

Historical Texas Drought Update

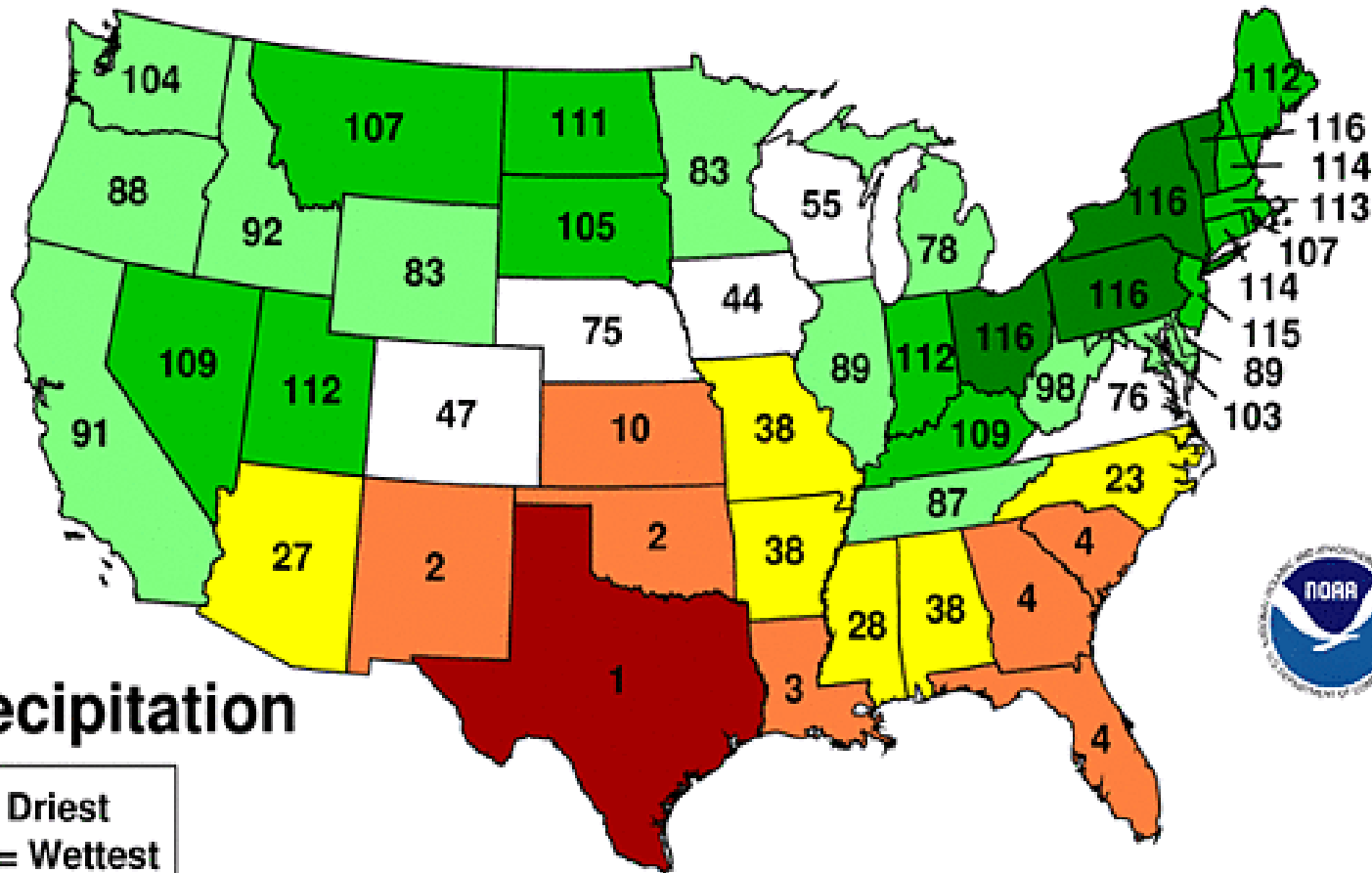
An aerial photograph of a reservoir in Texas. The water is a deep blue-green color. A large, light-colored, rocky bank has eroded significantly, exposing a wide, flat area of gravel and sand. Several boat docks with blue and green roofs are visible in the water. In the background, there are green trees and houses on a hillside under a clear blue sky.

October 18, 2011

Bob Rose, LCRA Meteorologist

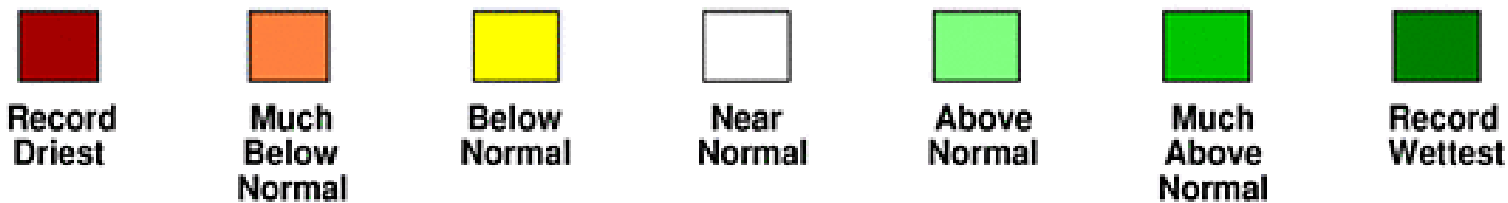
Oct 2010-Sep 2011 Statewide Ranks

National Climatic Data Center/NESDIS/NOAA



Precipitation

1 = Driest
116 = Wettest



Worst Drought in Texas History

**“Texas has experienced its most severe
one-year drought on record”**

John Nielsen-Gammon, Texas State Climatologist.

***Driest October-September on record
with 7.18 inches. Normal is 14.94.***

Record low was 7.35 inches

Oct 1901-Sep 1902.

Worst Drought in Texas History

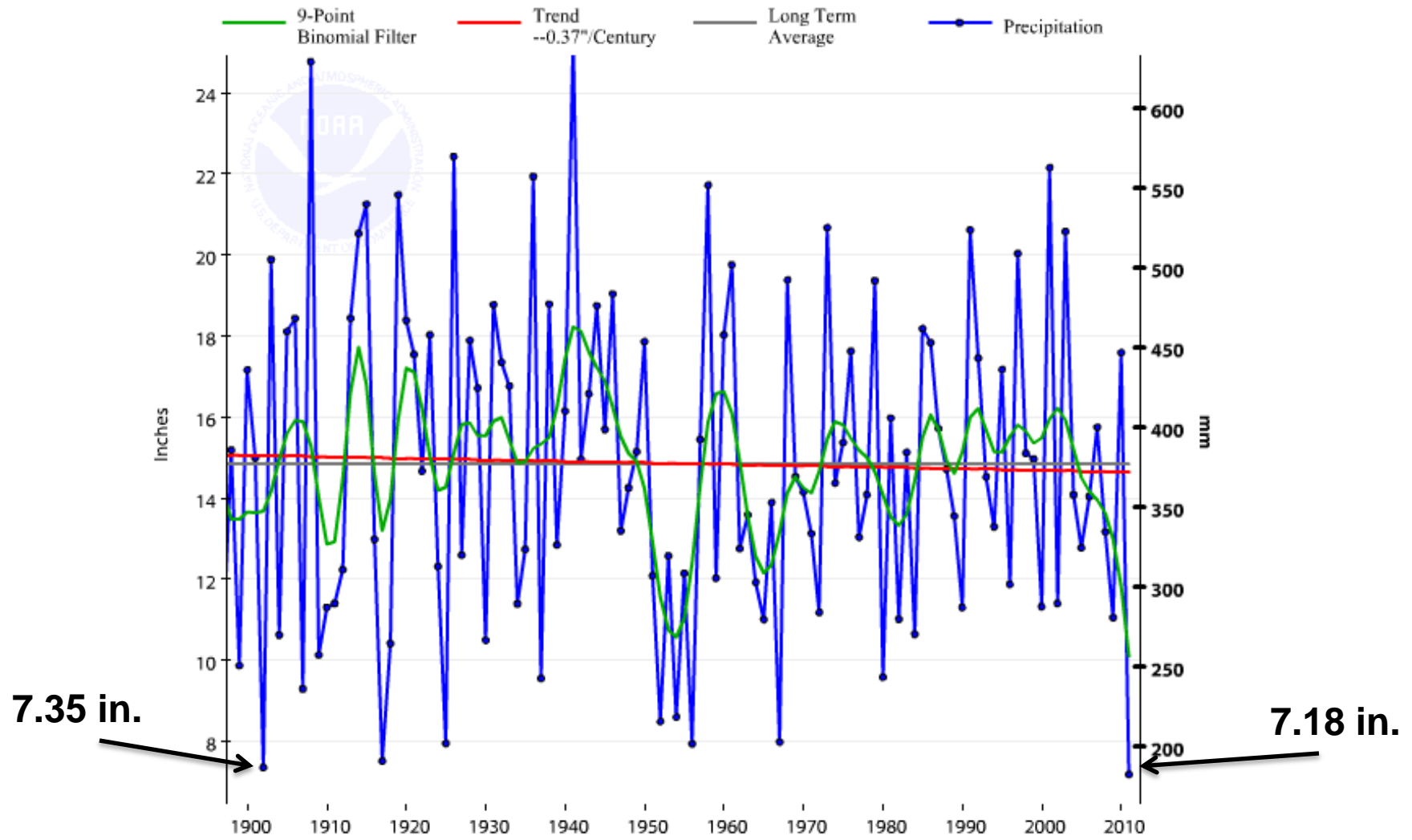
“Texas has experienced its most severe one-year drought on record”

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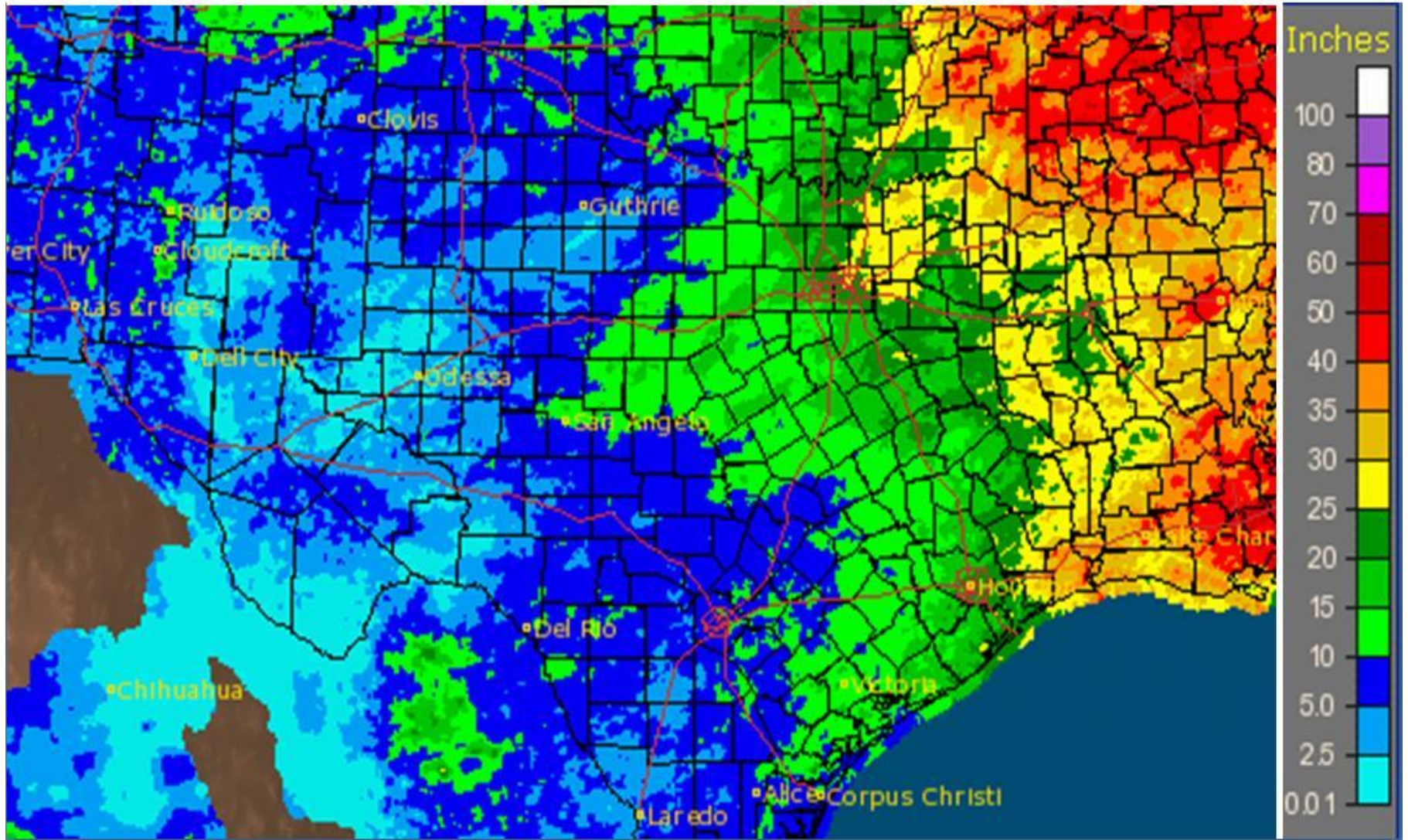
Hottest June, July and August on record. August was the hottest month ever recorded with an average temperature of 88.1 degrees, beating July 2011 with 87.1 degrees. Hottest month for any state ever in the US!

Texas Rainfall, Oct.-Sep.

