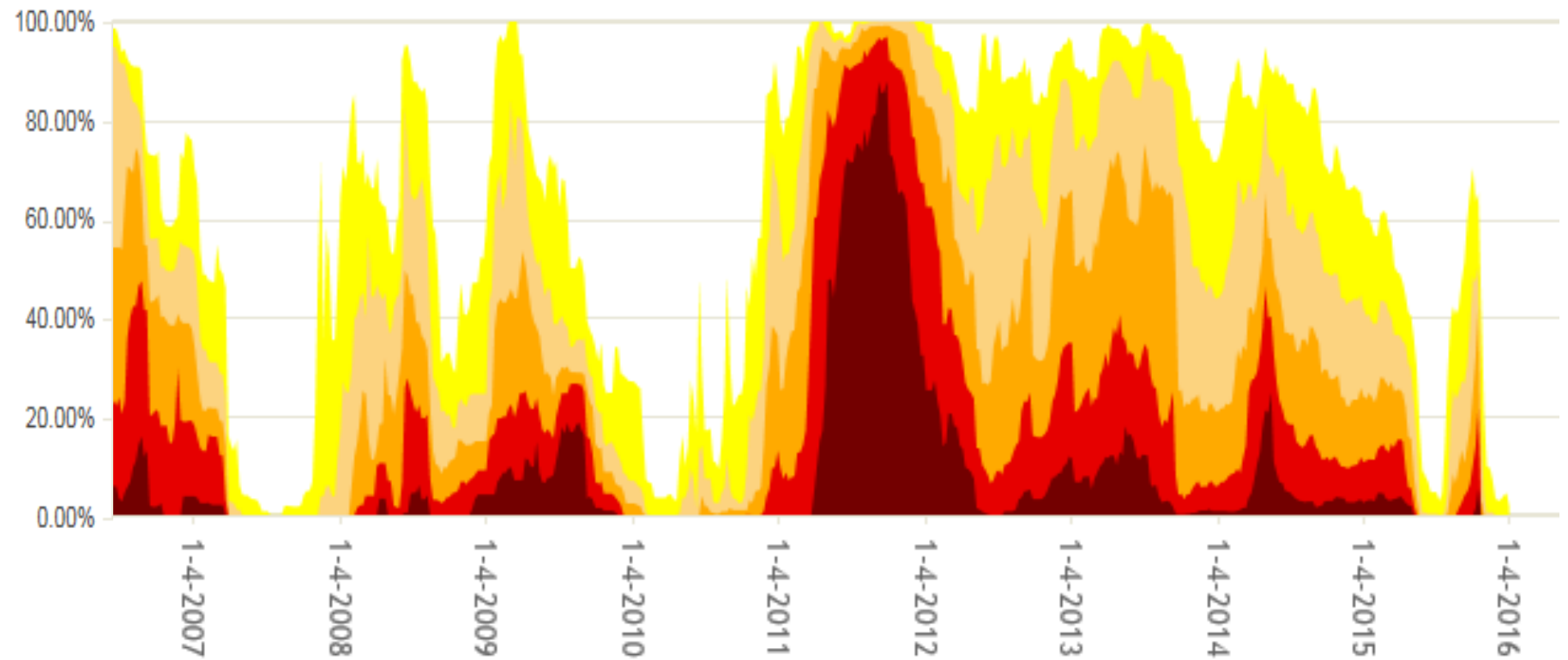


# **EL NINO UPDATE; SPRING AND SUMMER OUTLOOK**

**2016 Grow Green Landscape  
Professional Training Session**

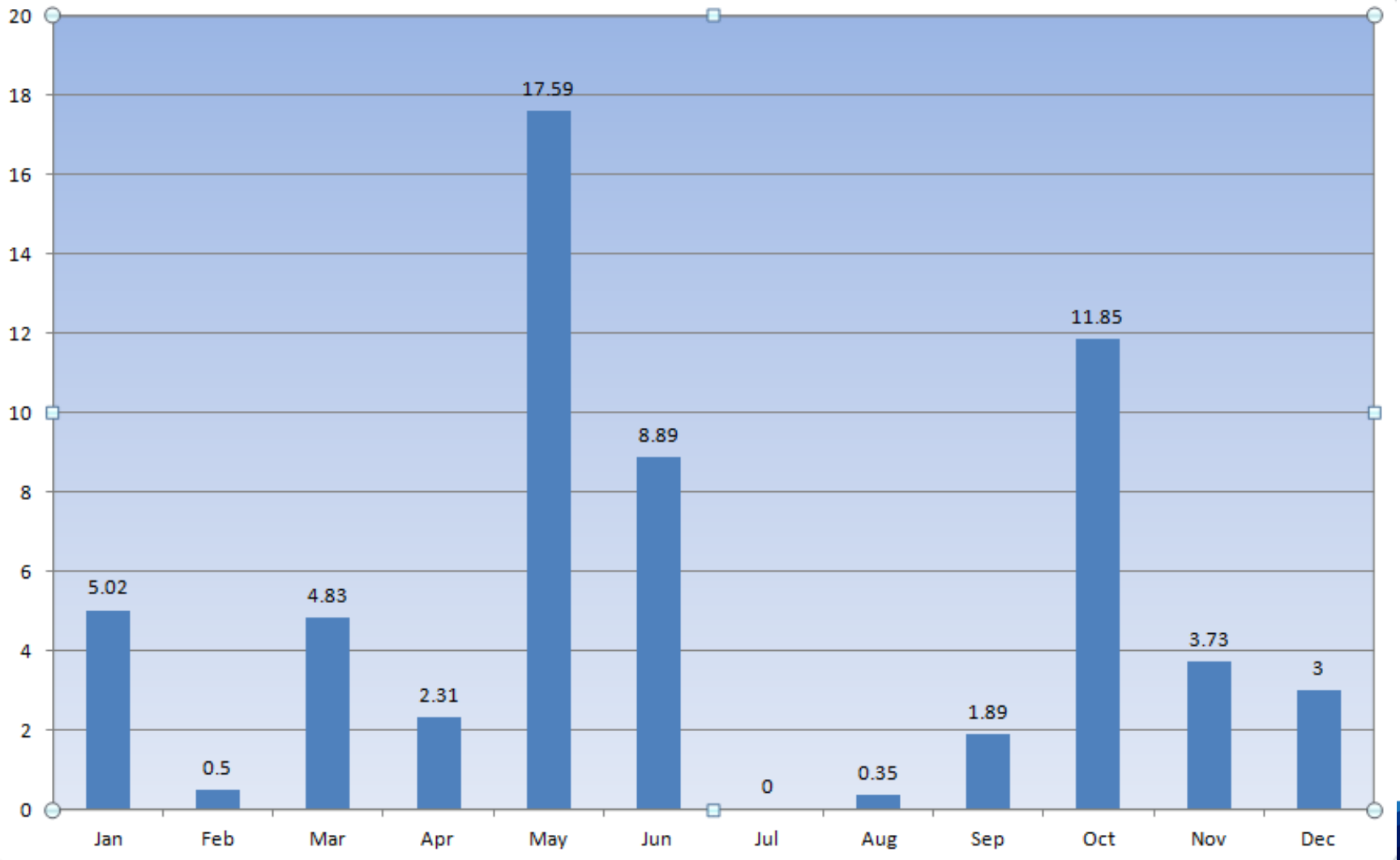
January 15, 2016

# Texas Drought Time Series



- D0-D4
- D1-D4
- D2-D4
- D3-D4
- D4

# 2015 Austin Rainfall



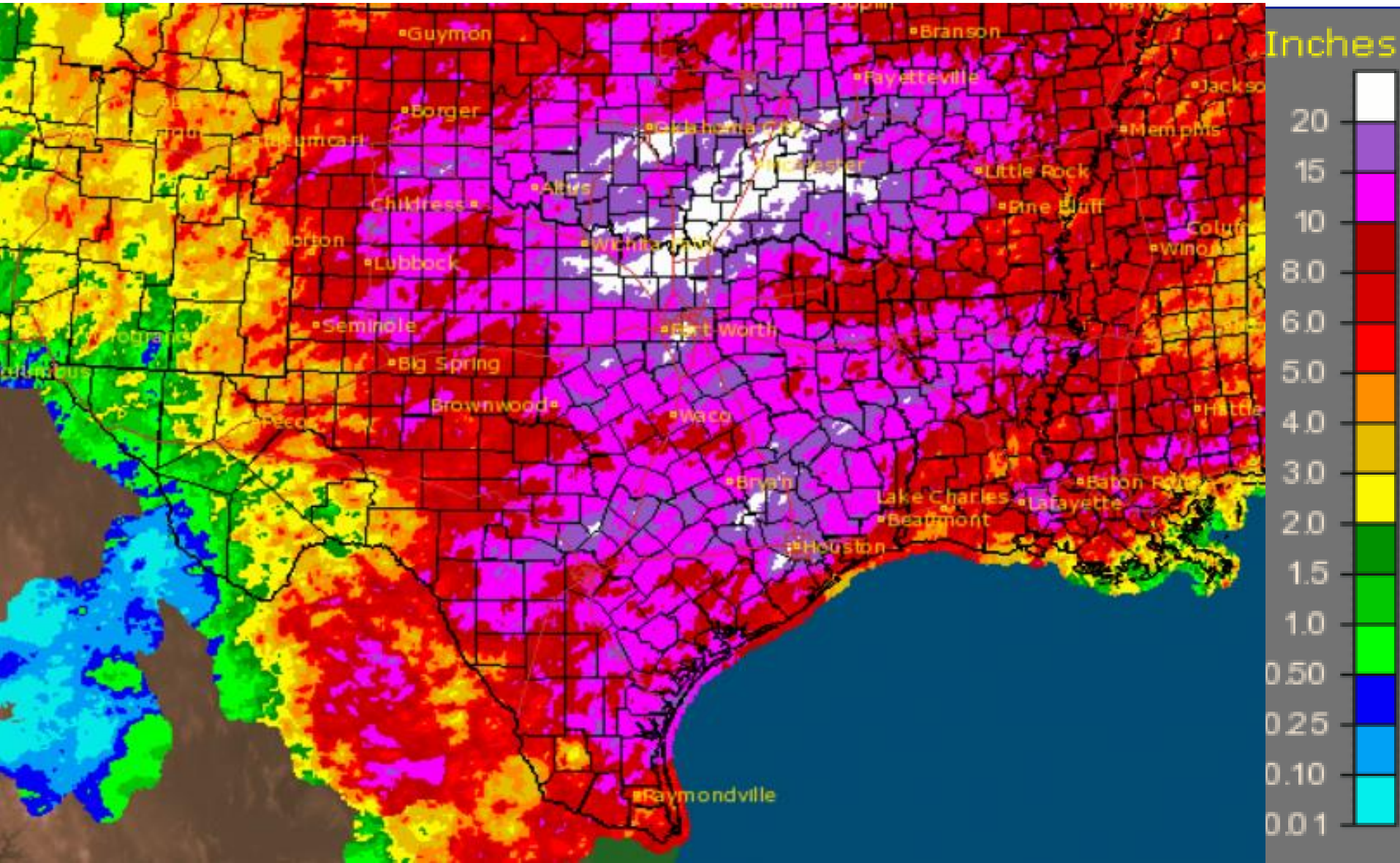
# 2015 Austin Rainfall

- **Second wettest year on record with 59.96 inches. Wettest year was 1919 with 64.68 inches.**
- **Wettest Jan-Jun on record with 39.14 inches.**
- **8<sup>th</sup> Wettest June and 5<sup>th</sup> wettest October on record.**
- **Wettest year on record at ABIA.**

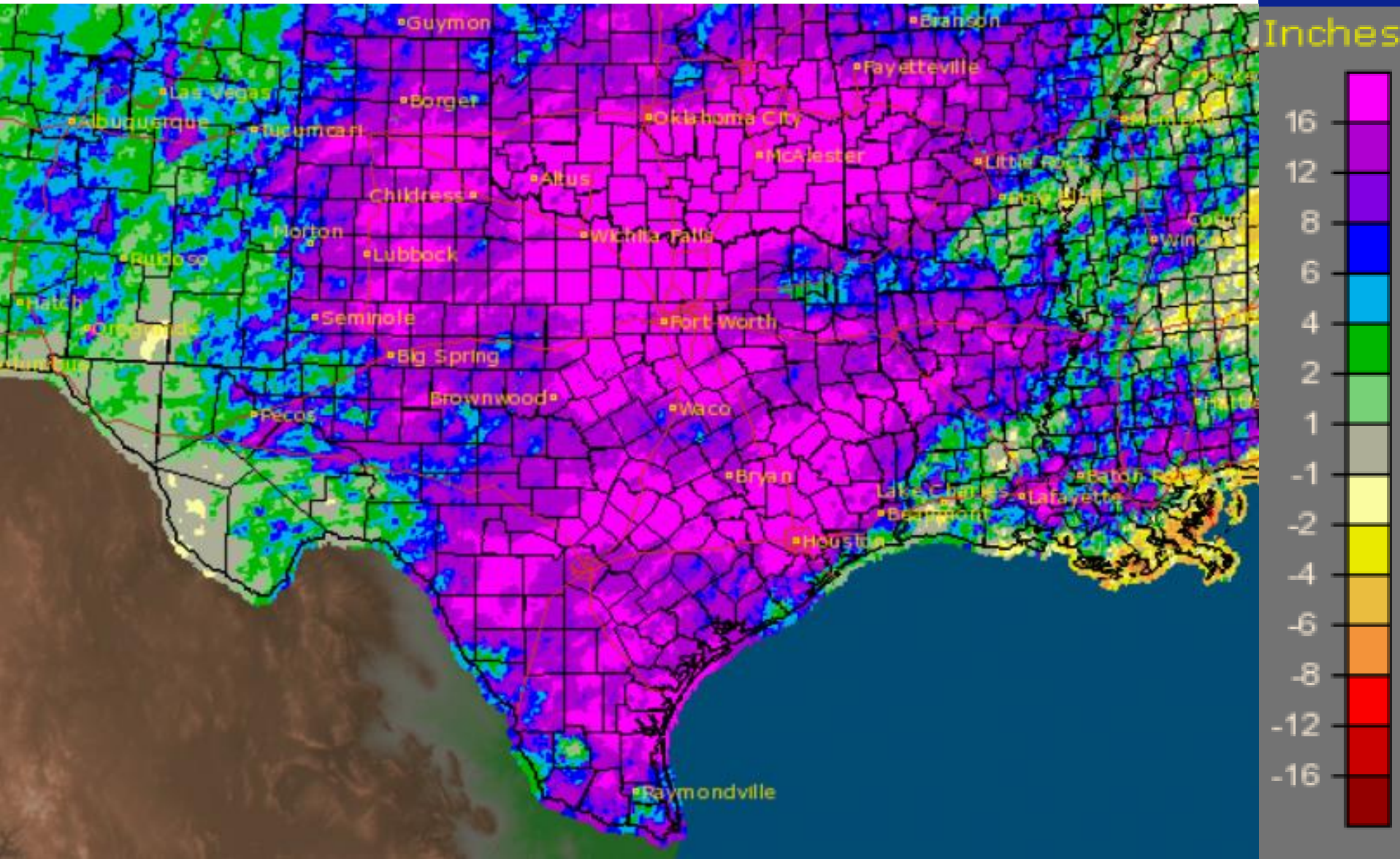
# **2015 Austin Temp. Data**

- **Average annual temp. was 69.8 degrees. 0.4 degrees above normal.**
- **20<sup>th</sup> warmest year on record, dating back to 1897.**
- **22 days at or above 100 degrees.**
- **Extremes ranged from 23 degrees on 1/8 to 105 degrees on 8/11 and 8/12.**

