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Southern Climate Monitor

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The Southern Climate Monitor is available at
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Local Drought Management

Mark Shafer, SCIPP Director, University of Oklahoma

Local Drought Management

Since about 2000, great strides have been made in monitoring, planning for, and managing drought. The work of the National Drought Mitigation Center, Western Governors' Association, National Integrated Drought Information System, and particularly the U.S. Drought Monitor authors, have created an integrated, national network of researchers, practitioners, and agencies who are working to improve resilience to the impacts of drought. While great strides have been made among national partners, federal agencies, and state governments, less is known about how these improvements connect to local communities. For example, does the weekly depiction in the U.S. Drought Monitor (USDM), which draws upon many new and improved data sources, accurately correspond with perceptions of drought in local communities?

To examine the relationship between national coordination and local challenges, SCIPP designed and administered a survey that was distributed electronically to county officials in the six-state region served by SCIPP. The survey was distributed in the Fall of 2014 and drew 331 respondents. These included representatives from counties and parishes, including Natural Resources Conservation Service, Farm Service Administration, Cooperative Extension, Emergency Management, and Water Districts.

The survey revealed an active, local network, particularly in more drought-stricken states of Texas and Oklahoma. Within the network, participants had access to a wealth of information, although there remain opportunities to improve communication channels between national and local monitoring efforts. The greatest needs for additional information included more localized

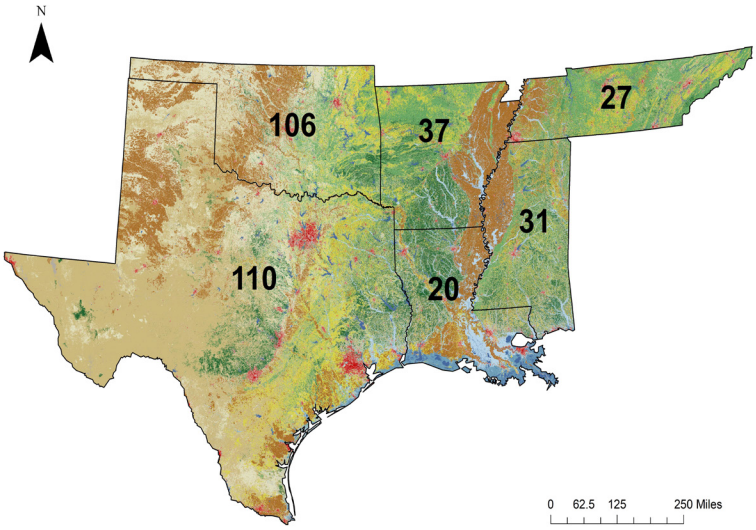


Figure 1: States represented in the survey. Map shows the number of responses for each state.

information, historical context, additional indicators, and improved forecasts.

Perceptions and Actions Related to Drought

At the time the survey was distributed, a severe multi-year drought continued across the western part of the region (Texas and Oklahoma), while shorter-lived droughts had affected the eastern states (Arkansas, Louisiana, Mississippi, and Tennessee) during the preceding several years. Consequently, more respondents indicated having experienced moderate or extreme impacts from the western part of the region while more respondents in the east indicated few or no impacts.

Few respondents had a formal role in drought management, although most monitored drought conditions and had an informal role in their offices, counties, or local networks. Most indicated that their agency would begin taking drought management actions at an equivalent to a D2 – severe drought – level of the USDM.

Types of actions varied by sector, but nearly all indicated a gradually increasing level of effort as drought severity increased. Typical actions for water managers revolved around measuring pond levels, stream flow, and groundwater, with actions taken to help supplement water supplies at more extreme levels. Agriculture activities were related to monitoring crop growth, pasture conditions, livestock, and forestry, with efforts to get financial assistance and supplemental feed as drought severity increased. Wildfire management included burn bans and monitoring fuels; education efforts involved meeting with producers and ranchers, urban settings, and the public; and financial assistance included FSA programs, emergency loans, and restructuring debt. Monitoring, meeting and reporting all increased with drought severity. At more severe levels of drought, concerns with wind erosion, wildlife, air quality, and heat were indicated.

Despite a range of actions, nearly 80% or respondents indicated that they did not have specific measures or triggers to spur action. Measures mentioned included monitoring reservoir levels, the USDM, precipitation departures, well or aquifer levels, available forage, stream flow, water use, soil moisture, water restrictions, plant and crop health, fire danger and burn bans, pond levels, and producer requests for assistance.

