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ALL HANDS ON DECK FOR ADDRESSING DROUGHT

Alek Krautmann, Southern Climate Impacts Planning Program

What brings researchers, mayors, emergency managers, Department of Homeland Security officials, fire departments, judges, the National Weather Service, the U.S. Geological Survey, and U.S. Army Corps of Engineers into one room? It was a drought outlook and assessment forum in early November involving about 60 people in Abilene, TX. The National Oceanic and Atmospheric Administration, National Integrated Drought Information System, National Weather Service, West Central Texas Council of Governments, and Southern Climate Impacts Planning Program sponsored the forum.

Figure 1: The West Texas Drought Outlook and Assessment Forum

Residents of West Texas have dealt with significant water concerns during the current two-year drought and are faced with an uncertain future regarding the sustainability of their water supply. Before a day of heavy rains earlier this fall, the city of San Angelo was within a year of running out of water, according to the city council. The rest of the 500,000 residents of West Texas face a similar situation to San Angelo and local government leaders are interested in addressing their water challenges. Many West Texas reservoirs are under 25% capacity and some are near 5%.

Figure 2: Low water in the O.H. Ivie Reservoir (from the City of San Angelo)

The Abilene forum was part of a series of on-site meetings in Lubbock, Austin, and Ft. Worth, TX (a virtual forum was held in New Mexico) over the past year with the purpose of updating local officials on the current state of the drought, explaining climate outlooks for the upcoming season, and hearing from water resource and agriculture specialists about the impact the drought is having on their operations. Even though the drought of 1950-1956 is still the drought of record for Texas, 2011 was the most intense short-term drought for the state. Another unique feature of the current drought has been above normal temperatures, especially in the summer, which lead to high evaporation rates from reservoirs and dry out area soils. The average annual evaporation rate for West Texas is about 65 inches. Compared to normal annual precipitation of about 20 inches, the area starts out with a significant water deficit.

Dr. John Nielson-Gammon, Texas State Climatologist, provided insight on future climate projections for Texas. Over the next several decades the natural year-to-year highly variable

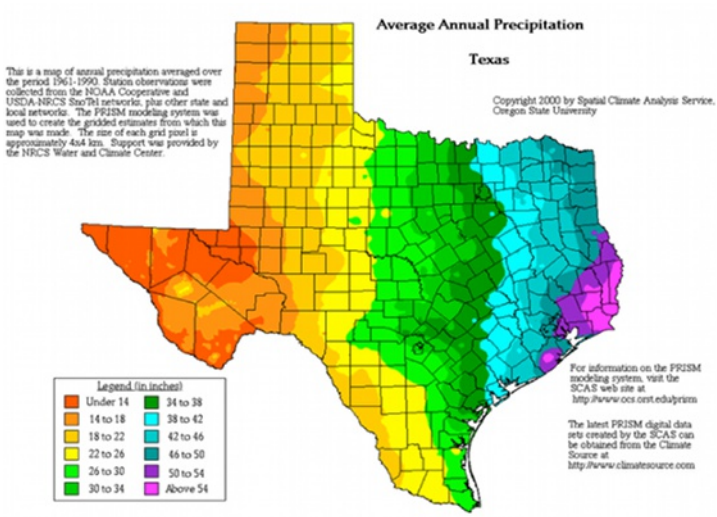


Figure 3: Average Annual Precipitation Across Texas

precipitation will likely continue with little overall change discernable from the variability. During this time, however, average annual temperatures are expected to increase outside of natural variability. Despite somewhat constant annual rainfall, warmer temperatures will increase evaporation rates and further stress water availability in the region.

The likelihood of neutral El Niño Southern Oscillation conditions persisting during the upcoming winter was also discussed at the forum. Given the rainfall deficits and low soil moisture already in place, researchers agreed that conditions in West Texas would most likely continue to be dry through the winter. Even though forecasts are help local planners understand their water situation, an emergency manager in attendance provided perspective saying, “We can’t plan on a maybe, we have to plan for what we have.” Another added, “A maybe wetter forecast could leave us with just mud.”