# May Record Rainfall



# May Rainfall Departure from Normal

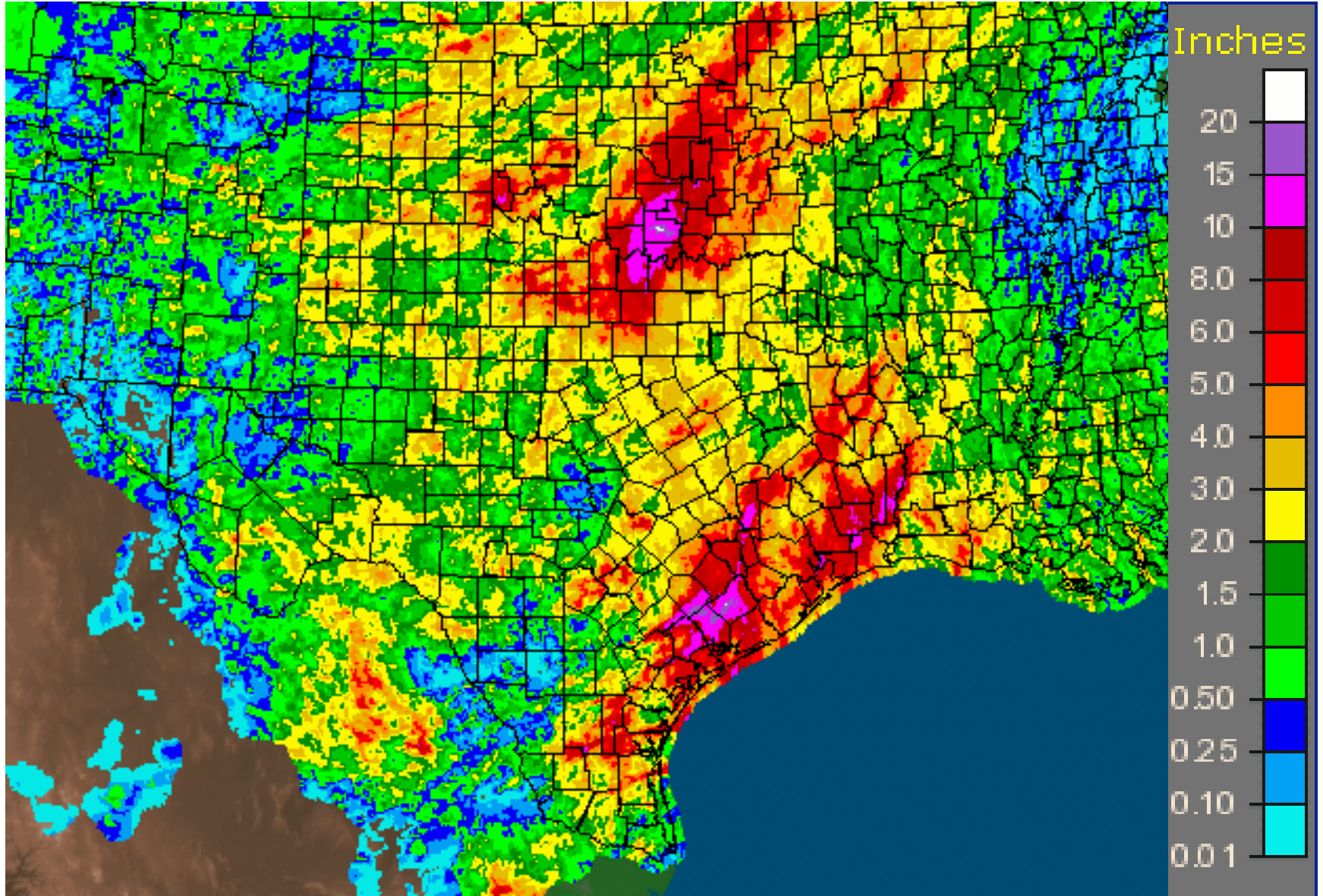


# Texas May Rainfall Stats

- **Rainfall averaged 9.06 inches.**
- **Wettest May on record.**
- **Wettest month ever (Previous was 6.66 inches in June 2004).**
- **Wettest spring on record.**
- **Wettest Jan-June on record.**



# June Rainfall





SIZZLING

July/August

ISOLATED T-STORMS



AMARILLO

LITTLE ROCK



MASSIVE



EL PASO

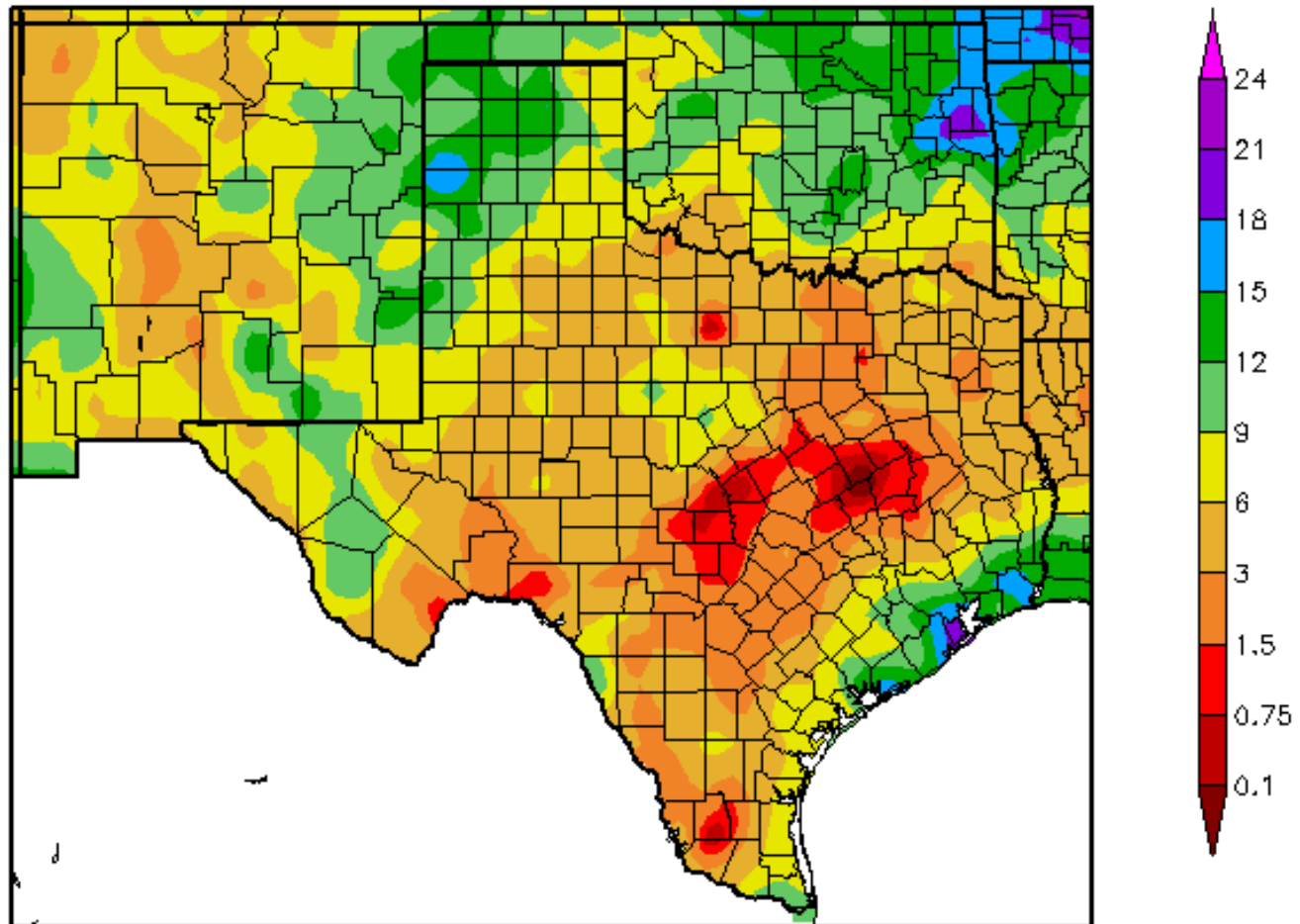
HOT & DRY



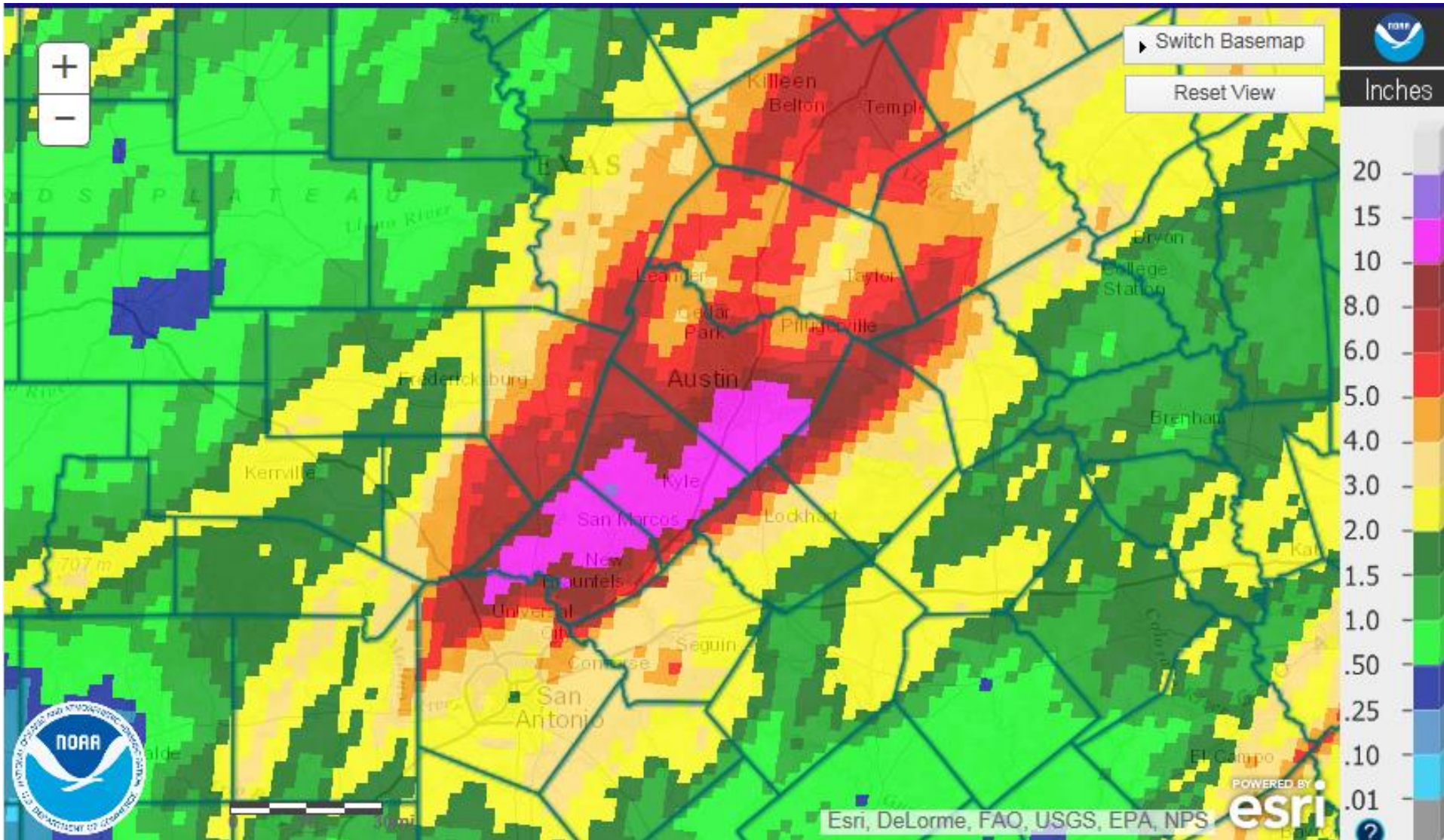
HOUSTON

# Rainfall 7/1 thru 10/18

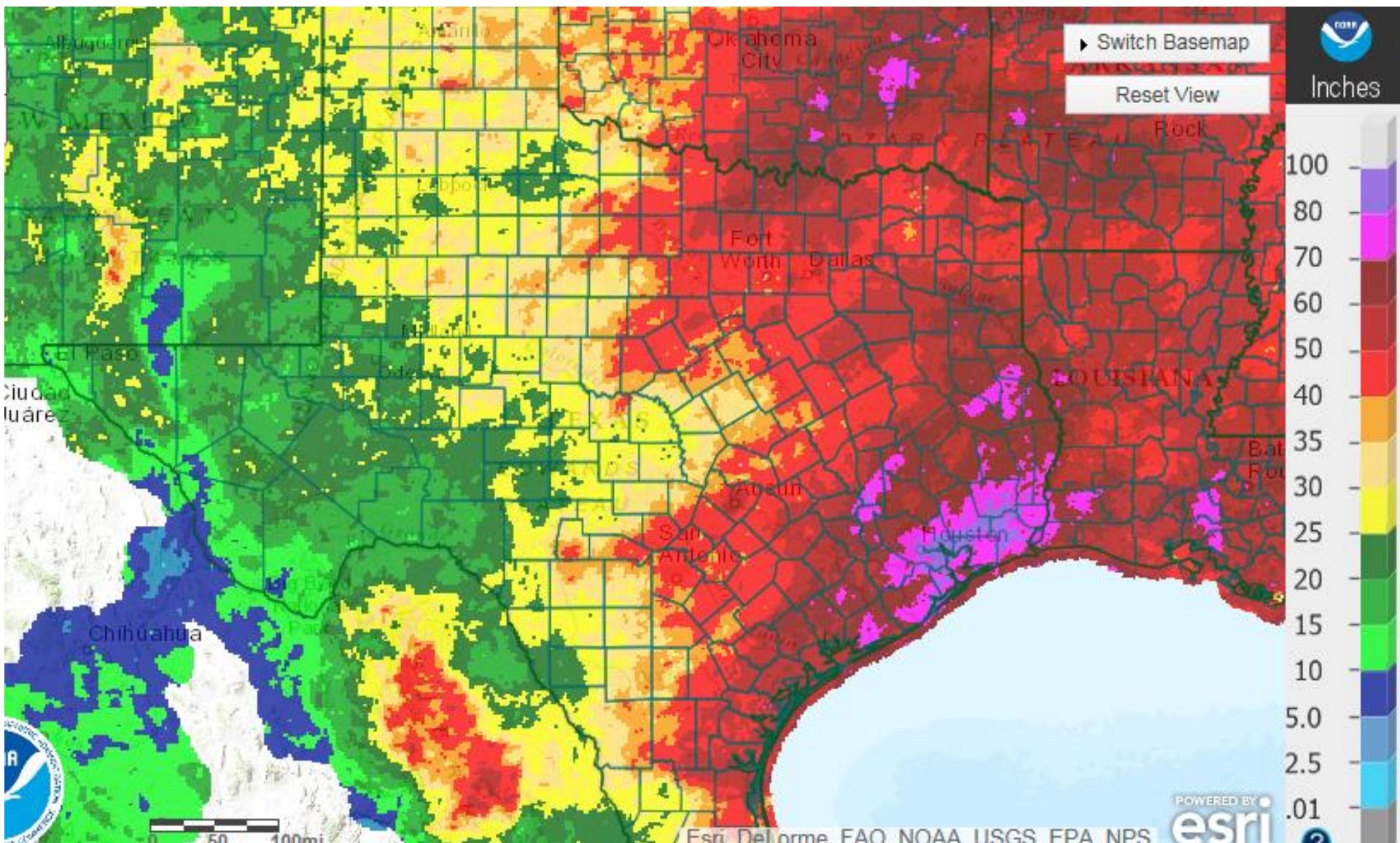
Precipitation (in)  
7/1/2015 - 10/18/2015



