



An assessment of the Texas Drought of 2010-2011, and the role of Seasonal Forecasts in Helping Stakeholders make Informed Decisions

Victor Murphy

**NWS Southern Region Climate
Service Program Manager**

CDPW, October 3, 2011

Fort Worth, TX



Status and Evolution of the 2010-2011 South Central/Texas Drought



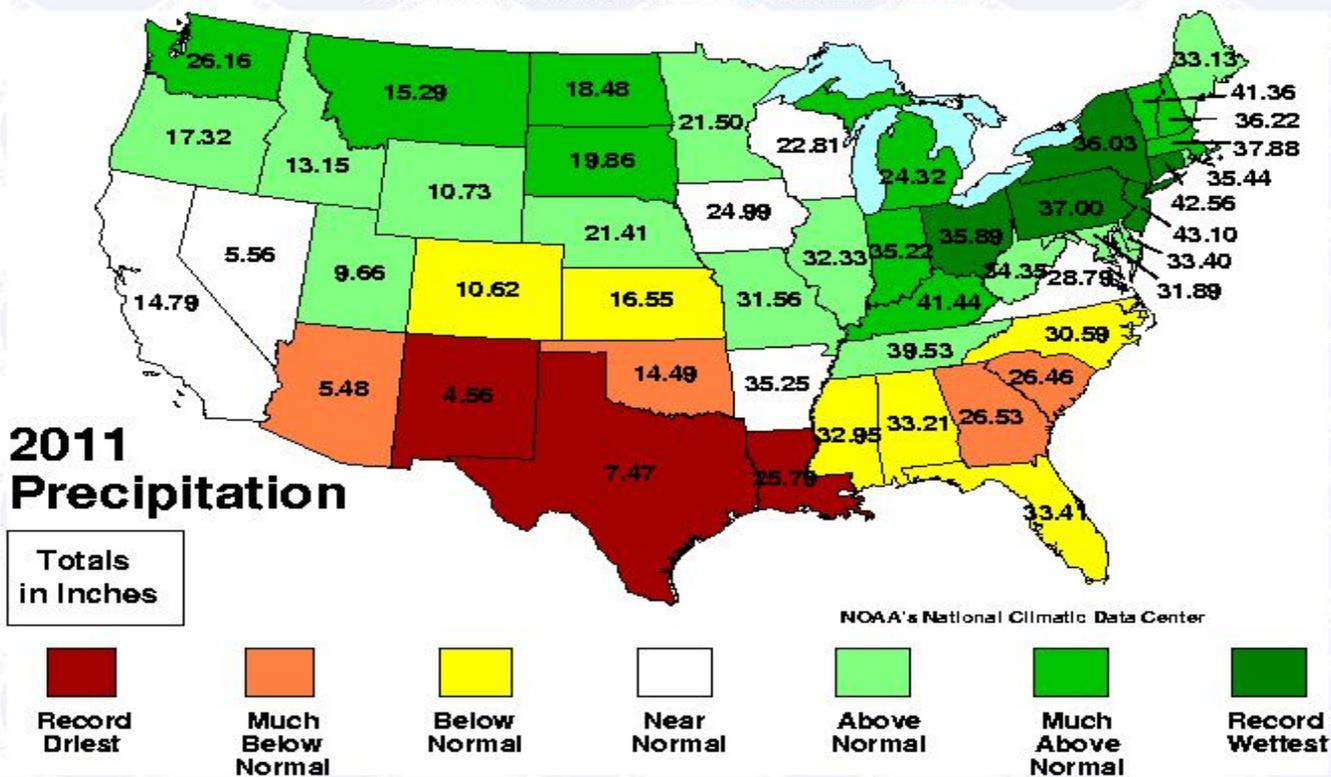
- This event is rather unique in several characteristics.
- 1) Geographic extent of the drought (TX, NM, OK, LA).
- 2) Magnitude and severity.
- 3) Almost uniform onset around 10/1/10 although it was earlier in LA.

How did we get to this? A Focus on Texas

Climate At A Glance

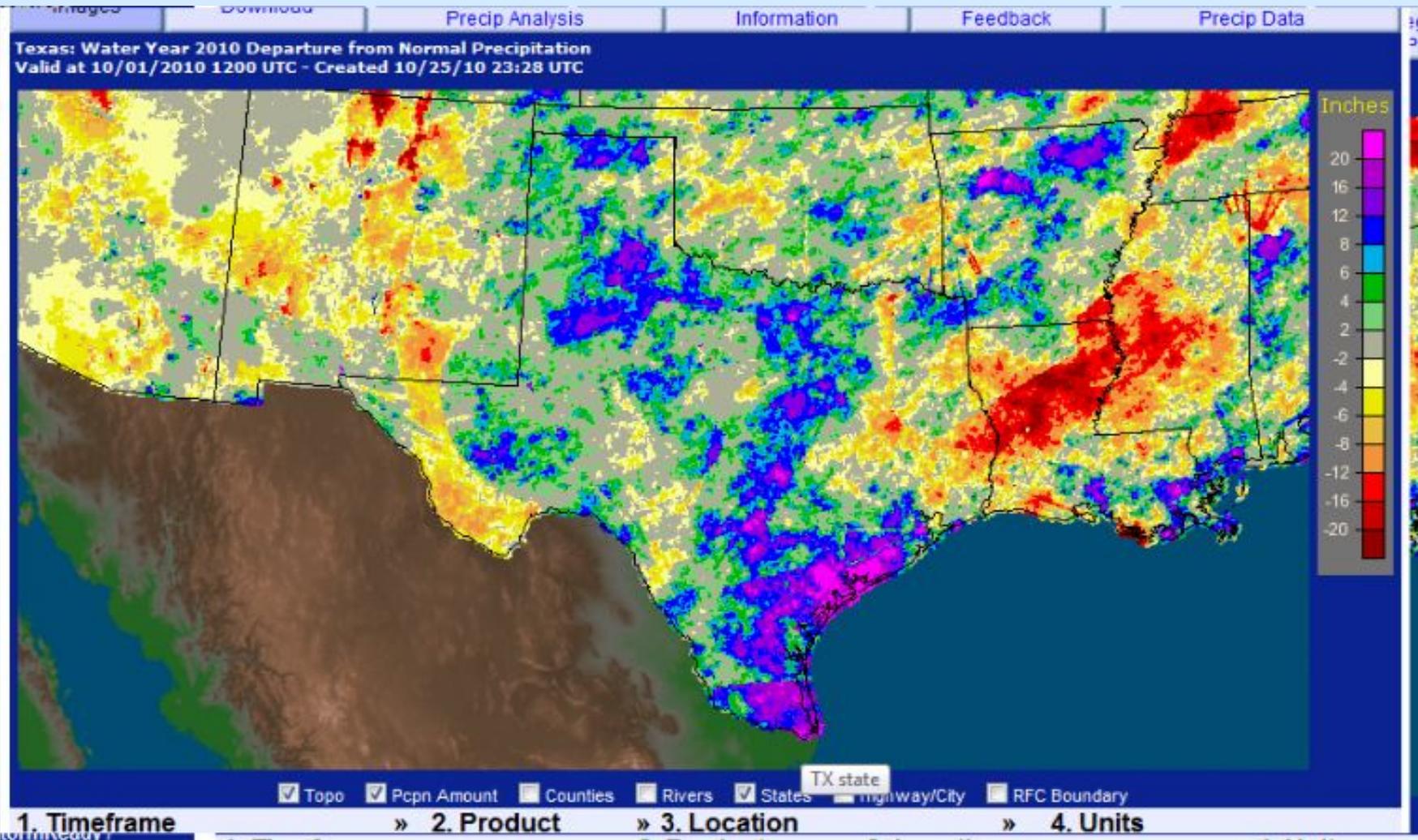
Year to Date (Jan - Aug) 2011 Precipitation

Some of the following data are preliminary and have not been quality controlled. For official data, please contact the NCDC customer services branch at ncdc.info@noaa.gov.



