

# 2017-2018 Drought Update and Outlook

National Weather Service Amarillo

Michael Gittinger  
Acting Meteorologist-in-Charge

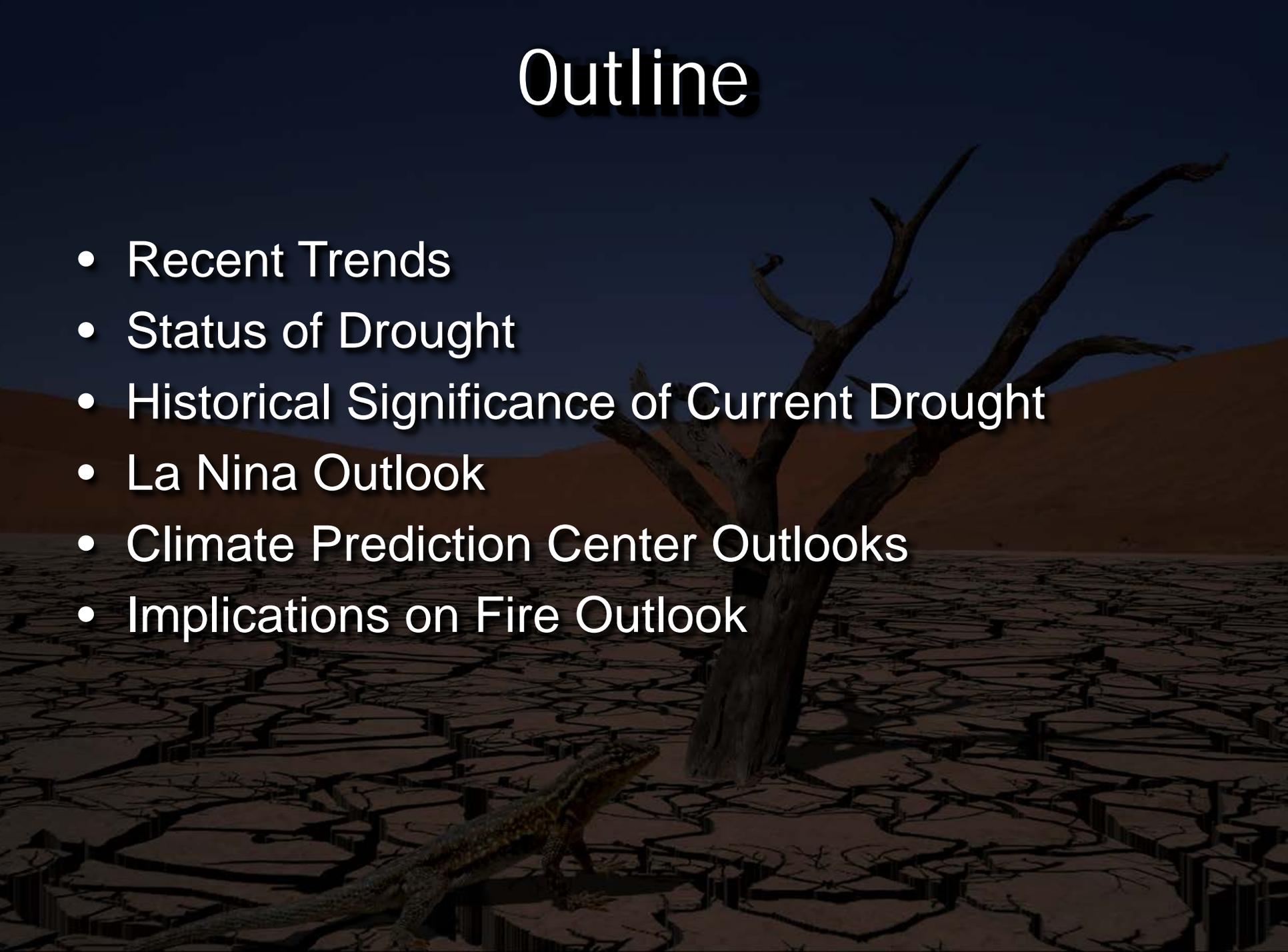
&

Dr. Stephen Bieda  
Science and Operations Officer



# Outline

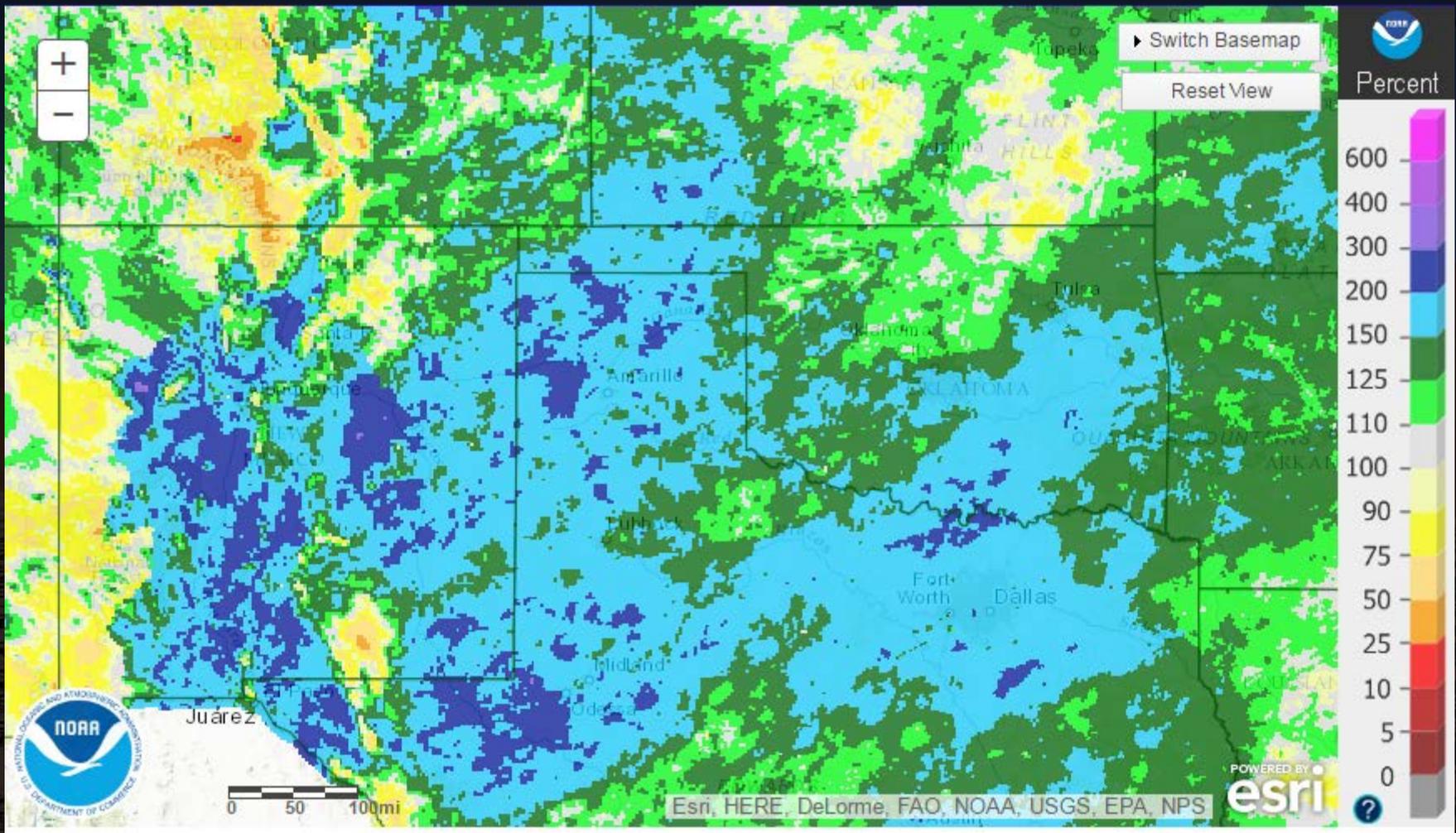
- Recent Trends
- Status of Drought
- Historical Significance of Current Drought
- La Nina Outlook
- Climate Prediction Center Outlooks
- Implications on Fire Outlook



# Recent Trends

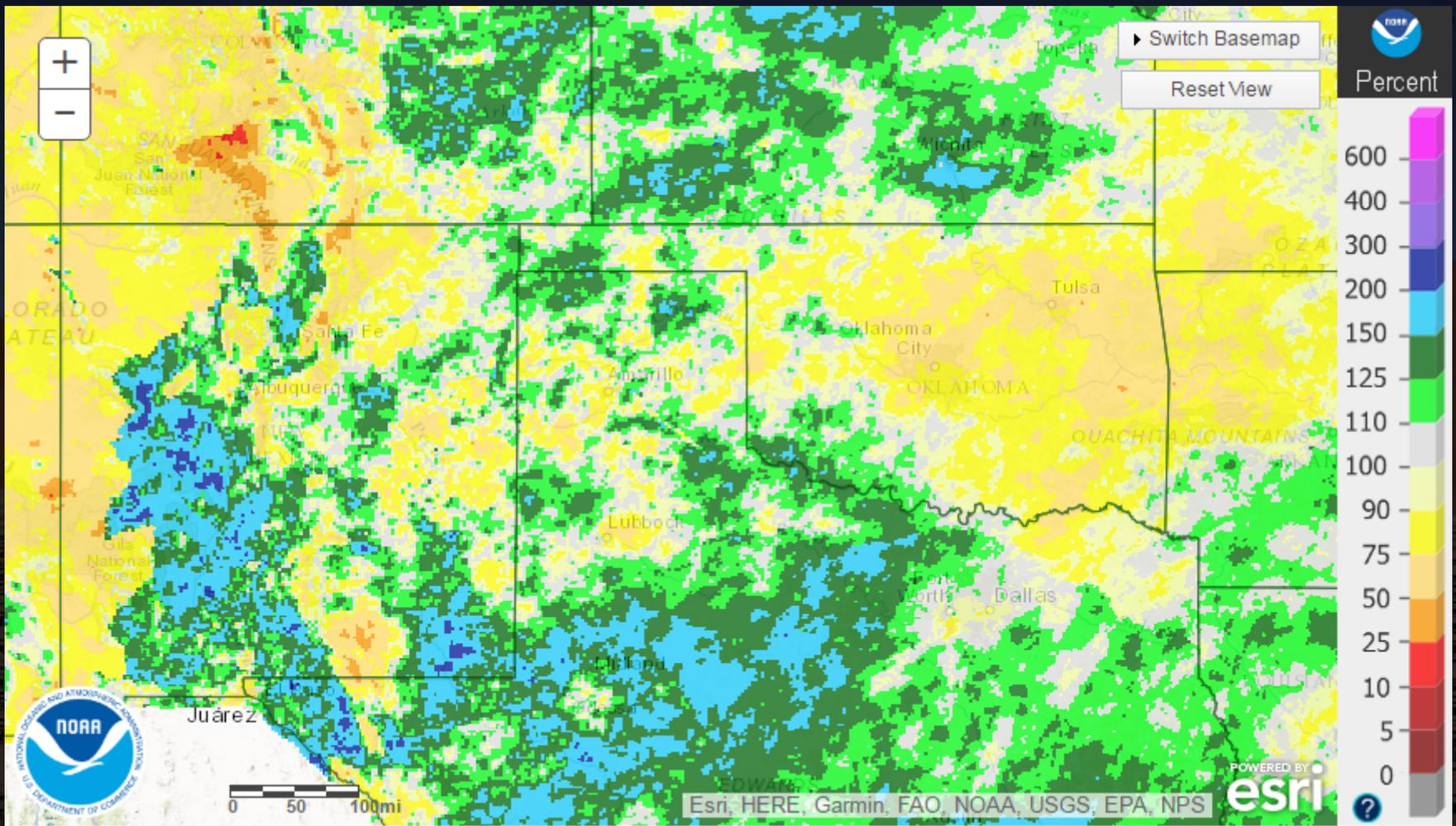


# 2015 Precip. % of Normal



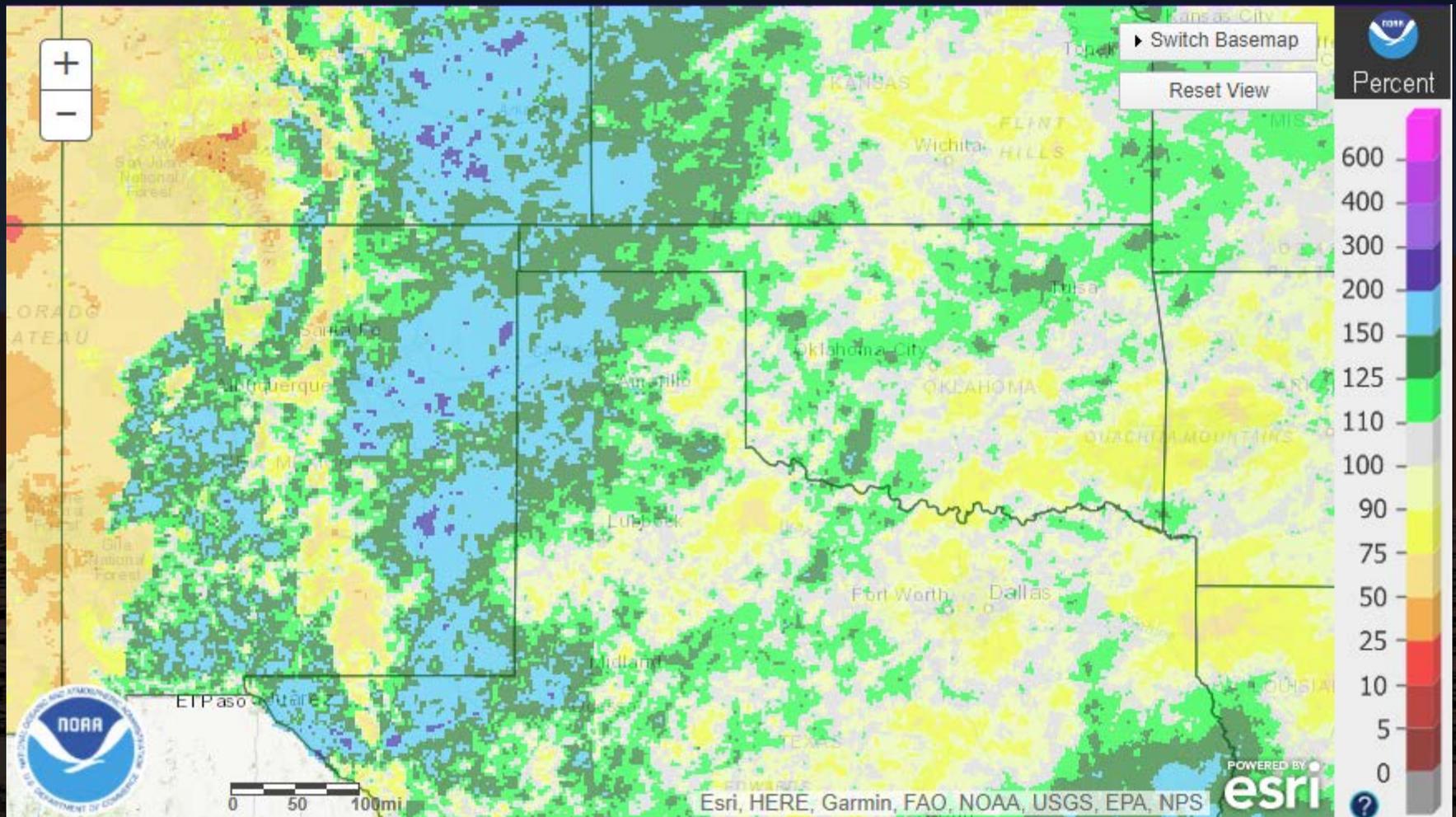
- Notes:
- Amarillo, TX – 4<sup>th</sup> wettest year on record (1892) - 34.63"
  - Amarillo, TX – First year above 30" since 1960

# 2016 Precip. % of Normal



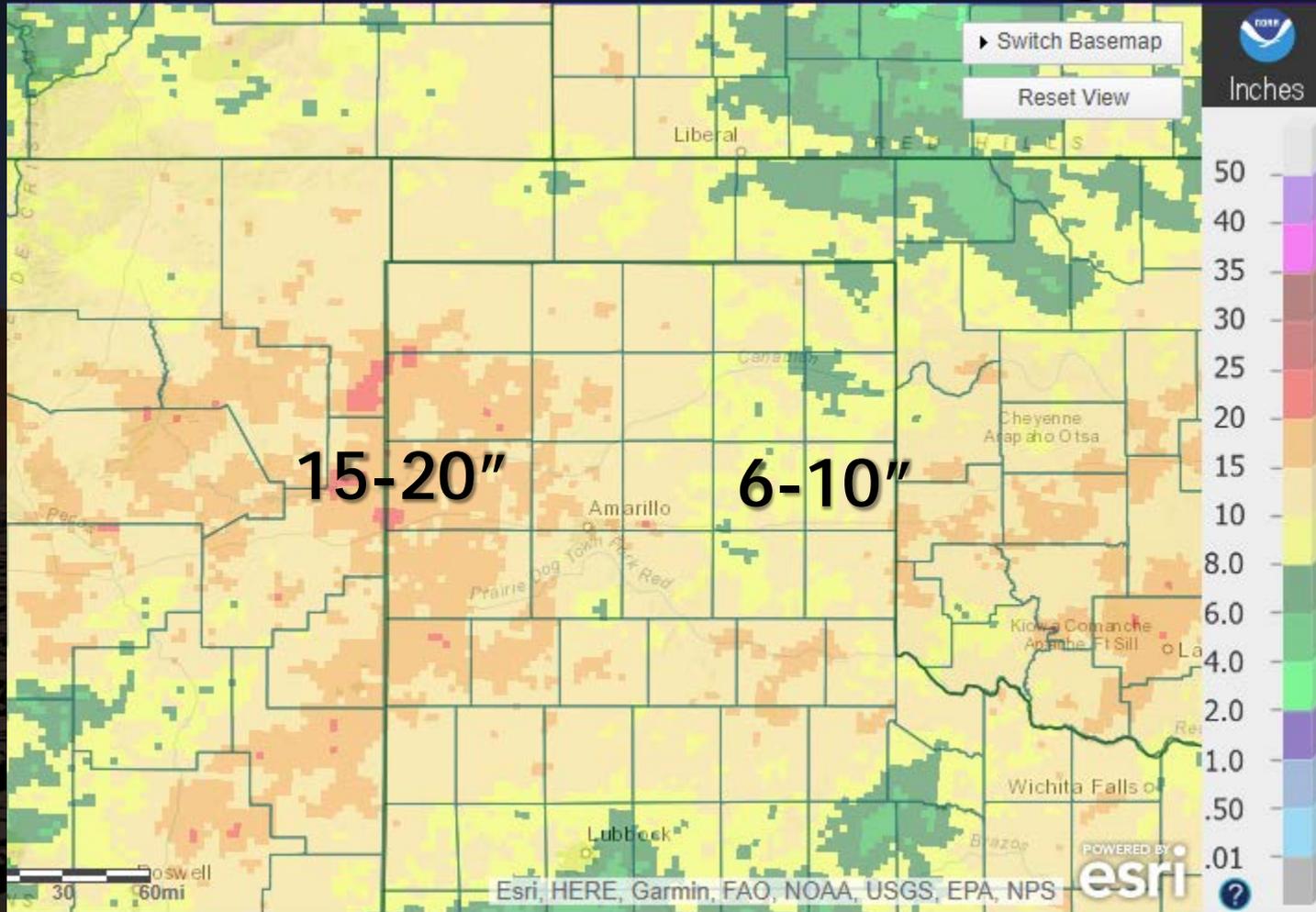
- Notes:
- Dry/wet spells averaging out near normal most areas
  - Wet July-Aug during growing season