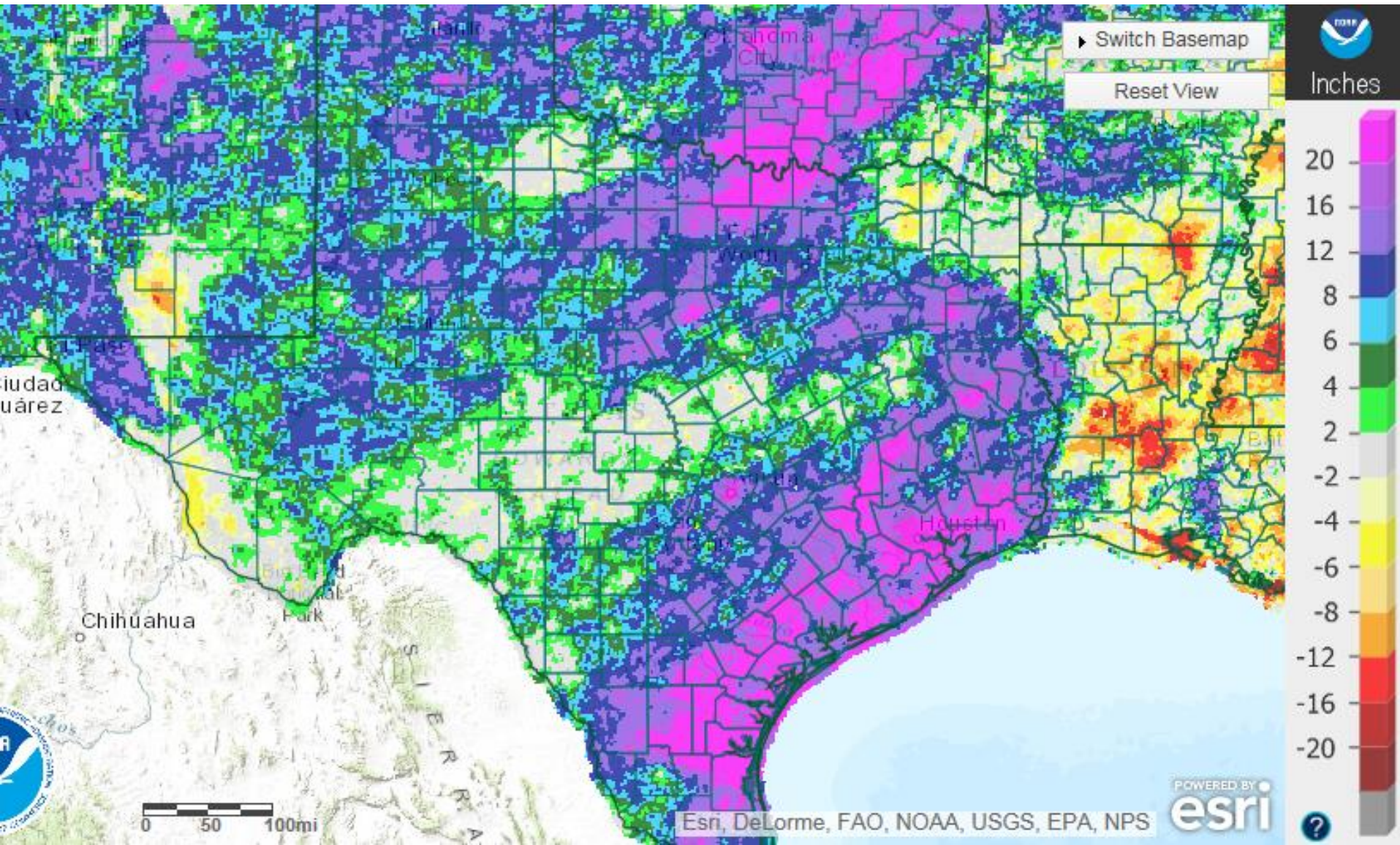
# October 30<sup>th</sup> Rain Event



# 2015 Rainfall

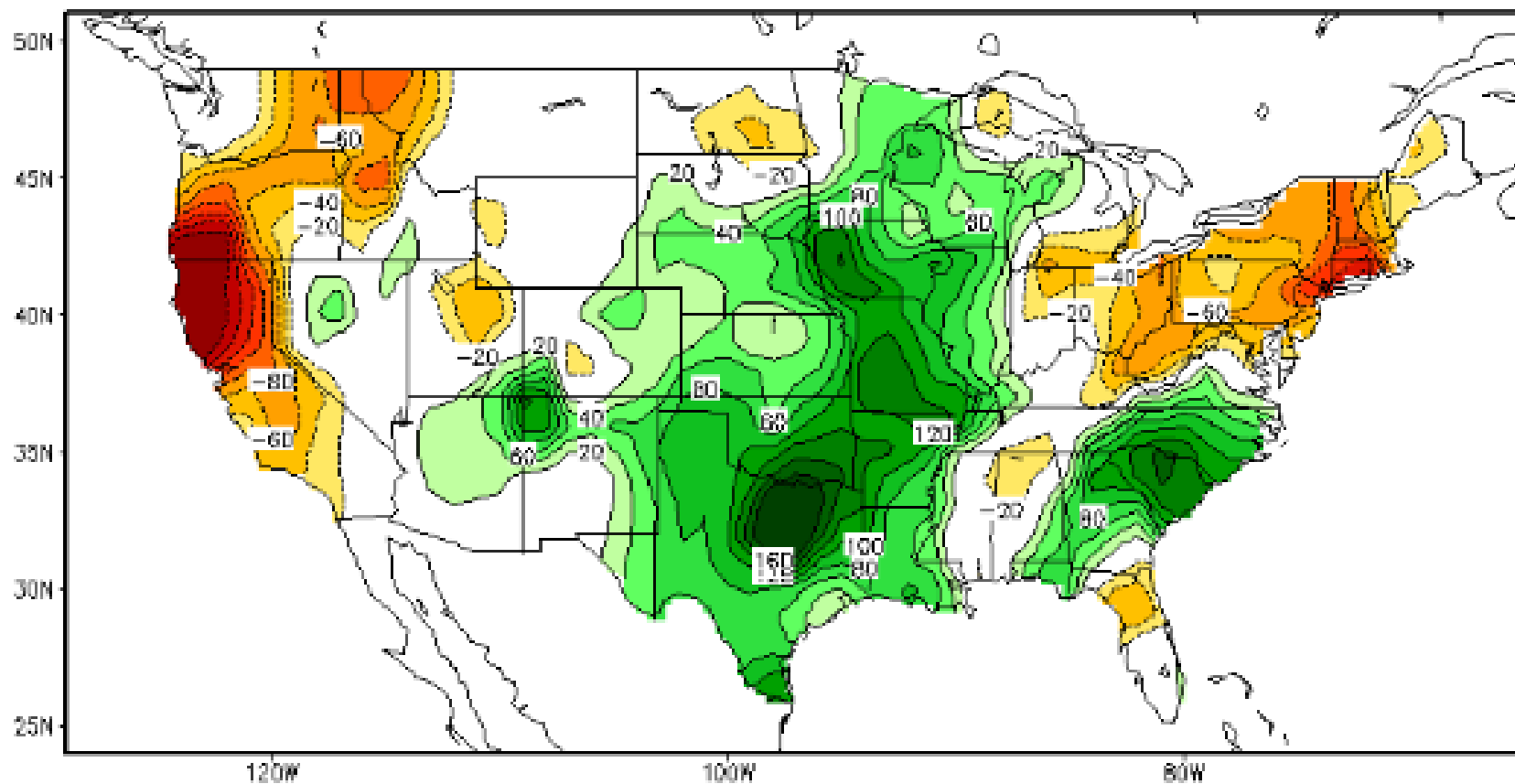


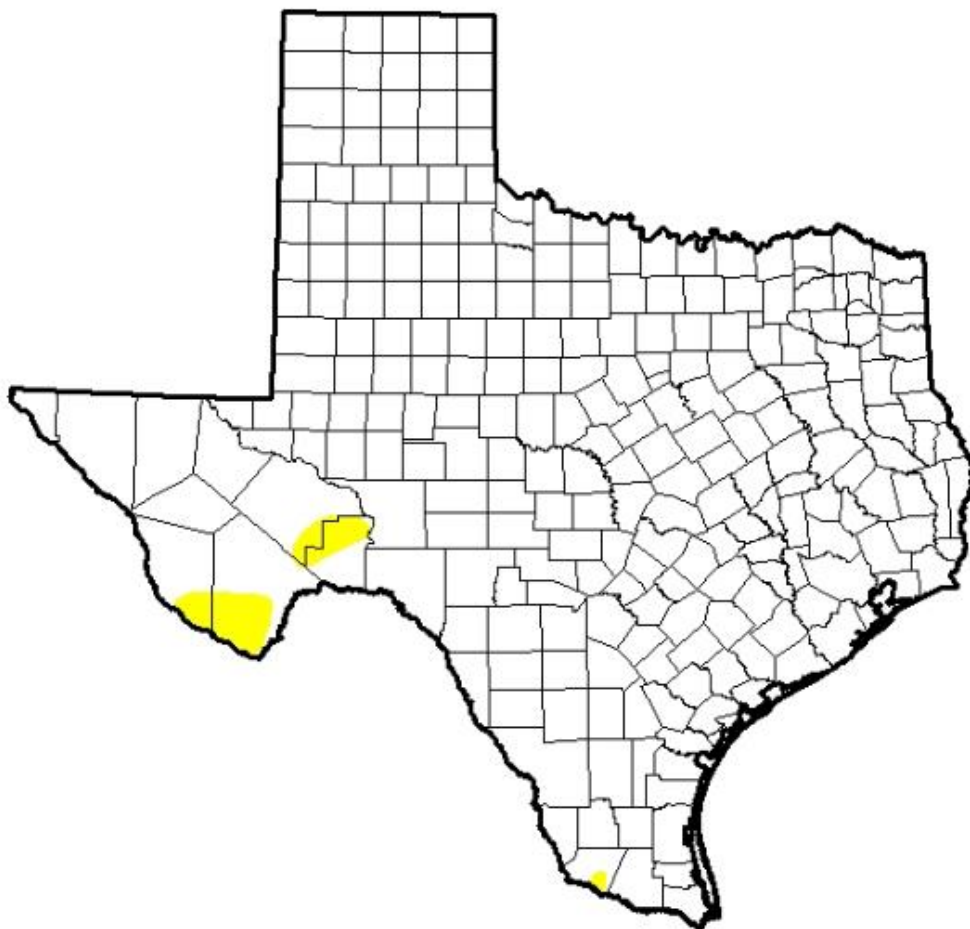
# 2015 Rainfall Departure from Normal



# Soil Moisture in Good Shape

Calculated Soil Moisture Anomaly (mm)  
JAN 12, 2016





Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	98.31	1.69	0.00	0.00	0.00	0.00
<b>Last Week</b> <i>12/29/2015</i>	95.48	4.52	0.00	0.00	0.00	0.00
<b>3 Months Ago</b> <i>10/6/2015</i>	29.70	70.30	48.43	24.66	10.17	0.00
<b>Start of Calendar Year</b> <i>12/29/2015</i>	95.48	4.52	0.00	0.00	0.00	0.00
<b>Start of Water Year</b> <i>9/29/2015</i>	34.51	65.49	38.32	17.55	6.27	0.00
<b>One Year Ago</b> <i>1/6/2015</i>	38.95	61.05	41.81	24.07	10.72	2.47

Intensity:

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

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

**Author:**

Brian Fuchs

National Drought Mitigation Center

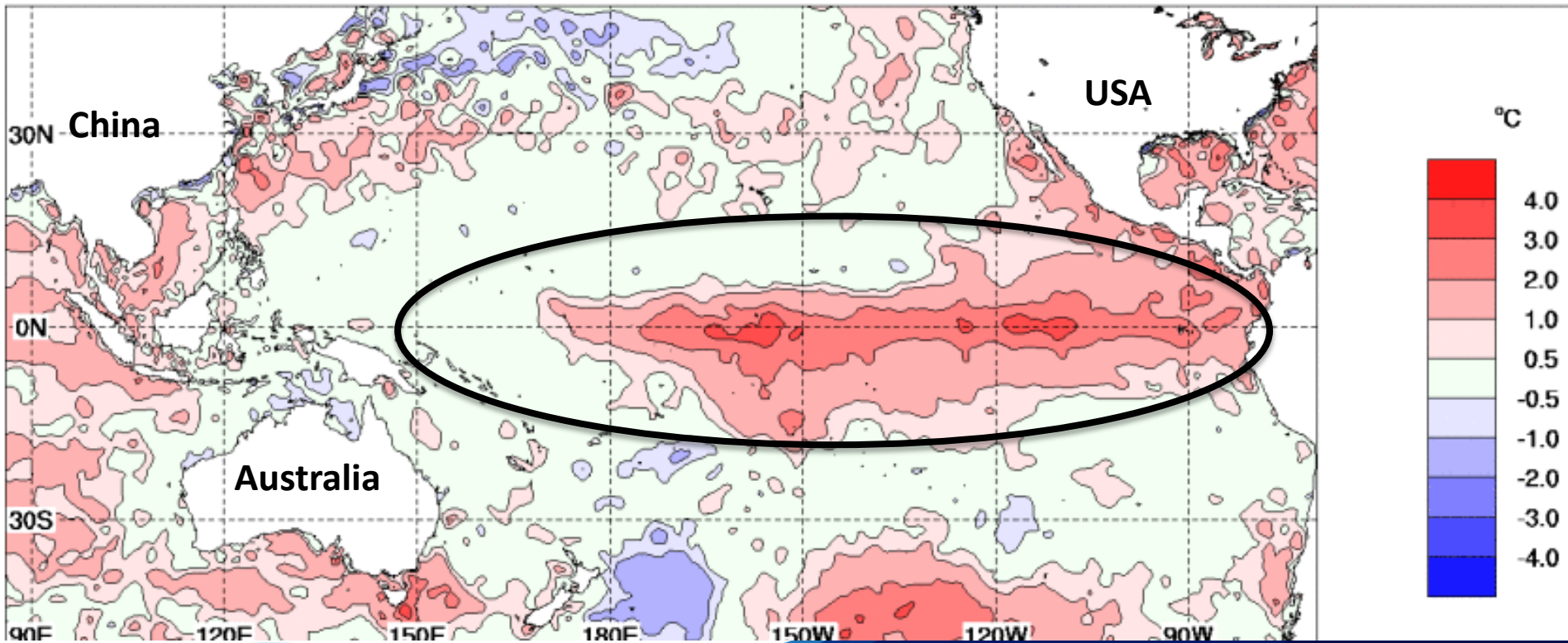




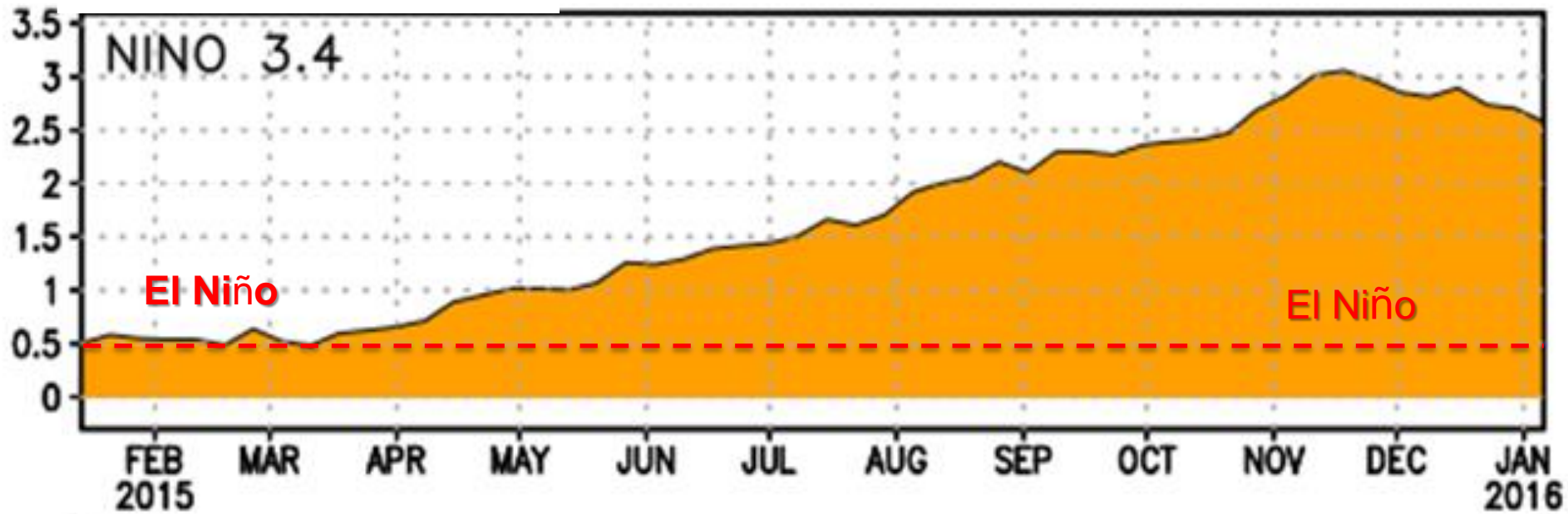
# El Niño Update

# A Strong El Niño Continues

SSTA 1.0X1.0 NMOC OCEAN ANOMALIES (C) 20151228 20160103



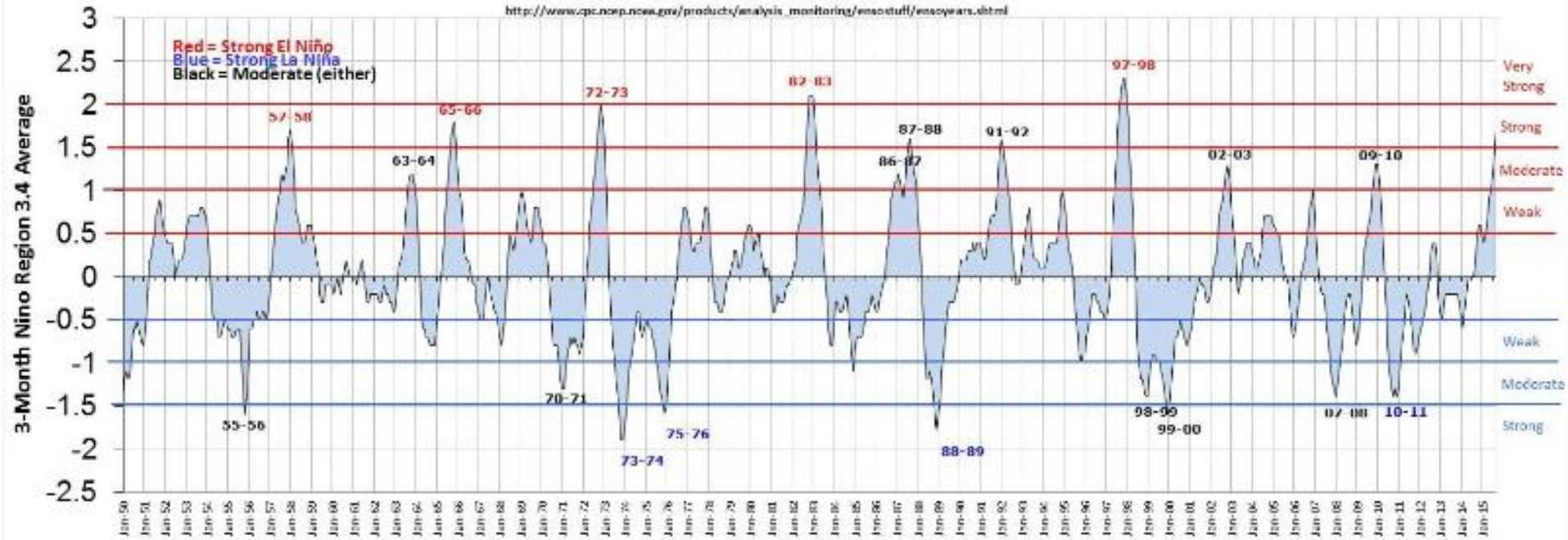
# Sea Surface Temperature Timetable



# 2015 Ties with 1997 for Strongest on Record

## Oceanic Niño Index (ONI)

[http://www.pcl.noaa.gov/products/analysis\\_monitoring/ensostuff/ensoyears.shtml](http://www.pcl.noaa.gov/products/analysis_monitoring/ensostuff/ensoyears.shtml)