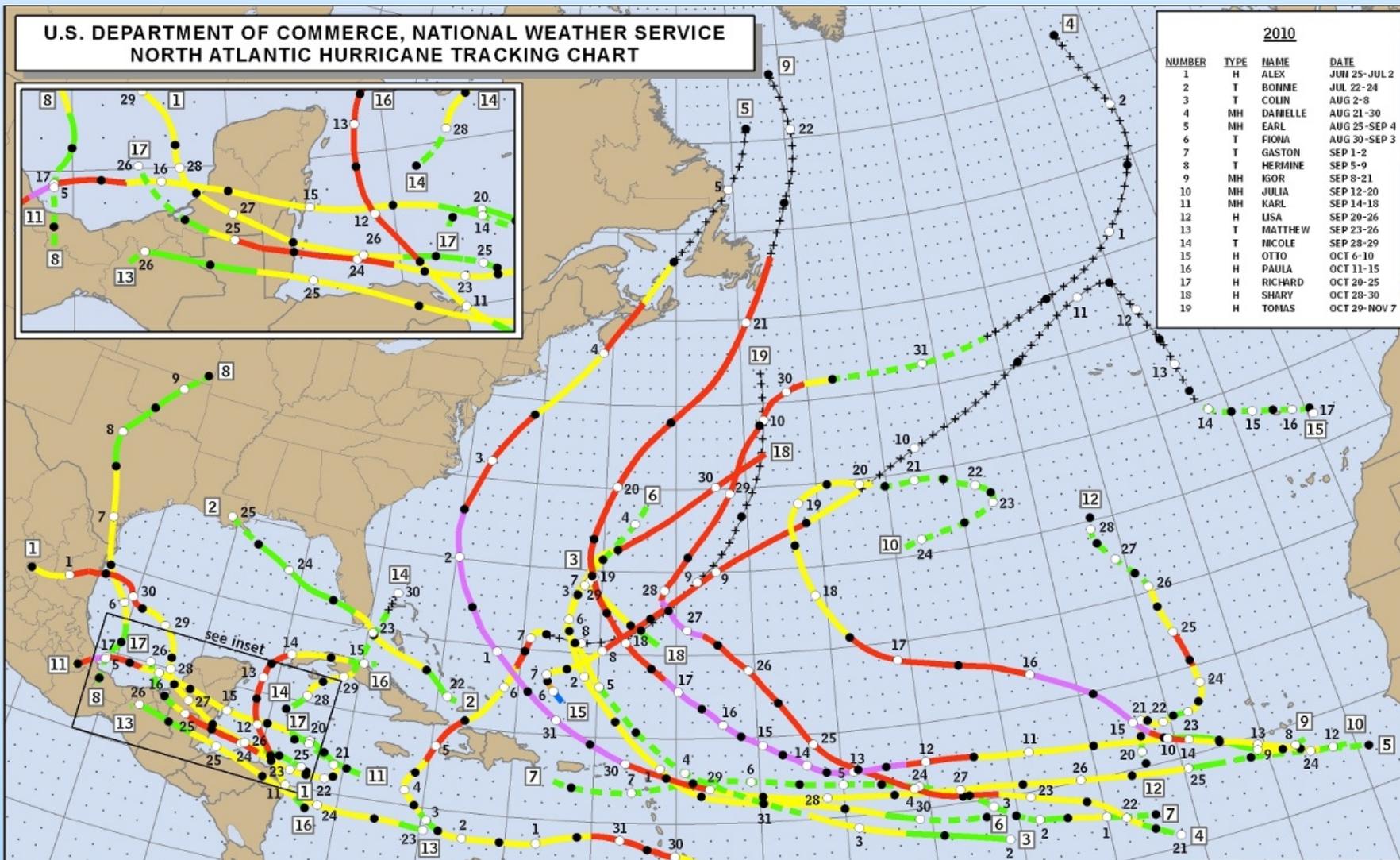


Other than Portions of Louisiana, the Southern Plains was Effectively Drought Free on 10/1/10





Tropical Cyclones Alex and Hermine Played a Significant Role in This...

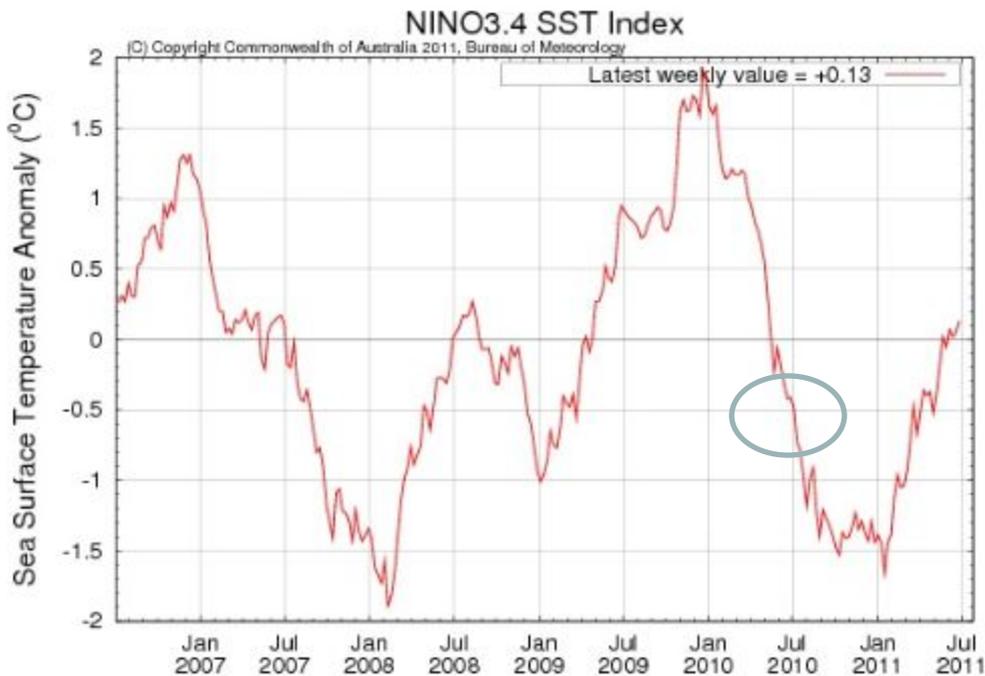




....as did the El Nino of 2009/2010. But, Warning Flags were on the Horizon.

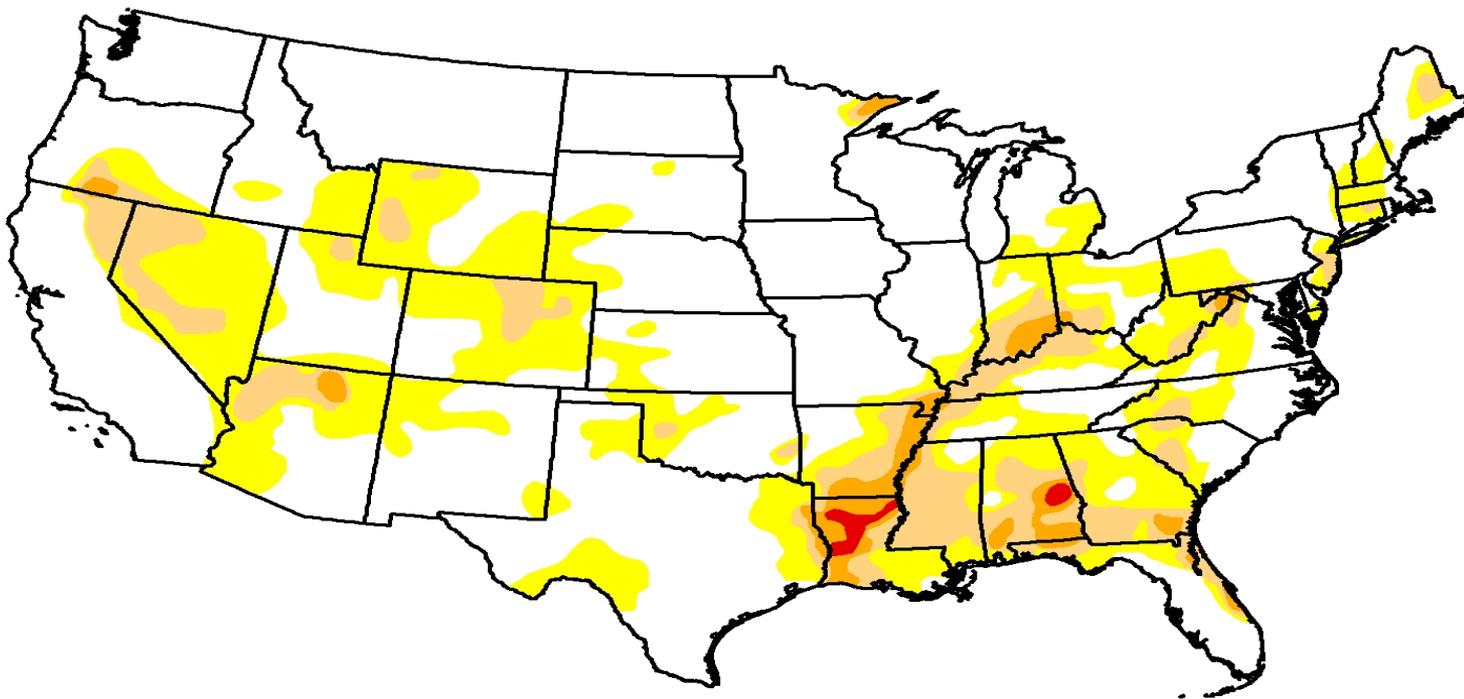
Weekly data to 26 Jun 2011.

