

Midwest/Great Plains Climate-Drought Outlook

September 20, 2018

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National Drought Mitigation Center
University of Nebraska-Lincoln
School of Natural Resources



United States Department of Agriculture
Midwest Climate Hub

September 20, 2018

General Information

Providing climate services to the Central Region

- Collaboration Activity Between:
 - NOAA NCEI/NWS/OAR/NIDIS/CPC
 - 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

- October 18, 2018 (1 PM CST) with Laura Edwards, South Dakota State Climatologist and Brad Rippey from USDA

Access to Future Climate Webinars and Related Information

www.drought.gov/drought/content/regional-programs/regional-drought-webinars

Access to Past Climate Webinars

mrcc.isws.illinois.edu/multimedia/webinars.jsp

www.hprcc.unl.edu/webinars.php

Agenda

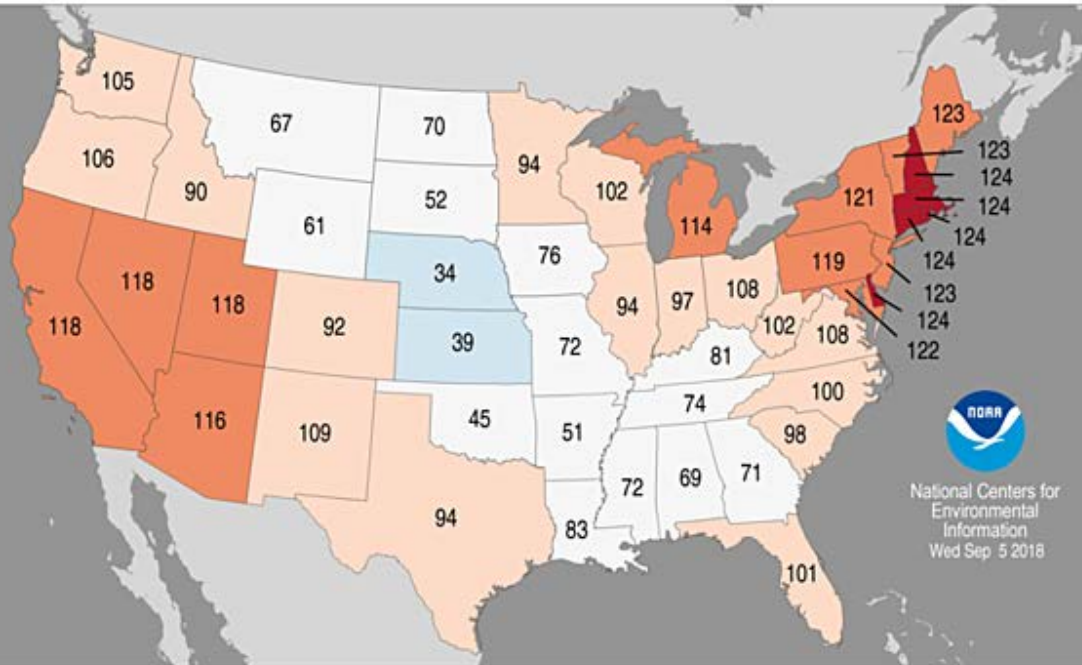
- **Current/Recent Past Conditions**
- **Regional Impacts**
 - **General**
 - **Hydrological**
 - **Agricultural**
- **Outlooks**
- **Questions**

Current Conditions

August Climatology from NCEI

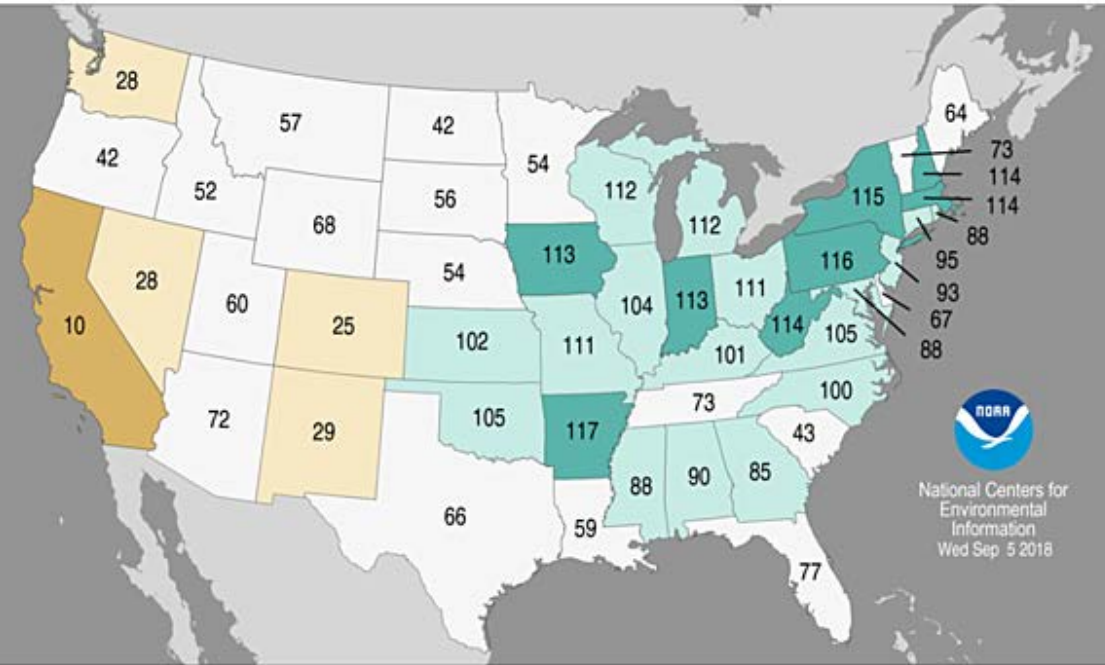
Statewide Average Temperature Ranks

August 2018
Period: 1895–2018



Statewide Precipitation Ranks

August 2018
Period: 1895–2018



<https://www.ncdc.noaa.gov/sotc/>

Statewide Minimum Temperature Ranks

June–August 2018

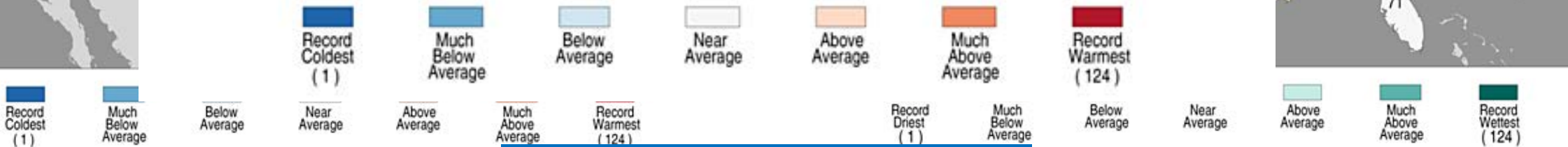
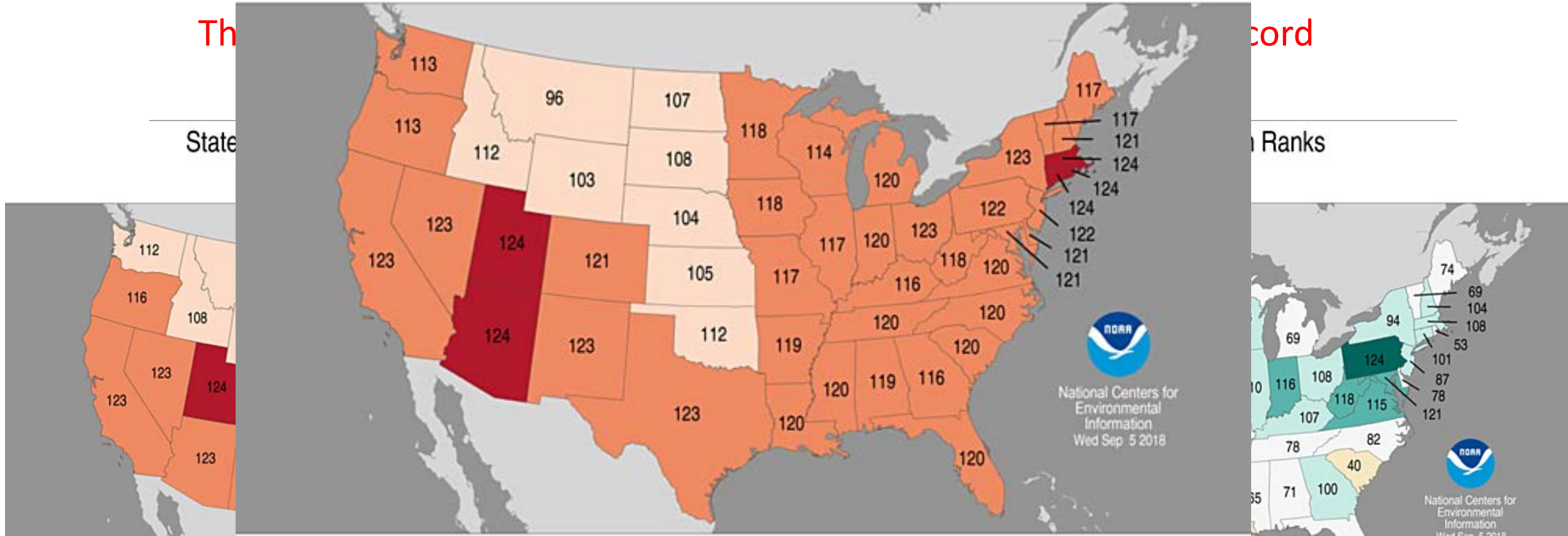
Period: 1895–2018

The

Record

State

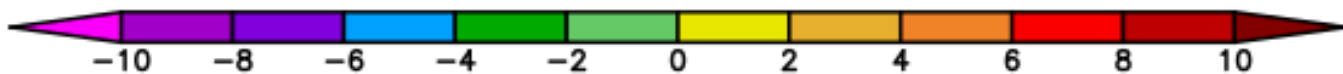
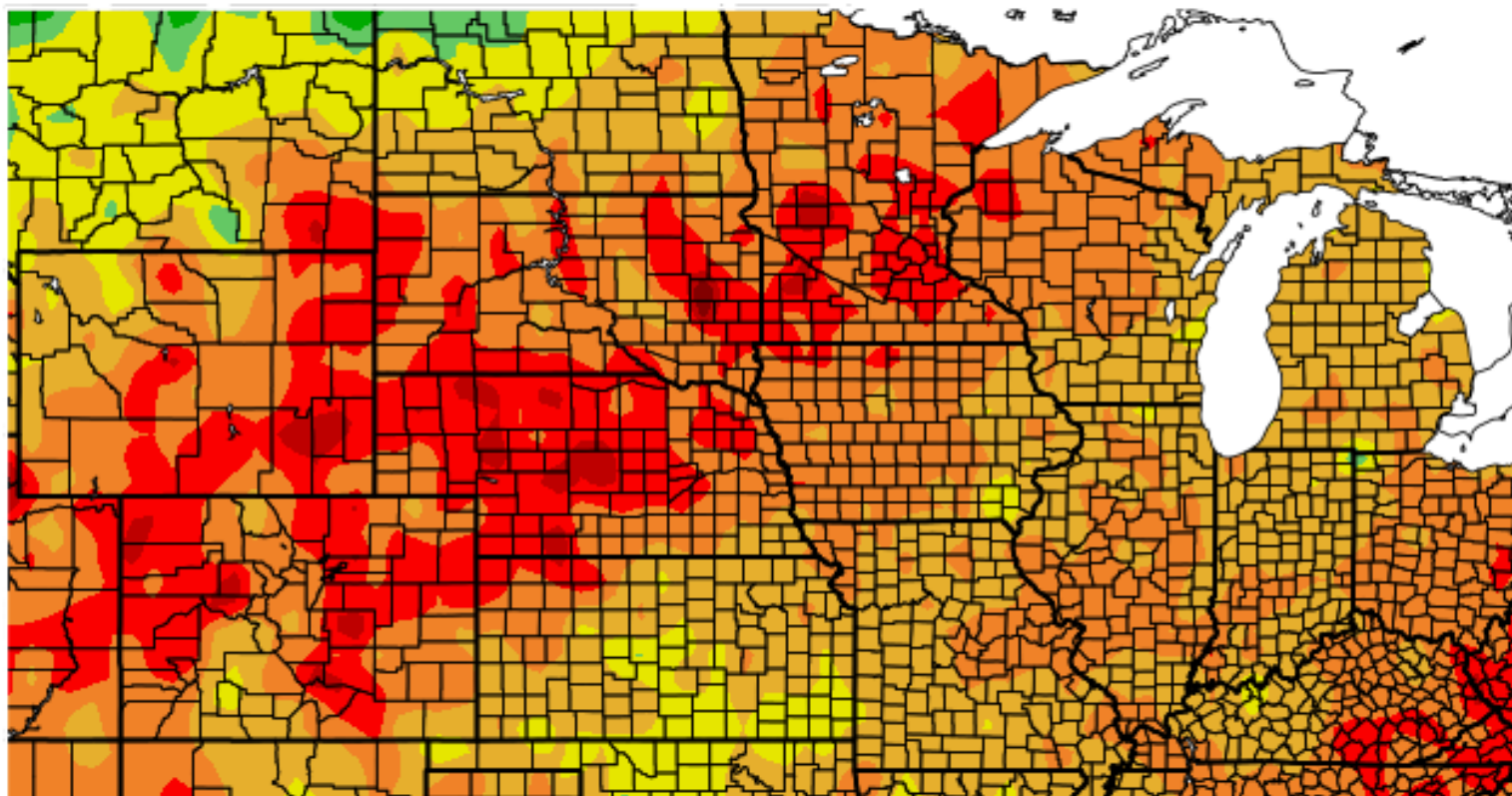
Ranks



<https://www.ncdc.noaa.gov/sotc/>

Departure from Normal Temperature (F)
Departure from Normal Temperature (F)
9/6/2018 – 9/19/2018

Temperature
departures over
the last 30 Days

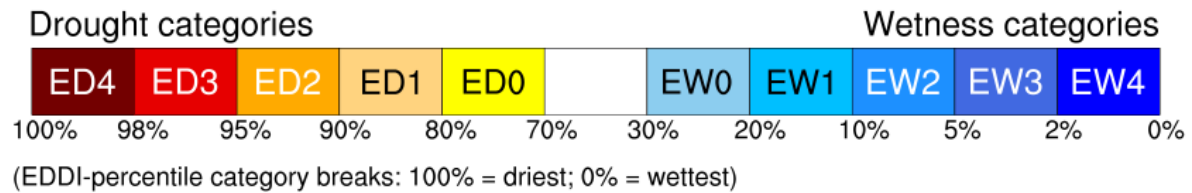
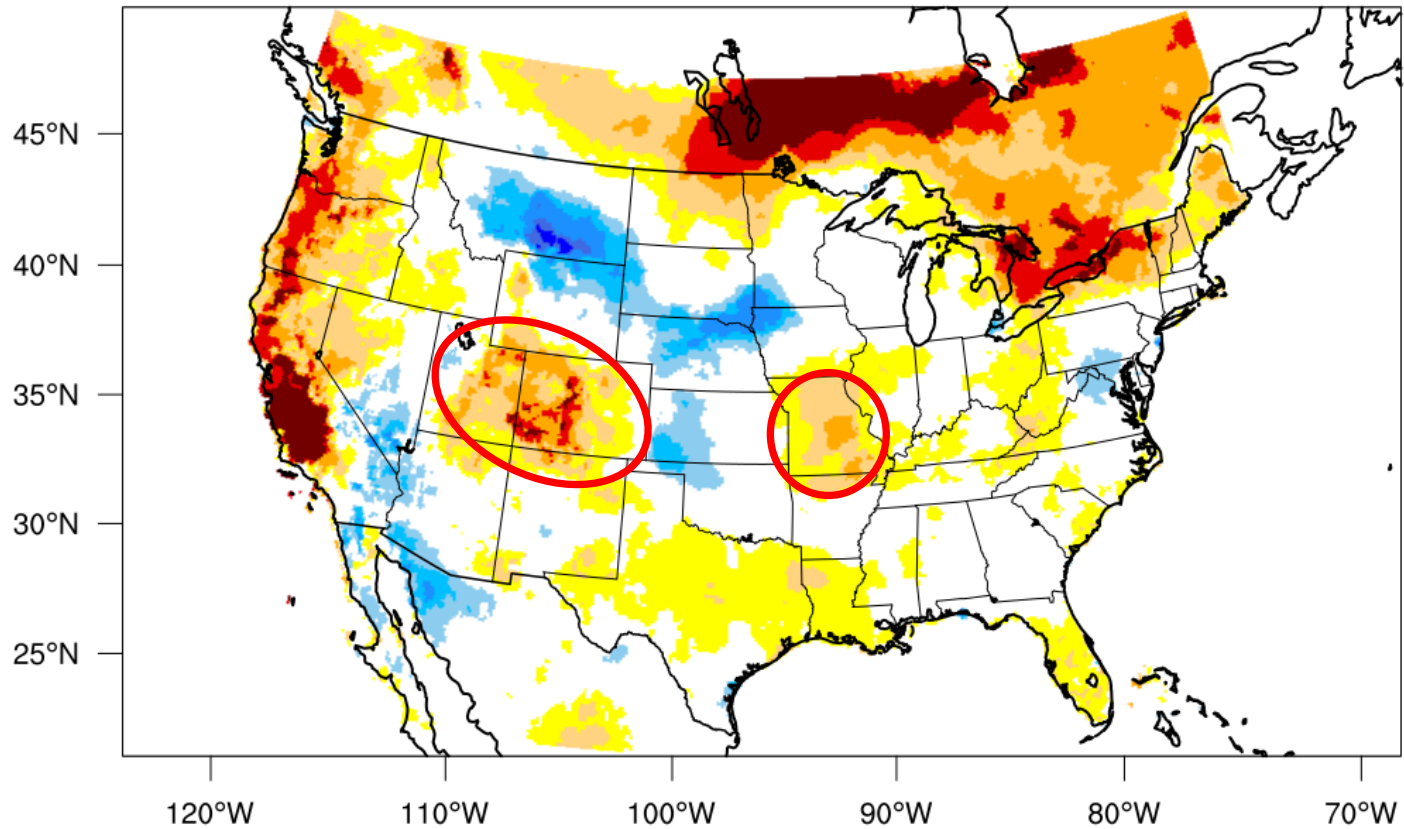


Generated 9/20/2018 at HPRCC using provisional data.
NATIONAL DROUGHT MITIGATION CENTER

NOAA Regional Climate Centers

Evaporative Demand Drought Index (EDDI)

3-month EDDI categories for September 13, 2018



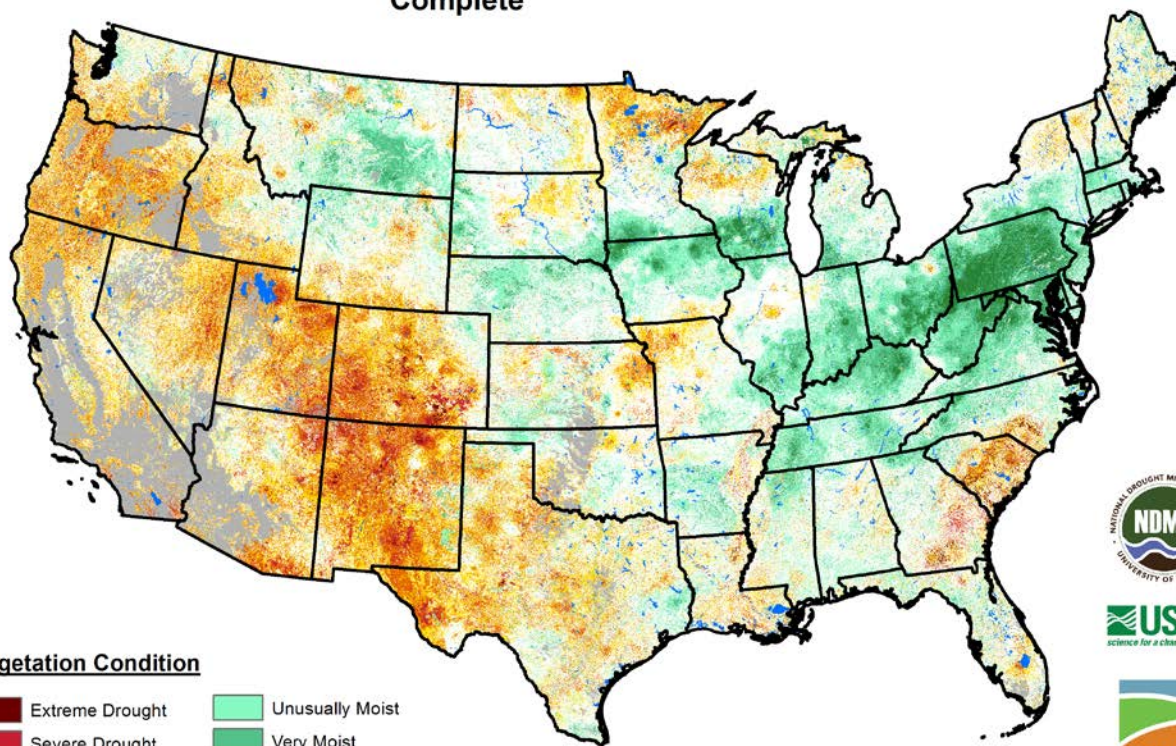
Generated by NOAA/ESRL/Physical Sciences Division

<https://www.esrl.noaa.gov/psd/eddi/>

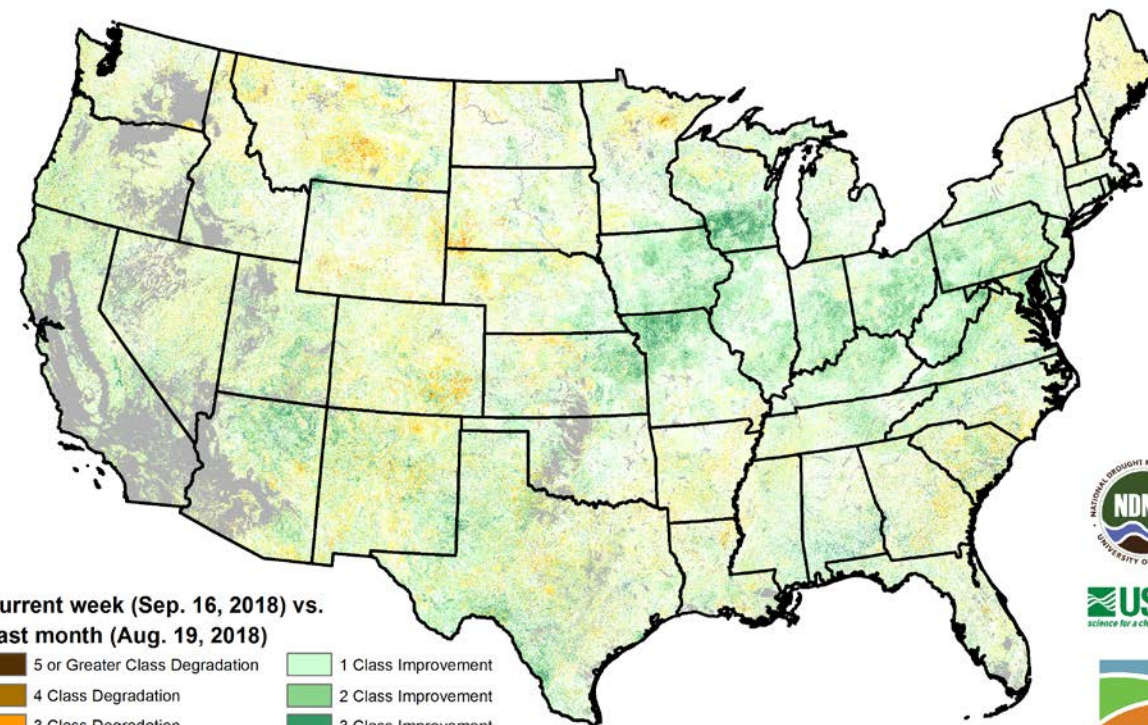
Vegetation Drought Response Index (VegDRI)

Vegetation Drought Response Index
Complete

September 16, 2018



Vegetation Drought Response Index (VegDRI) Change



Vegetation Condition

- | | |
|--------------------|-----------------|
| Extreme Drought | Unusually Moist |
| Severe Drought | Very Moist |
| Moderate Drought | Extreme Moist |
| Pre-drought stress | Out of Season |
| Near Normal | Water |



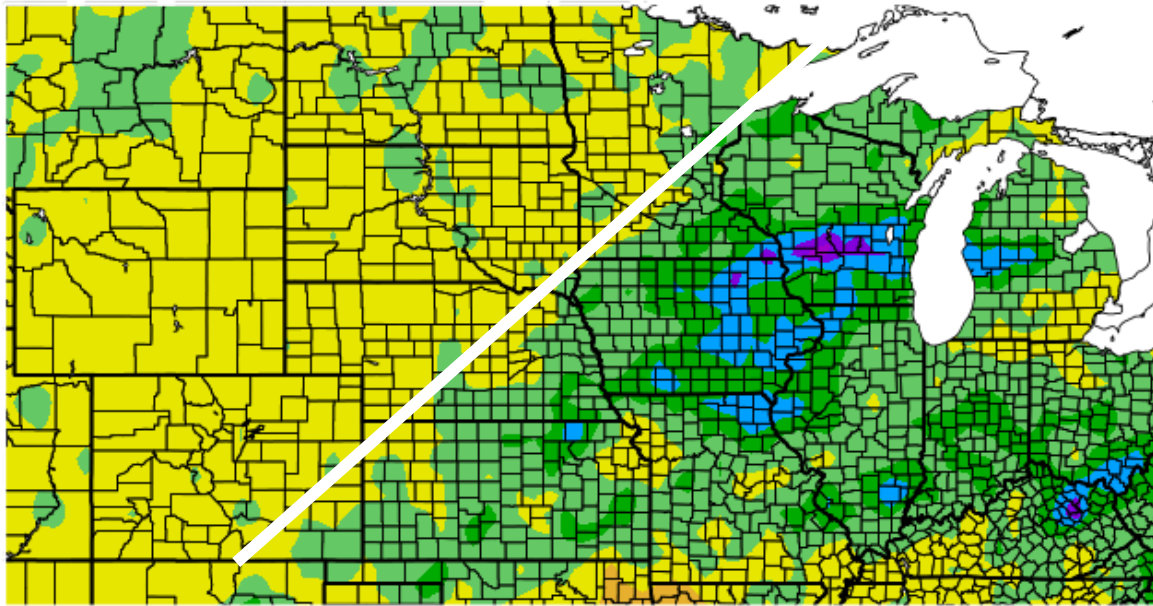
Current week (Sep. 16, 2018) vs. Last month (Aug. 19, 2018)

- | | |
|--------------------------------|--------------------------------|
| 5 or Greater Class Degradation | 1 Class Improvement |
| 4 Class Degradation | 2 Class Improvement |
| 3 Class Degradation | 3 Class Improvement |
| 2 Class Degradation | 4 Class Improvement |
| 1 Class Degradation | 5 or Greater Class Improvement |
| No Change | Out of Season |
| | Water |

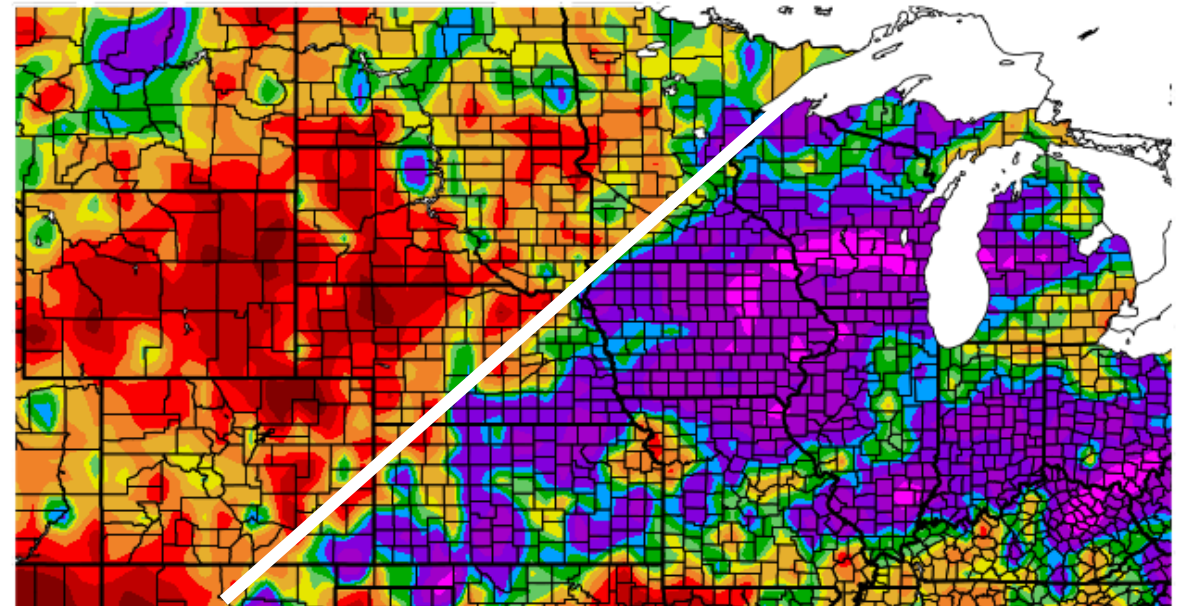


Precipitation over the last 30 Days

Departure from Normal Precipitation (in)
8/21/2018 - 9/19/2018



Percent of Normal Precipitation (%)
8/21/2018 - 9/19/2018



Generated 9/20/2018 at HPRCC using provisional data.