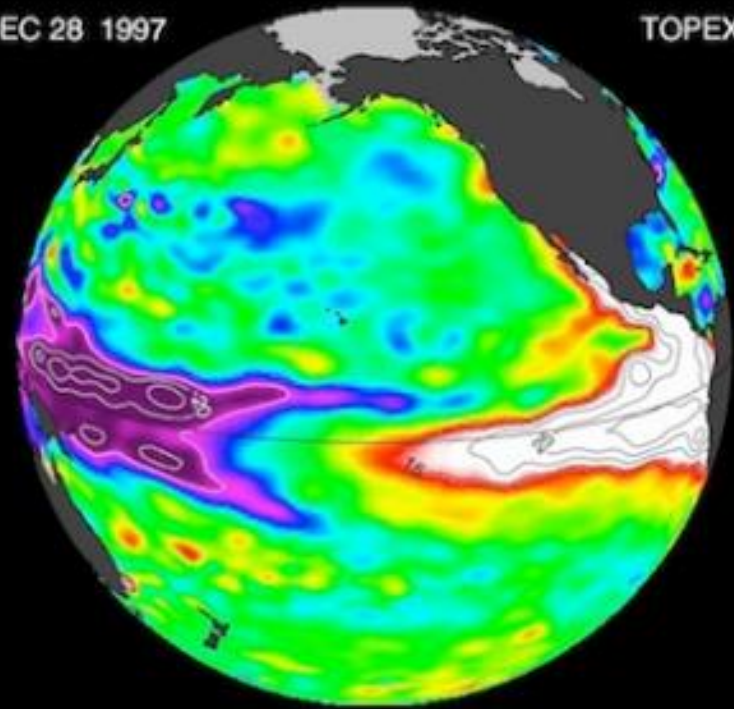
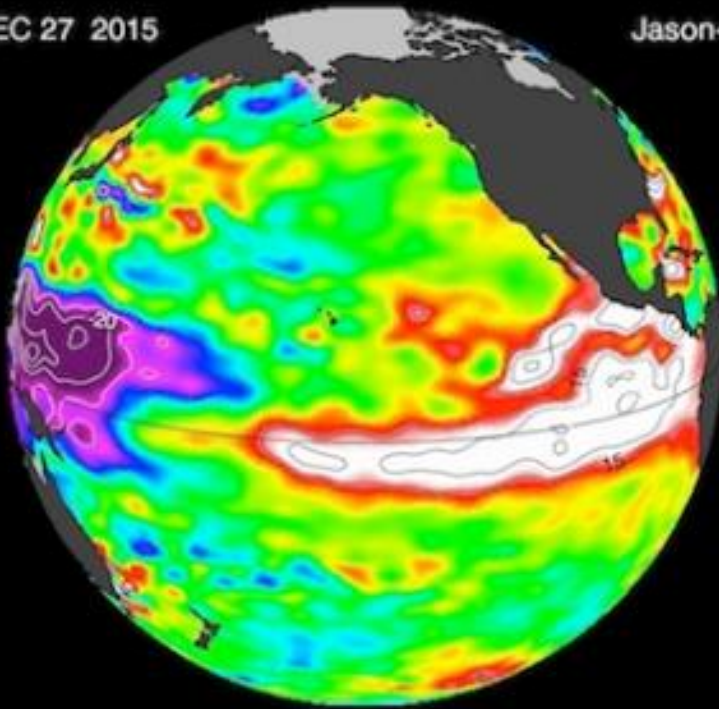
# Fairly similar to the El Niño of 1997-1998

DEC 27 2015

Jason-2

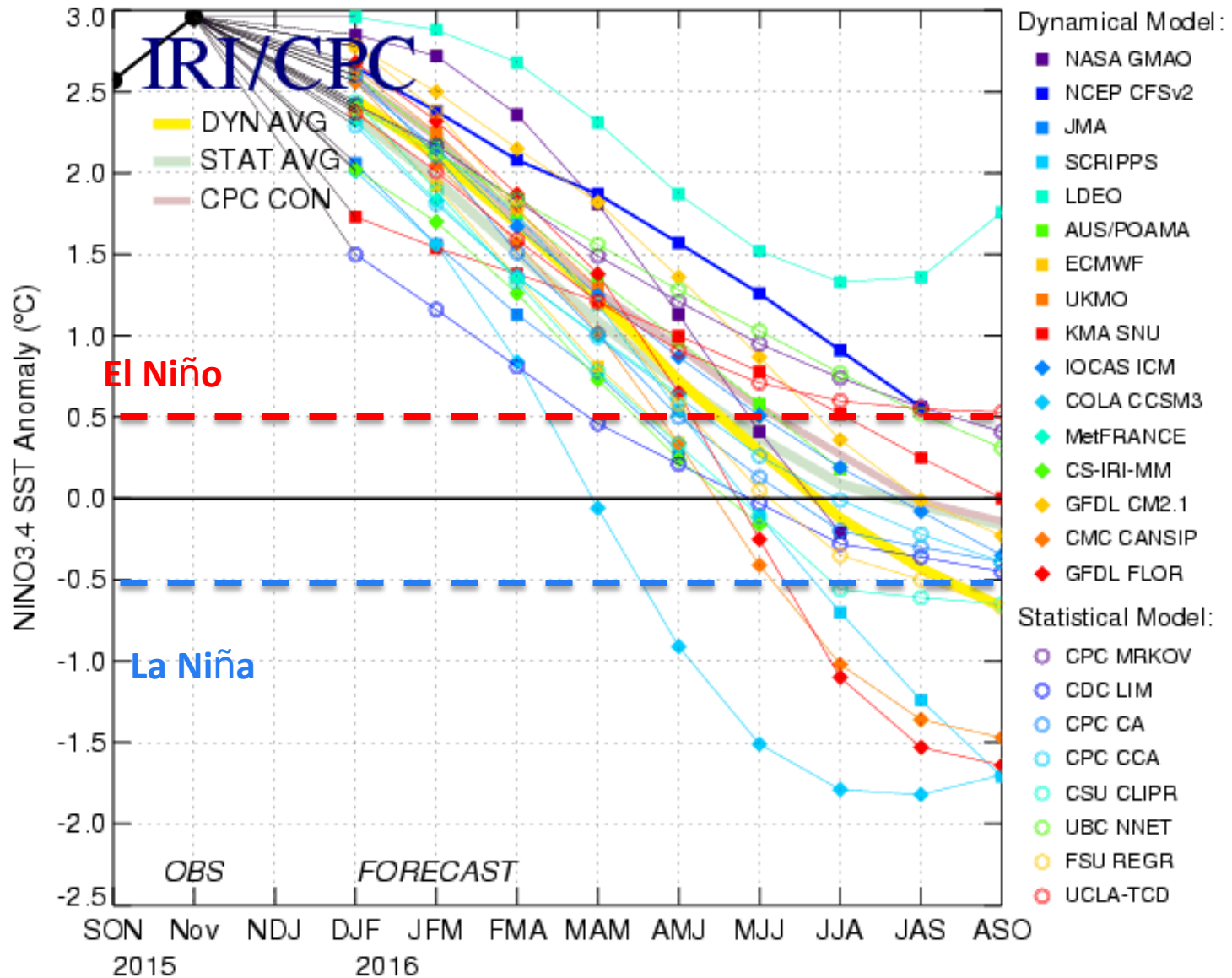
DEC 28 1997

TOPEX/POS

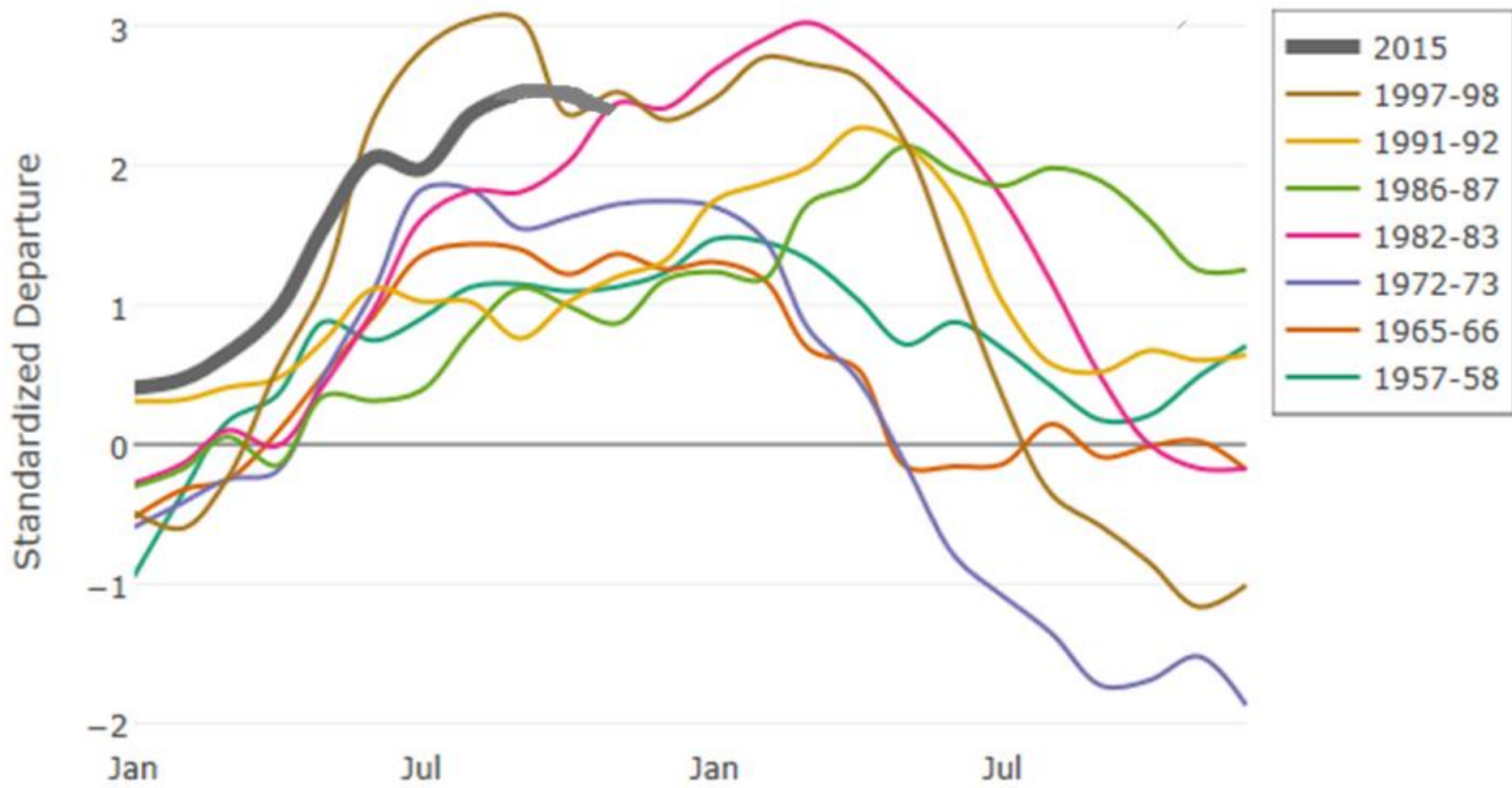


# Looking Ahead to Next Summer

## Mid-Dec 2015 Plume of Model ENSO Predictions



# Multivariate ENSO Index, Seven Strongest El Nino Events Since 1950

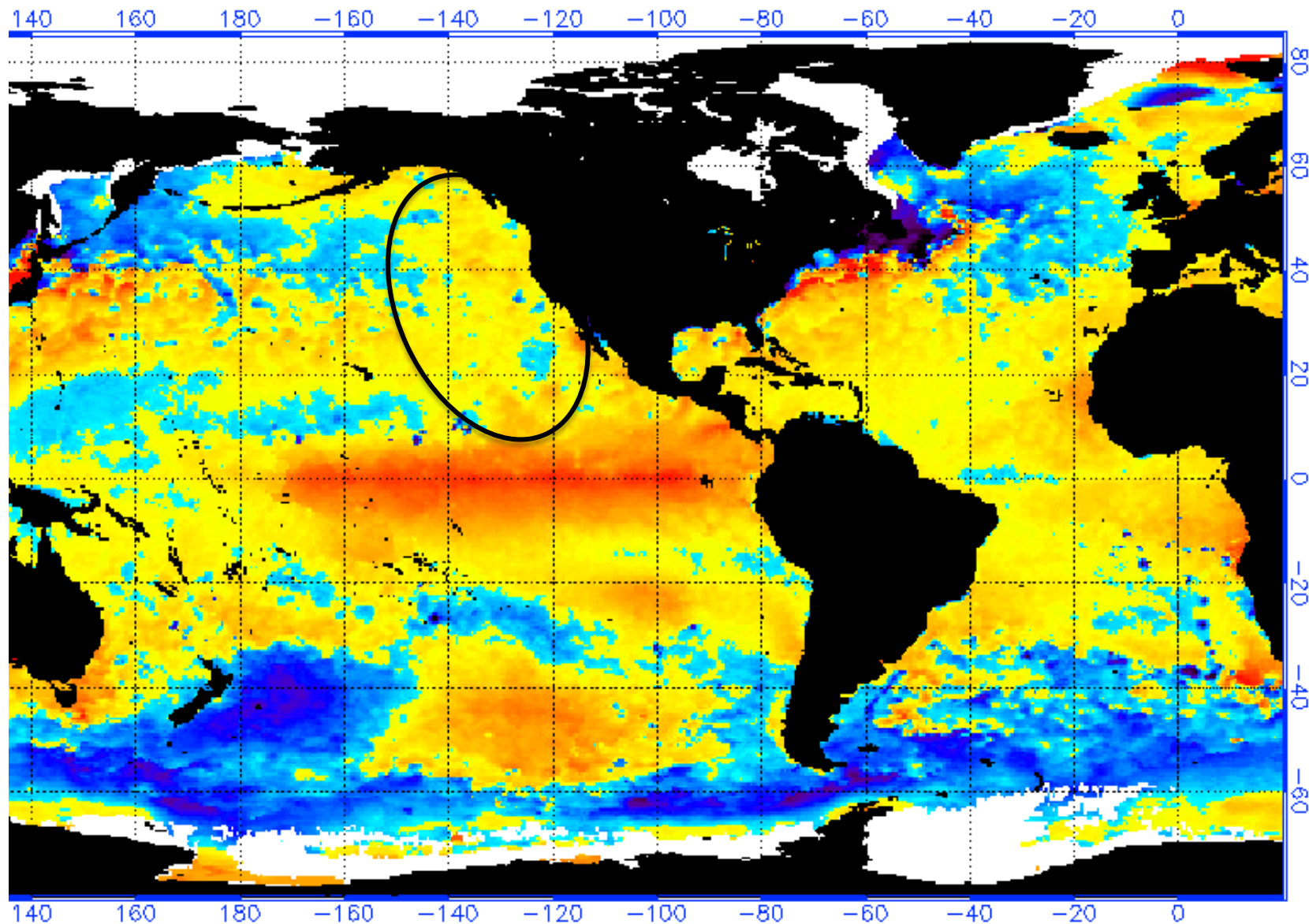


Source: [ESRL](#)