View
Variable **NINO3.4 SST Index**



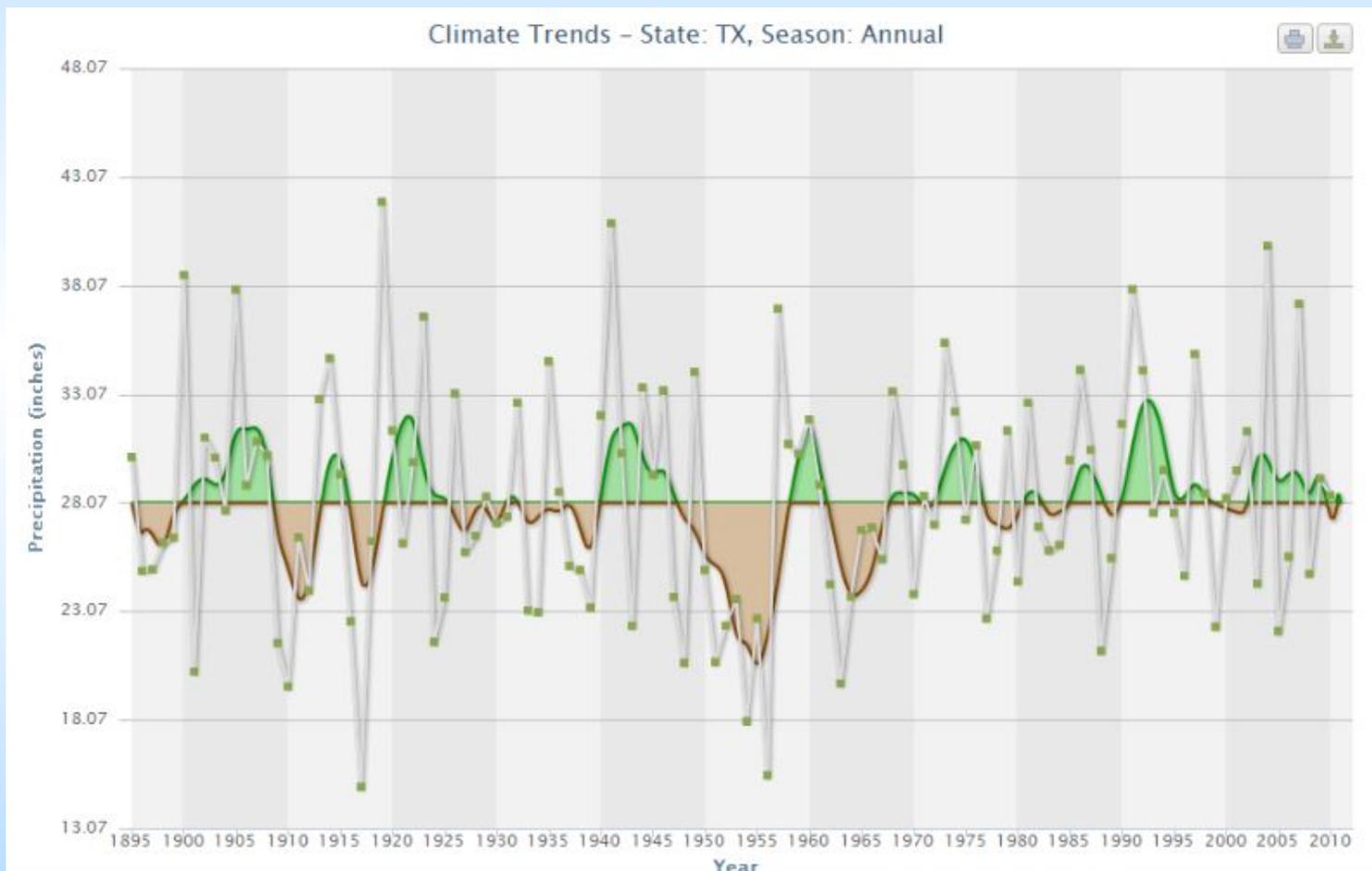


USDM on 10/5/10





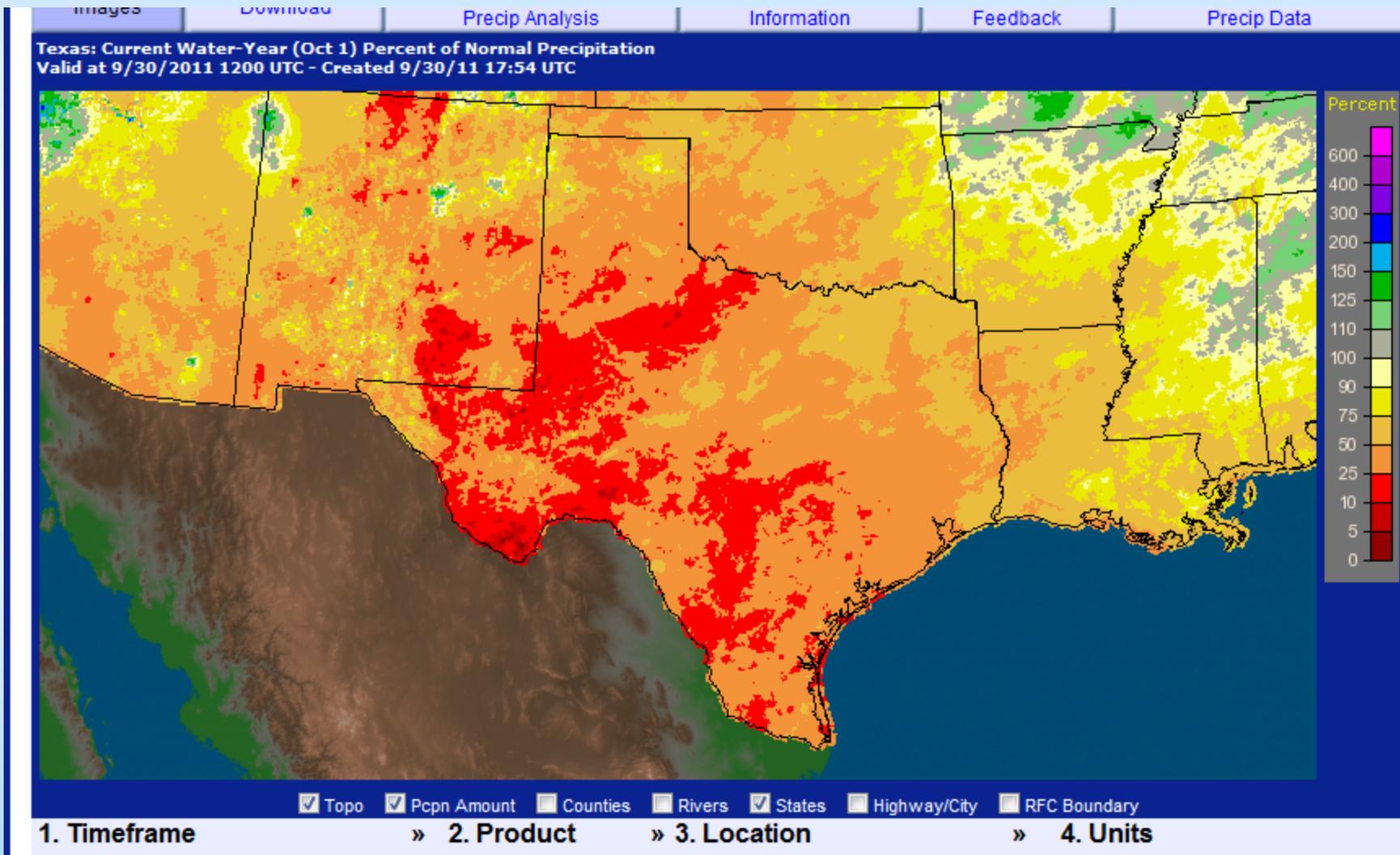
Precipitation Variability is Very Common for Texas.



Graphs Courtesy of SCIPP.



Precipitation Percent of Normal Since 10/1/10.





Lubbock/Midland Area of West Texas Basically Ground Zero.

Driest 12 Month October to September Period Midland International Airport 1930-2011

From October 2010 through September 2011 Midland International Airport had received 2.22 inches of precipitation. This is by far the least amount of precipitation that has fallen in any 12 month October to following year September period since record keeping began in 1930. Here is a list of the top ten driest 12 month October to following September periods at the airport from 1930-2011:

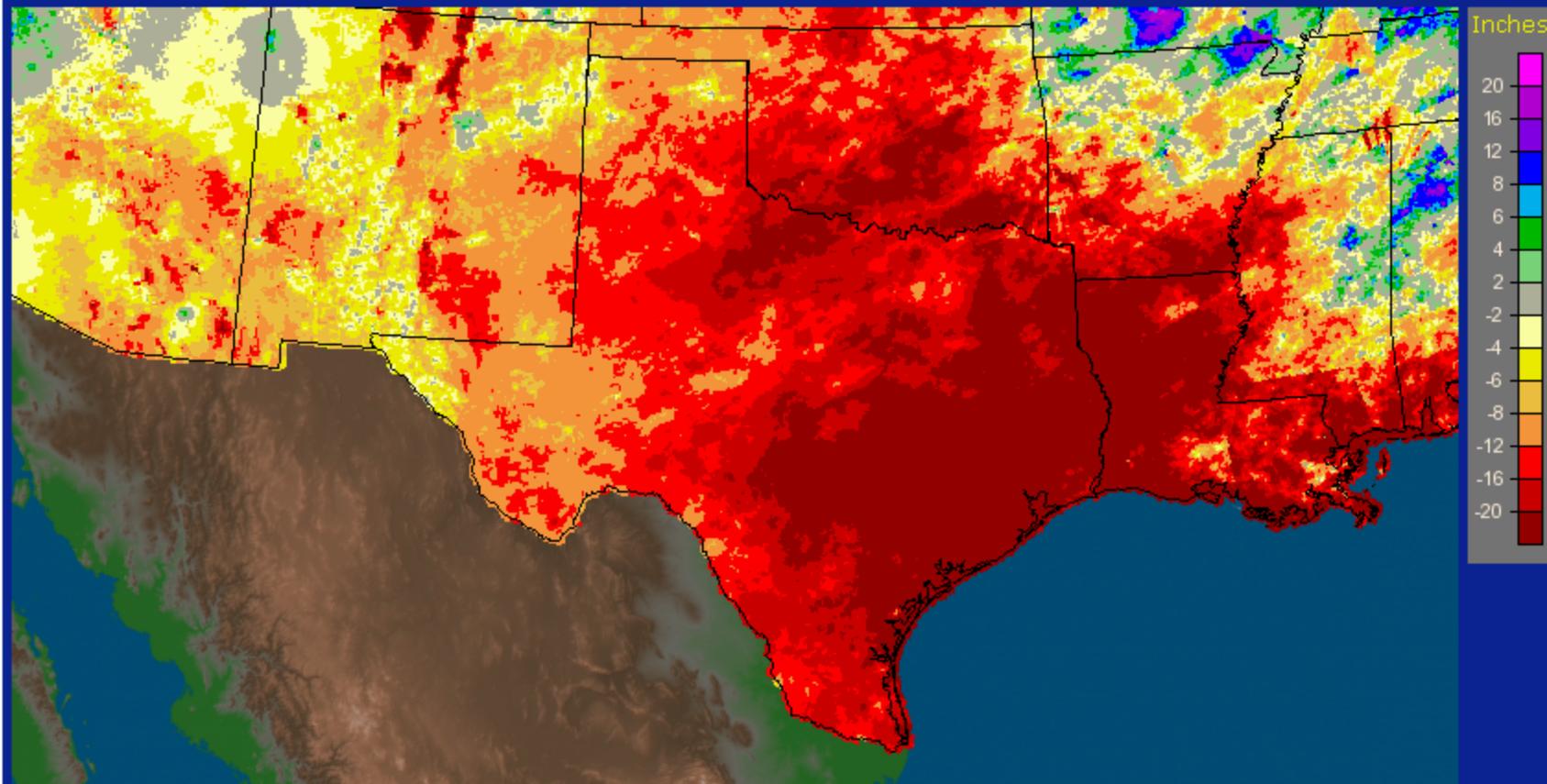
Top Ten Driest 12 Month October to September Period 1930-2011 Midland Texas

Rank	Precipitation	Years and Months
1	2.22 inches	October 2010 - September 2011
2	4.20 inches	October 1950 - September 1951
3	4.54 inches	October 1952 - September 1953
4	6.14 inches	October 2001 - September 2002



Precipitation Departure from Normal Since 10/1/10.

