure from Normal Temperature (F)

3/18/2019 - 4/16/2019



Generated 4/17/2019 at HPRCC using provisional data.

NOAA Regional Climate Centers

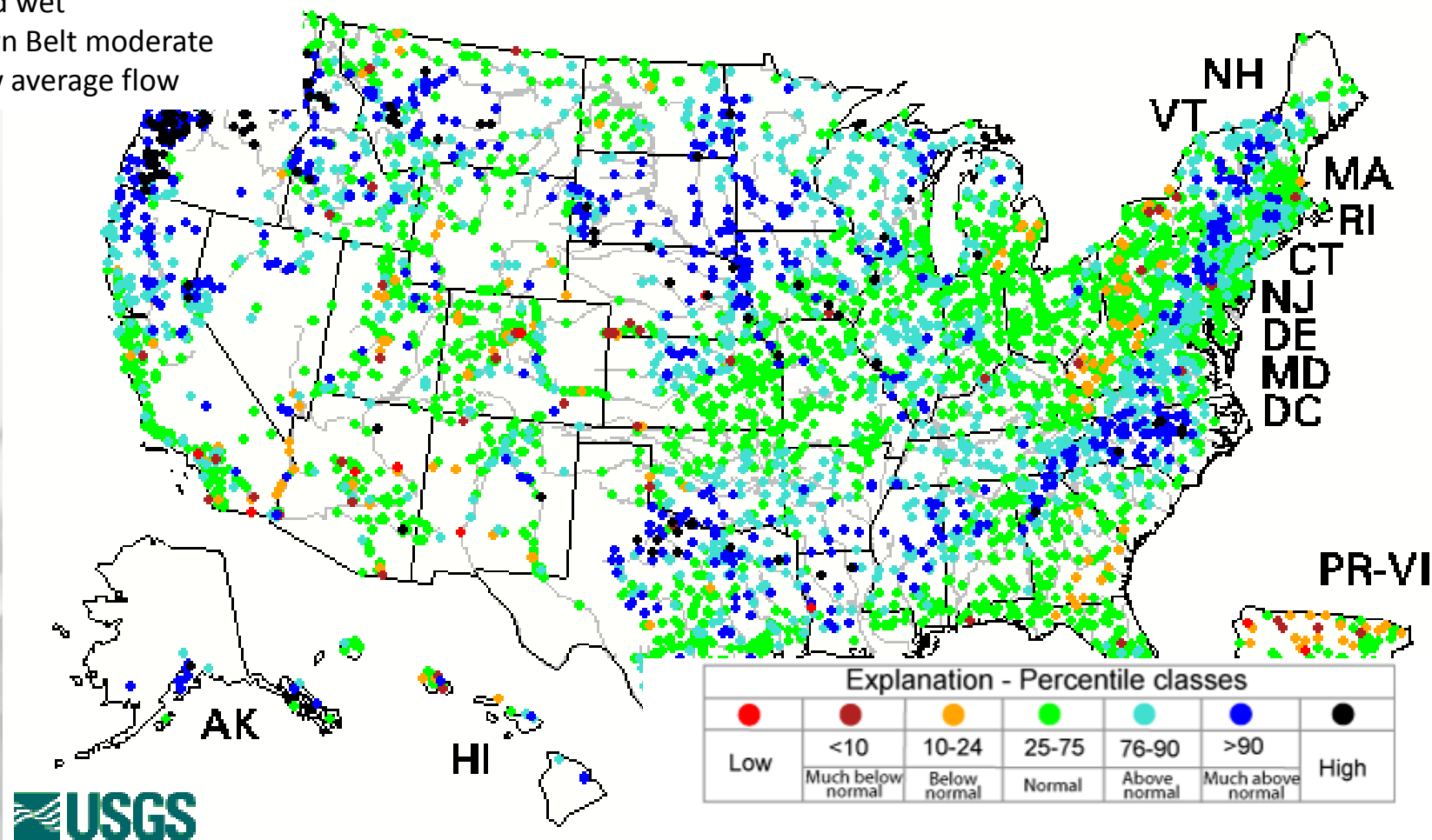


# 7-Day Average Streamflow

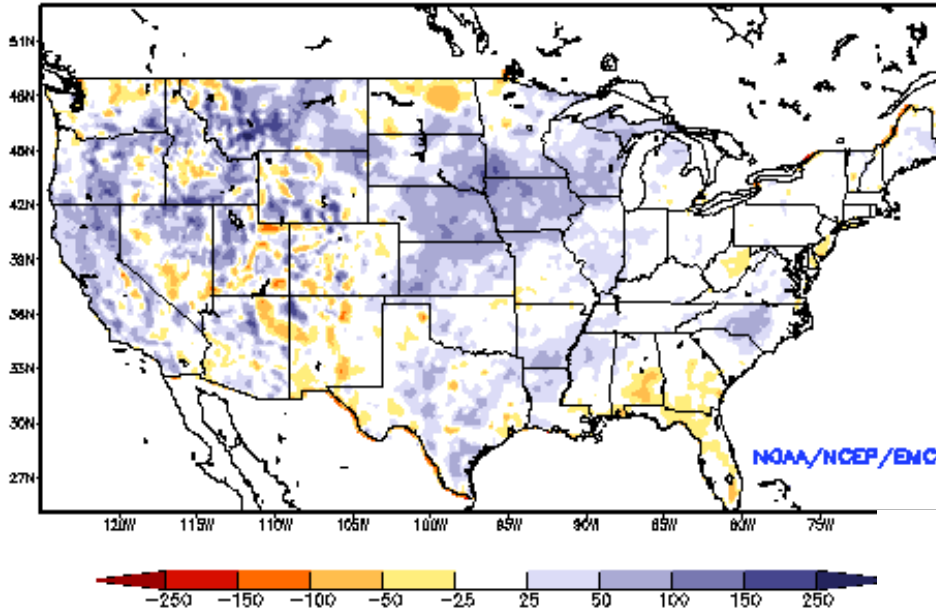
Wednesday, 17 April 2019

Tuesday, April 16, 2019

- Widespread wet
- Eastern Corn Belt moderate
- Little below average flow



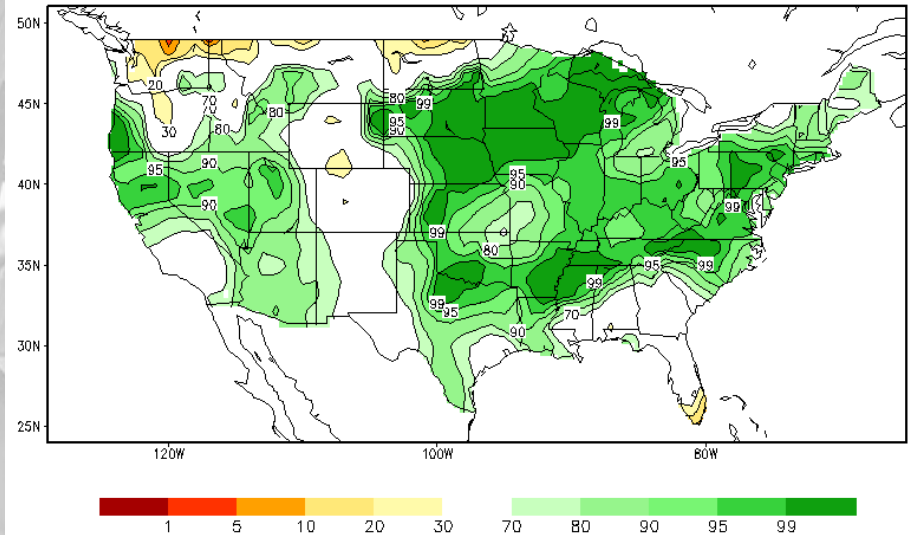
Ensemble-Mean - Current Total Column Soil Moisture Anomaly (mm)  
NCEP NLDAS Products Valid: APR 13, 2019



# Soil Moisture

<http://www.emc.ncep.noaa.gov/mm/b/nldas/drought/>

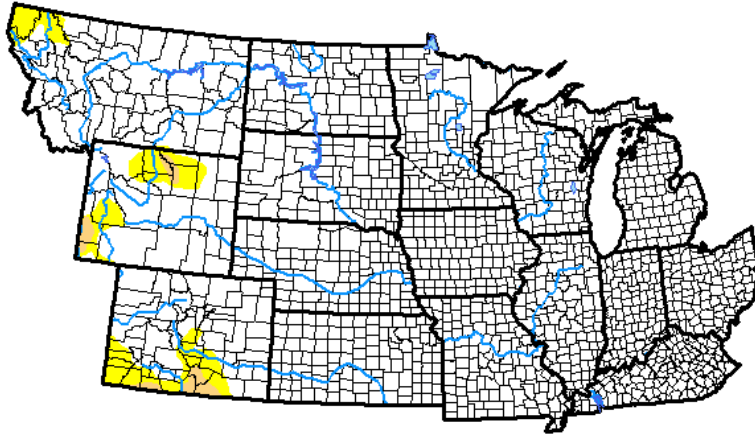
Calculated Soil Moisture Ranking Percentile  
APR 17, 2019



[https://www.cpc.ncep.noaa.gov/products/Soilmst\\_Monitoring/US/Soilmst/Soilmst.shtml](https://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml)

# US Drought Monitor

## U.S. Drought Monitor NWS Central Region



**April 16, 2019**

*(Released Thursday, Apr. 18, 2019)*

Valid 8 a.m. EDT

*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	95.40	4.60	0.77	0.00	0.00	0.00
<b>Last Week</b> <i>04-09-2019</i>	94.53	5.47	0.84	0.00	0.00	0.00
<b>3 Months Ago</b> <i>01-15-2019</i>	83.94	16.06	7.97	5.05	2.28	0.95
<b>Start of Calendar Year</b> <i>01-01-2019</i>	85.98	14.02	8.17	5.23	2.44	1.01
<b>Start of Water Year</b> <i>09-25-2018</i>	64.00	36.00	17.93	9.15	5.03	1.49
<b>One Year Ago</b> <i>04-17-2018</i>	72.03	27.97	17.55	9.21	4.15	0.86

Intensity:



*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.*

Author:

David Miskus  
NOAA/NWS/NCEP/CPC

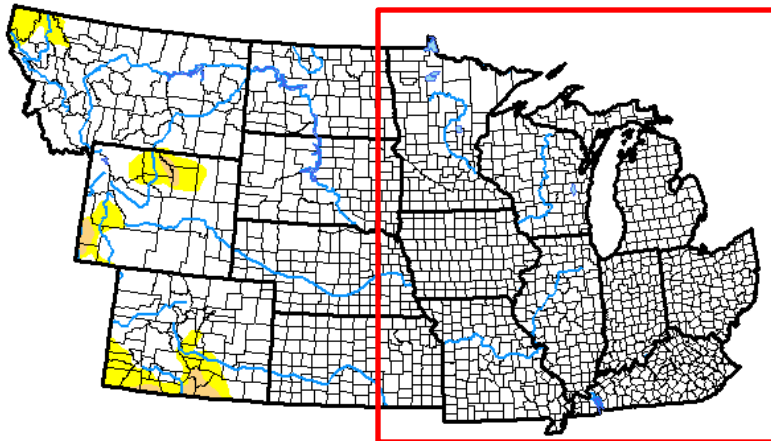


- 4.6% coverage (may be lowest ever for region)
- 0.77% D1 – nothing larger
- Eastern area – 8<sup>th</sup> straight week no coverage (longest ever)



# US Drought Monitor

## U.S. Drought Monitor NWS Central Region



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*(Released Thursday, Apr. 18, 2019)*

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*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.*

*Author:*

David Miskus  
NOAA/NWS/NCEP/CPC



- 4.6% coverage (may be lowest ever for region)
- 0.77% D1 – nothing larger
- Eastern area – 8<sup>th</sup> straight week no coverage (longest ever)

Road near West Point, NE

AI Dutcher, UNL Extension  
Climate



# MAJOR WINTER STORM – 1 (MARCH)

# Recovery issues

- Road damage (numerous minor – some major I-29 may not open until June)
- Railroad lines still not reopened
- Road repair budgets/materials being stretched
  - Pavement
  - Gravel
- Acres will not be planted this year due to:
  - Trash/sand coverage
  - Excess wetness (prevent plant)
  - Field access by road



Mental health issues ongoing due to several weather/climate events and larger economic issues