# 2017 Precip. % of Normal



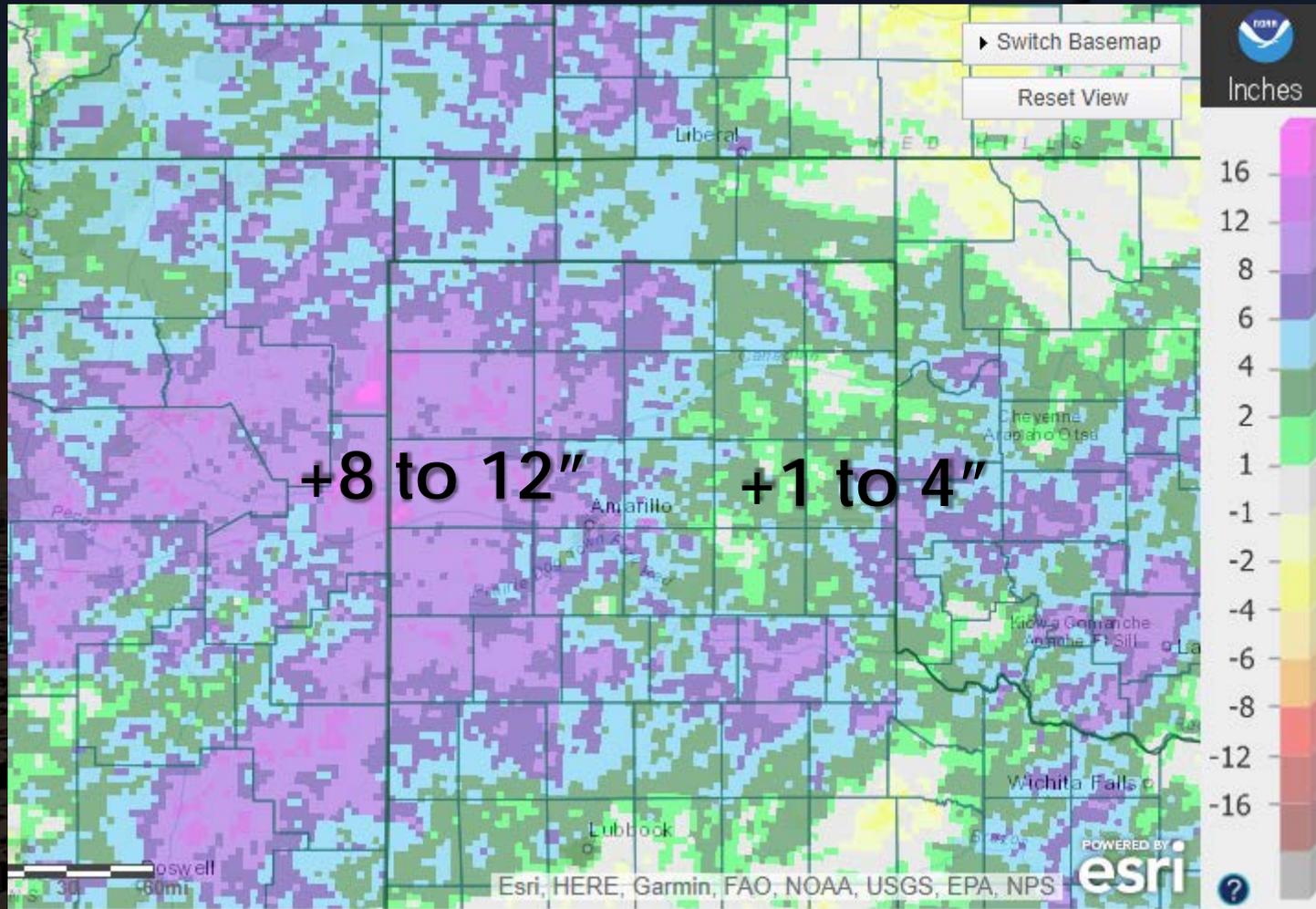
# July 25 – Oct 23rd

## Actual Amounts



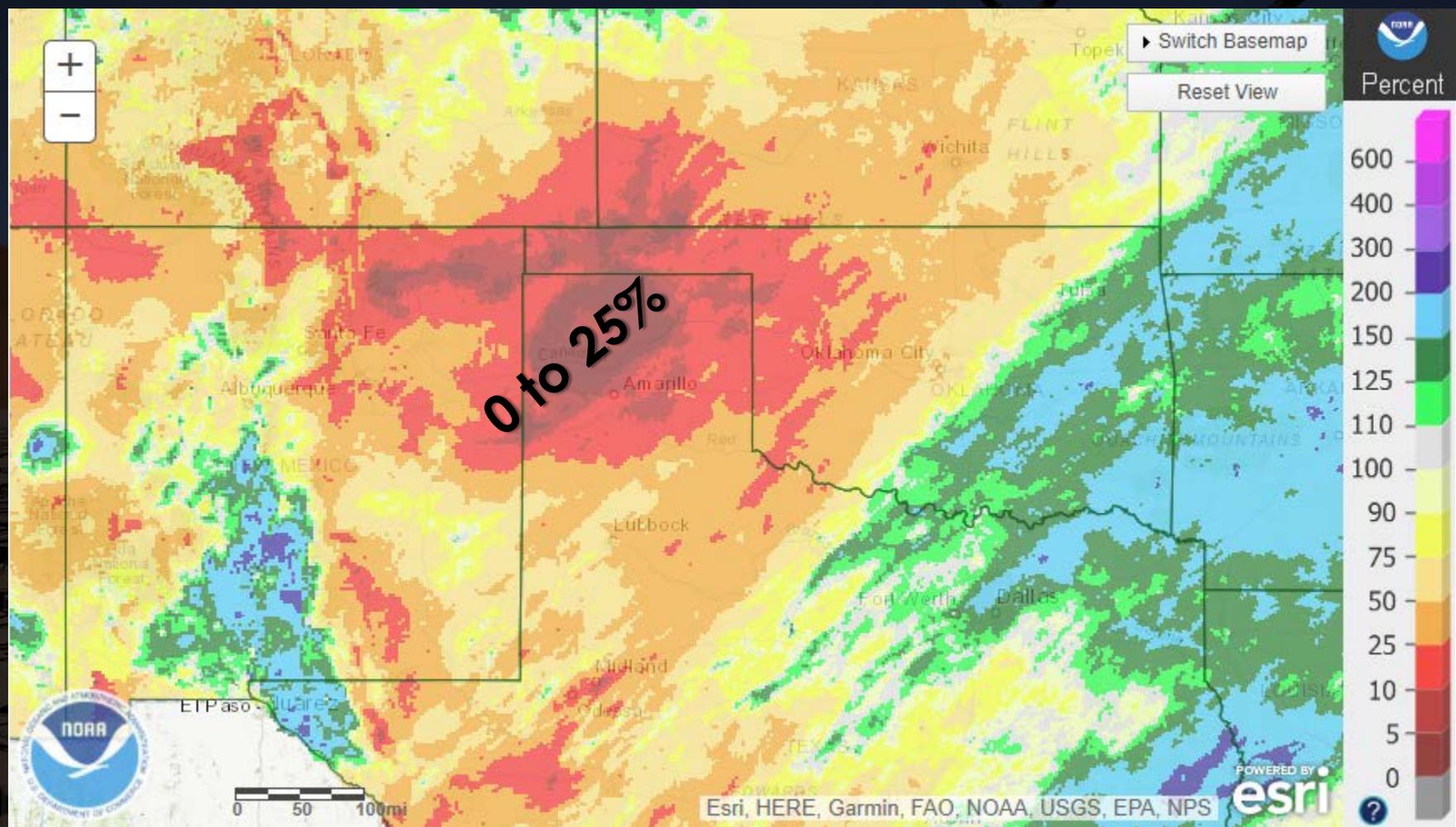
# July 25 – Oct 23

## Departure from Normal



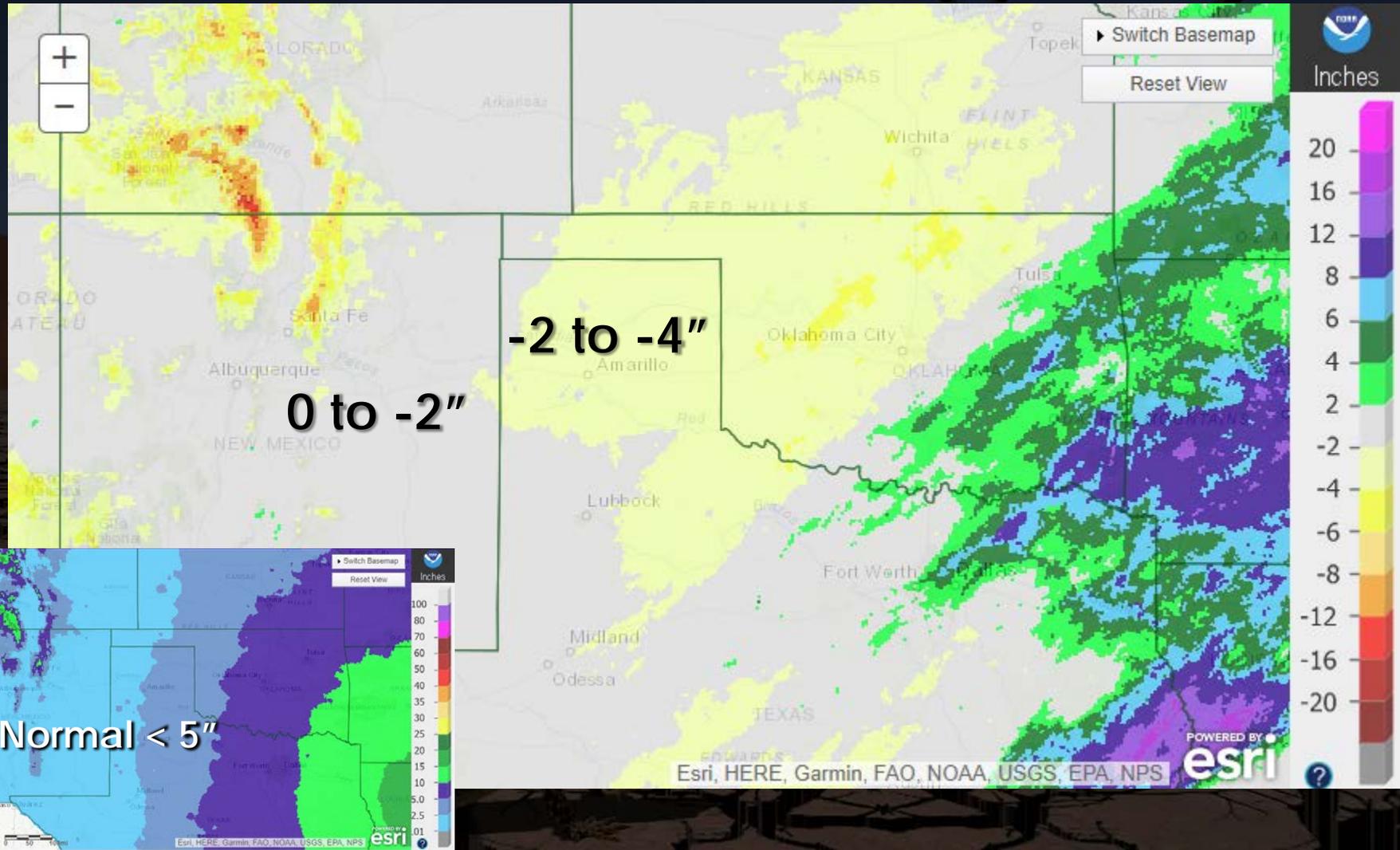
# Last 180 Days Precip % of Normal

Oct 7 2017 - Apr 5 2018



# Last 180 Days Departure from Normal

Oct 7, 2017 - Apr 5, 2018

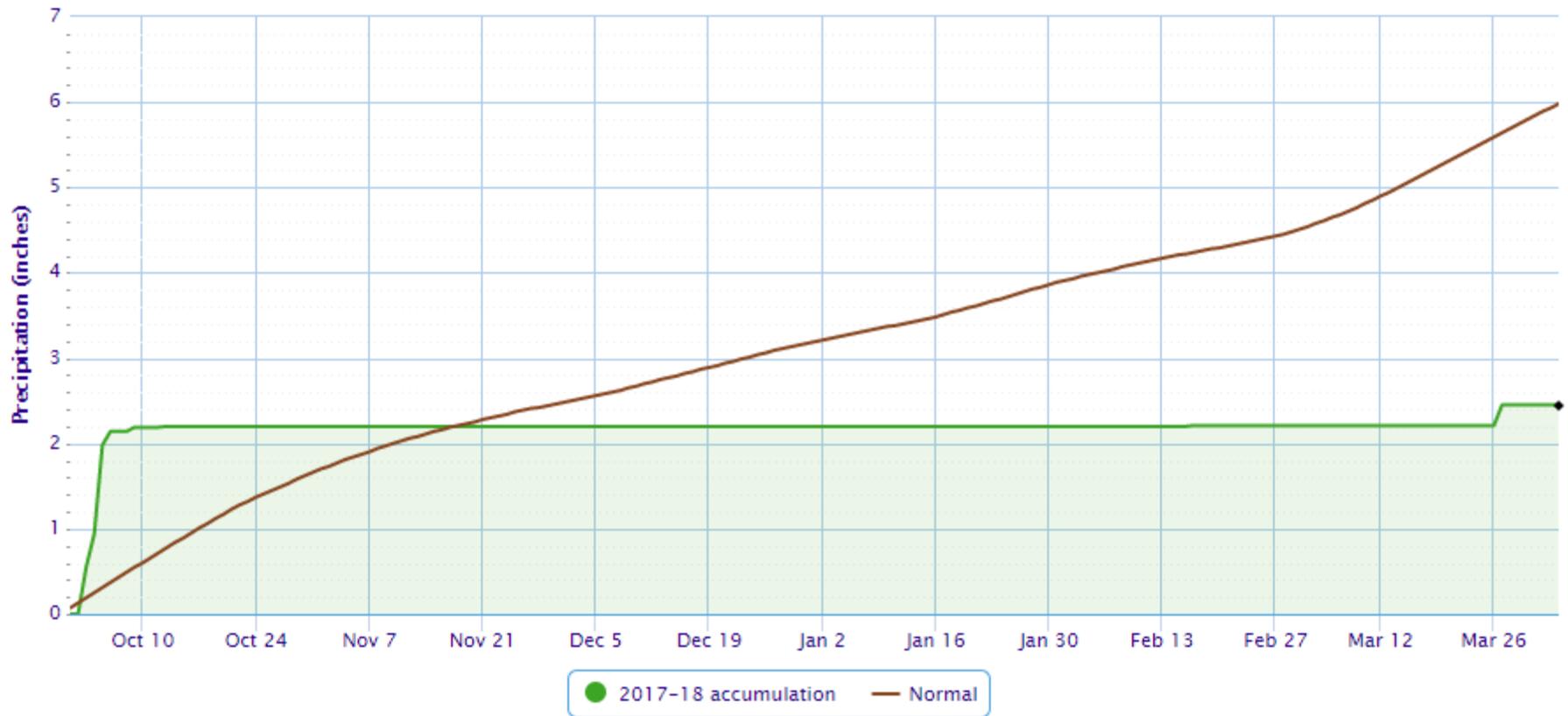


# Departure from Normal

## Amarillo, TX Oct 1, 2017 - Apr 3, 2018

Accumulated Precipitation – Amarillo Area, TX (ThreadEx)

Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values

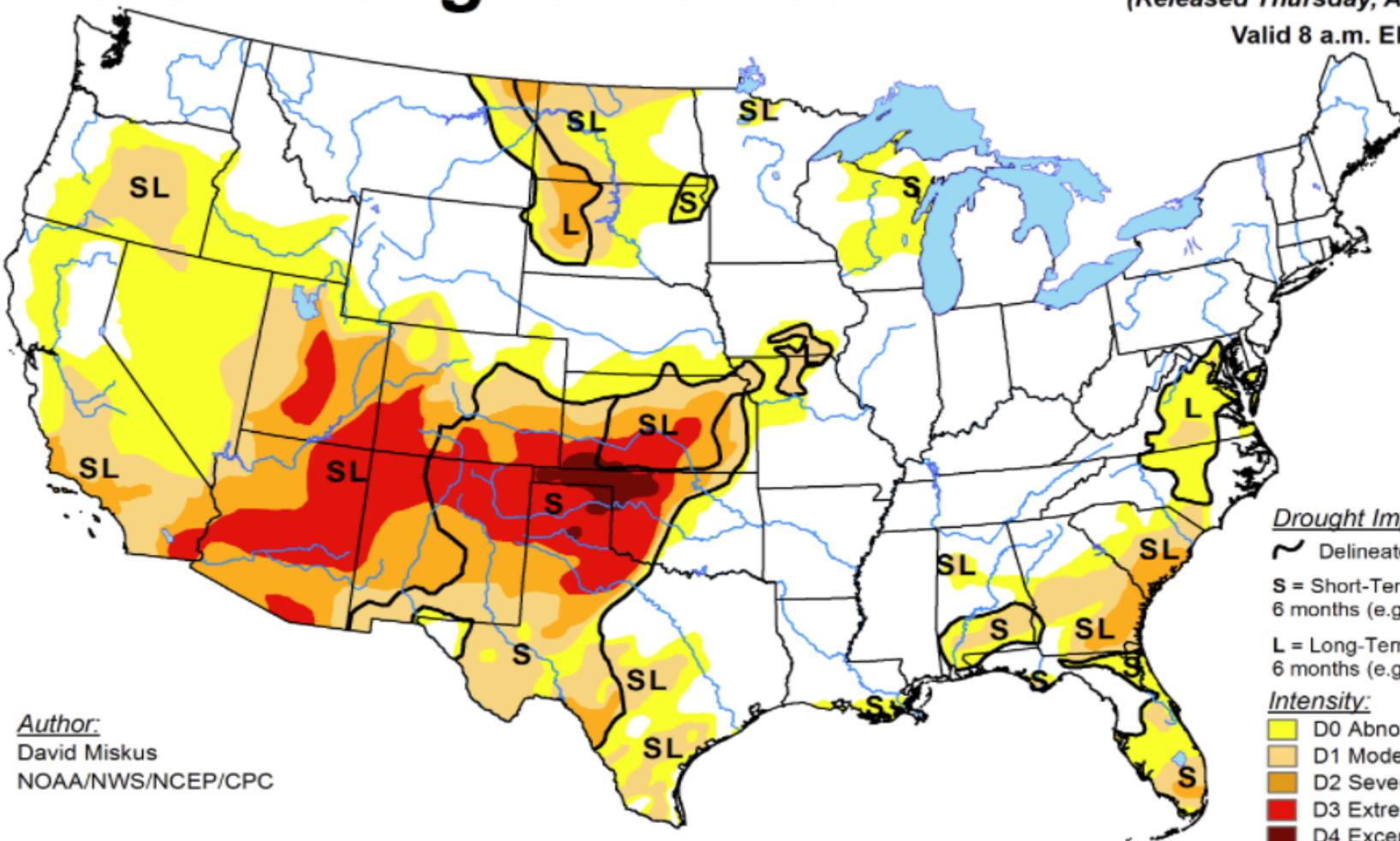


# U.S. Drought Monitor

April 3, 2018

(Released Thursday, Apr. 5, 2018)

Valid 8 a.m. EDT



### 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

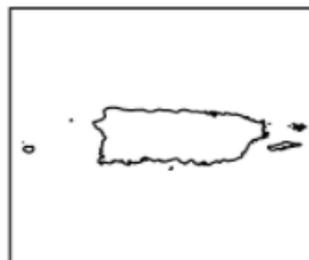
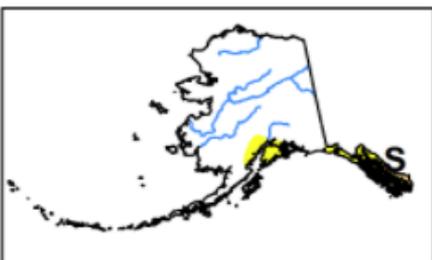
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.