Texas: Current Water-Year (Oct 1) Departure from Normal Precipitation
Valid at 9/30/2011 1200 UTC - Created 9/30/11 17:53 UTC



Topo Pcpn Amount Counties Rivers States Highway/City RFC Boundary

1. Timeframe

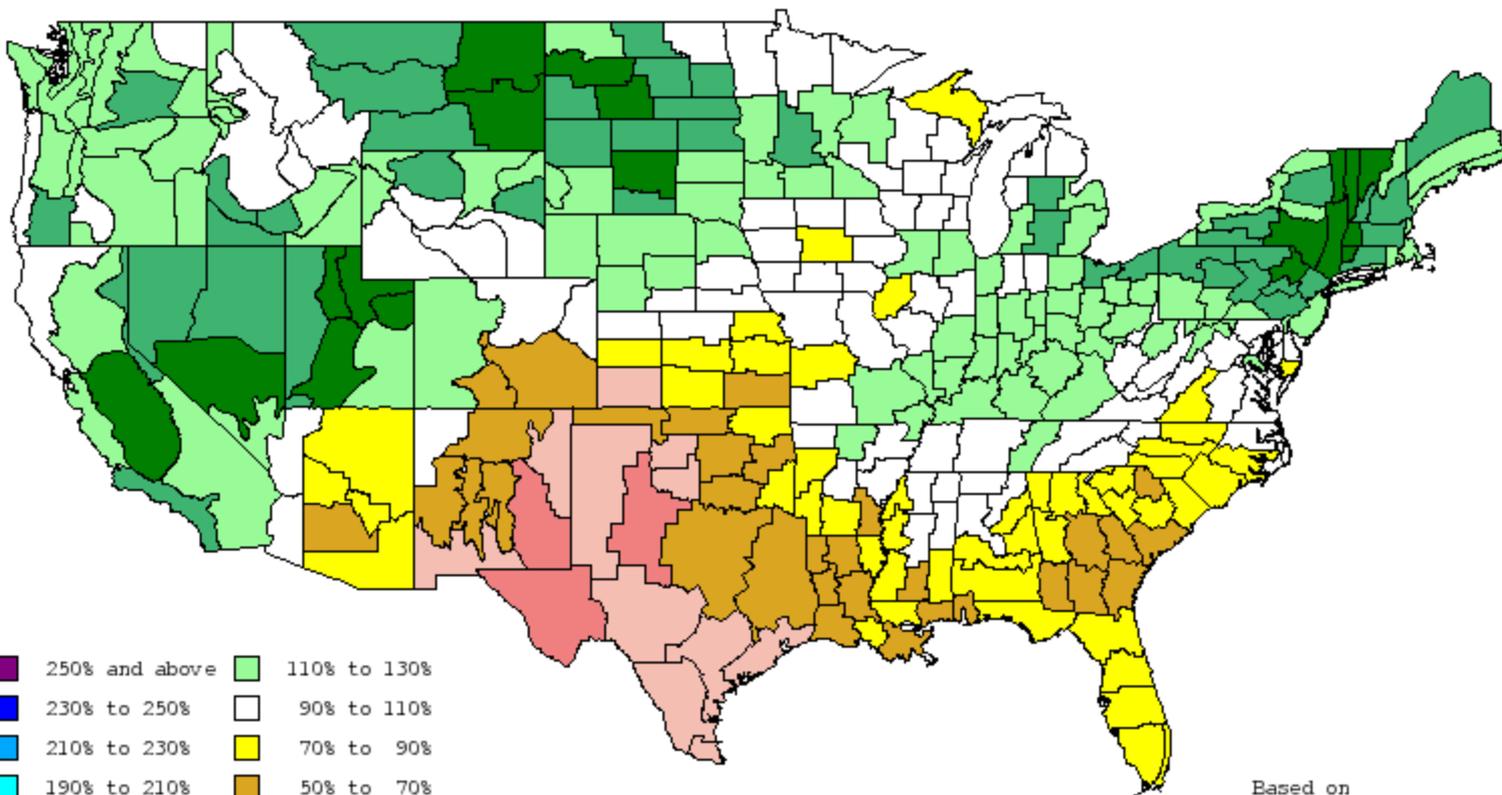
» 2. Product

» 3. Location

» 4. Units

Percent of Normal Precipitation

11-month Percent of Average Precipitation through the end of August 2011



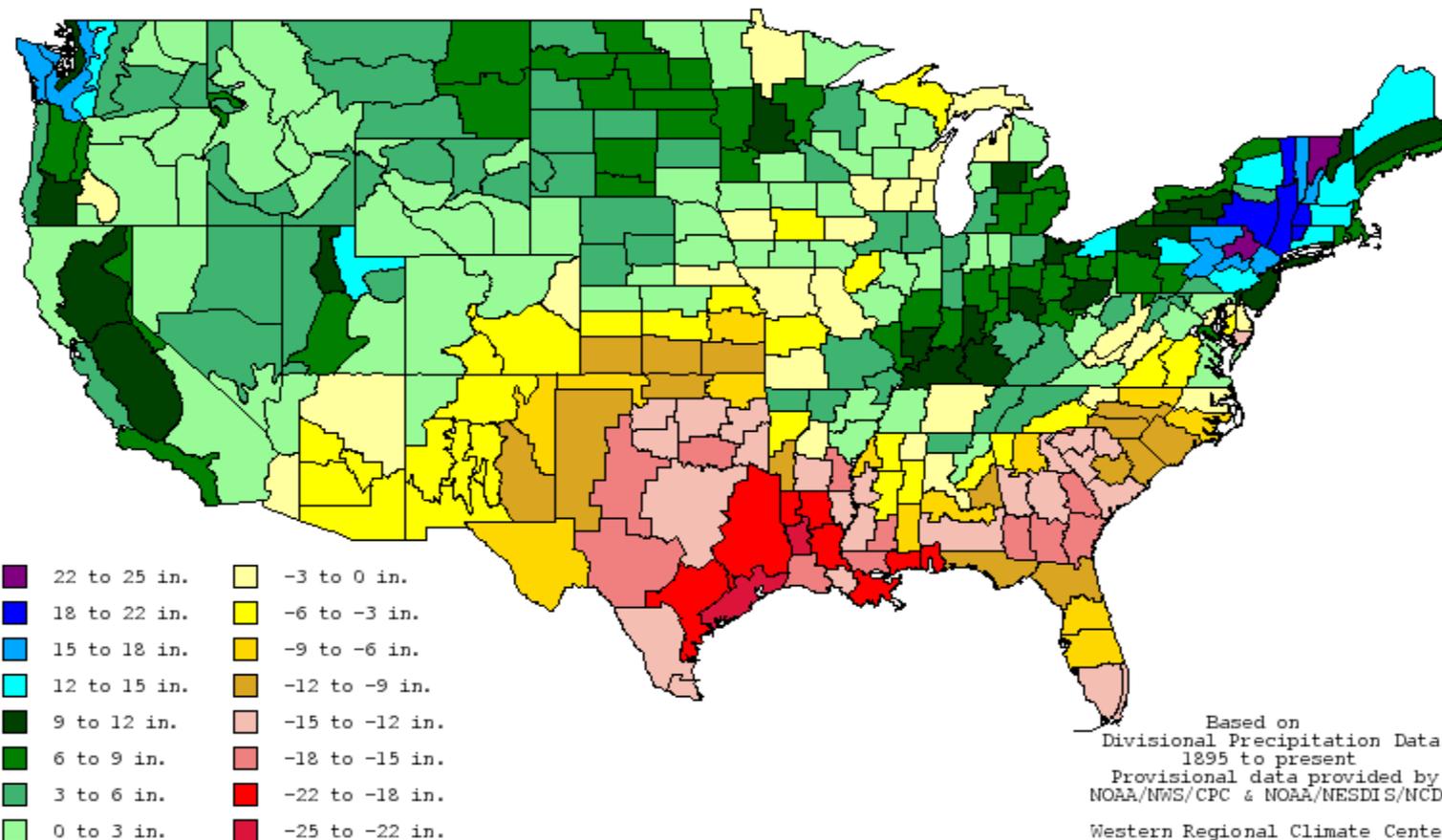
Based on
Divisional Precipitation Data
1895 to present
Provisional data provided by
NOAA/NWS/CPC & NOAA/NESDIS/NCDC