# The Weather Outlook for 2016

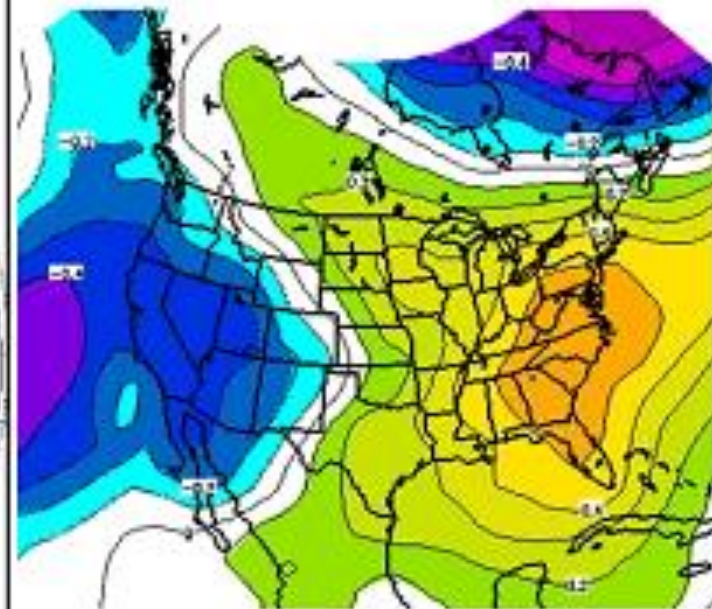
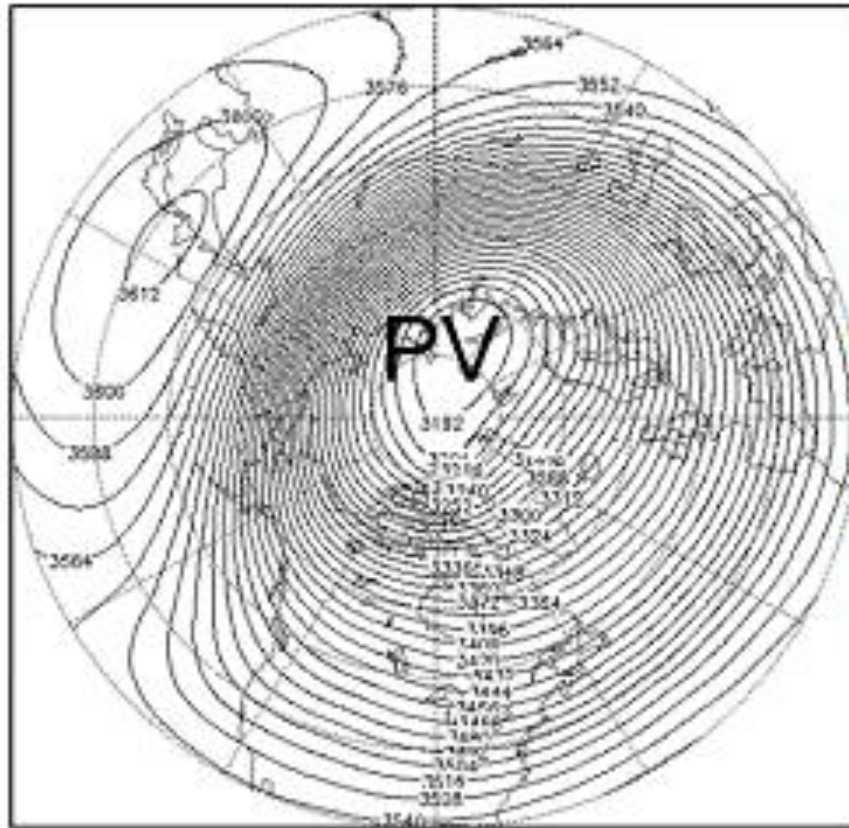


# A positive PDO continues



# A Very Strong Polar Vortex

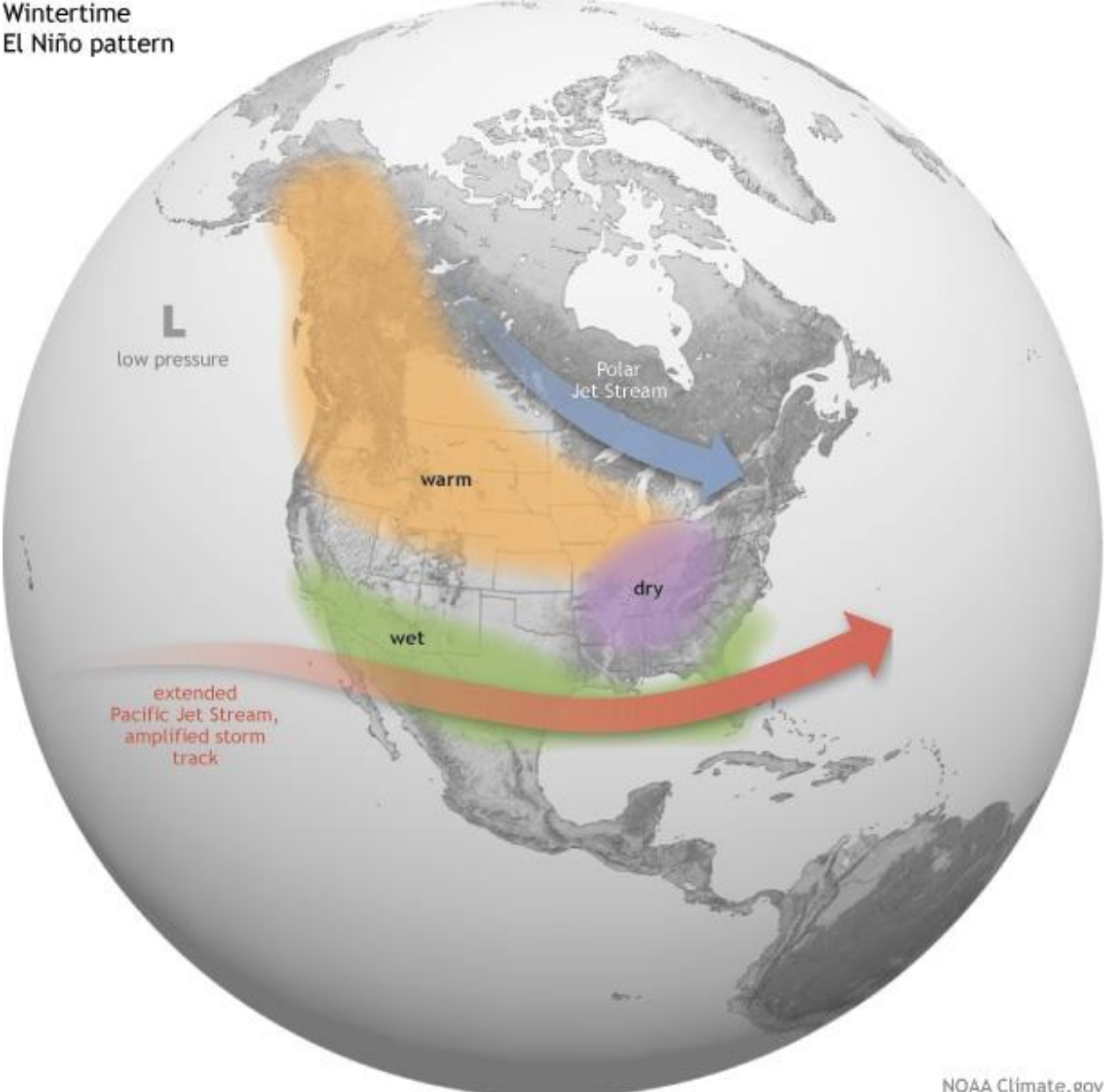
5mb Geopotential Height [dam]  
GFS 2015-12-17 12Z 12hr fcst valid 2015-12-18 00Z



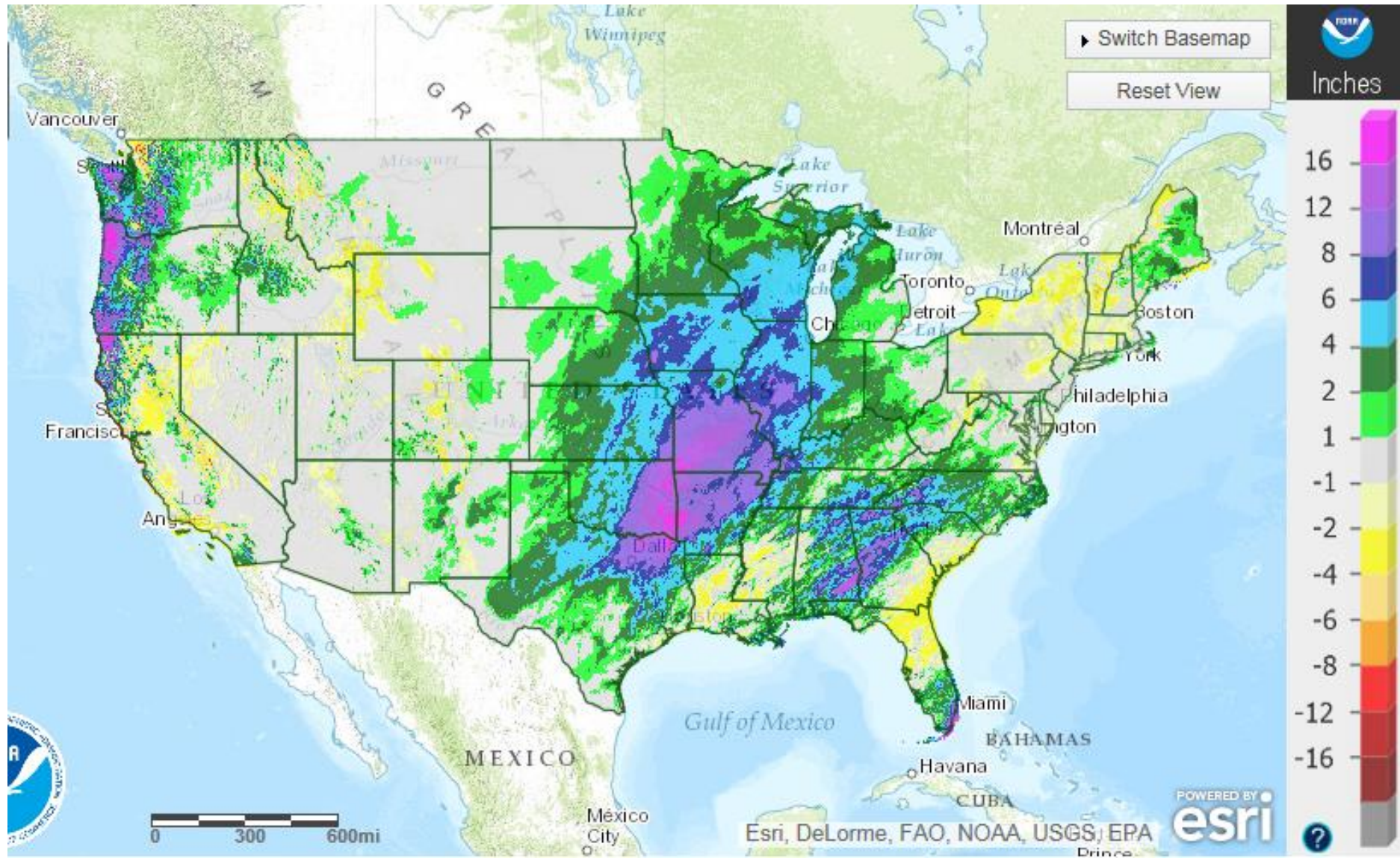
Dec 1950 to 2013: Surface Air Temperature  
Seasonal Correlation w/ Dec AG  
NCEP/NCAR Reanalysis