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

### Author:

David Miskus  
NOAA/NWS/NCEP/CPC



# State of Fuels

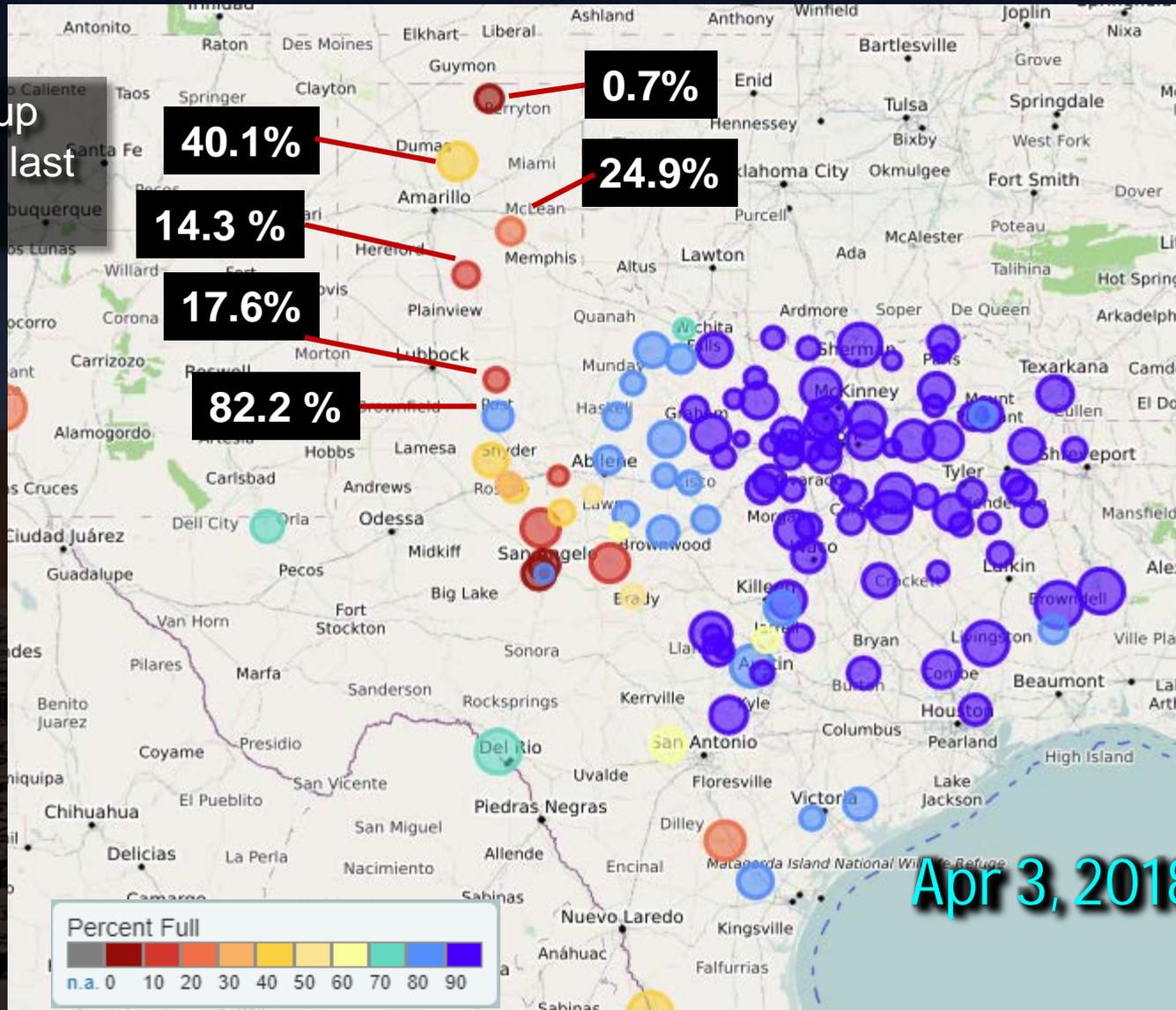
Excessive late summer rains have provided significant 1-hr fuel loading



West of Amarillo on Hwy 60

# Current Texas Reservoirs

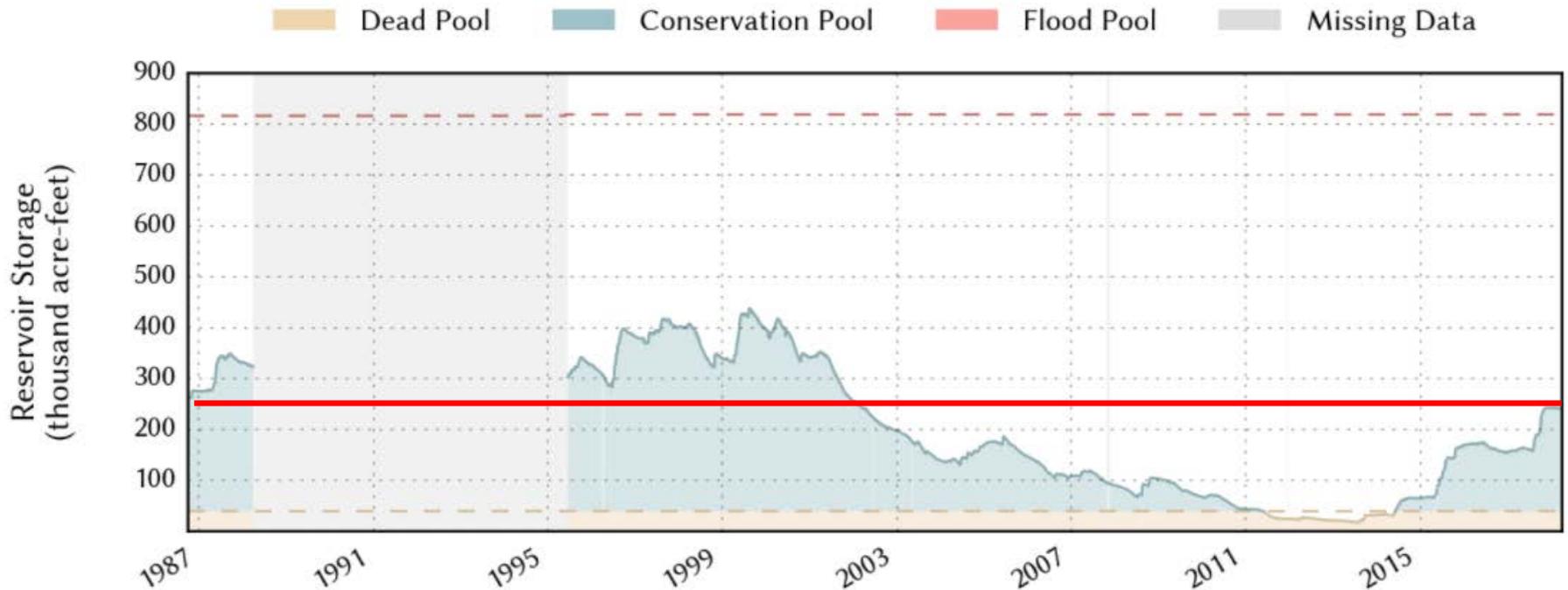
\*Meredith up  
20+ feet in last  
2 years



Source: Texas Water Development Board –  
[waterdatafortexas.org](http://waterdatafortexas.org)

# Lake Meredith

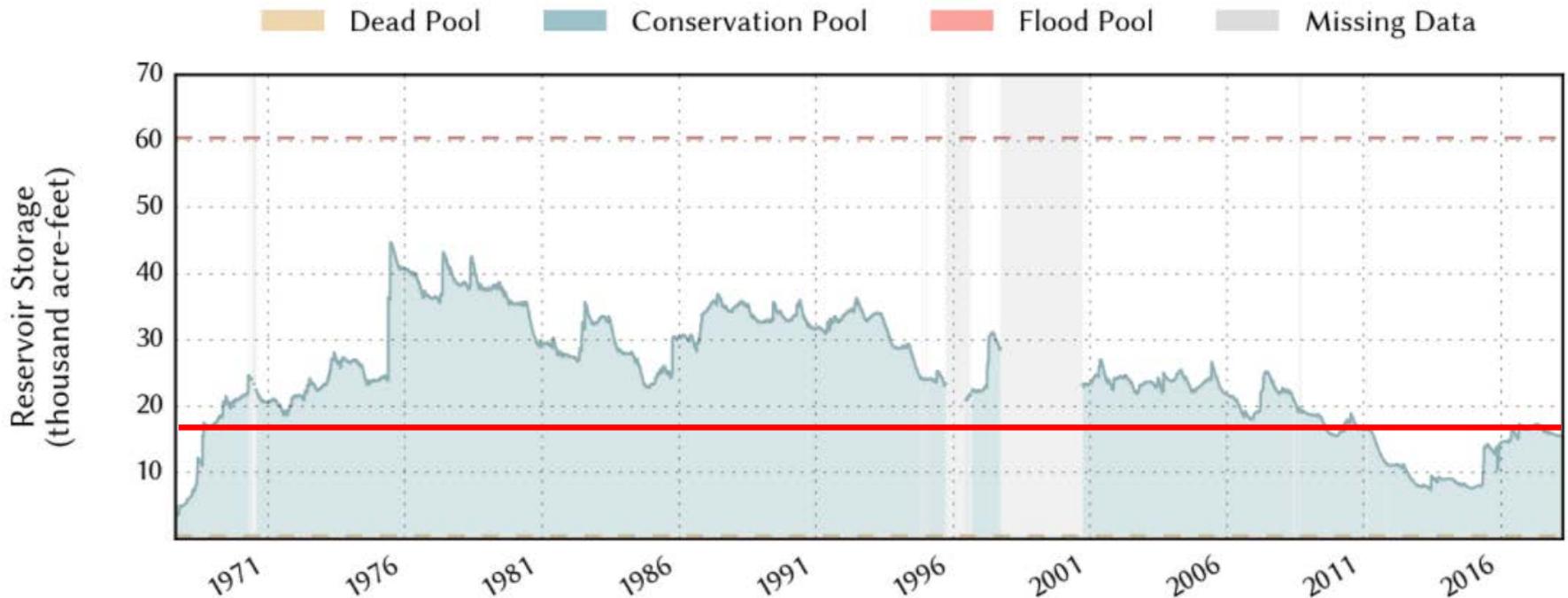
Apr 3, 2018



- Little drop with current drought and still at highest levels since 2002
- Meredith up 30 feet (over 200 acre-feet) in last 3 years and 12 feet higher than a year ago. This is only 8-10 feet elevation below the “glory days”
- Lake Ute overflowed spillway for first time in many years last summer

# Lake Greenbelt

Apr 3, 2018



- Greenbelt up 12 feet (over 5 acre-feet) in last 3 years. This is only 6-8 feet elevation below historic elevations.
- Minimal drop with current drought and still at highest levels since 2002

Source: Texas Water Development Board –  
[waterdatafortexas.org](http://waterdatafortexas.org)

# Historical Significance

## Rainfall – Liquid Equivalent

Amarillo, TX Consecutive days < 0.01"

Rank	Run Length	Ending Date
1	126	2018-02-16
2	75	1957-01-03
3	74	1946-01-03
4	69	1904-01-08
5	67	1936-04-26
6	64	1954-12-10
7	60	1991-03-15
8	57	1893-04-18
9	54	1996-05-23
-	54	1986-02-04

Amarillo, TX Consecutive days < 0.10"

Rank	Run Length	Ending Date
1	171	2018-03-26
2	139	2011-06-27
3	117	1934-02-28
4	116	1902-03-10
5	112	1964-05-26
6	103	1957-01-29
-	103	1901-02-11
8	102	1914-04-02
9	100	1943-04-06
10	96	2006-03-03

Amarillo, TX Consecutive days < 0.25"

Rank	Run Length	Ending Date
1	188	1950-04-15
2	179	2018-04-02
3	175	1967-04-10
4	168	1982-04-25
-	168	1916-03-30
6	163	1995-04-16
7	162	1901-04-08
8	160	2006-03-19
-	160	1979-03-16
10	158	1996-05-23

Period of record: 1892-01-01 to 2018-04-02

← Still Counting!

Look when most streaks ended

# Historical Significance

Driest 5 month Period on Record – Amarillo, TX

Rank	Value	Ending Date	Missing Days
1	0.24	1904-03-31	0
2	0.25	2018-03-31	0
3	0.51	1950-03-31	0
4	0.68	1901-03-31	0
5	0.84	1967-03-31	0
6	1.11	1955-03-31	0
7	1.20	1996-03-31	0
8	1.26	1916-03-31	0
9	1.28	1943-03-31	0
10	1.34	1956-03-31	0

Period of record: 1892-01-01 to 2018-04-02

# Historical Significance

## Top 20 Driest 12 month Periods on Record – Amarillo, TX

2011-2012

1952-1953

2011-2012

1952-1953

2011-2012

1952-1953

1932-1933

1970-1971

1934-1935

1970-1971

Rank	Value	Ending Date	Missing Days
1	5.69	2011-11-30	0
2	7.00	2012-01-31	0
3	7.01	2011-12-31	0
4	7.20	2012-02-29	0
5	7.44	1953-06-30	0
6	7.50	2011-09-30	0
7	7.89	1953-07-31	0
8	7.95	2011-10-31	0
9	8.30	2012-03-31	0
10	8.37	2011-08-31	0
11	8.71	1971-04-30	0
12	8.89	1953-09-30	0
13	9.01	1953-08-31	0
14	9.18	1953-05-31	0
15	9.25	1933-07-31	0
16	9.27	1971-03-31	0
17	9.39	1971-05-31	0
18	9.41	1935-06-30	0
19	9.56	1970-12-31	0
20	9.64	1971-01-31	0
Period of record: 1892-01-01 to 2018-04-02			

# Historical Significance

## Amarillo, TX

Precipitation < 10" in 12 Month Period

1. 2011-2012 – 5.69"
2. 1952-1953 – 7.44"
3. 1932-1933 – 9.25"
4. 1970-1971 – 9.27"
5. 1934-1935 – 9.41"
6. 1955-1956 – 9.81"
7. 2005-2006 – 10.01"

Amarillo, TX

\*Occurred multiple periods in these years

# Historical Significance

## Snowfall

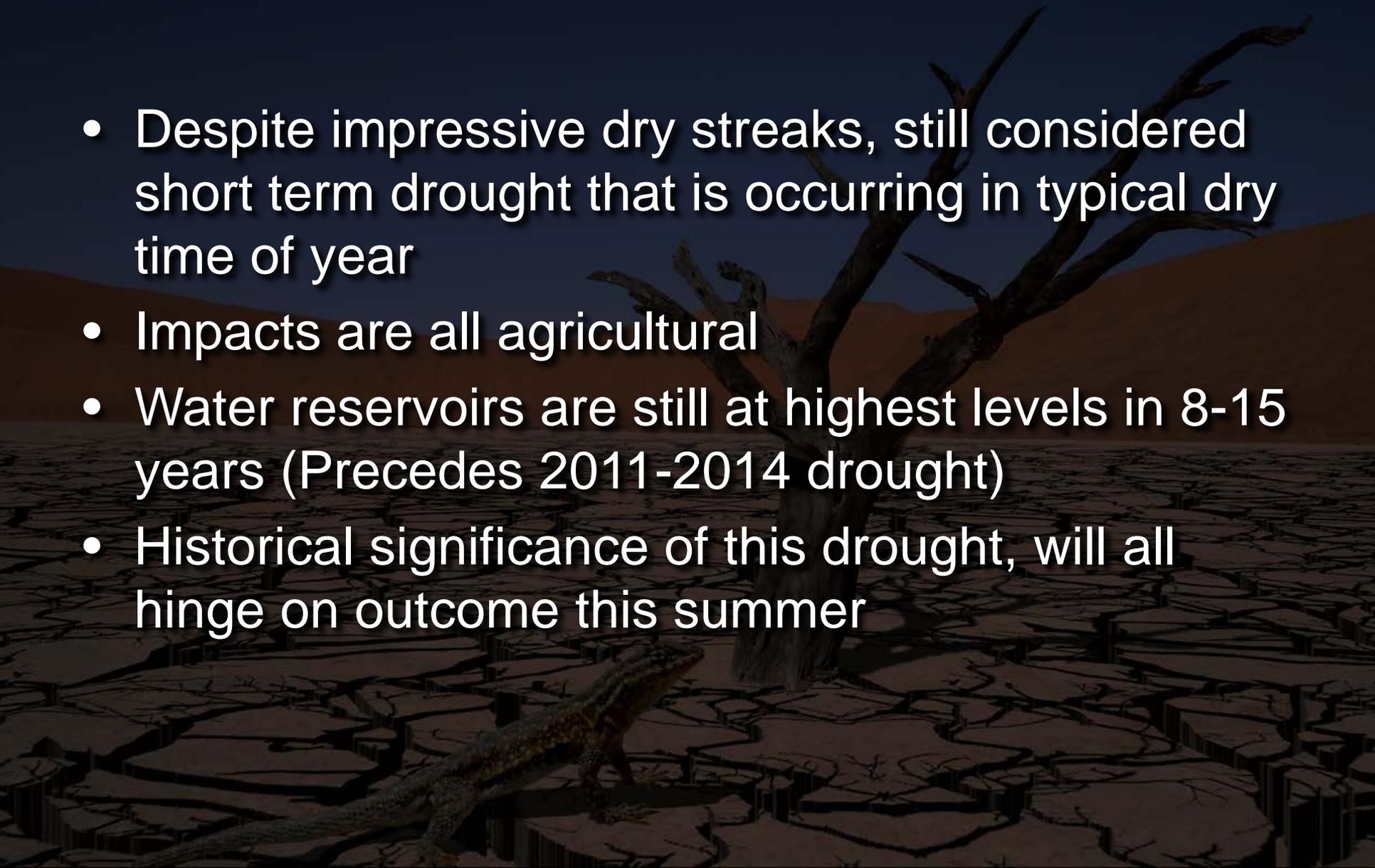
### Amarillo, TX – Top 10 Lowest Seasonal Snowfall

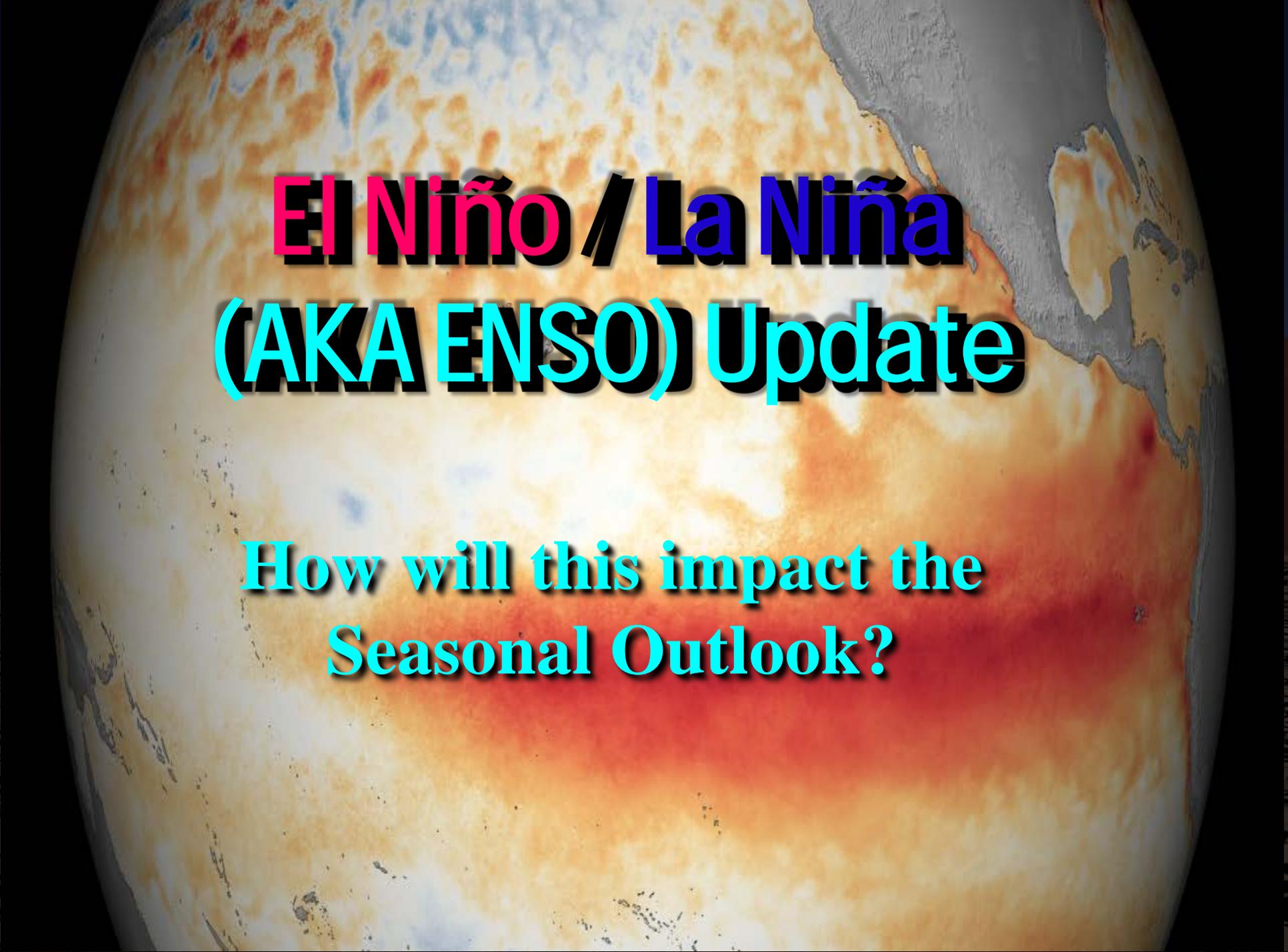
Rank	Value	Ending Date	Missing Days
1	T	2018-04-30	31
-	T	1950-04-30	0
3	0.5	1902-04-30	0
4	2.3	1955-04-30	0
-	2.3	1904-04-30	0
6	2.5	2006-04-30	0
7	3.3	1967-04-30	0
8	3.5	1992-04-30	0
9	6.0	1995-04-30	1
10	6.3	1954-04-30	0

Period of record: 1892-11-01 to 2018-04-02

# Summary

- Despite impressive dry streaks, still considered short term drought that is occurring in typical dry time of year
- Impacts are all agricultural
- Water reservoirs are still at highest levels in 8-15 years (Precedes 2011-2014 drought)
- Historical significance of this drought, will all hinge on outcome this summer