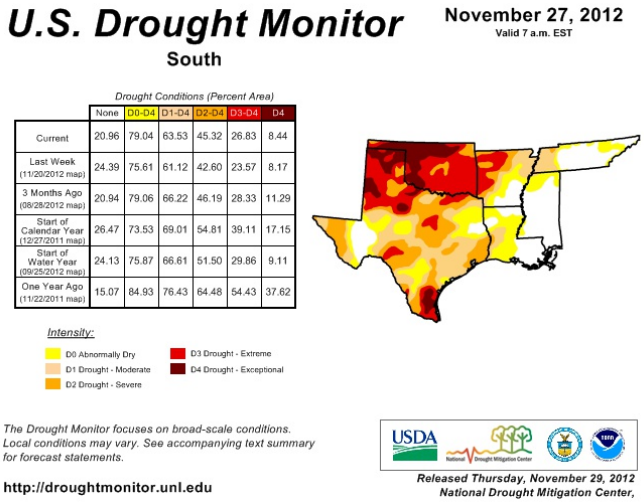
John Grant, General Manager of the Colorado River Municipal Water District, explained just how difficult a process it is to supply their customer municipalities with water. Water levels are below the pumping station infrastructure originally built for many of their reservoirs. Temporary pump barges with lines that reach out to the water pool have become the norm, but are just the beginning of a long path to supply water to communities. For example, water travels over 200 miles through pipeline to reach Snyder, TX. Grant also explained that as water levels decrease, the water quality also decreases and creates additional concerns. The drought has caused the water district to expand groundwater pumping capabilities and they can now supply minimum daily water needs for customers from groundwater, if necessary. Grant noted, however, that West Texas groundwater is mined, since the aquifers have a negligible annual recharge rate. Long-term pumping of aquifer water for daily use is not sustainable.

Those in attendance gained important take away messages from the forum. Communicating water concerns and conservation education is critical among local government leaders and community members. All residents and stakeholders benefit when engineers and scientists inform local planners who make decisions, as opposed to litigation through the judicial system. Researchers learned that better measurements and predictions of evaporation rates could be useful for water management. The forum also provided a reminder of the cascading impacts of drought and the assertive leadership needed to address the ongoing challenges. Local leaders are responsible for considering water related consequences that may be important to their community, such as impacts on businesses, public health, and future water supply costs. Even though West Texas appears to be in for a dry future, it is encouraging that so many people are willing to come together and learn in order to make plans for reducing negative consequences.

DROUGHT CONDITIONS

Luigi Romolo, Southern Regional Climate Center

Dry conditions in the Southern Region has not allowed for much improvement in drought status. The significant lack of November precipitation has led to widespread extreme and exceptional drought in Oklahoma and northwestern Texas. In addition, an area of severe drought is now present in the western panhandle of Texas. A one-category improvement did occur in western Tennessee and northeastern Arkansas. The area, which was classified as severe drought, is now classified as moderate drought.



Above: Drought conditions in the Southern Region. Map is valid for November 2012. Image courtesy of the National Drought Mitigation Center.

In Texas, one of the biggest concerns this time of year is the winter wheat crop, and the lack of rain in the short term is taking its toll: between 40 and 45 percent of all Texas winter wheat is rated as poor or very poor and that number is increasing rapidly. Additionally, grasslands continue to dry out, making it difficult for ranchers to put their herds out. On the positive side, pecan farmers are expected to have above normal harvests this year: 67 million pounds compared to the 52 million pound average (Information provided by the Texas Office of State Climatology).

Surface water declines have driven many meetings and symposiums in Texas, as water supplies continue to decline during a period of recharge or maintenance, such as in Corpus Christi, whose total water supply is at 40.6 percent. The city of El Paso currently is planning to drill nine new wells to meet water demands at a cost of $3.5 million. Other plans include a new pipeline between Stillhouse Hollow and Belton Lakes, estimated to cost approximately $500 million, diverting water from the Colorado River that would normally be reserved for rice farmers, and instituting water restrictions (Information provided by the Texas Office of State Climatology).