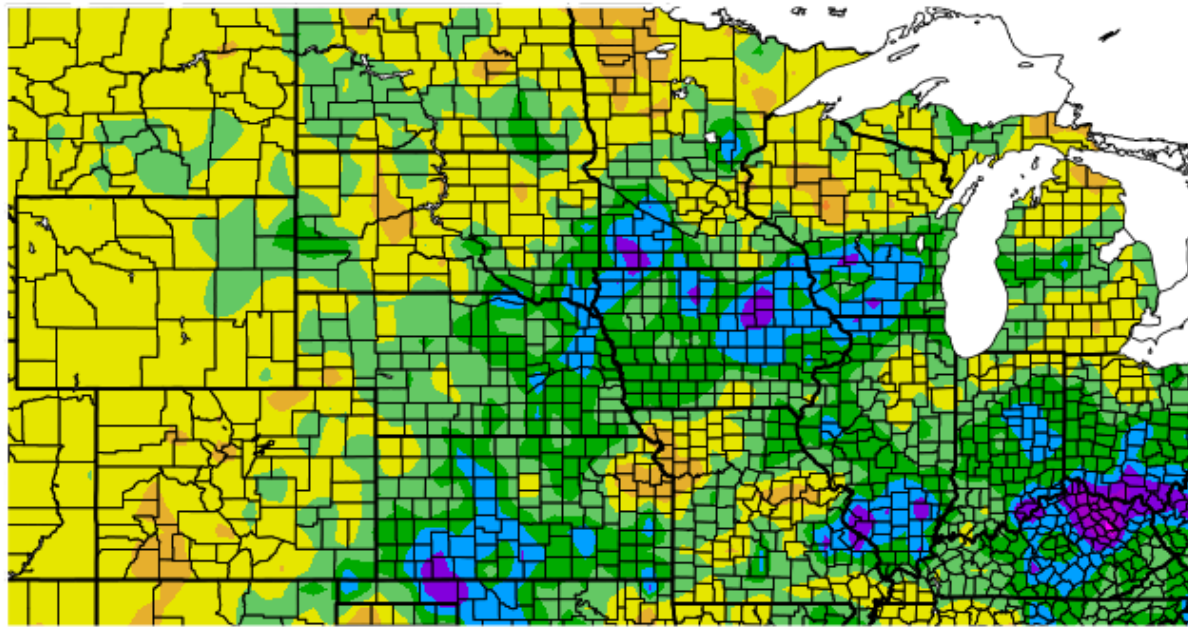
NOAA Regional Climate Centers

Generated 9/20/2018 at HPRCC using provisional data.

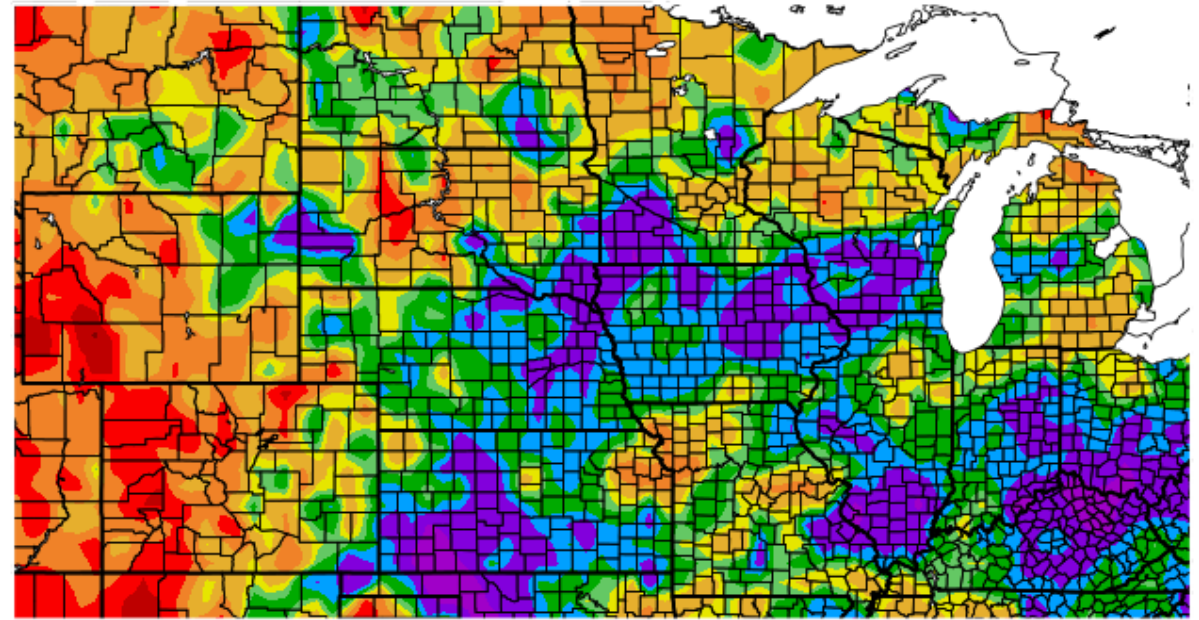
NOAA Regional Climate Centers

Precipitation over the last 90 Days

Departure from Normal Precipitation (in)
6/21/2018 - 9/18/2018

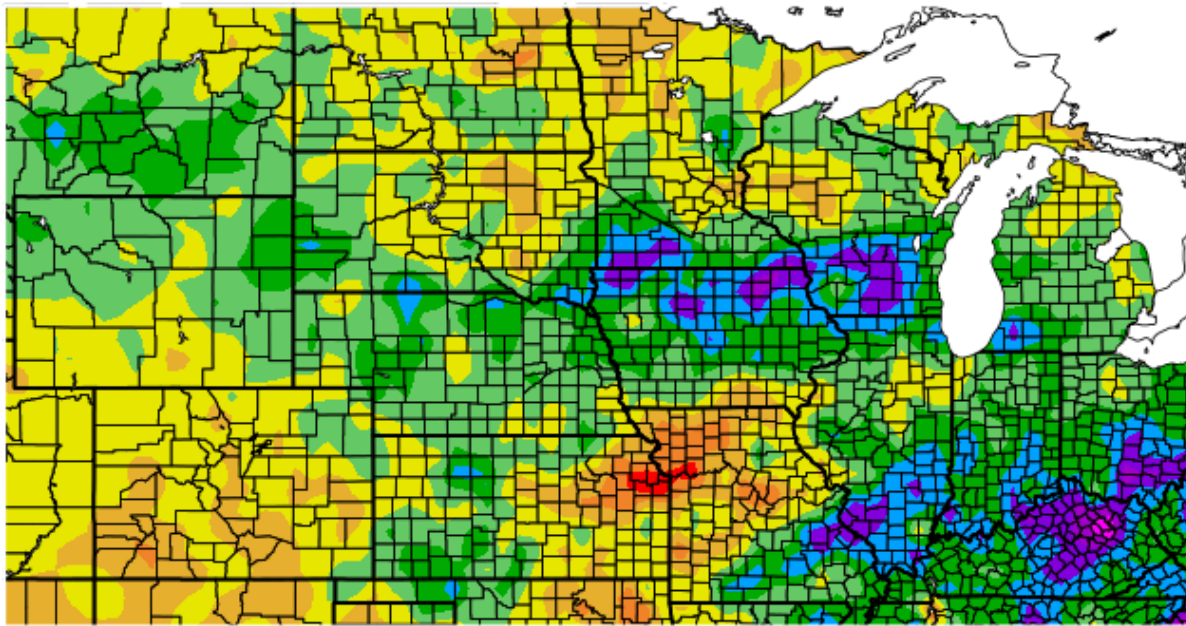


Percent of Normal Precipitation (%)
6/21/2018 - 9/18/2018

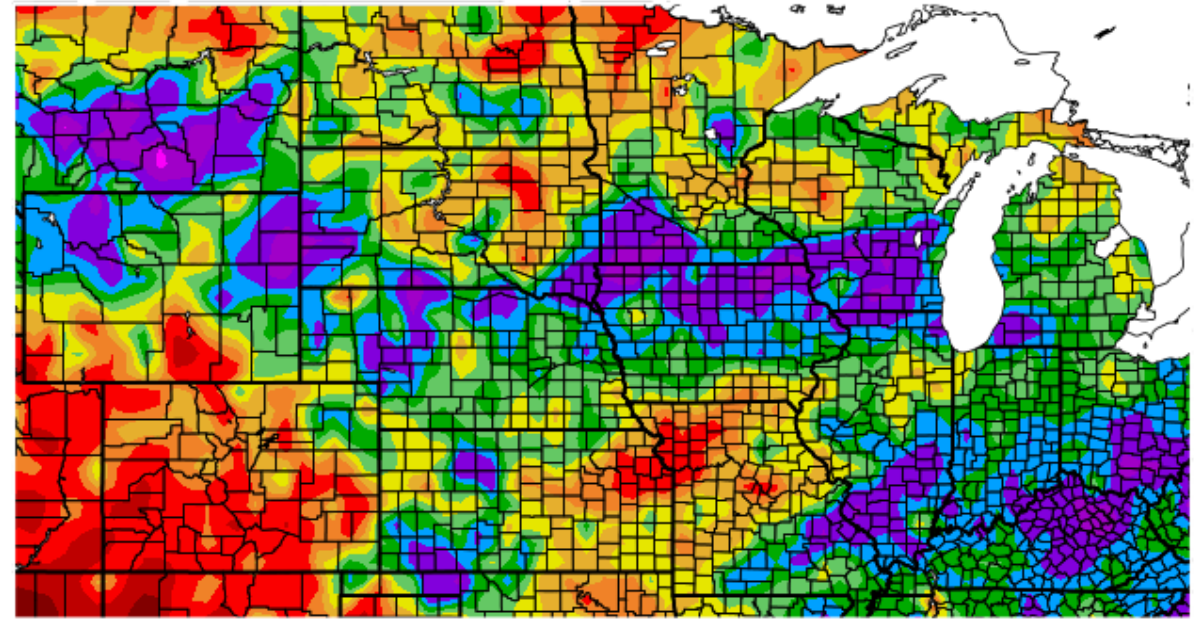


Calendar Year Precipitation

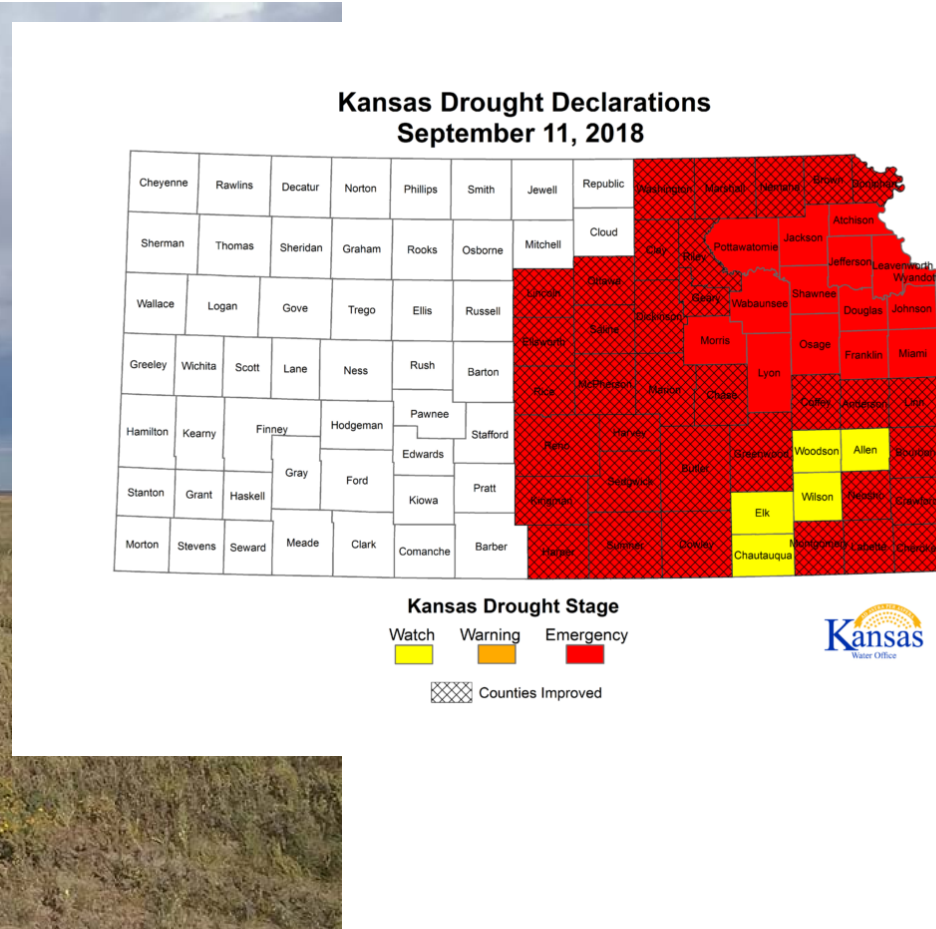
Departure from Normal Precipitation (in)
1/1/2018 - 9/18/2018



Percent of Normal Precipitation (%)
1/1/2018 - 9/18/2018



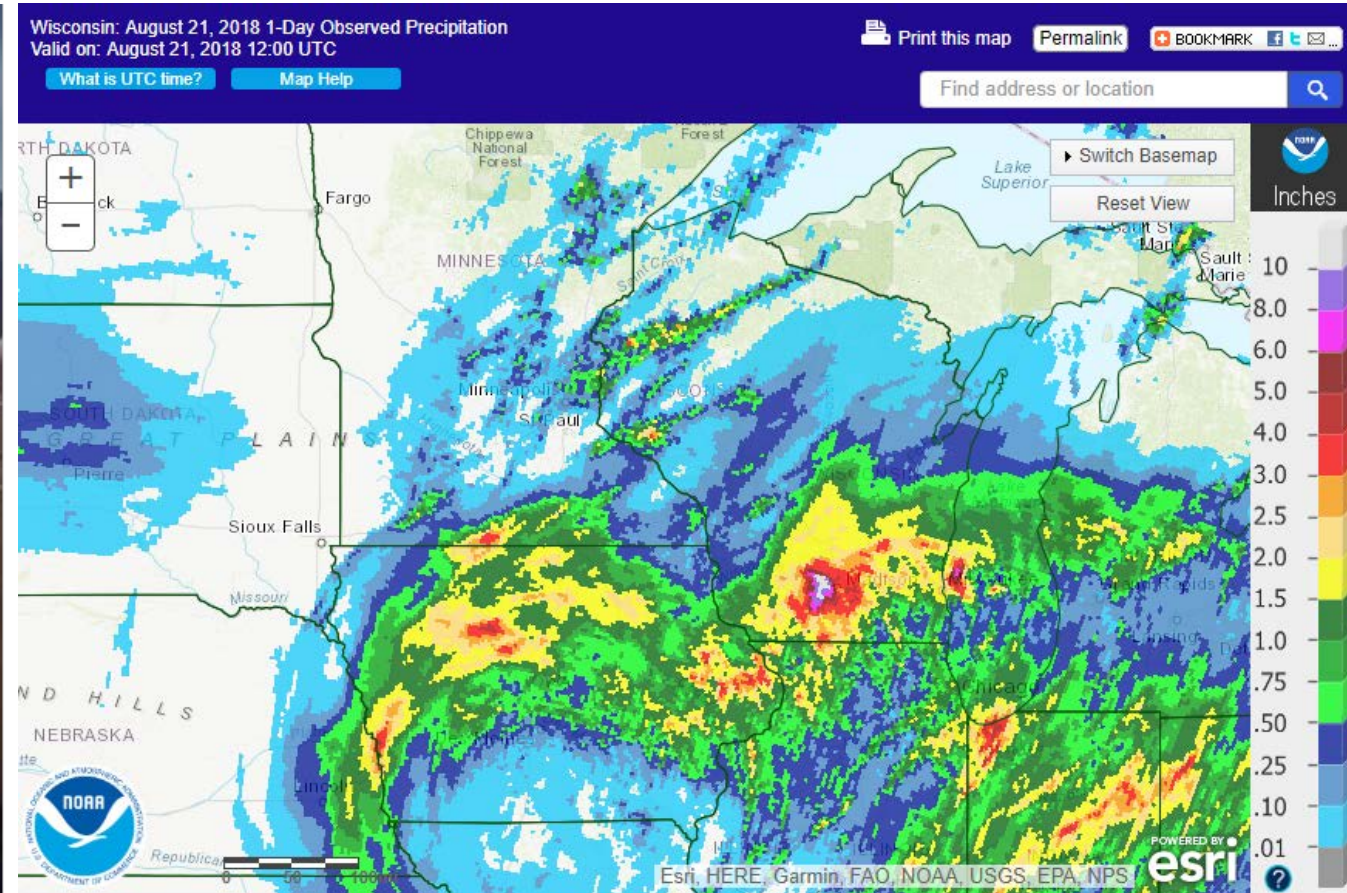
Regional Impacts



Flooding Rains through the Midwest



The Wapsipincon River reached major flood stage with several crests in early September impacting Iowa, Illinois, Wisconsin, Missouri as well as the mainstem Mississippi River.

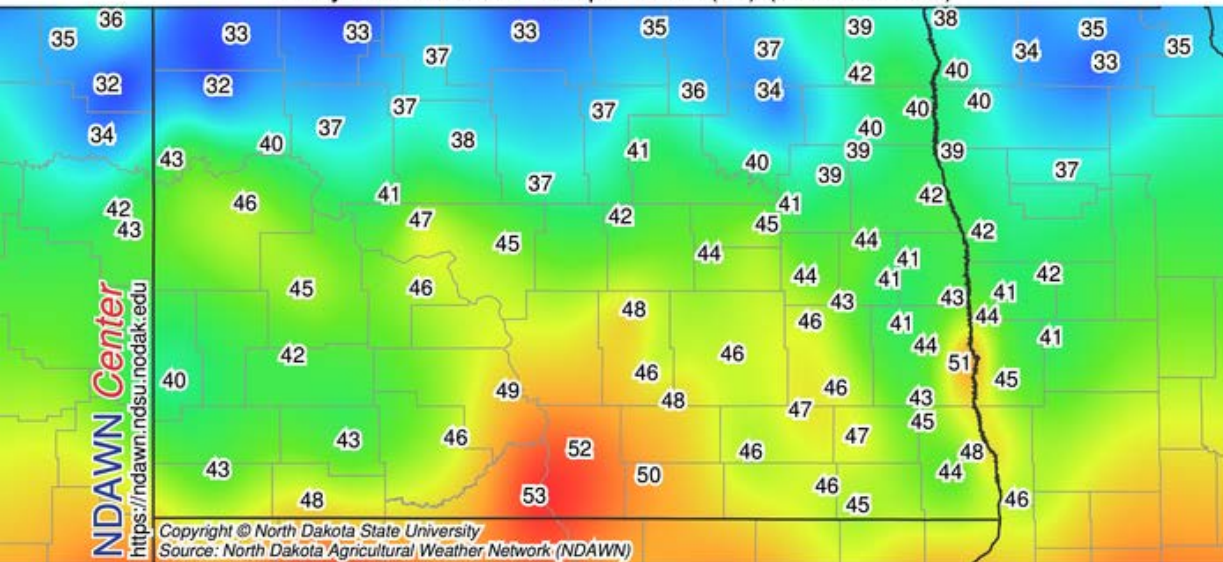


Record flooding in southwest Wisconsin: In late August, areas in and around Madison had reports of 10-11 inches of rain with some approaching 15 inches.

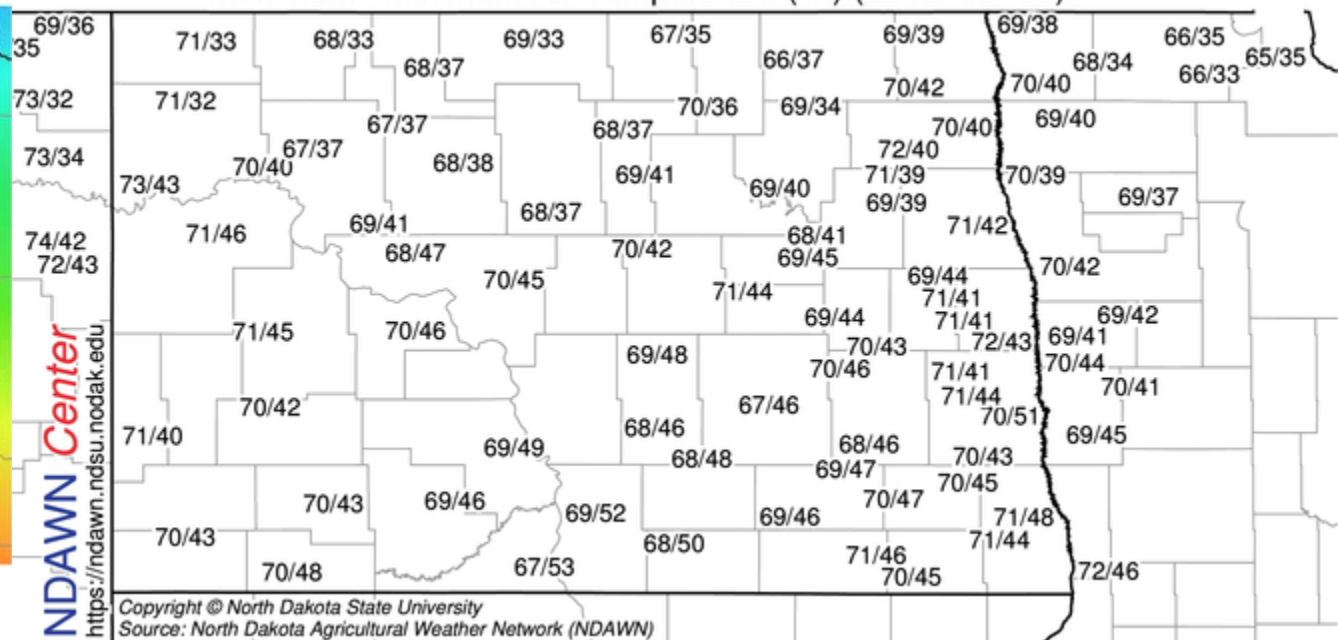
Early Frost in North Dakota

We has some widespread frost in northern counties on Sep 5. Recently, low land areas did receive a damaging frost. We haven't seen a lot of frost damage in other areas. I received the following comments from McHenry County about this: *"I live in the northern portion of McHenry County and my tomatoes are still producing with very little damage to the leaves. The crop have been so drought stressed that I can't tell if damage done to them was due to frost our drought. The leaves on the beans and corn did seem to turn faster after that date."*

Daily Minimum Air Temperature (°F) (2018-09-05)



Maximum / Minimum Air Temperature (°F) (2018-09-05)



Regional Impacts

- ❑ Drought improved over Iowa at the end of August and early September with 6-10 inches of rain.
- ❑ Rain and heat have spoiled the popular Honeycrisp Apple crop in Ohio where the combination caused widespread disease issues with the crop.
- ❑ Flash Flooding in Manhattan, KS on September 3-4, 2018
- ❑ Much of western Colorado is experiencing its record warmest Water Year to date. Some isolated parts of western CO are also experiencing their record driest water-year-to-date.
- ❑ Northeast Colorado continues to be a “bright” spot. Reports from there are that it’s drying out now, but the warm temperatures have been beneficial for late planted corn.

