Southern Climate *Monitor*

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DEALING WITH DROUGHT IN THE SOUTHERN PLAINS

Alex Krautmann, Southern Climate Impacts Planning Program

The agricultural producers in the Oklahoma and Texas Panhandles are among the most knowledgeable in the county when it comes to successful farming in the marginal rainfall climate of the high plains. However, the Panhandle region has also been among the areas hardest hit by the current drought. To bring focus to this region, the Southern Climate Impacts Planning Program joined with the National Oceanic and Atmospheric Administration and National Integrated Drought Information System to present a regional drought outlook and assessment forum in early March. The forum involved about 45 people and was hosted by the Oklahoma Panhandle Research and Extension Center in Goodwell, OK.

Stakeholders discuss ongoing drought in western Oklahoma and Texas.

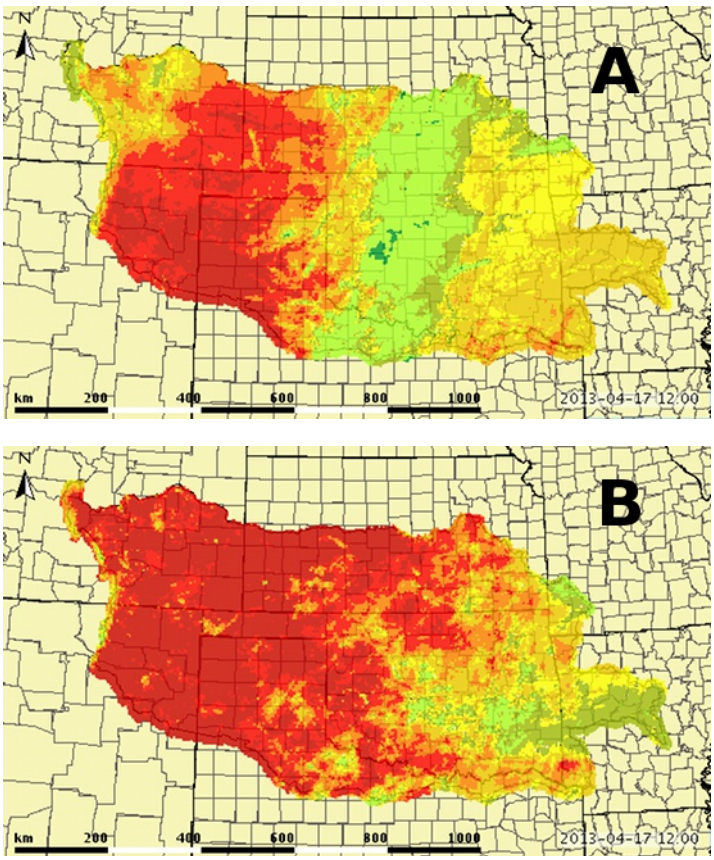
During the morning session, speakers presented information about the evolution and outlook of the drought. Since October 2010 most of the Southern Plains has grappled with historic drought conditions, punctuated by periods of precipitation and some short-term recovery. However, the Oklahoma and Texas Panhandles did not receive the beneficial spring 2012 rains that other parts of the region did and have truly been in a continuous two and a half year drought. Some of the Oklahoma records observed during this drought include the warmest summer on record in 2011, the driest May-December period on record in 2012, and the warmest year on record in 2012 along with the U.S. overall (since 1895). Prior to the onset of the current drought, the Southern Plains had generally been experiencing a 30-year wet period, causing many communities and businesses to become accustomed to above normal precipitation and suffer “drought memory loss.”

Even though recent rainfall has led to some short-term drought recovery across most of the Southern Plains, the Oklahoma and Texas Panhandles have again missed the reprieve. Experimental gridded soil moisture products from the Arkansas-Red Basin River Forecast Center tells the current story well, with the upper and lower soil zones in the Panhandle region remaining exceptionally dry and representative of long-term drought. As warmer springtime temperatures return and the growing season begins, regular precipitation will be needed to ensure regional drought recovery.