# Typical Effects of El Niño

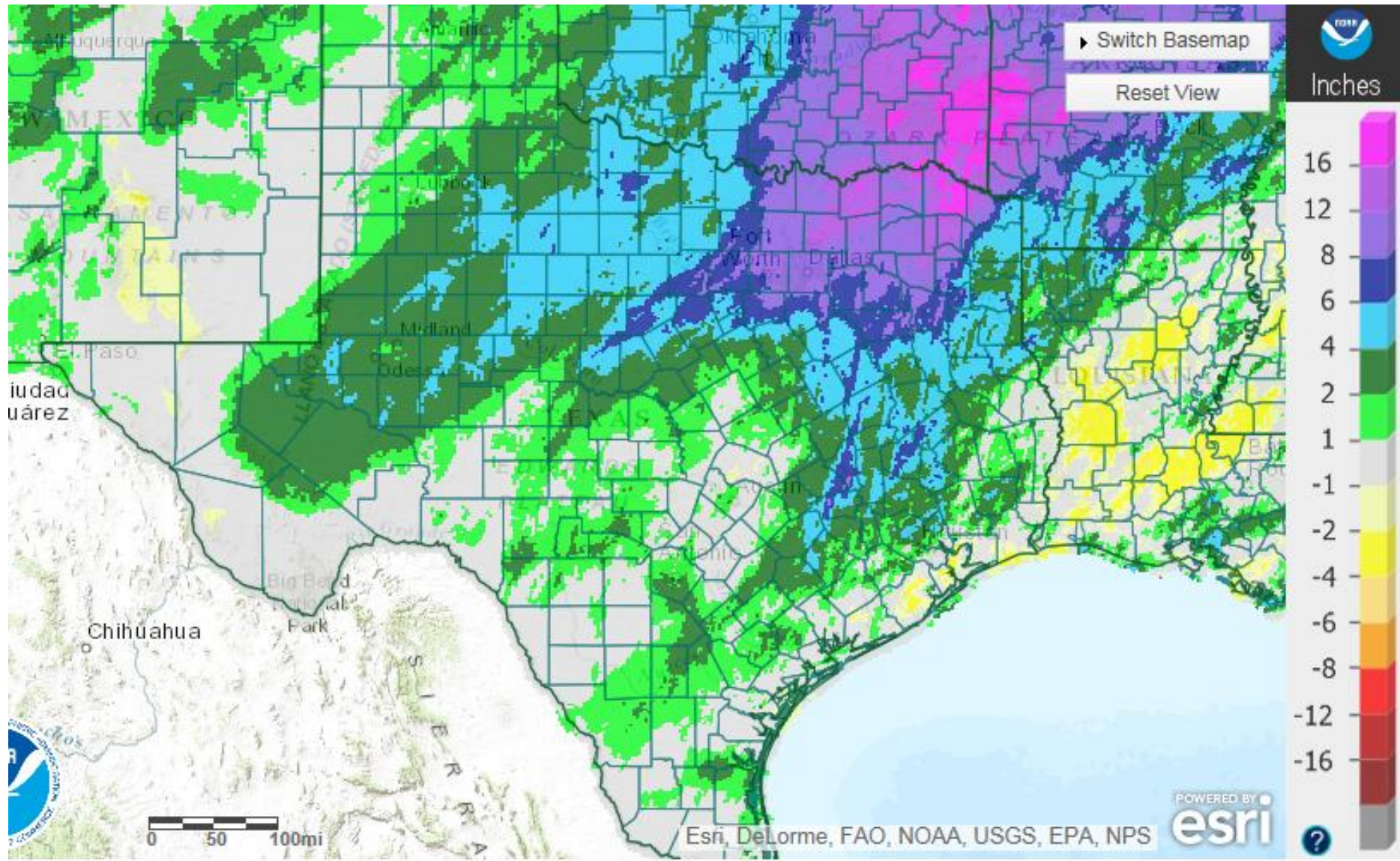
Wintertime  
El Niño pattern



# Rainfall departure from normal, past 60 days



# Rainfall departure from normal, past 60 days

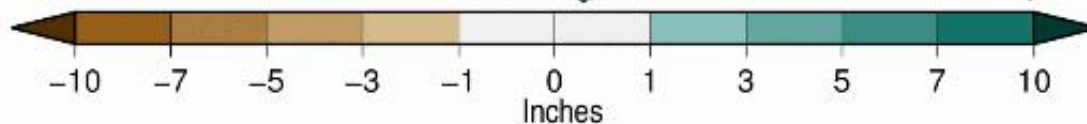
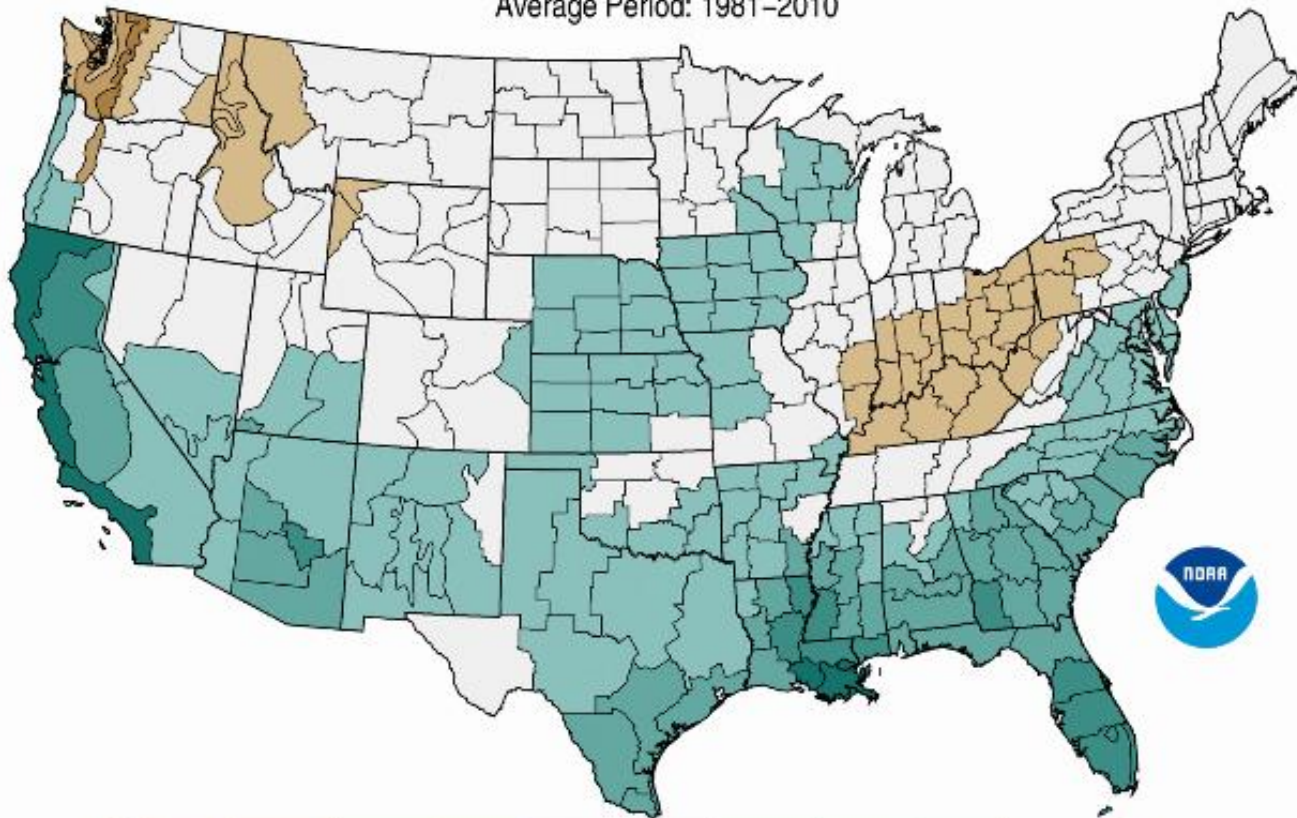


# Average Oct-Mar rain from a strong El Niño

Strong El Niño Precipitation Departure from Average

Composite: October–March 1957/1958, 1965/1966, 1972/1973, 1982/1983, 1991/1992, 1997/1998

Average Period: 1981–2010

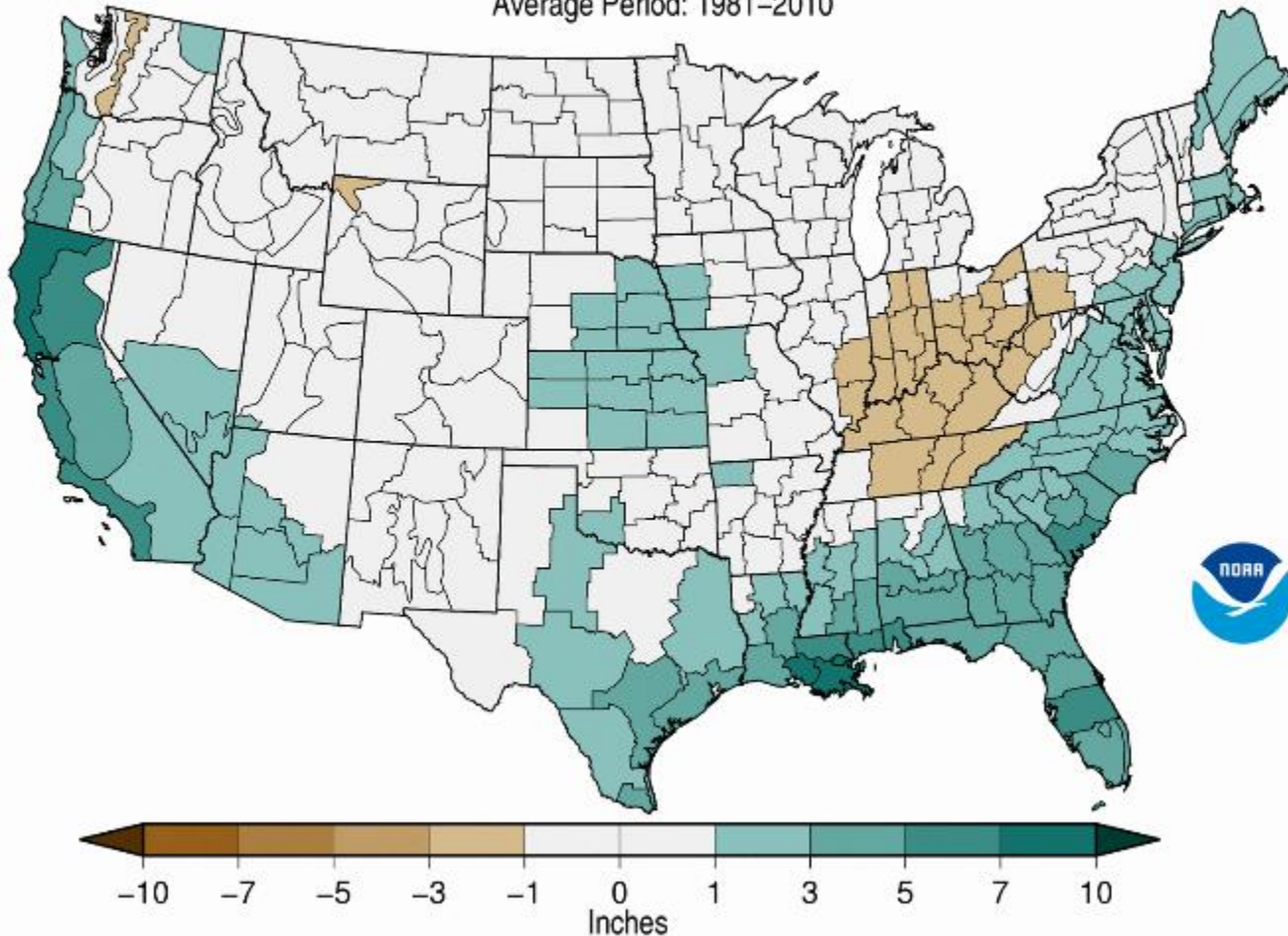


# Average Jan-Mar rain from a strong El Niño

Strong El Niño Precipitation Departure from Average

Composite: January–March 1958, 1966, 1973, 1983, 1992, 1998

Average Period: 1981–2010

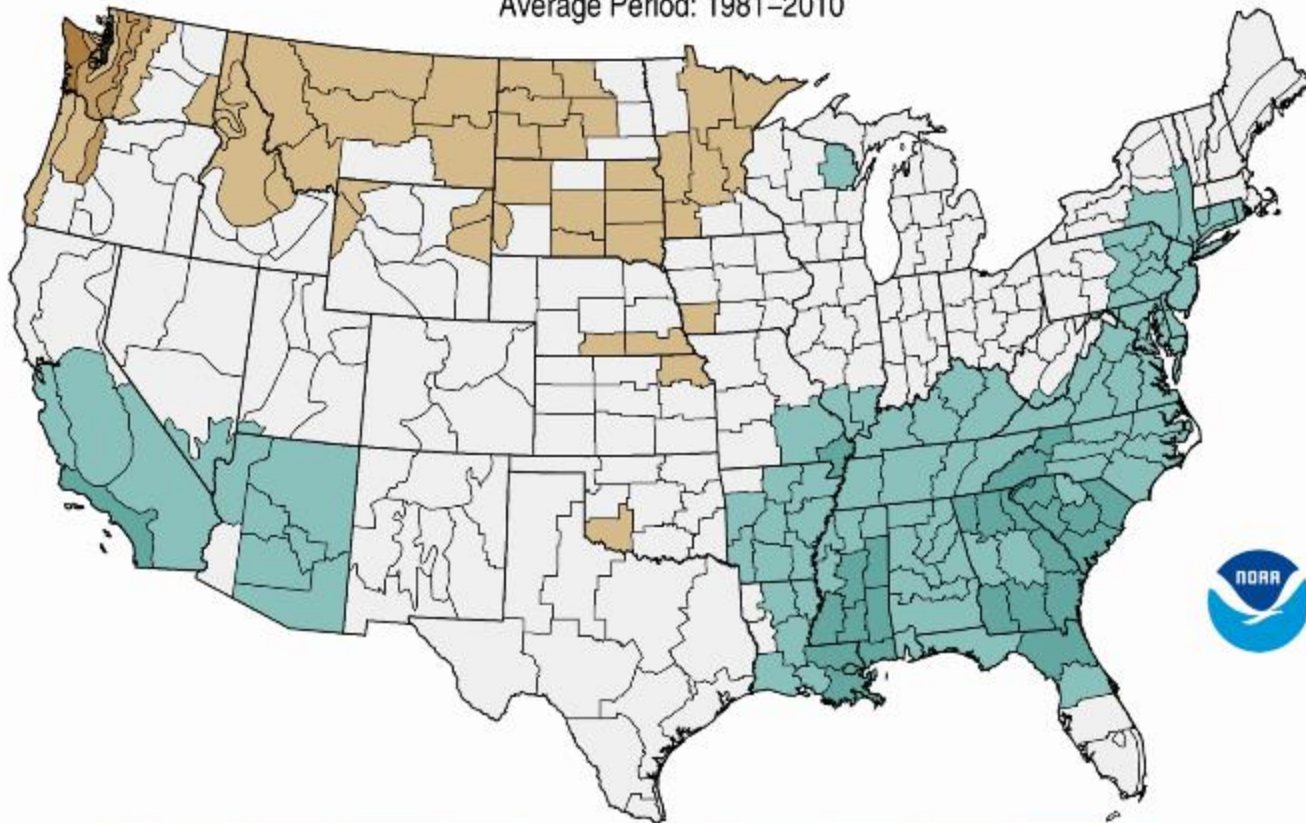


# Average Mar-May rain from a strong El Niño

Strong El Niño Precipitation Departure from Average

Composite: March–May 1958, 1966, 1973, 1983, 1992, 1998

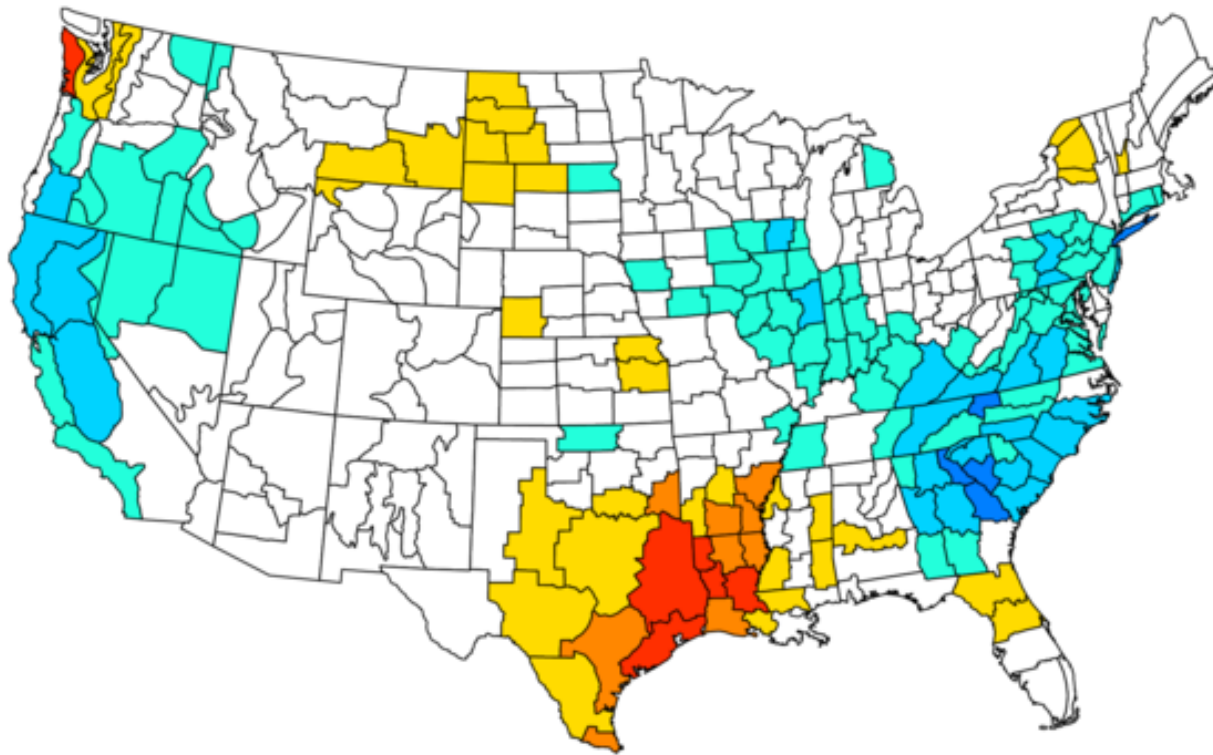
Average Period: 1981–2010



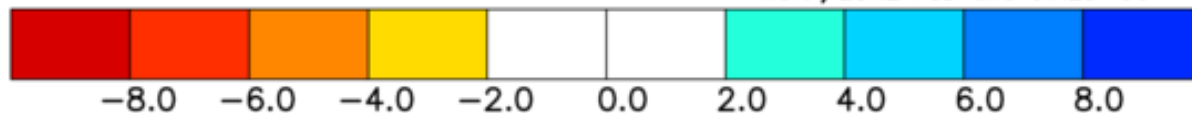


# Mar-May 1998 rainfall departure from normal

NOAA/NCDC Climate Division Precipitation Anomalies (in)  
Mar to May 1998  
Versus 1981–2010 Longterm Average