KCP&L Temporarily Expands Payment Options for Customers

8/31/2018

Media Contact

KCP&L 24-hour Media Hotline
[\(816\) 392-9455](tel:8163929455)

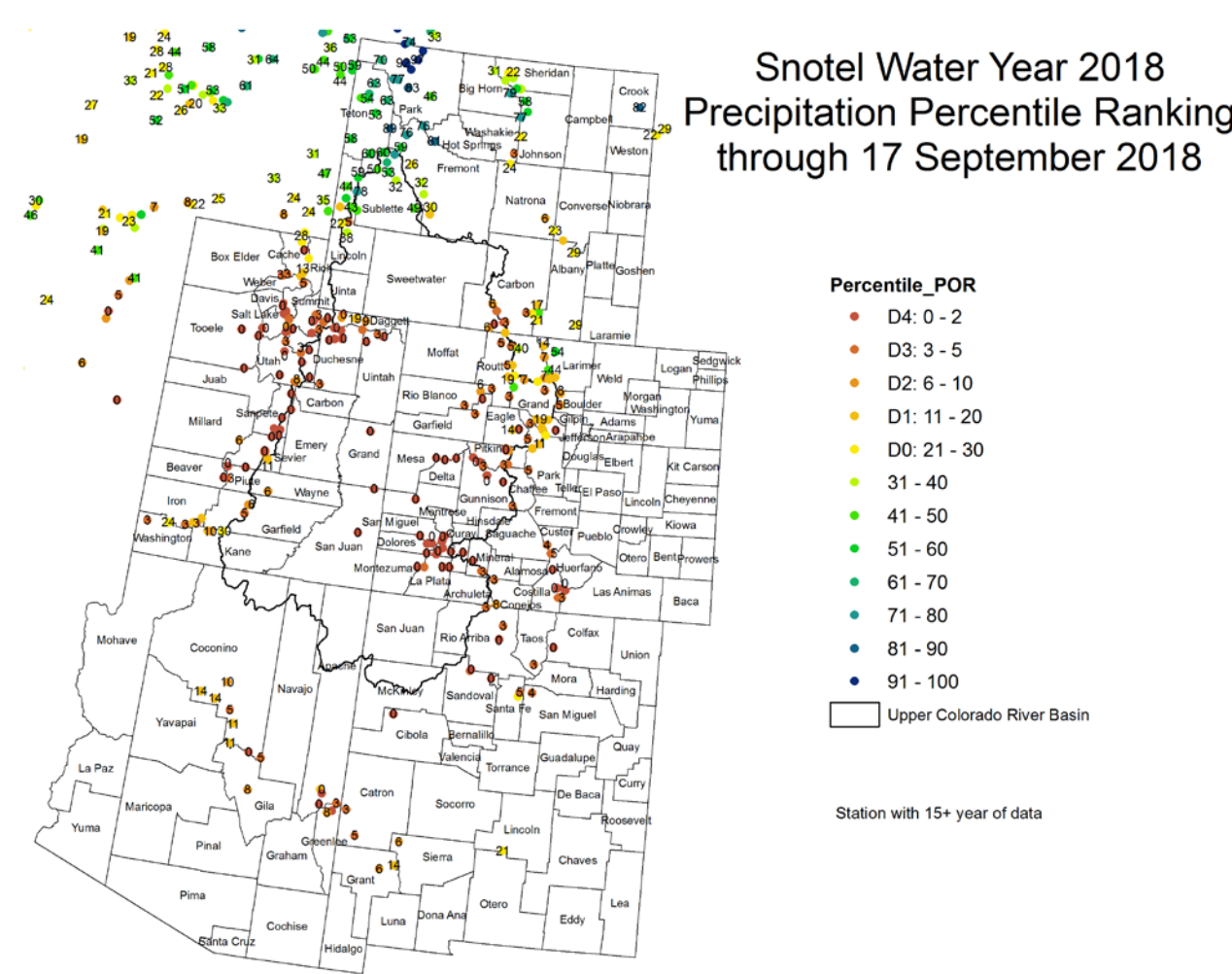
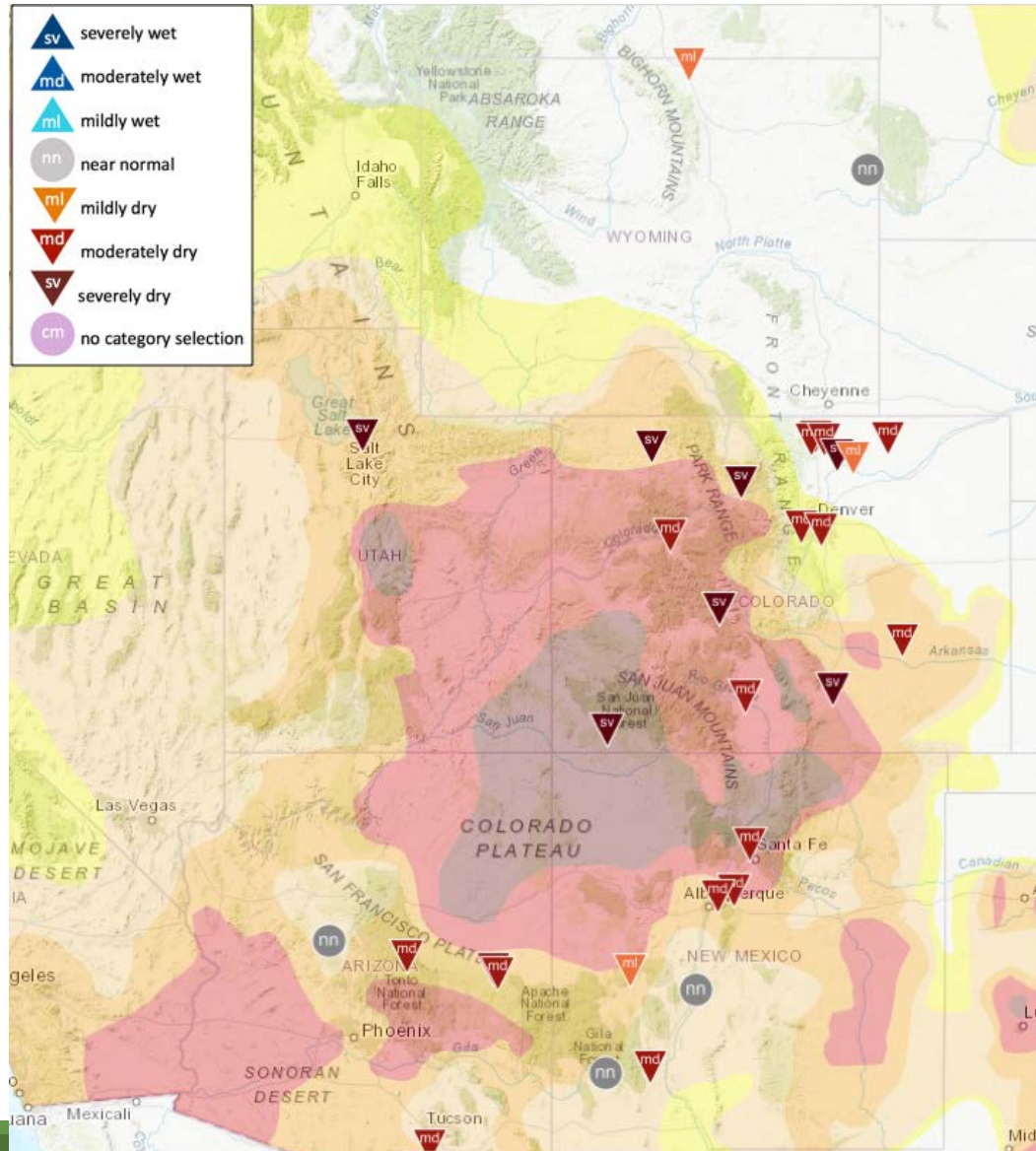
KCP&L urges customers to call to set up payment arrangements following the holiday weekend

KANSAS CITY, Mo., Aug. 31, 2018 — As a result of high customer bills due to one of the [hottest summers on record](#), KCP&L is temporarily expanding its customer payment options and delaying residential disconnections.

Effective immediately and through the month of September, KCP&L will not disconnect residential customers. Further, customers will be offered a four-month period to pay their balances. Customers should be aware that disconnect notices, including letters and phone calls, will continue to be sent out so that customers remain aware of their balances and can work toward paying them off to avoid disconnection once this grace period concludes Sept. 30.

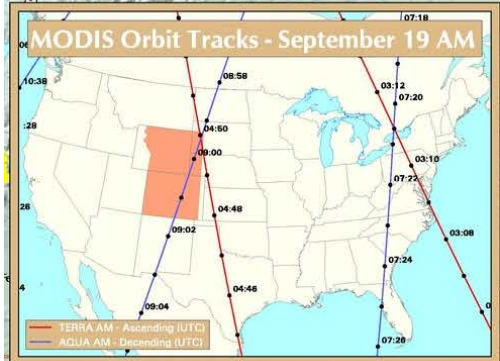
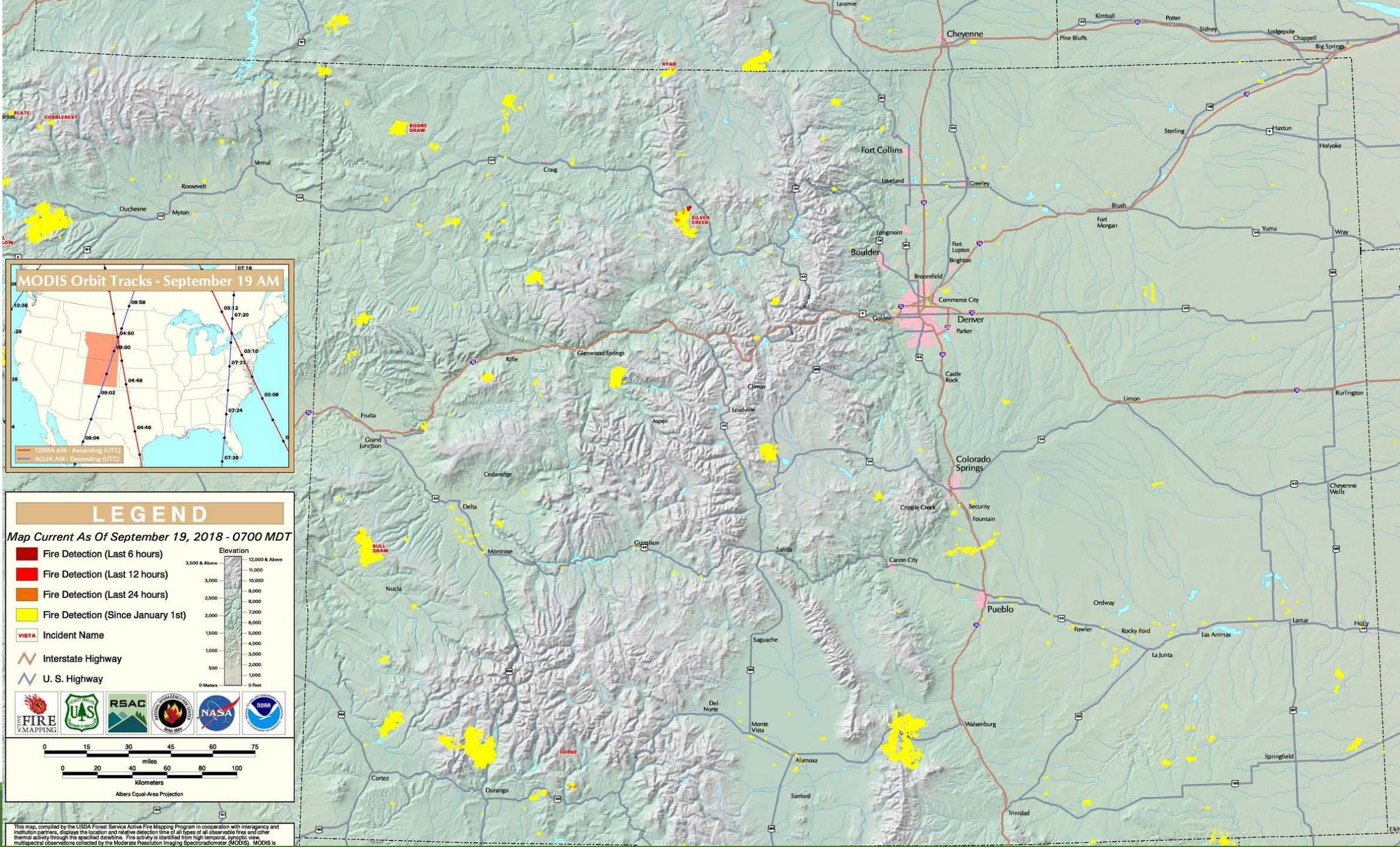
“We understand that our customers are feeling the stress of higher bills due to one of the hottest summers on record,” said Chuck Caisley, Chief Customer Officer. “We are providing extra time and additional payment options to help customers manage this expense.”

Colorado: Hot and Dry



Snotel Water Year 2018
Precipitation Percentile Ranking
through 17 September 2018

- Percentile_POR**
- D4: 0 - 2
 - D3: 3 - 5
 - D2: 6 - 10
 - D1: 11 - 20
 - D0: 21 - 30
 - 31 - 40
 - 41 - 50
 - 51 - 60
 - 61 - 70
 - 71 - 80
 - 81 - 90
 - 91 - 100
- Upper Colorado River Basin
- Station with 15+ year of data



LEGEND

Map Current As Of September 19, 2018 - 0700 MDT

- Fire Detection (Last 6 hours)
- Fire Detection (Last 12 hours)
- Fire Detection (Last 24 hours)
- Fire Detection (Since January 1st)
- VISTA Incident Name
- Interstate Highway
- U. S. Highway

Elevation

3,500 & Above

12,000 & Above

11,000

10,000

9,000

8,000

7,000

6,000

5,000

4,000

3,000

2,000

1,000

0 Meters

0 Feet

0 15 30 45 60 75

0 20 40 60 80 100

miles

kilometers

Albers Equal-Area Projection

This map, compiled by the USDA Forest Service Active Fire Mapping Program in cooperation with interagency and institution partners, displays the location and relative detection time of all types of all observable fires and other thermal activity through the specified date. Fire activity is identified from high temporal, synoptic view multispectral observations collected by the Moderate Resolution Imaging Spectroradiometer (MODIS). MODIS is

Missouri River Basin

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

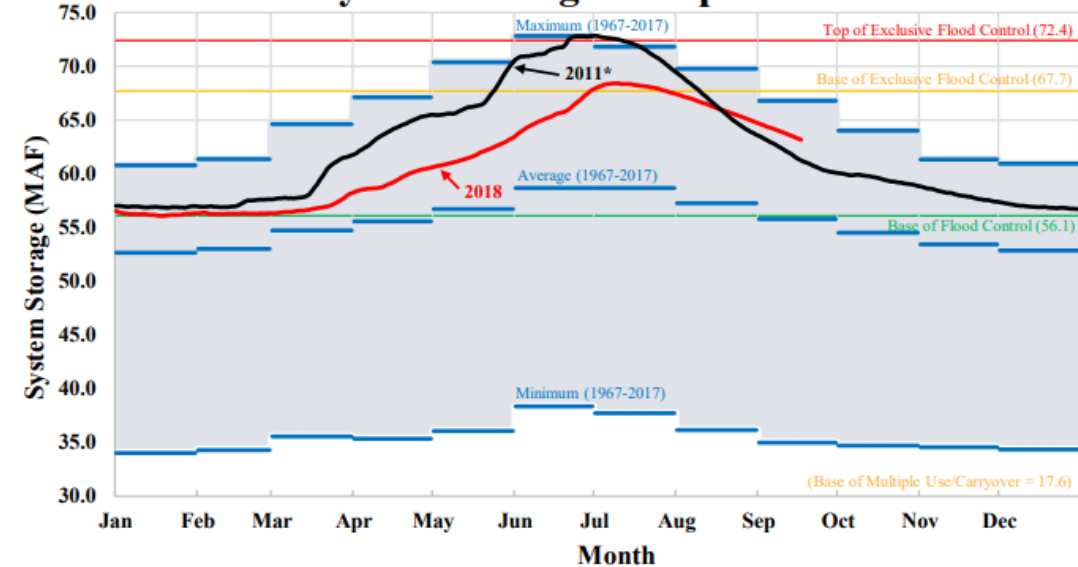
Missouri River Basin – Weekly Update – 18 Sep 2018

Mainstem Reservoir Status:

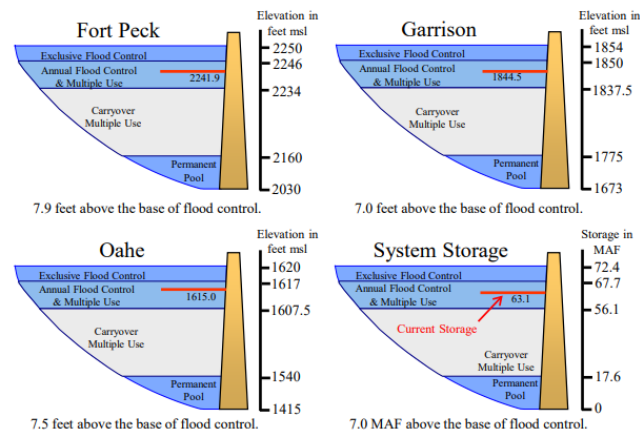
- ❖ System storage is currently 63.1 MAF, 7.0 MAF above the base of the Annual Flood Control and Multiple Use Zone. Since System storage peaked at 68.4 MAF approximately 10 weeks ago, 5.3 MAF have been released from the System. Over the next 11 weeks or so, most of the remaining 7.0 MAF will be evacuated.
- ❖ The updated U.S. Drought Monitor, released last Thursday, shows drought conditions are present in every Basin state except Nebraska.
- ❖ Gavins Point releases are expected to be about 58,000 cfs for the next several months, but will be adjusted if downstream conditions warrant.
- ❖ 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



Current Reservoir Levels



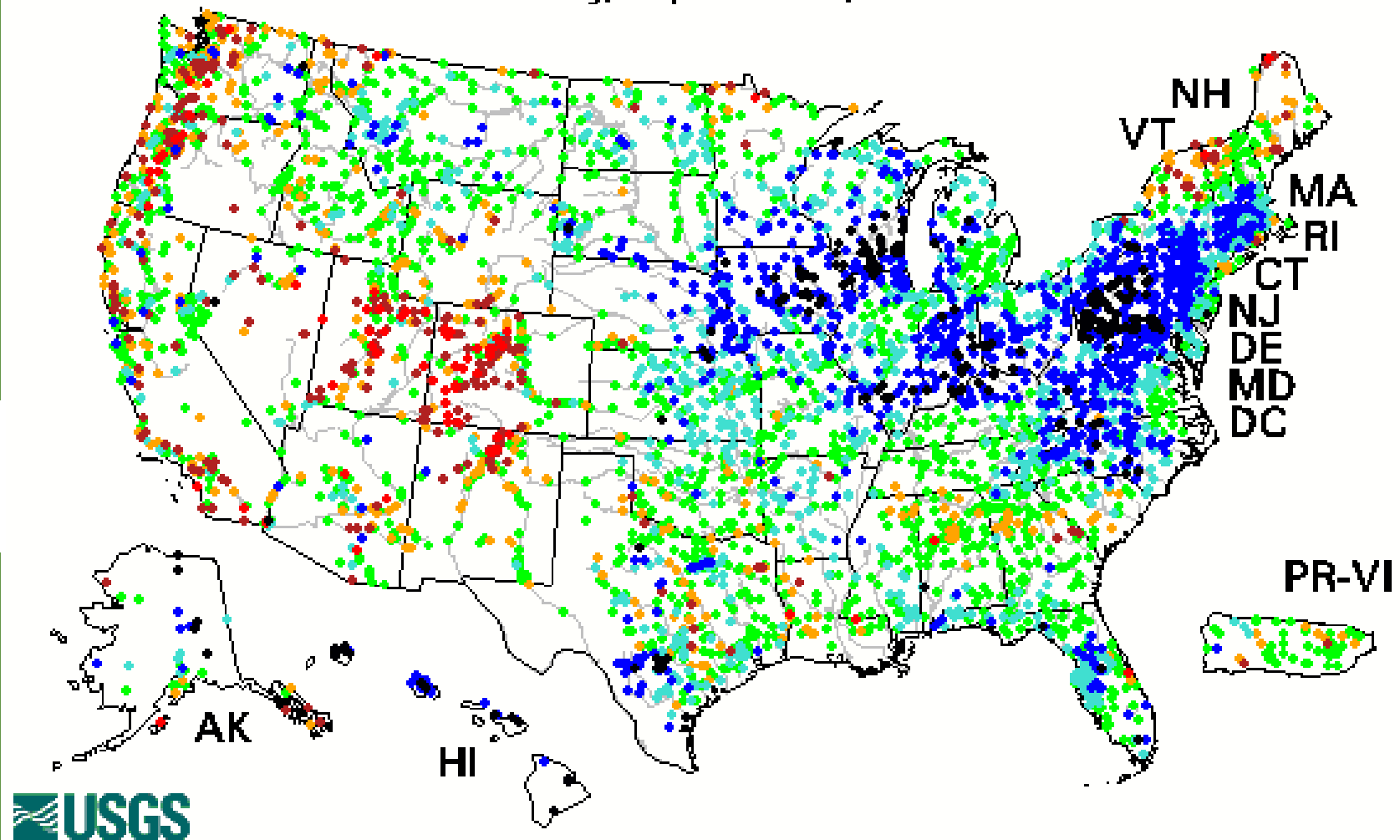
OMAHA, NE - Higher-than-average releases from all Missouri River Mainstem System dams, including Gavins Point, will continue through the fall, the U.S. Army Corps of Engineers announced today.

The 2018 runoff forecast in the Missouri River Basin above Sioux City, Iowa, is 39.8 million acre feet, 157 percent of average. August runoff was 1.8 MAF, 138 percent of normal.