The outlook is not favorable for a return to El Nino conditions this year, which would be more likely to usher in much-needed drought relief. A third consecutive drier-than-normal spring season is becoming increasingly likely across the Panhandle region. “Another bad spring rainfall would be catastrophic for the Southern Great Plains,” said Gary McManus, Oklahoma Associate State Climatologist.

The afternoon session at the forum featured panel discussions on issues of concern and management practices relative to the multi-state region. Summaries of the agricultural drought

assessments that were discussed at the forum are included below.



Figures 2A and 2B are experimental soil moisture plots for the Arkansas-Red River Basin. Fig. 2A reperents the soil moisture anomaly for the top few inches of the soil, and Fig. 2B represents the next few feet. The darkest red illustrates soil moisture values that are less than 30 percent of normal soil moisture, and the darkest green values represent soil moisture values that are more than 150 percent of normal soil moisture. (http://www.srh.noaa.gov/abrfc/?n+exp_soil)

Crop Water Management

Hot summer temperatures that have been a hallmark of the current drought have increased the water required to raise crops. Based on a study using 15 years of weather observations from the Goodwell, OK Mesonet site (see www.mesonet.org), about 30 inches on average of irrigated water is moved through an annual corn crop on the High Plains. Due to very high evapotranspiration from heat, 45 inches of water was required for the corn crop in 2011. Since such excessive watering is not sustainable, the drought has caused agricultural producers to become especially conscientious when considering crop money return per inch of water used. At Oklahoma Panhandle State University fields during 2011, corn returned about $48 per inch of water used, whereas sorghum returned about $100 per inch of water. Sorghum has proven resilient as a dry land crop during the drought.

Water Supplies

The current price return for corn provides easy incentives to pump aquifer water, but state water managers in the Southern Plains are concerned about future availability. Kansas, for example, has more water rights on the books than can be sustainably supplied. A transition of more land to grazing or rangeland is one solution so as to reduce the amount of irrigation required. Agricultural producers use most of the water, but other competing interests include hydraulic fracturing for natural gas or out of state municipal drinking supplies. Local stakeholders are being encouraged to plan for their desired future condition in partnership with state and regional water managers.

Rangeland Management

Ranchers are also struggling to determine how animal gain can still be effectively achieved even though the drought has caused heat stress on animals and depleted food stocks. Since precipitation and animal stocking rate are the two most important impacts on the health of grassland pasture, agricultural producers have been forced

to reduce herd size. About 56% of annual grass yield is dependent on May and June precipitation in west Kansas, another indication of how important rainfall this spring will be to the continuation of drought. In the Oklahoma and Texas Panhandles, some pastures have not seen growth in three years due to harsh conditions, and grass cover in most places has deteriorated.

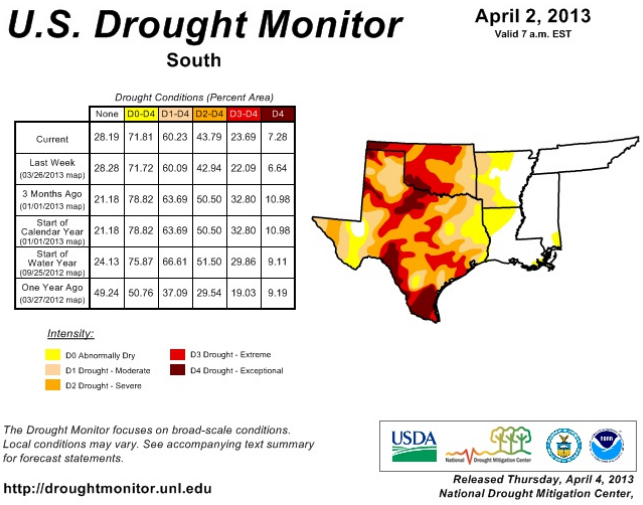
The Goodwell forum was part of a series of on-site meetings in Abilene, Lubbock, Austin, and Ft. Worth, TX over the past year with the purpose of updating local stakeholders on the current state of the drought, explaining climate outlooks for the upcoming season, and hearing from water resource and agriculture specialists about the impact the drought is having on their operations. Another theme that was clear from the forum is the stewardship and responsibility agricultural producers in the Panhandle region have for the land. Despite current challenges from the drought, those in attendance were still committed to preserving the land and water resources for future generations.