Lake Andes, SD

Steven Stluka, via NWS  
Sioux Falls

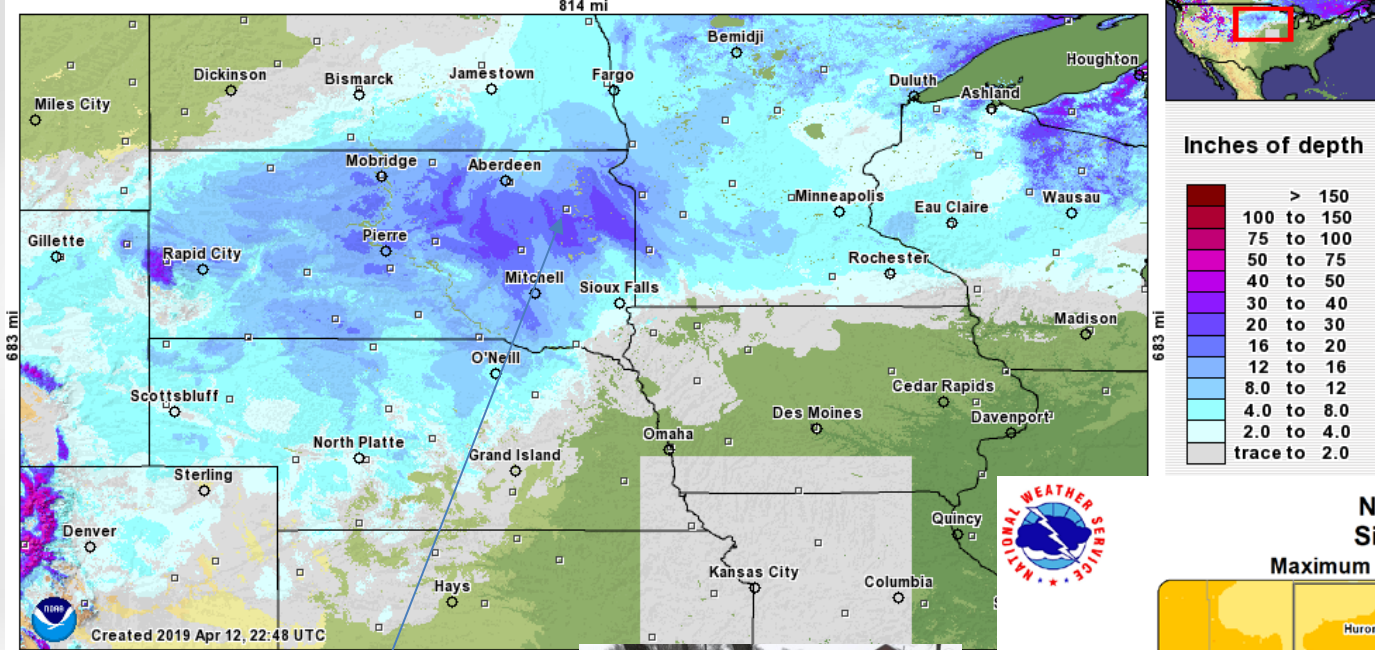
Minnehaha County, SD  
Minnehaha County Sheriff  
Via NWS Sioux Fall



# MAJOR WINTER STORM – 2 (APRIL)

# April 9-12 Blizzard

Modeled Snow Depth for 2019 April 12, 12:00 UTC



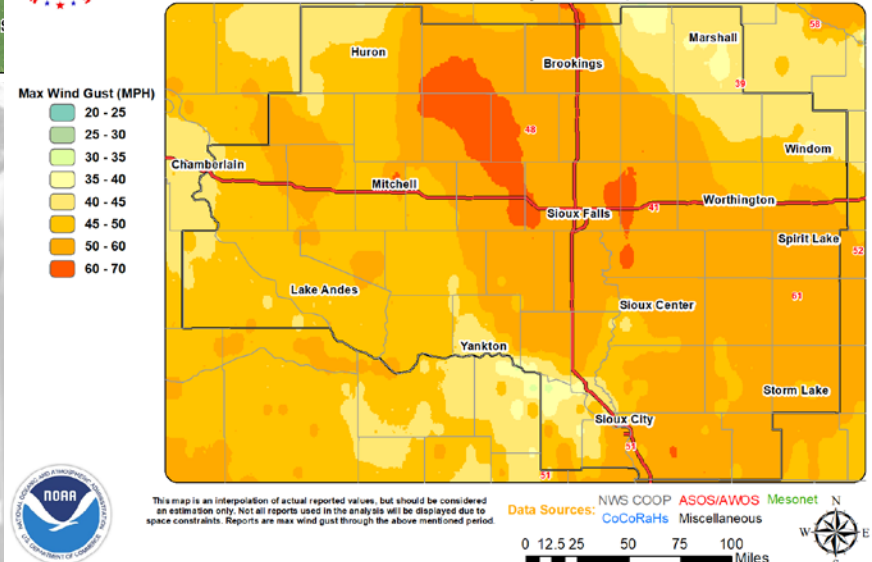
20-30" amounts

Clark, SD

Rae Jean Flora, via NWS  
Sioux Falls



National Weather Service  
Sioux Falls South Dakota  
Maximum Wind Gust - April 10-12, 2019 Blizzard





# April 9-12 issues

- Livestock losses (numbers still being accumulated)
- Additional flooding (snowmelt)
- Transportation
- Infrastructure
  - Power lines
  - Trees

Fostoria, IA

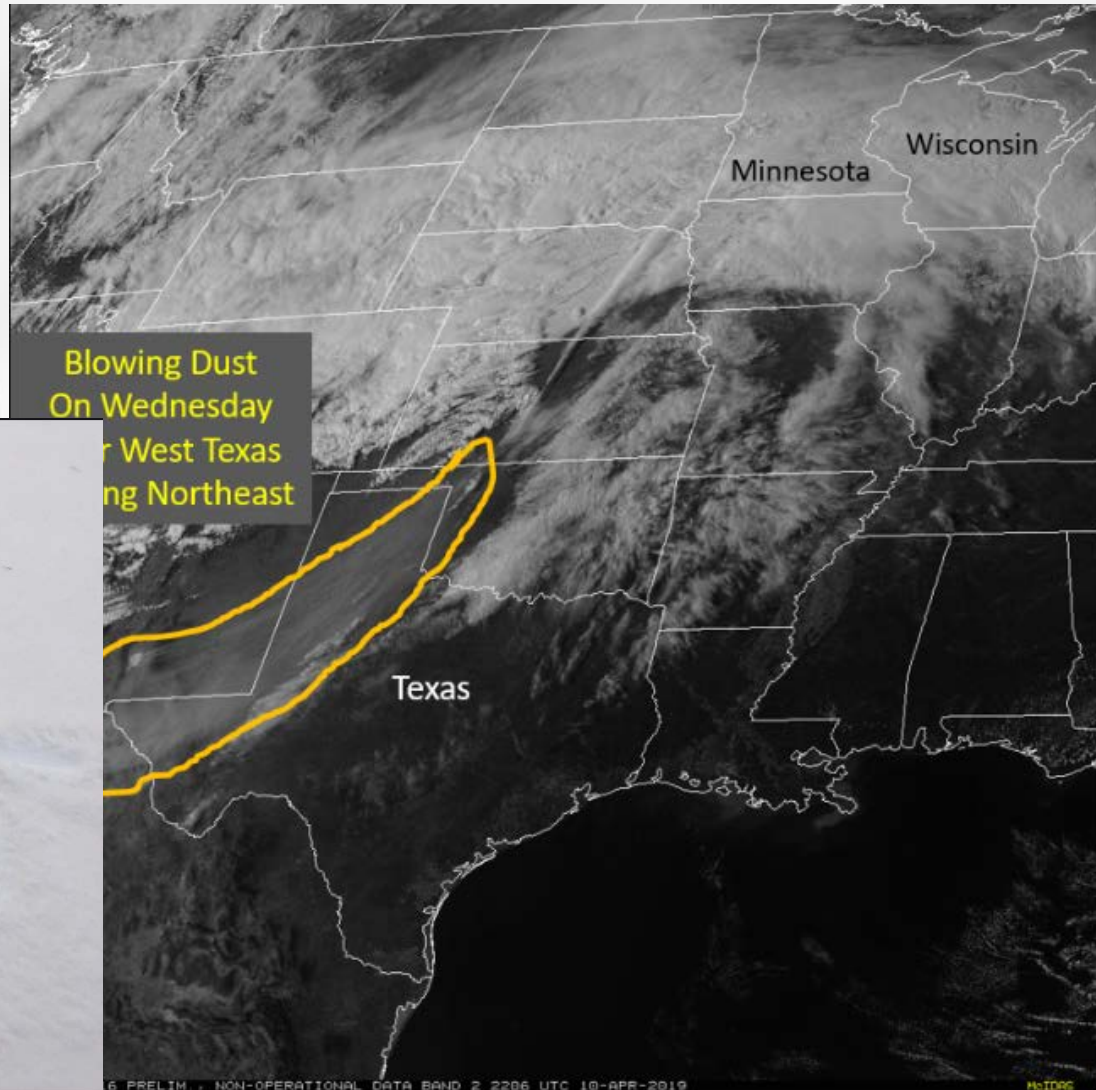
Jewlie Secord, via NWS  
Sioux Falls





# April 9-12 issues

- Dust – transported from southern plains

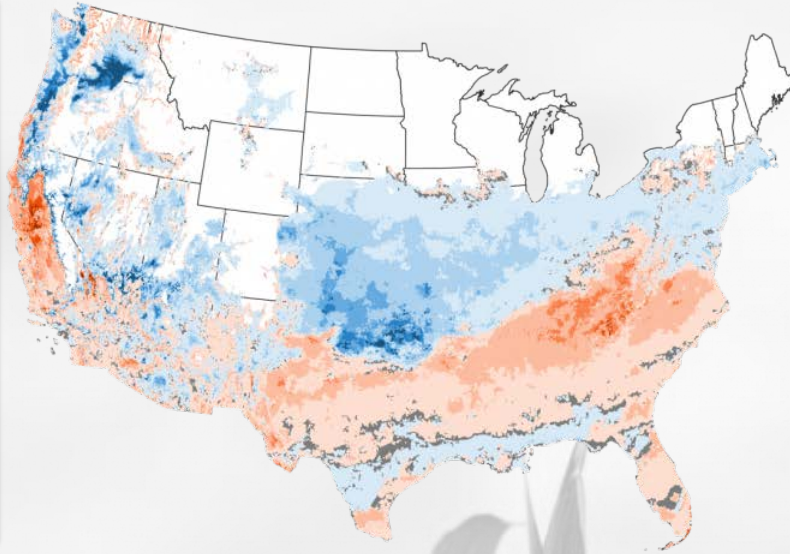
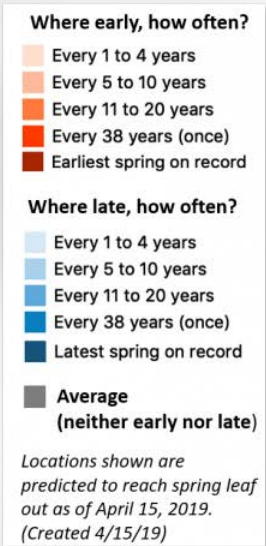


via NWS Minneapolis

ECONOMIC ISSUES

# How typical is this spring compared to recent decades?

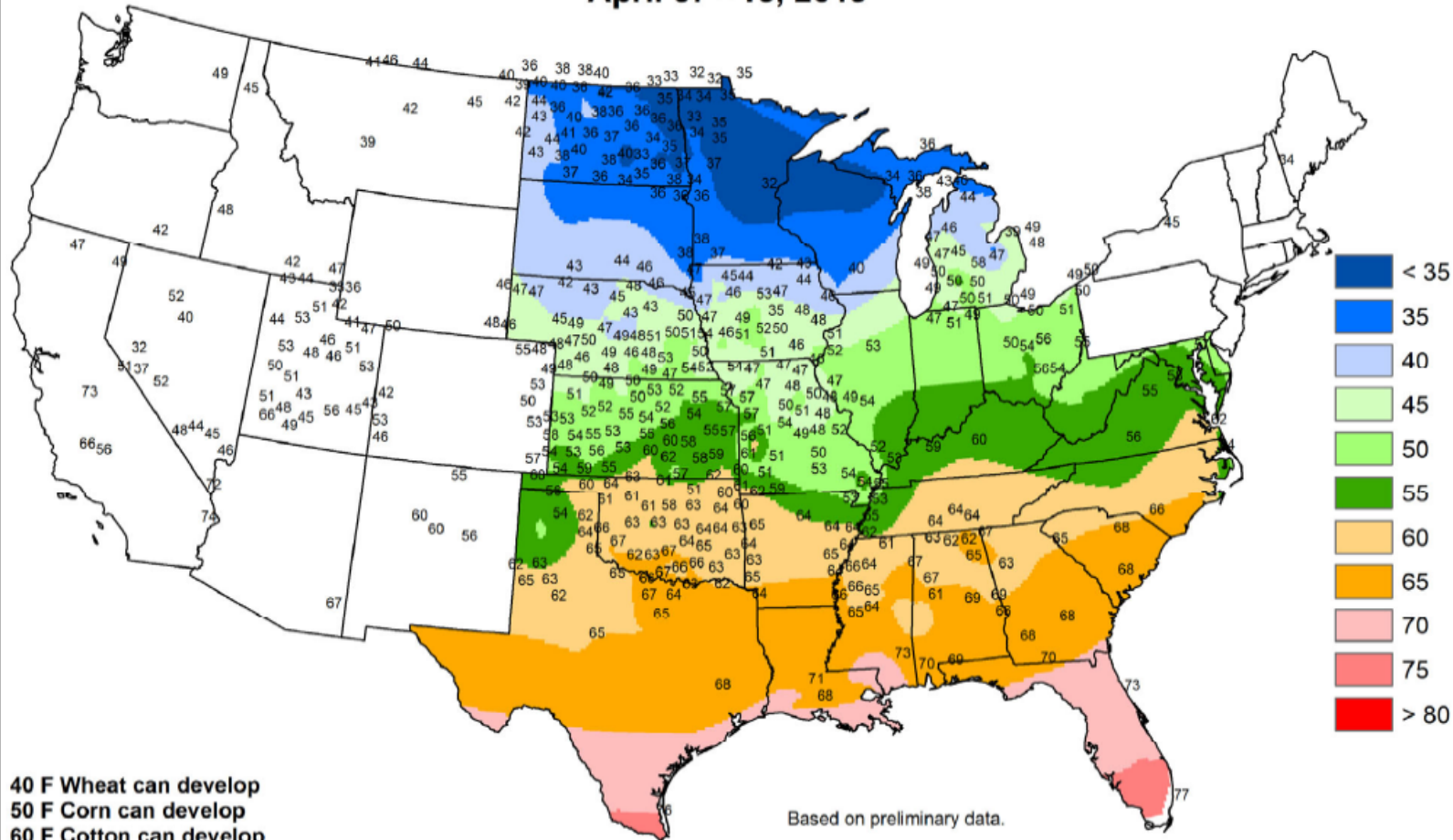
In a 38-year period of spring leaf out, how often do we see springs like 2019?