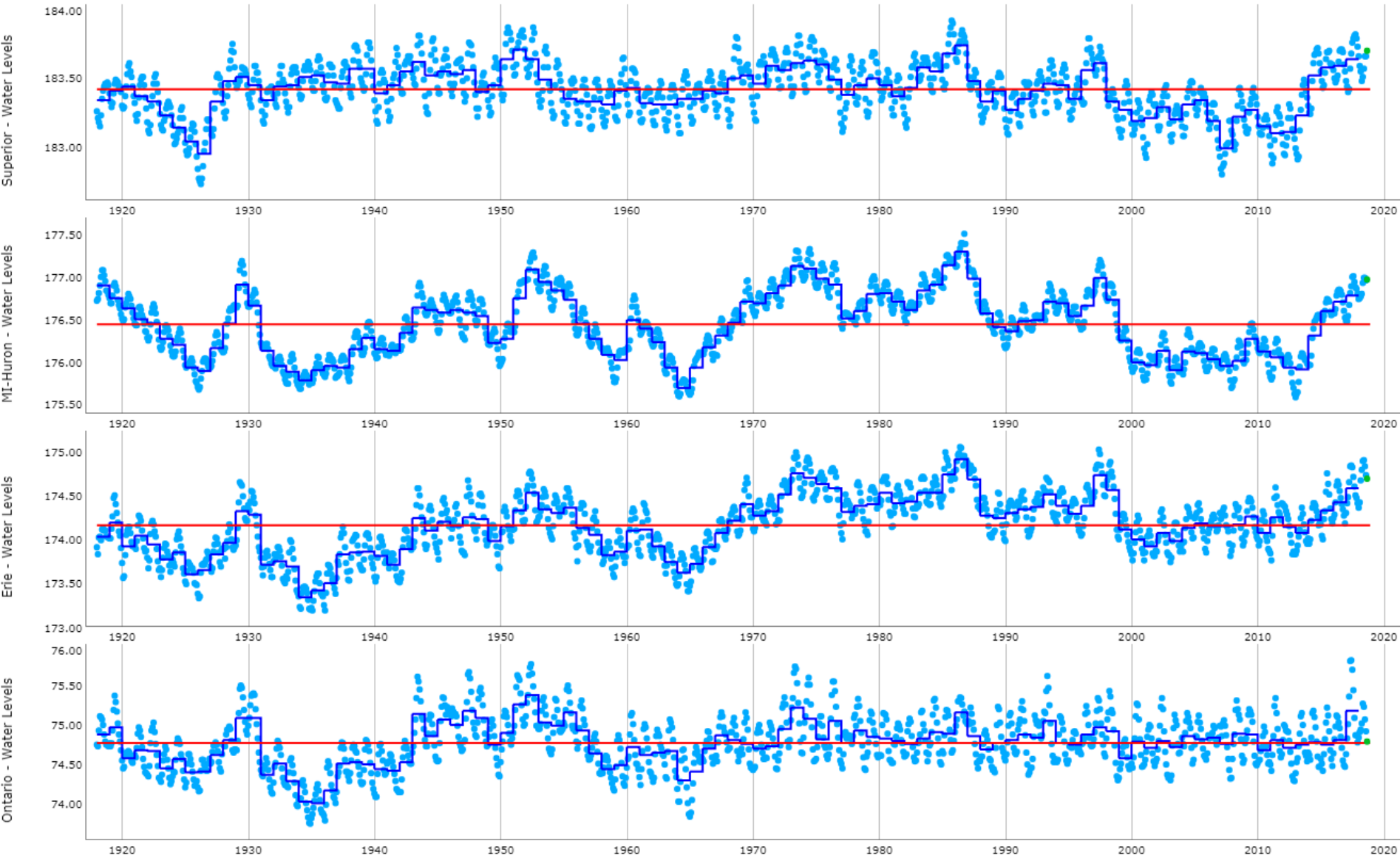
<http://www.nwd-mr.usace.army.mil/rcc/reports/pdfs/weeklyupdate.pdf>

28-Day Average Streamflow

Tuesday, September 18, 2018



Great Lakes Water Levels



Scientists investigating 'unprecedented' algae bloom in Lake Superior

 Dan Kraker · Duluth · Aug 14, 2018

Environment

YSIS (GLSEA)

261 09/18/2018

within +/-10 Days: 100.0%

48°

CoastWatch

46°

Toronto

Buffalo

42°

80°

78°

Research Laboratory

Great Lakes
current water
temperature



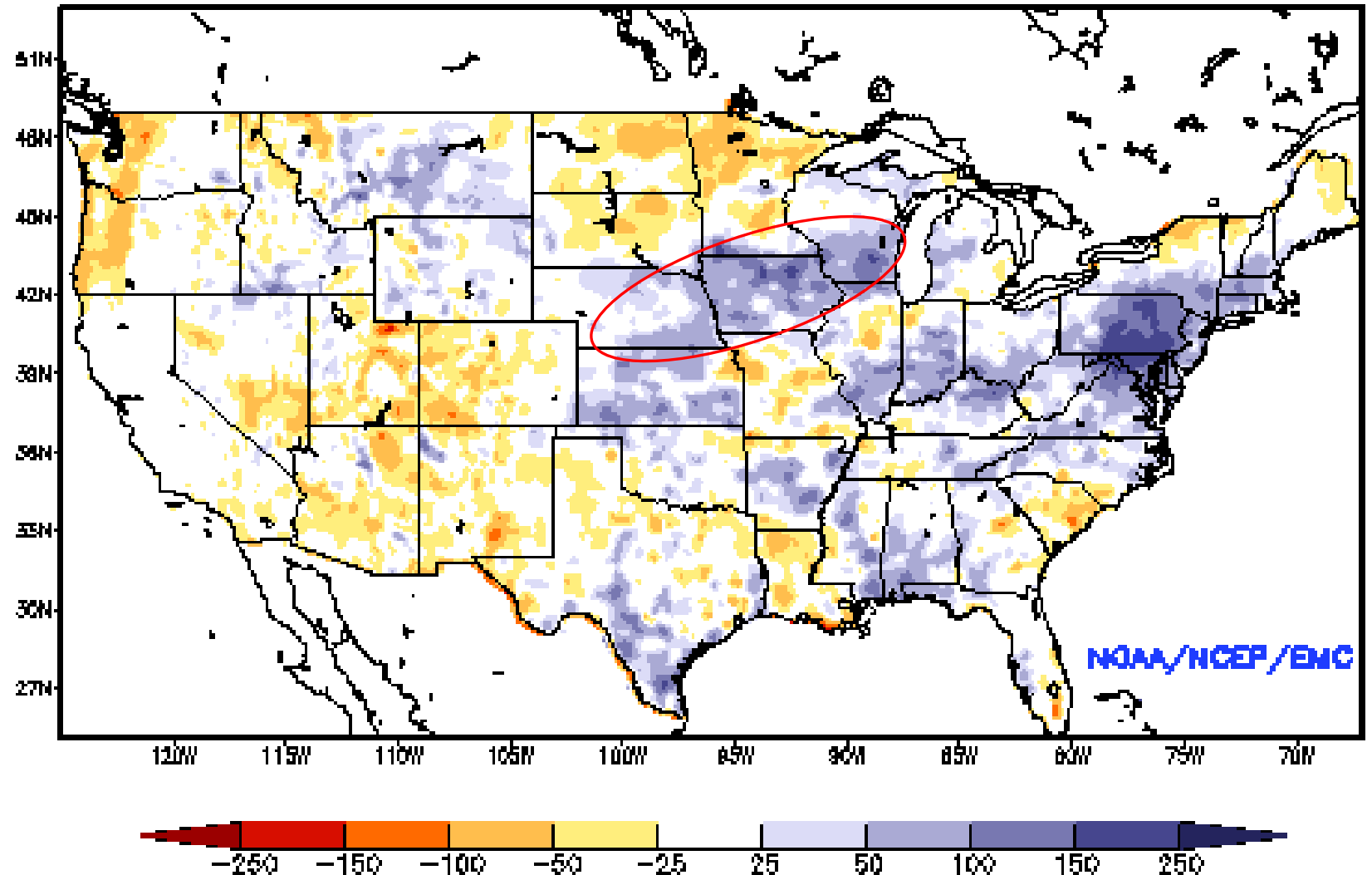
For June, July, August 2018, except for most of Lake Superior and central Lake Huron, the Great Lakes experienced higher than long-term average (1995-2017) surface water temperatures by almost 3 deg. C in some places (notably in Lake Michigan and Lake Ontario).

Researchers are investigating a major algal bloom that surfaced last week in Lake Superior between Duluth and the Apostle Islands. Courtesy of Brenda Moraska Lafrancois

Agricultural Impacts

Current Soil Moisture Anomaly

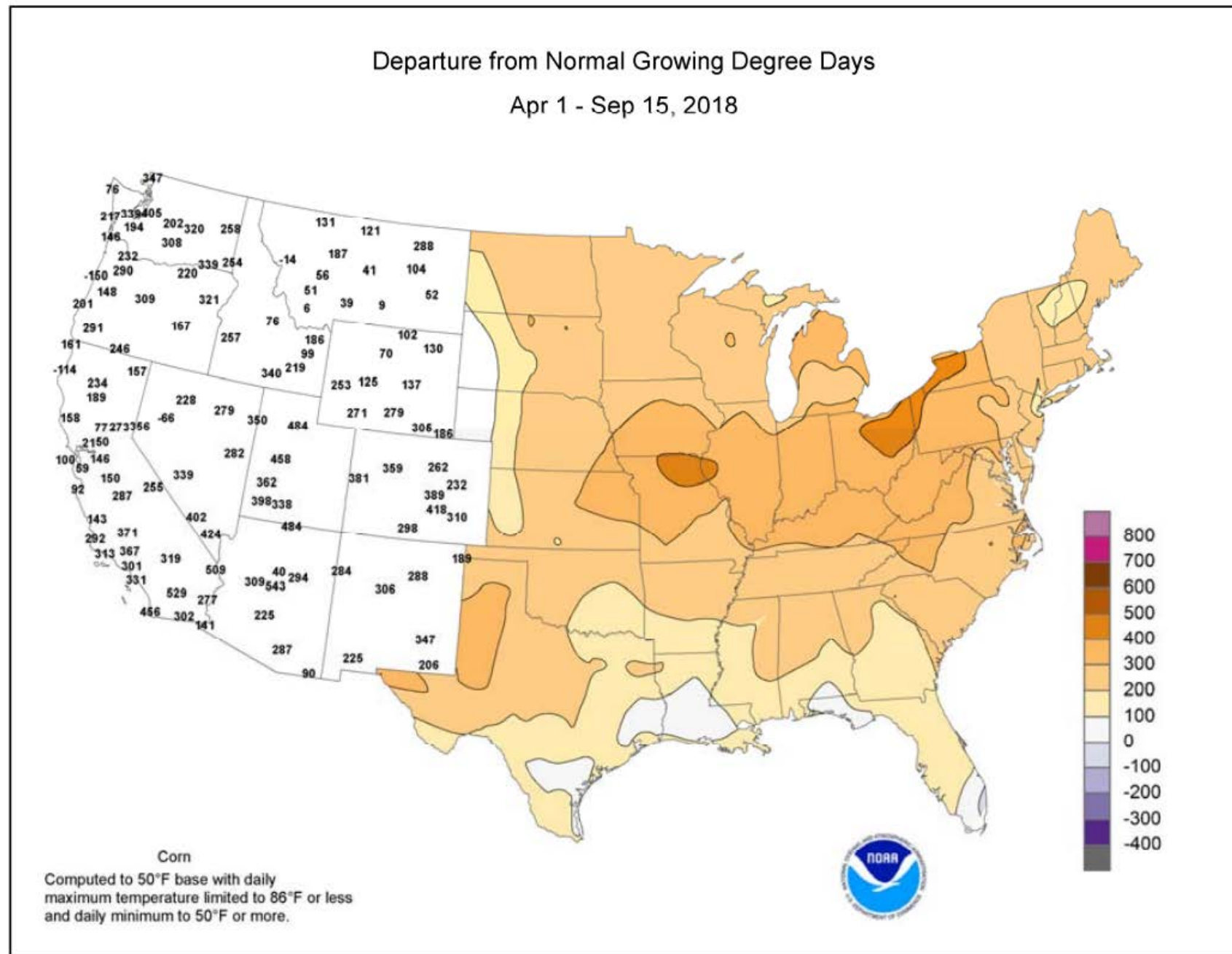
Ensemble-Mean - Current Total Column Soil Moisture Anomaly (mm)
NCEP NLDAS Products Valid: SEP 14, 2018



Departure from Normal Growing Degree Days

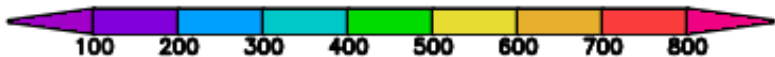
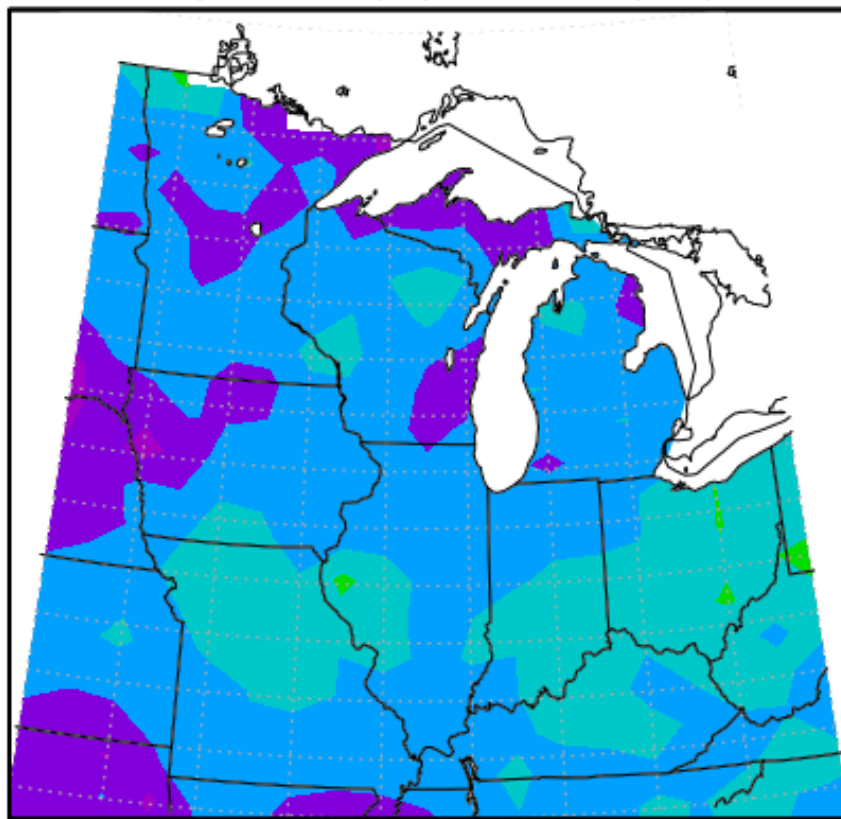
April 1-September 15, 2018

Computed for corn using a base of 50F and a maximum temperature of 86F



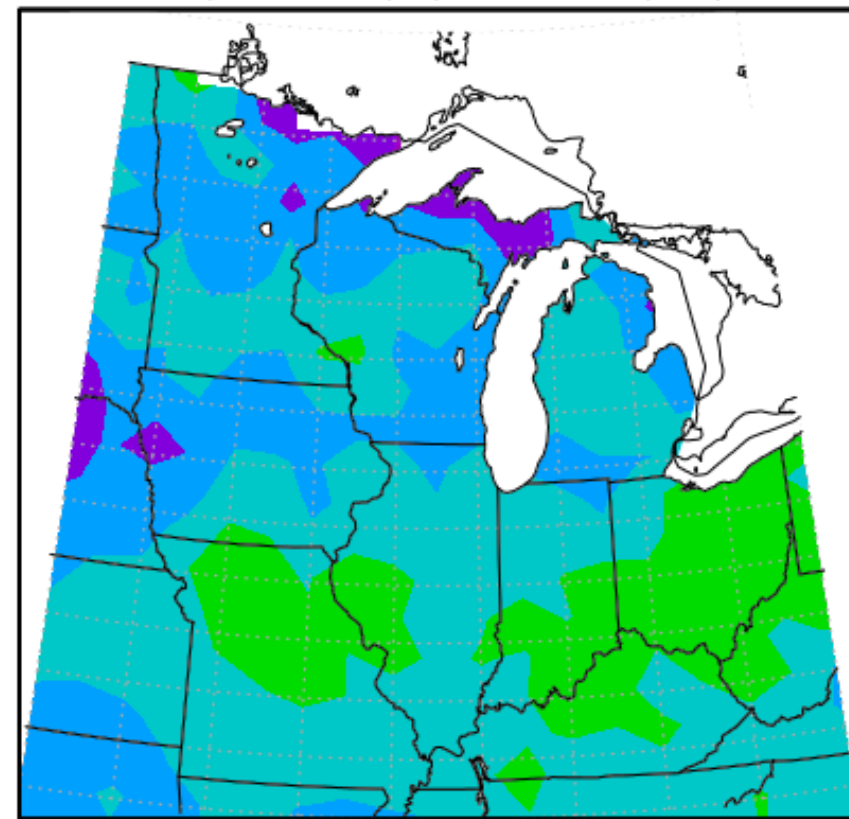
Growing Degree Day Departures

MGDD Departure, 4/1/2018 to 9/18/2018



Midwestern Regional Climate Center
Illinois State Water Survey
University of Illinois at Urbana-Champaign

MGDD Departure, 5/1/2018 to 9/18/2018



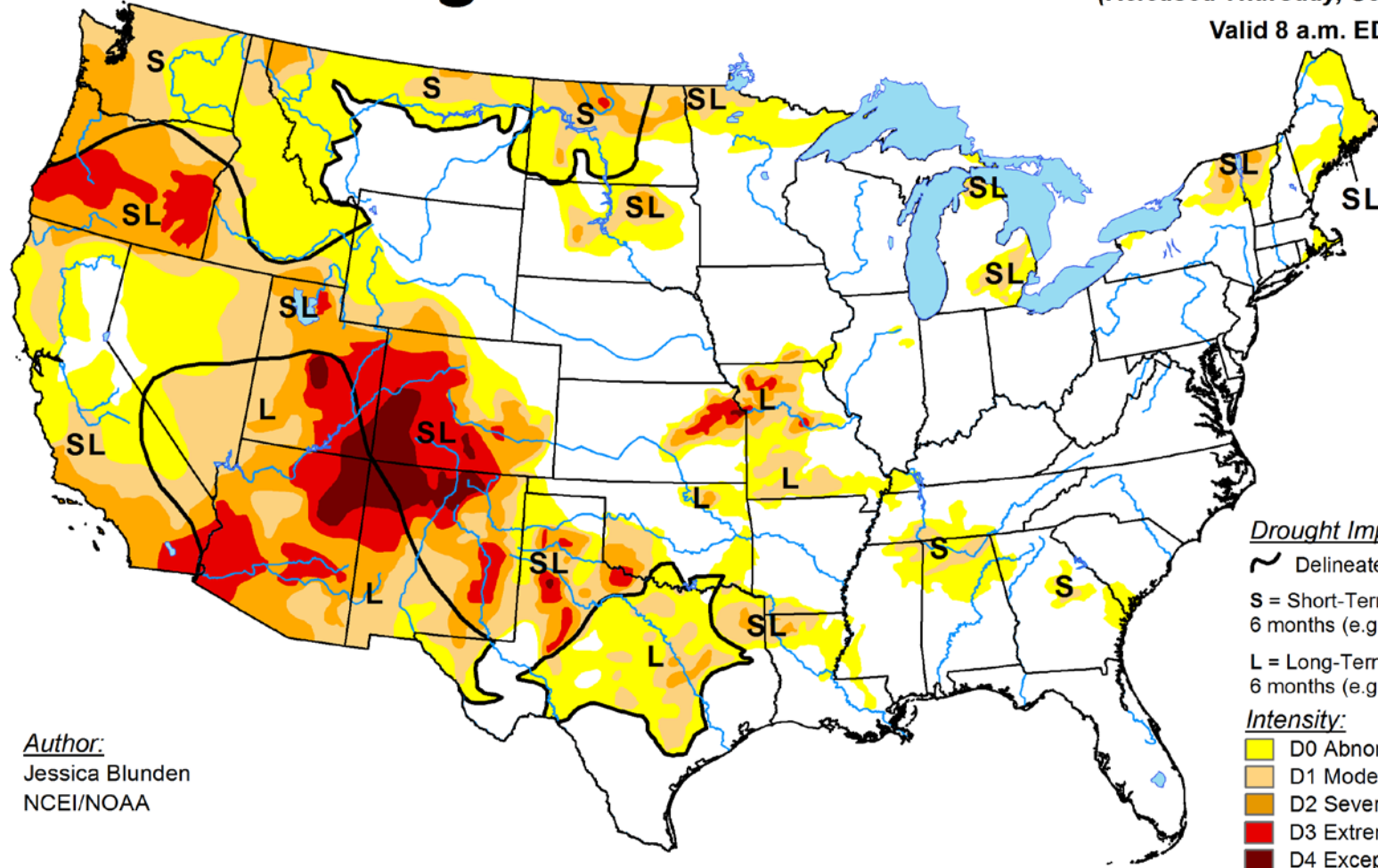
Midwestern Regional Climate Center
Illinois State Water Survey
University of Illinois at Urbana-Champaign

Drought Update

U.S. Drought Monitor

September 18, 2018
(Released Thursday, Sep. 20, 2018)

Valid 8 a.m. EDT



Author:
Jessica Blunden
NCEI/NOAA

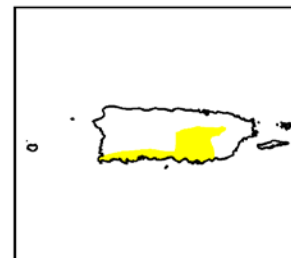
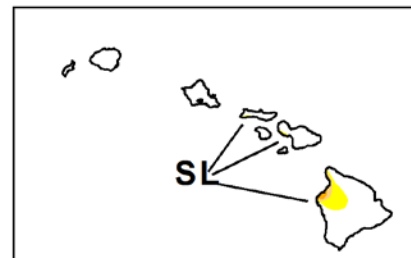
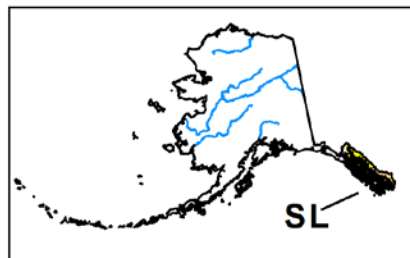
Drought Impact Types:

- ~ Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

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.





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

Statistics

Statistics type: Traditional Percent Area ▾

Display: Statistics ▾

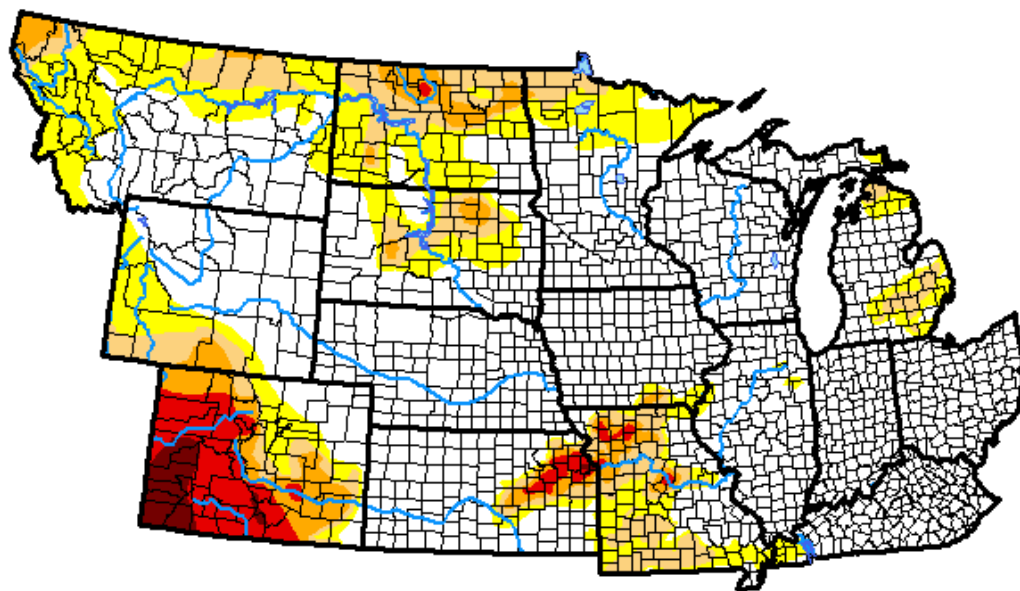
Export table:  

Week	Date	None	D0-D4	D1-D4	D2-D4	D3-D4	D4	DSCI
Current	2018-09-18	57.20	42.80	26.16	14.16	6.03	1.32	90
Last Week	2018-09-11	57.06	42.94	25.79	13.95	5.75	1.23	90
3 Months Ago	2018-06-19	59.56	40.44	22.66	13.82	6.88	1.53	85
Start of Calendar Year	2017-12-26	54.23	45.77	22.07	4.14	0.70	0.00	73
Start of Water Year	2017-09-26	68.98	31.02	11.65	4.19	1.97	0.72	50
One Year Ago	2017-09-19	69.04	30.96	13.07	4.71	2.00	0.72	51

As of 9/18/18 just over 61,000,000 people are being impacted by drought in the United States.