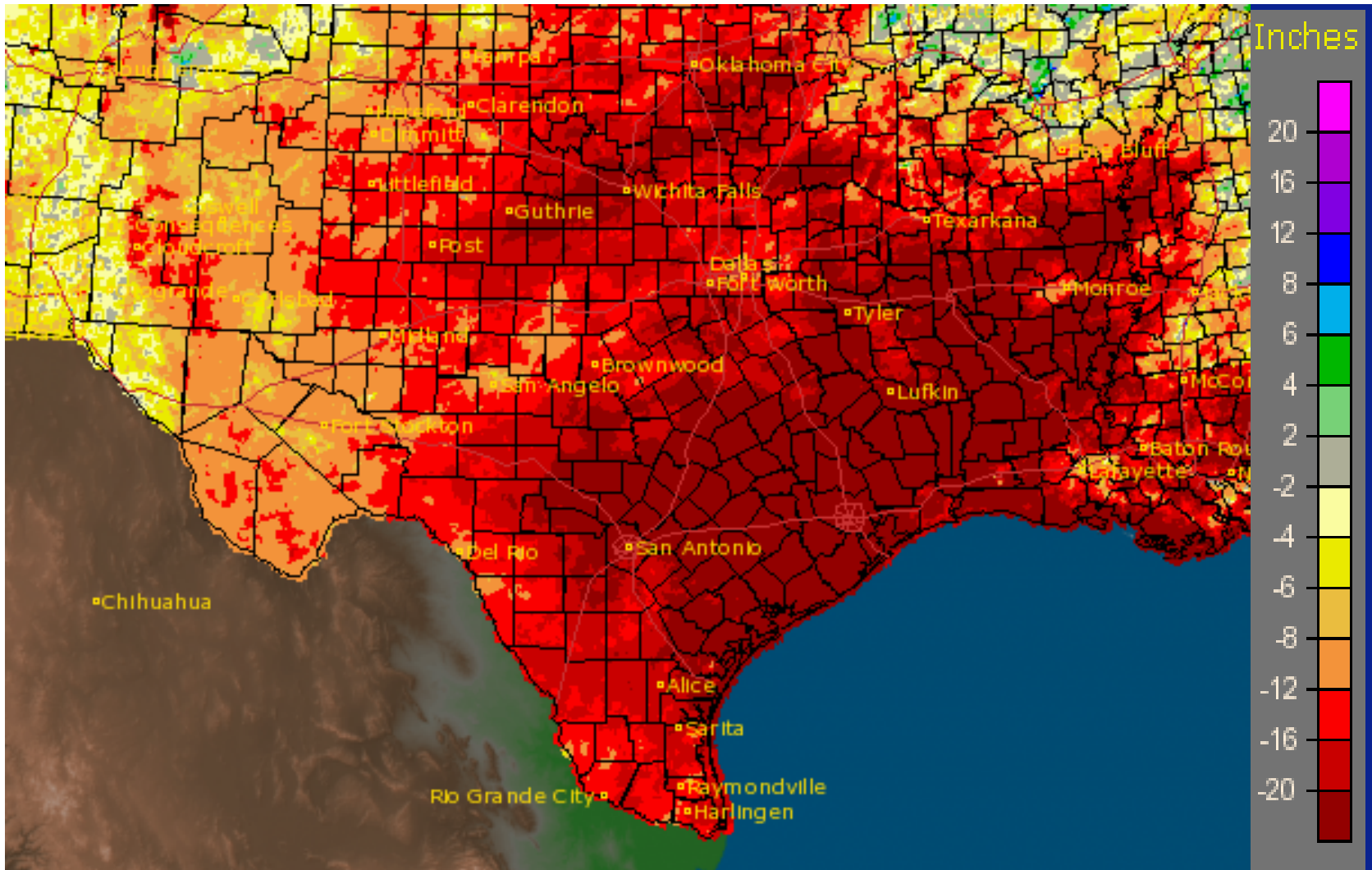
Texas, Precipitation, October-September



Rainfall Oct 2010-Sep 2011

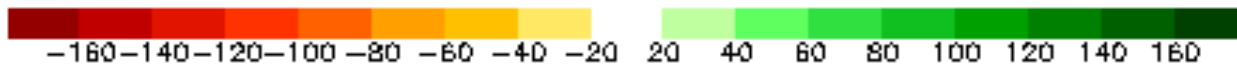
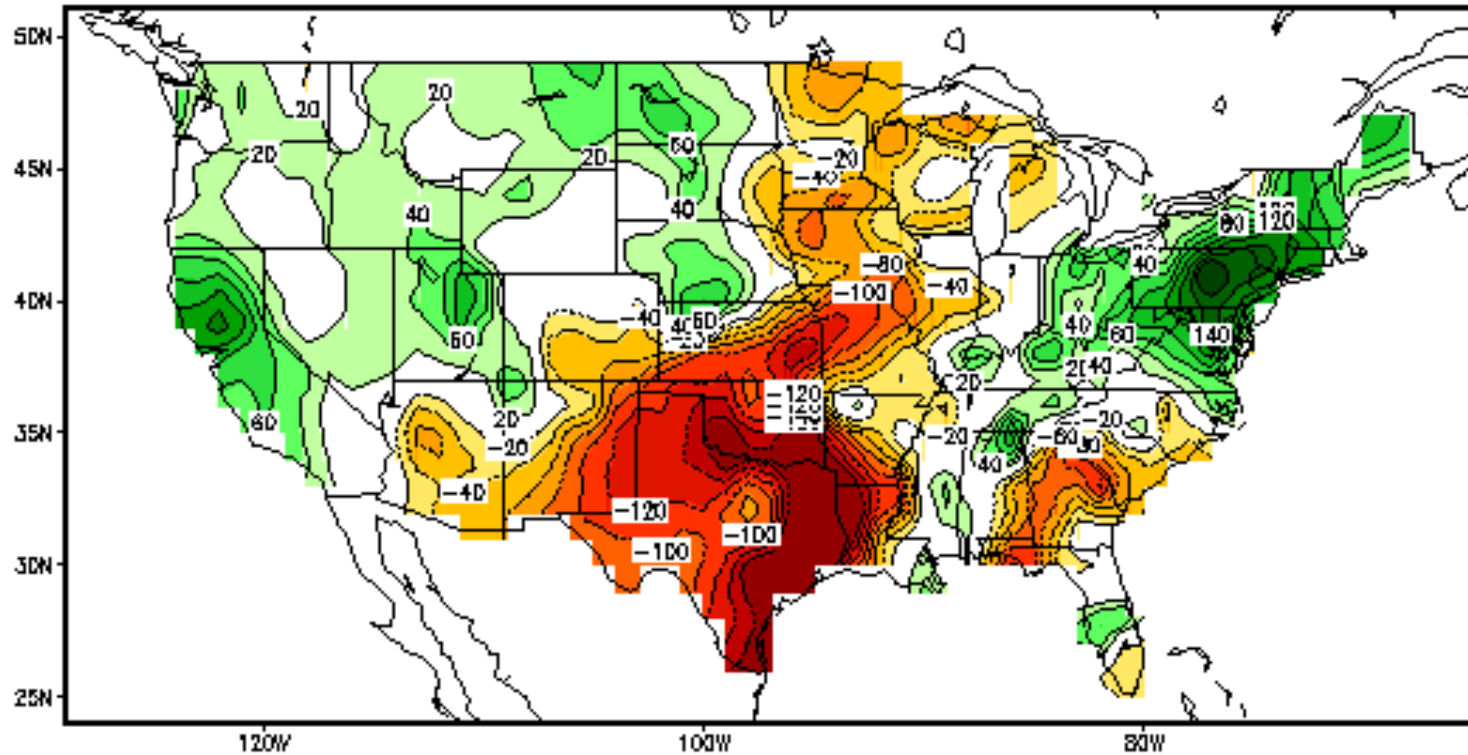


Rainfall Departure from Normal October 2010-September 2011



Soil Moisture Anomaly

Calculated Soil Moisture Anomaly (mm)
OCT 16, 2011





***Unprecedented Summer
Heat!!!***

Created 15:17 08/8 /2011

SUMMER-LONG HEAT WAVE

AVERAGE JET STREAM

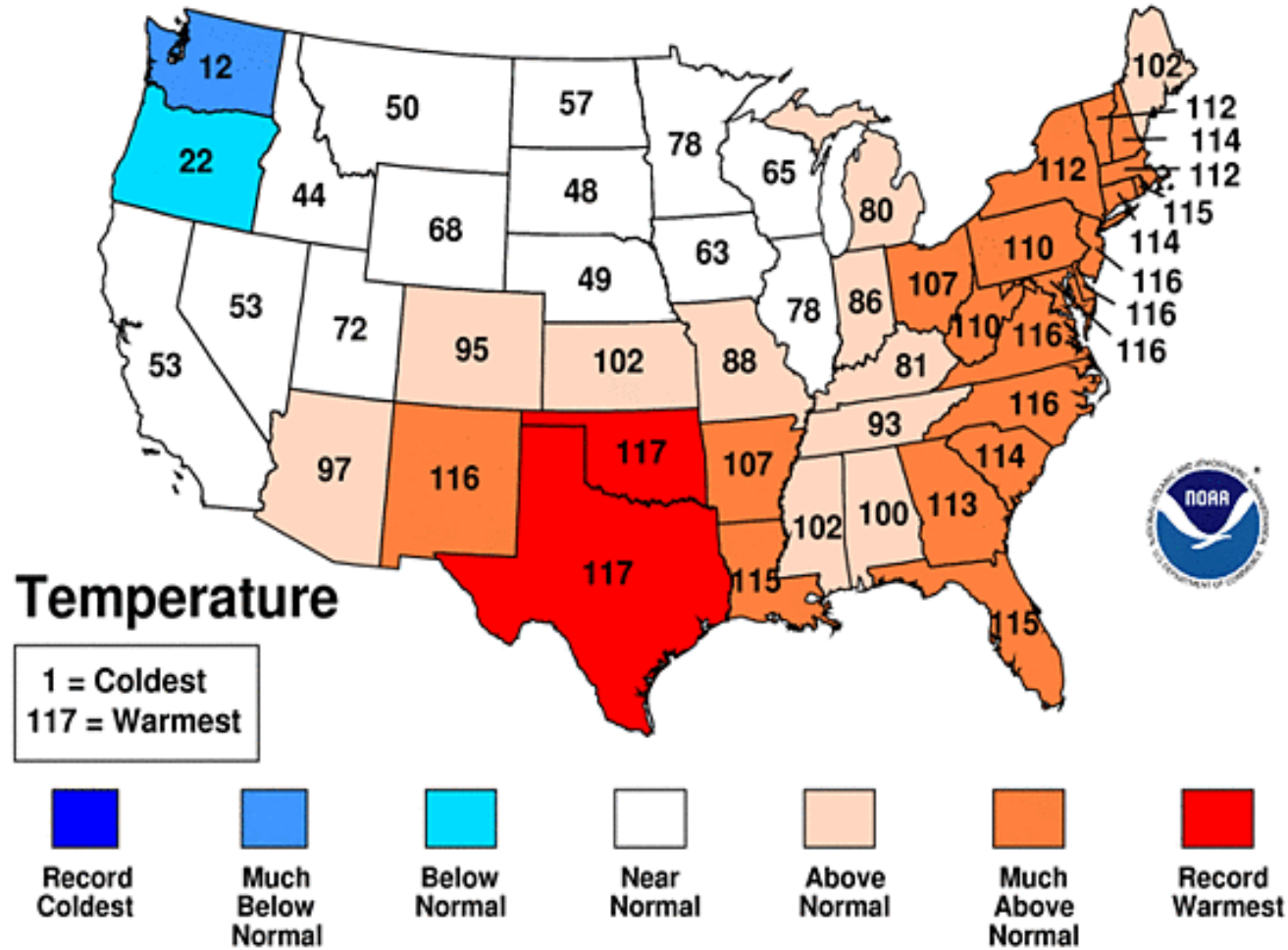
A map of the United States with a dark blue background. The landmass is colored in shades of orange and red, indicating a heat wave. A purple, glowing arc labeled 'AVERAGE JET STREAM' curves across the northern part of the country. A red, glowing outline labeled 'HOT CORE SINCE JUNE' encircles the central and southern regions of the United States.

HOT
CORE
SINCE JUNE

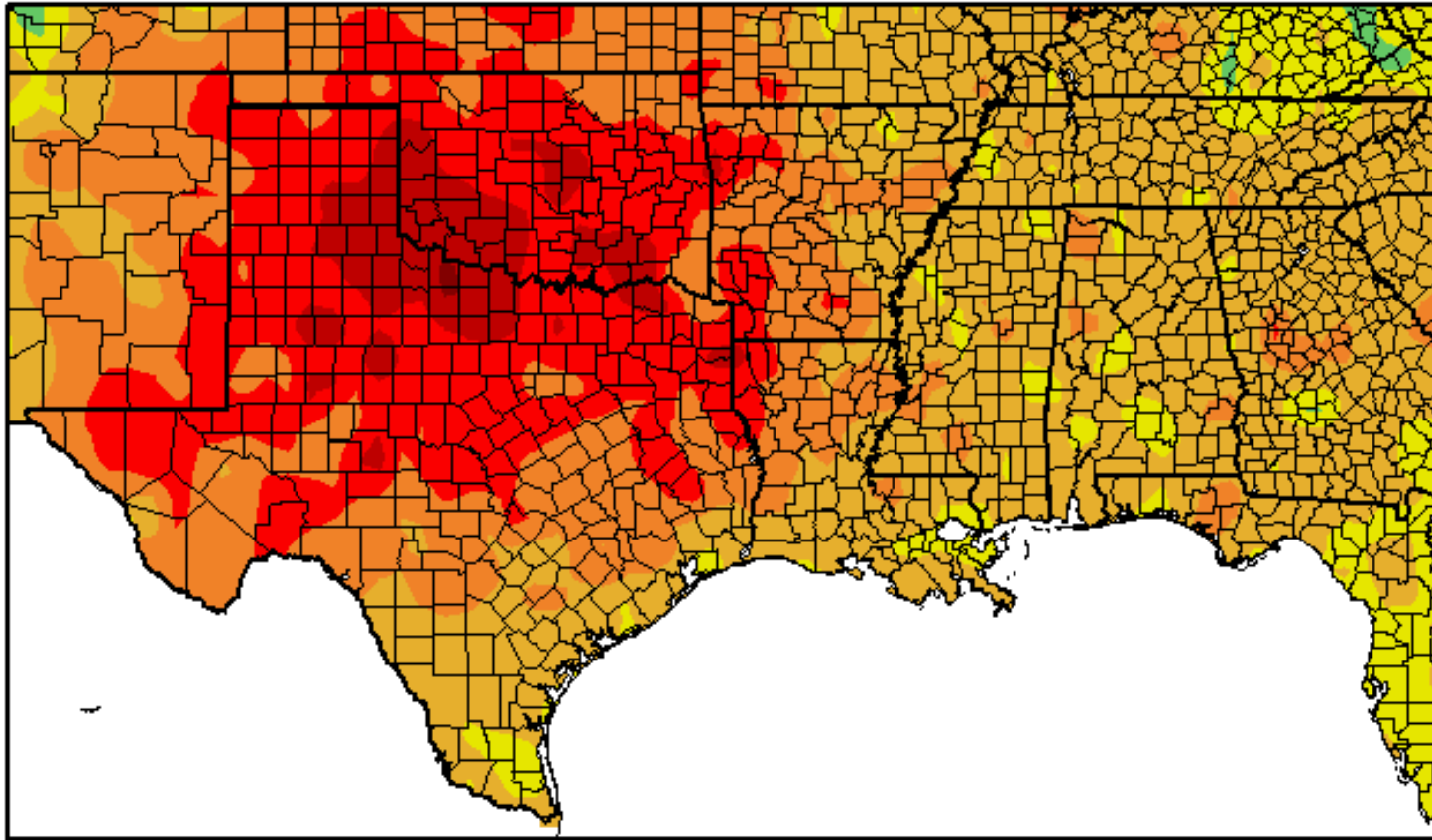
©2011 AccuWeather.com

April-September 2011 Statewide Ranks

National Climatic Data Center/NESDIS/NOAA



Temperature Departure from Normal, 6/1-8/31



Record Setting Summer Heat

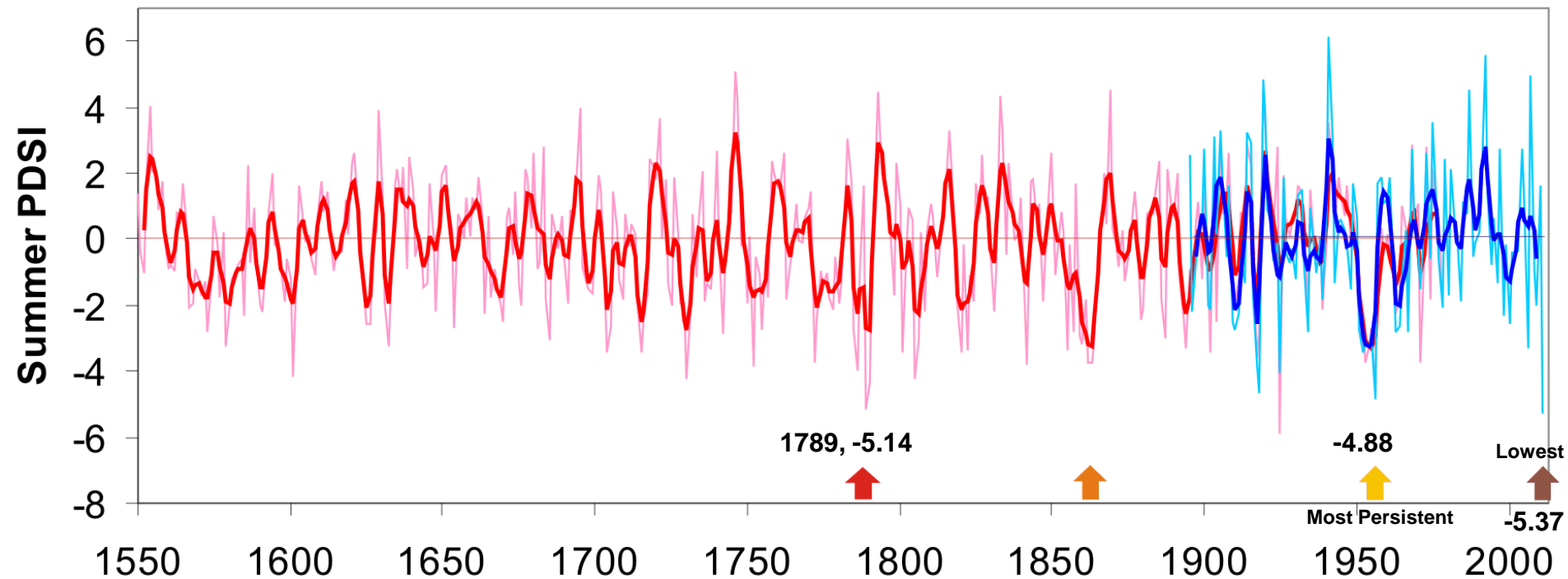
- **Many cities recorded their hottest June, July and August on record.**
- **Dozens of Texas cities recorded their longest stretch of consecutive 100-degree days.**
- **A multitude of Texas cities recorded a record number of 100-degree days.**
- **Second hottest summer on record for any state in any year.**