2012 HURRICANE SEASON ENDS

Barry D. Keim, Louisiana State Climatologist, Louisiana State University

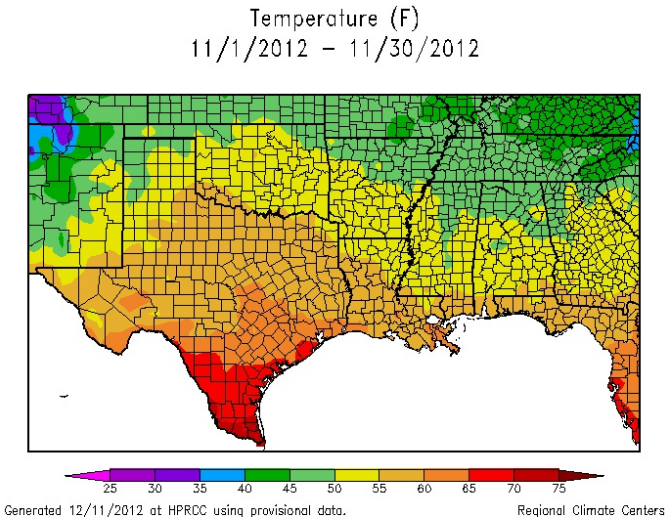
Hurricane season 2012 came to a close on the last day of November. Well, sorta. Officially, hurricane season extends from June 1st to November 30th. However, just as two storms this season formed in May – Tropical Storms Alberto and Beryl – tropical storms and hurricanes can also occur in December, or even later. So, assuming our hurricane season is actually over, the season will go into the record books having had 19 named storms. This made for a very busy season, whereby 19 tropical storms and hurricanes is tied for the third busiest season on record – behind the 28 named storms in 2005 and 21 named storms in 1933. We also had 19 named storms in 2010, as well as in 1995, and 1887.

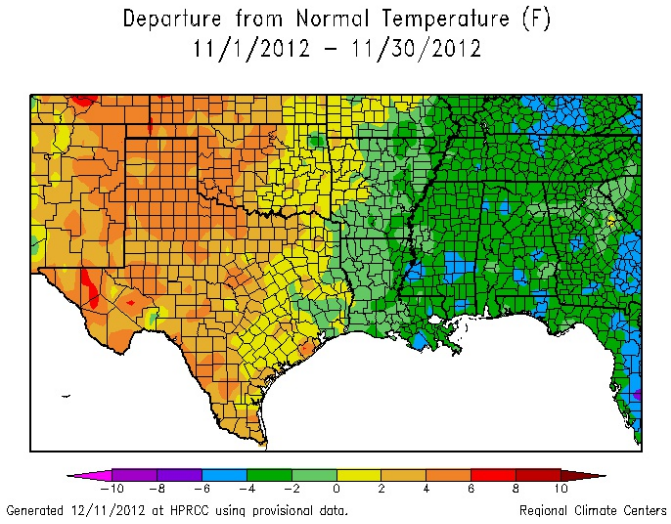
Nationally, Hurricane Sandy was the highlight of the year, as this "perfect storm" produced over a 14 storm surge in New Jersey, flooded parts of New York City, and also produced 2-3 feet in the Appalachian Mountains. Closer to home, Hurricane Isaac produced a peak storm surge of over 13 feet, while inundating Braithwaite and Laplace, Louisiana. There were two other landfalls in the United States this season, and those were Tropical Storms Beryl, which hit eastern Florida and Georgia, and Debby, which hit Florida on the Gulf side. Although Hurricanes Isaac and Sandy were catastrophic in their own way, the shores of the United States did not experience a landfall of a Category 3-5 hurricane, often referred to as a MAJOR hurricane landfall. By this definition, this is the 7th year in a row without a major hurricane landfall, and this is a record indeed. Since our record keeping began in 1851, the U.S. had never gone more than 5 years in a row without a major hurricane landfall, until this streak began. Our last major hurricane landfall was Hurricane Wilma in 2005. This is interesting considering how active hurricane seasons have been of late. If you have any questions, feel free to contact me at keim@lsu.edu.

TEMPERATURE SUMMARY

Luigi Romolo, Southern Regional Climate Center

November temperature averages in the Southern Region were split longitudinally down the middle, with the western half of the region experiencing a warmer than average month, while the eastern half experienced a colder than average month. In the western half, temperatures ranged from as high as 4 to 6 degrees F (2.22 to 3.33 degrees C) above normal, while in Mississippi and Tennessee, temperatures averaged between 2 to 4 degrees F (1.11 to 2.22 degrees C) below normal. Within the central portion of the region, temperature averages remained within about 2 degrees F (1.11 degrees C) of normal either way. For the Southern Region, it is the warmest year-to-date (January to November) on record (1895-2012). The year-to date average for the region is 67.31 degrees F (19.62 degrees C). For Texas, it was the fourteenth warmest November on record (1895-2012) with a statewide temperature average of 58.80 degrees F (14.89 degrees C). Oklahoma averaged 51.60 degrees F (10.89 degrees C), which was their nineteenth warmest November on record (1895-2012). The remaining four states all averaged cooler than normal. The states averages are as follows: Arkansas averaged 49.80 degrees F (9.89 degrees C), Louisiana averaged 56.80 degrees F (13.78 degrees C), Mississippi averaged 51.40 degrees F (10.78 degrees C), and Tennessee averaged 45.60 degrees F (7.56 degrees C). For Mississippi, it was the twenty-first coldest November on record (1895-2012), while for Tennessee it was the twenty-seventh coldest November (1895-2012). The other state rankings fell in the middle two quartiles.