DROUGHT CONDITIONS

Luigi Romolo, Southern Regional Climate Center

Below normal precipitation totals in Texas have caused some drought conditions in the southern portions to worsen, but in general, drought conditions in the Southern Region have not changed significantly over the past month. As was the case last month, Louisiana, Mississippi and Tennessee remain drought free. Though there is still some moderate drought in western Arkansas, the bulk of the severe to extreme drought conditions are still localized to Texas and Oklahoma, with little changes to total areal extent.

In Texas, frontal passages have also been causing damage across the state, with several storm systems bringing thunderstorms high winds to the state. The driest portions of west Texas, particularly near and west of Lubbock, saw several high wind days that caused dust storms. Dry grasslands, driven by high winds from frequent frontal passages, are leading to growing fire concerns, as several wildfires have burned over 750 acres, such that $161 million dollars for fuel removal and wildfire control is in the process of passing through the state legislature (Information provided by the Texas State Climate Office).



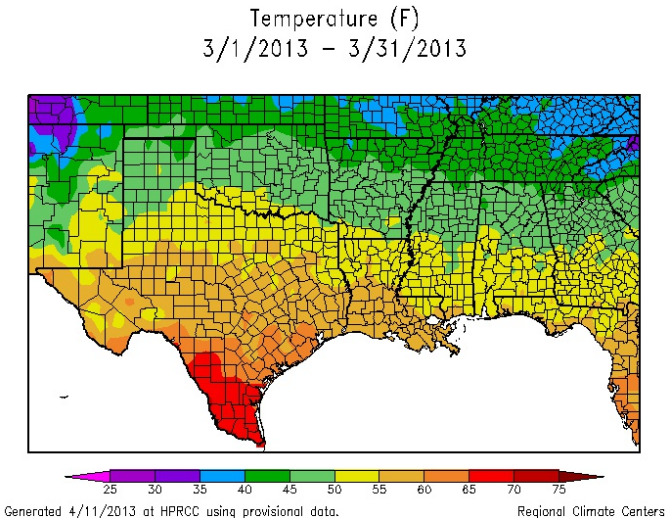
Above: Drought conditions in the Southern Region. Map is valid for March 2013. Image courtesy of the National Drought Mitigation Center.

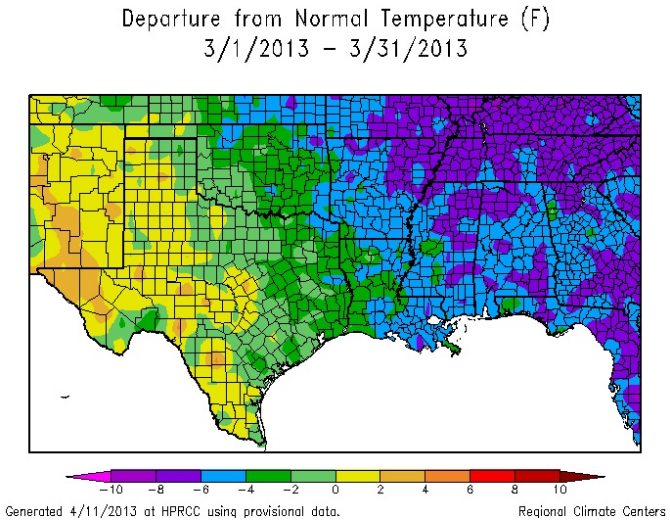
TEMPERATURE SUMMARY

Luigi Romolo, Southern Regional Climate Center

With the exception of Texas and Oklahoma, March proved to be a much cooler month than expected. Temperature averages throughout the central and eastern portions of the region ranged between 4 to 8 degrees F (2.22 to 4.44 degrees C) below normal, with the coldest anomalies situated in northeastern Arkansas, and throughout most of Tennessee. Temperatures in Oklahoma typically averaged only slightly cooler than normal. This was also the case for much of eastern Texas. In the western counties of Texas, temperatures averaged only slightly above normal.