# AGRICULTURE

# Average Soil Temperature (Deg. F, 4" Bare)

April 07 - 13, 2019



Data provided by the Climate Prediction Center, High Plains Regional Climate Center, Nebraska Mesonet at Univ of Nebraska, CoAgMet at Colorado State Univ, Kansas Mesonet at Kansas State Univ, North Dakota Agricultural Weather Network at North Dakota State Univ, Wyoming State Climate Office at the Univ of Wyoming, Illinois State Water Survey, Iowa State University, Oklahoma Mesonet, Purdue University, University of Missouri, Illinois State Water Survey, Michigan Automated Weather Network, West Texas Mesonet, South Dakota State Univ. Mesonet, Ohio Agricultural Research and Development Center, Univ. of Missouri and USDA/NRCS.

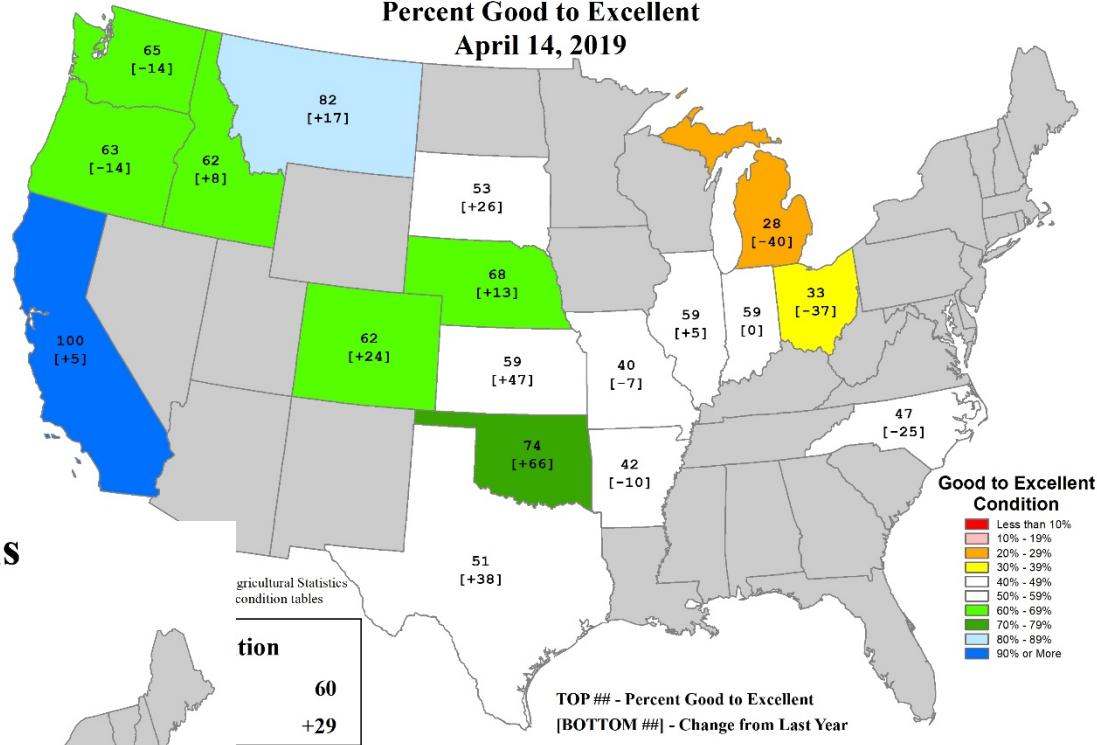




# USDA state reports Winter Wheat Conditions

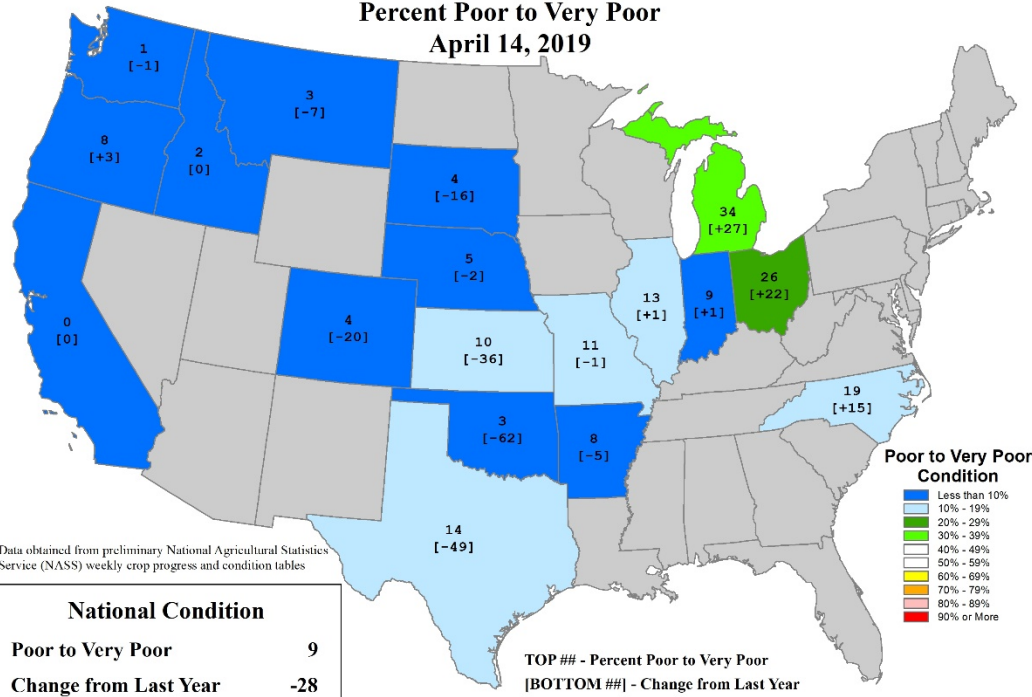
## U.S. Winter Wheat Conditions

Percent Good to Excellent  
April 14, 2019



## U.S. Winter Wheat Conditions

Percent Poor to Very Poor  
April 14, 2019



Data collected by USDA National Agricultural Statistics Service (NASS)

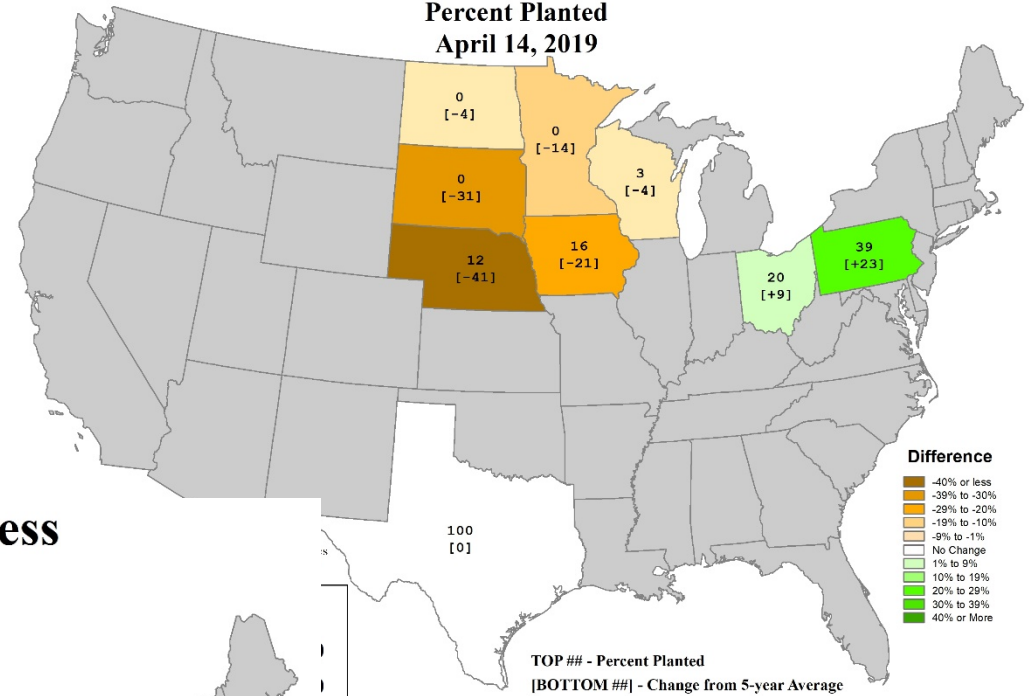
Plots courtesy Brad Rippey USDA Office of the Chief Economist

Data obtained from preliminary National Agricultural Statistics Service (NASS) weekly crop progress and condition tables

# NASS Small Grain Planting

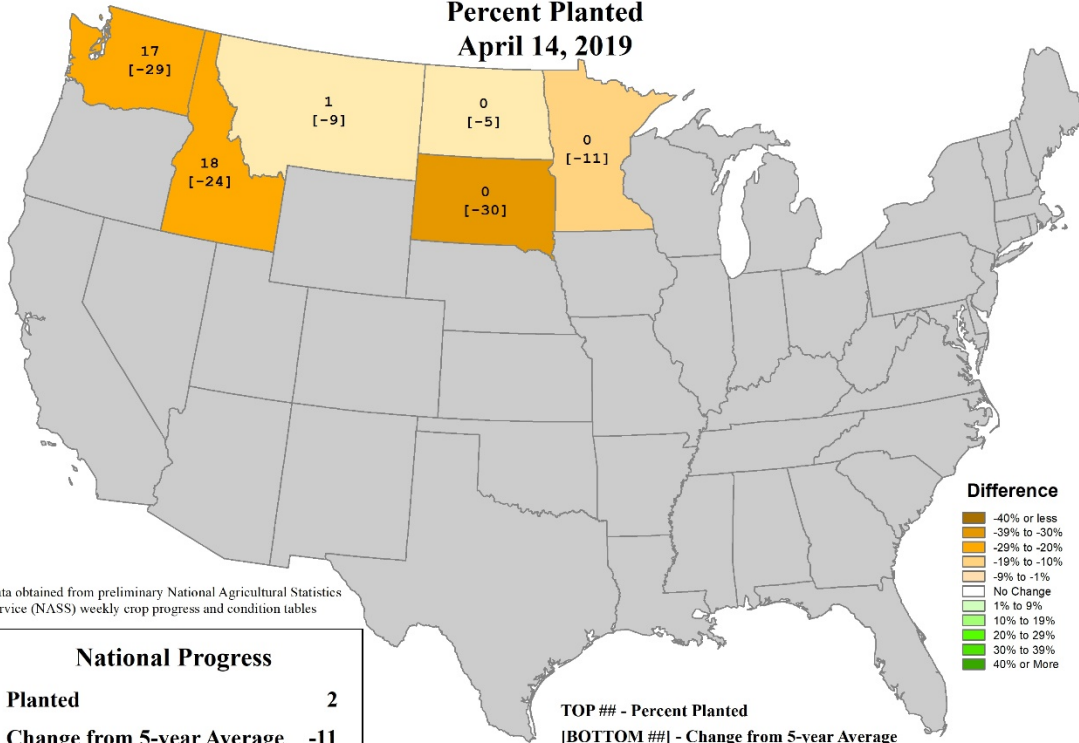
## U.S. Oats Progress

Percent Planted  
April 14, 2019



## U.S. Spring Wheat Progress

Percent Planted  
April 14, 2019



Data obtained from preliminary National Agricultural Statistics Service (NASS) weekly crop progress and condition tables

### National Progress

Planted 2  
Change from 5-year Average -11







# Various ag

- Alfalfa damage from Ohio – Iowa due to cold without snow cover and multiple freeze/thaw
- Widespread general wetness (slowing spring work)
- Eastern Corn Belt starting progress planting
- Southern MO – beautiful spring so far. Great for trees/early plants

Minnesota Flooding  
Pomme de Teer River

Photo: Laura Edwards  
SD Climatologist



# Various ag

- Livestock issues ongoing from March and April events
- Calf losses increased due to severe conditions (not without effort)
- Still could have additional issues with stressed livestock that did survive
- Numbers still being accumulated – April system may not have been as severe as expected