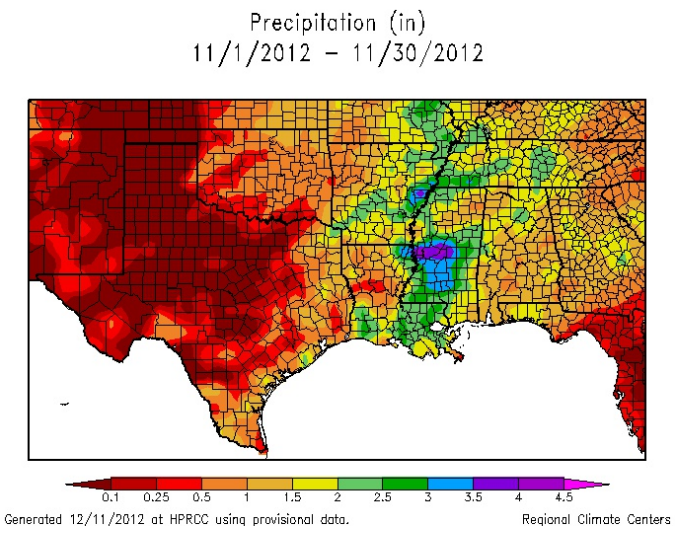


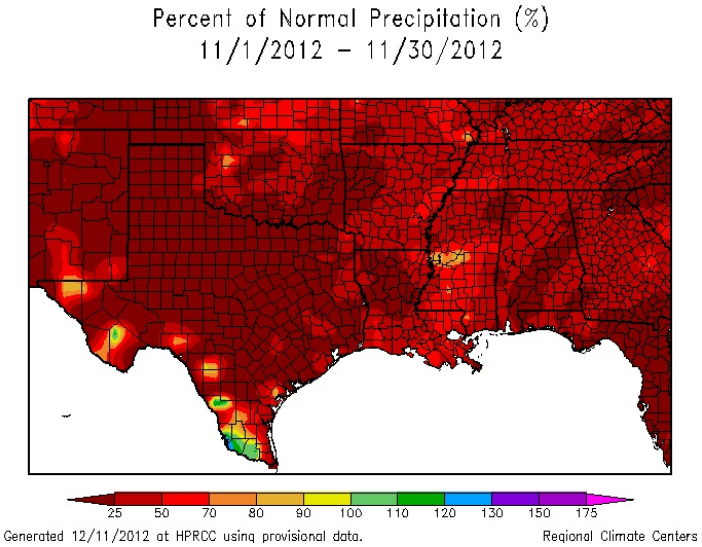
Average temperatures (left) and departures from 1971-2000 normal average temperatures (right) for November 2012, across the South.

PRECIPITATION SUMMARY

Luigi Romolo, Southern Regional Climate Center

November was a very dry month for the entire Southern Region, with a strong majority of stations averaging less than half of the monthly normal precipitation total. Collectively, it was the fourth driest November on record (1895-2012) for the region, which averaged only 0.93 inches (23.62 mm) of precipitation. All six states reported precipitation averages that rank significantly among the historical record. The state wide precipitation averages are as follows: Arkansas averaged 1.80 inches (45.72 mm), Louisiana averaged 1.69 inches (42.93 mm), Mississippi averaged 2.46 inches (62.48 mm), Oklahoma averaged 0.58 inches (14.73 mm), Tennessee averaged 1.65 inches (41.91 mm), and Texas averaged just 0.33 inches (8.38 mm). For Arkansas and Louisiana it was the twelfth driest November on record (1895-2012), while for Mississippi, it was the thirty-second driest November on record (1895-2012). Oklahoma experienced its twenty-first driest November on record (1895-2012). For Tennessee, it was the ninth driest November on record (1895-2012), while for Texas, it was the fourth driest on record (1895-2012).





Total precipitation values (left) and The percent of 1971-2000 normal precipitation totals (right) for November 2012.

CLIMATE PERSPECTIVE

State	Temperature	Rank	Precipitation	Rank
Arkansas	49.8	54th Coldest	1.80	12th Driest
Louisiana	56.8	44th Coldest	1.69	12th Driest
Mississippi	51.4	21st Coldest	2.46	32nd Driest
Oklahoma	51.6	19th Warmest	0.58	21st Driest
Tennessee	45.6	27th Coldest	1.65	9th Driest
Texas	58.8	14th Warmest	0.33	4th Driest

State temperature and precipitation values and rankings for November 2012. Ranks are based on the National Climatic Data Center's Statewide, Regional and National Dataset over the period 1895-2011.