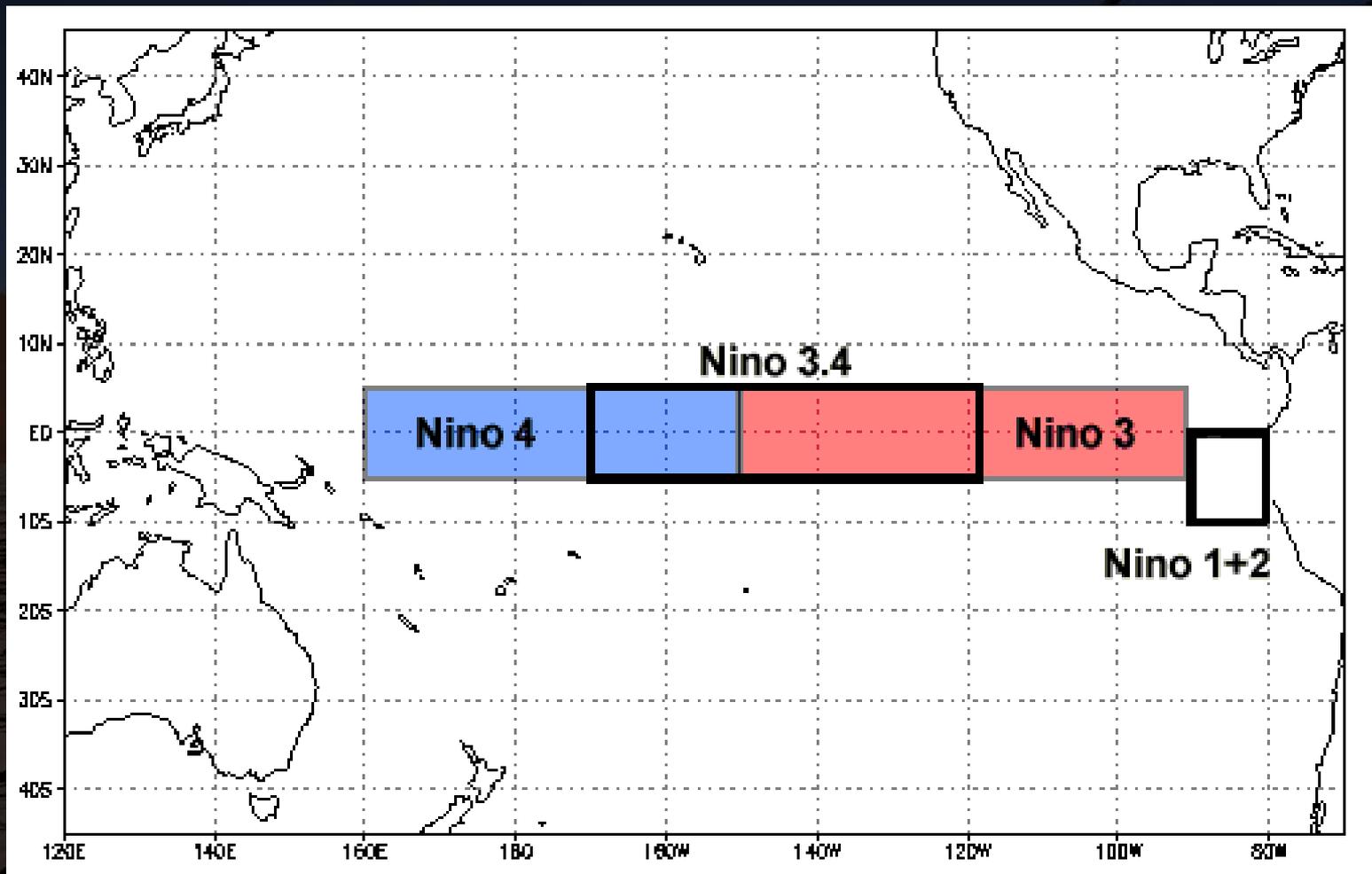




**El Niño / La Niña  
(AKA ENSO) Update**

**How will this impact the  
Seasonal Outlook?**

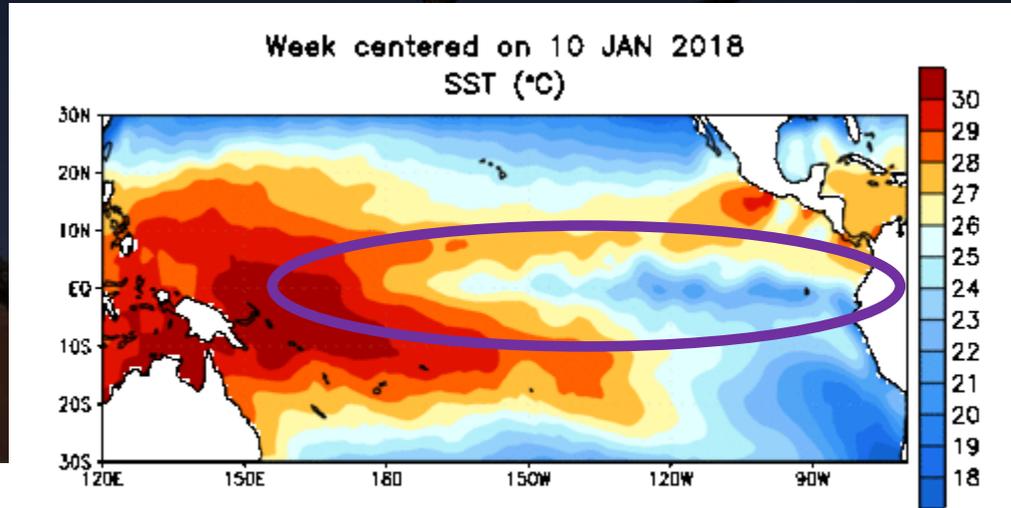
# How is it Measured?



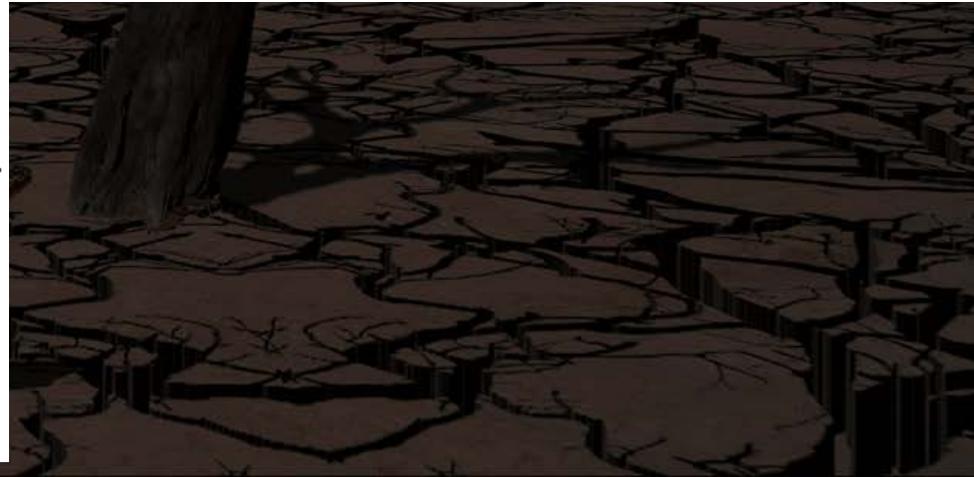
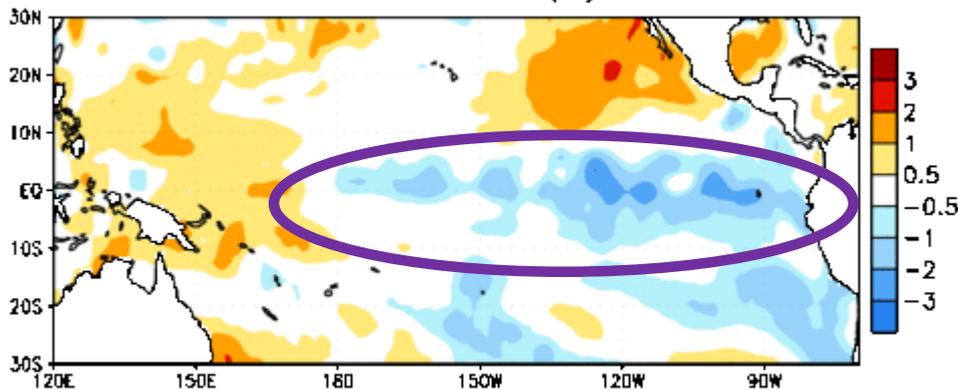
# Recent tropical Pacific SST Trends

Sea Surface Temperatures (SSTs)

SST Anomalies

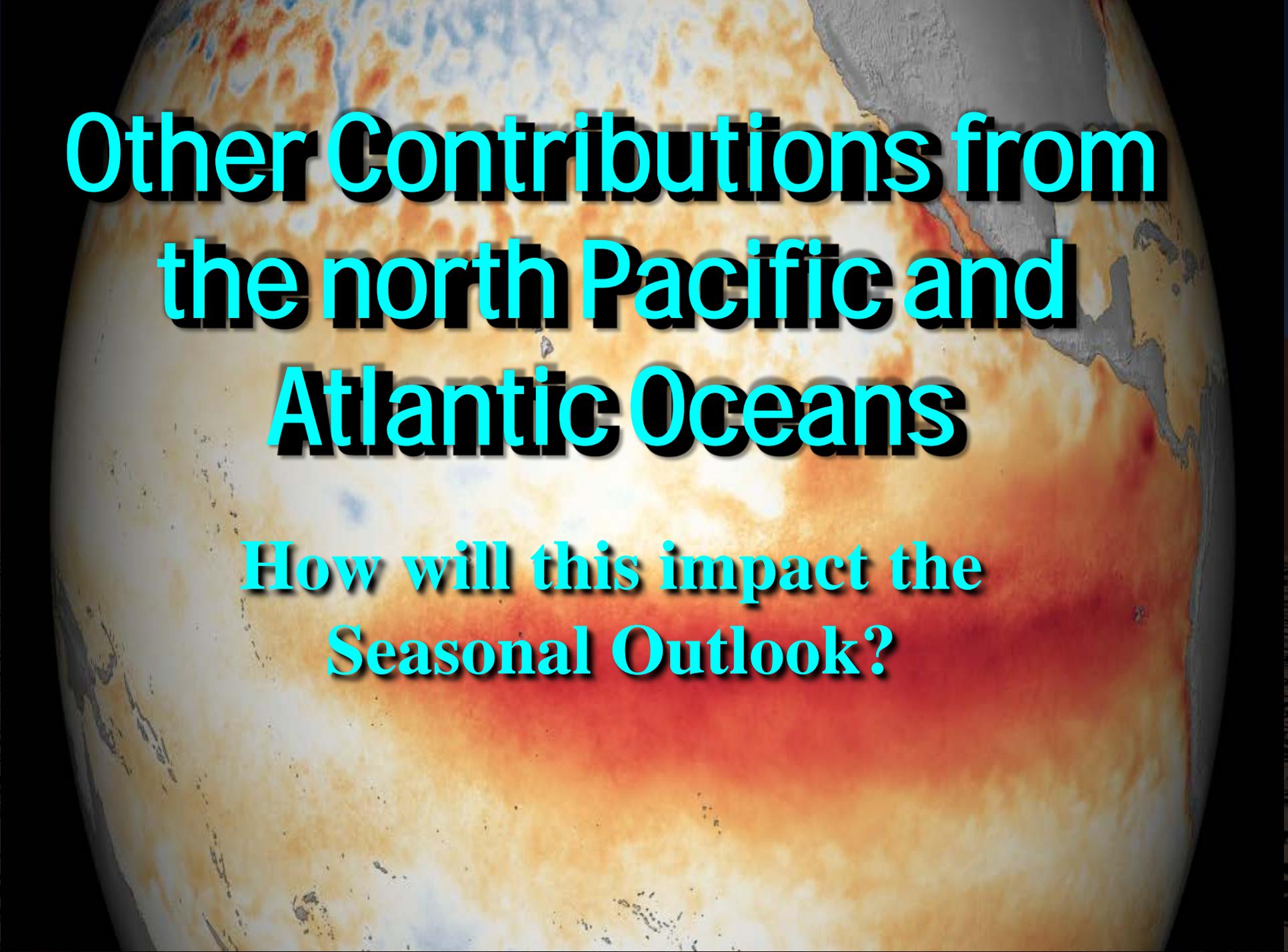


Week centered on 10 JAN 2018  
SST Anomalies (°C)



# LA NIÑA Cool Season Impacts

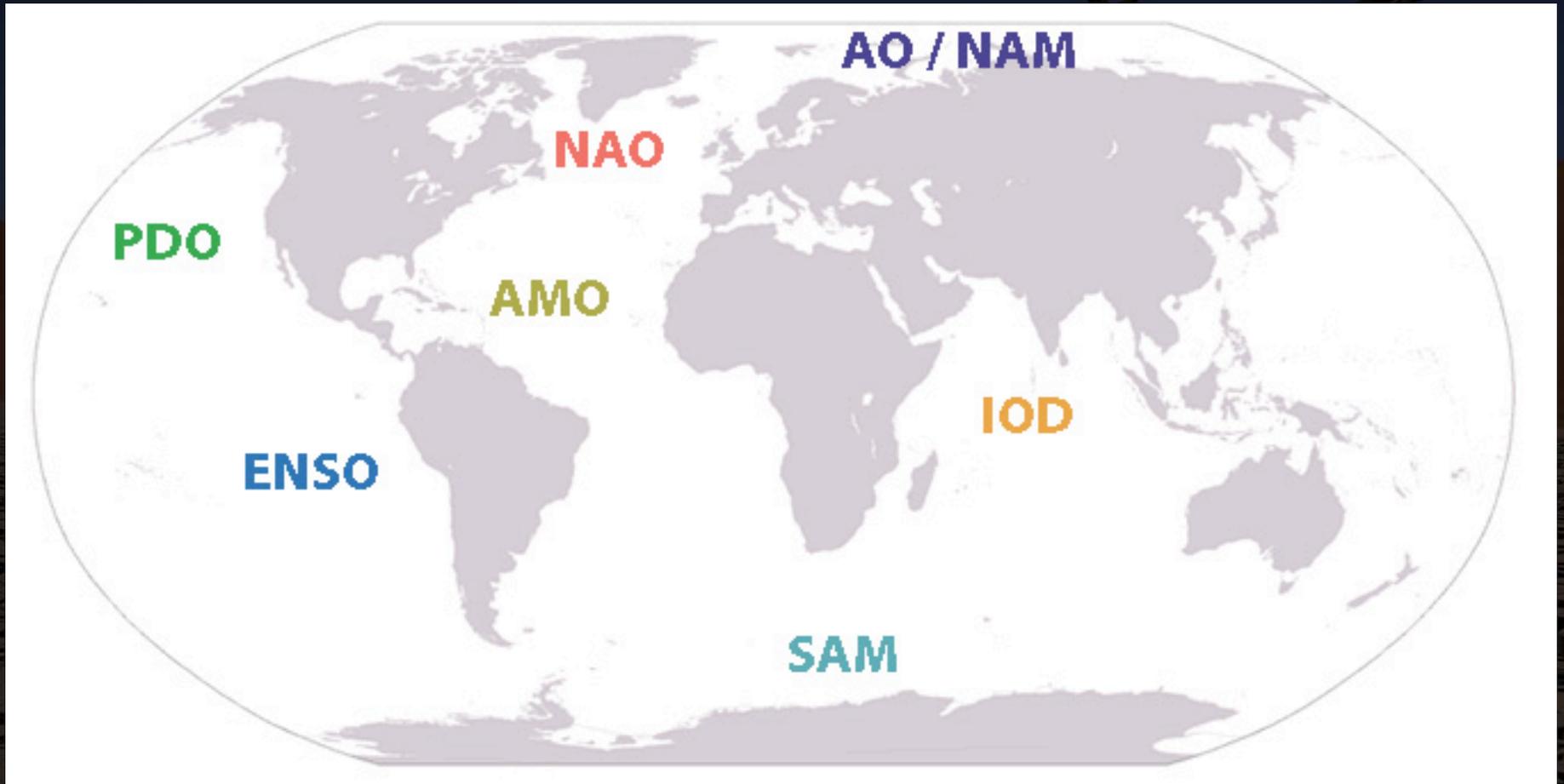




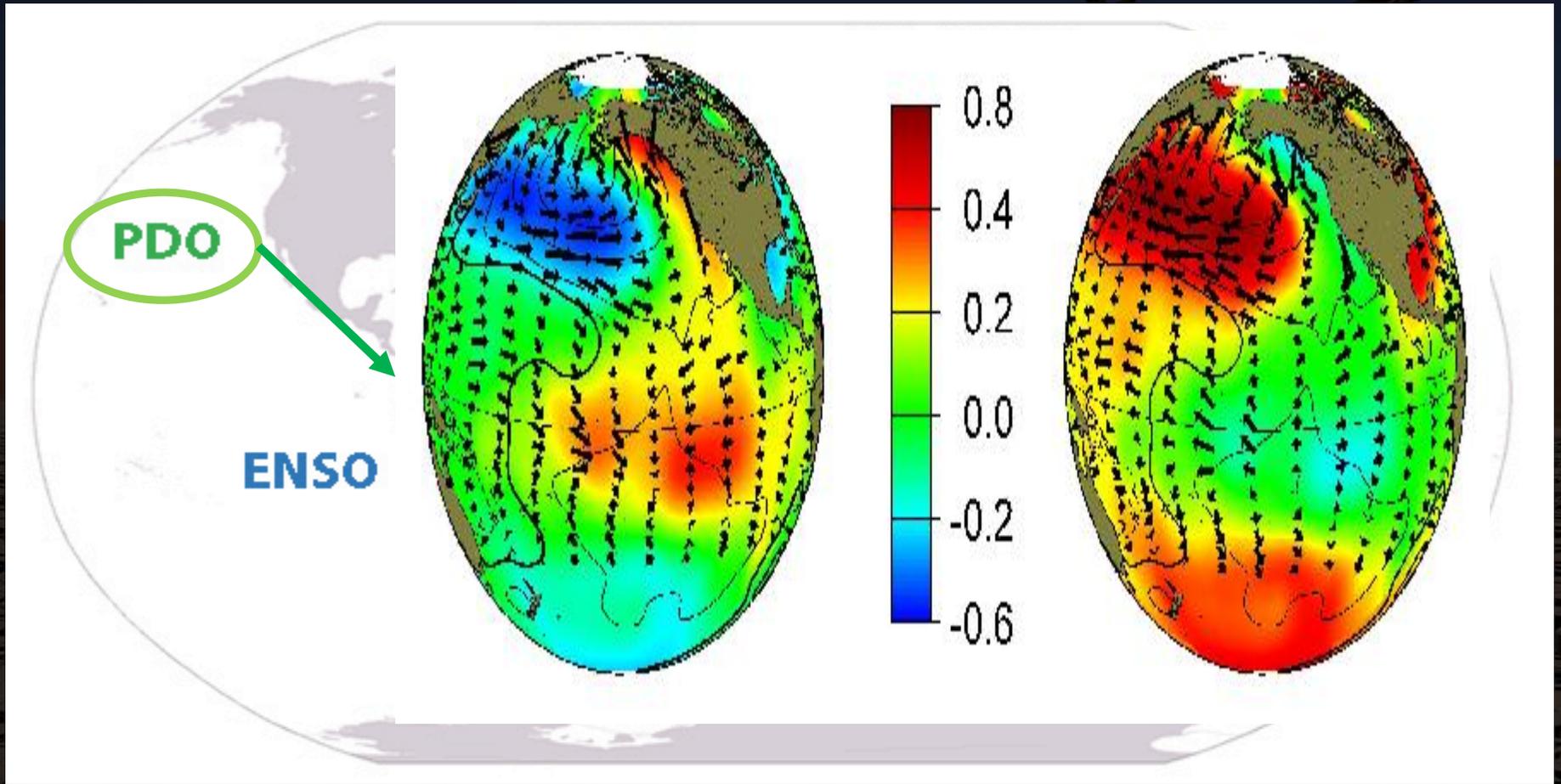
# **Other Contributions from the north Pacific and Atlantic Oceans**