U.S. Drought Monitor NWS Central Region

September 18, 2018
(Released Thursday, Sep. 20, 2018)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	64.96	35.04	17.88	9.18	4.54	1.17
Last Week <i>09-11-2018</i>	65.81	34.19	17.06	8.78	4.48	0.91
3 Months Ago <i>06-19-2018</i>	69.55	30.45	15.88	8.30	3.59	0.70
Start of Calendar Year <i>01-02-2018</i>	44.74	55.26	22.30	7.69	2.03	0.00
Start of Water Year <i>09-26-2017</i>	50.80	49.20	24.09	12.89	6.13	2.26
One Year Ago <i>09-19-2017</i>	44.82	55.18	28.25	14.24	6.21	2.26

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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Jessica Blunden
NCEI/NOAA



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

U.S. Drought Monitor

Missouri Watershed

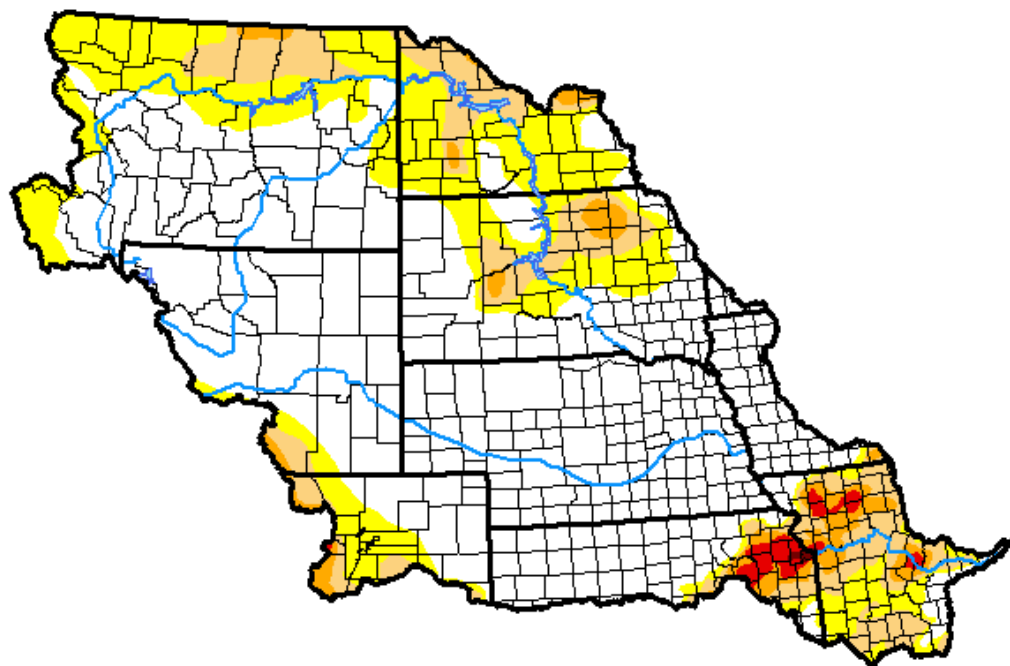
September 18, 2018

(Released Thursday, Sep. 20, 2018)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	64.12	35.88	14.79	4.30	1.02	0.07
Last Week <i>09-11-2018</i>	65.15	34.85	13.75	3.95	1.01	0.07
3 Months Ago <i>06-19-2018</i>	70.18	29.82	12.73	3.48	0.26	0.00
Start of Calendar Year <i>01-02-2018</i>	22.90	77.10	29.23	11.42	4.42	0.00
Start of Water Year <i>09-26-2017</i>	45.50	54.50	38.62	25.11	13.60	5.11
One Year Ago <i>09-19-2017</i>	35.71	64.29	42.91	27.52	13.62	5.11



Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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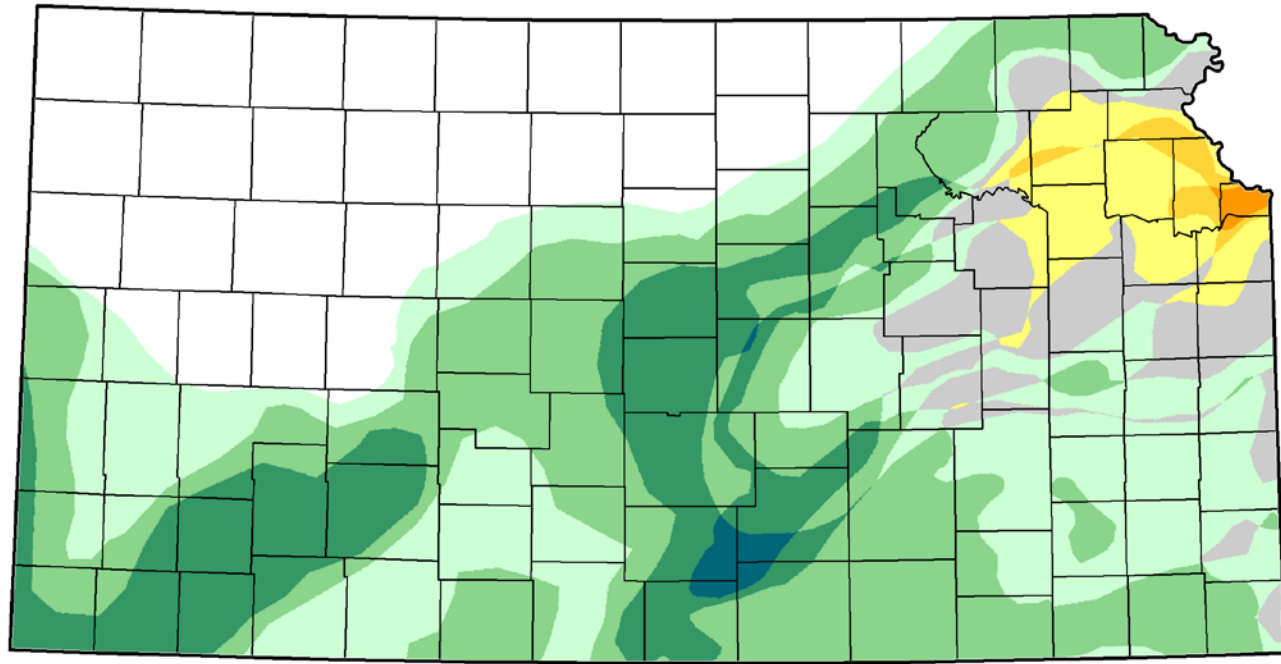
Author:

Jessica Blunden
NCEI/NOAA



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

U.S. Drought Monitor Class Change - Kansas 3 Months



- 5 Class Degradation
- 4 Class Degradation
- 3 Class Degradation
- 2 Class Degradation
- 1 Class Degradation
- No Change
- 1 Class Improvement
- 2 Class Improvement
- 3 Class Improvement
- 4 Class Improvement
- 5 Class Improvement

- Class Degradation
- Class Degradation
- Class Degradation
- Class Degradation
- Class Degradation
- o Change
- Class Improvement
- Class Improvement
- Class Improvement
- Class Improvement
- Class Improvement

**September 18, 2018
compared to
June 26, 2018**

<http://droughtmonitor.unl.edu>

Climate Outlooks

7-day precipitation forecast

8-14 day outlook

Monthly Outlook

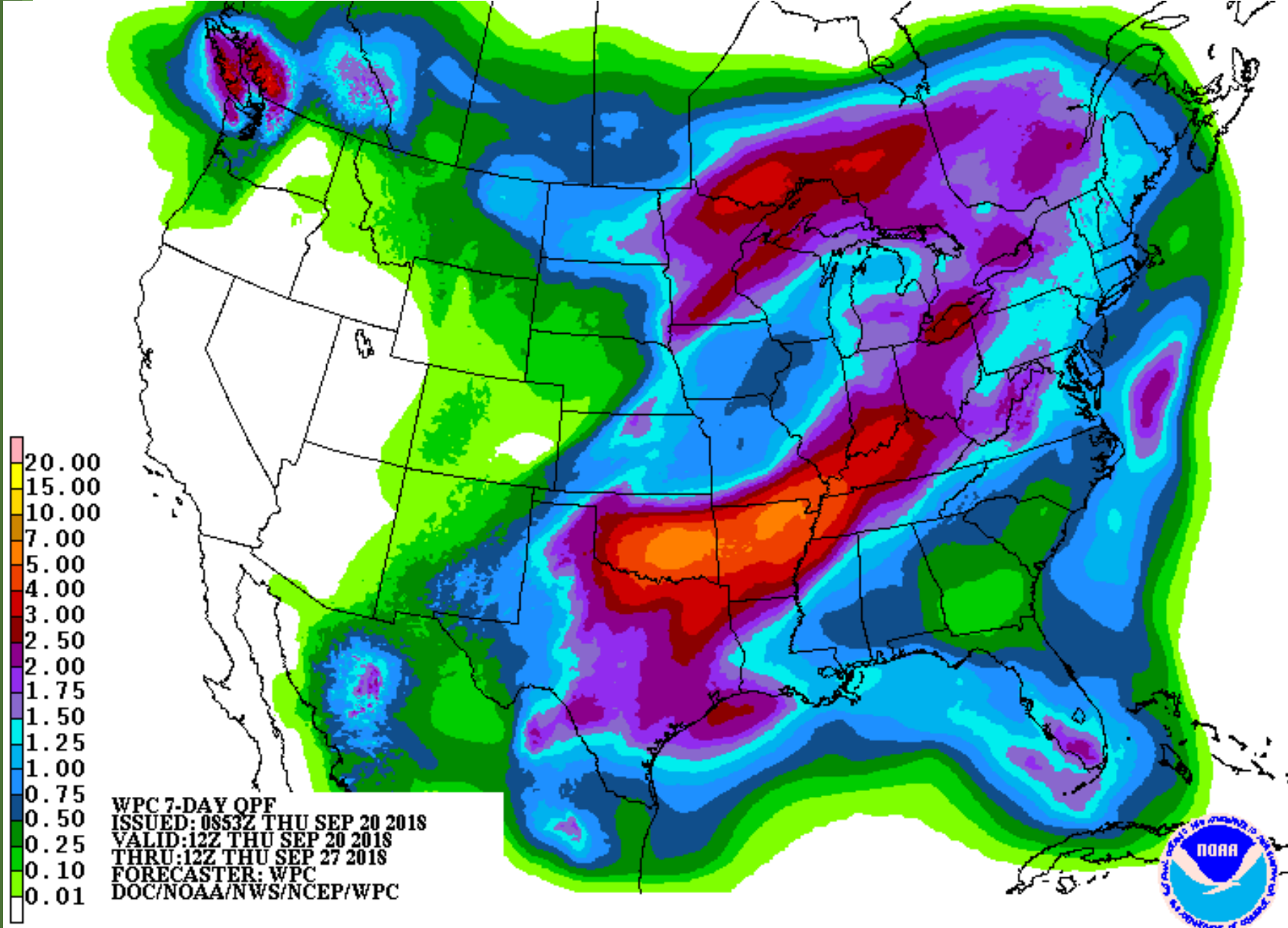
Autumn Outlook (Sep-Nov)

Winter Outlook (Dec-Feb)

Seasonal Drought Outlook

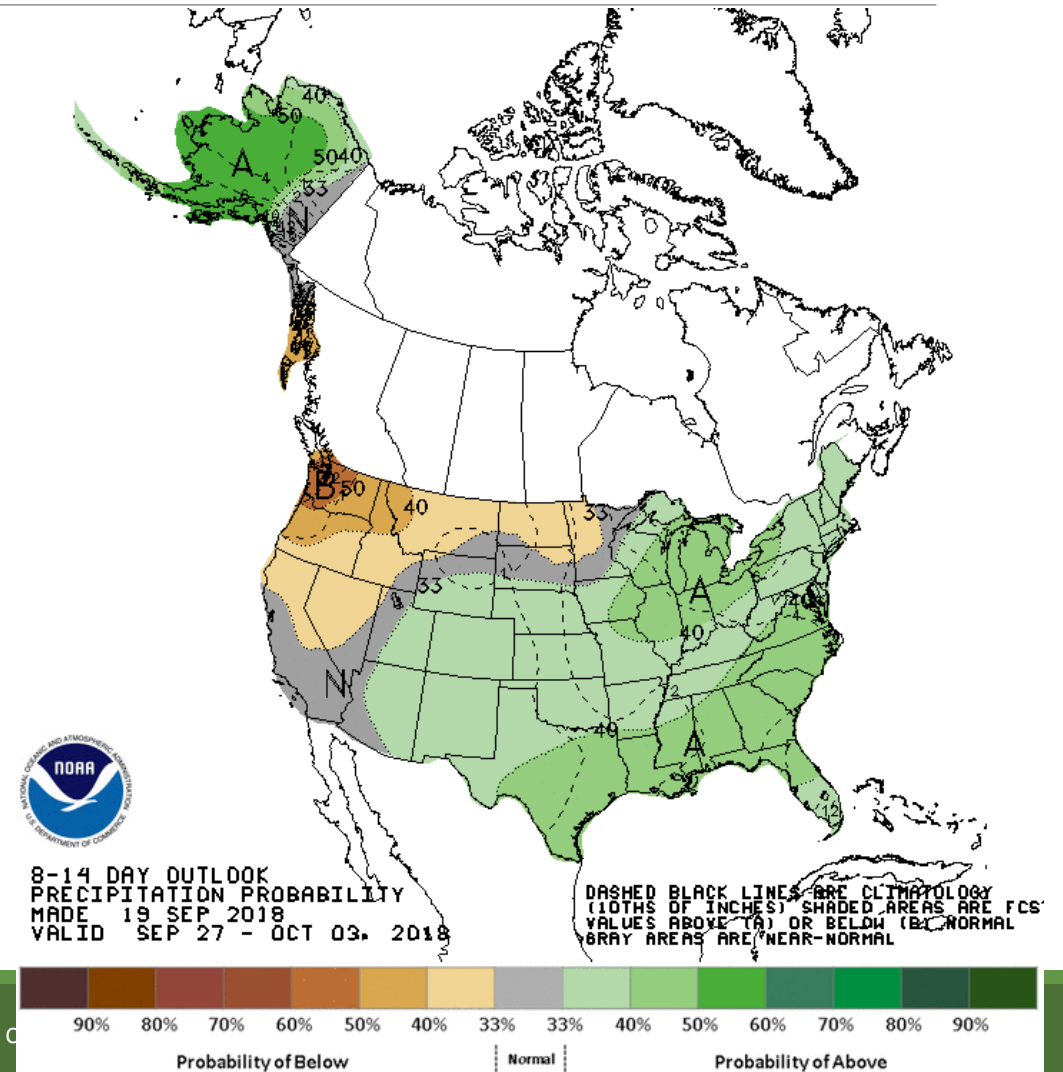
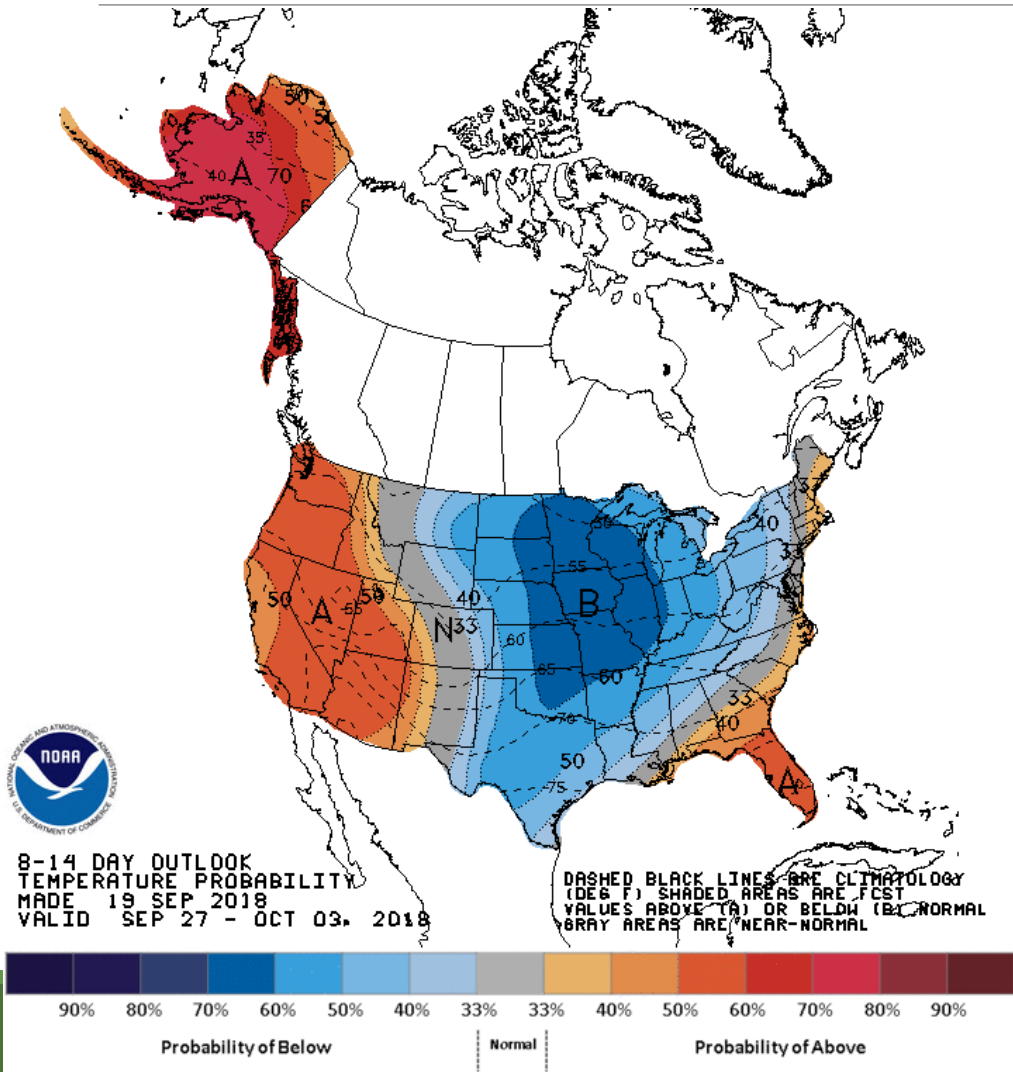
7 Day QPF valid from September 20-27, 2018

<http://www.wpc.ncep.noaa.gov/qpf/p168i.gif?1502982056>



8-14 day outlook for September 27-October 3, 2018

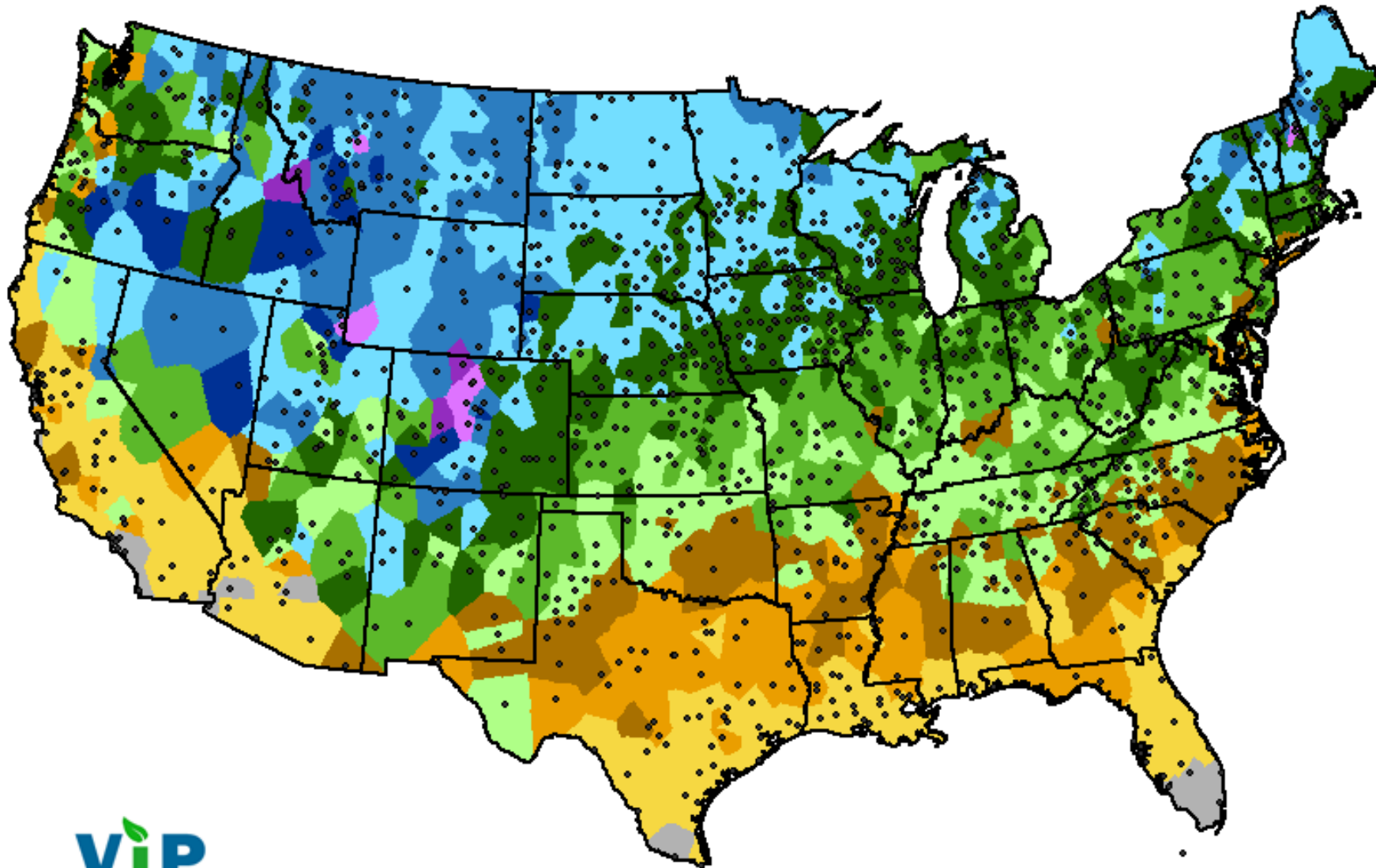
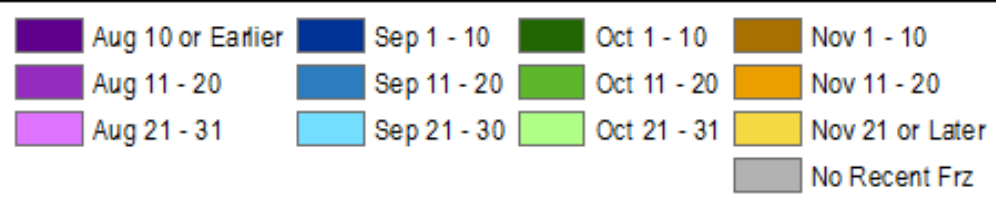
<http://www.cpc.ncep.noaa.gov/products/predictions/814day/>



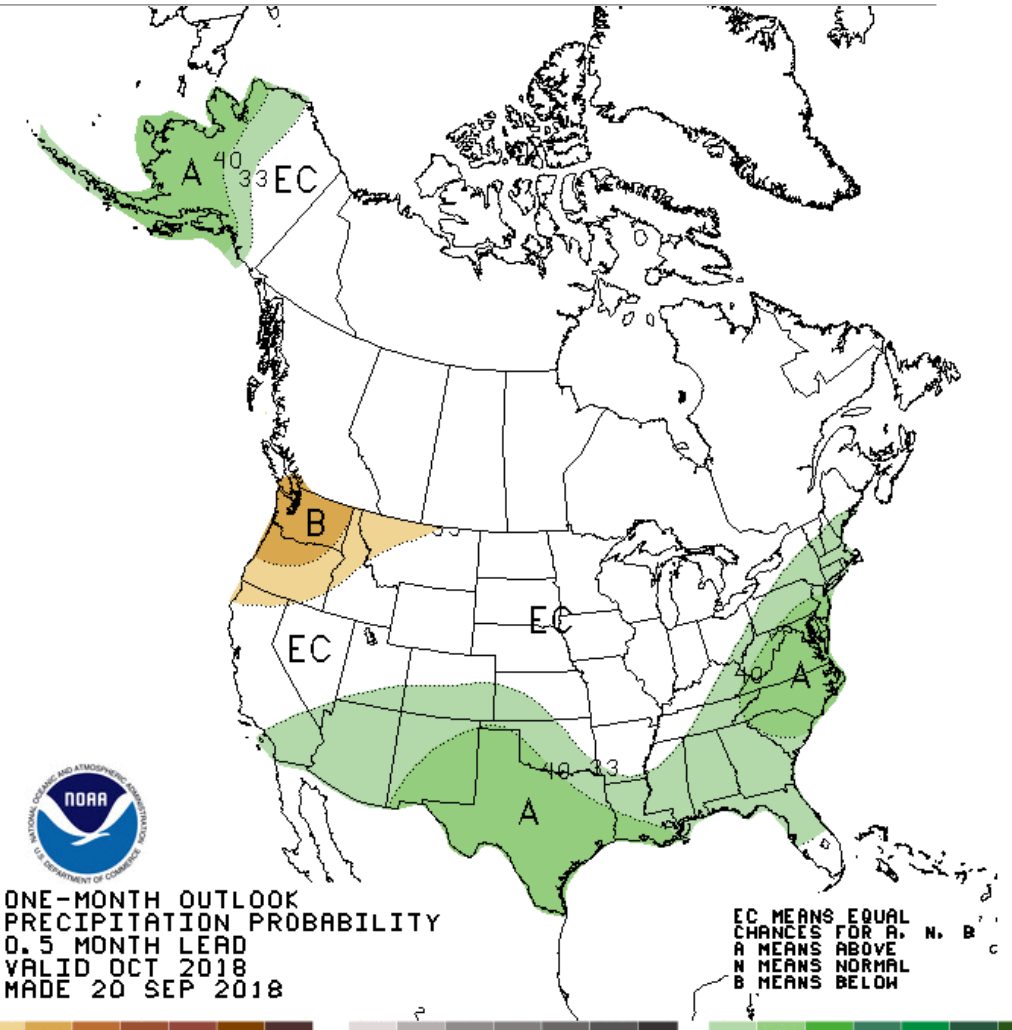
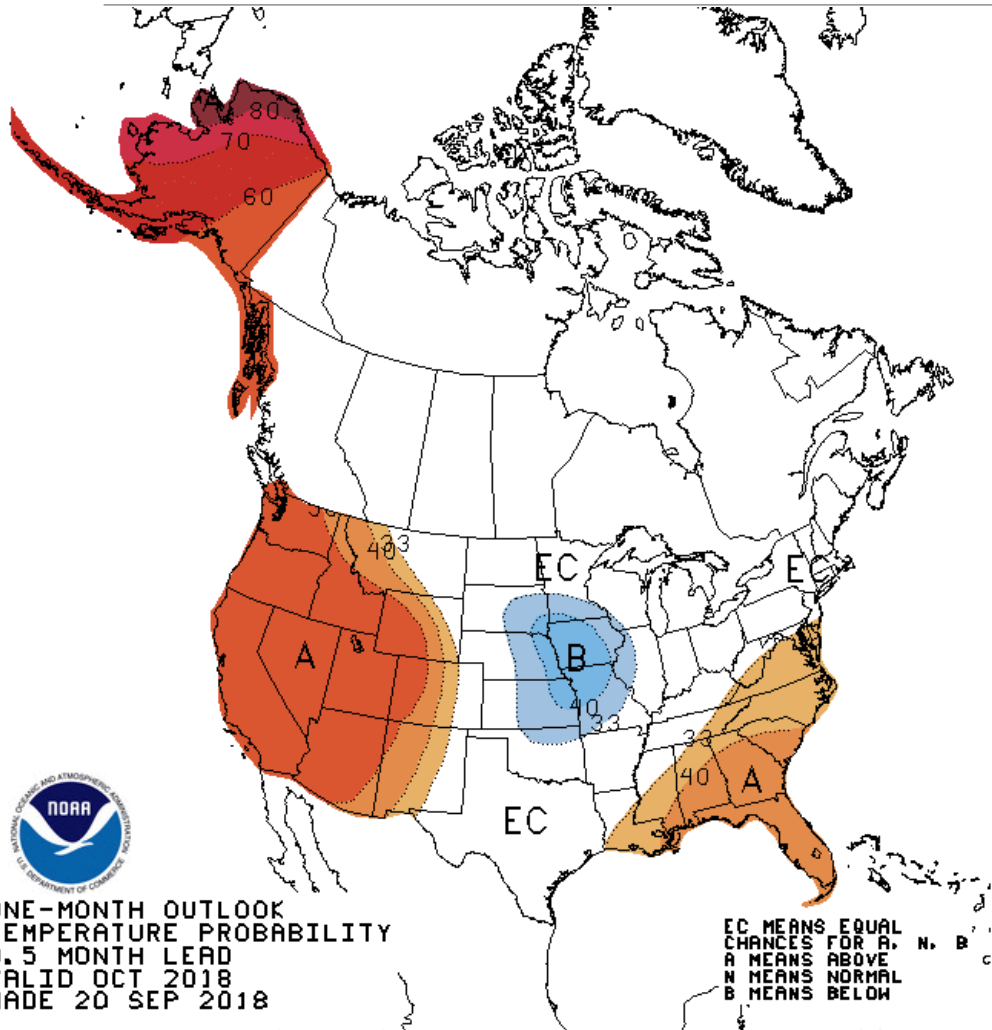
DROUGHT MITIGATION C

Climatological Date of Median First 32°F Freeze
For the years from 1980-81 to 2009-10