Western Regional Climate Center
Desert Research Institute
Reno, Nevada



Precipitation Deficits from 10/1/10 to 8/31/11

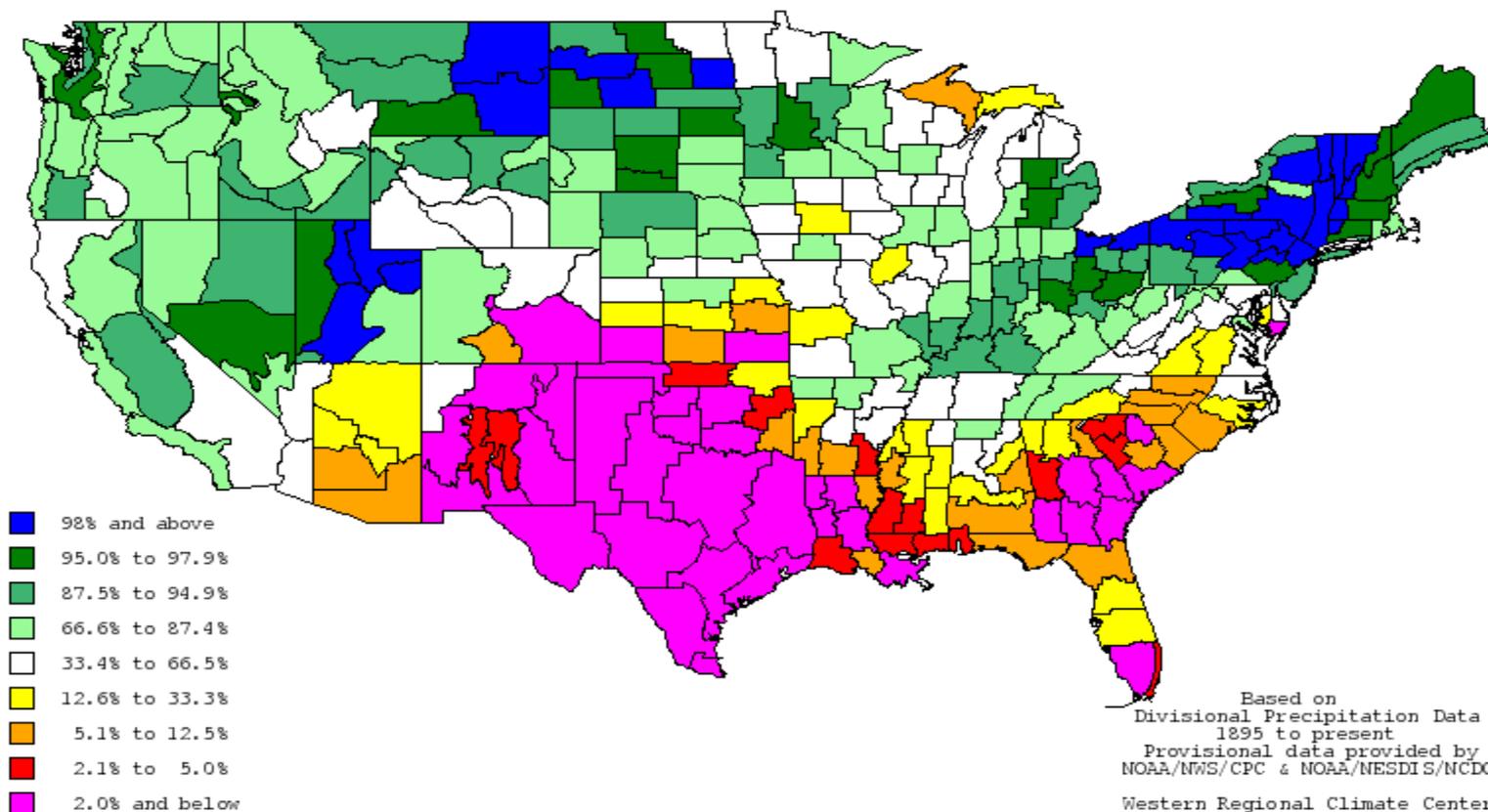
11-month Accumulated Precipitation Departure from Normal through the end of August 2011





Precipitation Percentile of Non-Exceedence from 10/1/10-8/31/11

11-month Precipitation Percentile (non-exceedance) through the end of August 2011



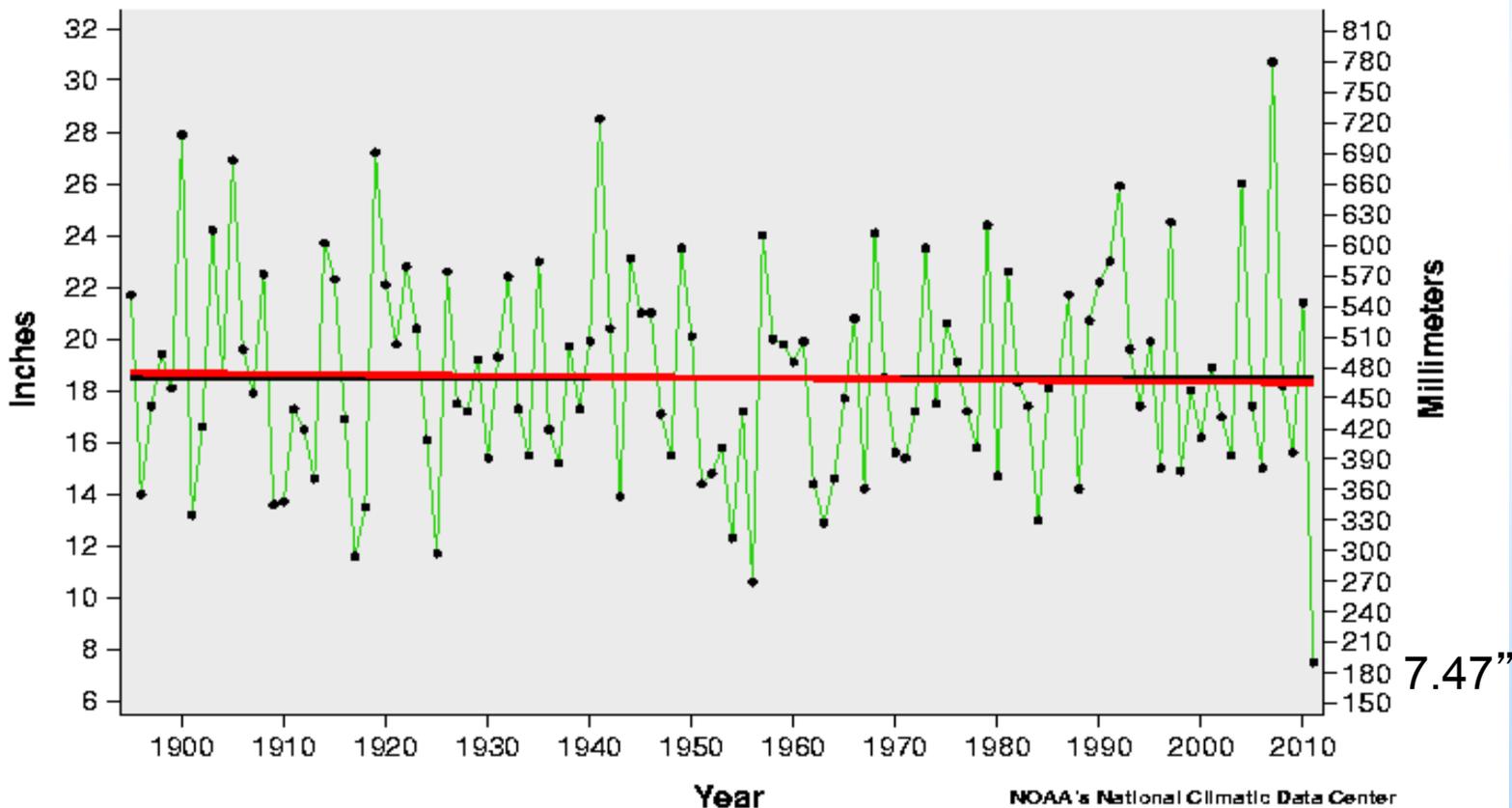
Based on
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Desert Research Institute
Reno, Nevada



Year to Date Precipitation Ending 8/31/11 for Texas.

Year to Date (Jan - Aug) 1901 - 2000 Average = 18.52 Inches
Year to Date (Jan - Aug) 1895 - 2011 Trend = -0.03 Inches / Decade