The 2011 Drought in Historical Context

Summer (June-August) PDSI, Texas

Texas Observed Summer PDSI, 1895-2011

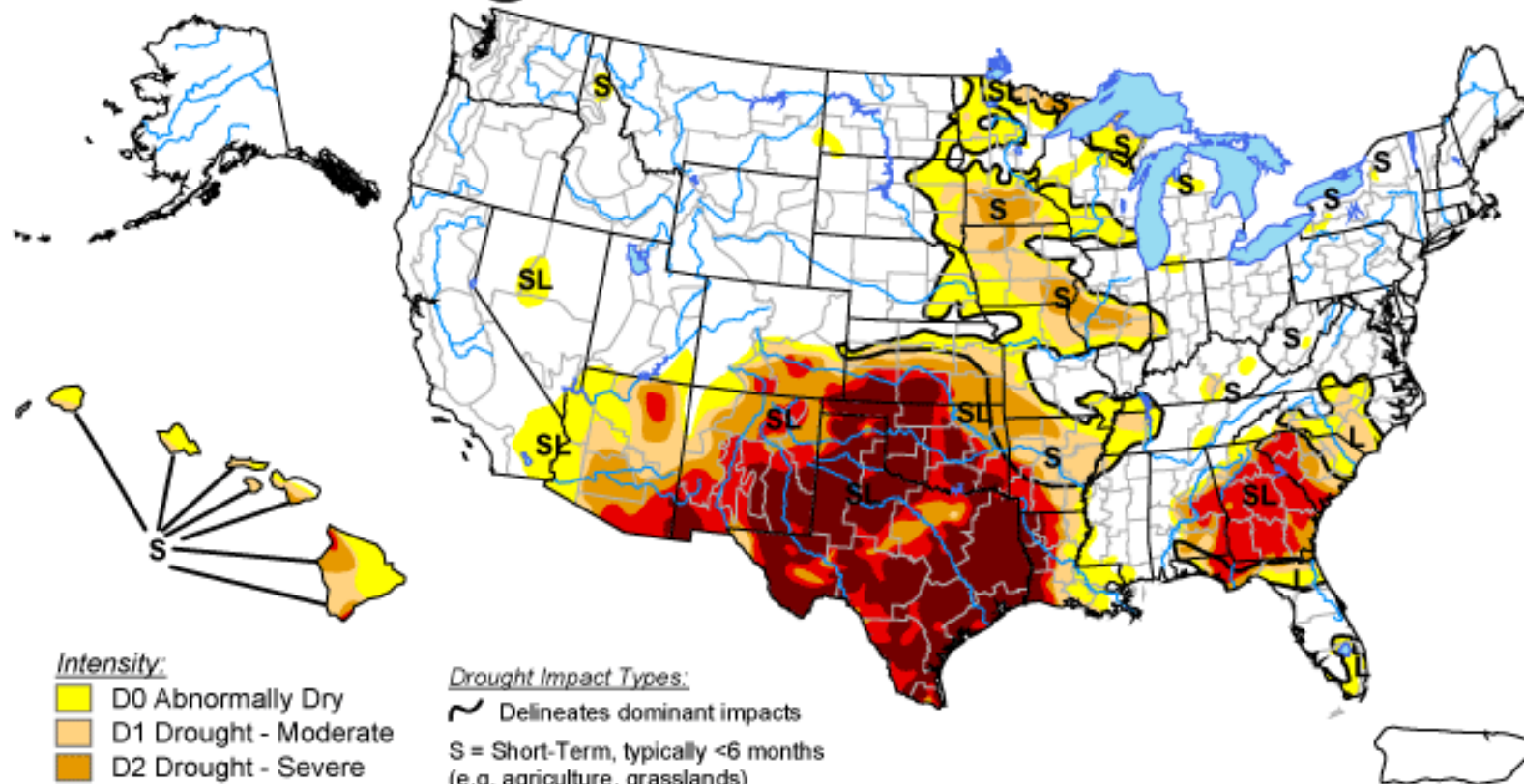
Tree-ring reconstruction of Texas Summer PDSI, 1550-1978








U.S. Drought Monitor

October 11, 2011


Valid 8 a.m. EDT



Intensity:

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

Drought Impact Types:

-  Delineates dominant impacts
- S = Short-Term, typically <6 months
(e.g. agriculture, grasslands)
- L = Long-Term, typically >6 months
(e.g. hydrology, ecology)

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

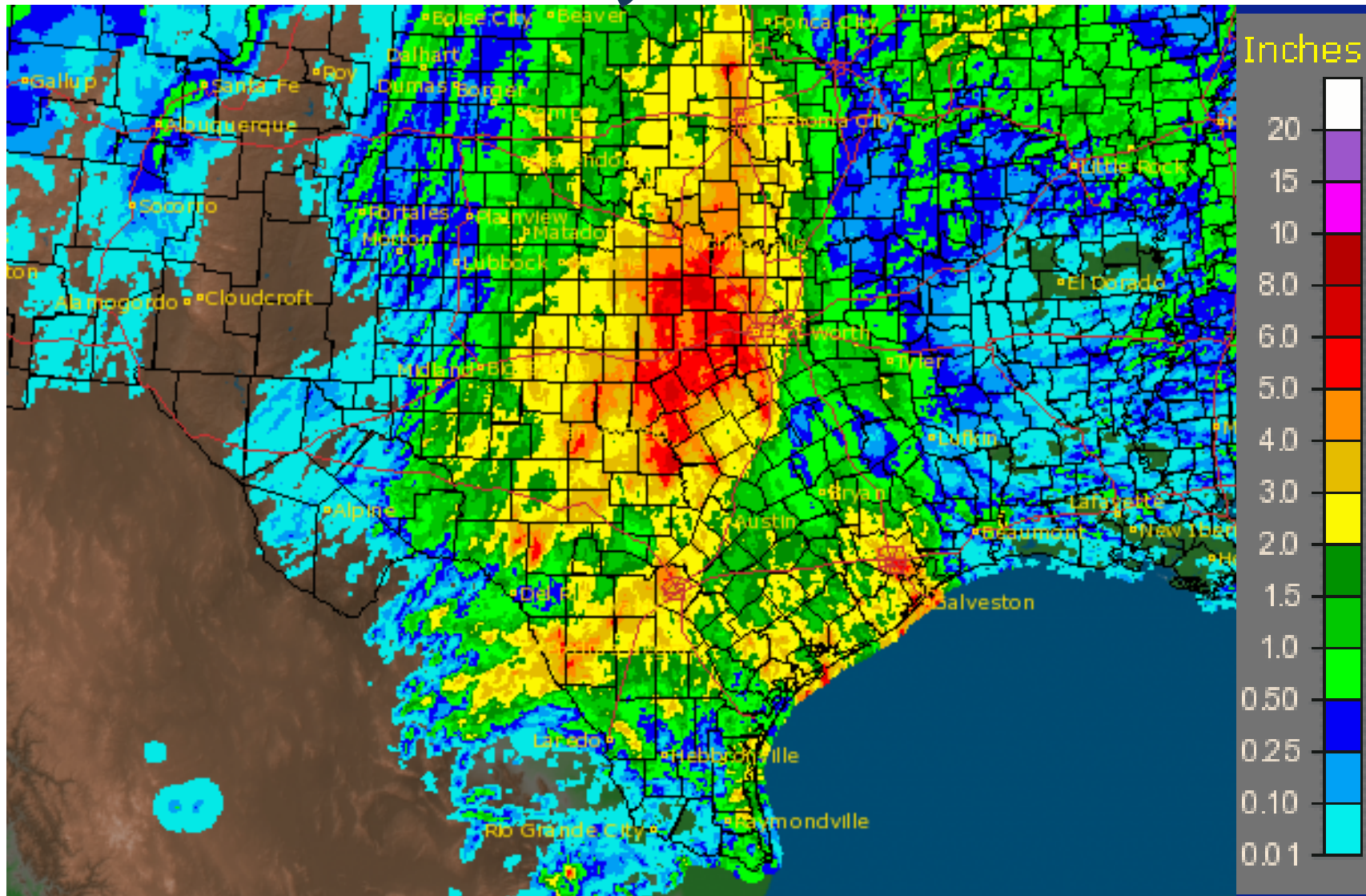
<http://droughtmonitor.unl.edu/>



Released Thursday, October 13, 2011

Authors: R. Tinker/M. Rosencrans, NOAA/NWS/NCEP/CPC

Rainfall, October 7-9



U.S. Drought Monitor

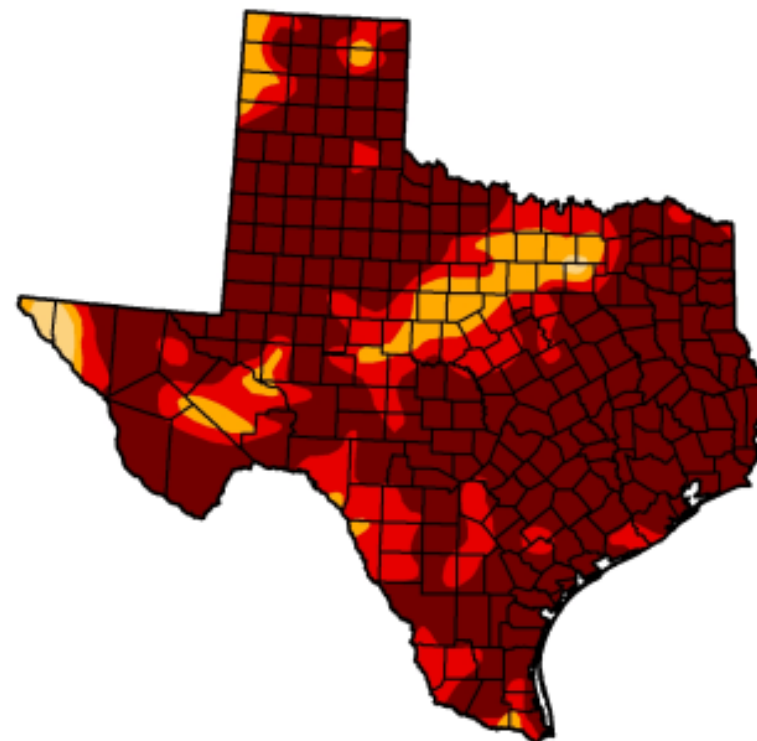
October 11, 2011

Valid 7 a.m. EST

Texas

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	99.15	91.96	73.13
Last Week (10/04/2011 map)	0.00	100.00	100.00	99.16	96.99	87.99
3 Months Ago (07/12/2011 map)	0.00	100.00	97.43	95.78	90.97	71.66
Start of Calendar Year (12/28/2010 map)	7.89	92.11	69.43	37.46	9.59	0.00
Start of Water Year (09/27/2011 map)	0.00	100.00	100.00	99.16	96.65	85.75
One Year Ago (10/05/2010 map)	75.60	24.40	2.43	1.01	0.02	0.00



Intensity:

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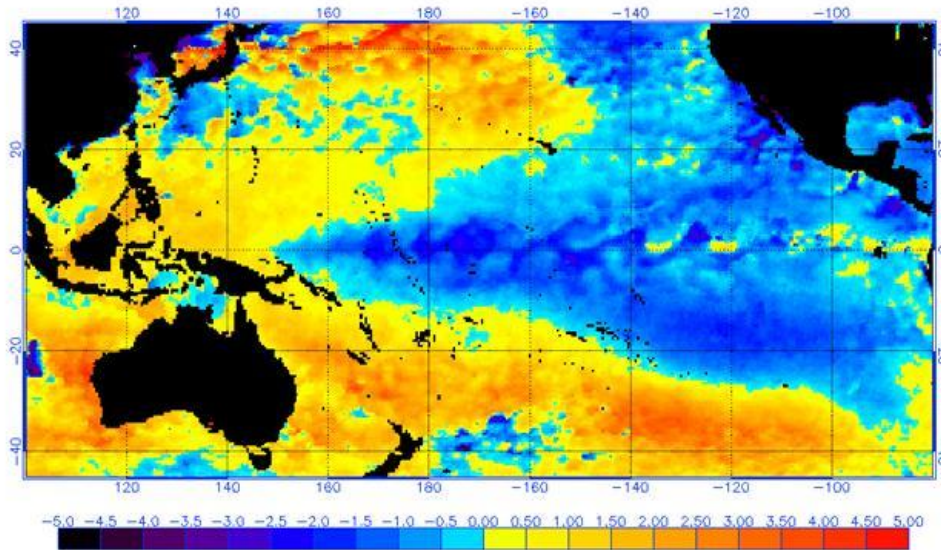
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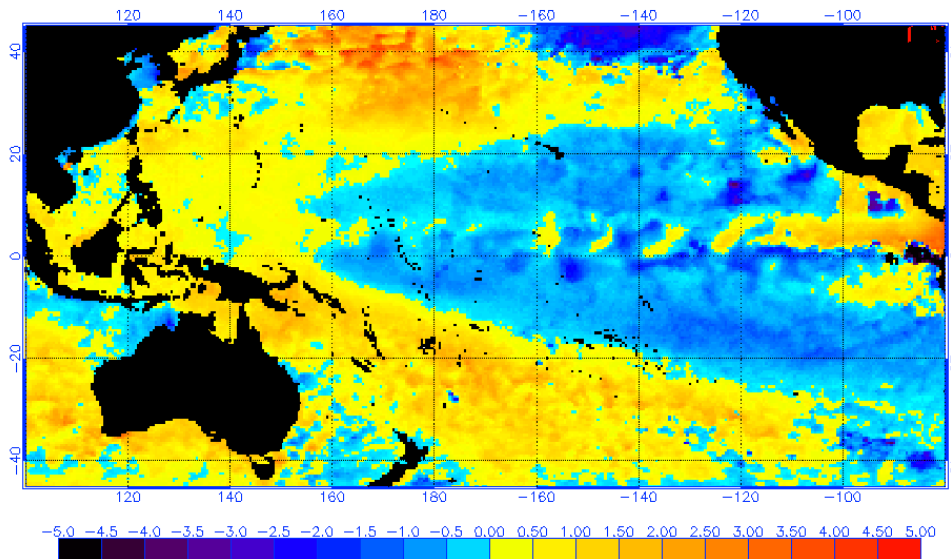
Going into Second Year of La Niña