Median Defined as 50th Percentile

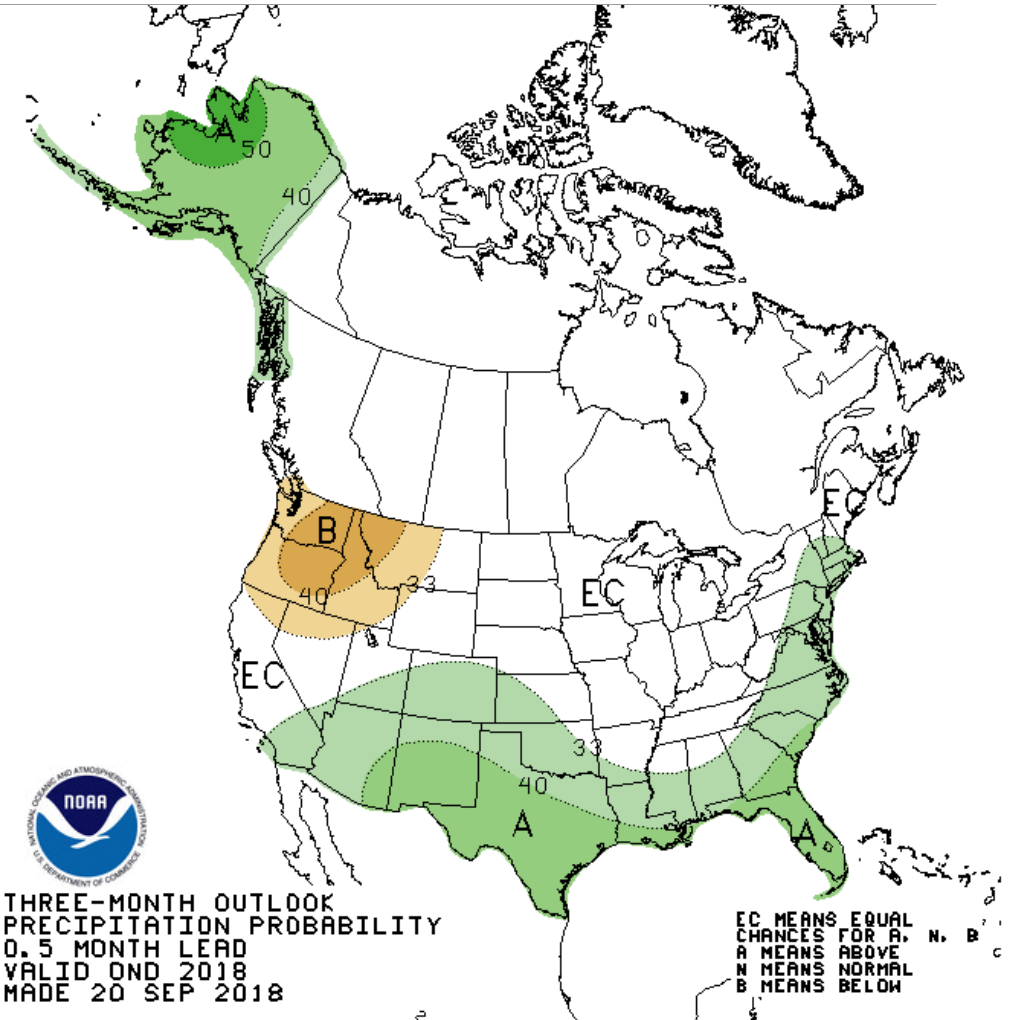
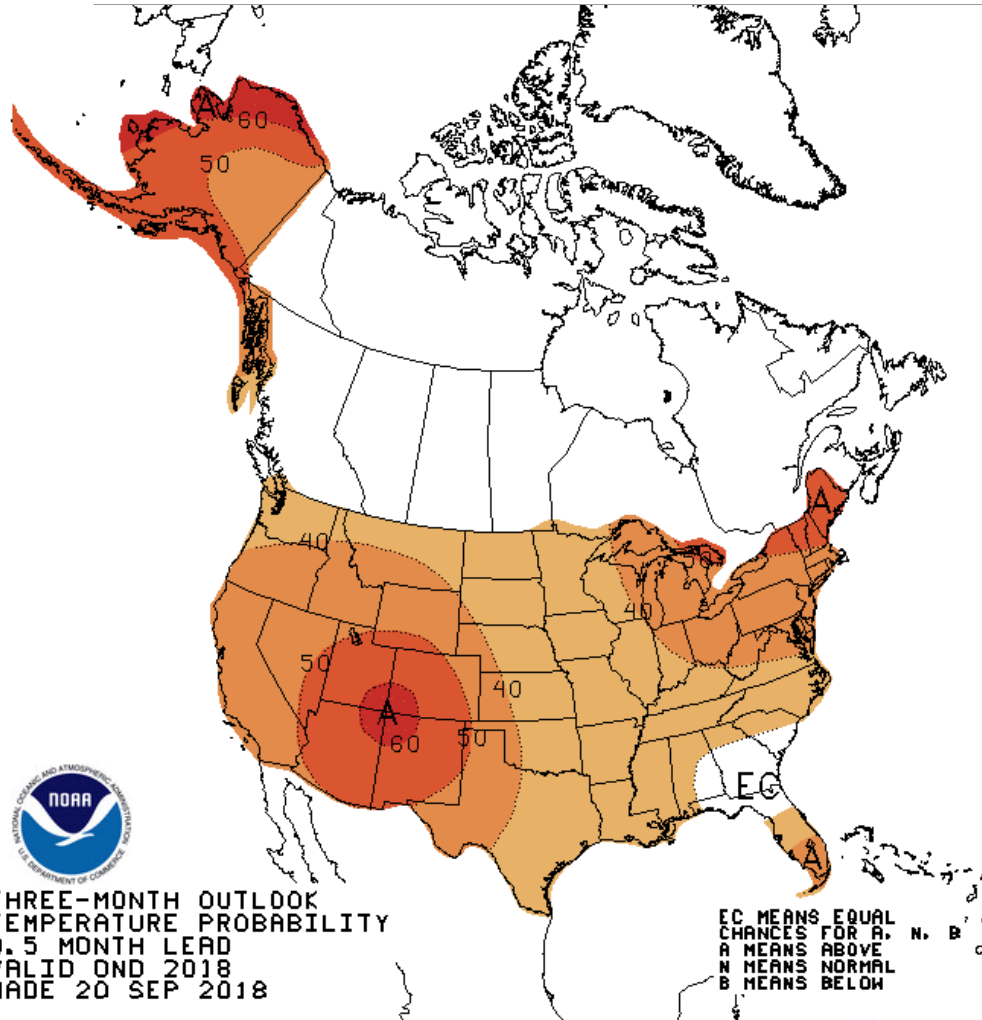


Monthly Outlook for October 2018



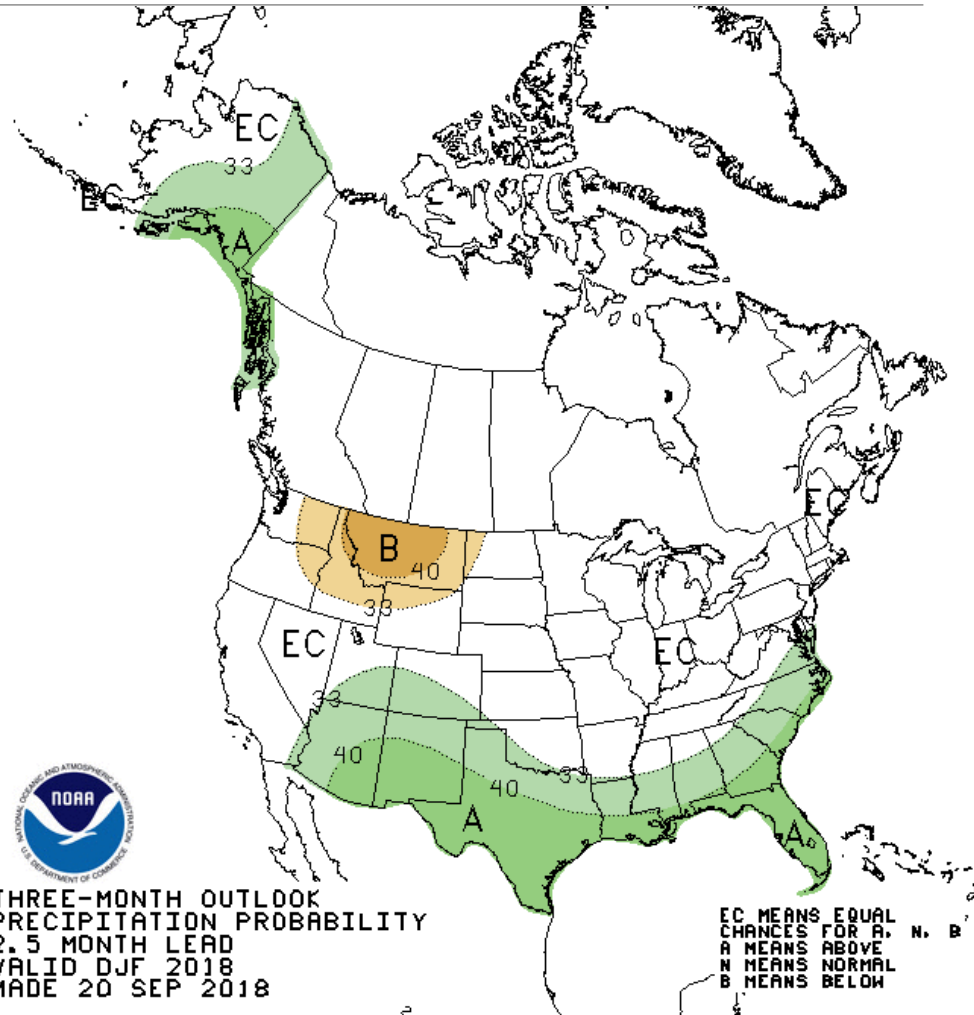
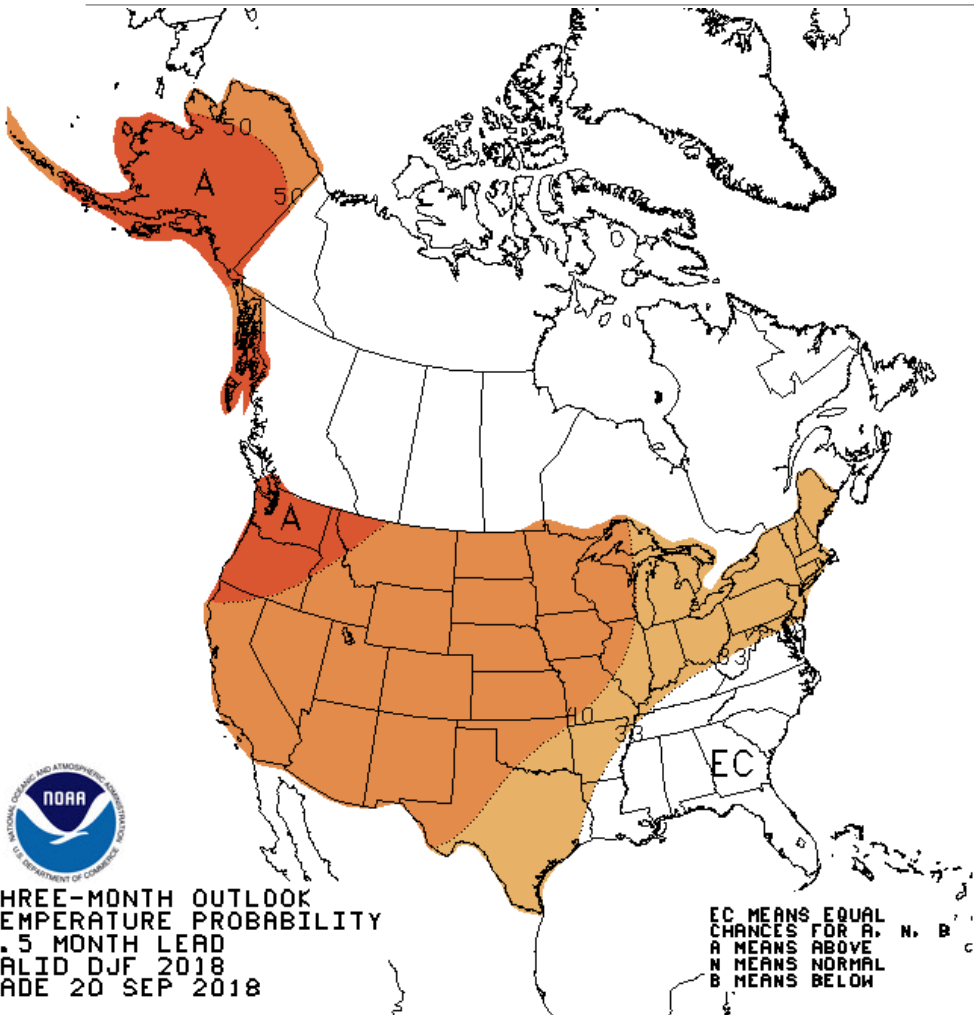
ROUGH MITIGAT

3-Month Outlook (October-December, 2018)

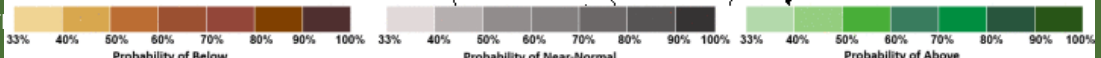
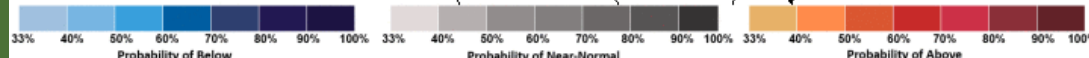


ROUGHT MITIGAT

Winter Outlook (December-February, 2018-19)



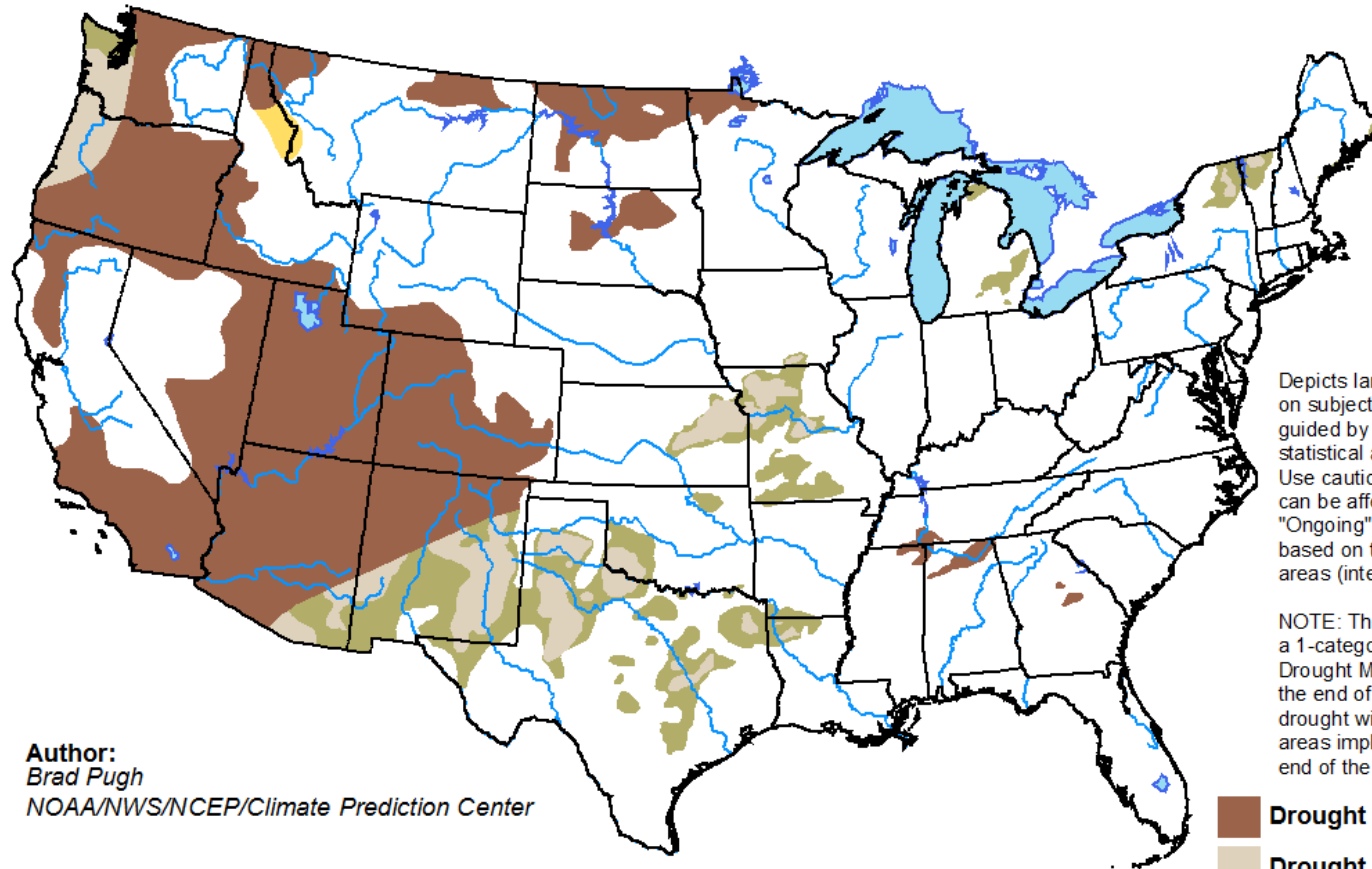
ROUGH MITIGAT



Seasonal Drought Outlook

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





Valid for September 20 - December 31, 2018
Released September 20, 2018

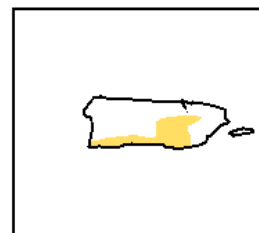
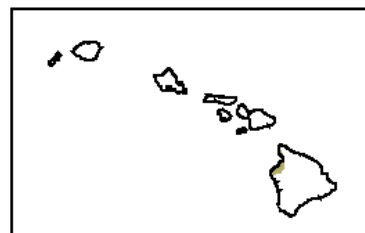
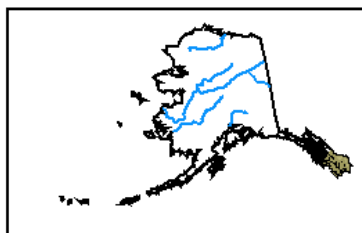


Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to 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).

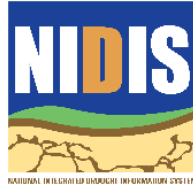
Author:
Brad Pugh
NOAA/NWS/NCEP/Climate Prediction Center

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



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

OUR PARTNERS



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402-472-6775

National Drought Mitigation Center
School of Natural Resources
University of Nebraska-Lincoln

Any Questions

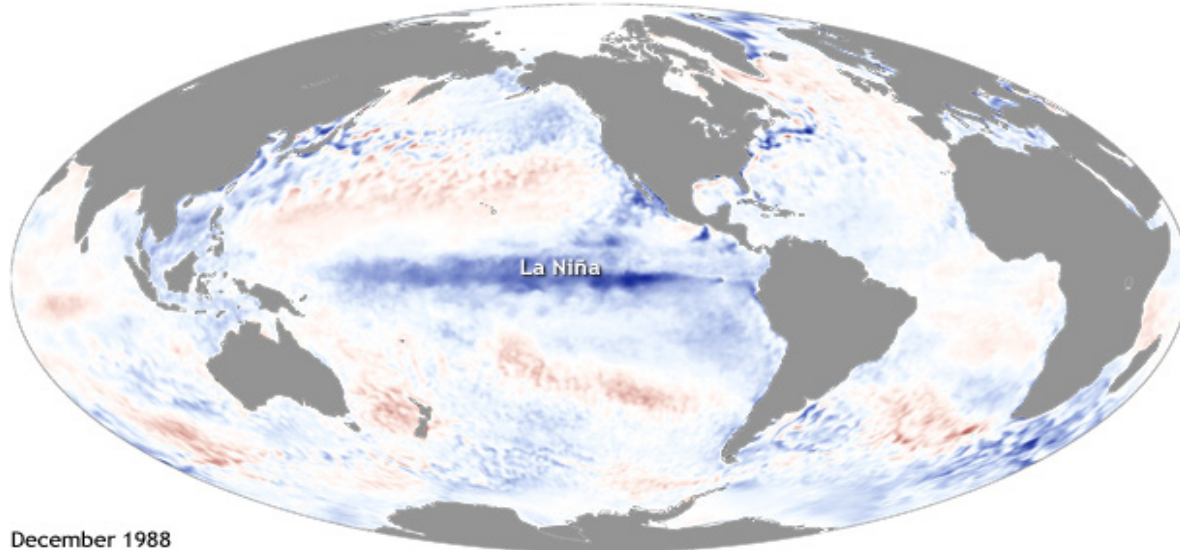


El Niño-Southern Oscillation (ENSO) Update Central Region

Michelle L'Heureux
Climate Prediction Center / NCEP/ NOAA
20 September 2018

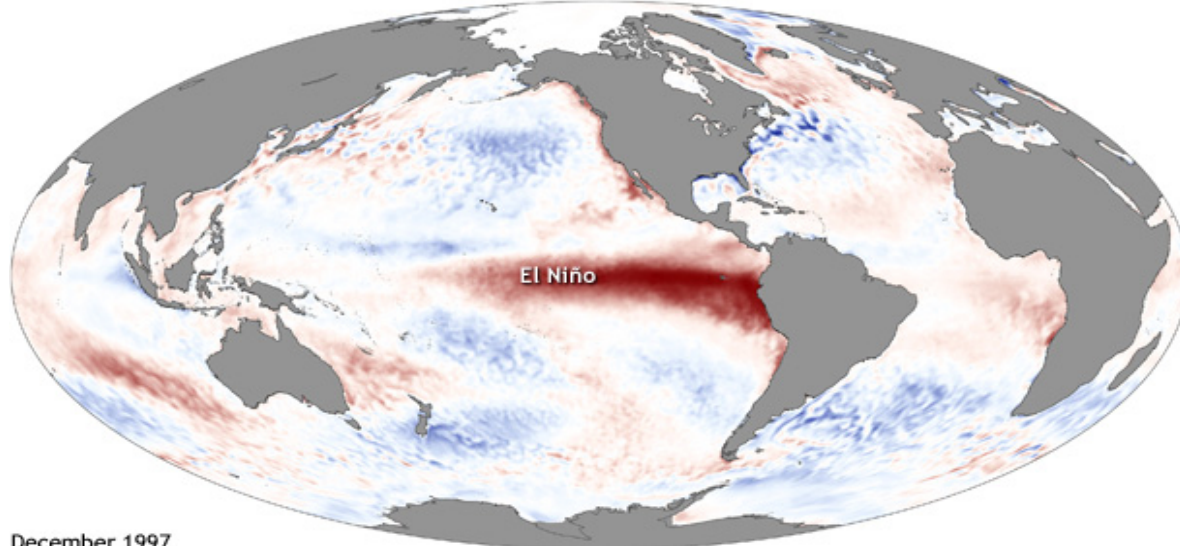
The El Niño-Southern Oscillation (or “ENSO”)

La Niña

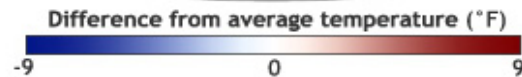


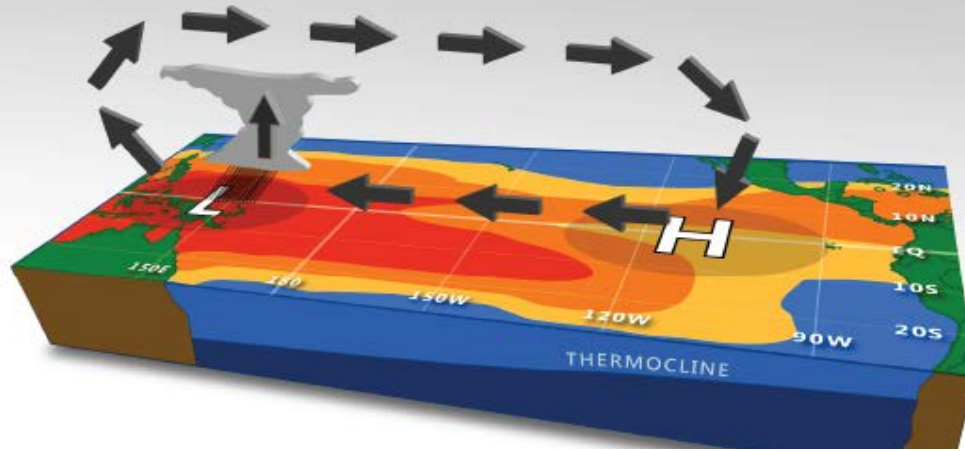
December 1988

El Niño

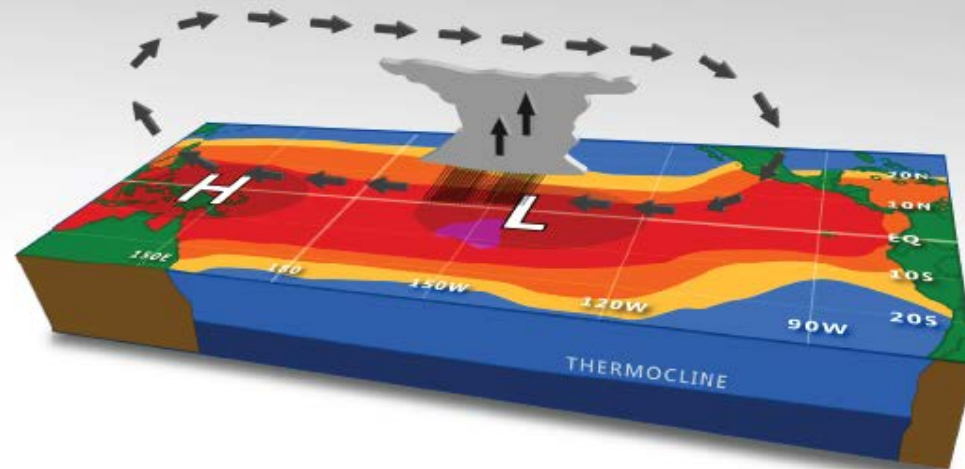


December 1997





Neutral (Normal)



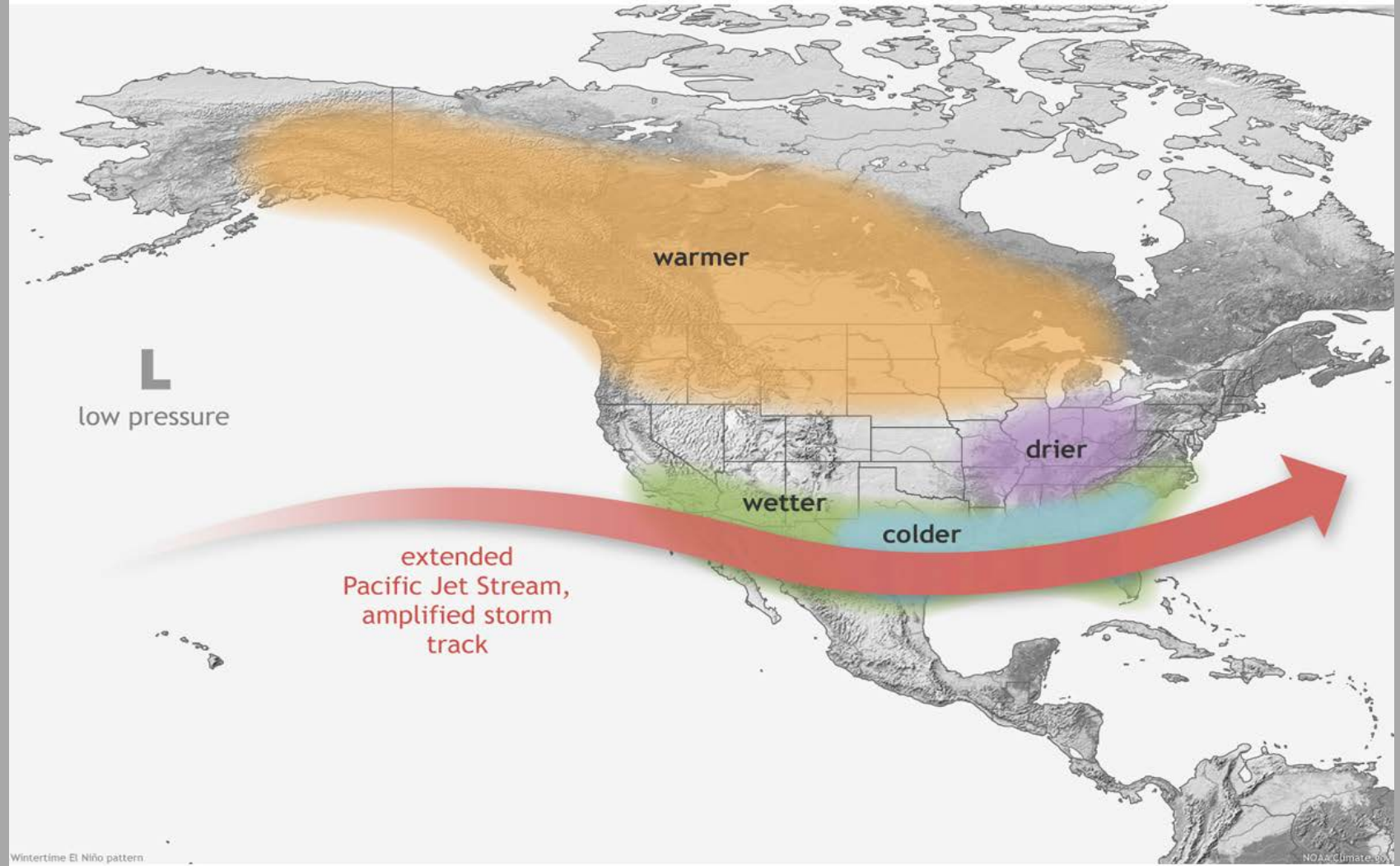
El Niño



We are in an El Niño Watch!