- Actual Precipitation
- Average Precipitation
- Trend

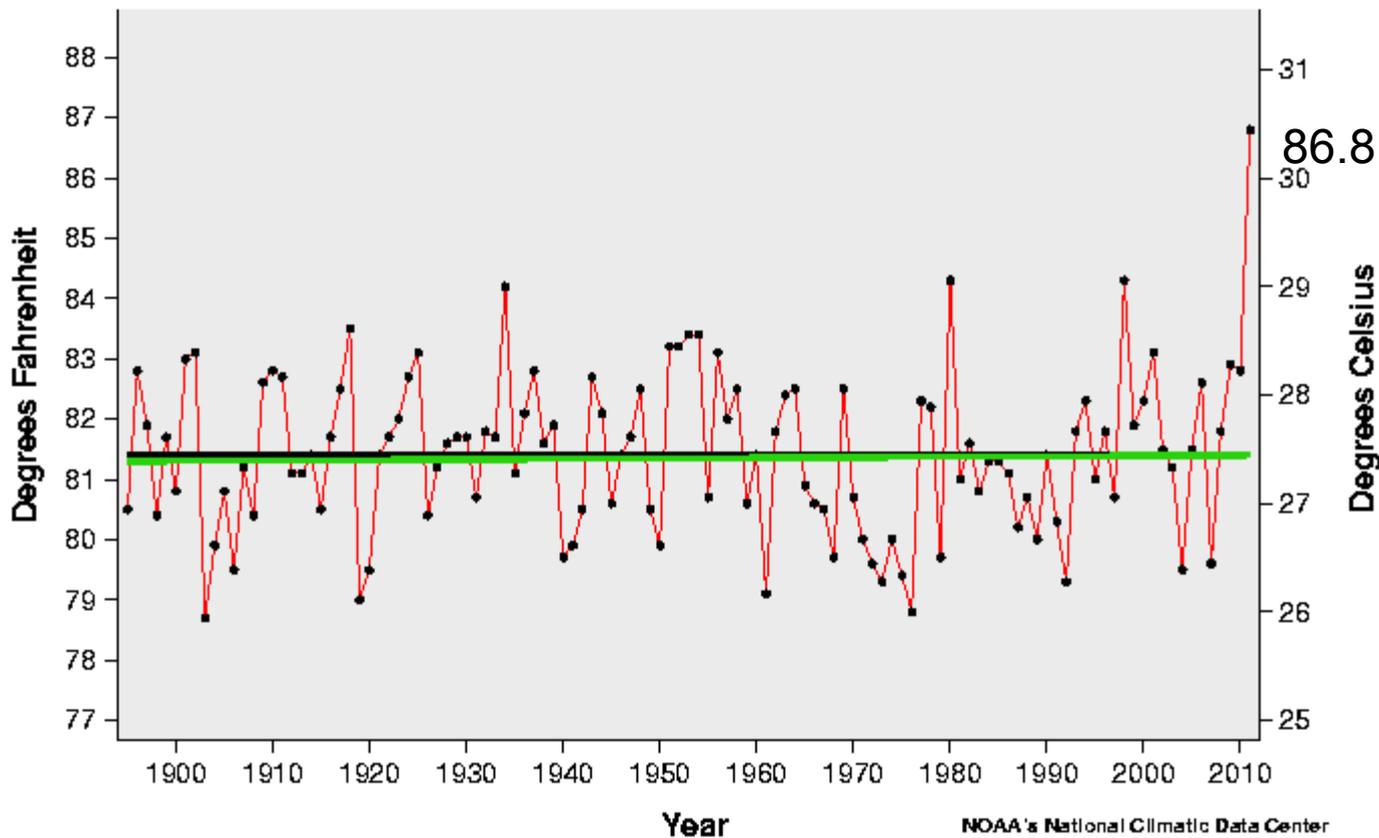




Summer of 2011 was 2.5 degrees hotter than previous warmest.

Summer (Jun-Aug) 1901 - 2000 Average = 81.36 degF
Summer (Jun-Aug) 1895 - 2011 Trend = 0.01 degF / Decade

- Actual Temperature
- Average Temperature
- Trend





Through August, TX Cashes the Daily Double for the Hottest and Driest Year to Date on Record. No change likely in September.



[Climate Monitoring](#) | [Temperature and Precipitation](#) | [Temperature and Precipitation Rankings](#) | [Help](#)

Precipitation Rankings, August 2011 Texas

National Oceanic and Atmospheric Administration
National Climatic Data Center

Choose from the options below and click "View" to display the results.
Data and statistics are as of January 1895.

Period(s) (Hold "Ctrl" to select multiple):

- 1-month period
- 2-month period
- 3-month period
- 4-month period
- 5-month period
- 6-month period
- 7-month period
- 8-month period
- 9-month period

Select All

Parameter: Precipitation

Year: 2011 Month: August

State/Region: Texas

Climate Division: All Divisions

Check to display statistics as of month/year requested (leave unchecked for statistics relative to the entire period of record)

View

« July 2011



[More information on Climatological Rankings](#)

Period	Amount	20 th Century Average	Departure	Rank	Wettest/Driest Since	Record Year
Jan - Aug 2011 Year-to-Date	7.51" (190.75 mm)	18.52" (470.41 mm)	-11.01" (-279.66 mm)	1 st Driest 117 th Wettest	Driest to Date Wettest since: 2010	Driest: 2011 Wettest: 2007

7.51" vs. normal of 18.52"



[DOC](#) > [NOAA](#) > [NESDIS](#) > [NCDC](#)

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Temperature Rankings, August 2011 Texas

National Oceanic and Atmospheric Administration
National Climatic Data Center

Choose from the options below and click "View" to display the results.
Data and statistics are as of January 1895.

Period(s) (Hold "Ctrl" to select multiple):

- 1-month period
- 2-month period
- 3-month period
- 4-month period
- 5-month period
- 6-month period
- 7-month period
- 8-month period
- 9-month period

Select All

Parameter: Temperature

Year: 2011 Month: August

State/Region: Texas

Climate Division: All Divisions

Check to display statistics as of month/year requested (leave unchecked for statistics relative to the entire period of record)

View

« July 2011



[More information on Climatological Rankings](#)

Period	Temp	20 th Century Average	Departure	Rank	Warmest/Coldest Since	Record Year
Jan - Aug 2011 Year-to-Date	69.90°F (21.06°C)	66.90°F (19.39°C)	3.00°F (1.67°C)	117 th Coldest 1 st Warmest	Coldest since: 2010 Warmest to Date	Coldest: 1979 Warmest: 2011

69.9 vs. normal of 66.9

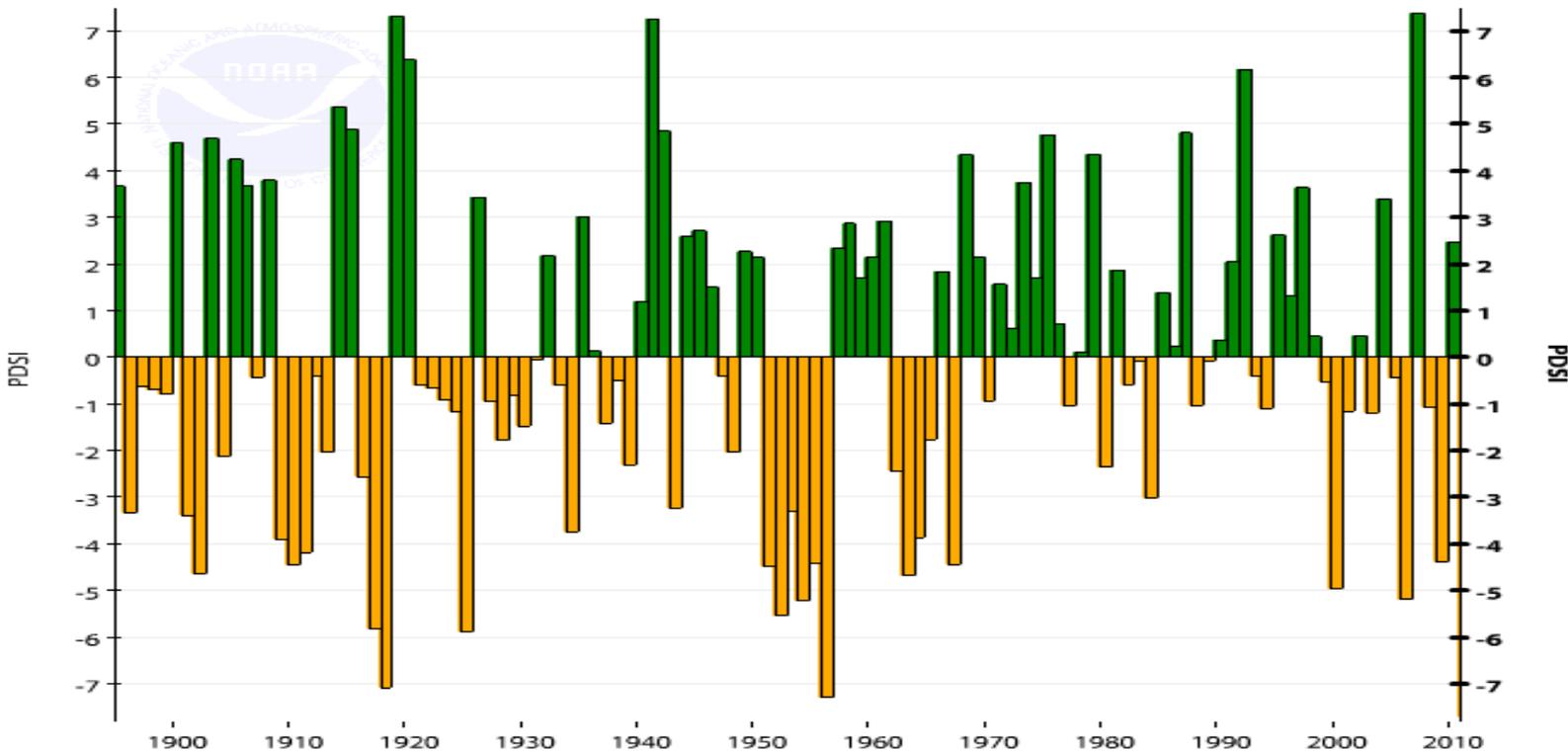


Current PDSI the 2nd Worst Ever on Record.



Move mouse towards an axis until highlighted. Left-click mouse to pan. Shift key + left-click to zoom.