The state average temperature values are as follows: Arkansas averaged 46.2 degrees F (7.89 degrees C), Louisiana averaged 55.2 degrees F (12.89 degrees C), Mississippi averaged 50.1 degrees F (10.06 degrees C), Oklahoma averaged 47.2 degrees F (8.44 degrees C), Tennessee averaged 42.6 degrees F (5.89 degrees C), and Texas averaged 56.9 degrees F (13.85 degrees C). Both Tennessee and Mississippi reported its sixth coldest March on record (1895-2013). For Arkansas, it was the tenth coldest March on record (1895-2013), while Louisiana posted its sixteenth coldest March on record (1895-2013). All other state rankings fell in the middle two quartiles.



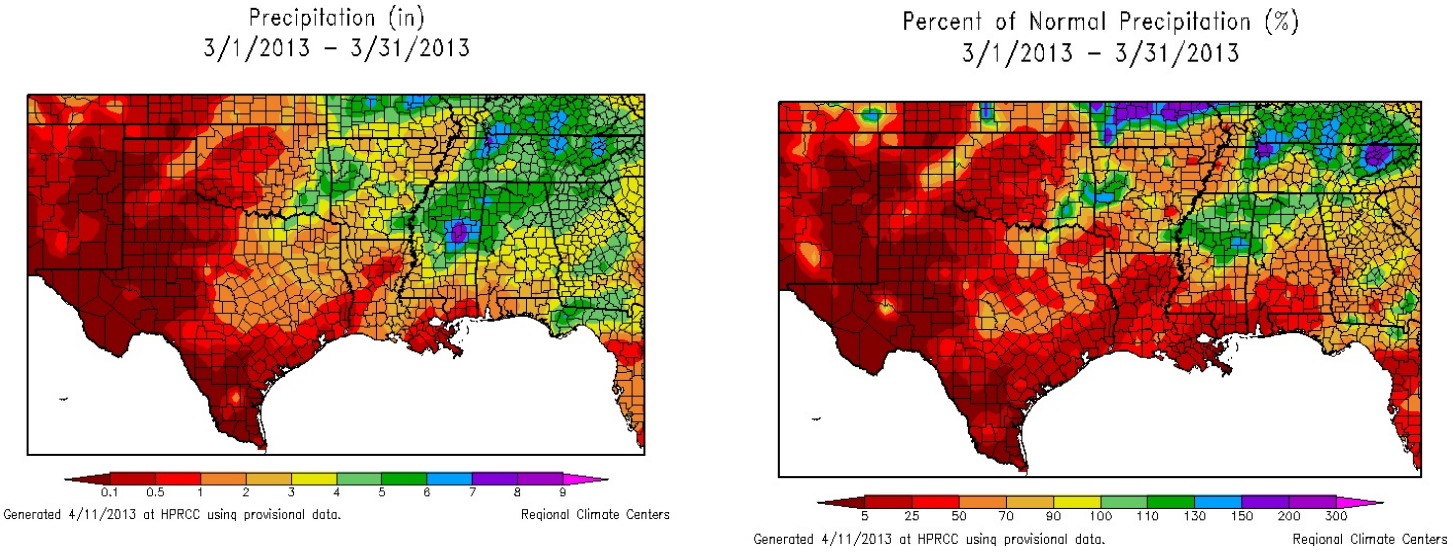


Average temperatures (left) and departures from 1971-2000 normal average temperatures (right) for March 2013, across the South.