Willow Lake, SD

Carolyn Edelman, via NWS  
Sioux Falls



# **WATER/FLOODING**

SD Flooding

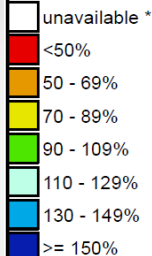
Photo: Laura Edwards  
SD Climatologist



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

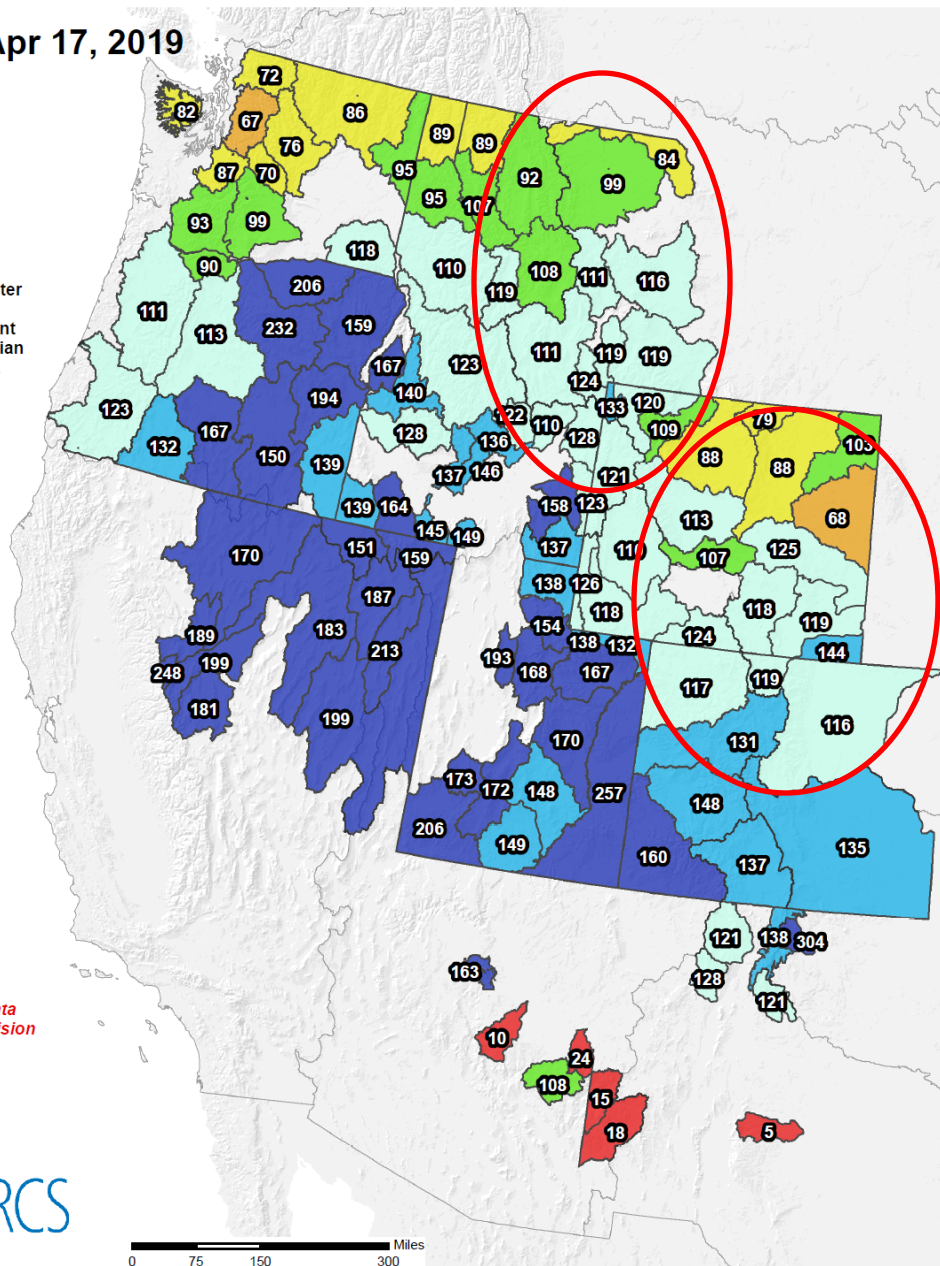
Apr 17, 2019

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>

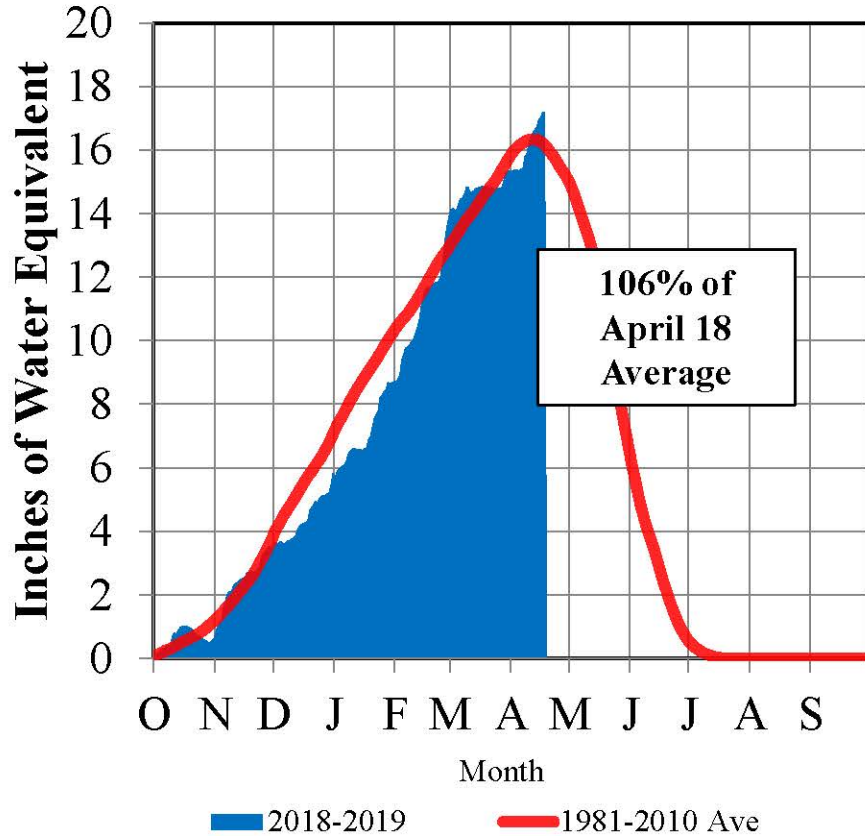
# NRCS Snow Water Equivalent

- MT-WY – Missouri drainage snow reaching peak (around avg. toals)
- CO – Platte drainage low snow pack

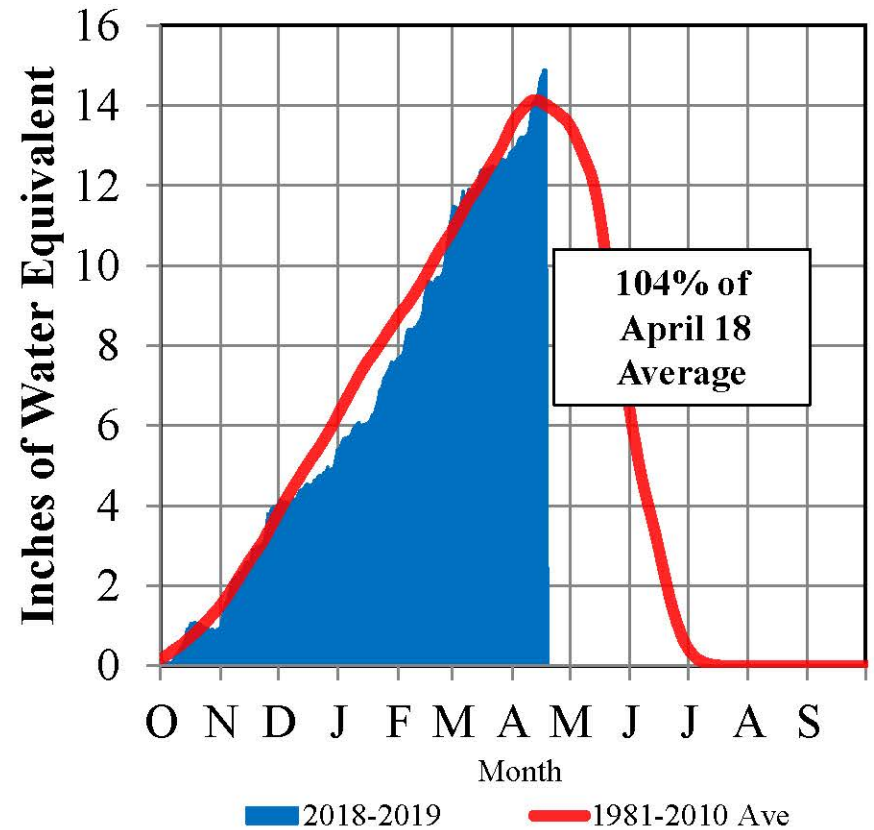
# Missouri River Basin Mountain Snowpack Water Content

April 18, 2019

### Total above Fort Peck



### Total Fort Peck to Garrison

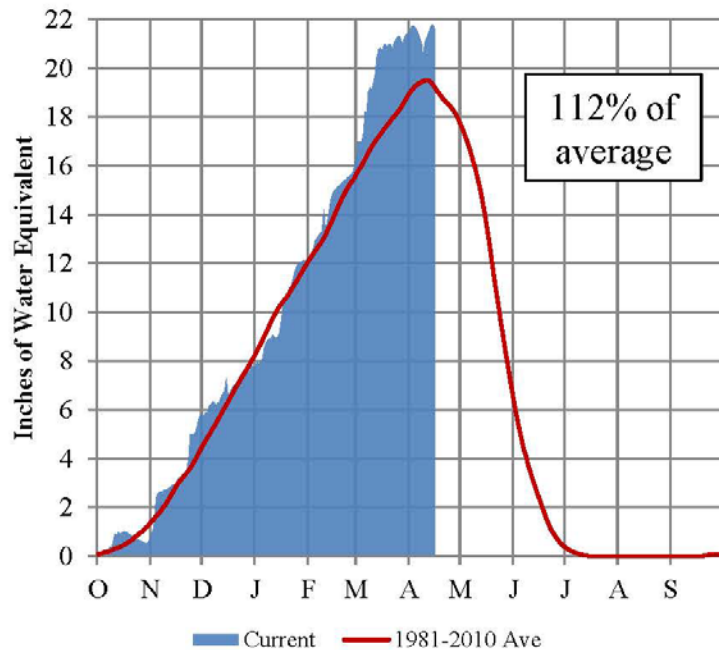


The Missouri River Basin mountain snowpack normally peaks near April 15.

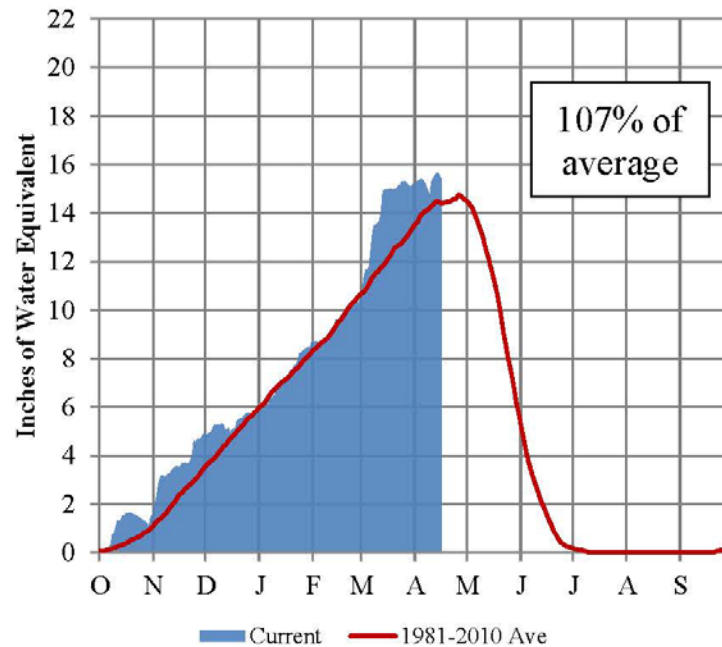
# Platte River Basin - Mountain Snowpack Water Content Water Year 2018-2019

April 18, 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 April 17, 2019, the mountain snowpack SWE in the "Total North Platte" reach is currently 21.5", 112% of average. The mountain snowpack SWE in the "Total South Platte" reach is currently 15.4", 107% of average.



# UPPER MISSISSIPPI RIVER VALLEY

including the RRN, Ohio & Missouri Basins

## WHAT TO EXPECT (next 4 weeks or so)

### Ohio River Basin:

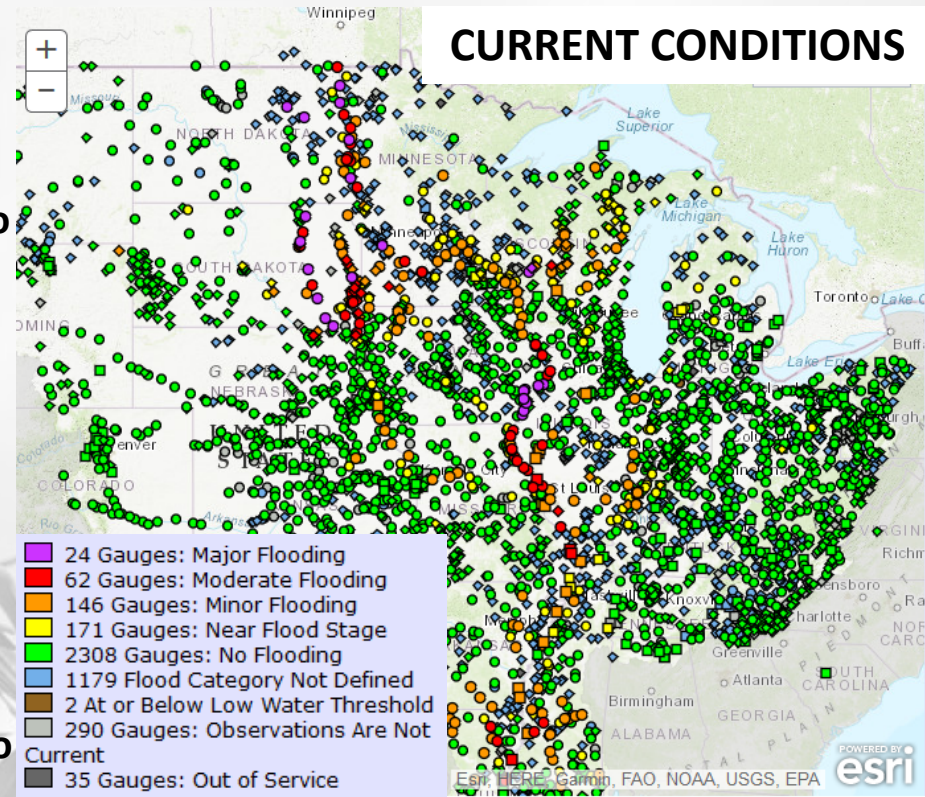
- No huge concerns, but vulnerable to flooding due to wet soils.