**How will this impact the  
Seasonal Outlook?**

# Other Important Oscillations

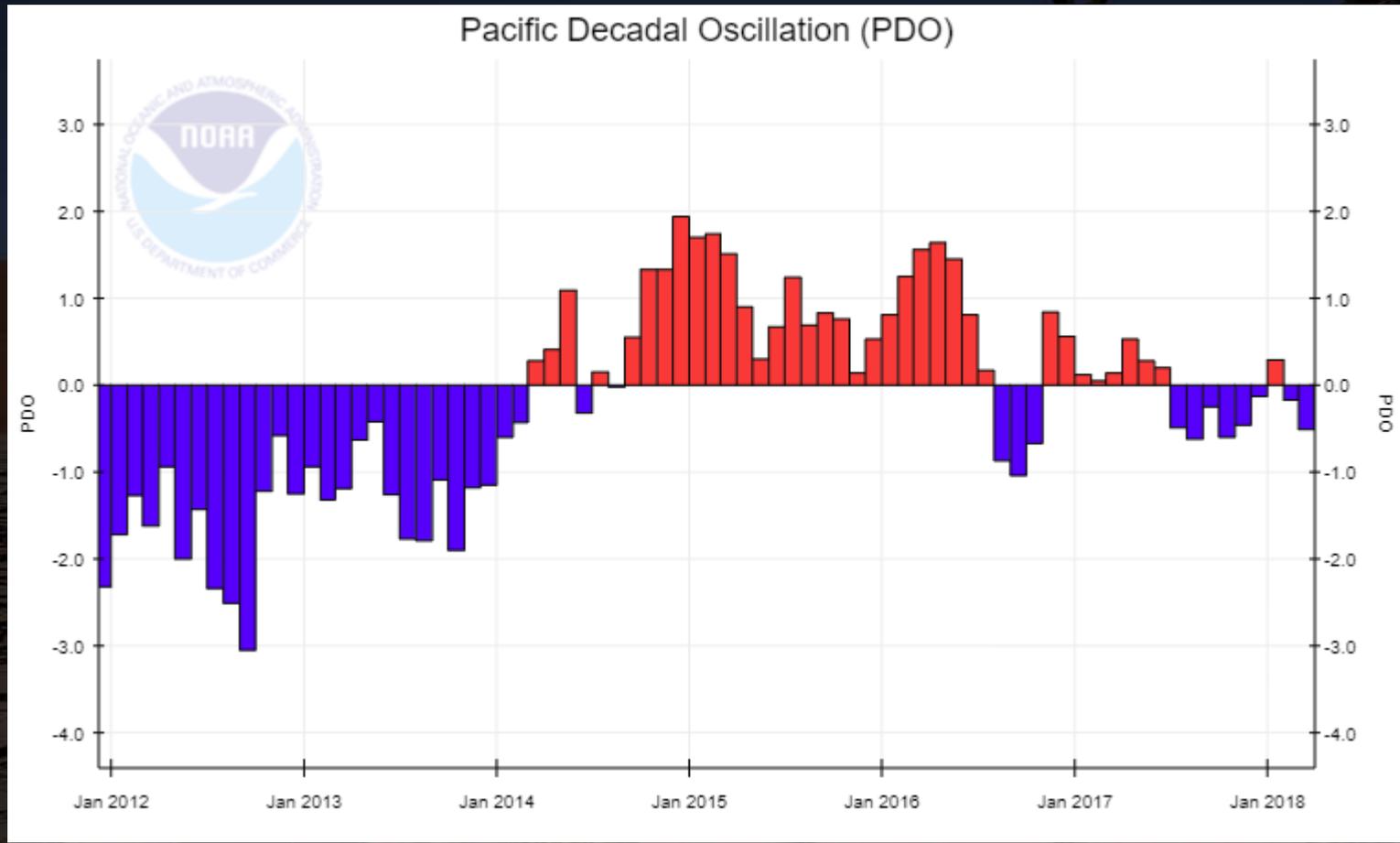


# Pacific Decadal Oscillation



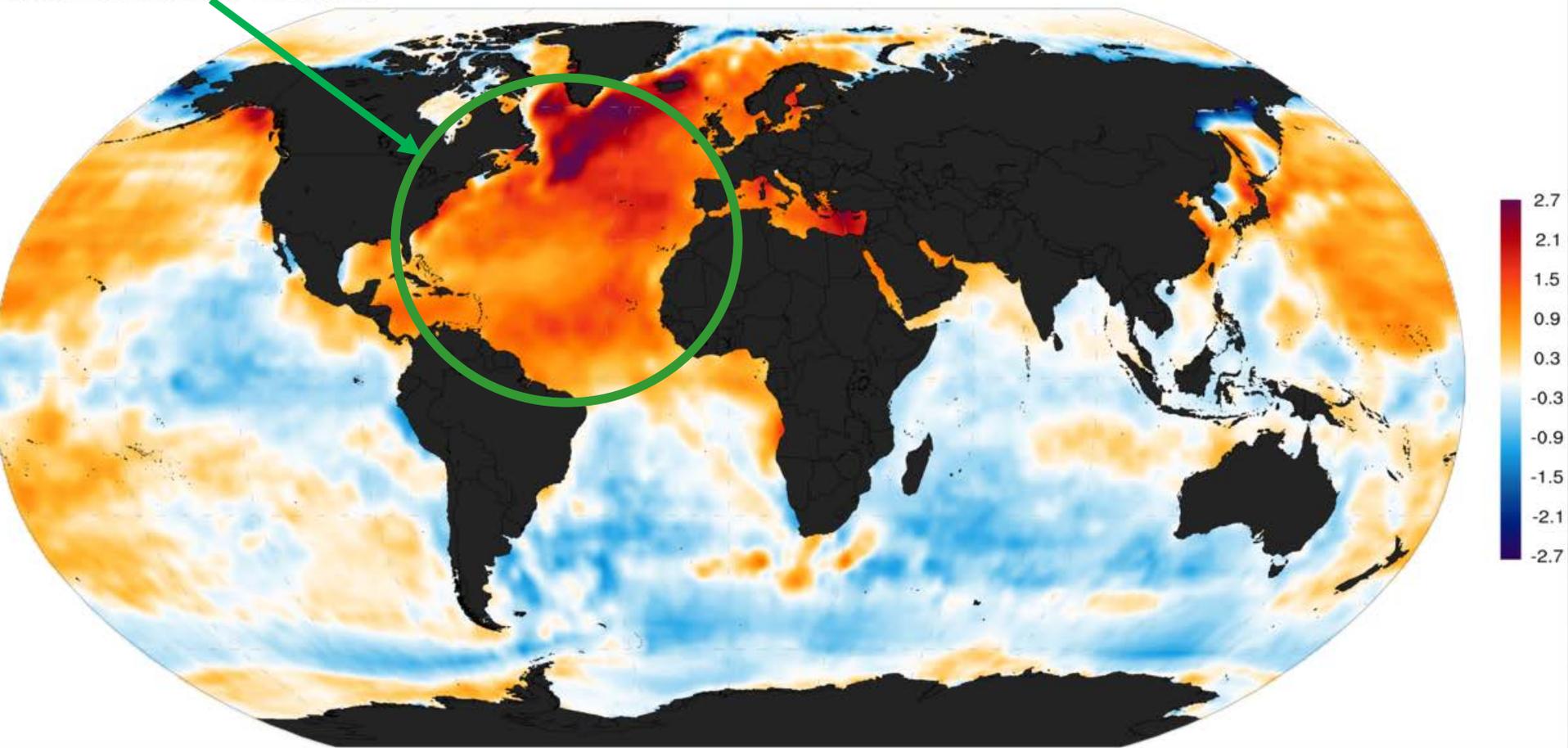
# Pacific Decadal Oscillation (PDO)

Negative PDO Promotes Dry Conditions in Panhandles



# Atlantic Multidecadal Oscillation

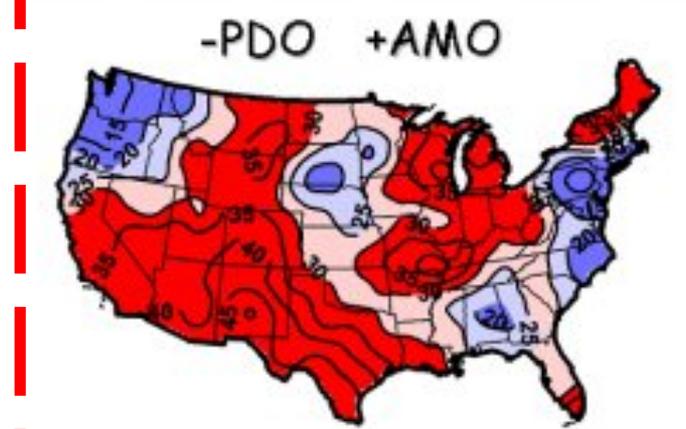
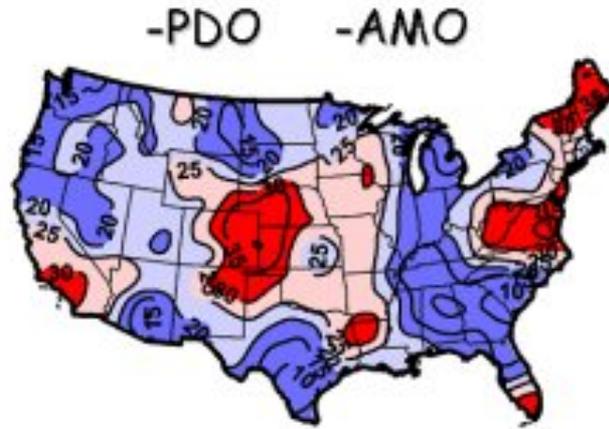
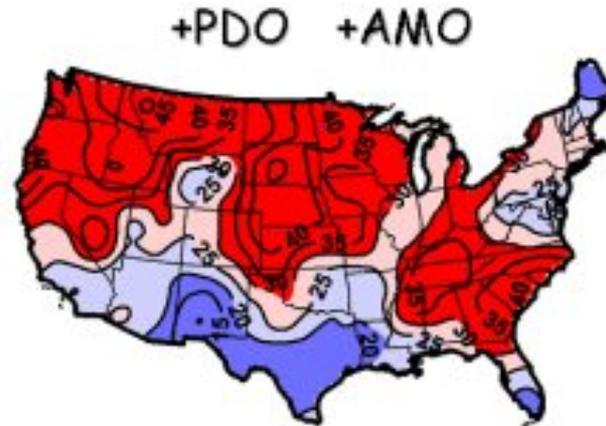
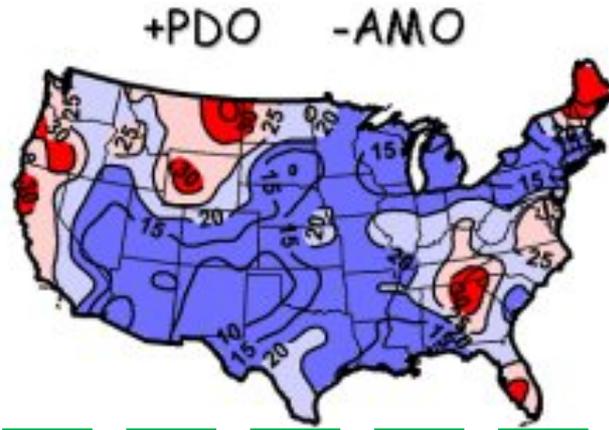
Atlantic Multidecadal Oscillation



# PDO/AMO Implications

Drought Probabilities (Red higher Drought Chance)

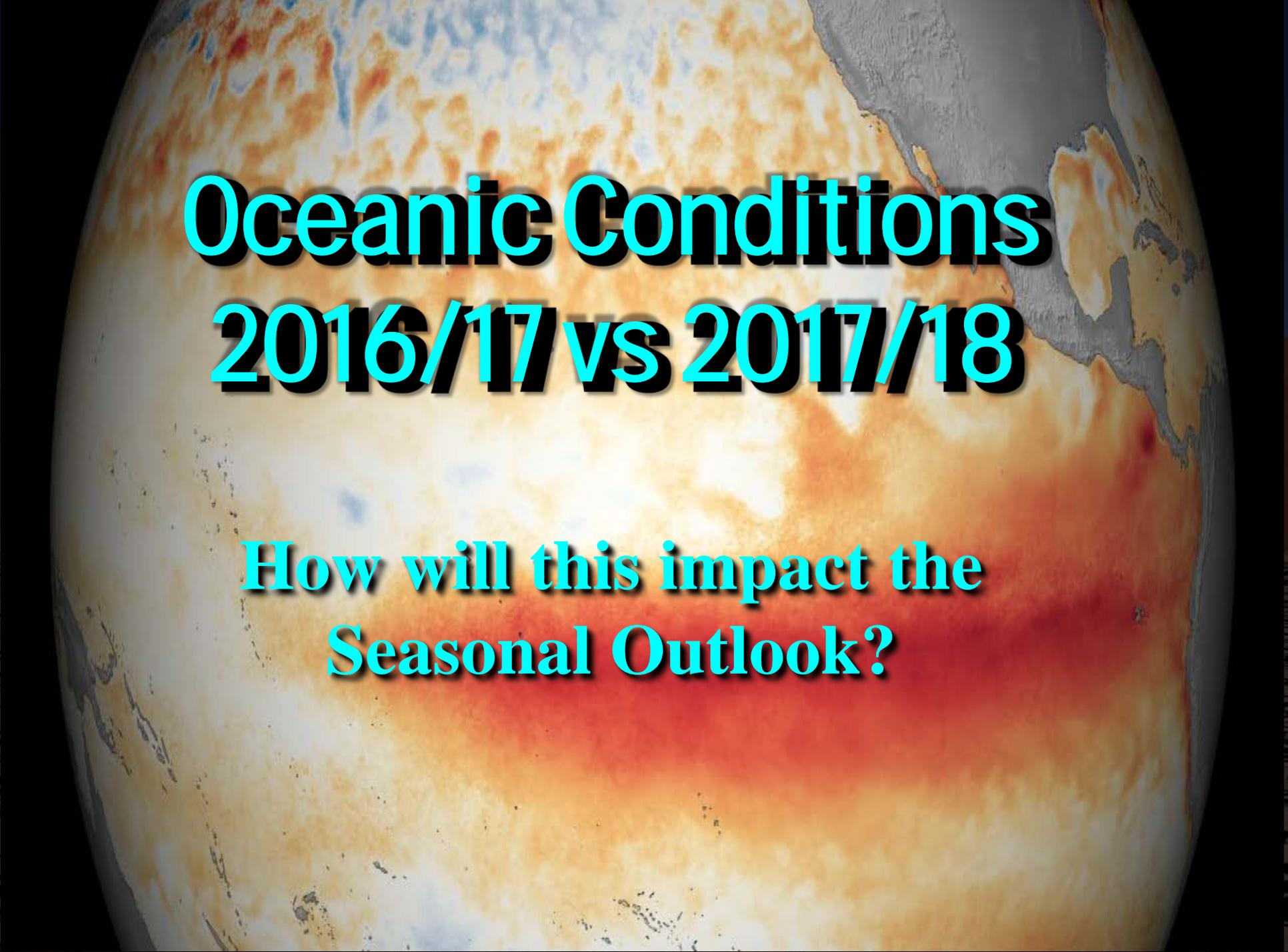
Only Favorable Combo



Recent

25% = normal drought frequency

$\frac{3}{4}$  are Drought Signatures for Panhandles



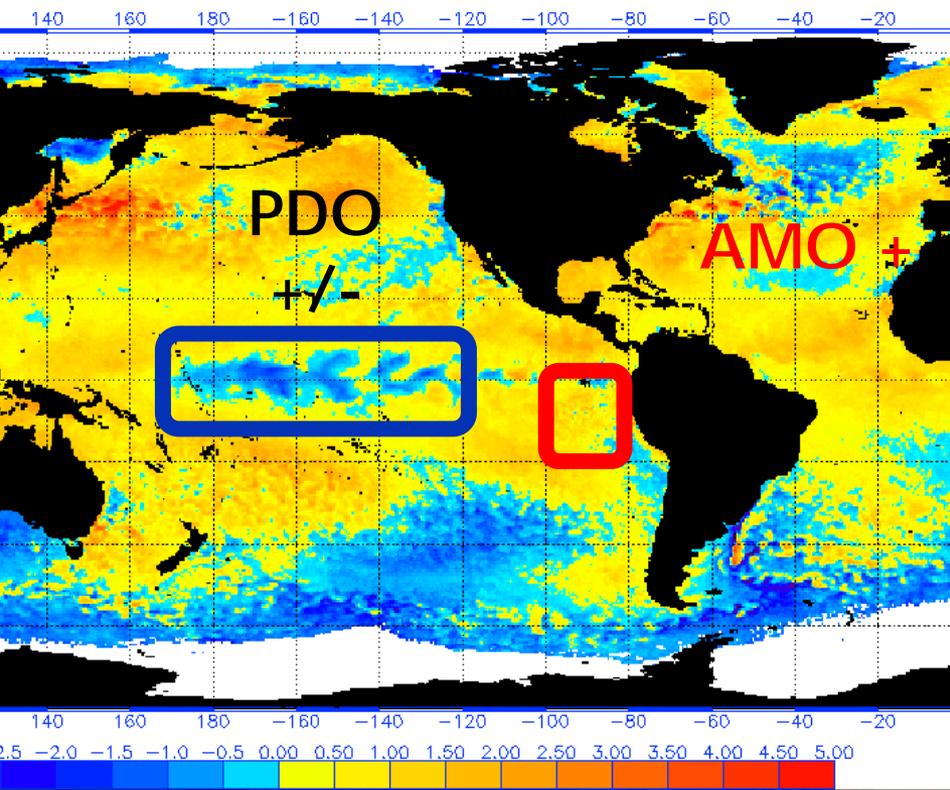
# **Oceanic Conditions 2016/17 vs 2017/18**

**How will this impact the  
Seasonal Outlook?**

# Comparison

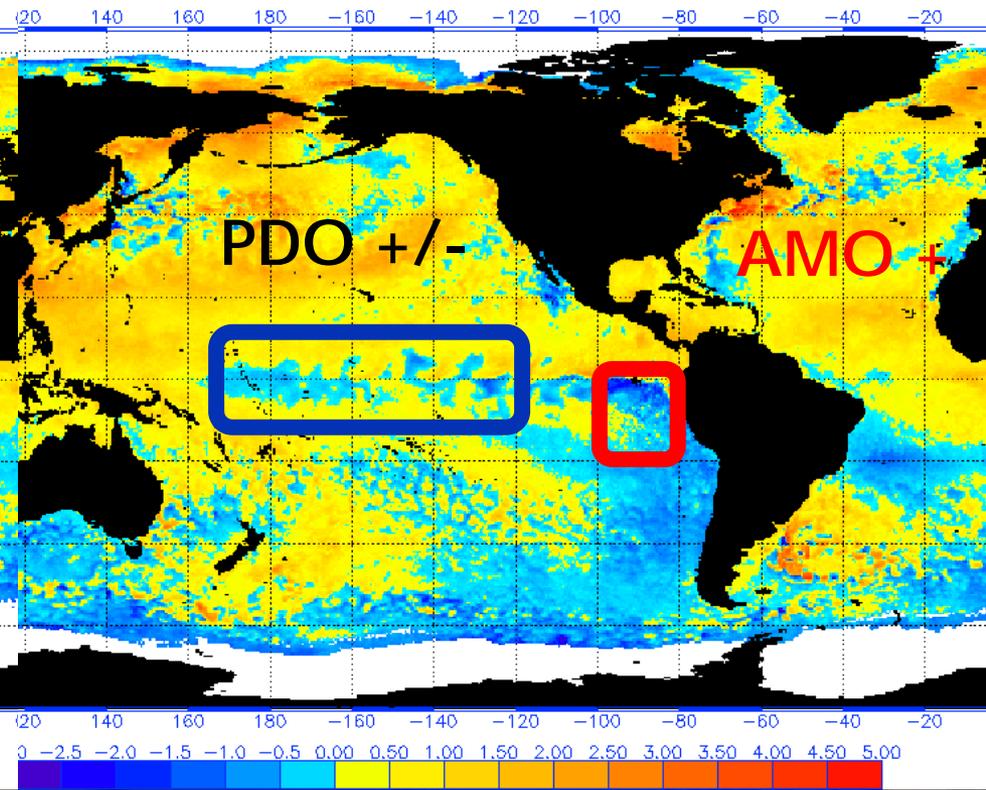
## Why was 2016-17 different than 2017-18?

50 KM GLOBAL ANALYSIS: SST Anomaly (degrees C), 10/3/2016  
(white regions indicate sea-ice)



Oct 3, 2016

50 KM GLOBAL ANALYSIS: SST Anomaly (degrees C), 10/2/2017  
(white regions indicate sea-ice)



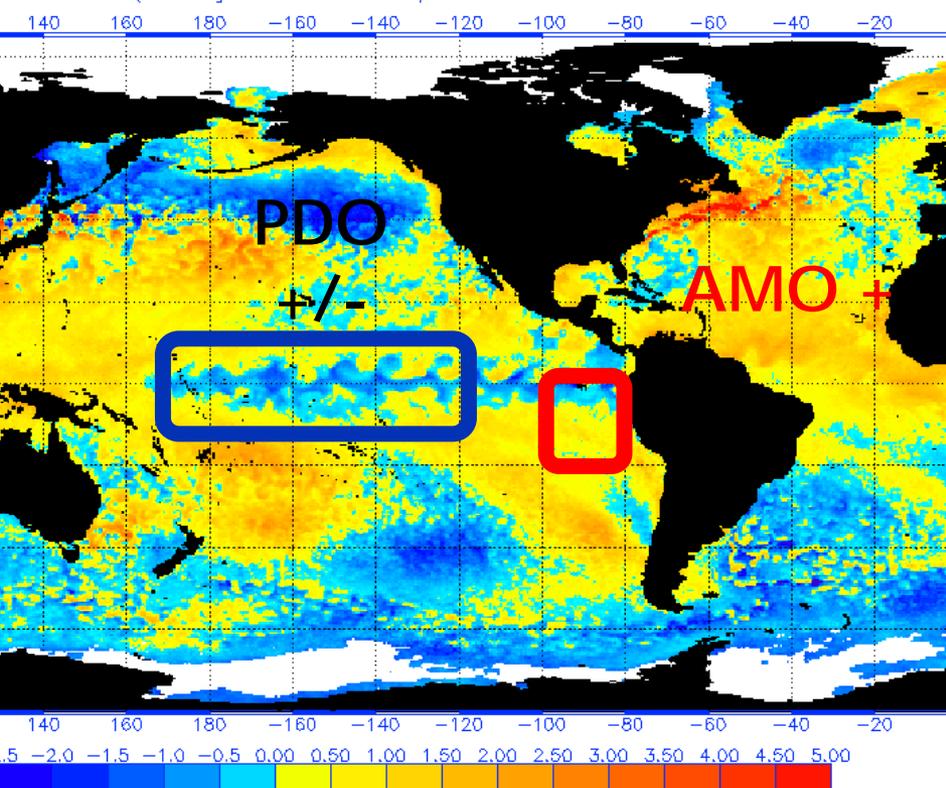
Oct 2, 2017

# Comparison

Why was 2016-17 different than 2017-18?