STATION SUMMARIES ACROSS THE SOUTH

Station Name	Temperatures (degrees F)								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	%Norm
El Dorado, AR	66.4	38.9	52.6	-1.2	82.0	11/2	28.0	11/28+	1.66	-3.14	35
Little Rock, AR	64.5	38.9	51.7	0.0	83.0	11/3	29.0	11/28+	1.86	-3.87	32
Baton Rouge, LA	71.6	43.7	57.6	-1.4	83.0	11/3+	31.0	11/25	1.21	-3.55	25
New Orleans, LA	70.5	50.4	60.5	-0.9	84.0	11/3	40.0	11/25	2.48	-2.61	49
Shreveport, LA	70.0	43.5	56.7	0.6	84.0	11/3+	31.0	11/25	0.85	-3.83	18
Greenwood, MS	66.0	35.5	50.7	-3.9	83.0	11/3+	24.0	11/28+	1.81	-3.04	37
Jackson, MS	66.9	38.6	52.8	-2.0	84.0	11/3+	26.0	11/25	2.93	-2.11	58
Tupelo, MS	64.0	35.7	49.9	-1.6	84.0	11/3	25.0	11/29+	1.16	-3.85	23
Oklahoma City, OK	67.4	40.0	53.7	4.8	84.0	11/2	23.0	11/12	0.81	-1.30	38
Ponca City, OK	67.3	37.5	53.4	5.0	90.0	11/2	19.0	11/27	0.90	-1.69	35
Tulsa, OK	66.2	39.0	53.6	2.9	88.0	11/2	24.0	11/27	1.11	-2.36	32
Knoxville, TN	59.6	33.8	46.7	-2.3	73.0	11/11	24.0	11/25	1.06	-2.92	27
Memphis, TN	62.9	40.5	51.7	-0.6	83.0	11/3	30.0	11/28	2.90	-2.86	50
Nashville, TN	60.9	34.4	47.6	-1.7	82.0	11/3	24.0	11/25	1.38	-3.07	31
Amarillo, TX	68.7	36.5	52.6	7.5	84.0	11/8+	19.0	11/27	0.01	-0.67	1
El Paso, TX	71.7	43.8	57.8	5.1	82.0	11/7+	32.0	11/12	0.02	-0.40	5
Dallas, TX	72.6	46.8	59.7	4.6	88.0	11/1	35.0	11/28+	0.05	-2.52	2
Houston, TX	76.0	49.8	62.9	2.0	87.0	11/1	38.0	11/17+	0.65	-3.54	16
San Antonio, TX	74.3	52.2	63.2	3.2	86.0	11/5	38.0	11/28	0.27	-2.31	10

Summary of temperature and precipitation information from around the region for November 2012. Data provided by the Applied Climate Information System. On this chart, "depart" is the average's departure from the normal average, and "% norm" is the percentage of rainfall received compared with normal amounts of rainfall. Plus signs in the dates column denote that the extremes were reached on multiple days. Blue-shaded boxes represent cooler than normal temperatures; red-shaded boxes denote warmer than normal temperatures; tan shades represent drier than normal conditions; and green shades denote wetter than normal conditions.

Disclaimer: This is an experimental climate outreach and engagement product. While we make every attempt to verify this information, we do not warrant the accuracy of any of these materials. The user assumes the entire risk related to the use of these data. This publication was prepared by SRCC/SCIPP with support in part from the U.S. Department of Commerce/NOAA. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of NOAA

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The *Monitor* is an experimental climate outreach and engagement product of the Southern Regional Climate Center and Southern Climate Impacts Planning Program. To provide feedback or suggestions to improve the content provided in the *Monitor*, please contact us at **monitor@southernclimate.org.** We look forward to hearing from you and tailoring the *Monitor* to better serve you. You can also find us online at **www.srcc.lsu.edu** and **www.southernclimate.org**.

For any questions pertaining to historical climate data across the states of Oklahoma, Texas, Arkansas, Louisiana, Mississippi, or Tennessee, please contact the Southern Regional Climate Center at 225-578-502. For questions or inquiries regarding research, experimental tool development, and engagement activities at the Southern Climate Impacts Planning Program, please contact us at 405-325-7809 or 225-578-8374.