NOAA/NESDIS SST Anomaly (degrees C), 1/6/2011



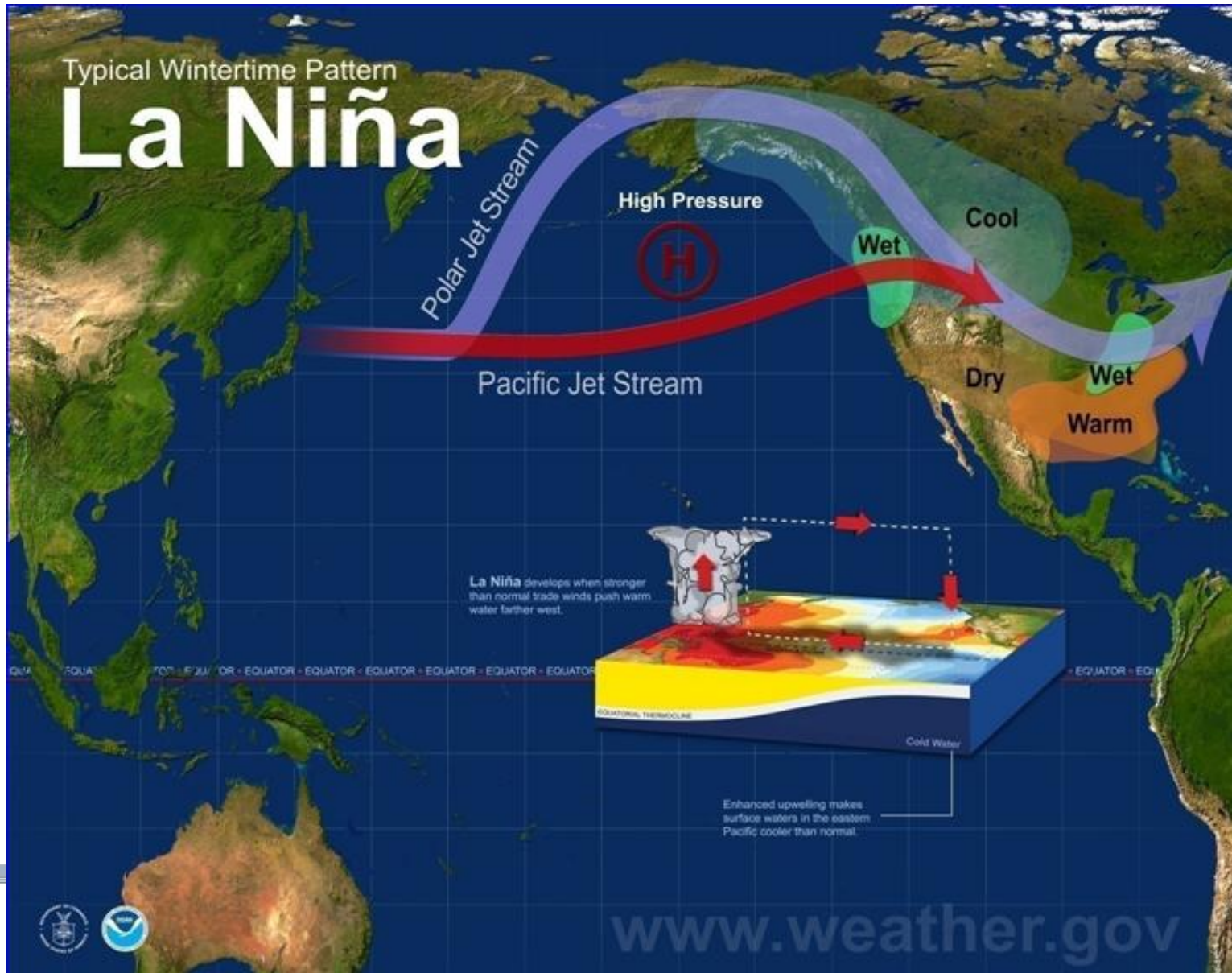
January 6th

NOAA/NESDIS SST Anomaly (degrees C), 10/17/2011



October 17th

Typical Patterns Associated with La Niña



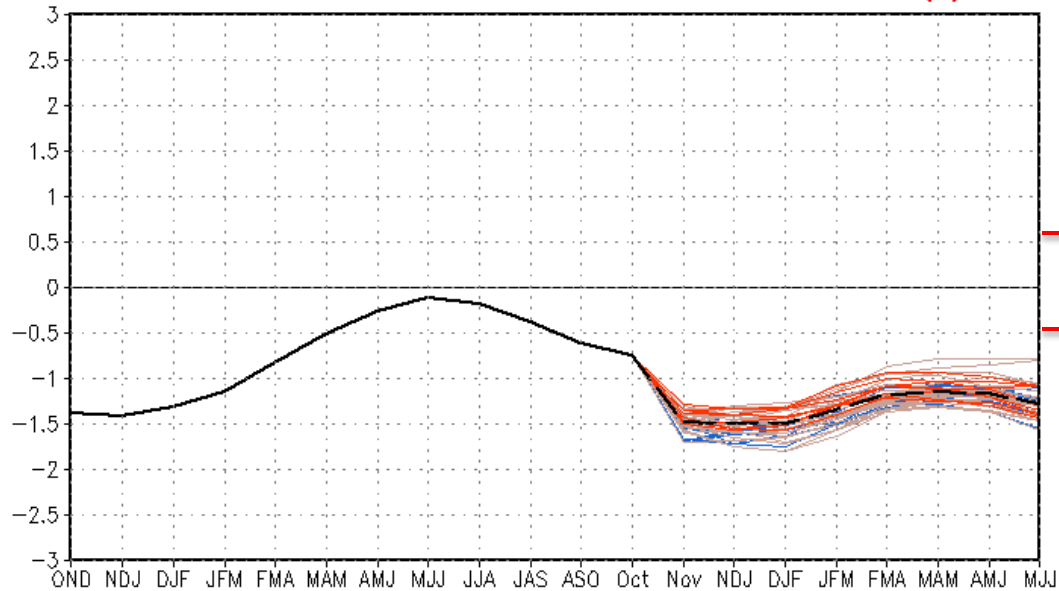
Trending Back into La Niña



NWS/NCEP/CPC

Last update: Sun Oct 16 2011
Initial conditions: 6Oct2011-15Oct2011

PDF corrected CFS forecast Nino3.4 SST anomalies (K)



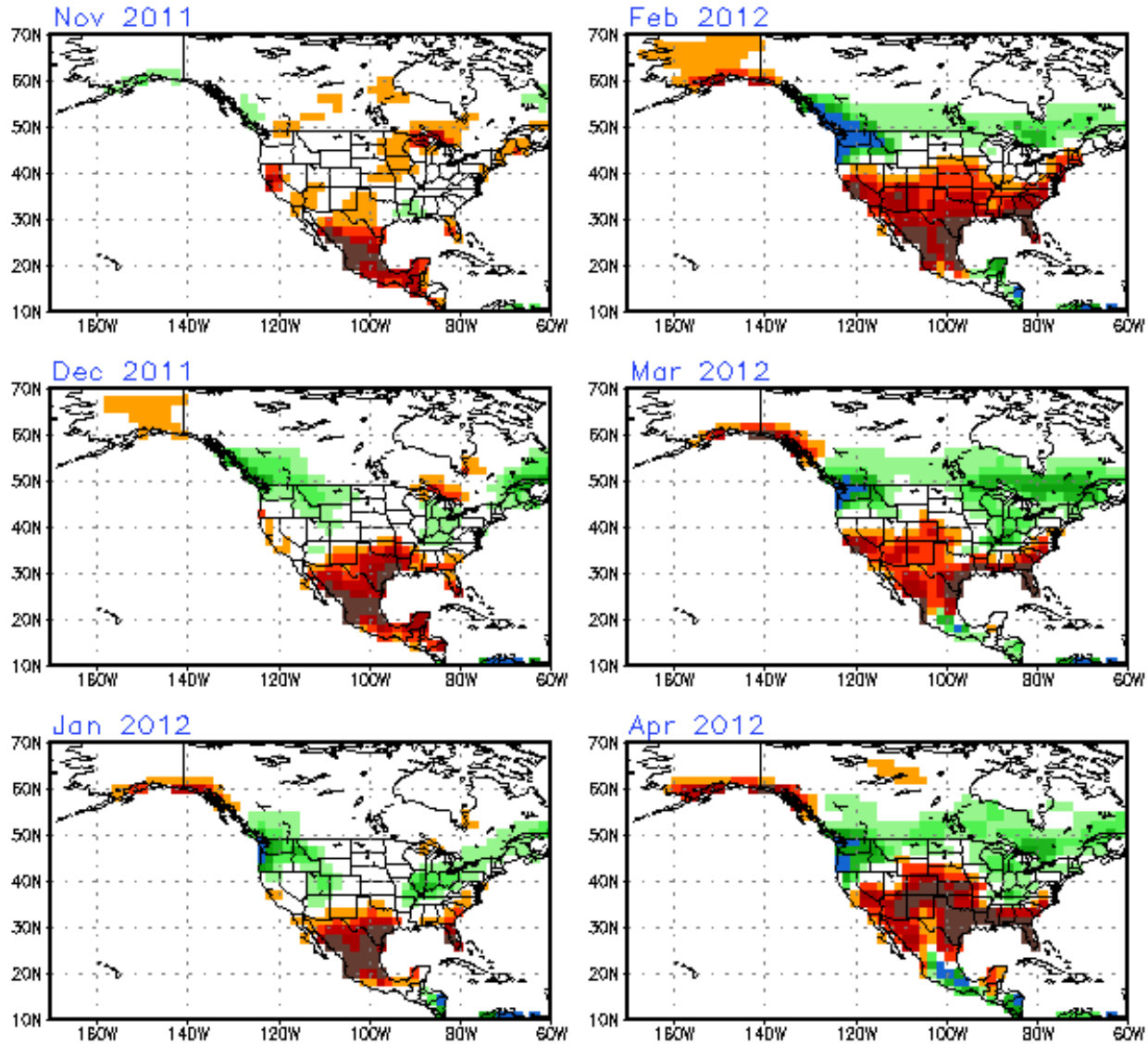
El Niño

La Niña

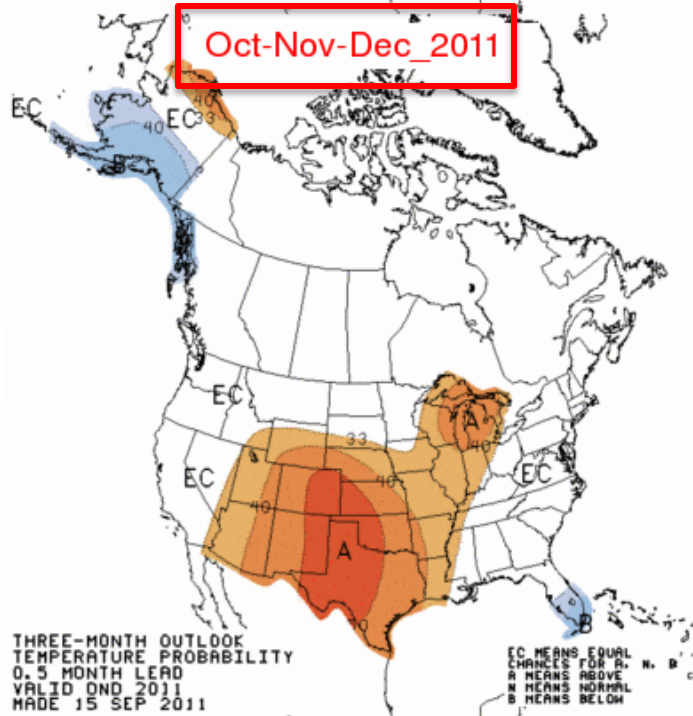
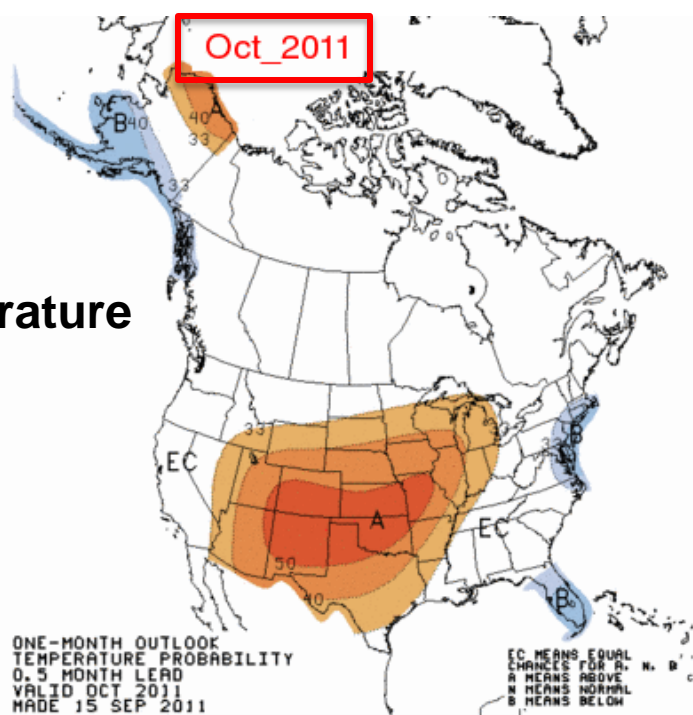
- Latest 8 forecast members
- Earliest 8 forecast members
- Other forecast members
- Forecast ensemble mean
- NCDC daily analysis



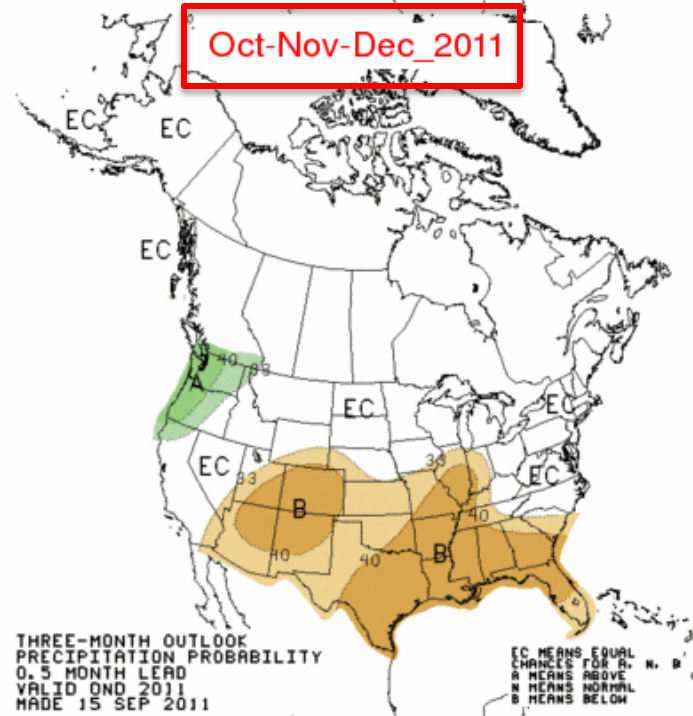
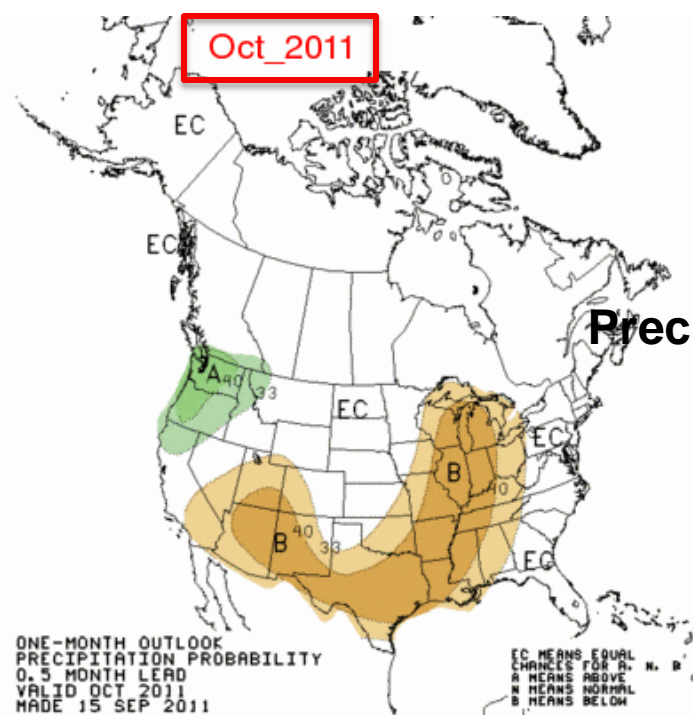
CFS monthly Prec (mm/day)