NOAA GLOBAL ANALYSIS: SST Anomaly (degrees C), 12/5/2016

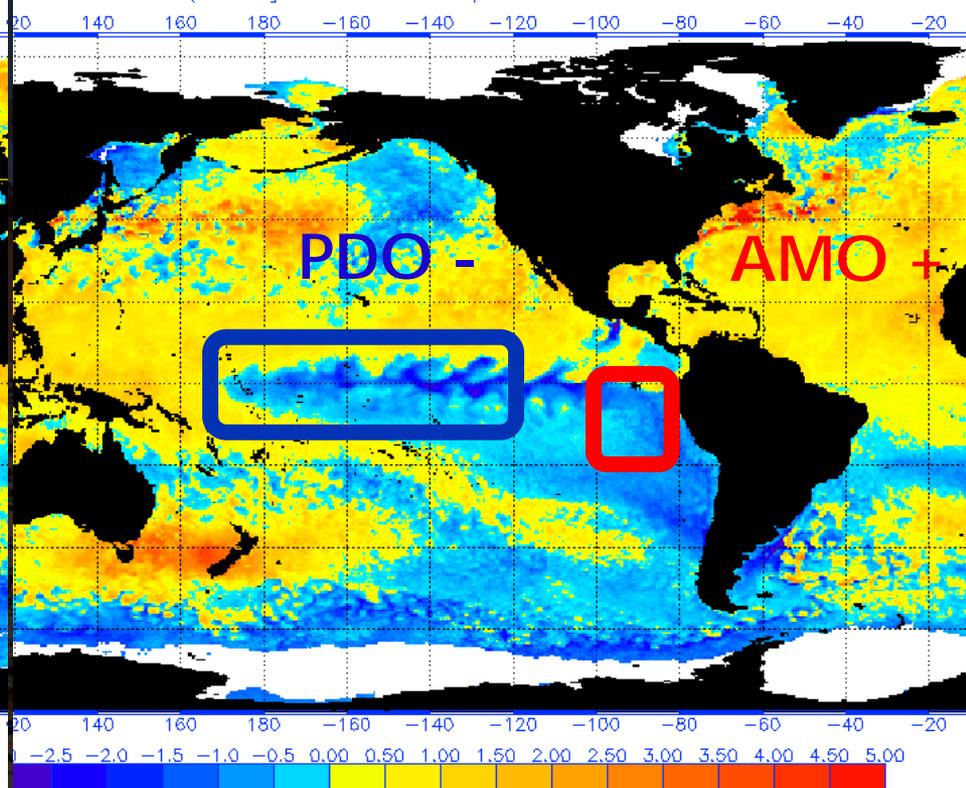
(white regions indicate sea-ice)



Dec 5, 2016

NOAA GLOBAL ANALYSIS: SST Anomaly (degrees C), 12/4/2017

(white regions indicate sea-ice)



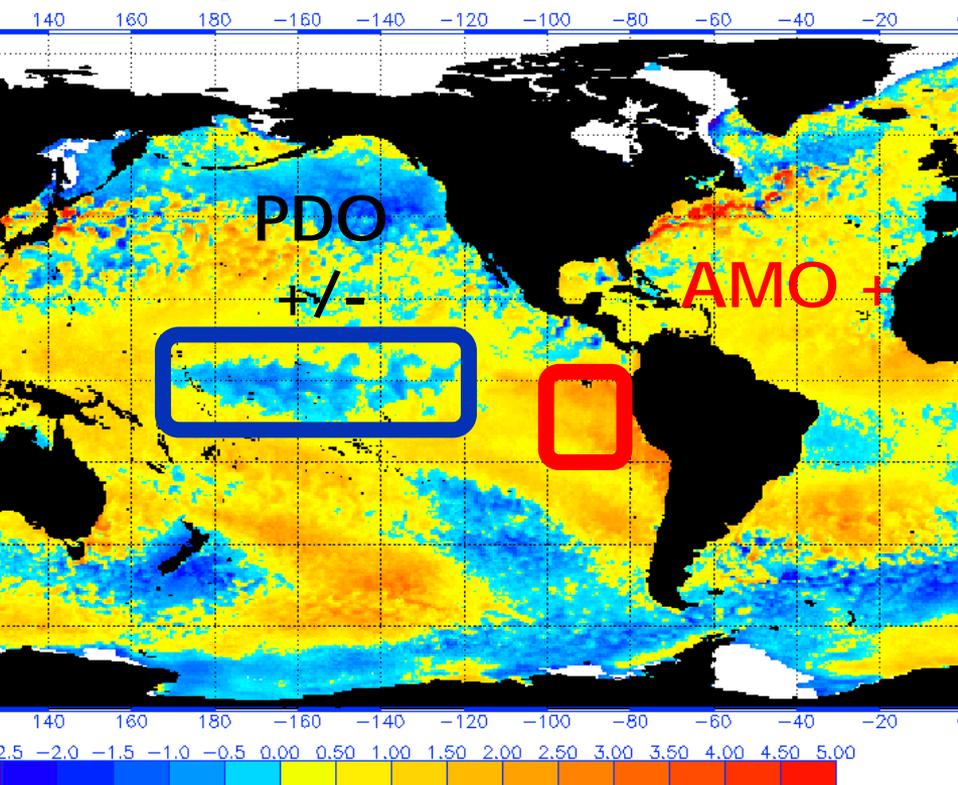
Dec 4, 2017

# Comparison

## Why was 2016-17 different than 2017-18?

10 KM GLOBAL ANALYSIS: SST Anomaly (degrees C), 2/6/2017

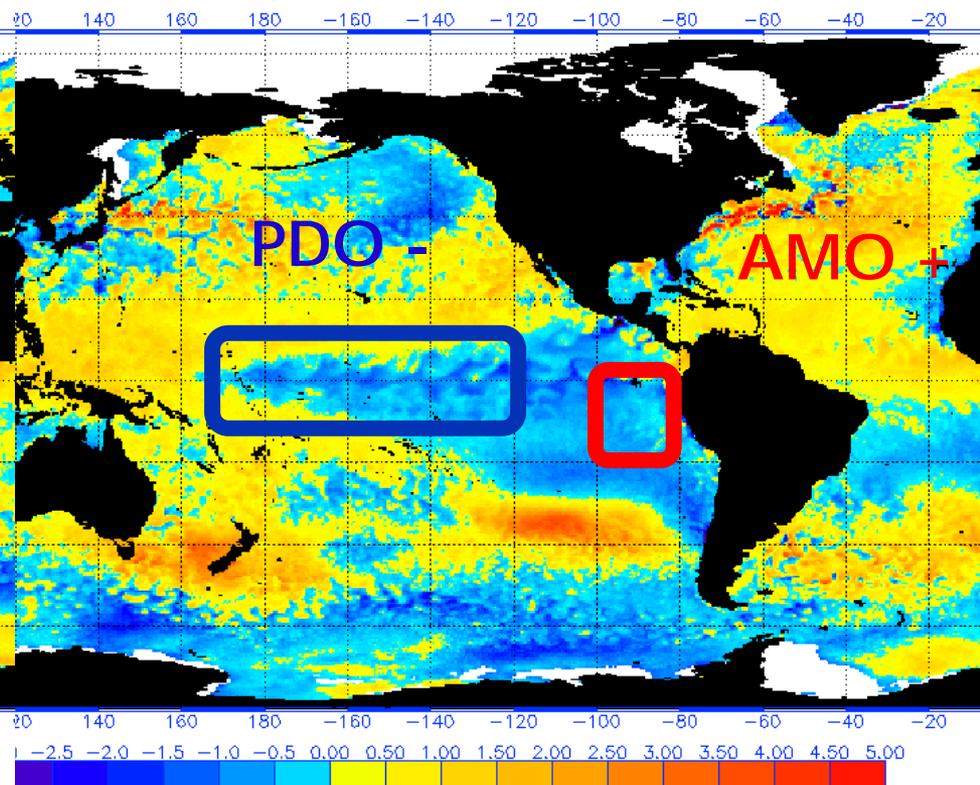
(white regions indicate sea-ice)



Feb 6, 2017

10 KM GLOBAL ANALYSIS: SST Anomaly (degrees C), 2/5/2018

(white regions indicate sea-ice)

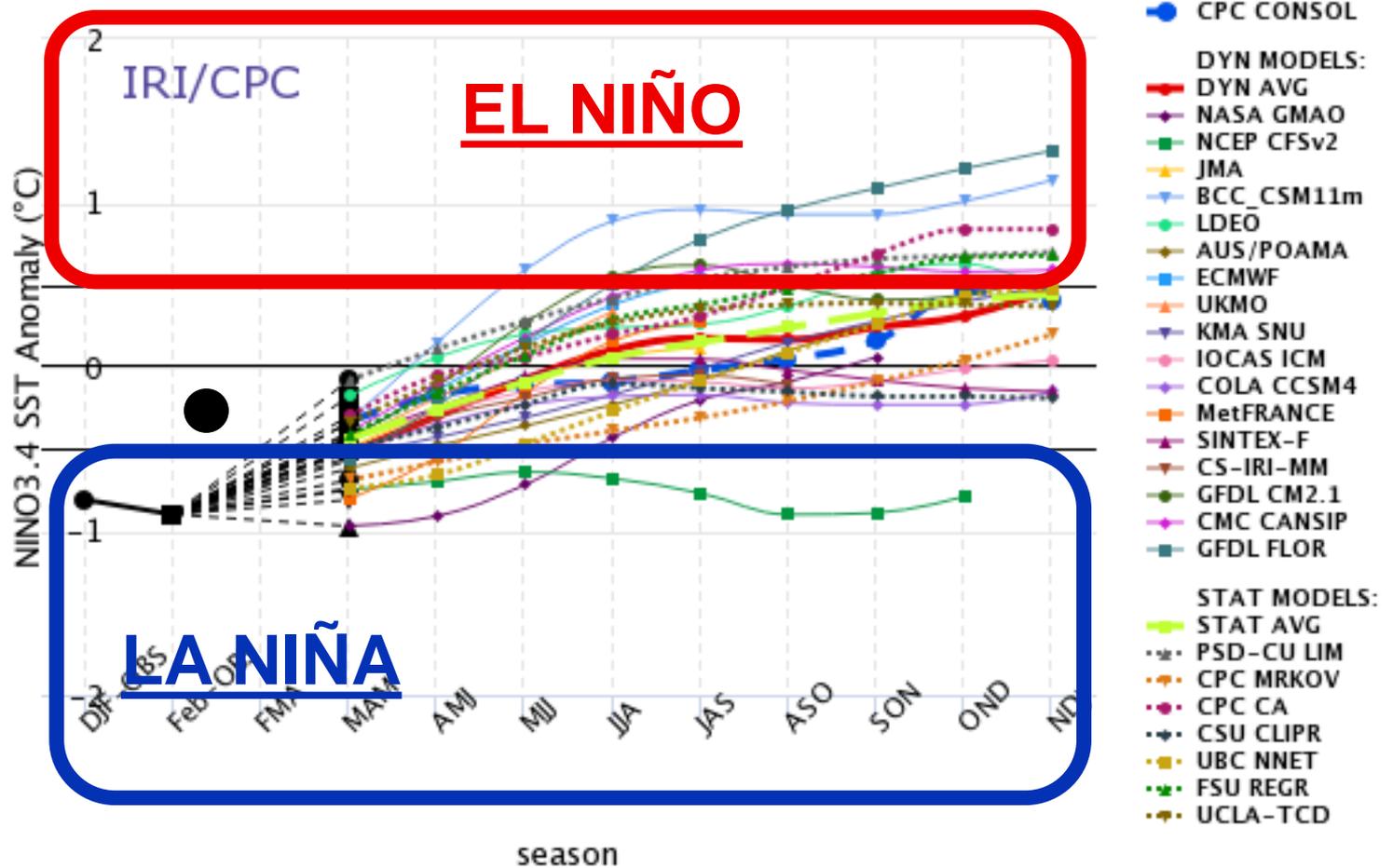


Feb 5, 2018

# Outlook



## Mid-Mar 2018 Plume of Model ENSO Predictions

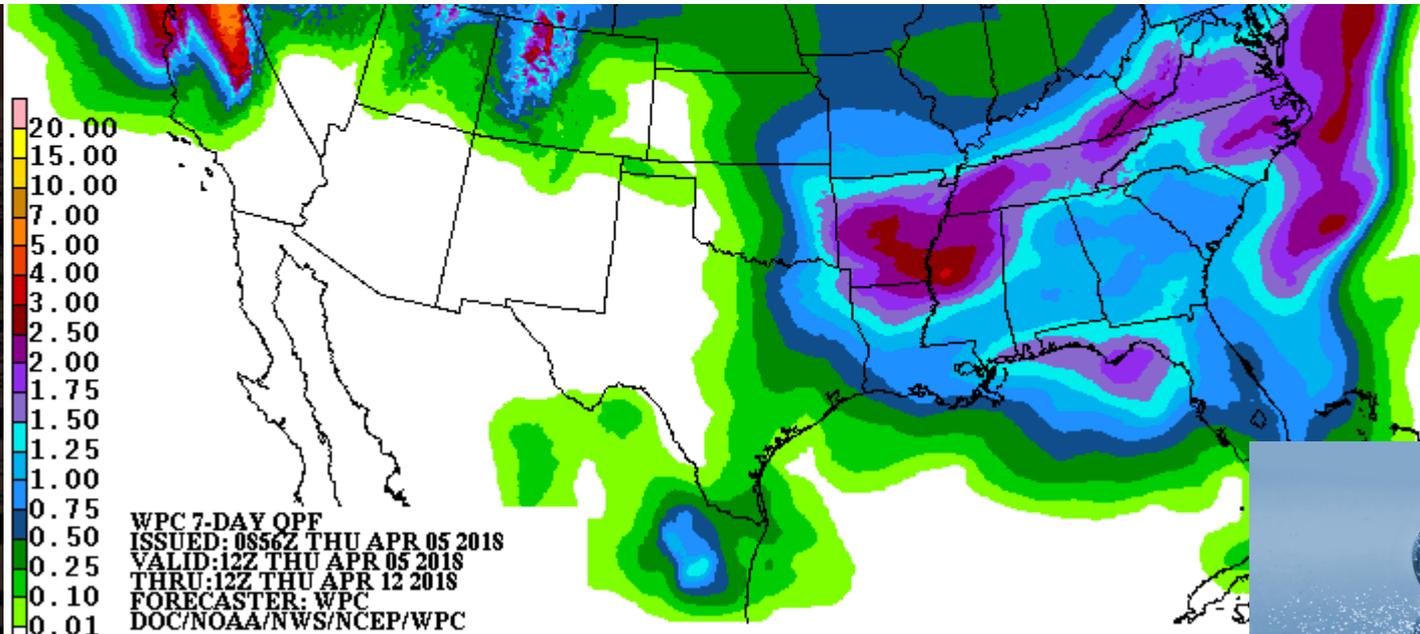


- ENSO is measured in 3 month averages
- 3 consecutive three month averages  $\pm 0.5$  required to declare an event

# 7-Day Precipitation Forecast

## Rainfall Forecast Through Wednesday

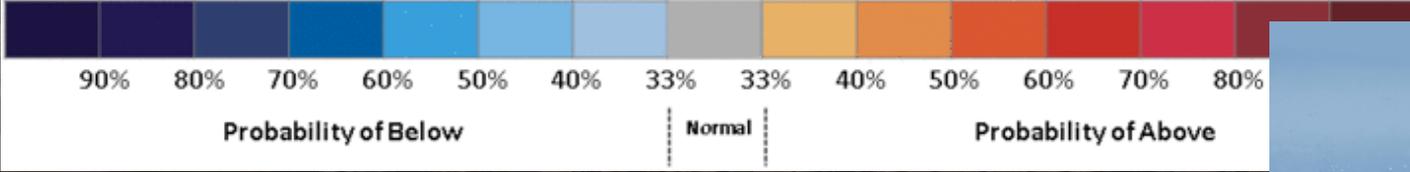
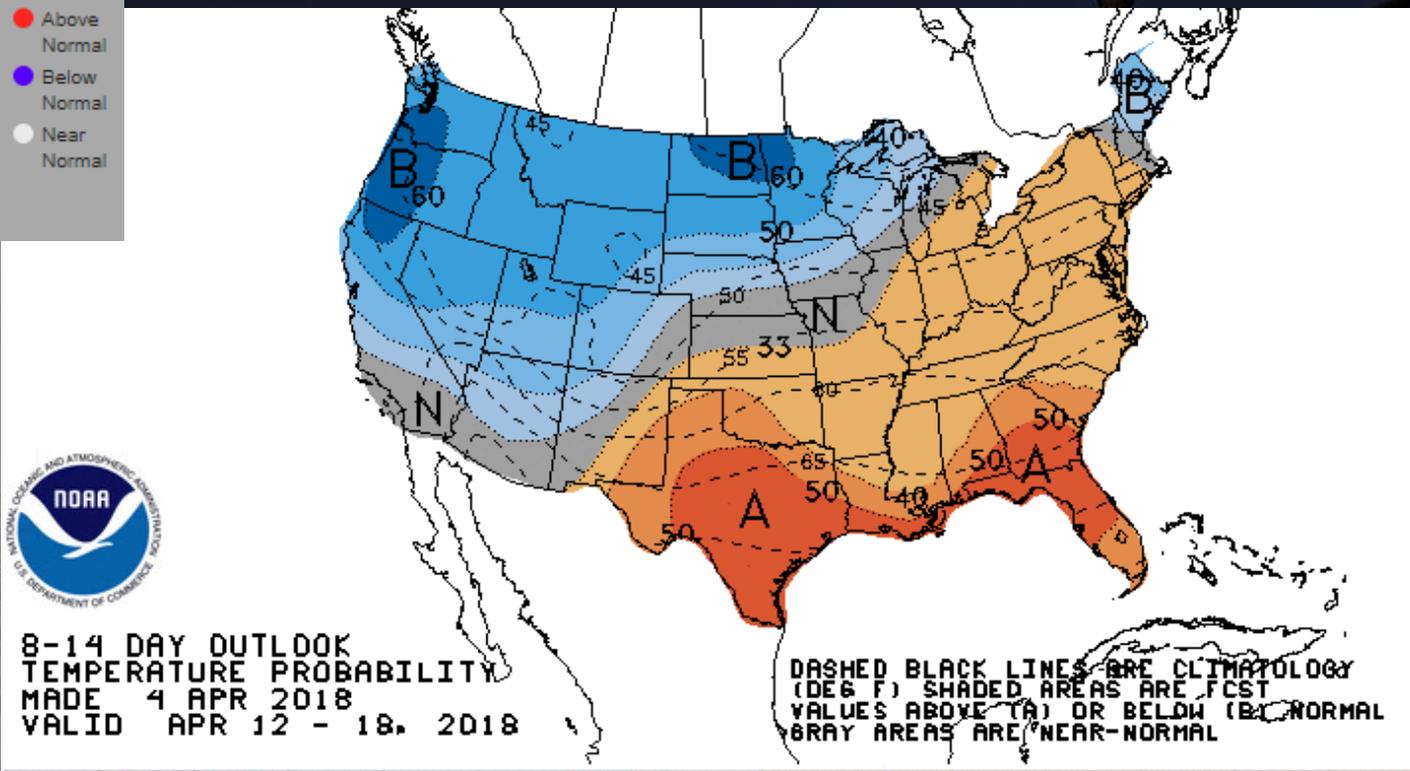
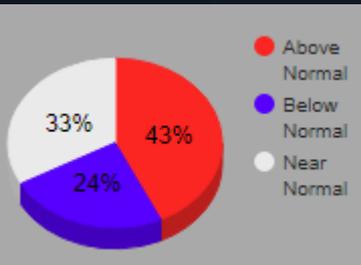
Today	Tonight	Friday	Friday Night	Saturday	Saturday Night	Sunday	Sunday Night	Monday
								
Sunny	Partly Cloudy	Mostly Sunny then Partly Sunny and Windy	Mostly Cloudy and Very Windy then Mostly Cloudy	Partly Sunny	Partly Cloudy then Partly Cloudy and Breezy	Sunny and Windy	Mostly Clear	Sunny
High: 79 °F	Low: 47 °F	High: 71 °F	Low: 23 °F	High: 57 °F	Low: 41 °F	High: 80 °F	Low: 40 °F	High: 70 °F