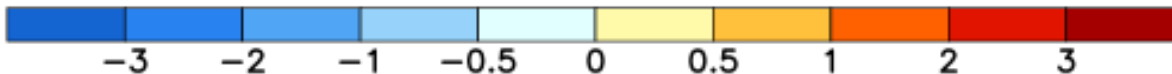
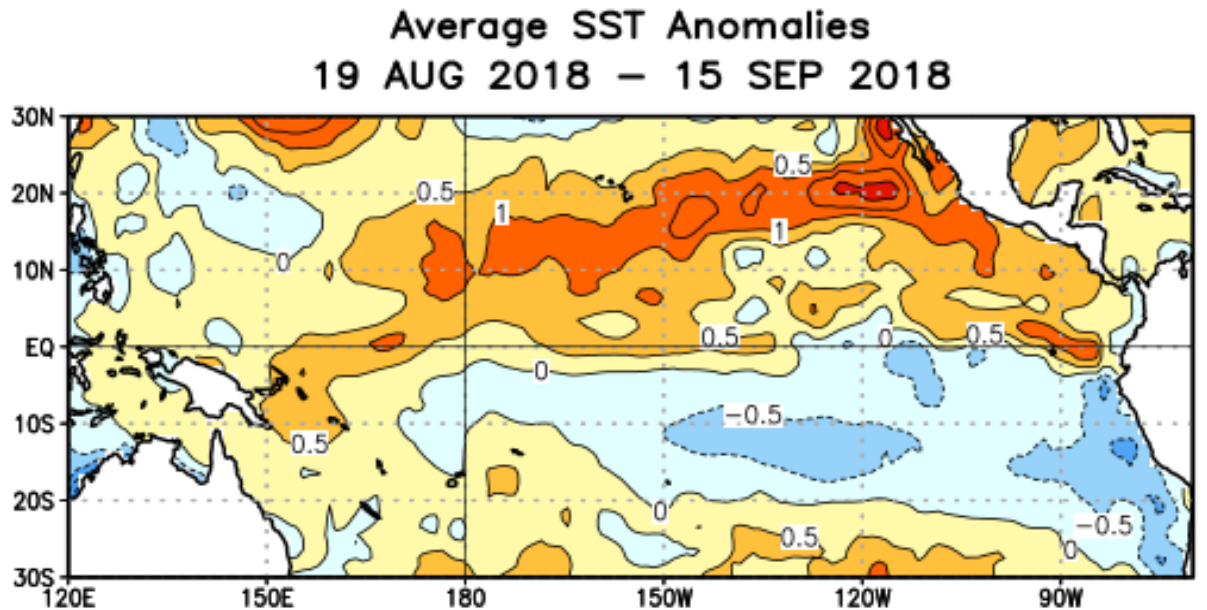
There is a 50-55% chance of El Niño onset during the fall 2018 (September-November), increasing to 65-70% during winter 2018-19.

TYPICAL EL NIÑO WINTERS



Keep in mind this pattern is not the case for EVERY El Niño winter. It will vary considerably from El Niño event to El Niño event, which is why related impacts are expressed as **PROBABILITIES (% Chance Of)**.

Sea surface temperatures (SST) anomalies over the last Month

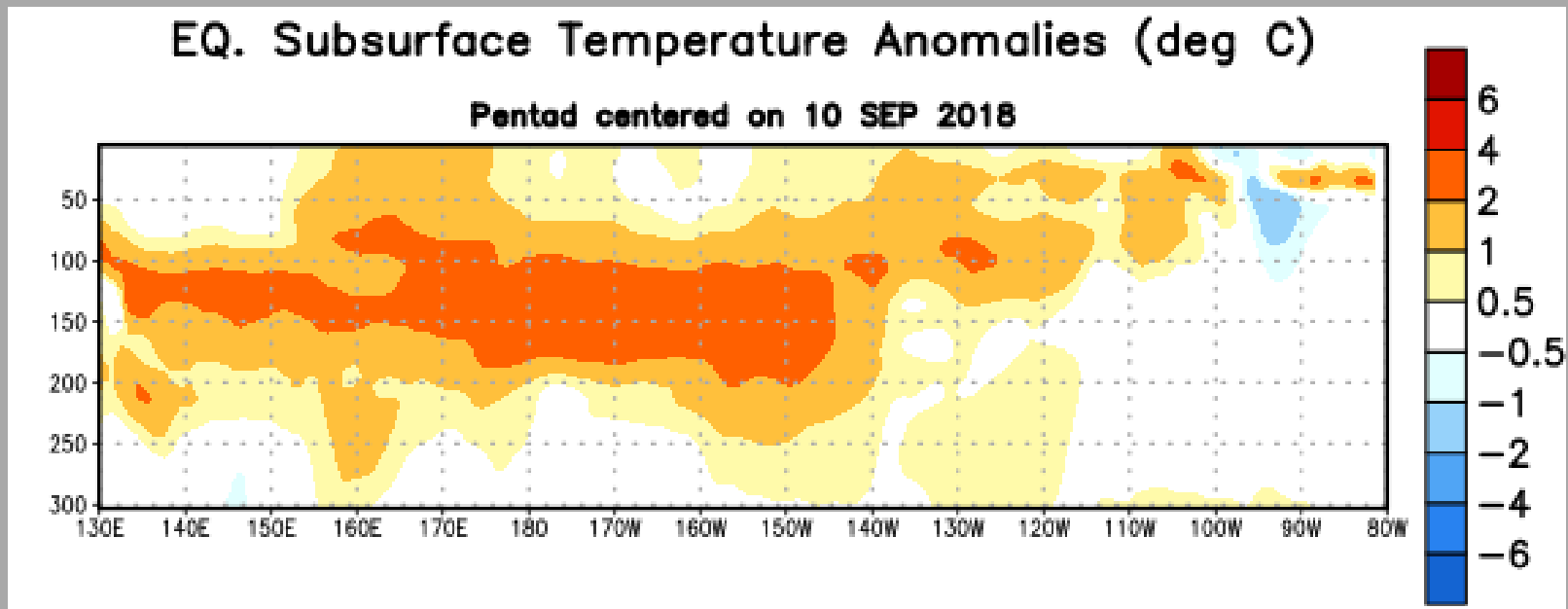


Blue shading is Below-Average SST

Yellow-Red shading is Above-Average SST

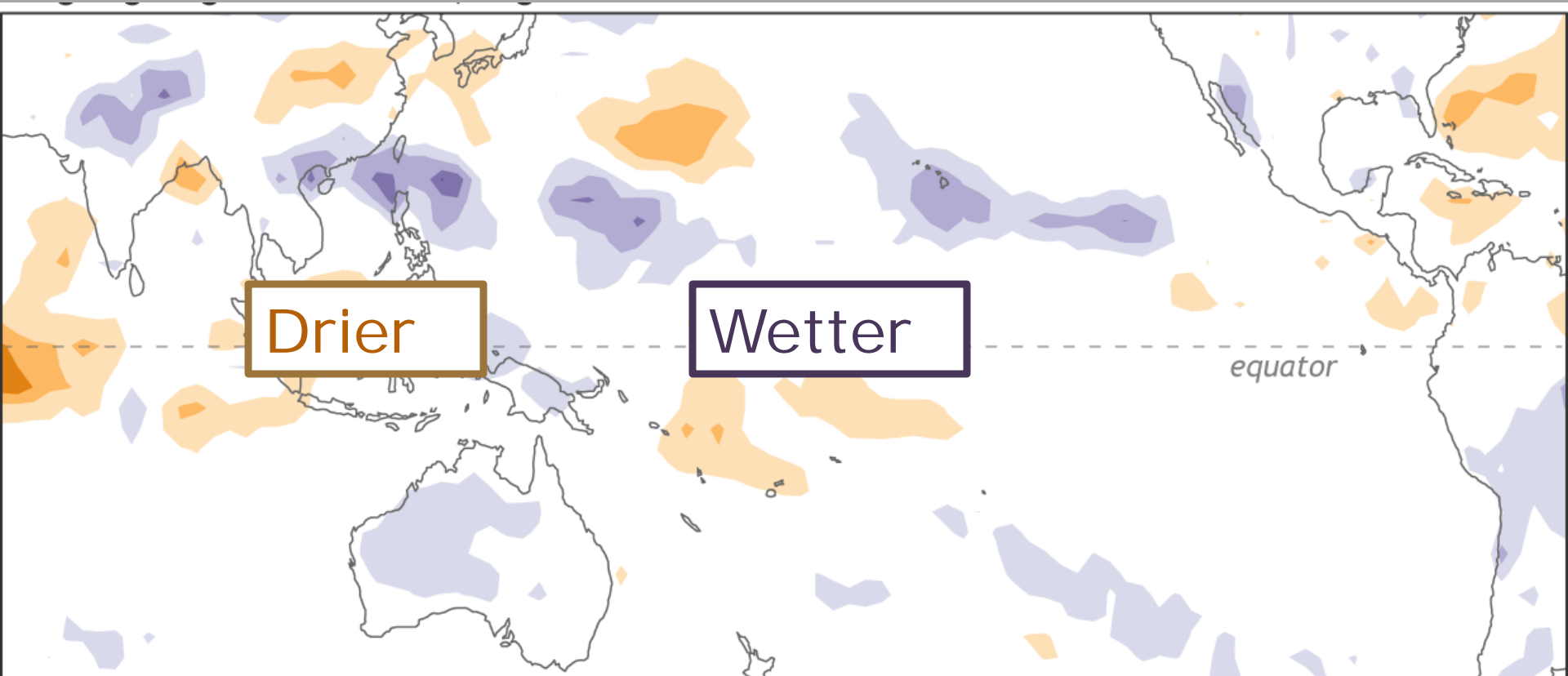
Temperature Departures along the Equatorial Pacific At Depth (below the surface of the ocean)

In the last two months, positive subsurface temperature anomalies have expanded in the central and east-central Pacific.



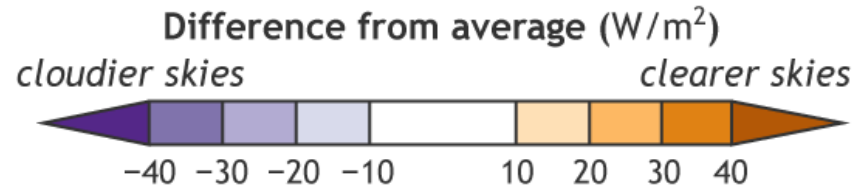
Warmer temperatures in the subsurface tropical Pacific is one indicator of a possible El Niño developing

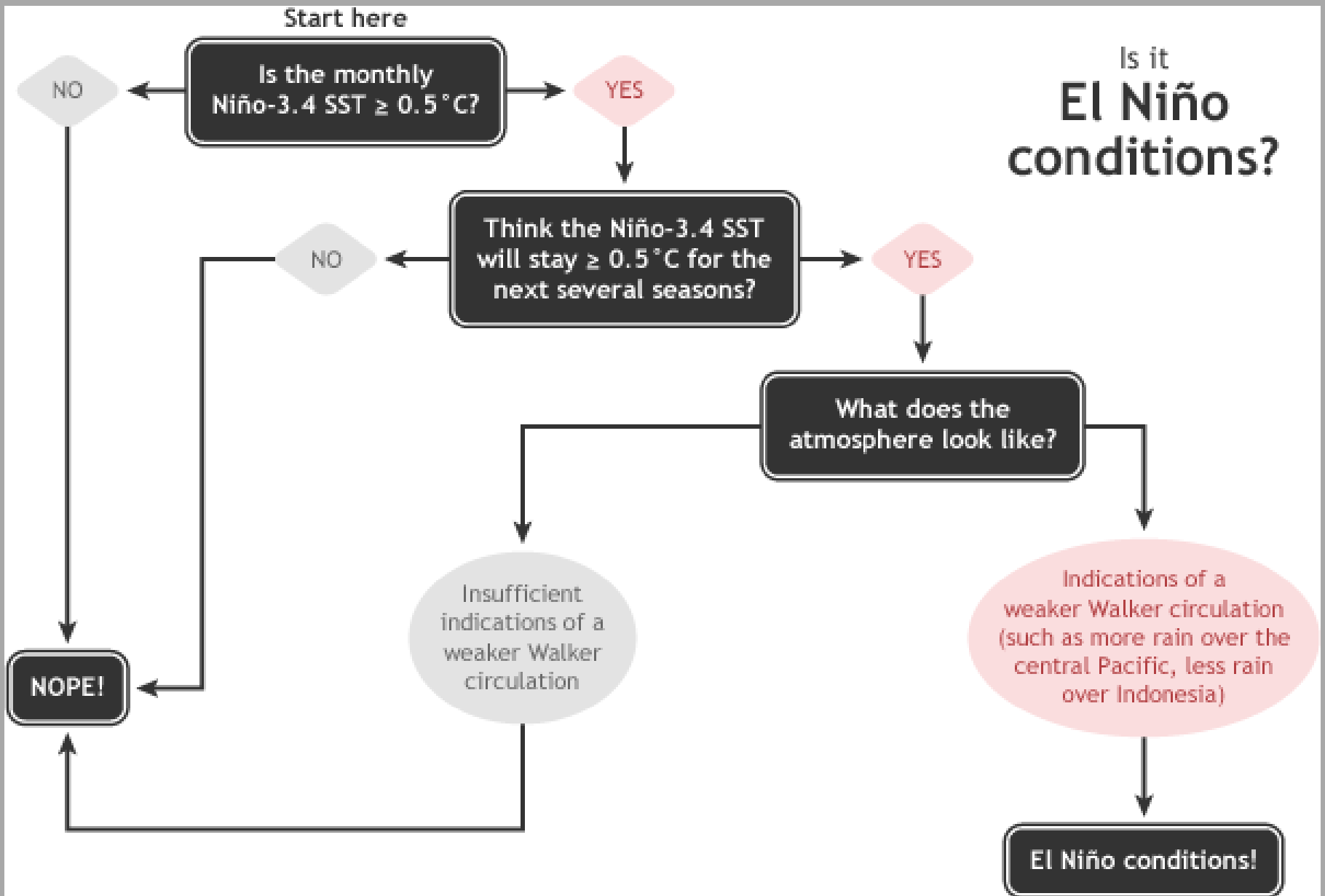
Patterns of Rainfall/Cloudiness over the Tropics during August 2018



compared to 1981-2010

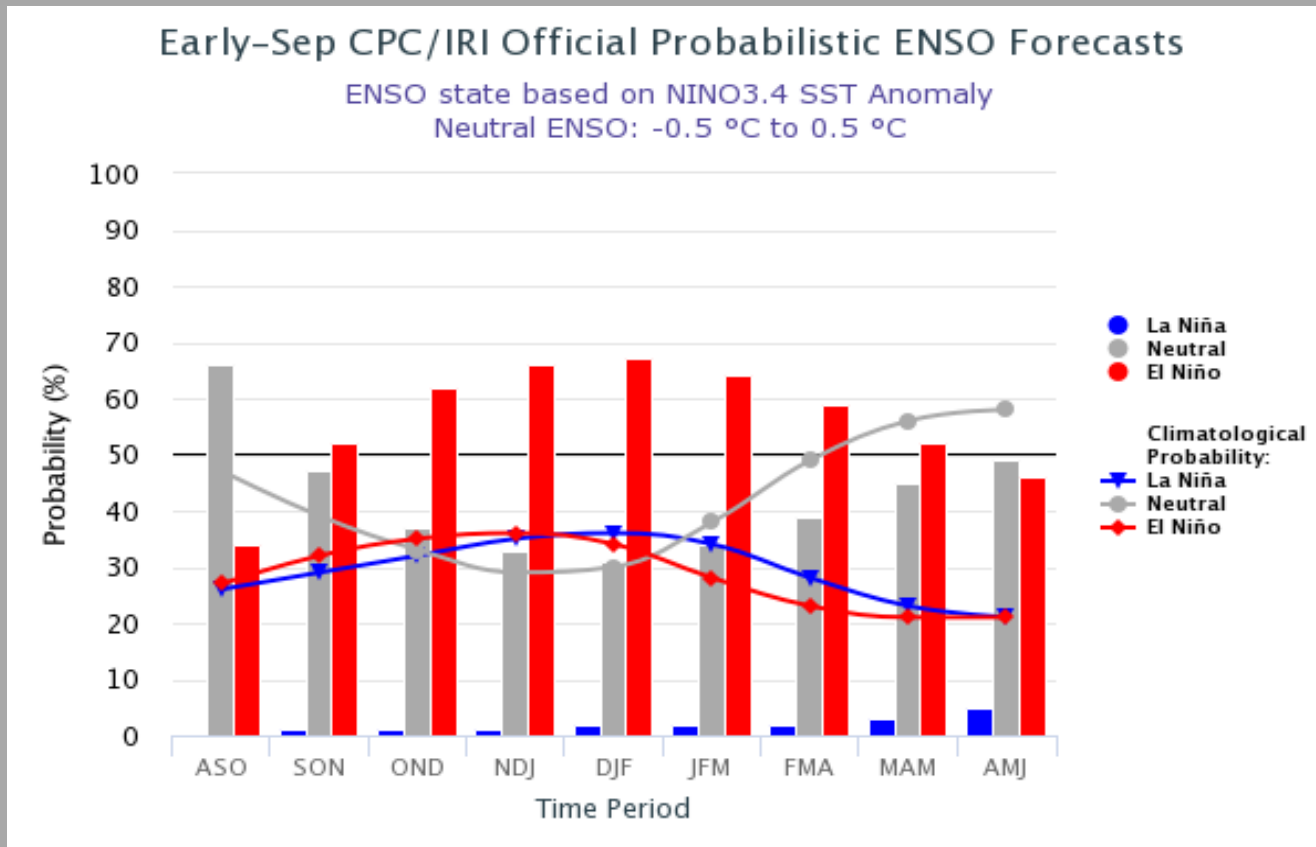
NOAA Climate.gov
Data: CPC



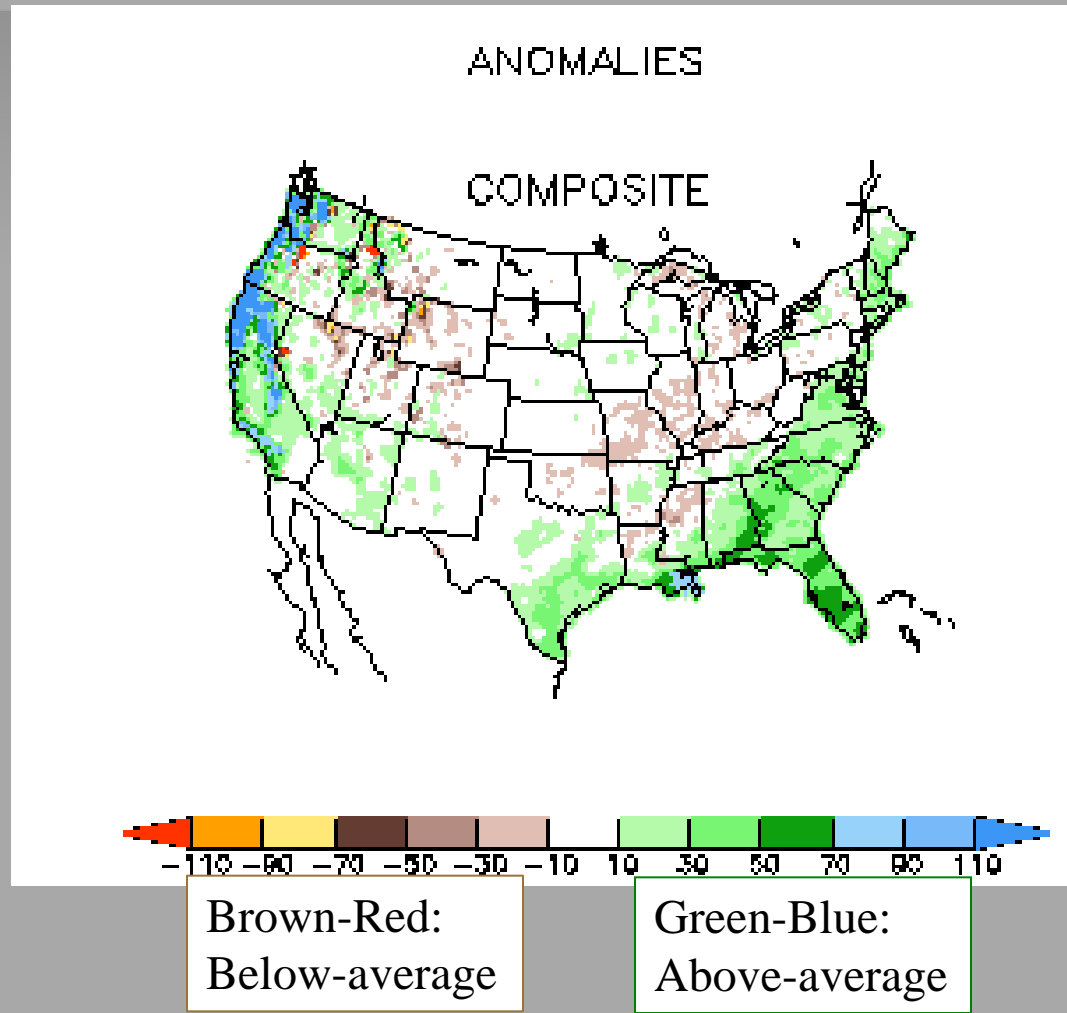


Current ENSO Probabilities or Chances (13 September 2018)

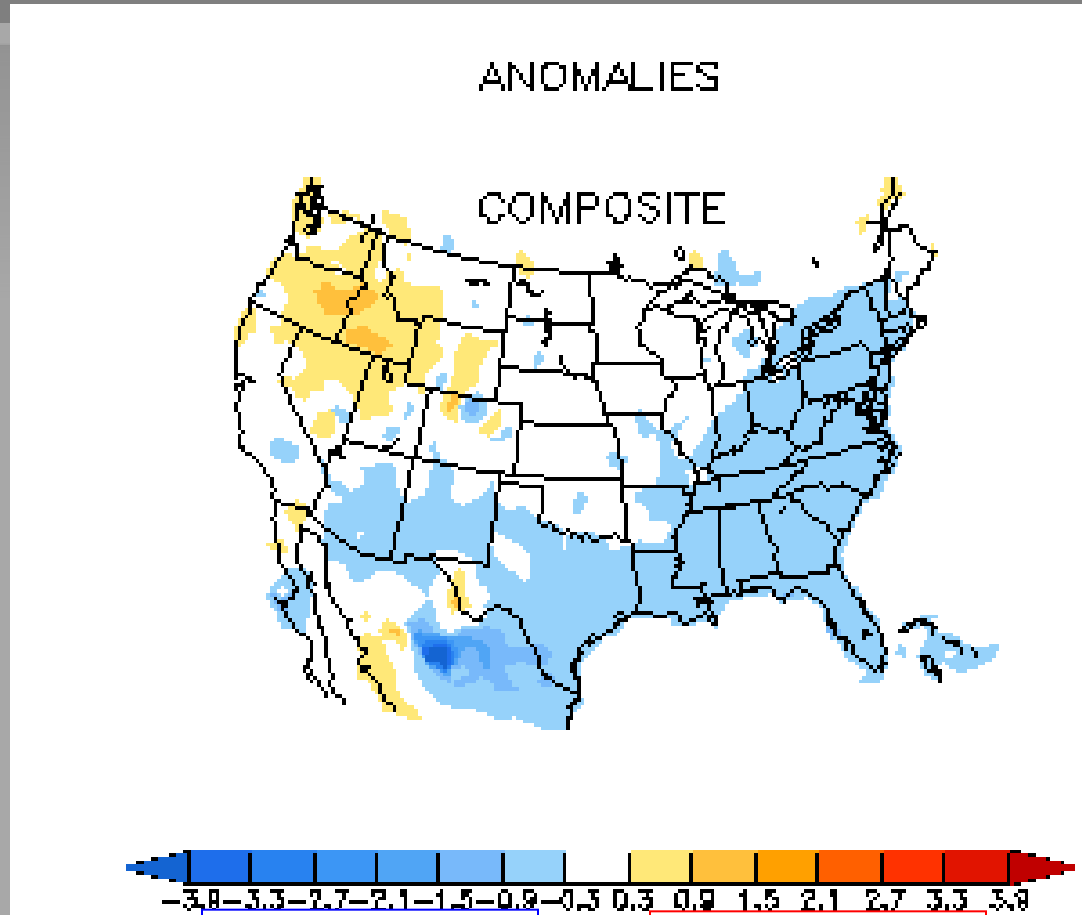
ENSO-neutral is favored through August-October 2018, with El Niño favored thereafter. Chances for El Niño are 65-70% during Northern Hemisphere winter 2018-19.