### Upper Midwest:

- Red River of the North: major flooding ongoing, cresting over the next week.
- Minnesota River: major flooding ongoing, cresting over the next week.
- Mississippi River: remains in flood for much of its length. Rising levels in upper reach. But forecast is steady-to-falling downstream of Keokuk Iowa.
- Soils wet, tribs running high, therefore vulnerable to spring rains.

### Missouri River Basin:

- Big Sioux River: flooding ongoing, cresting early next week.
- James River: major flooding ongoing, cresting now to early May.
- Missouri River: minor flooding ongoing, will remain in flood until late May
- Soils wet, tribs running high, therefore vulnerable to spring rains.



# Other water issues

- Stretch of major flooding in Mississippi (top 8-10 crests)
- At Davenport 26 days at major flood (April 18)  
Could reach the most (31 days)
- Red River flood ongoing

Red River Flooding (Fargo)

Photo: Adnan Akyuz  
ND State Climatol.



# GREAT LAKES SURFACE ENVIRONMENTAL ANALYSIS (GLSEA)



Analysis Date: JD 107 04/17/2019

Percent Pixels with Data within +/-10 Days: 95.4%

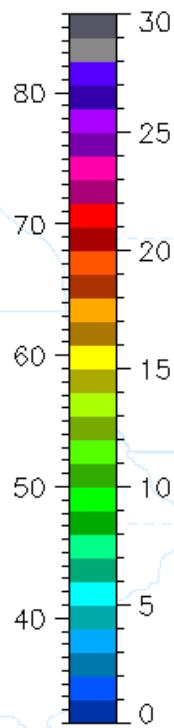
Date of last ice analysis: 4/17/2019 48°

NOAA CoastWatch

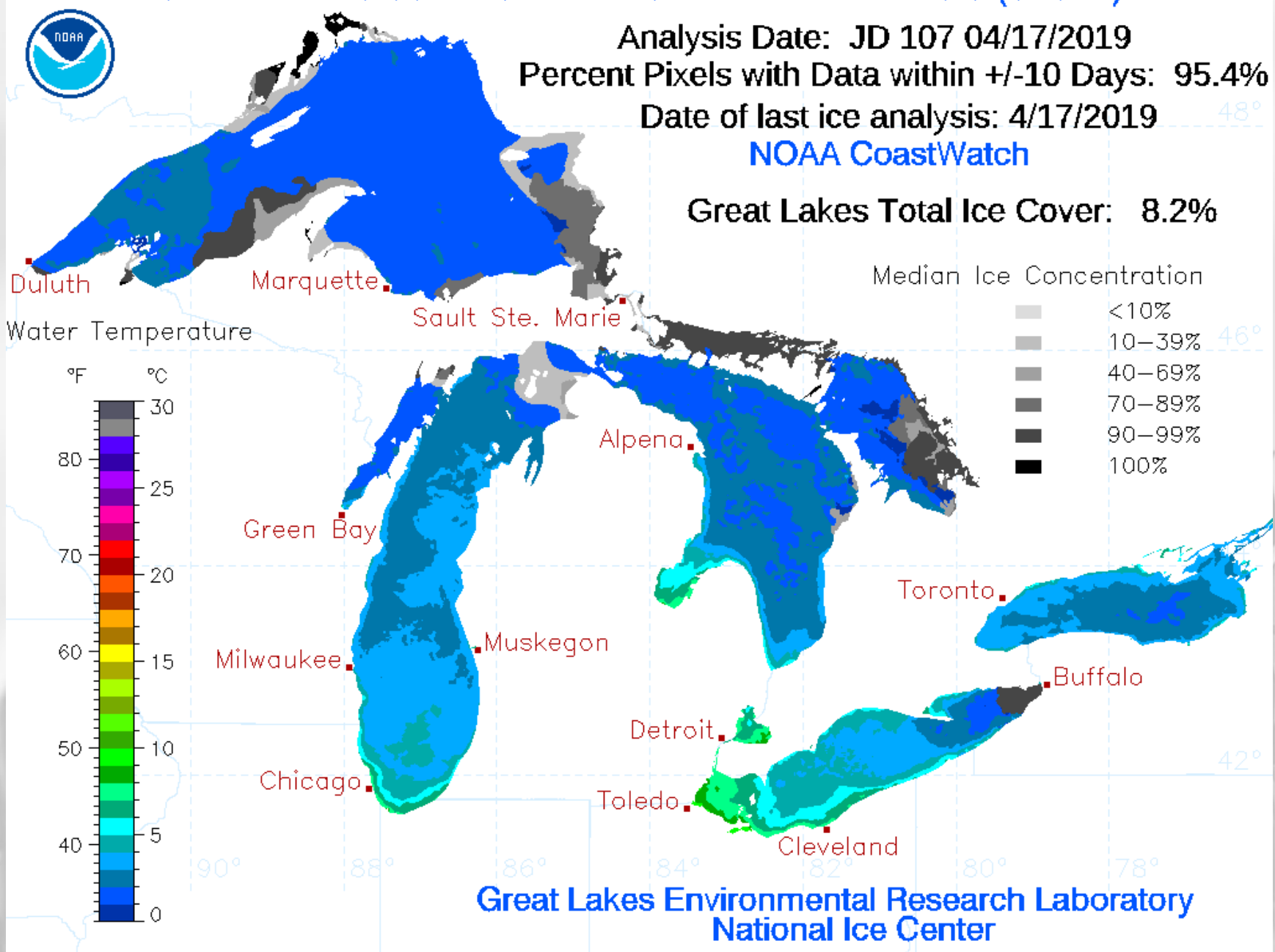
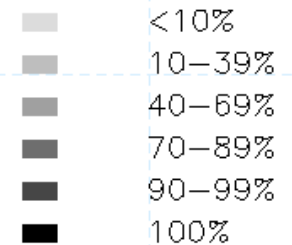
Great Lakes Total Ice Cover: 8.2%

Water Temperature

°F °C



Median Ice Concentration

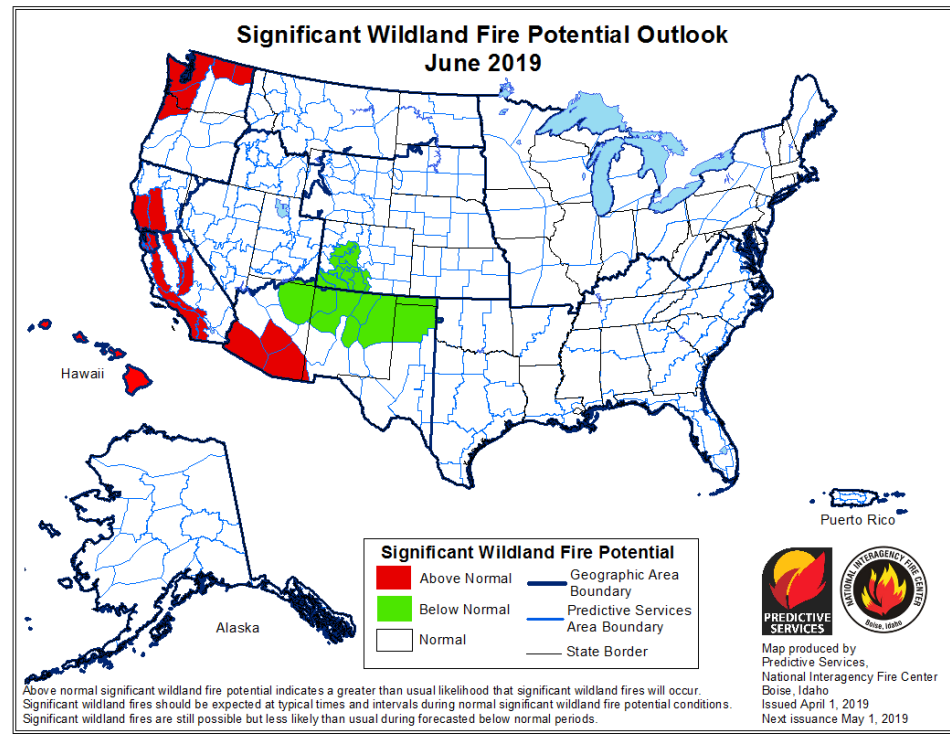
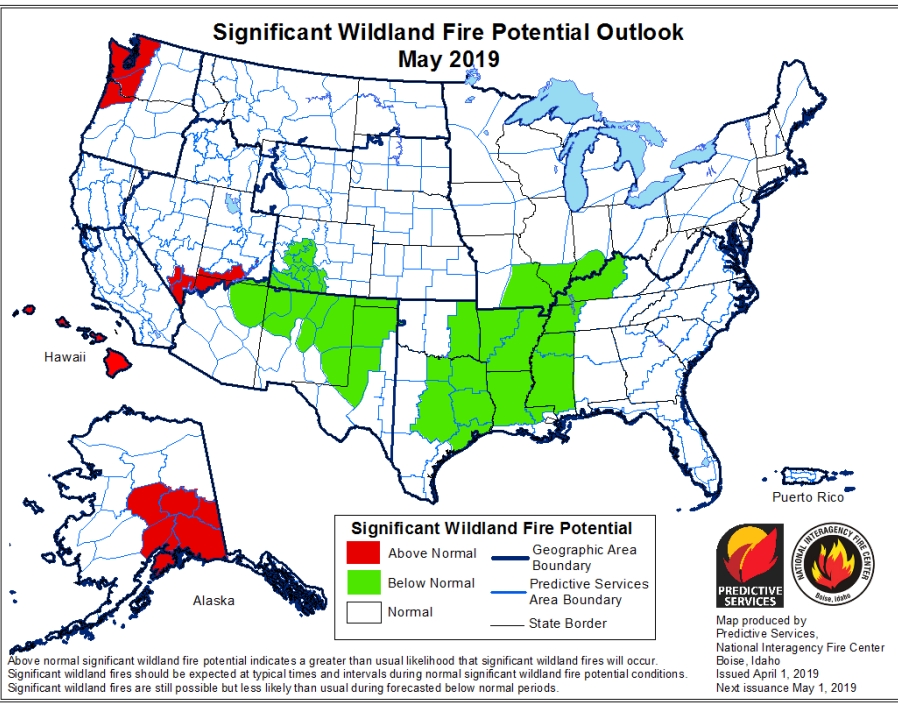


Great Lakes Environmental Research Laboratory  
National Ice Center



# Fire

So far fairly quiet early fire season. Some reports in Colorado recently.