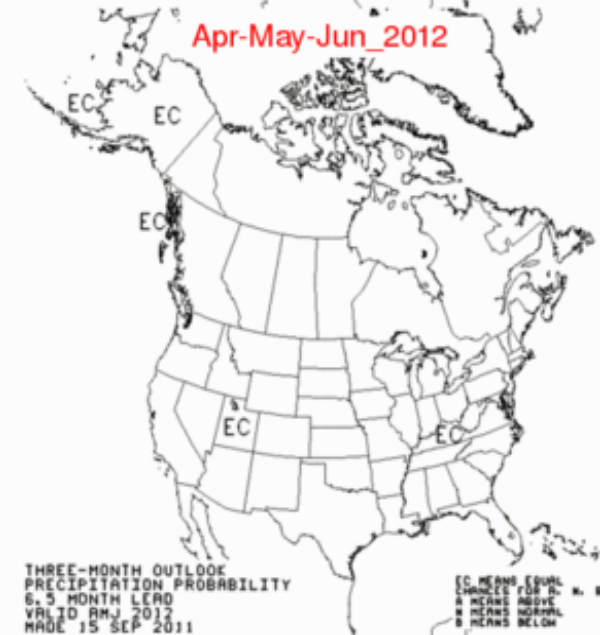
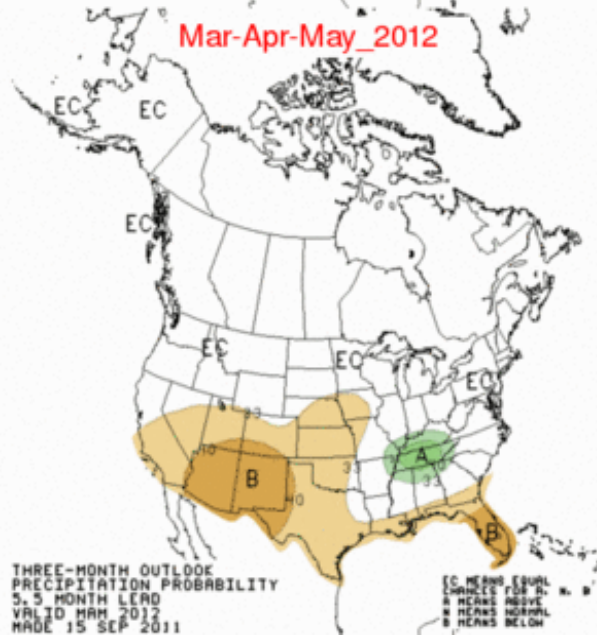
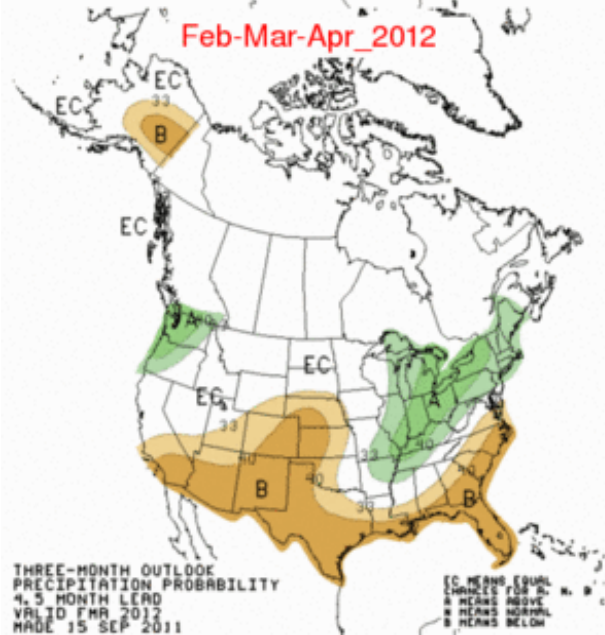
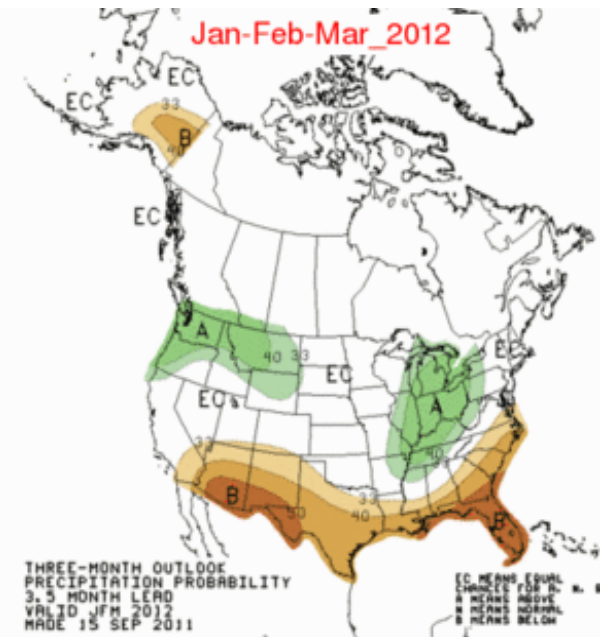
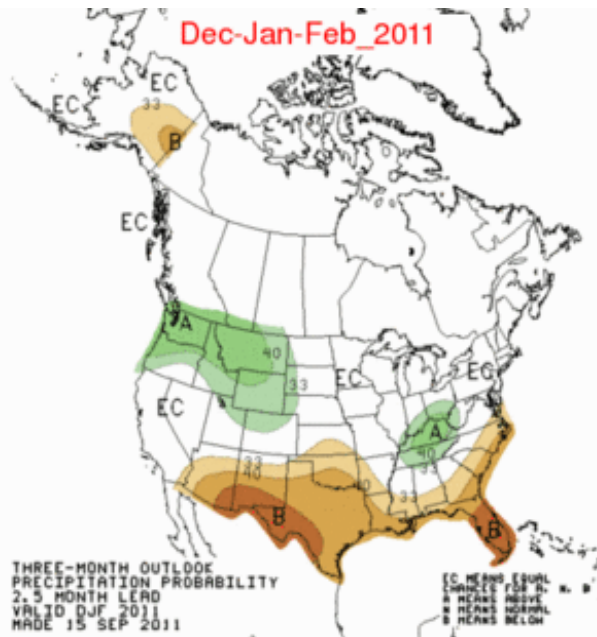
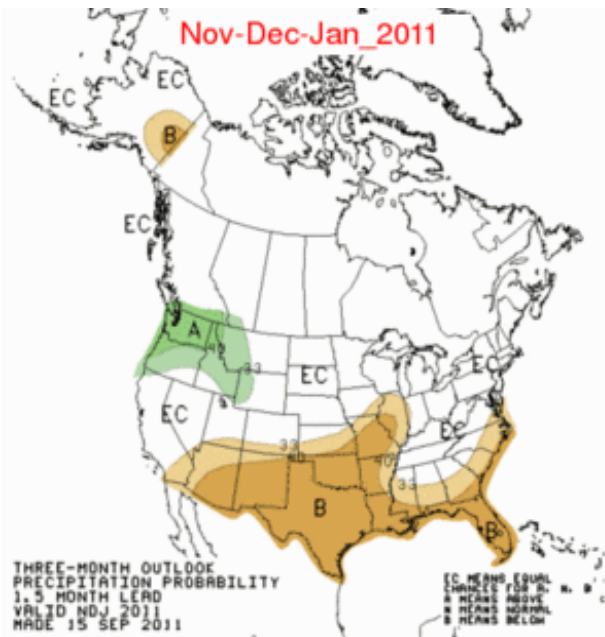
Temperature



Precipitation



NWS Winter into Spring Rainfall Outlook



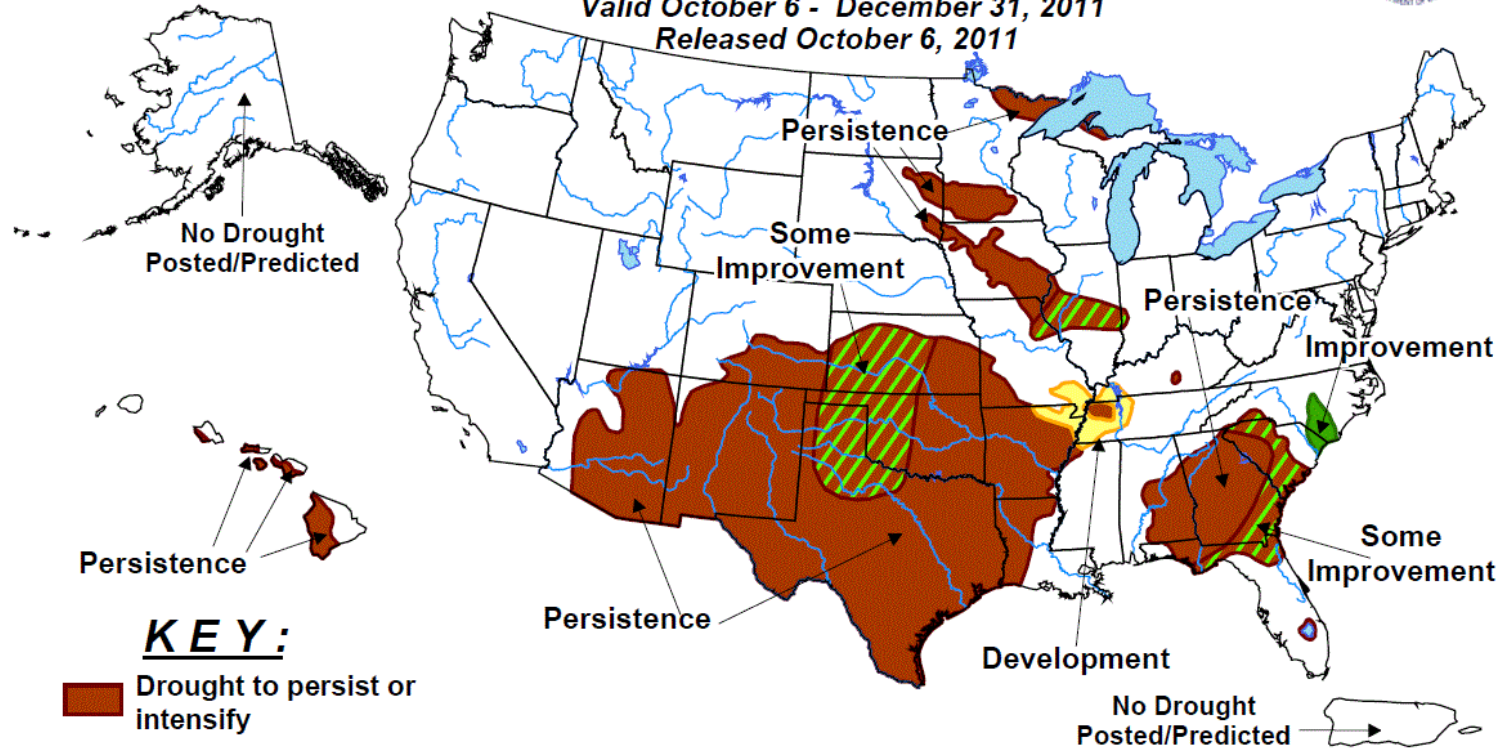
Drought Outlook through December







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



Valid October 6 - December 31, 2011
Released October 6, 2011



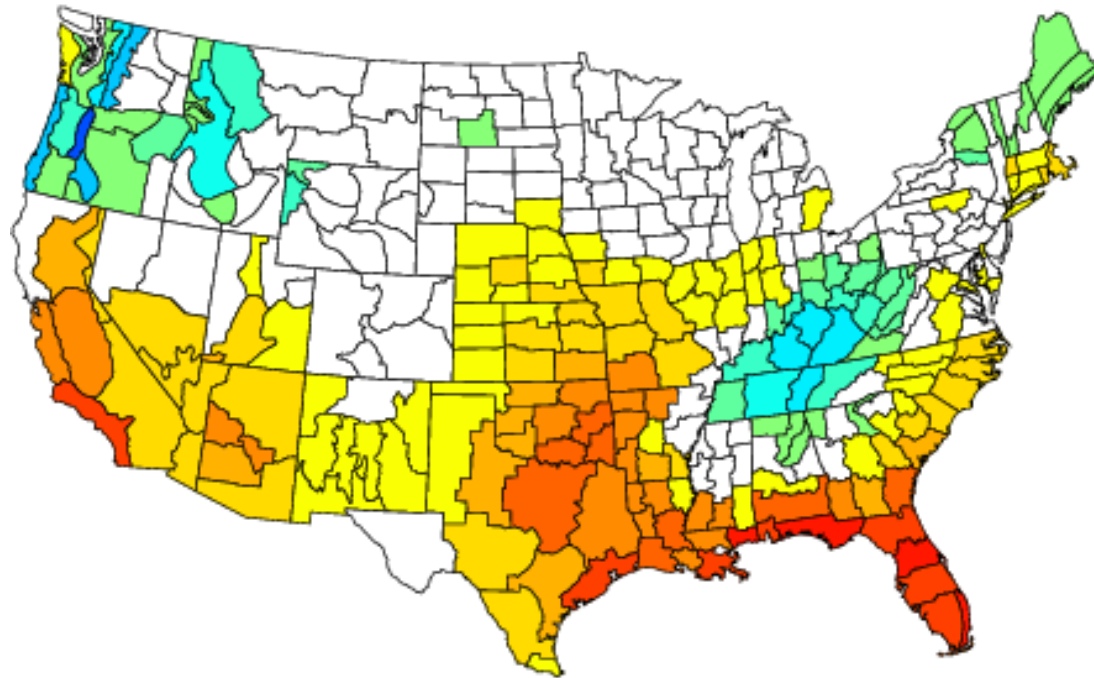
KEY:

-  Drought to persist or intensify
-  Drought ongoing, some improvement
-  Drought likely to improve, impacts ease
-  Drought development likely

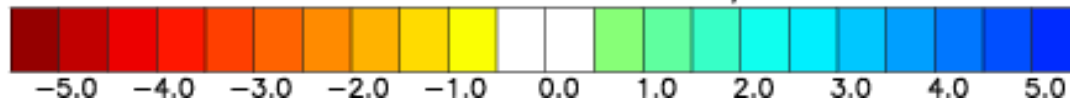
Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Short-term events -- such as individual storms -- cannot be accurately forecast more than a few days in advance. Use caution for applications -- such as crops -- that can be affected by such events. "Ongoing" drought areas are approximated from the Drought Monitor (D1 to D4 intensity). For weekly drought updates, see the latest U.S. Drought Monitor. NOTE: the green improvement areas imply at least a 1-category improvement in the Drought Monitor intensity levels, but do not necessarily imply drought elimination.