Monitoring Drought

Respondents were asked to rank indicators, impacts, and information sources according to their importance as a source. Indicators and impacts were ranked on a scale from not relevant to critical indicator; information sources were ranked based upon frequency of use. Among drought indicators, soil moisture, the USDM, and precipitation and temperature departures were ranked by most as highly relevant or a critical indicator. The order of rankings were similar among the "dry states" compared to the "wet states", although indicators were more frequently ranked as highly relevant or a critical indicator across-the-board in the dry states.

Impact-based indicators were more variable, with crop status, county burn bans, drought reports, groundwater, vegetation health, and reservoir storage among the top measures. Crop status as ranked as most important in both the wet and dry states, but there was less emphasis in the dry states on reported drought impacts and media reports. This may be attributable, in part, to a more aggressive inclusion of drought impacts and media coverage in the Drought Monitor discussion in Oklahoma and Texas; therefore respondents may have considered that such information was already accounted for in the USDM and instead concentrated on other impacts. Water-based impacts, such as reservoir storage, water quality, and groundwater depth, were more predominant in the dry states.

Indicator	"Wet States"	"Dry States"
Soil Moisture	75	92
U.S. Drought Monitor	76	86
Precipitation Departures from Normal	67	88
Temperature Departures from Normal	57	78
Palmer Drought Severity Index	53	59
U.S. Drought Outlook	44	66
5-Day Forecasts	42	58
Keetch-Byrum Drought Index	33	58
Standardized Precipitation Index	33	54
30-Day Forecasts	35	50
8-14 Day Forecasts	32	47
Precipitation Ranks	31	46
Temperature Ranks	24	47
Seasonal Forecasts	25	46

Figure 2: Percentages of respondents who ranked the indicators as Highly Relevant or Critical Indicator in the "Wet States" (AR, LA, MS, TN) and the "Dry States" (OK, TX).

The National Weather Service was the principal source of information in both the wet states (82% accessing it daily, weekly, or monthly) and the dry states (91%). USDA was the next most-frequently-accessed source, followed by state or local Mesonet, and state climate office. State Mesonets were a more frequent source in the dry states (67% compared to 20%), likely in large part

because regional or statewide networks are only available in Oklahoma and Texas within the SCIPP region. CoCoRaHS was more commonly used in the wet states, where access to Mesonets is more limited. Surprisingly, agencies providing information on water resources, such as the U.S. Army Corps of Engineers and USGS stream gauge network, were consulted less frequently in the dry states, even though water-based indicators were rated as higher importance.

The U.S. Drought Monitor

The USDM seeks to synthesize all of these indicators and sources into a weekly composite. This weekly analysis is in part dependent upon local sources of information and expertise, provided through its listserve discussion group. If the national efforts at managing drought are reflective of local perceptions, than the USDM should be viewed as usually accurate in the survey results. However, only 45% of respondents considered the USDM to be usually accurate. Seventeen percent had no opinion or were not familiar with the USDM. Of those who felt it was often inaccurate, respondents indicated more of a tendency for it to lag rather than overestimate. This may be partially explained by the USDA's use of the USDM as a trigger for aid, creating more scrutiny of the index before reaching the threshold for aid.

As of Fall 2014, Oklahoma and Texas, and to a somewhat lesser extent Louisiana, all had a noticeable presence in the weekly discussions; less local input was provided from Arkansas, Mississippi, and Tennessee [participation in these other states has improved since the time of the survey]. Not surprisingly, respondents from the states with more frequent input rated the accuracy of the USDM more highly than states with less frequent input. However, even the best-performing state (Texas) achieved only 55% of respondents rating it as "usually accurate", suggesting there may be local variations and impacts that are not adequately captured in the weekly depiction.