<https://www.predictiveservices.nifc.gov/outlooks/outlooks.htm>

Near Aberdeen, SD  
14 March 2019

Laura Edwards, SD State  
Climatologist (SDSU  
Extension)

# OUTLOOKS



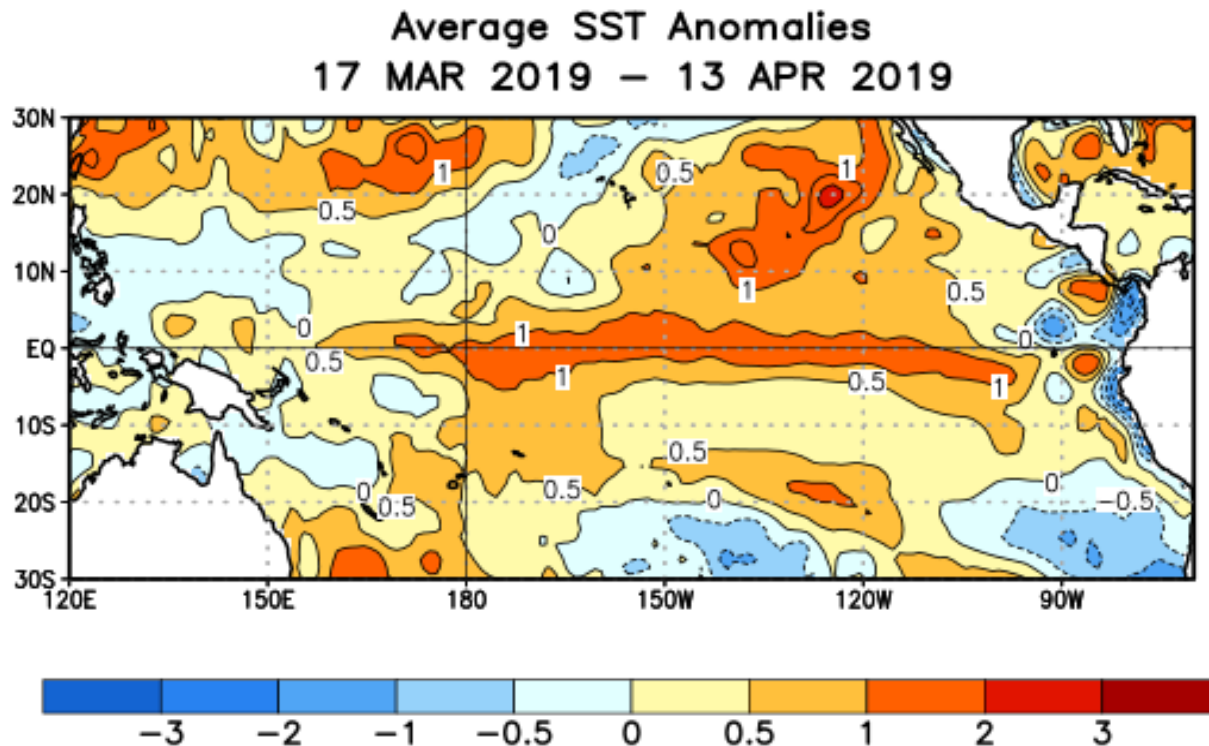
# Climate Outlooks

- **La Niña/El Niño in status.....**
- **7-day precipitation forecast**
- **8-14 day outlook**
- **May**
- **Summer/growing season**



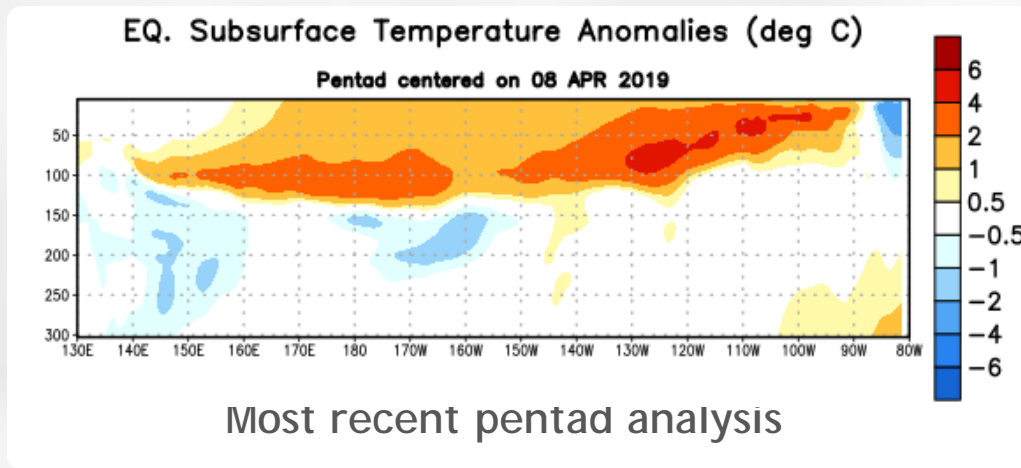
# SST Departures (°C) in the Tropical Pacific During the Last Four Weeks

During the last four weeks, equatorial SSTs were above average in the central and east-central Pacific Ocean. SSTs were below average around Indonesia and in parts of the far eastern Pacific.



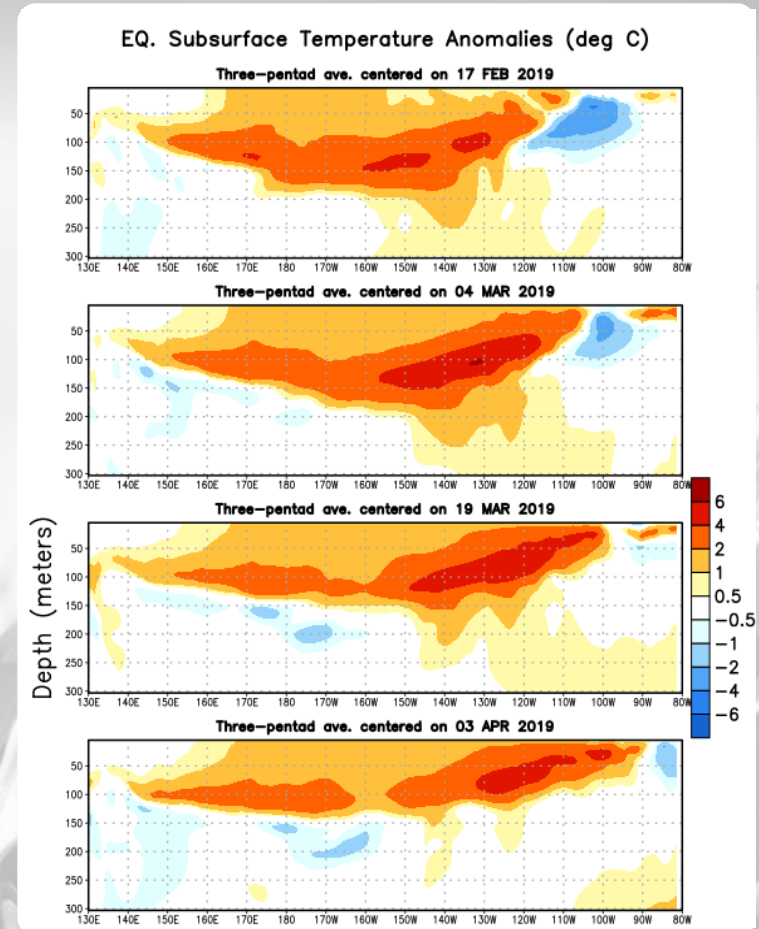
# Sub-Surface Temperature Departures in the Equatorial Pacific

In the last two months, positive subsurface temperature anomalies have persisted across most of the equatorial Pacific Ocean.



Negative subsurface temperature anomalies have shifted to the far eastern Pacific (85°W-80°W).

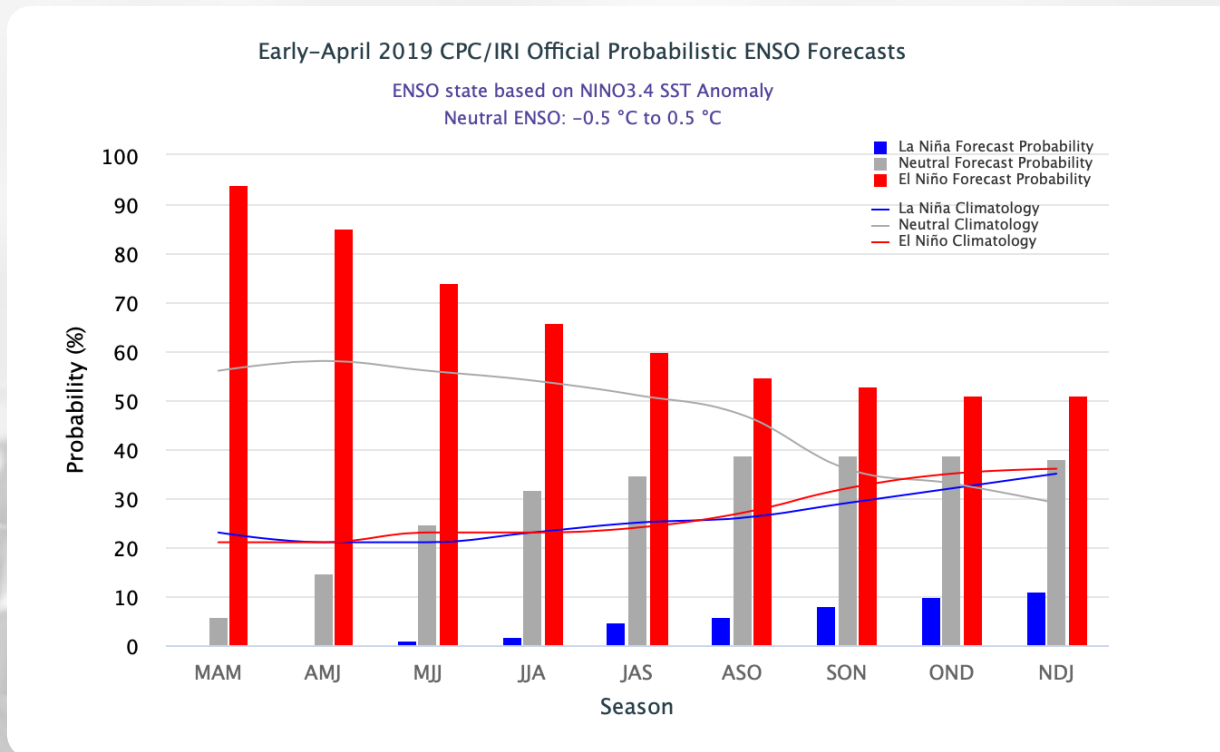
The recent cooling in the central Pacific at 150-200m depth reflects an upwelling equatorial oceanic Kelvin wave.



# CPC/IRI Probabilistic ENSO Outlook

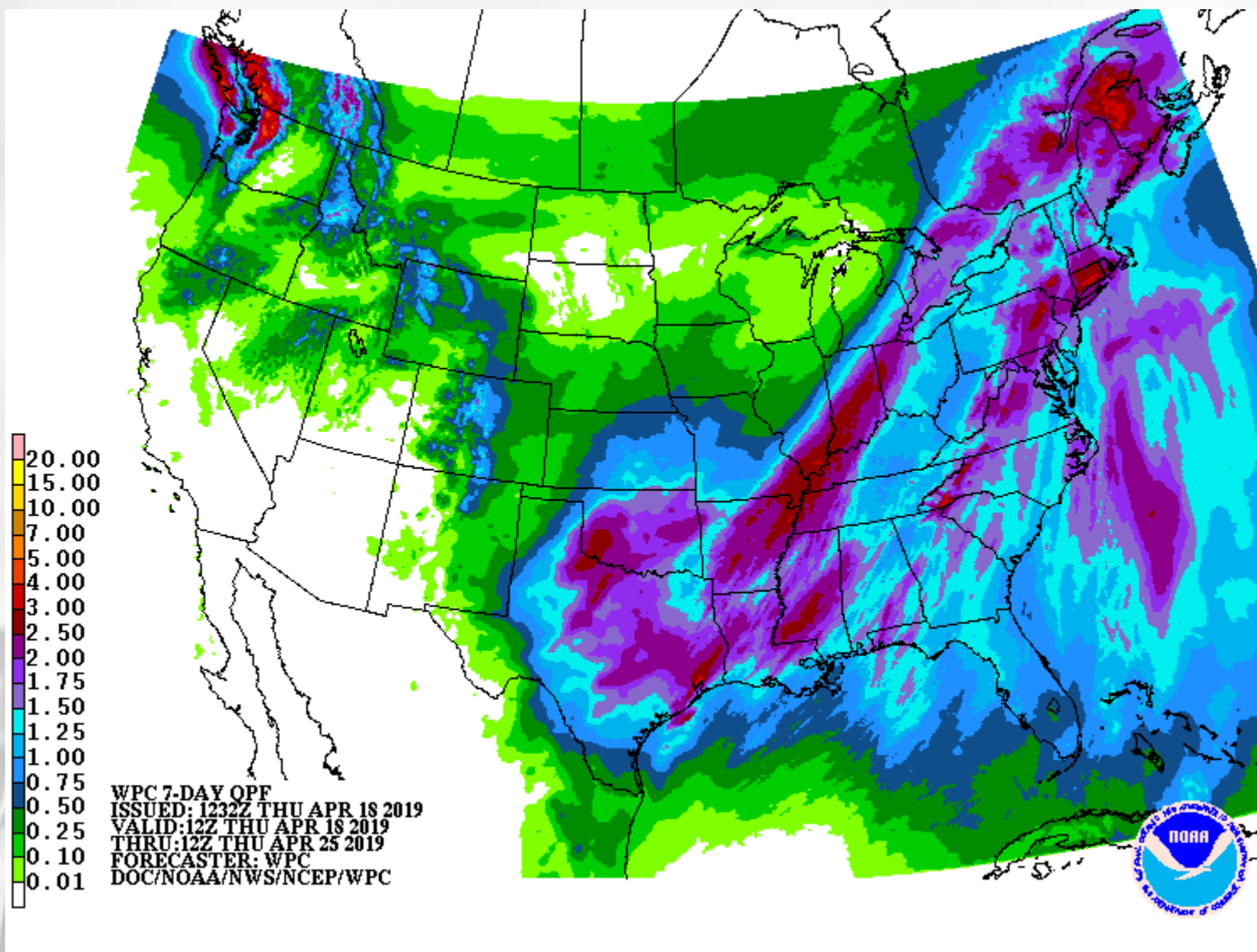
Updated: 11 April 2019

El Niño conditions are favored to continue through fall 2019 with diminishing chances (~50% in October-November-December).