PRECIPITATION SUMMARY

Luigi Romolo, Southern Regional Climate Center

March precipitation totals were generally below normal throughout most of the Southern Region. Texas had an extremely dry month, with a majority of stations receiving less than half the expected amounts. The driest parts of the region occurred in western and southern Texas, and along the gulf coast of the Southern Region, where most stations reported less than twenty-five percent of normal precipitation. In the western central counties of Texas, many stations averaged less than five percent of normal precipitation for the month. The state average precipitation totals for the month are as follows: Arkansas averaged 3.57 inches (90.68 mm), Louisiana averaged 1.46 inches (37.08 mm), Mississippi averaged 4.09 inches (103.89 mm), Oklahoma averaged 1.22 inches (30.99 mm), Tennessee averaged 5.05 inches (128.26 mm), and Texas averaged 0.71 inches (18.03 mm). For Louisiana, it was the fourth driest March on record (1895-2013), while Texas reported its twelfth driest March on record (1895-2013). Oklahoma experienced its twenty-third driest March on record (1895-2013), while for Mississippi, it was their twenty-seventh driest March on record (1895-2013). All other state rankings fell in the middle two quartiles.

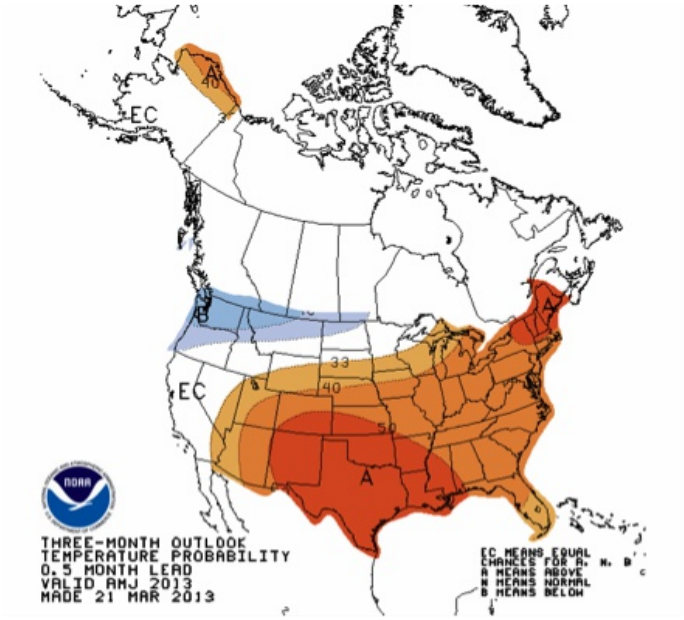


Total precipitation values (left) and The percent of 1971-2000 normal precipitation totals (right) for March 2013.

SPRING FORECASTS CALLS FOR HOT AND DRY

Barry Keim, Louisiana State Climatologist, Louisiana State University

Spring has sprung, with the vernal equinox having occurred this past Marth 20th. Winter was warm and wet across Louisiana, but the forecast for the Spring (defined here as April, May, and June) calls for warmer and drier than normal conditions, according the Climate Prediction Center. As shown below, most of the eastern two-thirds of the country, including Louisiana, have greater than average odds of being warm this spring. Only the Pacific Northwest through northern Montana and North Dakota is expected to be colder than normal. Regarding precipitation, most of the West Coast, extending through the Four Corners region (Arizona, Utah, Colorado, and New Mexico) and Texas and on through the Gulf Coast is expected to be drier than normal. This certainly continues the recent pattern of drought in our area, and especially in Texas. The Midwest is expected to be wetter than normal, suggesting a storm tracking pattern aimed toward the Great Lakes this Spring. Remember, however, that long lead forecasts are only so accurate. Surely they're getting better, but I wouldn't bet the farm on their accuracy. If you have any questions, feel free to contact me at keim@lsu.edu.