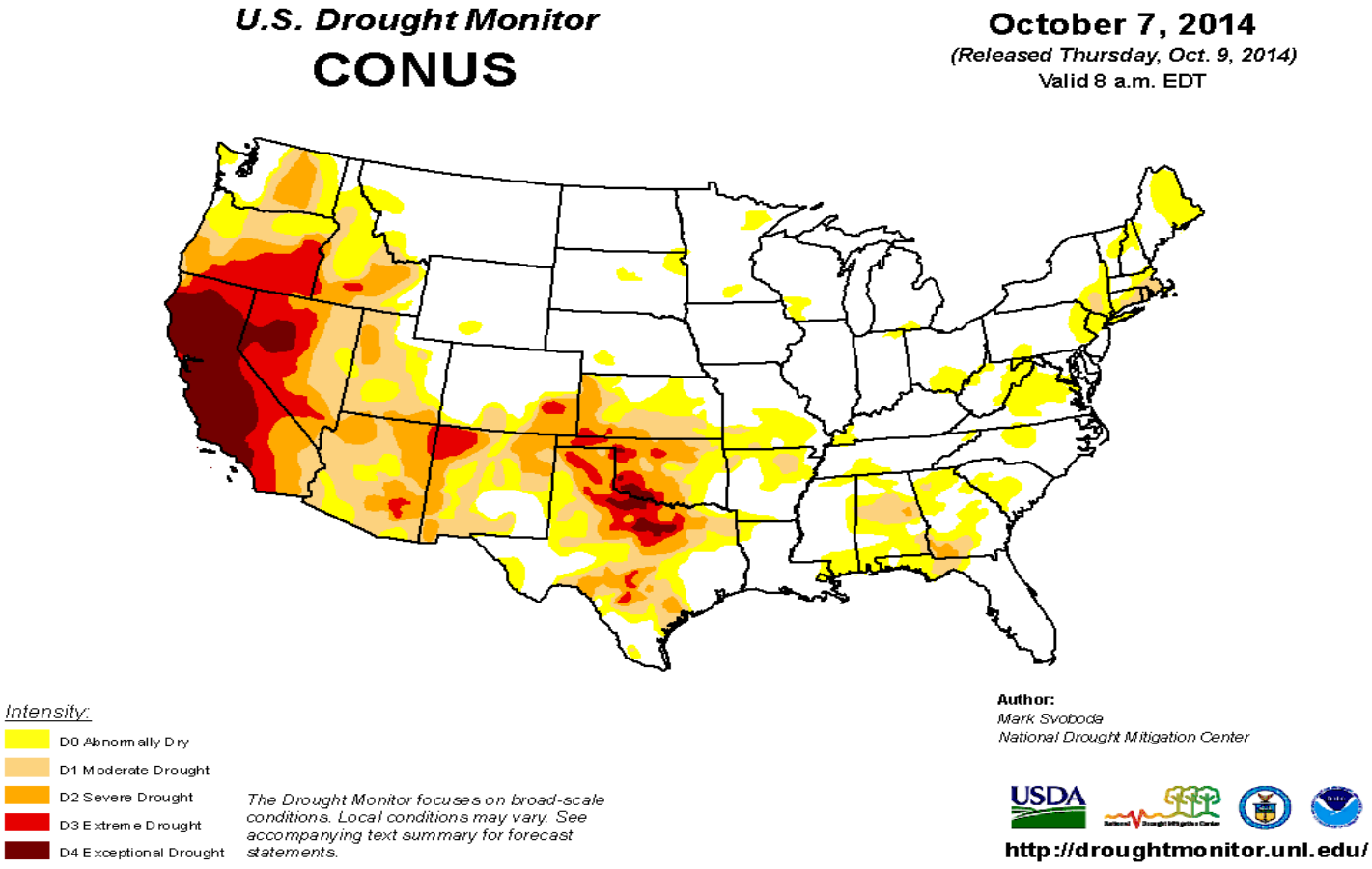


Figure 3: USDM October 7, 2014

Respondents were asked, "If you suspected there were some emerging drought issues in your area or the USDM was not accurately portraying local conditions, who would you contact to investigate?" The response was open-ended. Responses were coded as to organizations mentioned and then evaluated for whether those organizations were frequent participates in USDM discussions. Oklahoma, Louisiana, and Arkansas respondents were most likely to correctly identify a source that participated in the USDM discussion, with 28%-38% of respondents in these states accurately identifying such contacts. Three respondents from Oklahoma mentioned the state climatologist, who is a frequent contributor to the USDM, by name. The least connected state appeared to be Texas (13%), which is counter-intuitive given that Texas had the highest percentage (55%) who indicated that the USDM was usually accurate. Because of the higher accuracy, perhaps, local officials in Texas did not feel as compelled to voice their concerns. Tennessee and Mississippi appear to be the least-connected to the USDM process and expressed substantial concerns about its accuracy.

Communicating

Most respondents (62%) communicate drought status to other individuals, organizations, or agencies. These include USDA offices, producers or clients, local organizations, the public, water districts, and state and federal agencies. However, only 45% indicated that they receive notification from other sources, suggesting the need for local offices to make efforts to collect and relay the information directly. Sources that provide information included the USDA, National Weather Service, state agencies, state Mesonets, farmers, or media. Written material were the preferred form of communication, with newspapers, radio, television, direct mail, and email seen as most effective. Social media posts and website messages were also commonly used, although not considered as effective as other sources. Respondents also mentioned using billboards, fact sheets, flyers in agricultural businesses, mass notification systems, general education, and word of mouth.