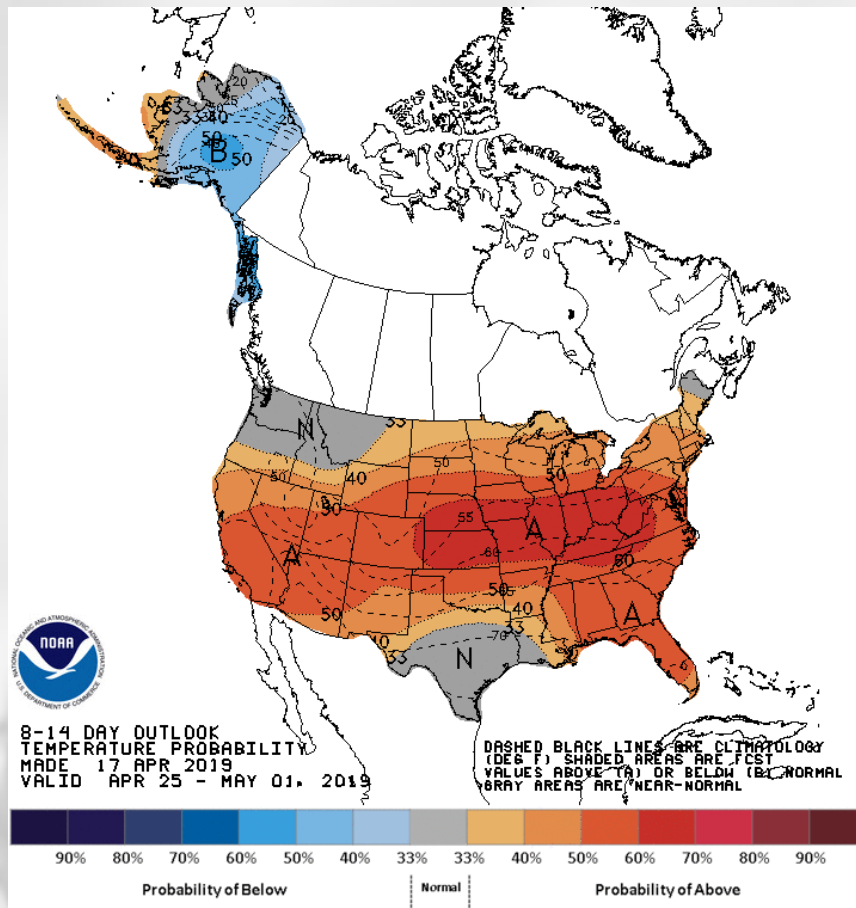


# 7-day Quantitative Precipitation Forecast

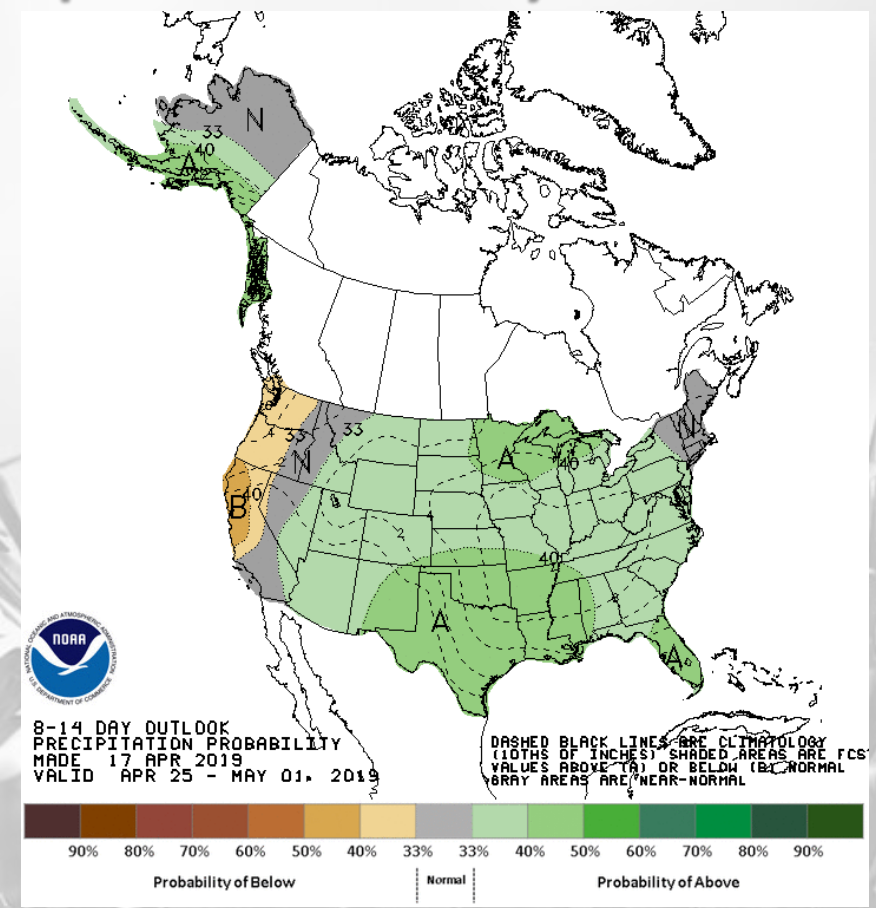


<http://www.wpc.ncep.noaa.gov/qpf/day1-7.shtml>

# Temperature and Precipitation Probabilities for 25 April – 1 May 2019



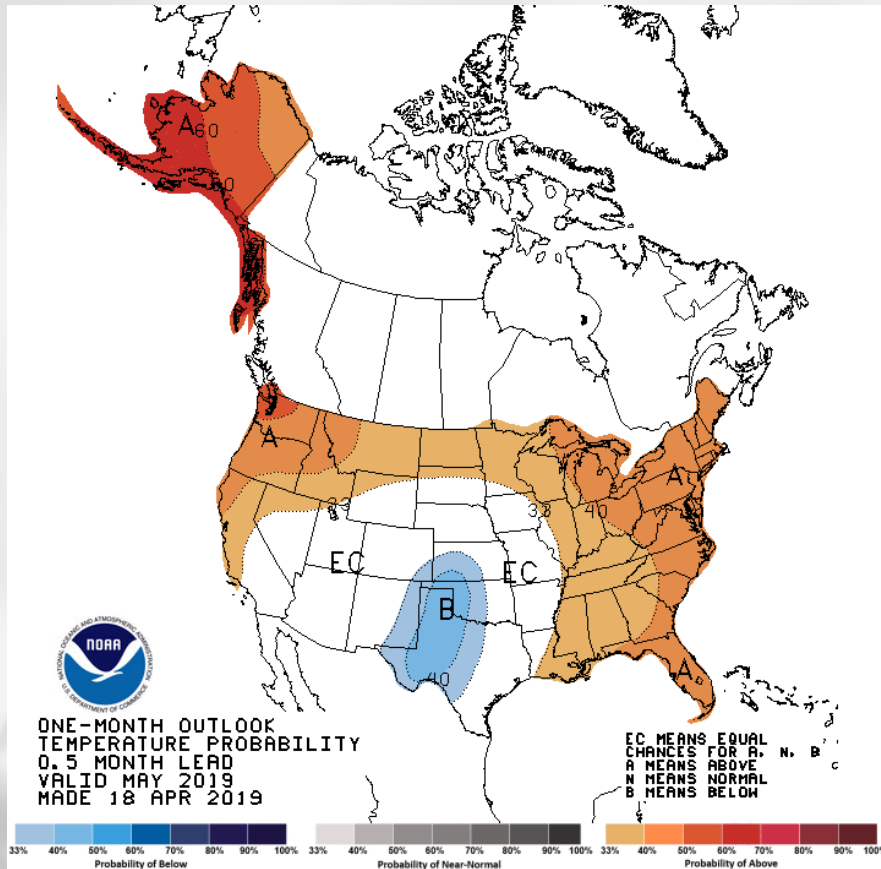
Temperature



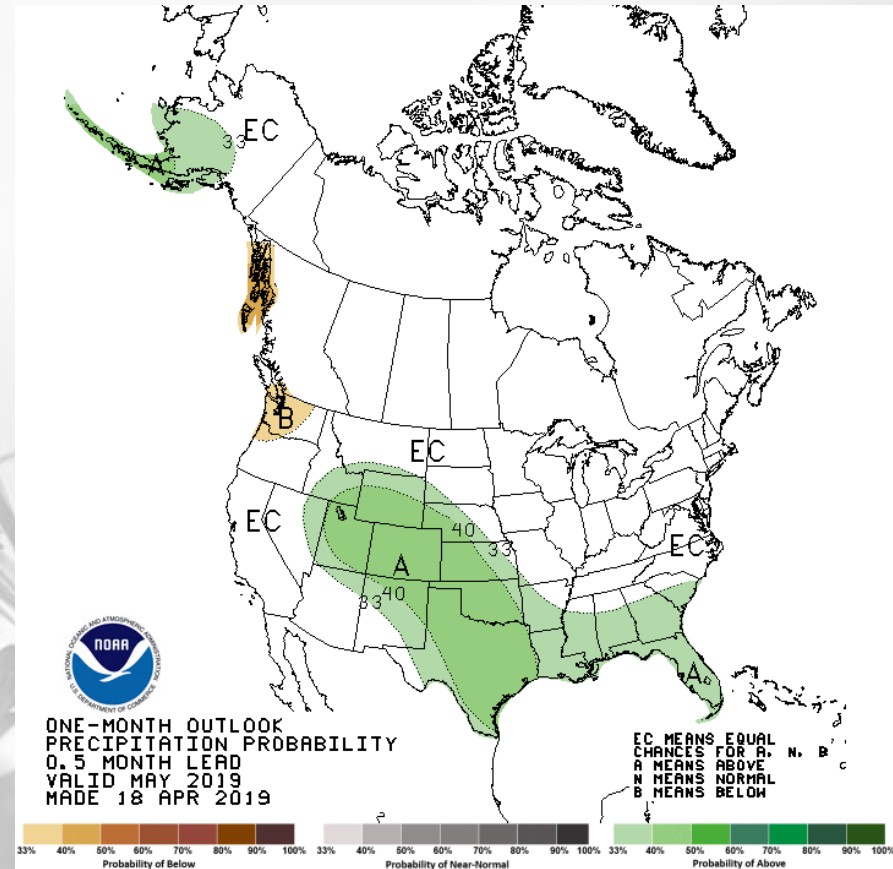
Precipitation

<http://www.cpc.ncep.noaa.gov/products/predictions/814day/index.php>

# May Temperature and Precipitation Probabilities



Temperature

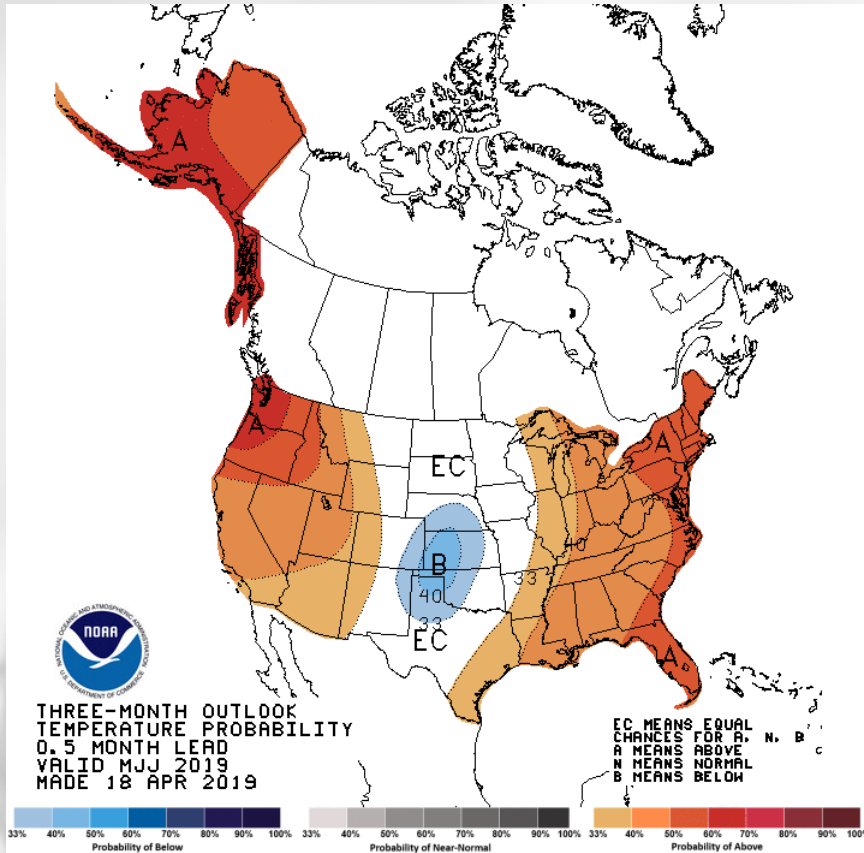


Precipitation

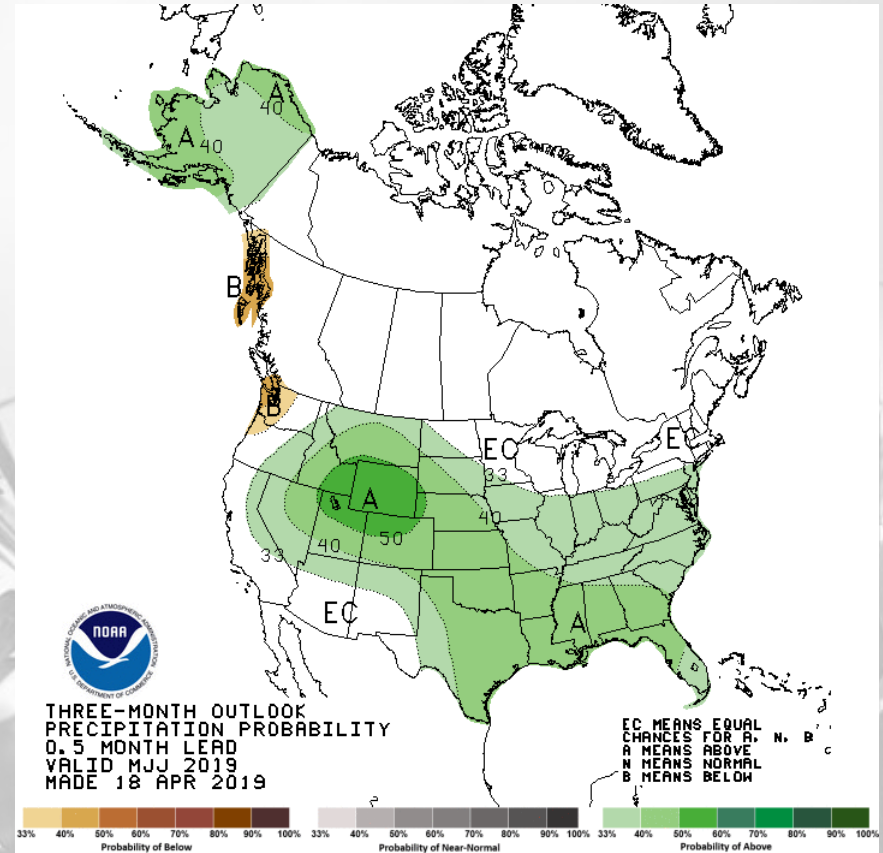
<http://www.cpc.ncep.noaa.gov/products/predictions/30day/>