# 8-14 Day Temperature Outlook

Apr 12 - 18

Amarillo, TX



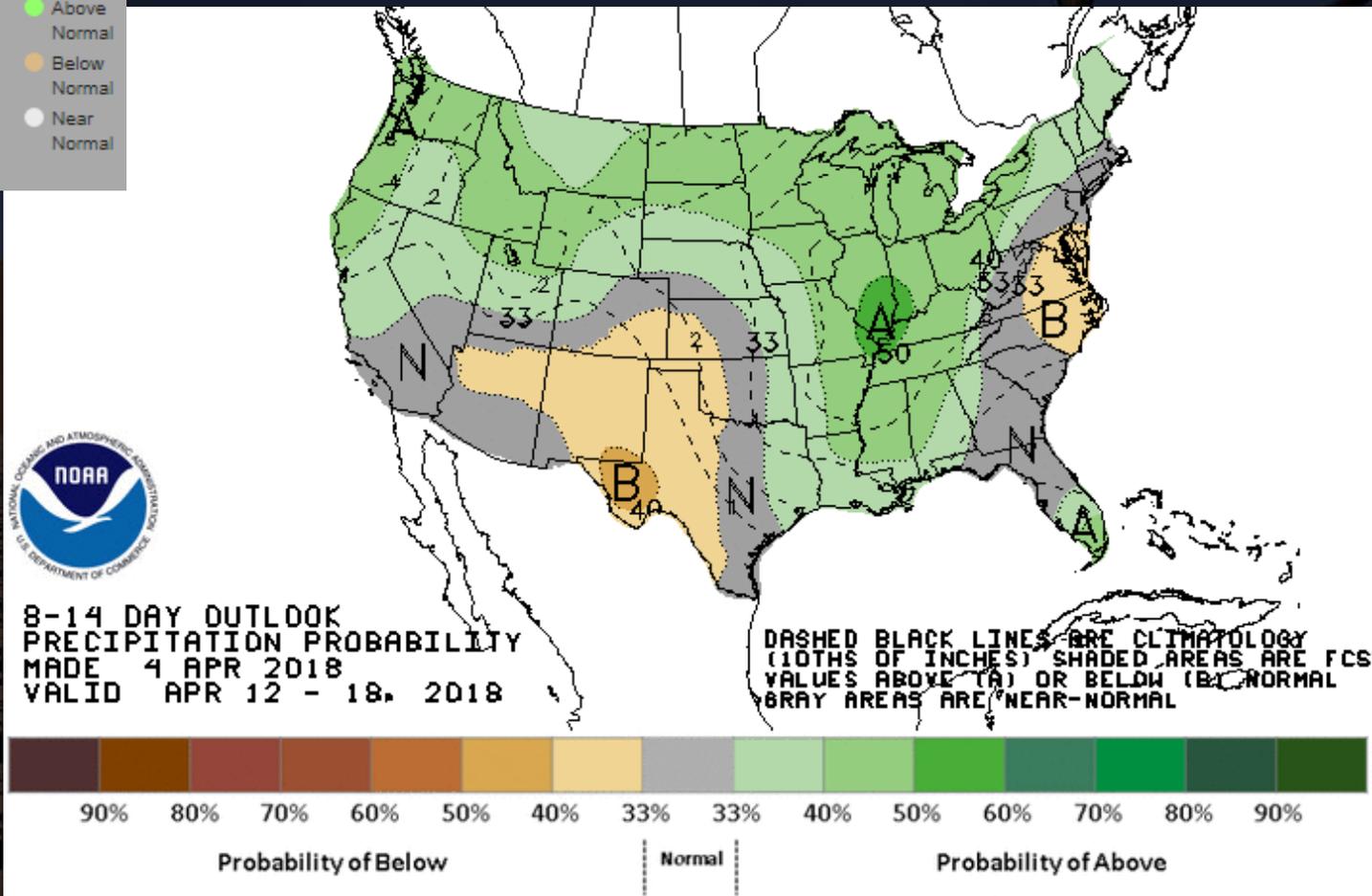
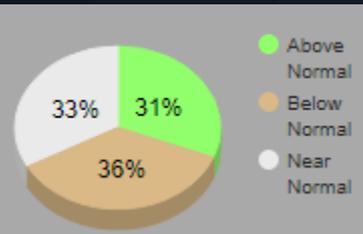
<http://www.cpc.ncep.noaa.gov/>



# 8-14 Day Precipitation Outlook

Apr 12 - 18

Amarillo, TX

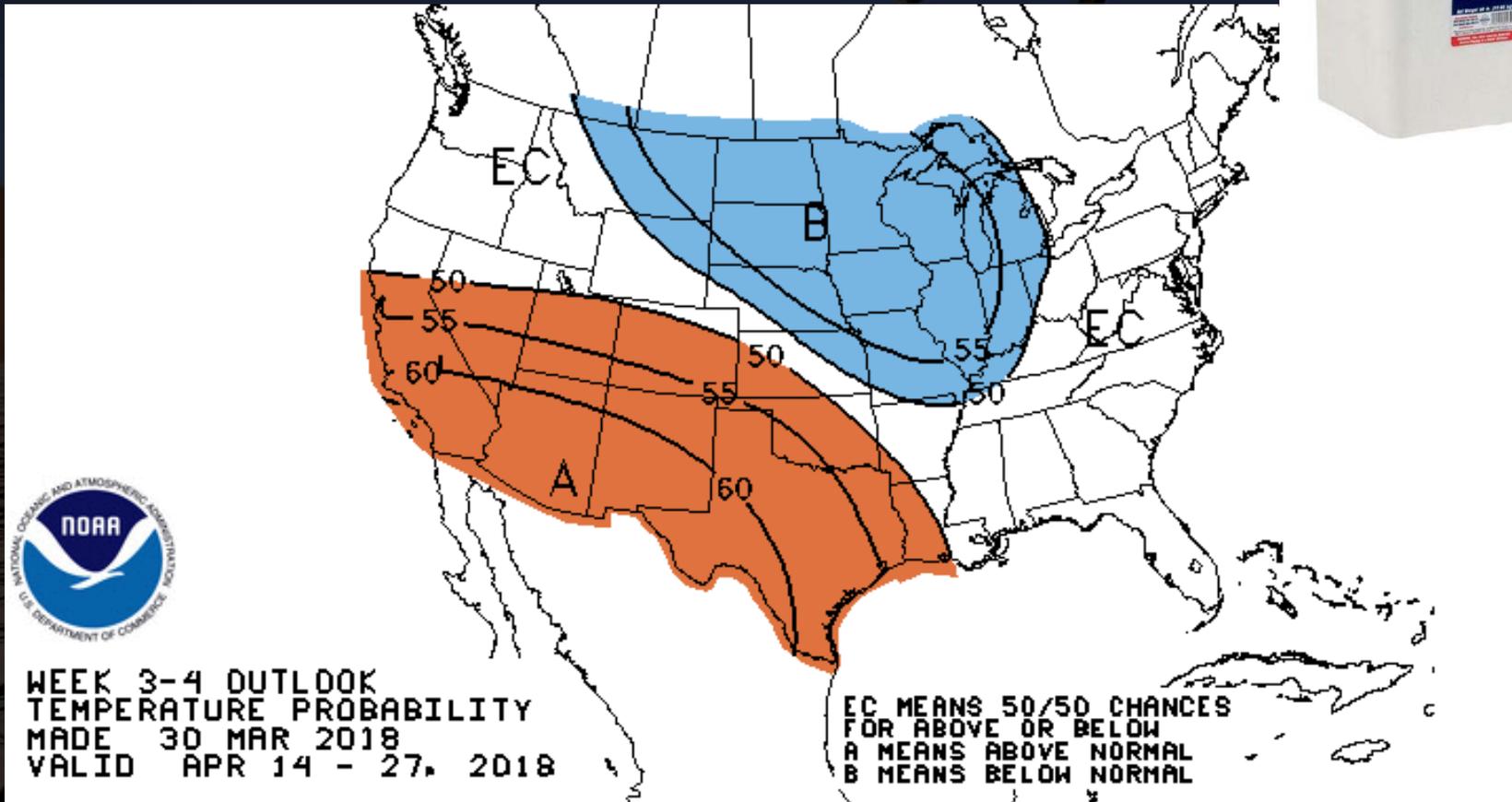


<http://www.cpc.ncep.noaa.gov/>



# 3-4 Week Temperature Outlook

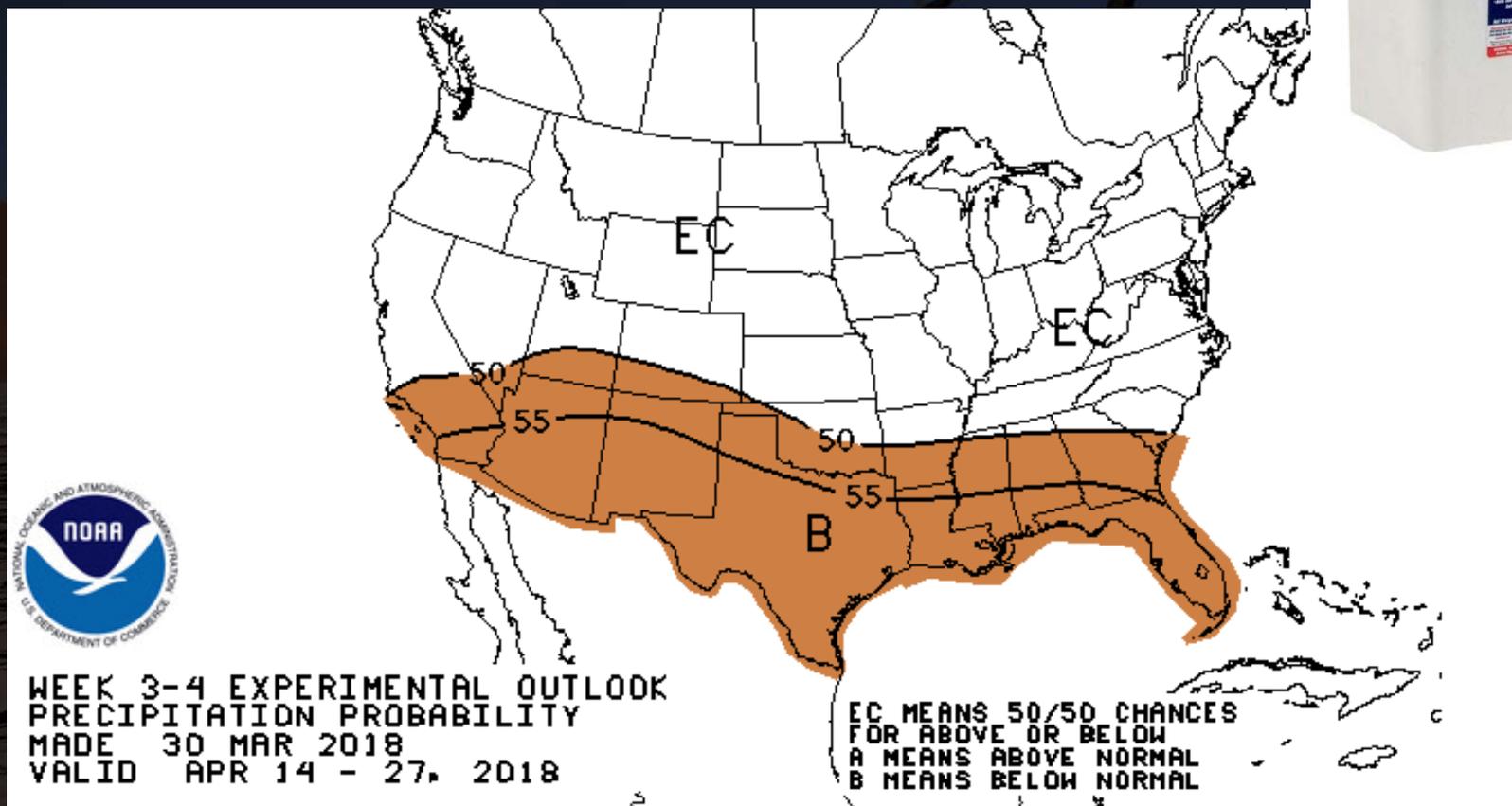
Apr 14 - 27



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

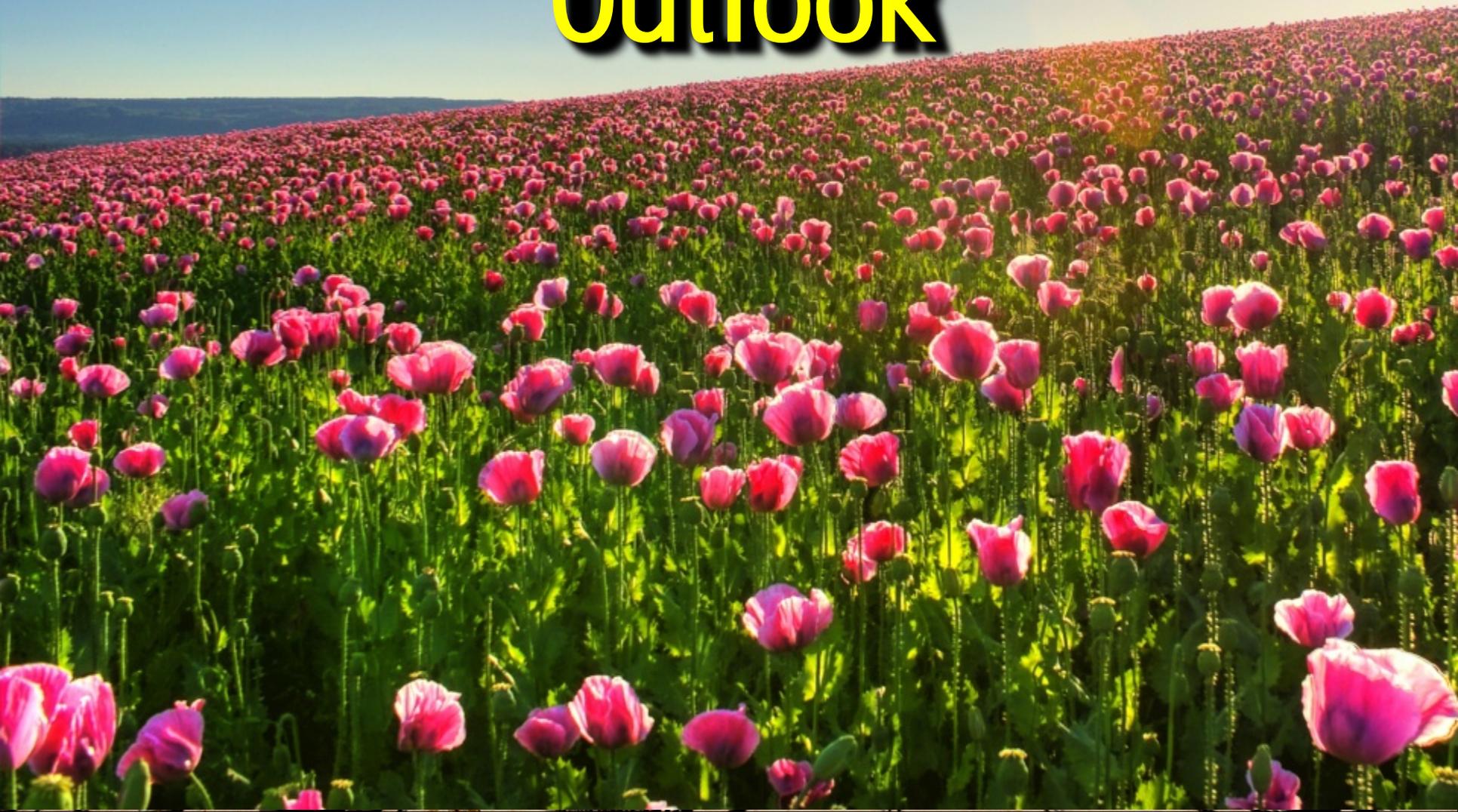
# 3-4 Week Precipitation Outlook

Apr 14 - 27



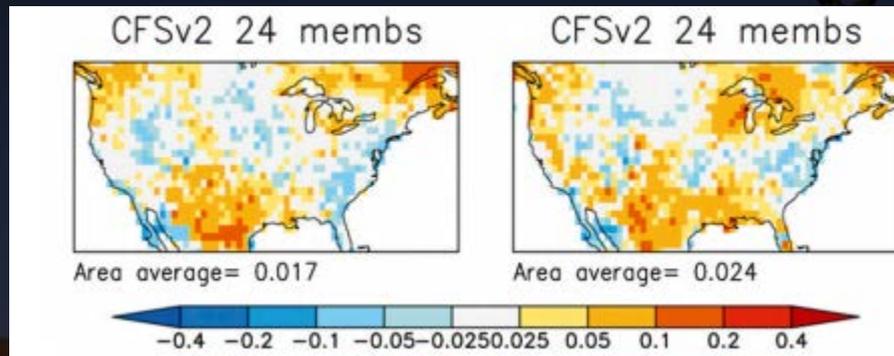
<http://www.cpc.ncep.noaa.gov/>

# Spring / Early Summer Outlook



# How are Climate Forecasts made?

## Climate Forecast System



The Climate Forecast System model, version 2, has 24 forecast members.

It runs 4 control runs a day, plus a randomly forced run once per day with 3 different runs, out to 9 months.

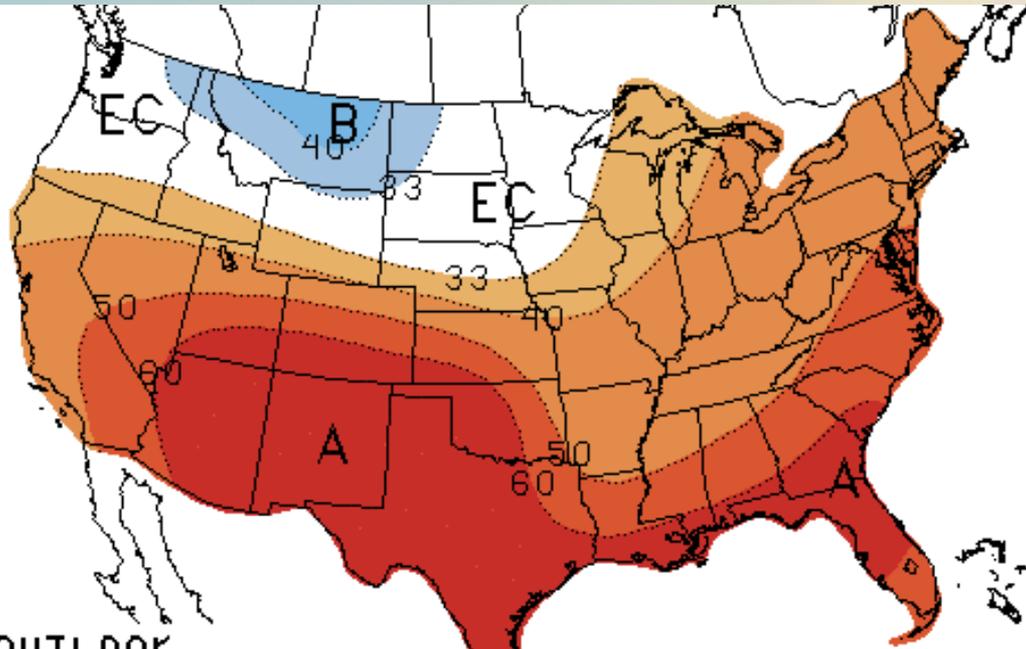
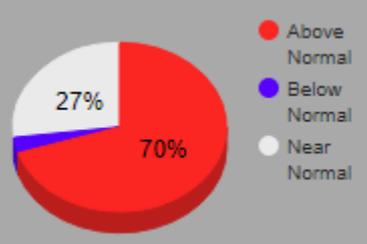
There are 3 additional runs out to 45 days to help with 8-14, 2-3 week and 1 month forecasts.

In addition to the above, 8-14 forecasts include long range GFS and ECMWF runs.