Jan-Mar Anomalies Based on 2nd Year La Niña

Composite Precipitation Anomalies (inches)
Jan to Mar 1910,1918,1923,1951,1956,1963,1972,1975,2000,2009
Versus 1981–2010 Longterm Average

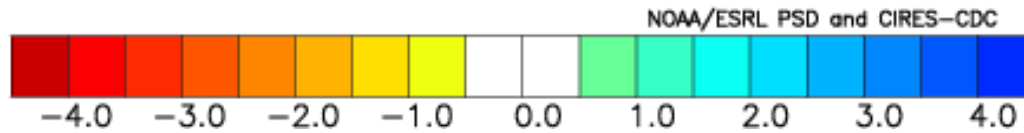
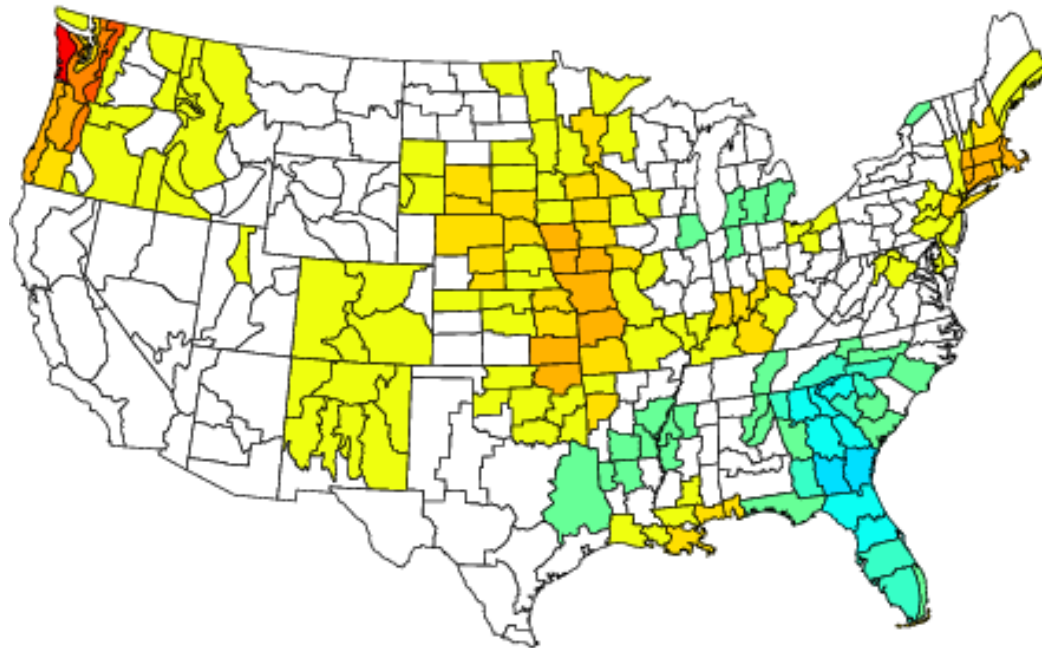


NOAA/ESRL PSD and CIRES-CDC



Apr-May Anomalies Based on 2nd Year La Niña

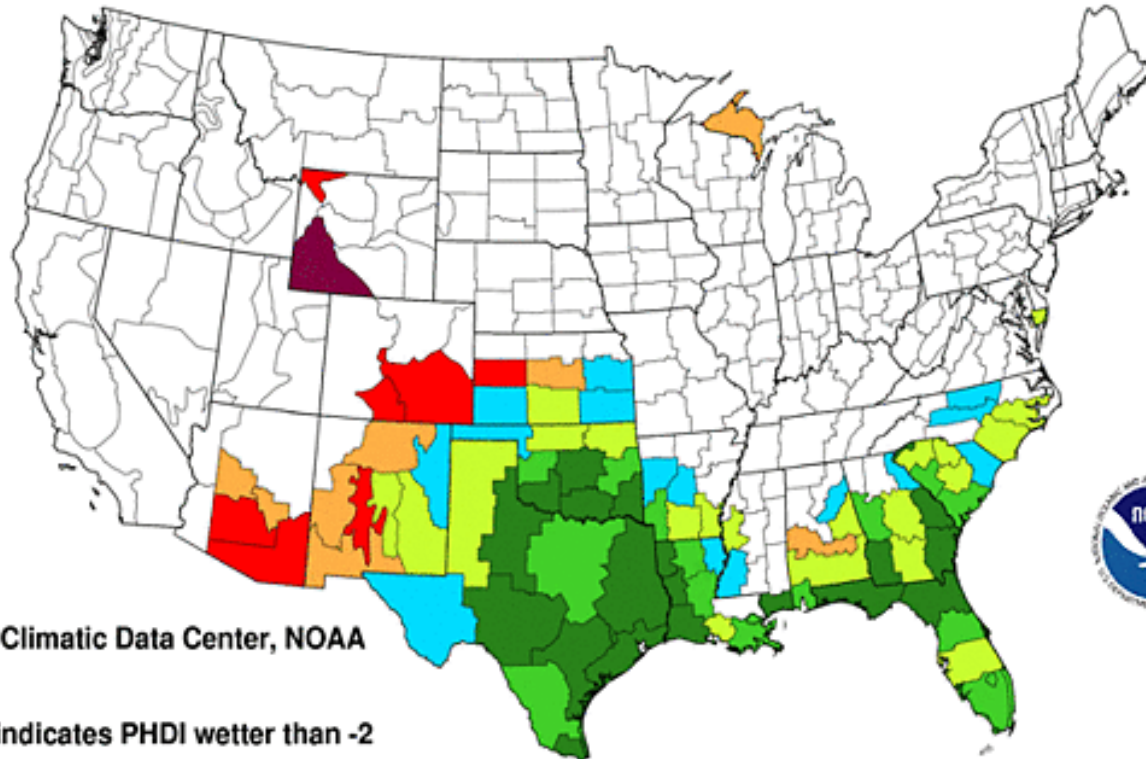
Composite Precipitation Anomalies (inches)
Apr to May 1910,1918,1923,1951,1956,1963,1972,1975,2000,2009
Versus 1981–2010 Longterm Average



Ending Drought in 1 Month

Precipitation Required to End Current
Drought Conditions in One Month

September 2011



National Climatic Data Center, NOAA

White indicates PHDI wetter than -2



trace
to
3.00



3.01
to
6.00



6.01
to
9.00



9.01
to
12.00



12.01
to
15.00



15.01
to
18.00



18.01
to
21.00

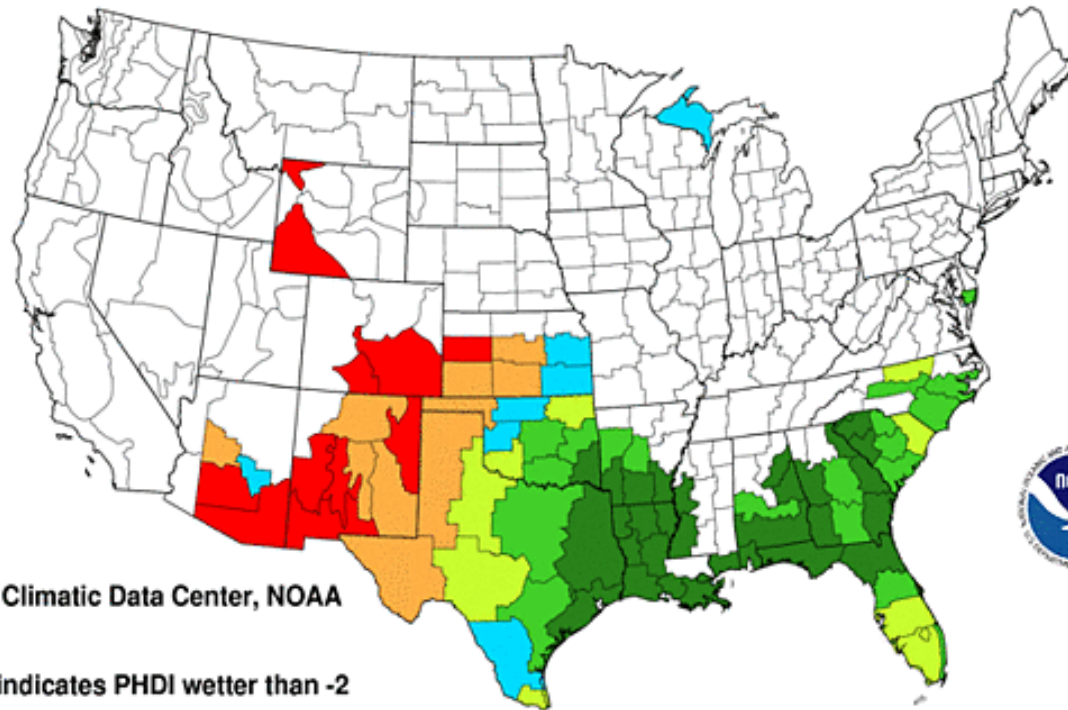
inches



Rain Needed to End the Drought in 6 Months

Precipitation Required to End Current Drought Conditions in Six Months

September 2011



Could drought last till 2020?



Jay Janner AMERICAN STATESMAN

The drought has forced Brian Eckert, surveying cracks in an empty stock tank on land he leases in Gillespie County, to reduce his herd of cattle. The region's climate is amid a 20- to 40-year dry phase, the state climatologist says.

Drought continues in Texas



Tuesday
86% of
Texas
was in
exceptional
drought.



Sources: National Drought Mitigation Center, NOAA, LCRA

Linda Scott AMERICAN STATESMAN

Planners urged to prepare for record water shortage

By Farzad Mashhood

AMERICAN STATESMAN STAFF

Texas could be in the midst of a drought the history books have never seen, meaning water planners need to prepare for worse than what they've seen, state climatologist John Nielsen-Gammon said Thursday.

The current drought could last until 2020, because the region's climate is in the middle of a 20- to 40-year dry phase, Nielsen-Gammon said.

Water planners, including state

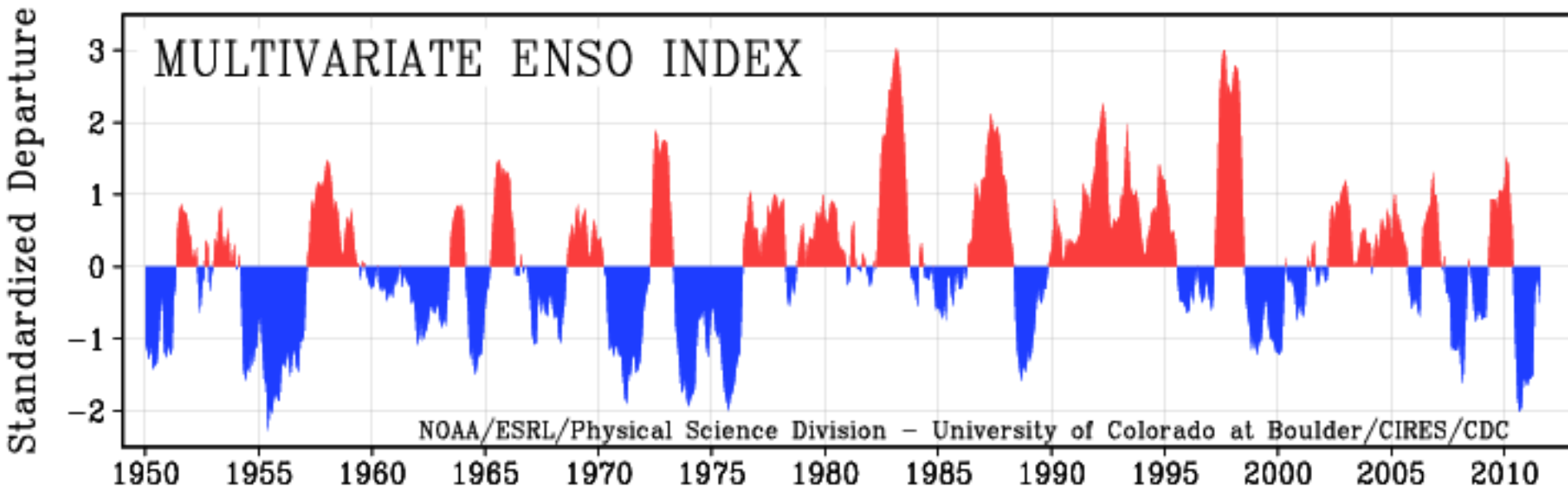
An end to record heat?

A cold front may put triple-digit weather behind us for now, B1

"Sooner or later there will be a drought that's worse" (than the drought of record), Nielsen-Gammon said. "The planning needs to be able to cover the bases not just for the worst that we've seen but also have a plan going forward in case conditions become worse than that."

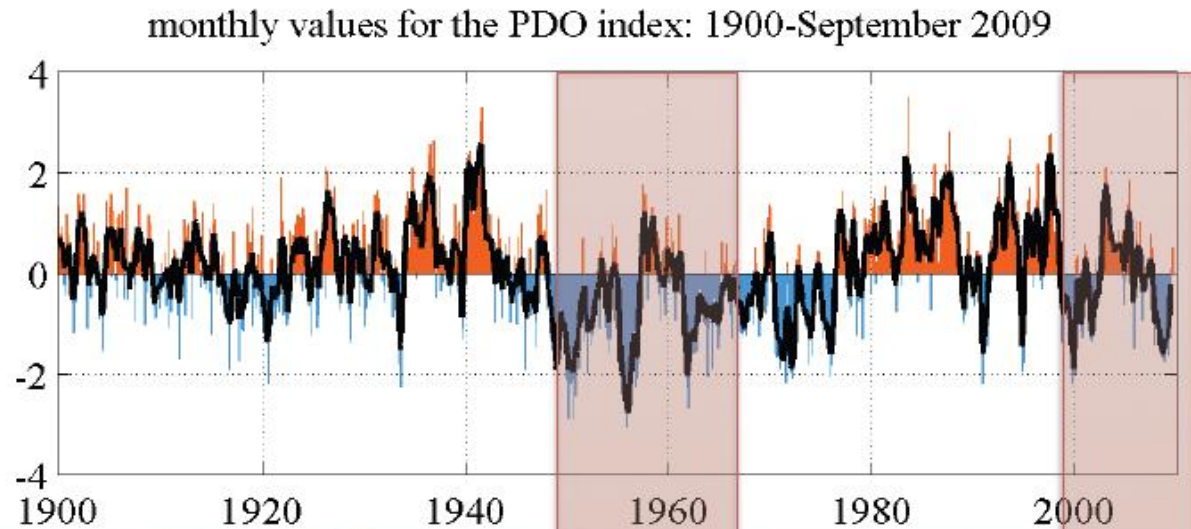
The state's water development board, which conducts long-term

Pacific Decadal Oscillation

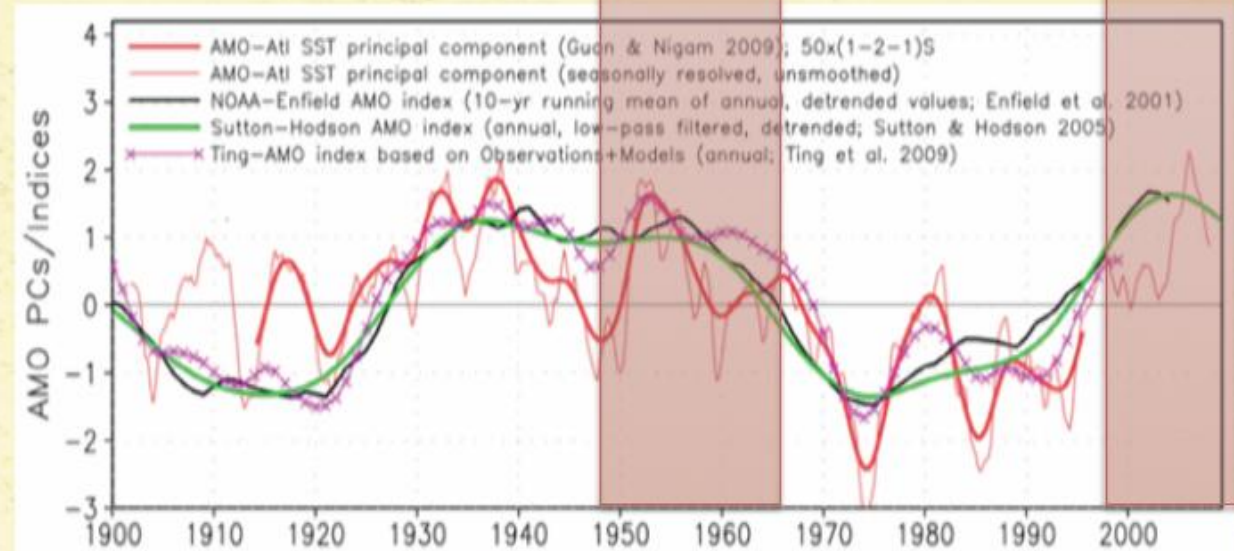


Similar Conditions to the 1950s?