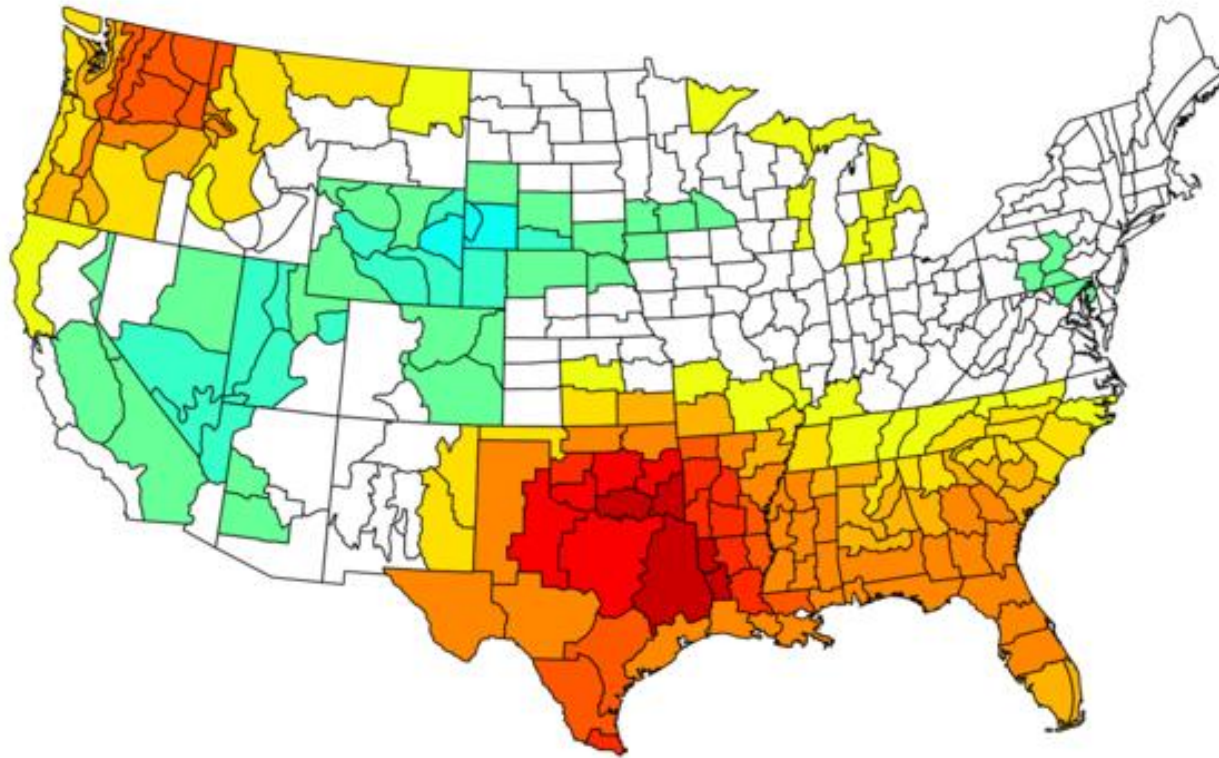


NOAA/ESRL PSD and CIRES-CU



# Jun-Aug 1998 rainfall departure from normal

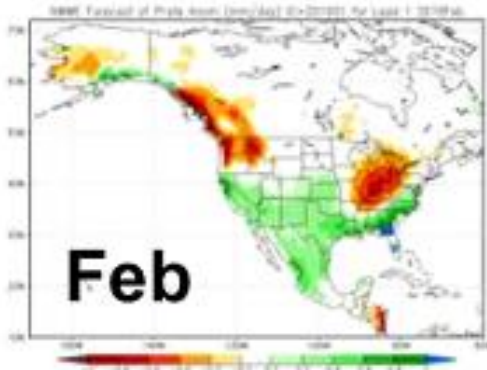
NOAA/NCDC Climate Division Temperature Anomalies (F)  
Jun to Aug 1998  
Versus 1981–2010 Longterm Average



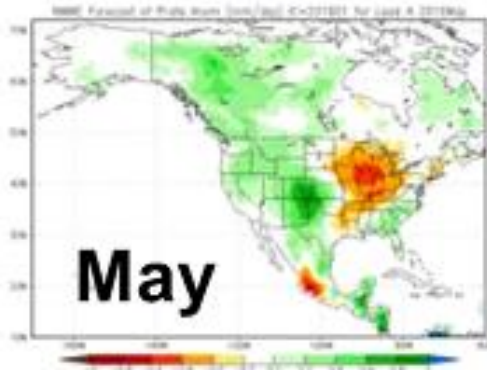
NOAA/ESRL PSD and CIRES-CU



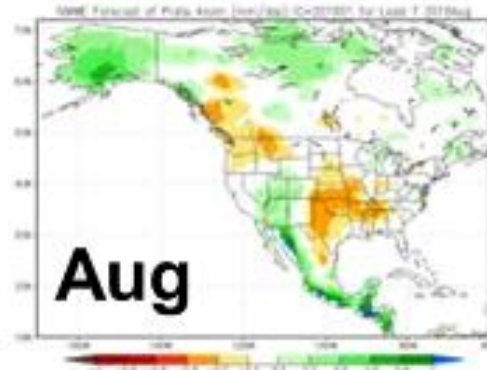
Lead 1



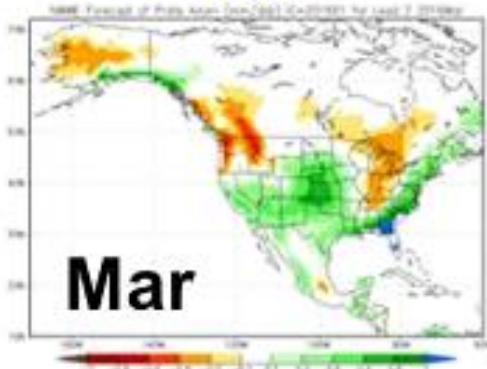
Lead 4



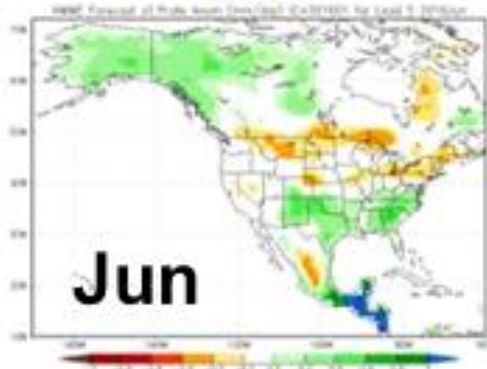
Lead 7



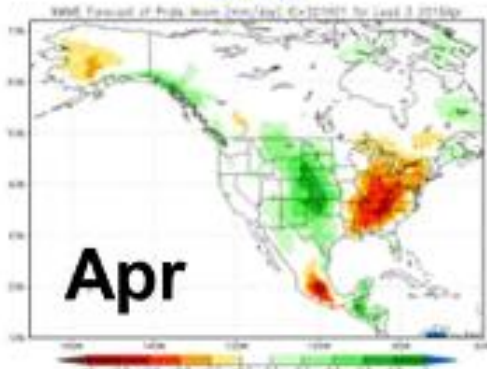
Lead 2



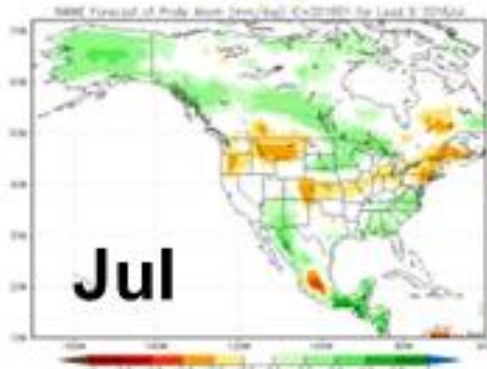
Lead 5



Lead 3



Lead 6

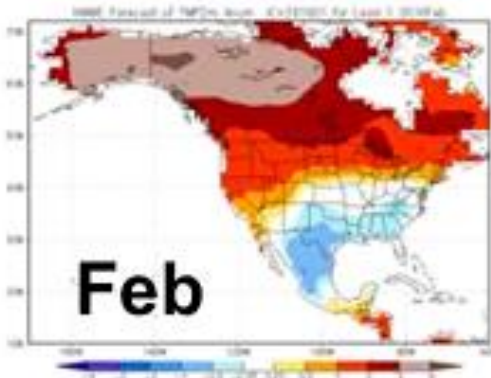


# Monthly average of 8 climate models Precipitation

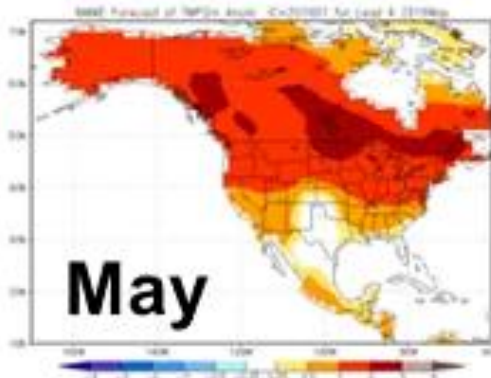


NMME prate\_us forecast

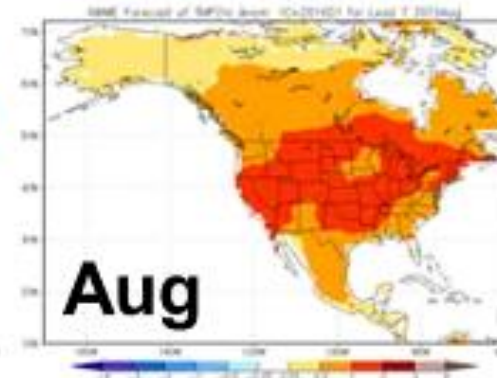
Lead 1



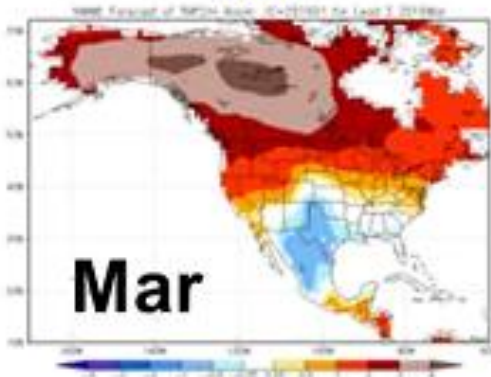
Lead 4



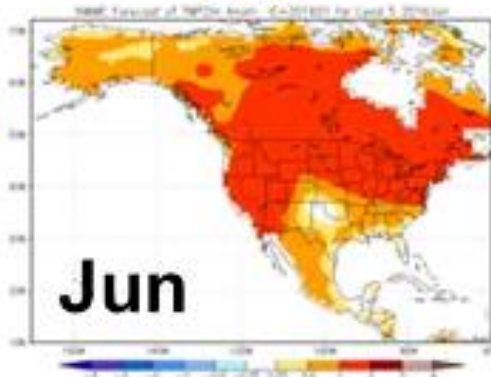
Lead 7



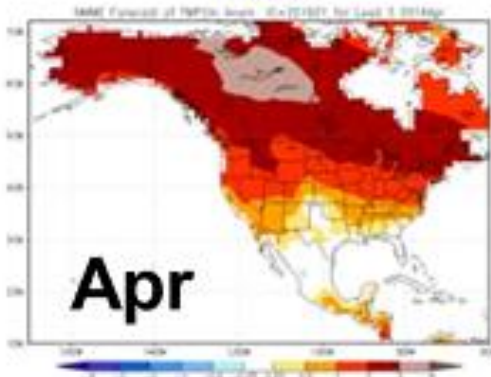
Lead 2



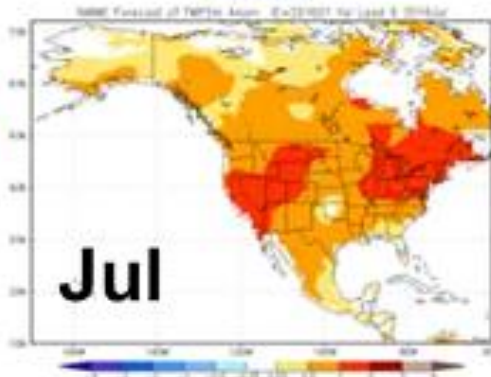
Lead 5



Lead 3



Lead 6



# Monthly average of 8 climate models Temperature



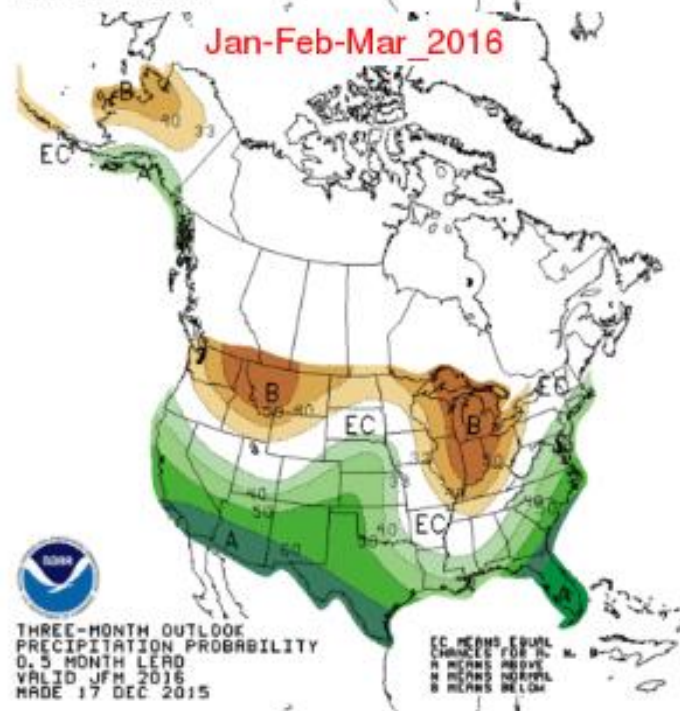
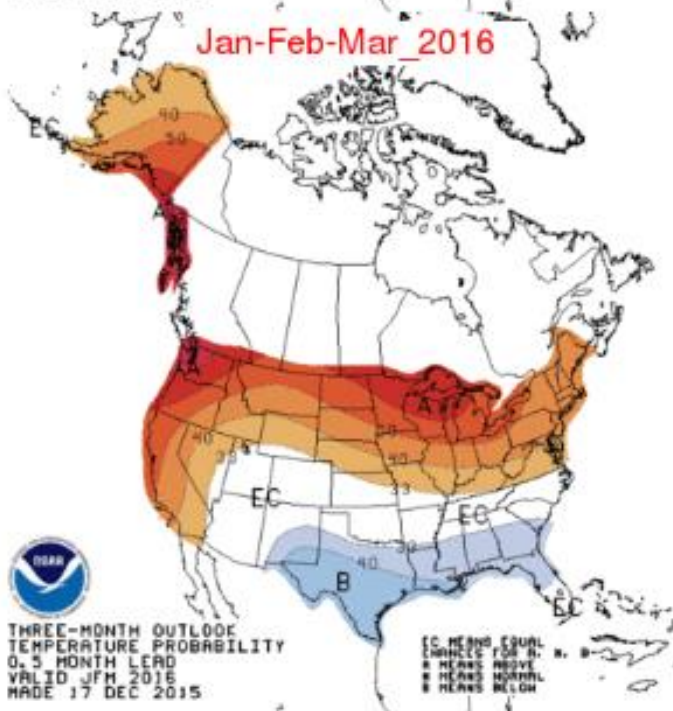
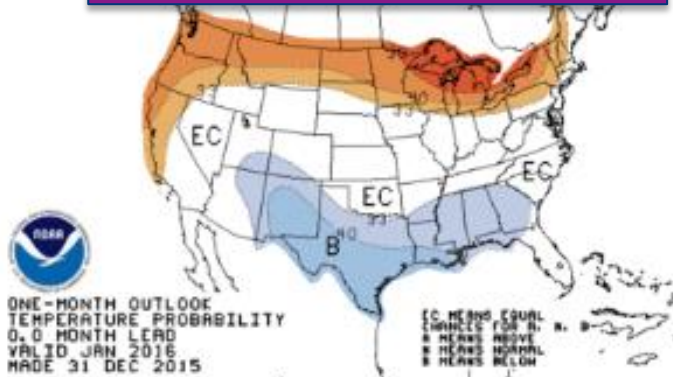
NMME tmp2m\_us fore