# Three-Month Outlook

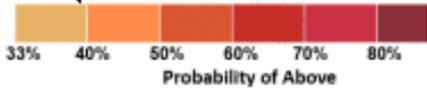
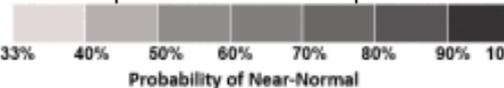
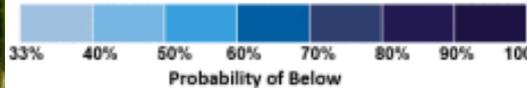
April - June

Amarillo, TX



THREE-MONTH OUTLOOK  
TEMPERATURE PROBABILITY  
0.5 MONTH LEAD  
VALID AMJ 2018  
MADE 15 MAR 2018

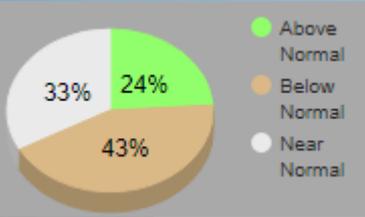
EC MEANS EQUAL  
CHANCES FOR A, N, B  
A MEANS ABOVE  
N MEANS NORMAL  
B MEANS BELOW



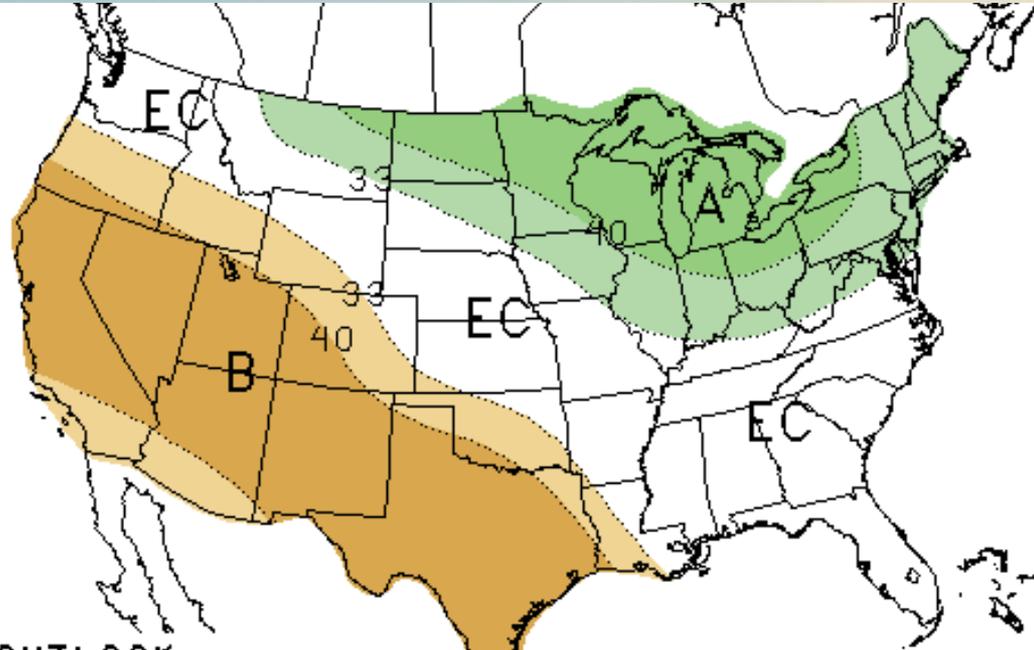
# Three-Month Outlook

April – June

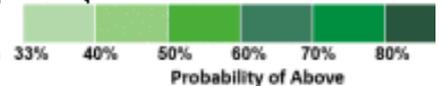
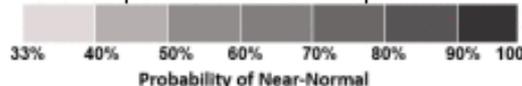
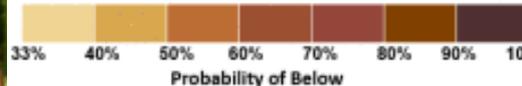
Amarillo, TX



THREE-MONTH OUTLOOK  
PRECIPITATION PROBABILITY  
0.5 MONTH LEAD  
VALID AMJ 2018  
MADE 15 MAR 2018



EC MEANS EQUAL CHANCES FOR A, N, B  
A MEANS ABOVE  
N MEANS NORMAL  
B MEANS BELOW



GETTY

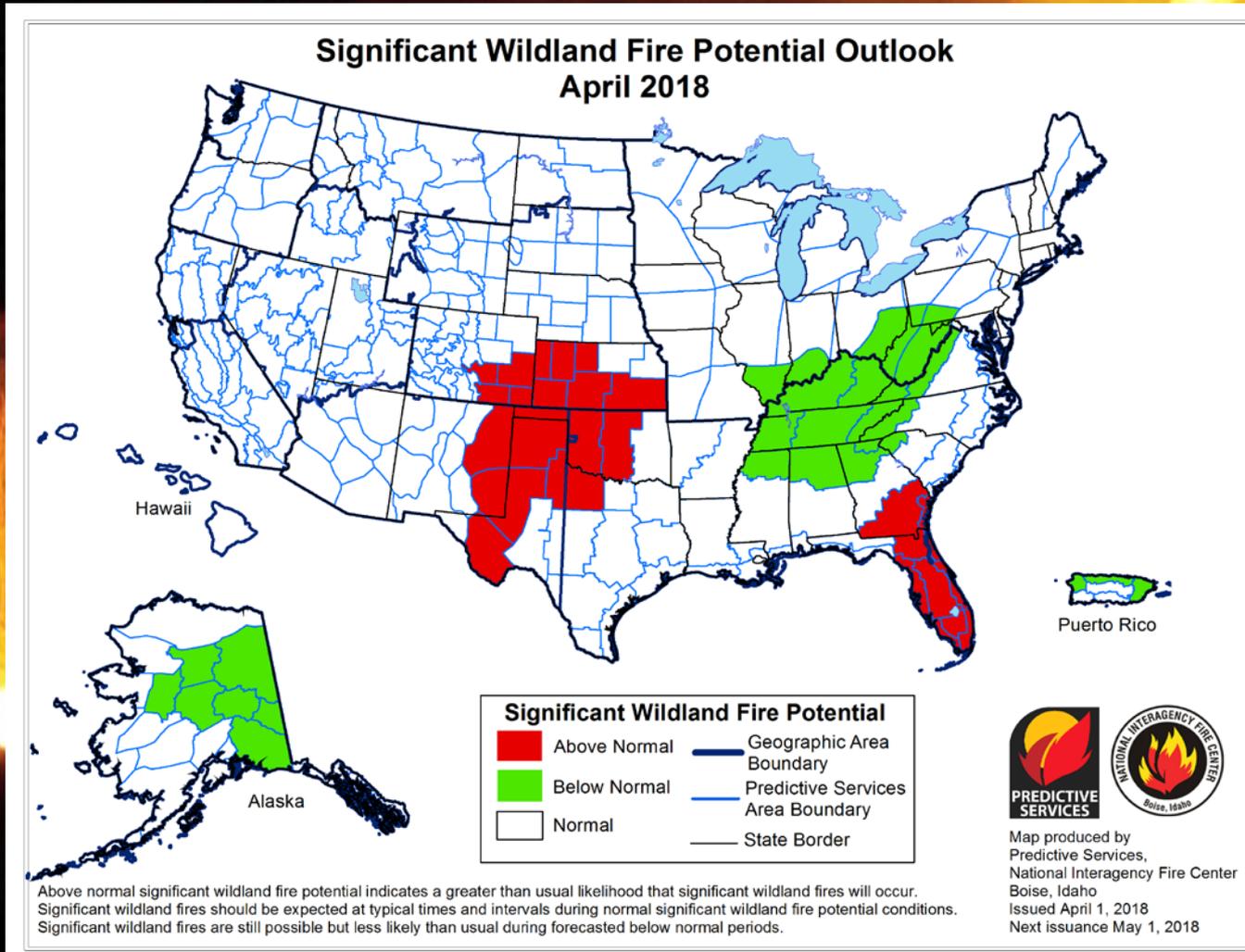
# WildFire Outlook



# Fire Potential Outlook

April 2018

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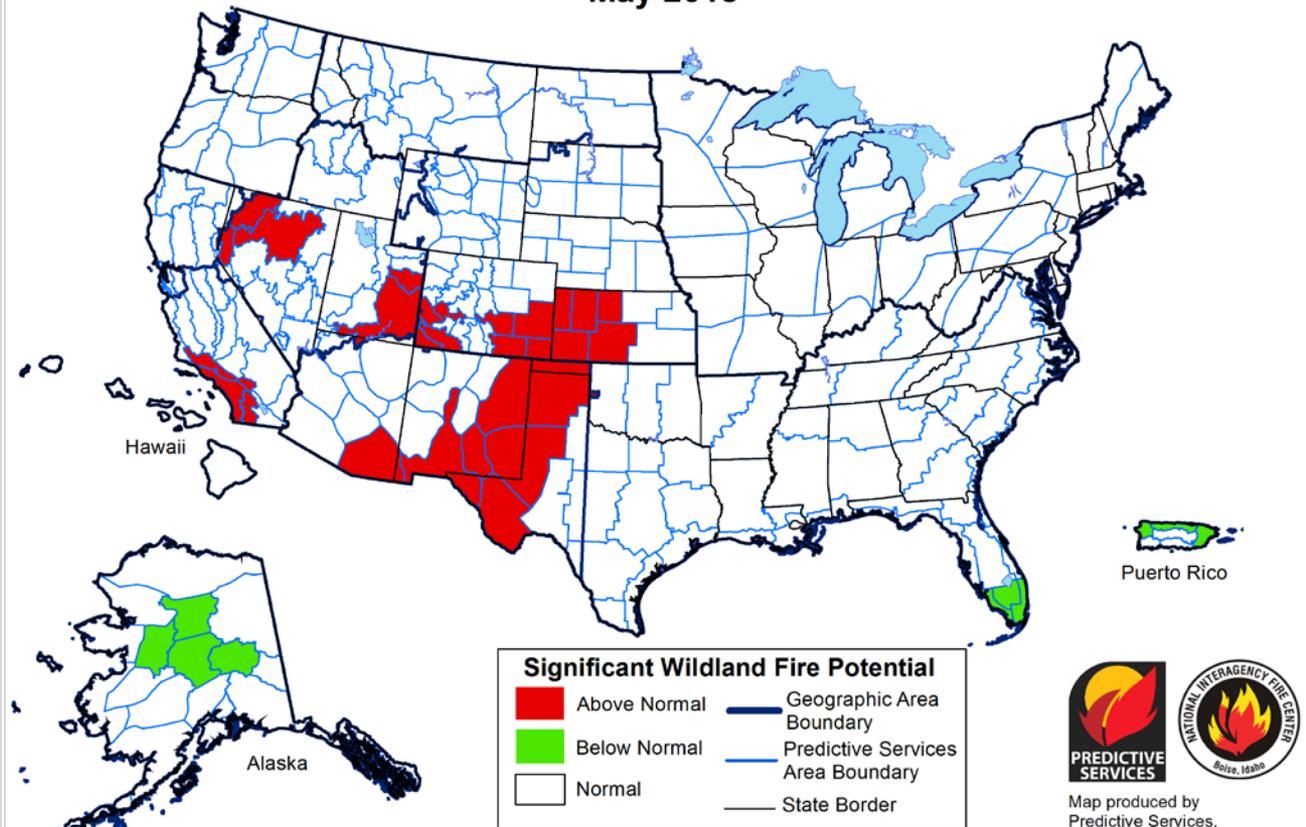


# Fire Potential Outlook

## May 2018

GETTY

### Significant Wildland Fire Potential Outlook May 2018



Above normal significant wildland fire potential indicates a greater than usual likelihood that significant wildland fires will occur. Significant wildland fires should be expected at typical times and intervals during normal significant wildland fire potential conditions. Significant wildland fires are still possible but less likely than usual during forecasted below normal periods.

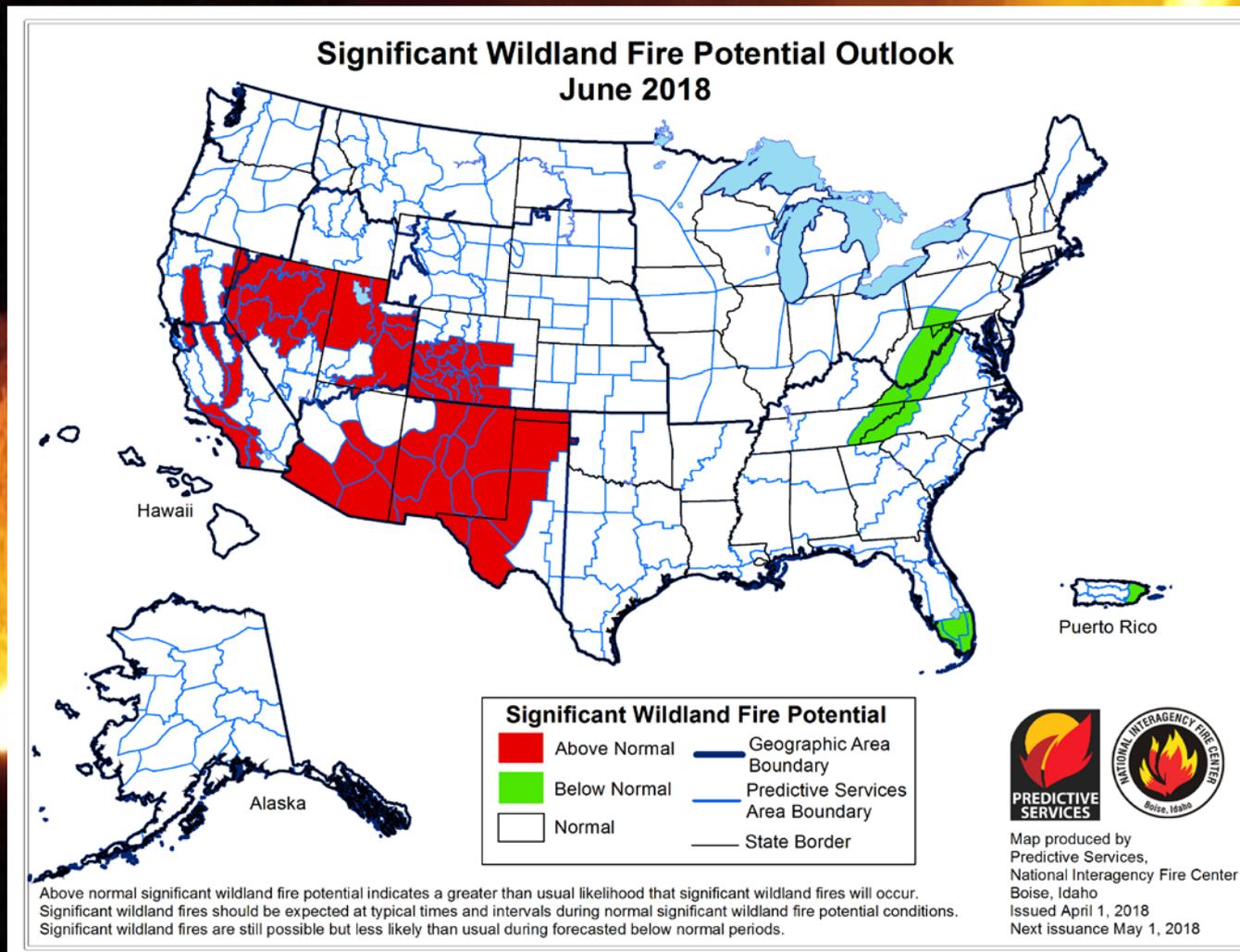


Map produced by  
Predictive Services,  
National Interagency Fire Center  
Boise, Idaho  
Issued April 1, 2018  
Next issuance May 1, 2018

# Fire Potential Outlook

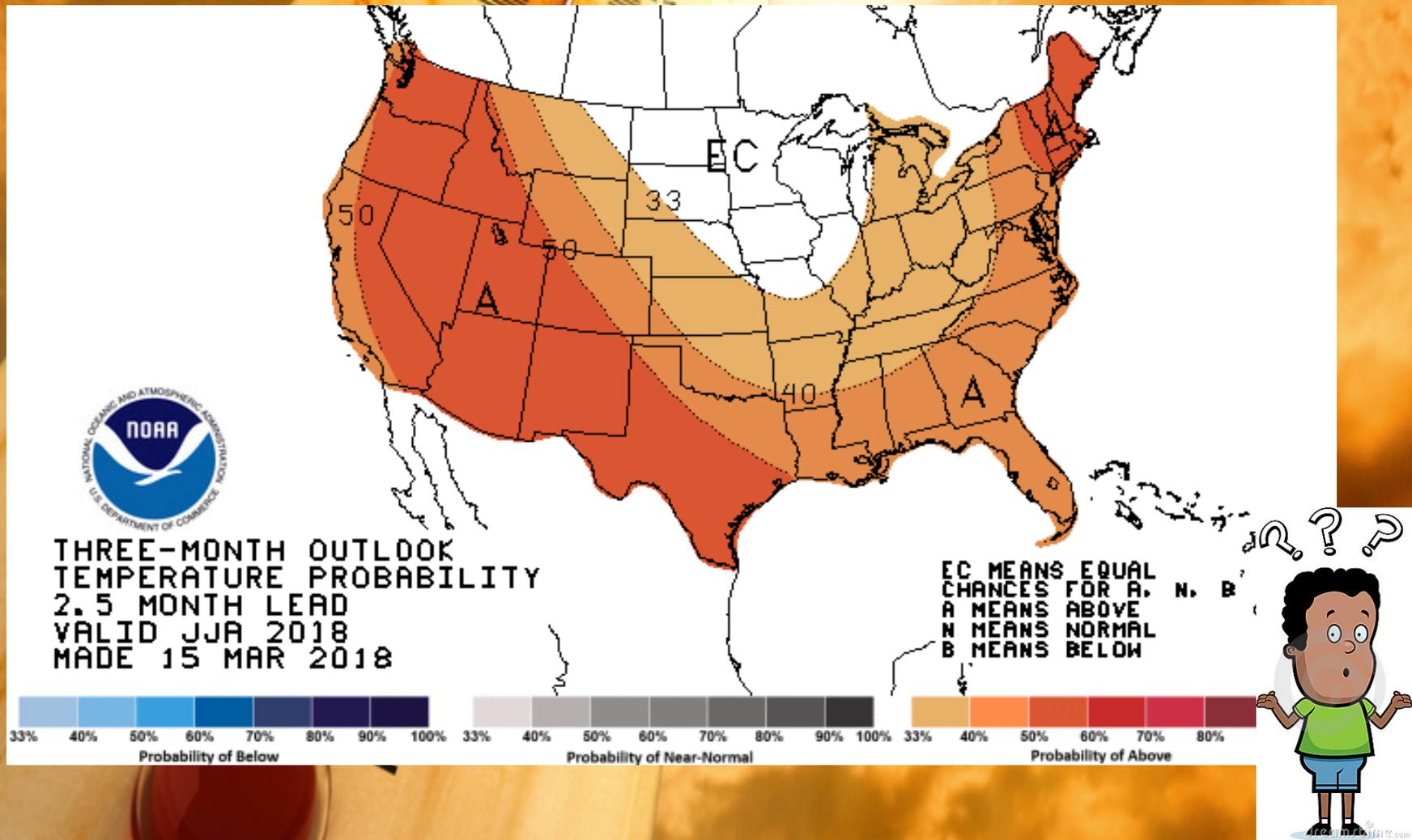
June 2018

GETTY



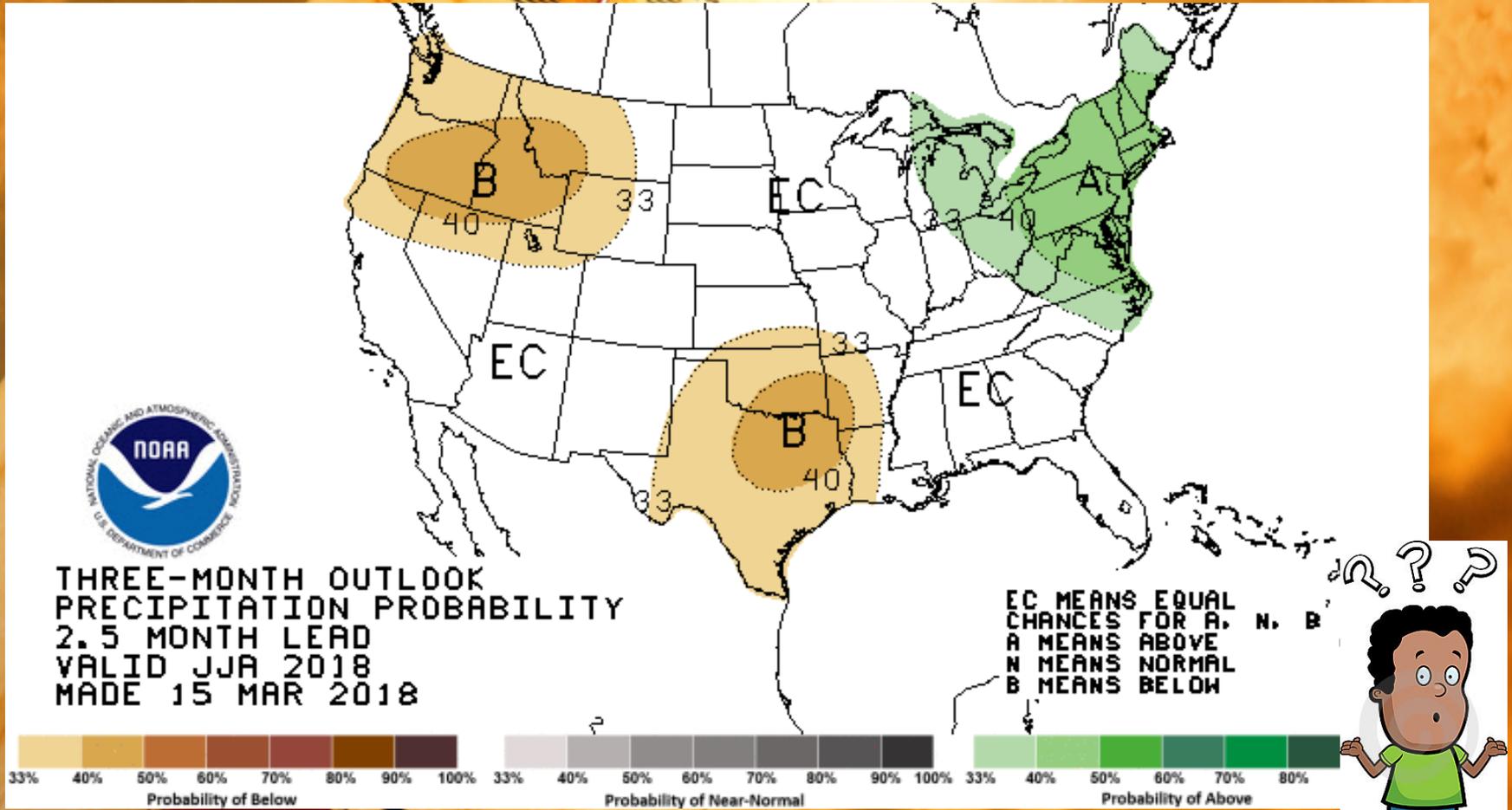
# Summer Temperature Outlook

June - August



# Summer Precipitation Outlook

June - August



# Summary

- The ongoing La Niña signal continues, with recent indications that ocean waters of South America are once again cooling.
- The Pacific Decadal Oscillation is negative, which helps reinforce or enhance ongoing La Niña conditions.
- The Atlantic Multidecadal Oscillation, in combination with PDO, continue to show a signal favorable for continued drought.
- Climate outlooks indicate **most likely (“tilting odds”)** outcomes that can be overridden by short term variability and deviations from typical patterns within climate oscillations
- Above normal temps and near to below normal precipitation is **most likely outcome** through the rest of this Spring through the Summer. This does not preclude weather patterns that could cause cooler than normal conditions for short periods of time.
- Potential continues for a significant fire season as we continue through the Spring into early Summer.

# QUESTIONS?



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