Texas, PDSI, August



0	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1.07	1.16	0.46	1.20	2.20	0.45	5.20	7.20	1.00	4.20	2.47	7.72



Eight Major Cities had More than 80 days of 100 degree plus temps



100 Degree Days for the Southern Plains for 2011

Location	Consecutive 100°F+ Days	Current/Previous Record	2011 Rank	Total 100°F+ Days	Current/Previous Record	2011 Rank	Summer 2011 Avg Temp	Rank	Previous Record/Year
Shreveport, LA	15	15 (1956)	1 st (tied)	63	47 (1881)	1 st	88.4	1 st	86.4 (1881)
Oklahoma City, OK	13	22 (1936)	8 th	63	50 (1980)	1 st	87.5	1 st	85.9 (1980)
Abilene, TX	18	30 (1952)	5 th	81	46 (1934)	1 st	89.3	1 st	86.6 (1980)
Amarillo, TX	5	8 (1998)	9 th	50	26 (1953)	1 st	84.3	1 st	81.7 (1934)
Austin, TX	27	21 (2001)	1 st	90	69 (1925)	1 st	89.5	1 st	88.4 (2009)
Brownsville, TX	2	5 (1901)	7 th	5	10 (1900)	4 th	85.8	8 th	86.9 (1998)
College Station, TX	26	30 (1998)	2 nd	69	58 (1917)	1 st	88.7	1 st	87.6 (2009)
Corpus Christi, TX	3	7 (2000)	3 rd	12	11 (2005)	1 st	85.8	3 rd	86.8 (2009)
Dallas/Fort Worth, TX	40	42 (1980)	2 nd	71	69 (1980)	1 st	90.5	1 st	89.2 (1980)
Del Rio, TX	11	50 (1980)	22 nd	85	78 (1953)	1 st	89.0	1 st	88.8 (2009)
El Paso, TX	10	23 (1994)	10 th	50	62 (1994)	3 rd	86.6	2 nd	87.7 (1994)
Houston, TX	24	14 (1980)	1 st	46	32 (1980)	1 st	87.9	1 st	86.4 (2009)
Midland, TX	14	14 (1998)	1 st (tied)	64	52 (1964)	1 st	87.6	1 st	85.8 (1964)
Lubbock, TX	9	12 (1980)	4 th	48	29 (1934)	1 st	86.0	1 st	82.6 (1980)
Lufkin, TX	26	17 (1944)	1 st	63	53 (1934)	1 st	87.1	1 st	86.0 (1934)
San Angelo, TX	28	27 (1912)	1 st	100	60 (1969)	1 st	89.3	1 st	85.6 (2010)
San Antonio, TX	12	21 (1962)	2 nd	57	59 (2009)	2 nd	88.0	1 st	87.8 (2009)
Tyler, TX	46	20 (1998)	1 st	81	47 (1998)	1 st	90.2	1 st	87.1 (1998)
Victoria, TX	24	16 (1911)	1 st	58	42 (1912)	1 st	87.3	1 st	86.6 (2009)
Waco, TX	44	42 (1980)	1 st	90	63 (1980)	1 st	90.5	1 st	88.7 (1925)
Wichita Falls, TX	52	42 (1980)	1 st	100	79 (1980)	1 st	91.9	1 st	88.6 (1980)

Information through the end of September 29, 2011



Current US Drought Monitor: 86% of TX in Exceptional Drought

U.S. Drought Monitor

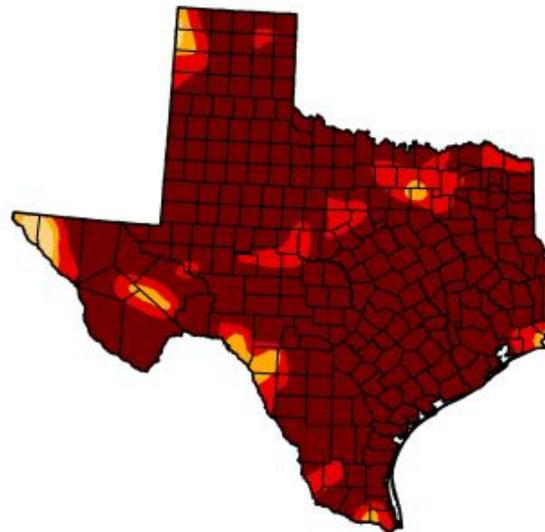
September 27, 2011

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	99.16	96.65	85.75
Last Week (09/20/2011 map)	0.00	100.00	100.00	99.03	96.10	85.43
3 Months Ago (06/28/2011 map)	2.68	97.32	95.71	94.52	90.62	72.32
Start of Calendar Year (12/28/2010 map)	7.89	92.11	69.43	37.46	9.59	0.00
Start of Water Year (09/28/2010 map)	75.57	24.43	2.43	0.99	0.00	0.00
One Year Ago (09/21/2010 map)	77.29	22.71	3.34	0.97	0.00	0.00



Intensity:

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

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

<http://drought.unl.edu/dm>



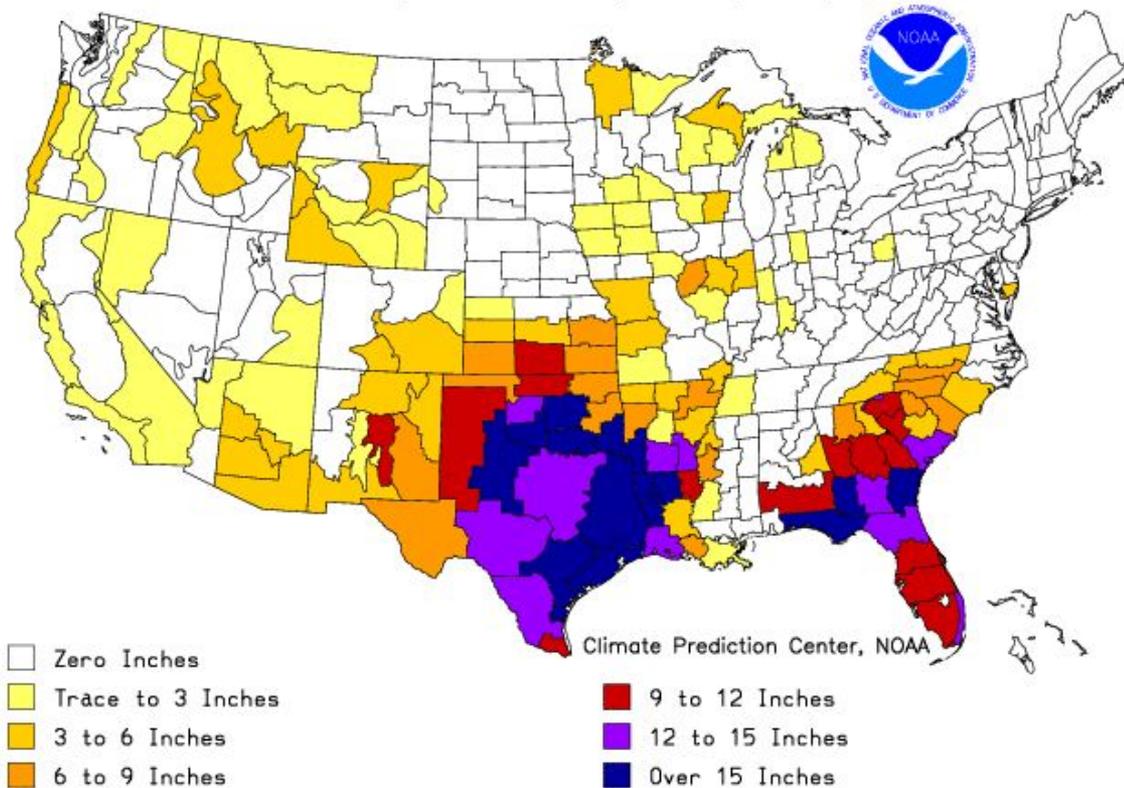
Released Thursday, September 29, 2011
Michael Brewer, National Climatic Data Center, NOAA

6 consecutive months (i.e. Mar-Aug) with rainfall in the bottom 10 for that given month, dating back 117 years. September likely #7.



Amount of Precipitation Needed to Bring PDI to 0.5.

Additional Precip. Needed (In.) to Bring PDI to -0.5
Weekly Value for Period Ending SEP 24, 2011
Long Term Palmer Drought Severity Index (PDI)





In NWS Southern Region, we Want to Build a “Climate and Weather Ready” Nation

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 **NOAA** NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
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NOAA's National Weather Service taking action to build a 'Weather-ready' nation

2011 ties record for billion-dollar disasters

August 17, 2011

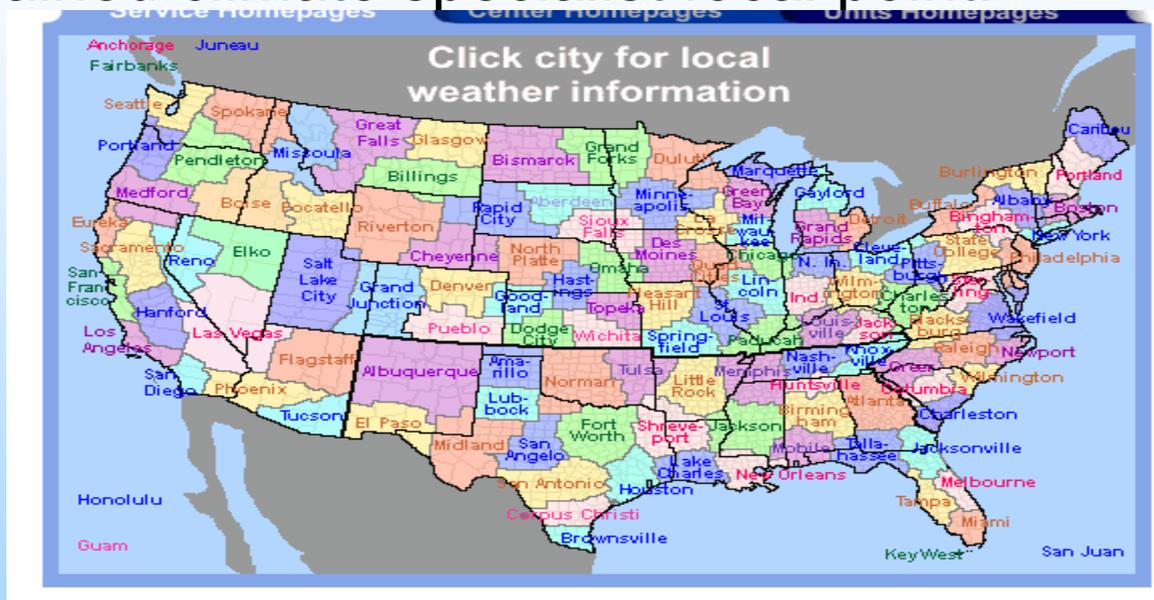
NOAA is launching a comprehensive initiative to build a “Weather-ready” nation to make America safer by saving more lives and protecting livelihoods as communities across the country become increasingly vulnerable to severe weather events, such as tornado outbreaks, intense heat waves, flooding, active hurricane seasons, and solar storms that threaten electrical and communication systems.