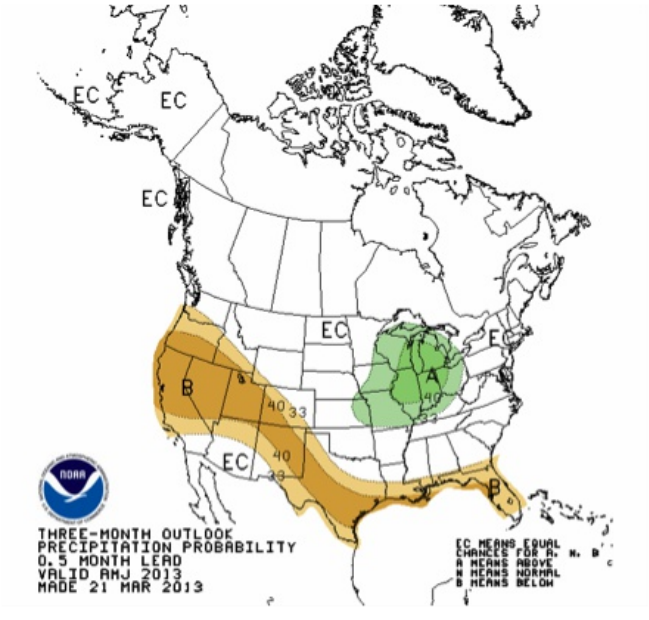


Figure 1: Forecast for April, May and June from the Climate Prediction Center. Graphics from <http://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=1>.

CLIMATE PERSPECTIVE

State	Temperature	Rank	Precipitation	Rank
Arkansas	46.2	10th Coldest	3.61	38th Driest
Louisiana	55.2	16th Coldest	1.51	4th Driest
Mississippi	50.2	6th Coldest	4.11	28th Driest
Oklahoma	47.3	35th Coldest	1.25	24th Driest
Tennessee	42.6	6th Coldest	5.07	58th Driest
Texas	57.0	53rd Coldest	0.72	12th Driest

State temperature and precipitation values and rankings for March 2013. 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	62.9	39.0	50.9	-5.5	79.0	3/16+	23.0	3/3	3.06	-2.09	59
Little Rock, AR	59.6	38.3	49.0	-4.4	81.0	3/15	23.0	3/3	4.57	-0.31	94
Baton Rouge, LA	69.3	43.6	56.4	-3.9	82.0	3/18	26.0	3/3	2.91	-2.16	57
New Orleans, LA	69.1	49.1	59.1	-3.3	83.0	3/18	35.0	3/3	1.08	-4.16	21
Shreveport, LA	67.6	43.1	55.4	-3.1	81.0	3/17+	26.0	3/3	3.58	-0.60	86
Greenwood, MS	60.5	37.5	49.0	-7.3	76.0	3/18+	20.0	3/3	5.82	0.03	101
Jackson, MS	65.0	39.5	52.2	-4.6	84.0	3/18	22.0	3/3	5.59	-0.15	97
Tupelo, MS	59.2	37.1	48.1	-5.0	78.0	3/15	26.0	3/27+	4.33	-1.97	69
Oklahoma City, OK	61.4	37.5	49.4	-1.6	82.0	3/15	18.0	3/26	1.09	-1.81	38
Ponca City, OK	58.2	33.8	46.0	-3.2	82.0	3/15	18.0	3/26	0.62	-2.32	21
Tulsa, OK	58.7	36.6	47.7	-3.7	84.0	3/15	22.0	3/26	1.10	-2.47	31
Knoxville, TN	53.1	35.0	44.0	-5.7	76.0	3/16	20.0	3/4	5.49	0.32	106
Memphis, TN	57.8	39.2	48.5	-5.0	77.0	3/15	22.0	3/3	3.38	-2.20	61
Nashville, TN	54.6	35.1	44.9	-5.2	78.0	3/16	22.0	3/21	4.32	-0.55	89
Amarillo, TX	66.3	34.9	50.6	2.7	85.0	3/15	21.0	3/25	0.15	-0.98	13
El Paso, TX	74.4	46.2	60.3	3.3	85.0	3/16+	33.0	3/24+	0.00	-0.26	0
Dallas, TX	67.8	45.0	56.4	-1.0	88.0	3/4	31.0	3/26+	2.27	-0.79	74
Houston, TX	73.2	49.3	61.2	-1.0	90.0	3/18	31.0	3/3	0.89	-2.47	26
San Antonio, TX	76.1	49.4	62.7	0.6	95.0	3/18	33.0	3/1	0.95	-0.94	50

Summary of temperature and precipitation information from around the region for March 2013. 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.