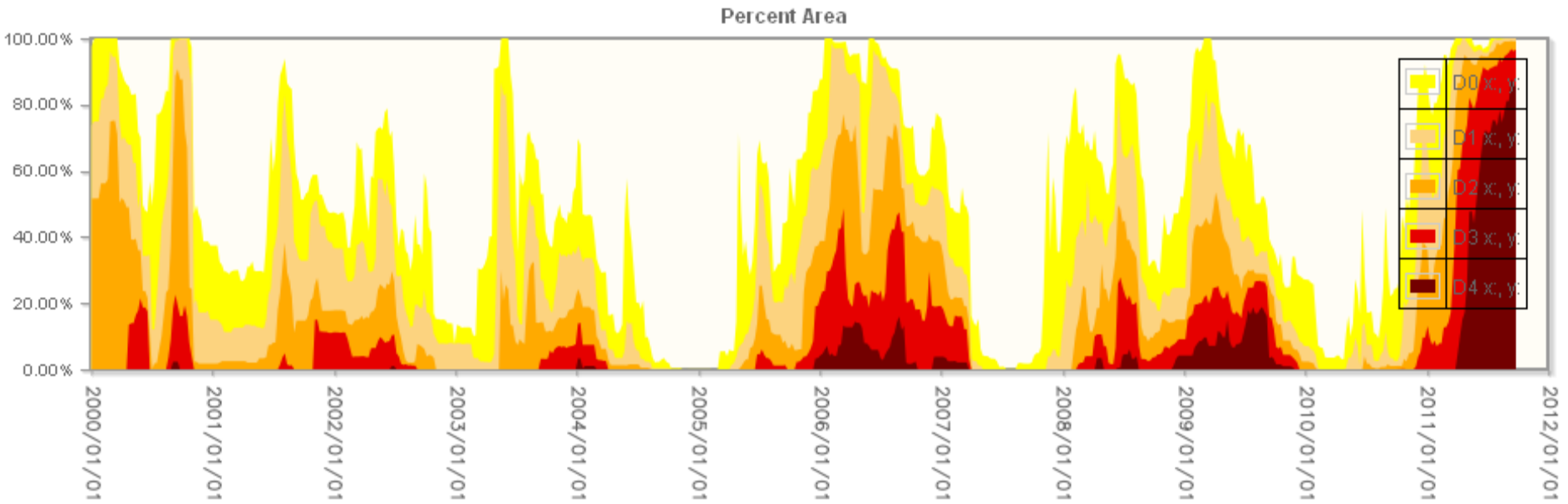
PDO



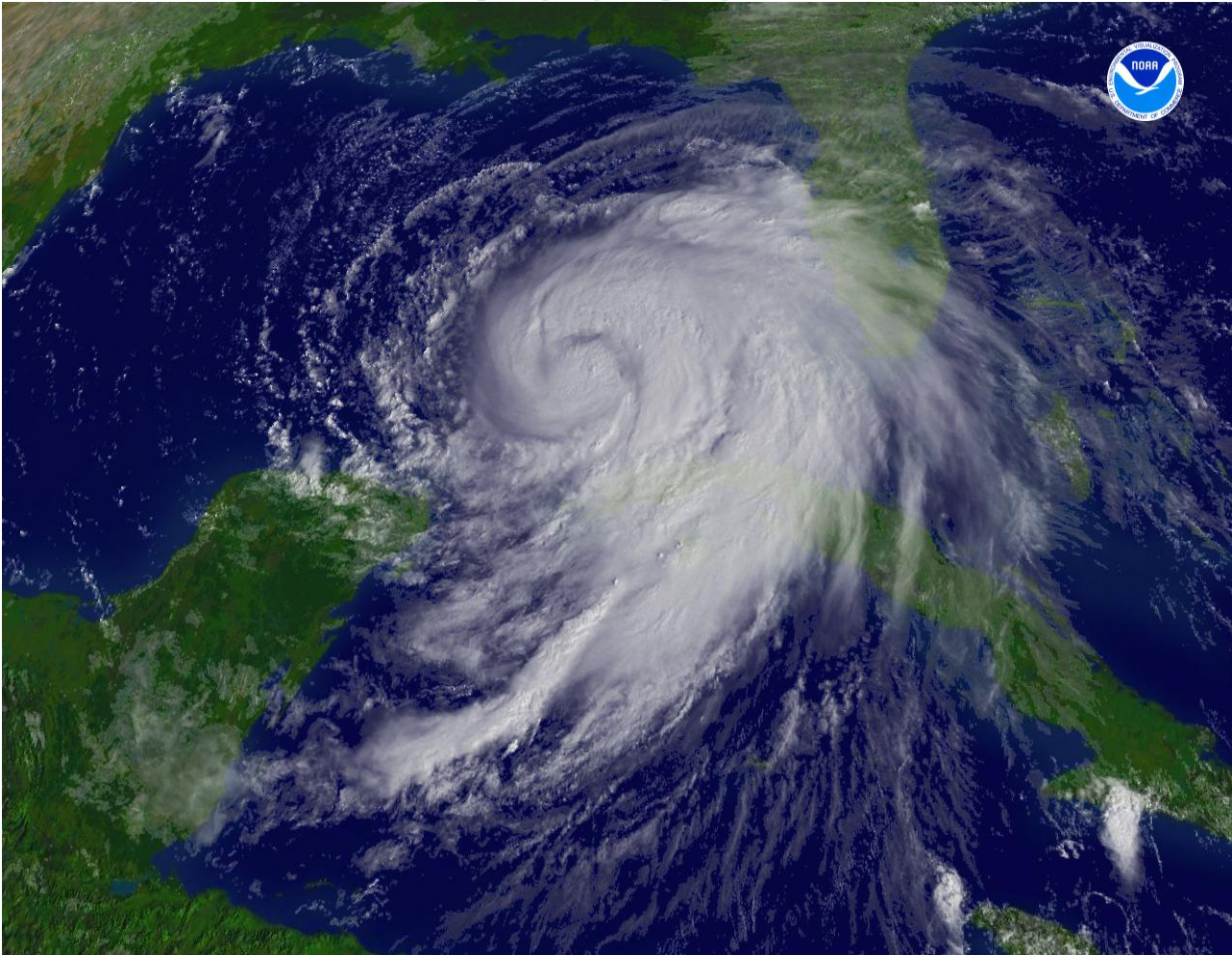
AMO



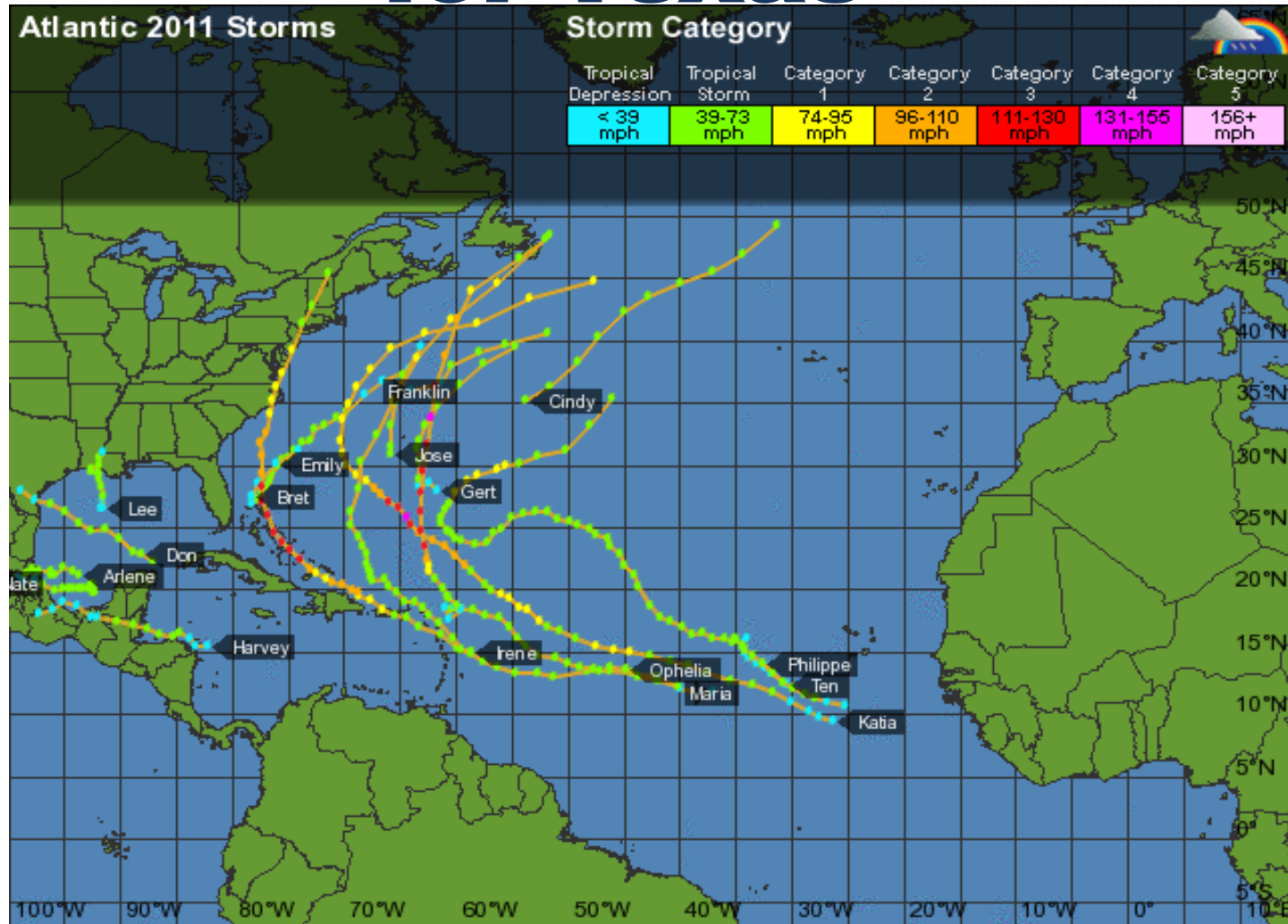
Percent Area of Texas in Drought, Jan 2001-Sep 2011



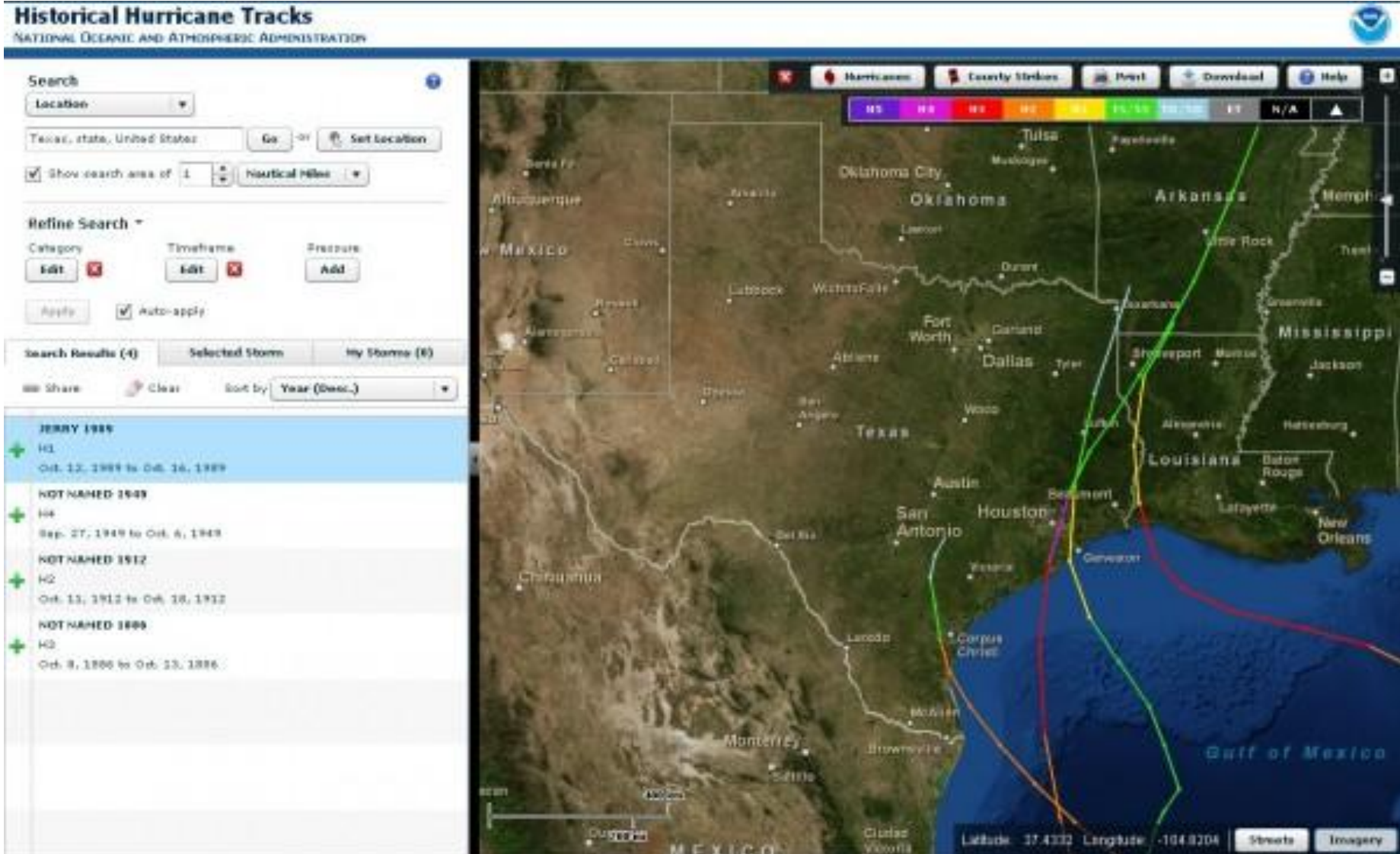
The 2011 Atlantic Hurricane Season



An Active Season, but Not for Texas



Historical Hurricane Tracks after September 24th



Take Home Points

- ***No clear end in sight to the ongoing drought; could last well into 2012.***
- ***Scattered rains possible this fall and winter but not heavy enough to temper the drought.***
- ***Intense droughts are hard to break.***
- ***Tropical storms rains now not likely.***
- ***La Niña is back. Late fall and winter expected to be drier than normal.***
- ***Dry years interspersed with wet years.***