# 3 Month Temperature and Precipitation Probabilities (May – July)



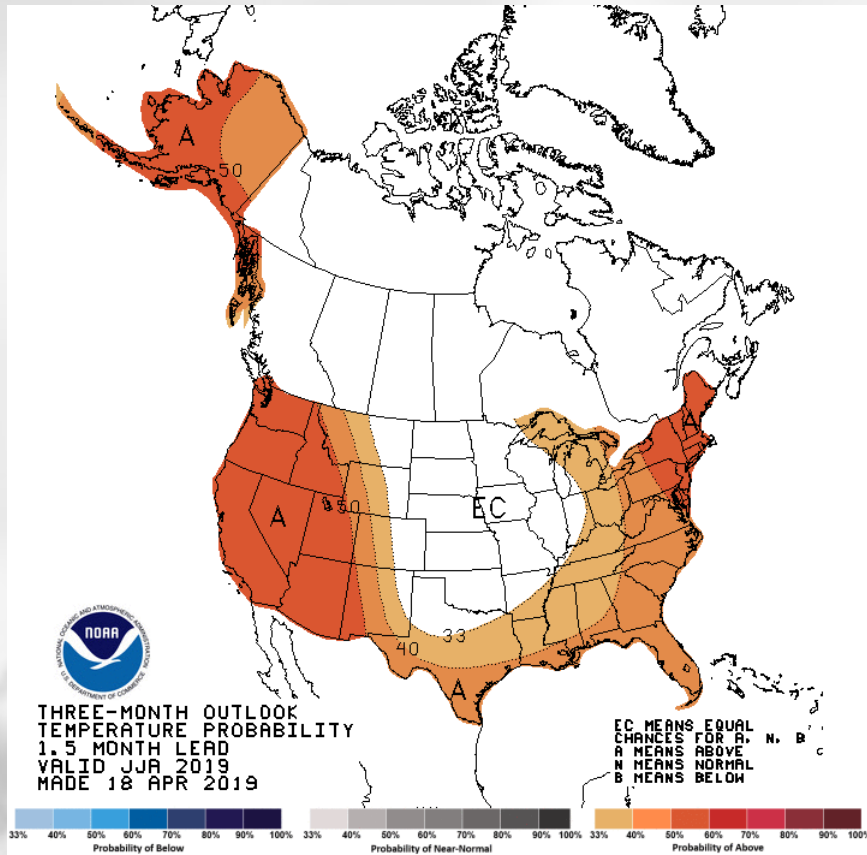
Temperature



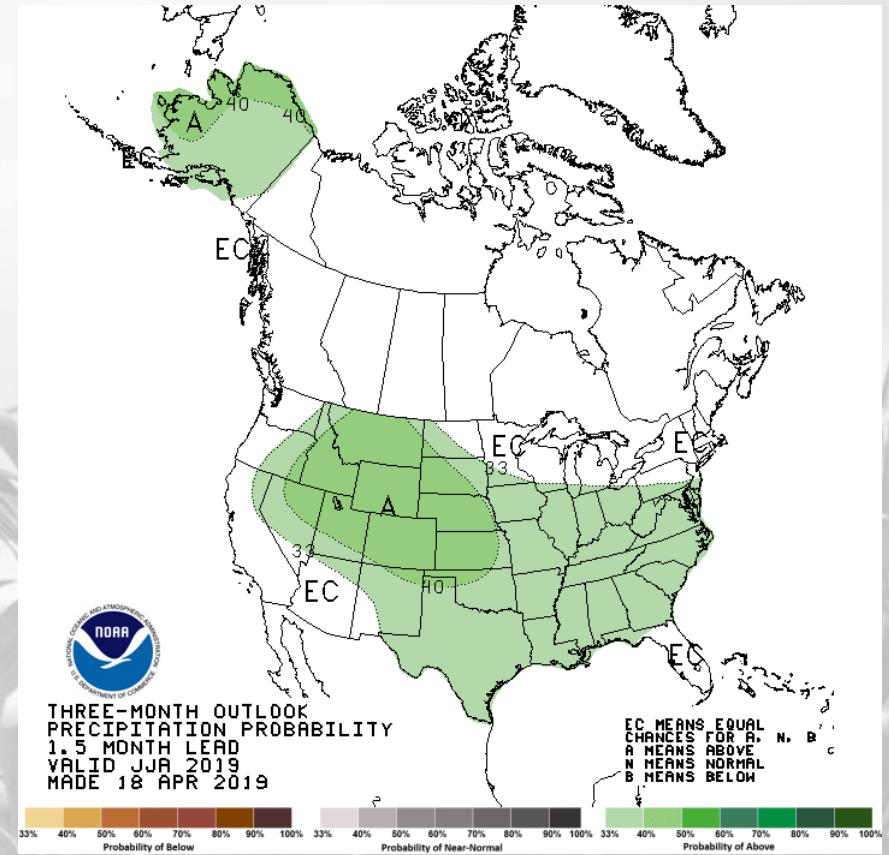
Precipitation

[http://www.cpc.ncep.noaa.gov/products/predictions/long\\_range/seasonal.php?lead=2](http://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=2)

# 3 Month Temperature and Precipitation Probabilities (June - August)



Temperature



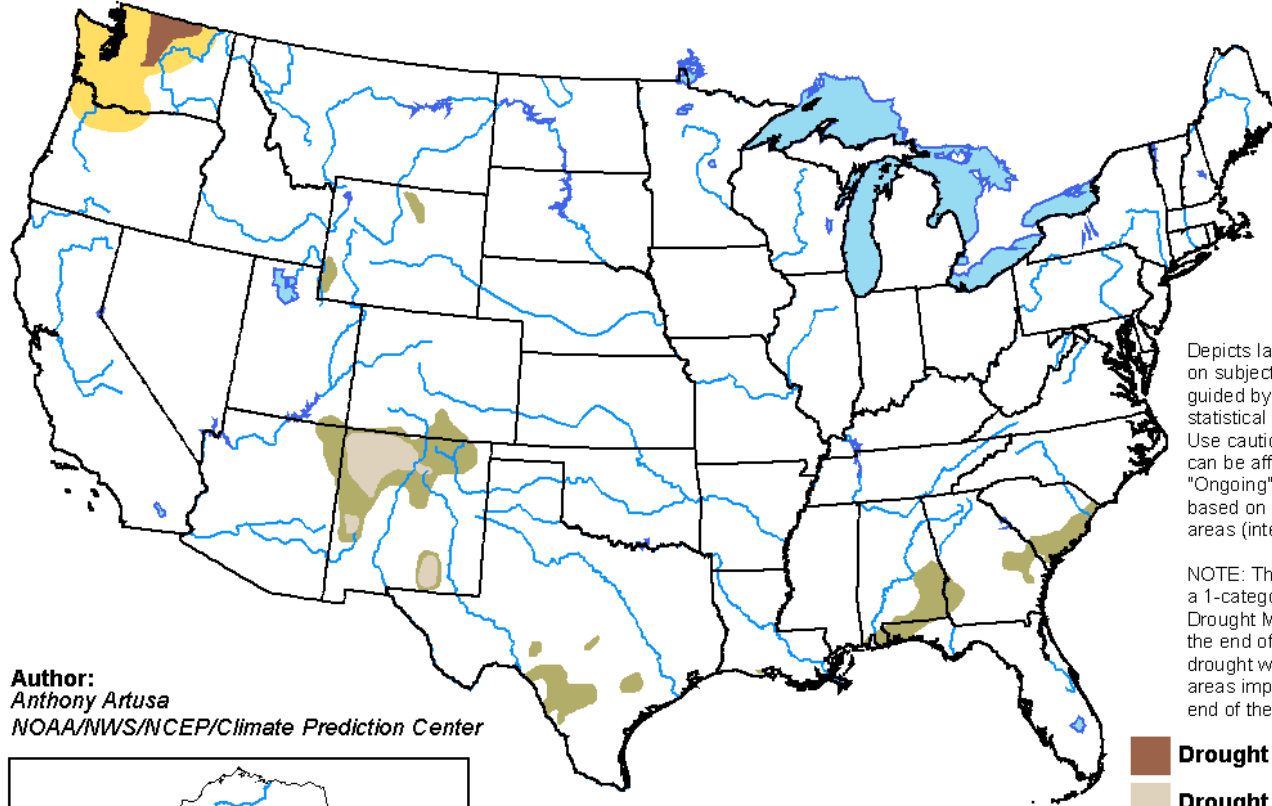
Precipitation

[http://www.cpc.ncep.noaa.gov/products/predictions/long\\_range/seasonal.php?lead=2](http://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=2)

# Drought Outlook through 31 July

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

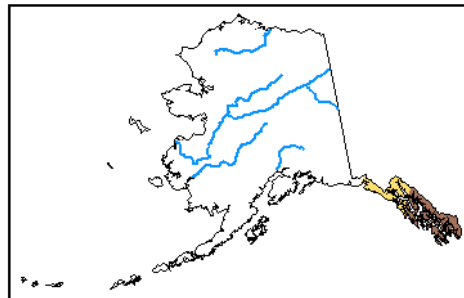
Valid for April 18 - July 31, 2019  
Released April 18






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:  
Anthony Artusa  
NOAA/NWS/NCEP/Climate Prediction Center



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



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



# Summary - Conditions

- \* Wetness at many time scales (many record setting periods)
- \* Impacts
  - \* Wet soils
  - \* Ongoing flooding
  - \* Delayed ag activity
- \* Cold avoided many crop issues perennials
- \* Drought issues nearly non-existent
- \* Another major winter storm cause large livestock and infrastructure issues in April – details still accumulating

# Summary - Outlooks

- \* El Niño (currently weak/moderate) likely to stay through summer
- \* Decent impact on summer outlooks
- \* Slight chance warmer far east and west in our region
- \* Cooler chance than EC for much of summer
- \* Slight chance wetter over much of region into summer.
- \* Drought issues likely limited

## Further Information - Partners

- **Today's and Past Recorded Presentations and :**
- <http://mrcc.isws.illinois.edu/webinars.htm>
- <http://www.hprcc.unl.edu>
- NOAA's National Climatic Data Center: [www.ncdc.noaa.gov](http://www.ncdc.noaa.gov)
  - Monthly climate reports (U.S. & Global): [www.ncdc.noaa.gov/sotc/](http://www.ncdc.noaa.gov/sotc/)
- NOAA's Climate Prediction Center: [www.cpc.ncep.noaa.gov](http://www.cpc.ncep.noaa.gov)
- Climate Portal: [www.climate.gov](http://www.climate.gov)
- U.S. Drought Portal: [www.drought.gov](http://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?

- Questions:
  - **Climate:**
  - Dennis Todey: [dennis.todey@ars.usda.gov](mailto:dennis.todey@ars.usda.gov) , 515-294-2013
  - Doug Kluck: [doug.kluck@noaa.gov](mailto:doug.kluck@noaa.gov), 816-994-3008
  - Mike Timlin: [mtimlin@illinois.edu](mailto:mtimlin@illinois.edu); 217-333-8506
  - Natalie Umphlett: [numphlett2@unl.edu](mailto:numphlett2@unl.edu) ; 402 472-6764
  - Brian Fuchs: [bfuchs2@unl.edu](mailto:bfuchs2@unl.edu) 402 472-6775
  - **Weather:**
  - [crhroc@noaa.gov](mailto:crhroc@noaa.gov)

# For More Information



Midwest Climate Hub



@dennistodey



<https://www.climatehubs.ocs.usda.gov/hubs/midwest>



**Charlene Felkley, Coordinator**

515-294-0136

[Charlene.felkley@ars.usda.gov](mailto:Charlene.felkley@ars.usda.gov)

**Dennis Todey, Director**

515-294-2013

[Dennis.todey@ars.usda.gov](mailto:Dennis.todey@ars.usda.gov)

**Erica Kistner, Fellow**

515-294-9602

[Erica.kristner@ars.usda.gov](mailto:Erica.kristner@ars.usda.gov)

**National Laboratory for Agriculture and the Environment**

Attn: Midwest Climate Hub

1015 N University Blvd

Ames, Iowa 50011-3611



Midwest Climate Hub  
U.S. DEPARTMENT OF AGRICULTURE