“Typical” December-February Precipitation Anomalies associated with El Niño



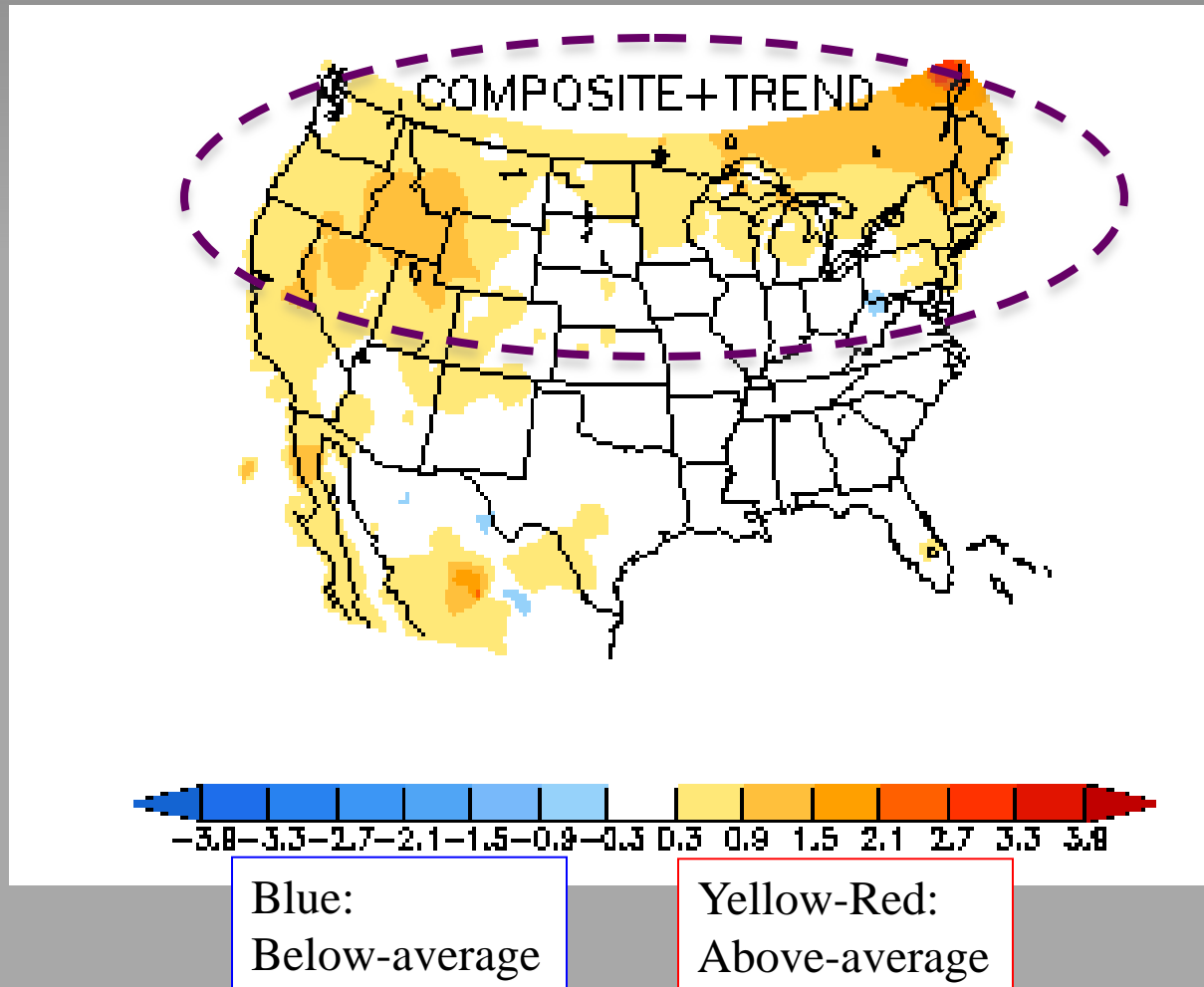
“Typical” December-February Temperature Anomalies associated with El Niño



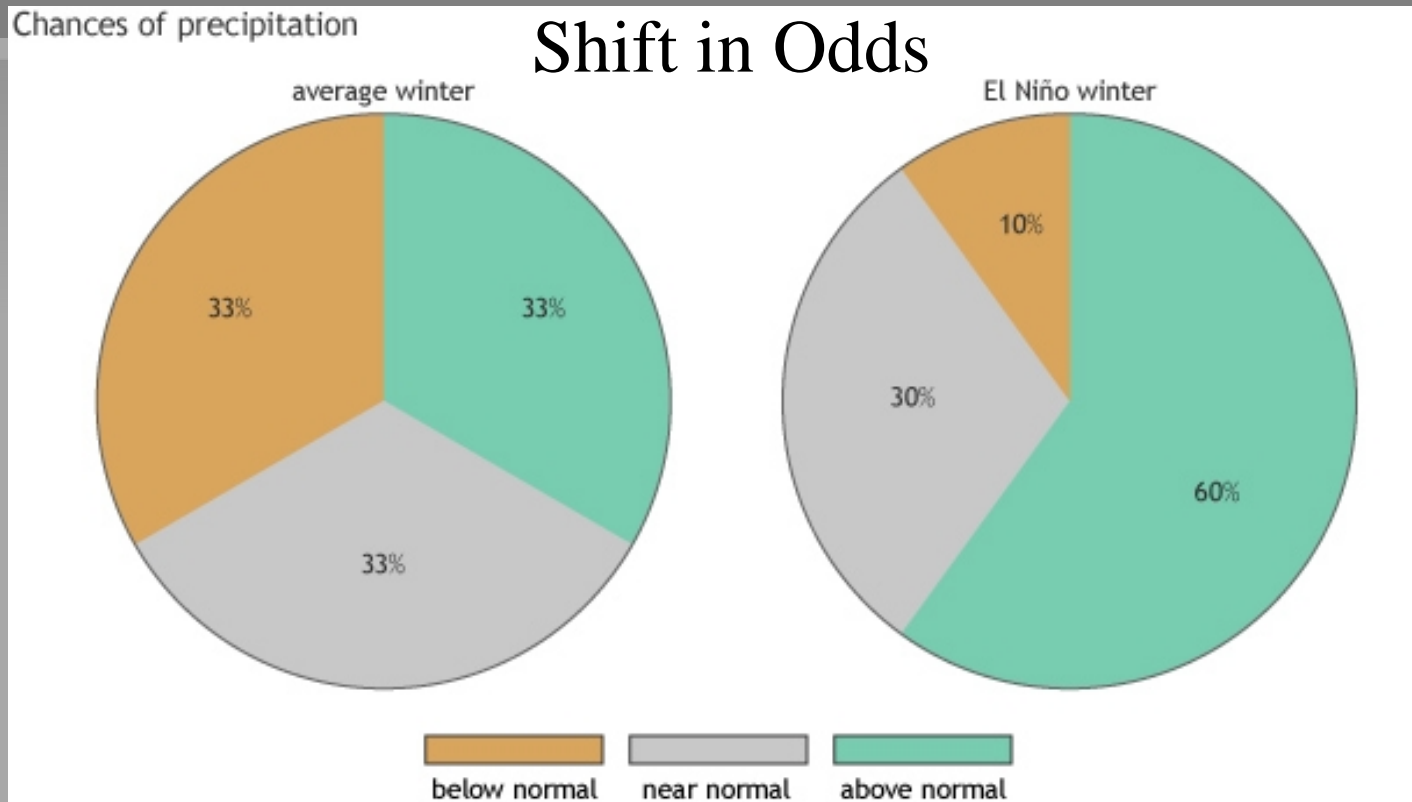
Blue:
Below-average

Yellow-Red:
Above-average

December-February Temperature Anomalies associated with El Niño + Trends



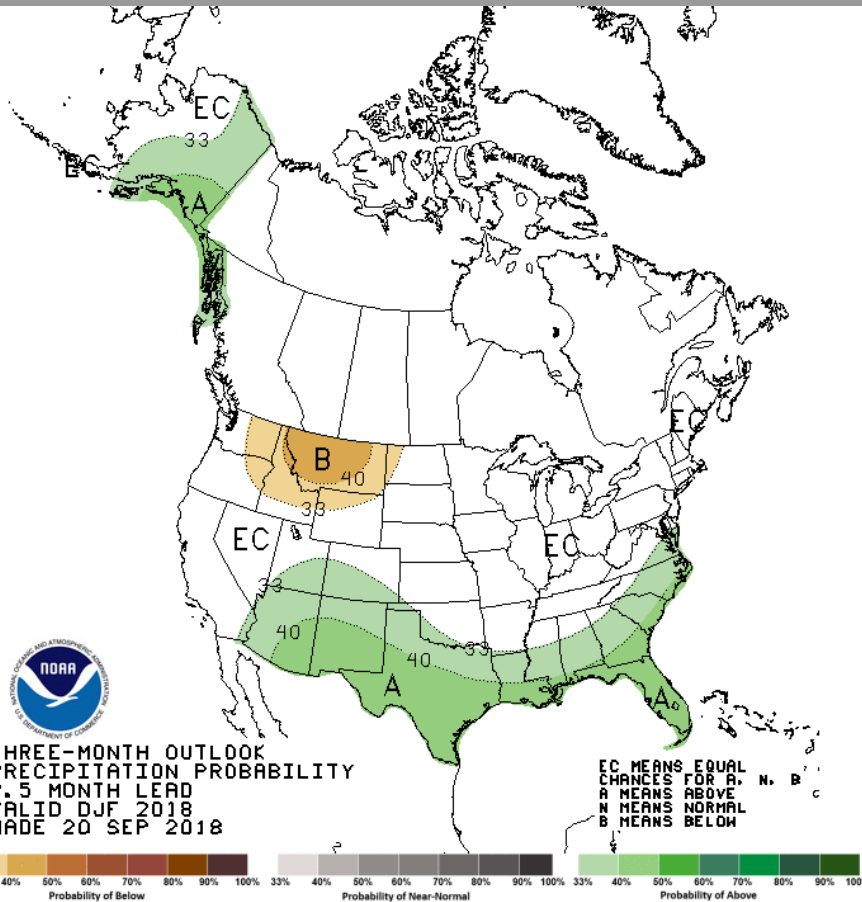
El Niño changes the odds for certain impacts.
The % shift tends to be smaller for weaker El Niño events.



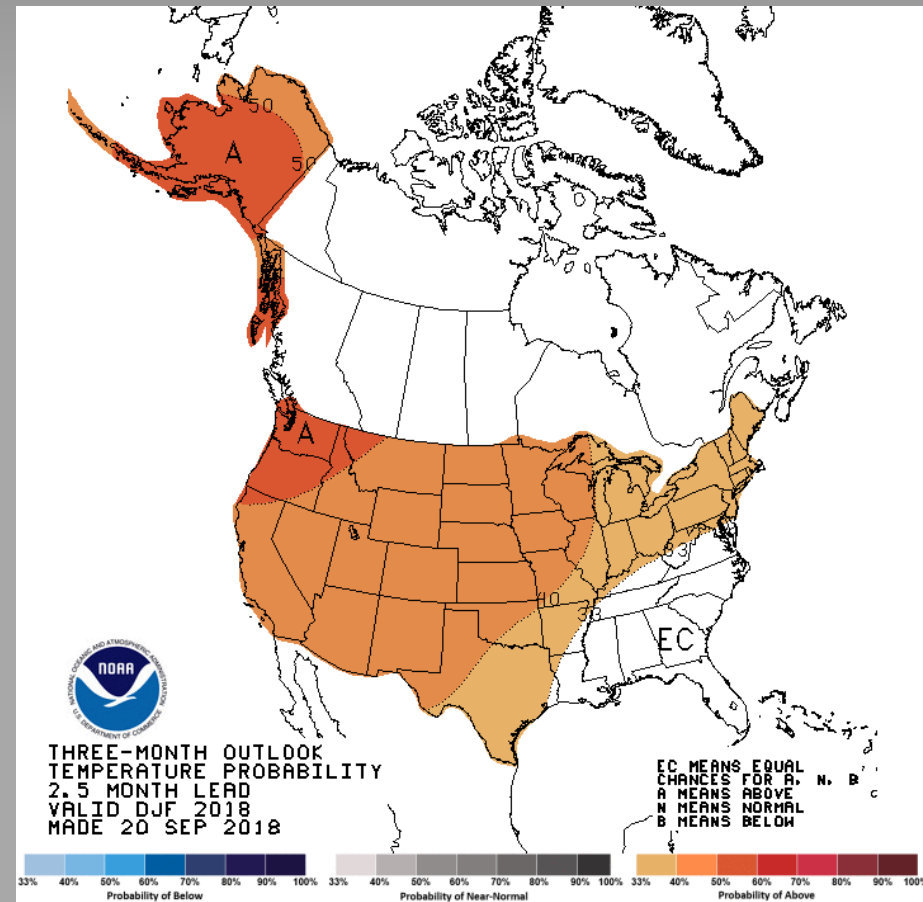
... but, impacts are never guaranteed in seasonal climate prediction because there are unpredictable elements that influence the result.

December-January-February (DJF) Outlook 2018-19

Precipitation Chances

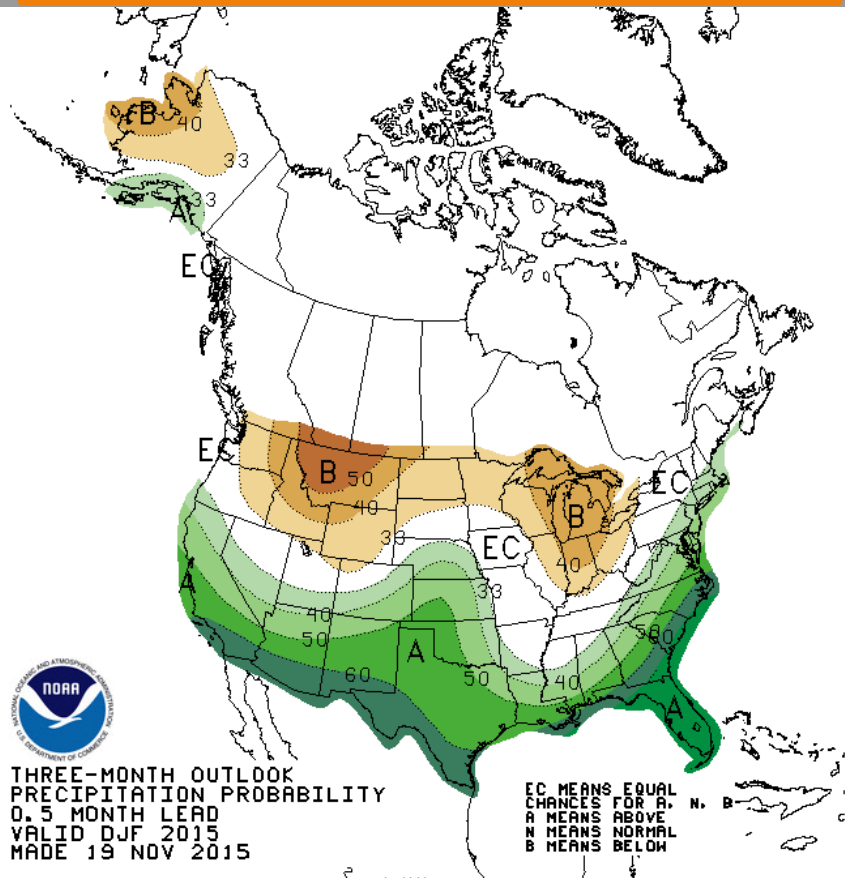


Temperature Chances

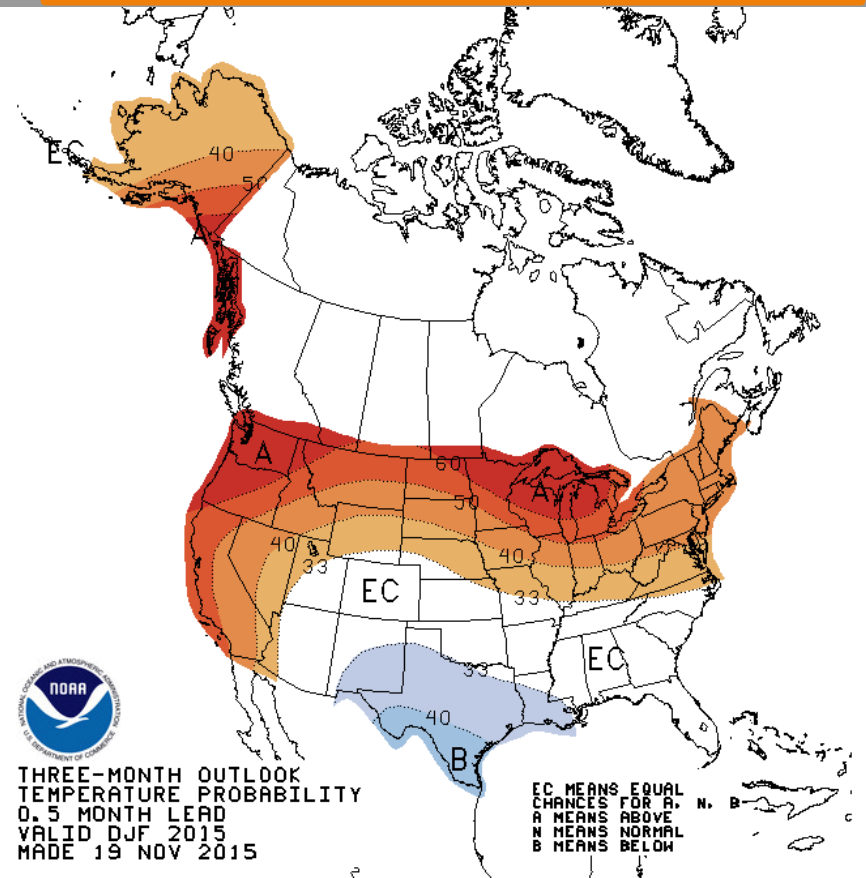


DJF 2015-16 El Niño Outlook (A Strong event!)

Precipitation Chances

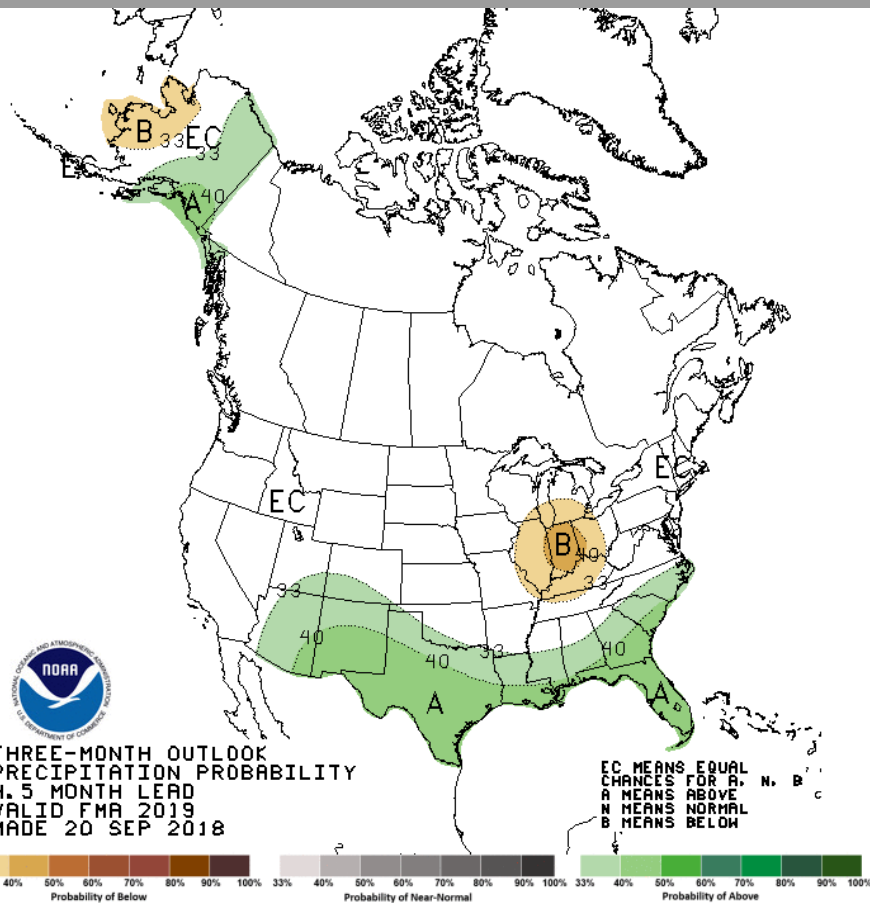


Temperature Chances

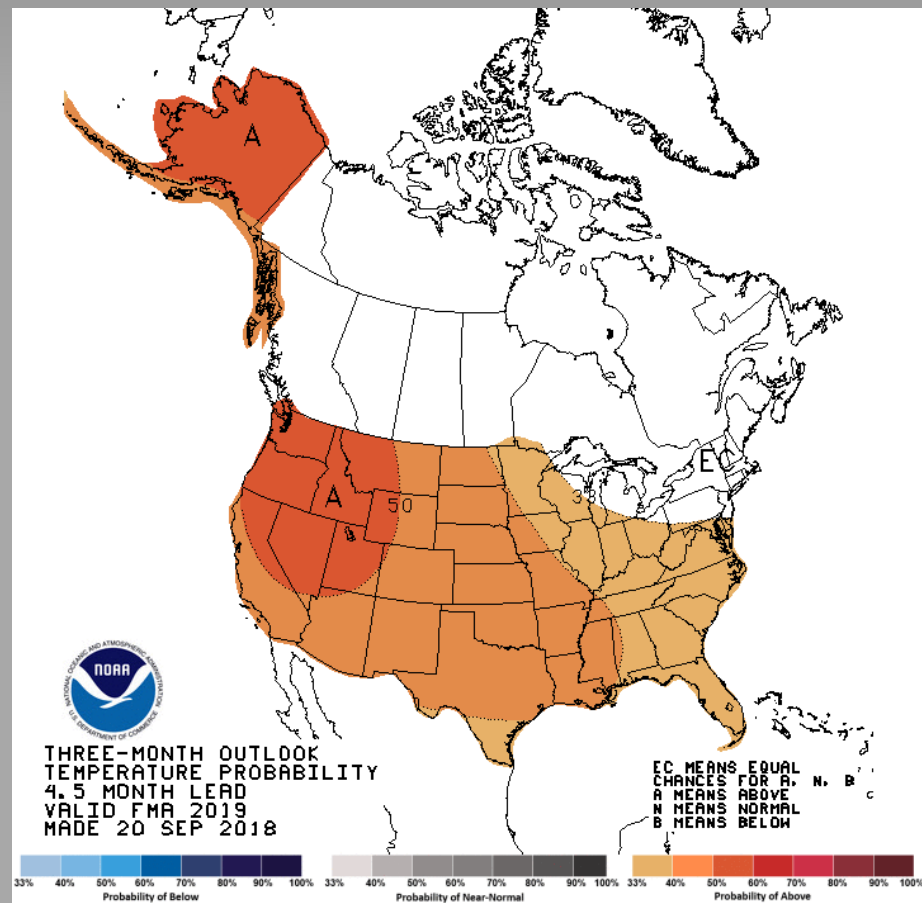


February-March-April (FMA) Outlook 2019

Precipitation Chances



Temperature Chances



Summary

- Currently, ENSO-neutral with an El Niño Watch (conditions favorable for the development of El Niño)
- Equatorial sea surface temperatures (SSTs) are near-to-above average across most of the Pacific Ocean.
- There is a 50-55% chance of El Niño onset during the Northern Hemisphere fall 2018 (September-November), increasing to 65-70% during winter 2018-19.*

ENSO Diagnostics Discussion

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/ensodisc.html

ENSO Blog <http://www.climate.gov/news-features/department/enso-blog>