NOAA is also announcing that the United States has so far this year experienced [nine separate disasters](#), each with an economic loss of \$1 billion or more — tying the record set in 2008. The latest event to surpass the \$1 billion price tag is this summer’s flooding along the Missouri and Souris rivers in the upper Midwest. This year’s losses have so far amounted to more than \$35 billion.

“To prepare for and respond to environmental events that affect safety, health, the environment, economy, and homeland security.

Decision Support in the Climate Arena

- 5 new “DSS” meteorologists hired in NWS Southern Region. One will work in climate related areas to brief stakeholders, coordinate outreach and workshops and support WFOs.
- NWS has 122 “brick and mortar” WFOs each with a trained climate specialist focal point.



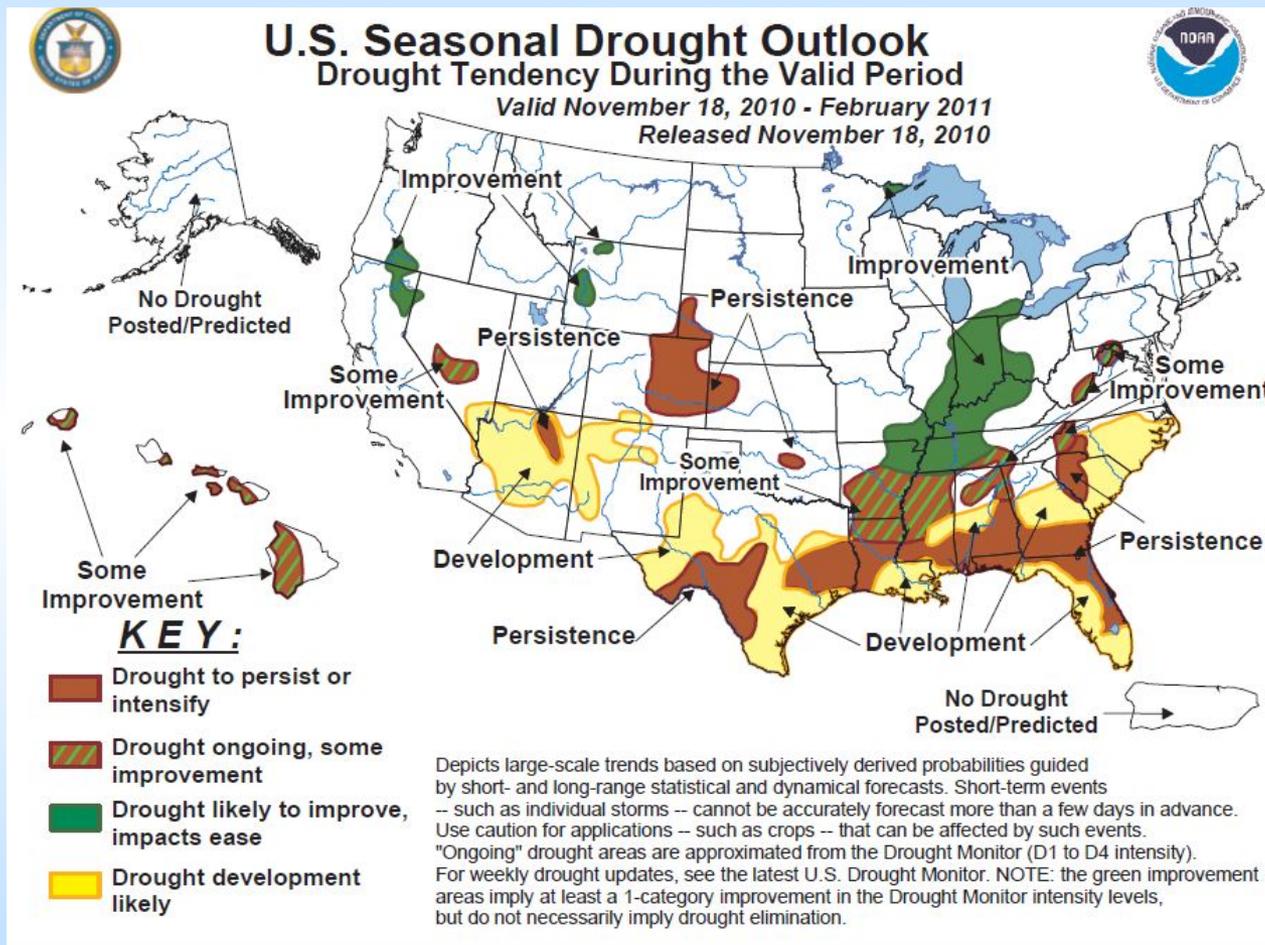


2011 Texas Wildfire Season the Worst Ever on Record

- 23,519 fires have burned a record 3.8 Million Acres and 2,742 homes.
- Approximately a 77 mile by 77 mile area. Larger than the states of RI and Delaware combined.
- 49.4% of all acres burned in the USA in 2011 has been in TX.
- 2 firefighters killed. 4 fatalities during Labor Day fires in Bastrop, just east of Austin.



CPC US Seasonal Drought Outlook the Most Used Tool on Main Street.





Joint NWS/Texas Forest Service/USFS Workshop Held the First Week of December 2010 in CLL to Alert State and Fed Fire



Drought's grip threatens state with arid 2011 (By Mike Mecke)

Wildfires soar as La Niña effects keep rain at bay

By ERIC BERGER
Copyright 2010 Houston Chronicle

Dec. 8, 2010

The great **drought** of 2011 may have started two months ago.

Since **Tropical Storm** Hermine drenched central Texas in September, the state has been very dry, with large swaths receiving less than 10 percent of normal rainfall levels. Locally, nearly all but the southeastern corner of Harris County has received less than 50 percent of normal rain.

According to the **National Climatic Data Center**, the two-month period of October and November was the state's eighth driest on record, and second driest in 44 years. If Texas doesn't receive at least 0.78 inches in December, it would be the driest October-December period since the 1950s.

The beginnings of drought conditions now — an updated U.S. Drought Monitor released this morning will show much of Harris County now in a moderate and worsening drought — trouble

meteorologists because there's little reason to expect relief during the next few months.

"Continuing dry weather is likely to persist at least into the spring," said John Nielsen-Gammon, the state climatologist and a professor of atmospheric sciences at **Texas A&M University**. "It's probably going to get worse before it gets better."

RANCH & RURAL LIVING



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"Continuing dry weather is likely to persist at least into spring. It is probably going to get worse before it gets better". Prof John Nielsen-Gammon, Invited Speaker.



PROCLAMATION

BY THE

Governor of the State of Texas

TO ALL TO WHOM THESE PRESENTS SHALL COME:

I, RICK PERRY, Governor of the State of Texas, issued an Emergency Disaster Proclamation on December 21, 2010, as extreme fire hazard posed a threat of imminent disaster in specified counties in Texas.

WHEREAS, the extreme fire hazard continues to create a threat of disaster for the people in the State of Texas; and

WHEREAS, record high temperatures, preceded by significantly low rainfall, have resulted in declining reservoir and aquifer levels, threatening water supplies and delivery systems in many parts of the state; and

Statewide disaster proclamation has been reissued every subsequent month, most recently on 10/1/11. Monthly climate outlooks now being provided by SRH for TFS personnel use.



Through mid-August, over \$5.2B in Agricultural Drought Losses in TX.

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Texas agricultural drought losses reach record \$5.2 billion

Further losses could continue if no rainfall received for remainder of year

August 17, 2011
By: Blair Fannin

Print PDF

Current Plans are for a **joint** fire weather/agriculture based decision support workshop in College Station in mid-November/Dec timeframe.



Continued Drought Likely Means Continued Pressure on the TX Power Grid.



Existing 2010 Electricity Record Peak Demand Exceeded 8 Times in 2011.

Weekend Peak Records of 65,100 and 65,159 set on 8/27 and 8/28.

18.7% Increase in Peak Power Demand from 2000 to 2011, or 1.7%/year, but increase is 4.6% over the past 3 years.

ERCOT Peak Demand History, 2000 – 2011

YEAR	DAY OF WEEK	DATE	PEAK DEMAND, MW	CHANGE FROM PREVIOUS YEAR
2011	Wed	8/3/2011	68,379	3.96%
2010	Mon	8/23/2010	65,776	6.02%
2009	Mon	7/13/2009	63,400	3.73%
2008	Mon	8/4/2008	62,171	0.07%
2007	Mon	8/13/2007	62,130	-0.34%
2006	Thu	8/17/2006	62,339	3.53%
2005	Tue	8/23/2005	60,214	2.92%
2004	Tue	8/3/2004	58,506	-2.55%
2003	Thu	8/7/2003	60,037	7.04%
2002	Mon	8/26/2002	56,086	2.53%
2001	Wed	8/15/2001	54,729	-4.99%
2000	Thurs	8/31/2000	57,606	5.03%



USDA Pasture, Rangeland, and Forage Pilot Insurance Programs.

Uses EROS NDVI and CPC Unified Rainfall Index to allow Ranchers the opportunity to mitigate losses due to drought.

\$6.56 Million Paid out in the April/May 2011 timeframe.

The image shows the cover of a fact sheet from the USDA Risk Management Agency (RMA). The cover is green with white text. On the left side, there is the USDA logo (United States Department of Agriculture) and the RMA logo (Risk Management Agency). Below the RMA logo, it says "Program Aid Number 1896". On the right side, the title reads "A Risk Management Agency Fact Sheet Pasture, Rangeland, Forage Pilot Insurance Program" and the date "November 2010".

USDA RMA pilot programs are designed to give forage and livestock producers the ability to buy insurance protection for losses of forage.

Meeting scheduled this fall with senior USDA RMA officials to ensure that Best Practices are being used by all parties involve to optimize efficiency.



Questions??

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