Water flowing into the Highland Lakes

**January - September
totals
(in acre-feet)**

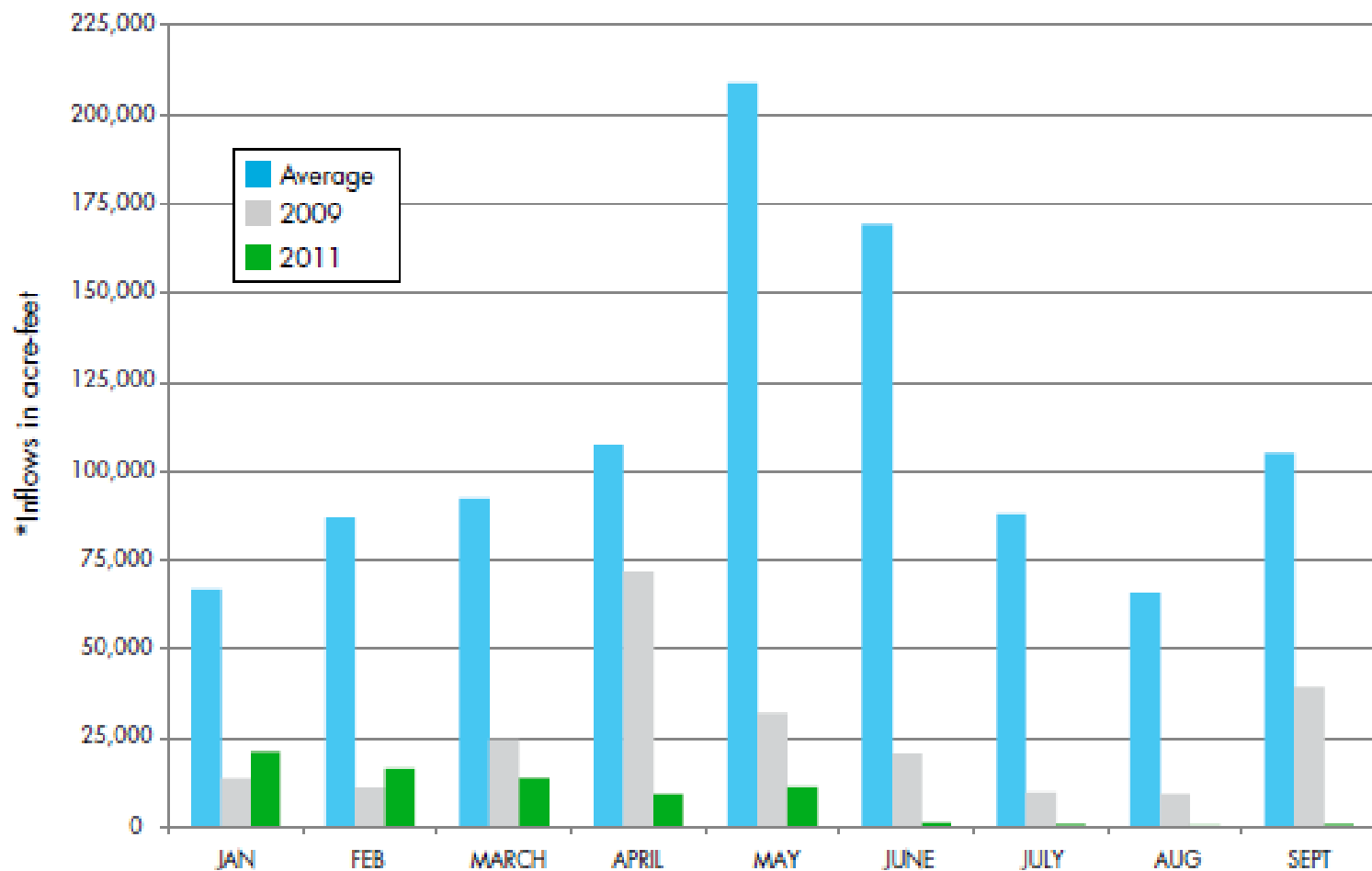
Average:	991,848
2009:	231,918
2011:	74,719



[View the graph](#)

Water flowing into the Highland Lakes

Rivers and streams are drying up

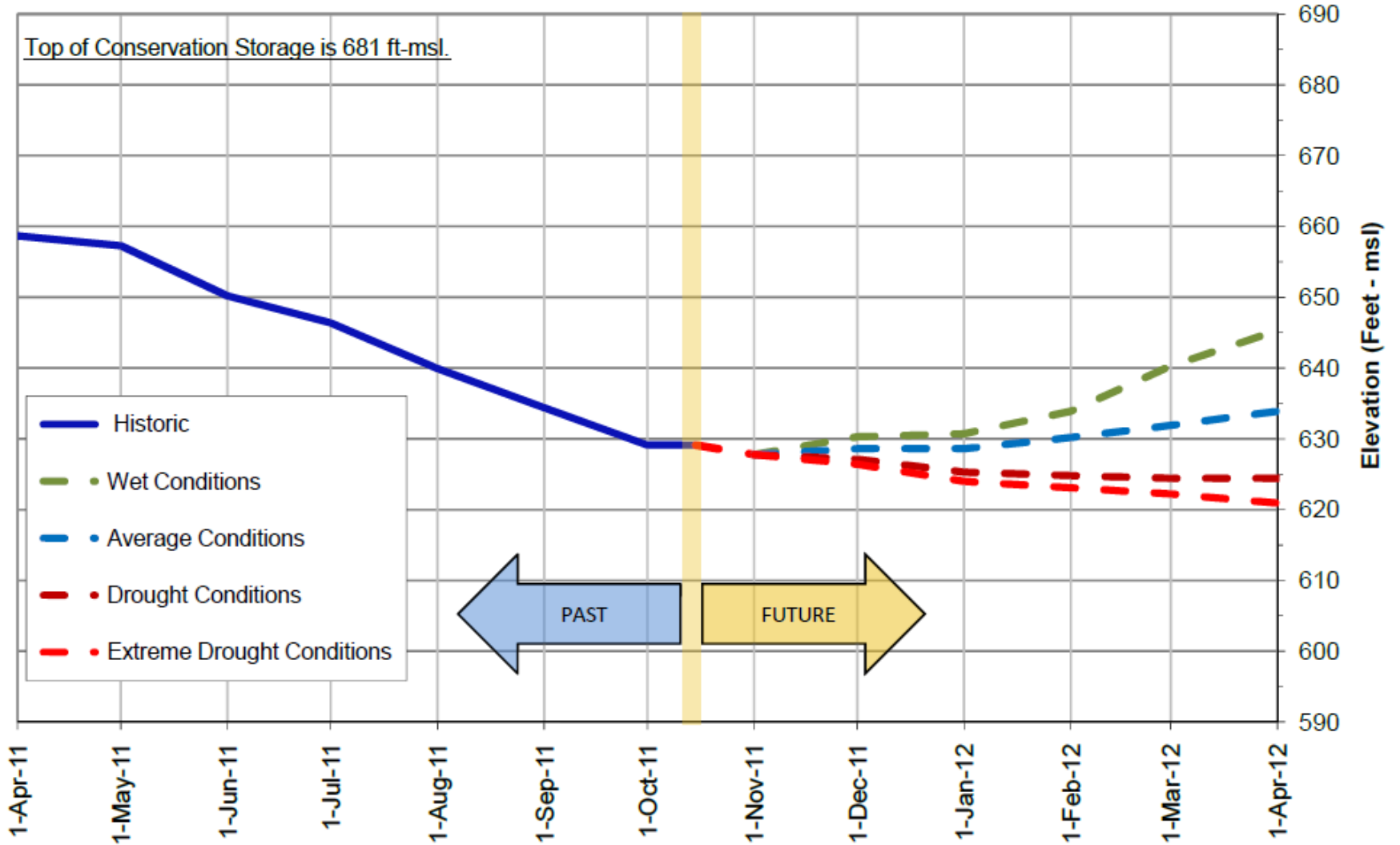


*Inflows: the estimated amount of water flowing into the Highland Lakes from rivers and streams.

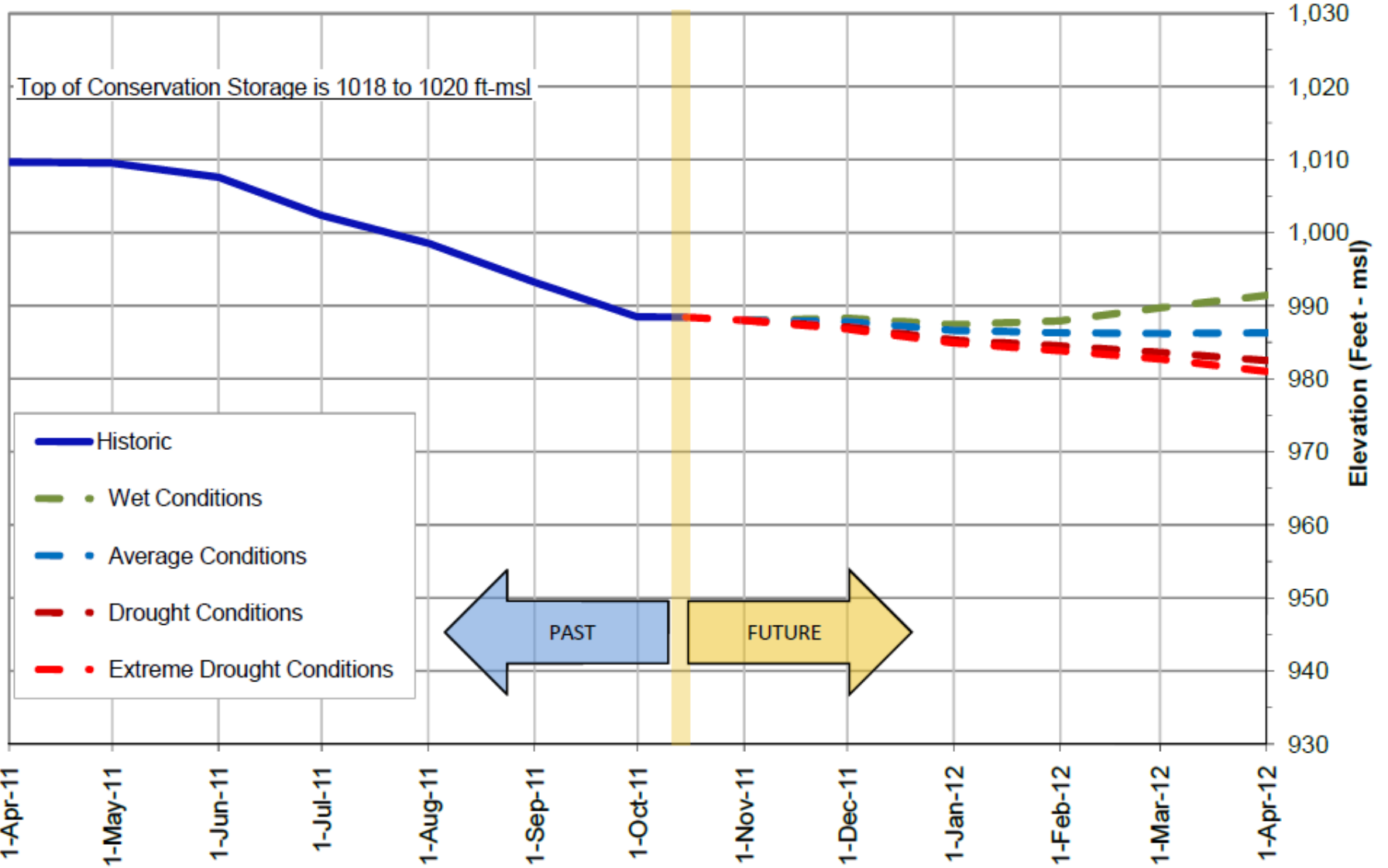
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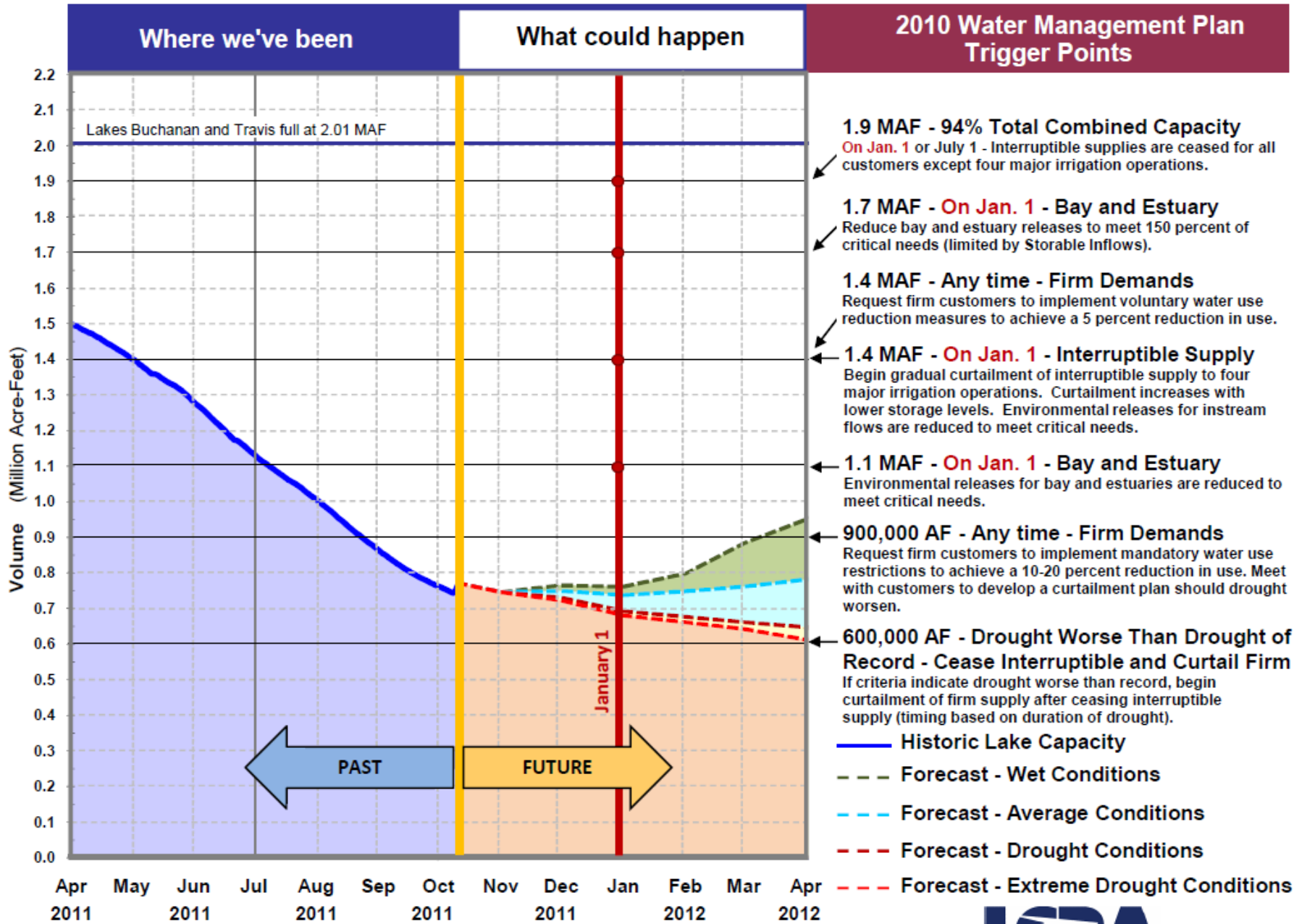
Lake Travis Level Forecast



Lake Buchanan Level Forecast



Highland Lakes Storage



Note: MAF equals One Million Acre-Feet
One Acre-Foot (AF) equals 325,851 gallons.

Date: October 10, 2011





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