# Temperature

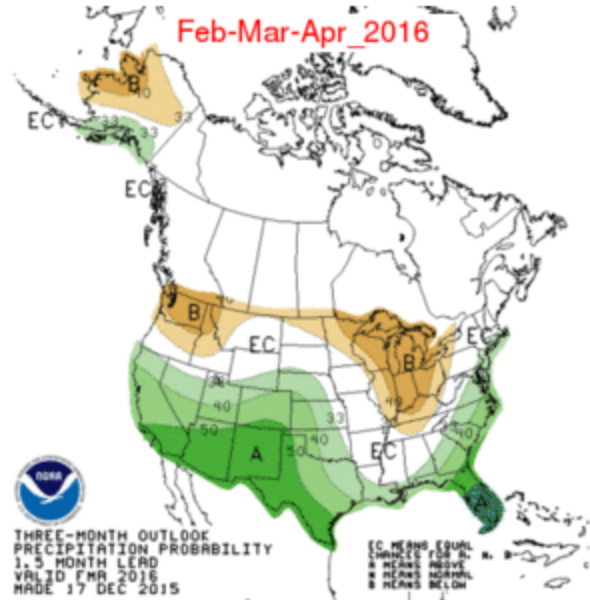


# Precipitation

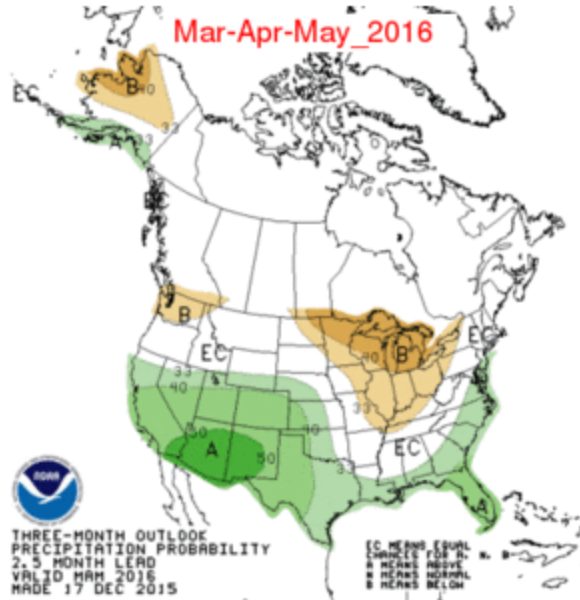


# NWS Rainfall Outlook

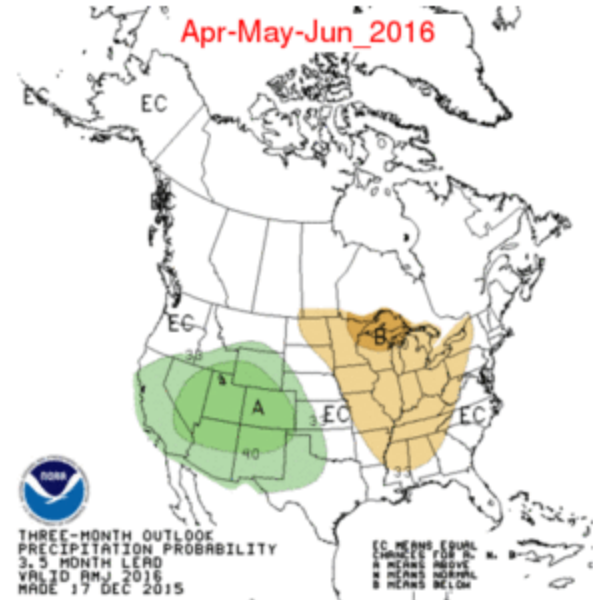
Feb-Mar-Apr 2016



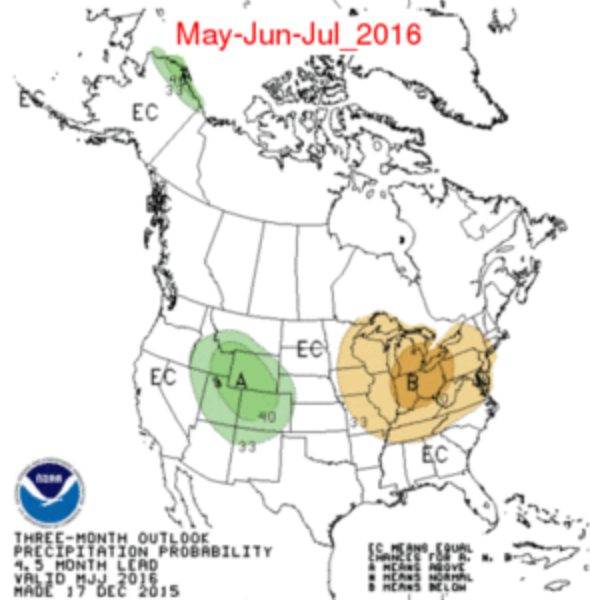
Mar-Apr-May 2016



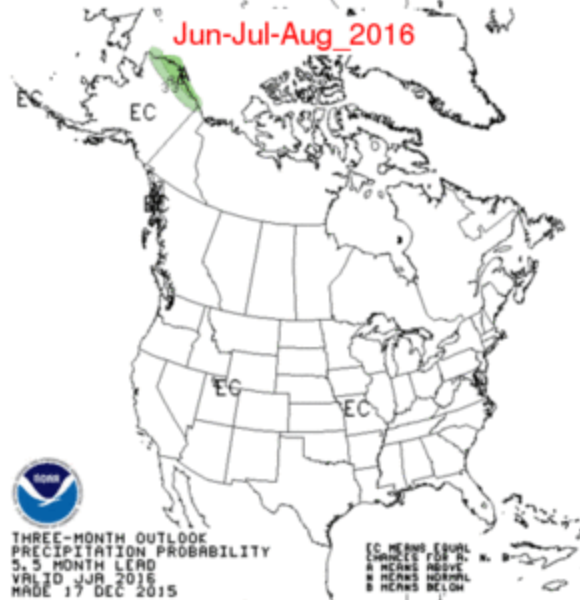
Apr-May-Jun 2016



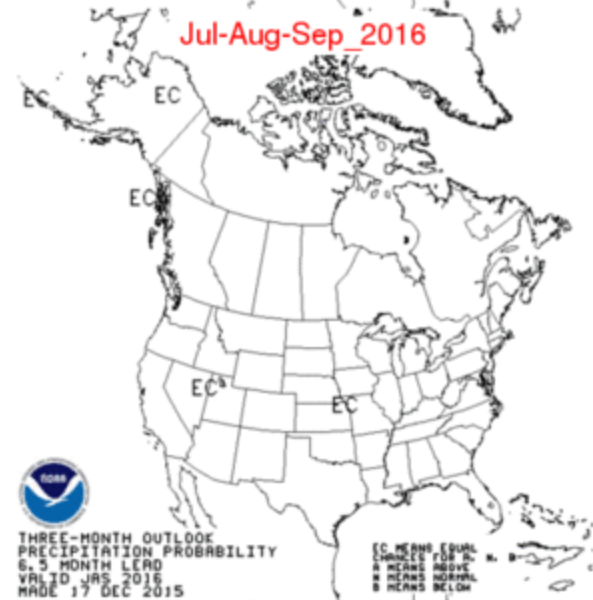
May-Jun-Jul 2016



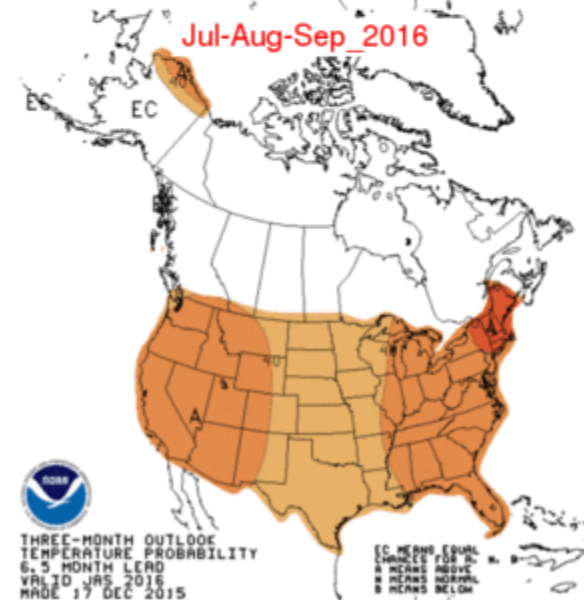
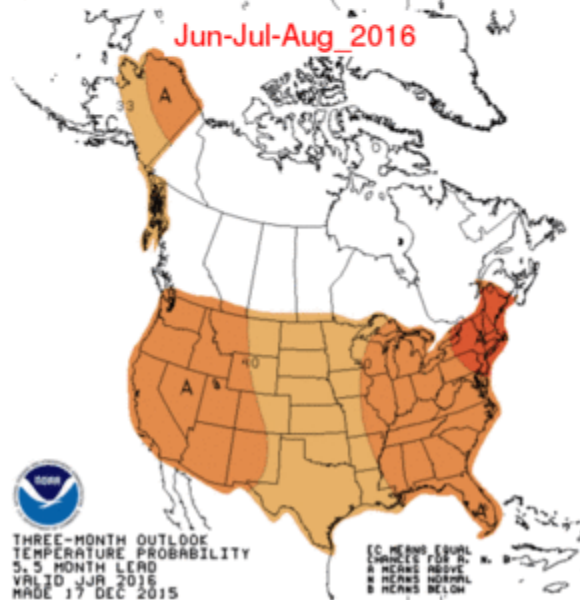
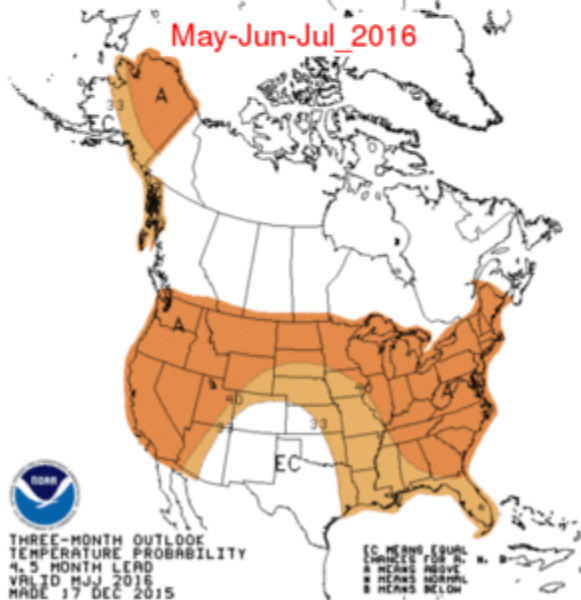
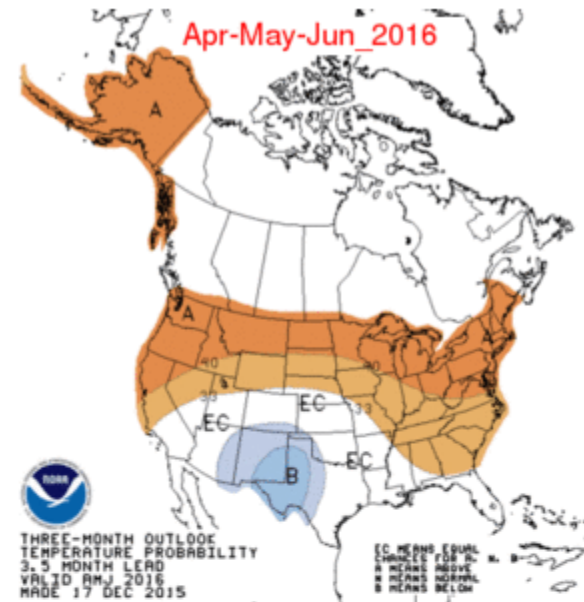
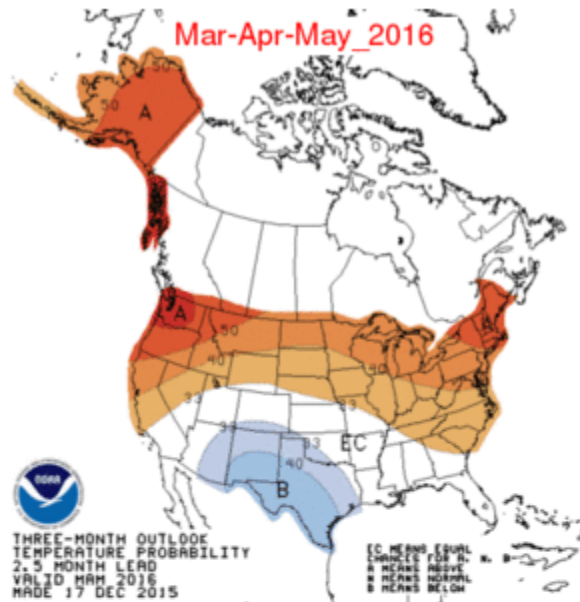
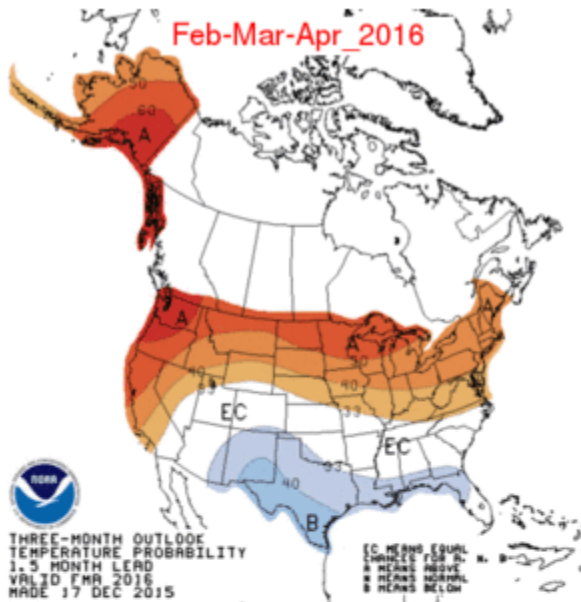
Jun-Jul-Aug 2016



Jul-Aug-Sep 2016

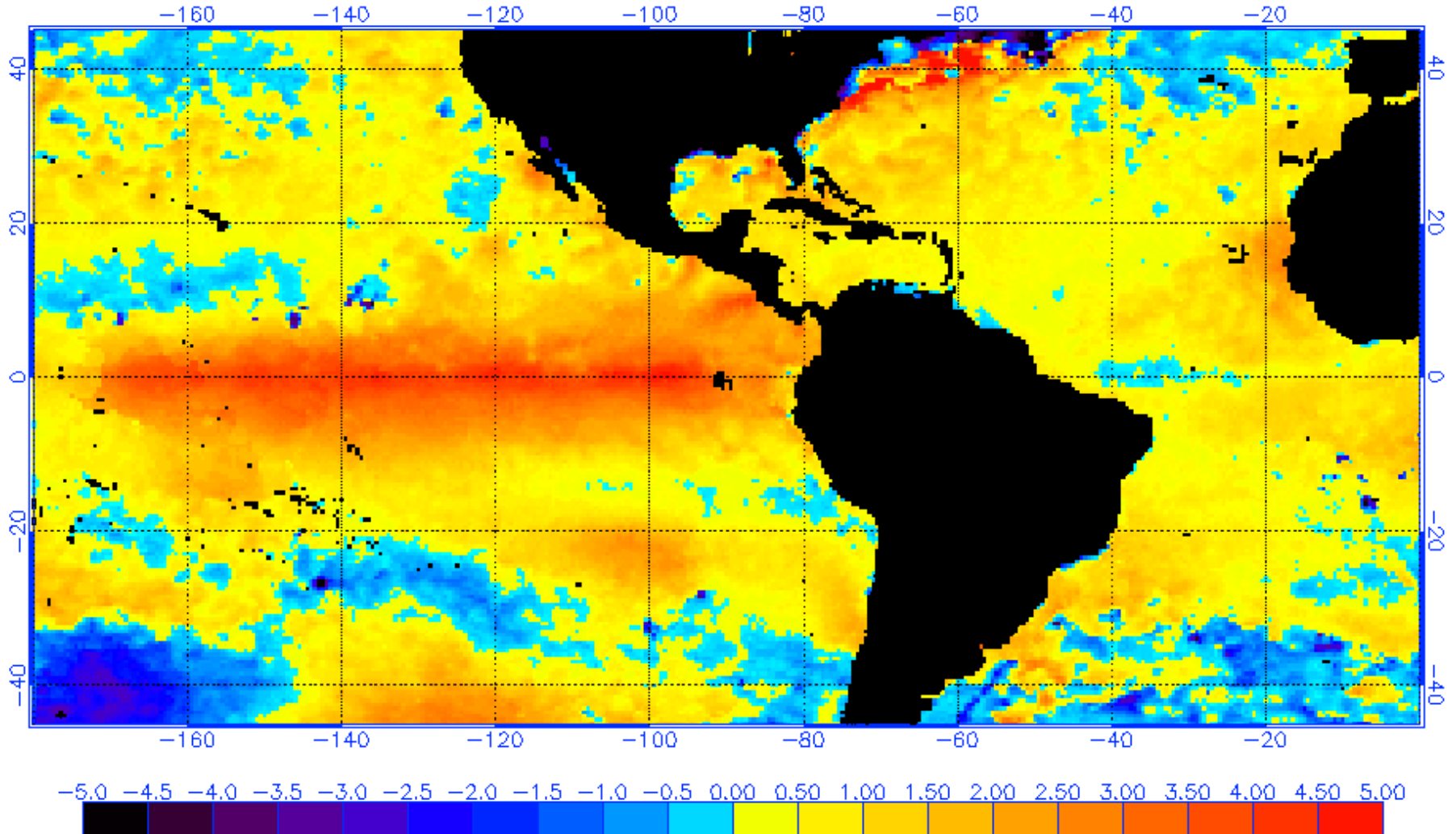


# NWS Temperature Outlook



# What about the 2016 Atlantic Hurricane Season?

NOAA/NESDIS SST Anomaly (degrees C), 1/14/2016





# Questions?

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**LCRA Chief Meteorologist**

**[bob.rose@lcra.org](mailto:bob.rose@lcra.org)**

**512-578-3350**