Full survey results are available at http://www.southernclimate.org/documents/Regional_Drought_Survey_Summary.pdf

Drought Update

Kyle Brehe and Rudy Bartels,
Southern Regional Climate Center

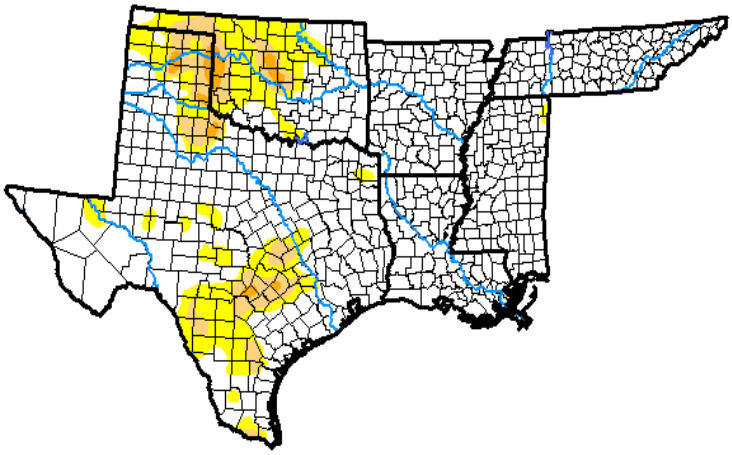
Over the month of July 2017, drought conditions improved for some parts of the region, such as areas in eastern Texas and northeastern Mississippi. In contrast, drought conditions worsened in the panhandles of Texas and Oklahoma, central Oklahoma, and southern Texas. Currently there are areas of severe drought present in Oklahoma and Texas. At this time there are no areas of extreme or exceptional drought. Parts of Oklahoma and southern Texas became abnormally dry whereas parts of northwestern Louisiana, northeastern Mississippi, and central Texas improved from abnormally dry to normal conditions.

On July 2, 2017, there was a tornado reported in Craighead, Arkansas. There were also over a dozen wind events reported throughout the region, with Osage, Oklahoma reporting 80 mph (128.75 kph) winds.

On July 3, 2017, there was a tornado reported in Dyer, Tennessee. A macroburst wind event in Hockley, Texas caused an injury. There was an 80 mph (128.75 kph) wind gust reported in Woodward, Oklahoma.

On July 5, 2017, there were two tornado reports in Tennessee. In Humphreys, Tennessee, a tornado caused uprooted trees and structural damage.

On July 15, 2017, there were two tornadoes reported, one in Polk, Texas and the other in Calcasieu, Louisiana. In Polk, Texas the tornado caused property damage to storage and roofs. There was a 60 mph (96.56 kph) in Cleveland, Oklahoma which bent a few street signs and caused roads to be blocked by debris.



Released Thursday, Jul. 27, 2017
Richard Heim, NCEI/NOAA

Above: Drought conditions in the Southern Region. Map is valid for July 25, 2017. Image is courtesy of National Drought Mitigation Center.

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	80.36	19.64	6.69	1.17	0.00	0.00
Last Week *07-18-2017*	81.09	18.91	5.65	0.39	0.00	0.00
3 Months Ago *04-25-2017*	76.16	23.84	5.13	0.00	0.00	0.00
Start of Calendar Year *01-03-2017*	53.95	46.05	27.69	11.09	1.11	0.00
Start of Water Year *09-27-2016*	76.89	23.11	6.74	1.89	0.28	0.11
One Year Ago *07-26-2016*	55.49	44.51	11.56	2.87	0.36	0.00

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.

Temperature Summary

Kyle Brehe and Rudy Bartels,
Southern Regional Climate Center

July had near to above normal temperatures for most of the region. There were clusters of 3 to 5 degrees F above normal temperatures in northern and southern Texas, western Oklahoma, southern Arkansas, and central Tennessee. Eastern Tennessee, northeastern Mississippi, northern Louisiana, central Oklahoma, and many parts of Texas reported 1 to 3 degrees F above normal temperatures. In contrast, parts of northern Arkansas, western Texas, central Louisiana, and southern Mississippi were 1 to 2 degrees F below normal temperatures. Each state in the southern region had clusters of near normal temperatures. The statewide monthly average temperatures were as follows: Arkansas reporting 80.50 degrees F (26.94 degrees C), Louisiana reporting 82.40 degrees F (28.00 degrees C), Mississippi reporting 81.30 degrees F (27.39 degrees C), Oklahoma reporting 82.40 degrees F (28.00 degrees C), Tennessee reporting 78.10 degrees F (25.61 degrees C), and Texas reporting 83.50 degrees F (28.61 degrees C). The state-wide temperature rankings for July are as follows: Arkansas (fifty-fourth warmest), Louisiana (forty-second warmest), Mississippi (forty-fifth warmest), Oklahoma (forty-seventh warmest), Tennessee (thirty-sixth warmest), and Texas (twenty-seventh warmest). All state rankings are based on the period spanning 1895-2017.

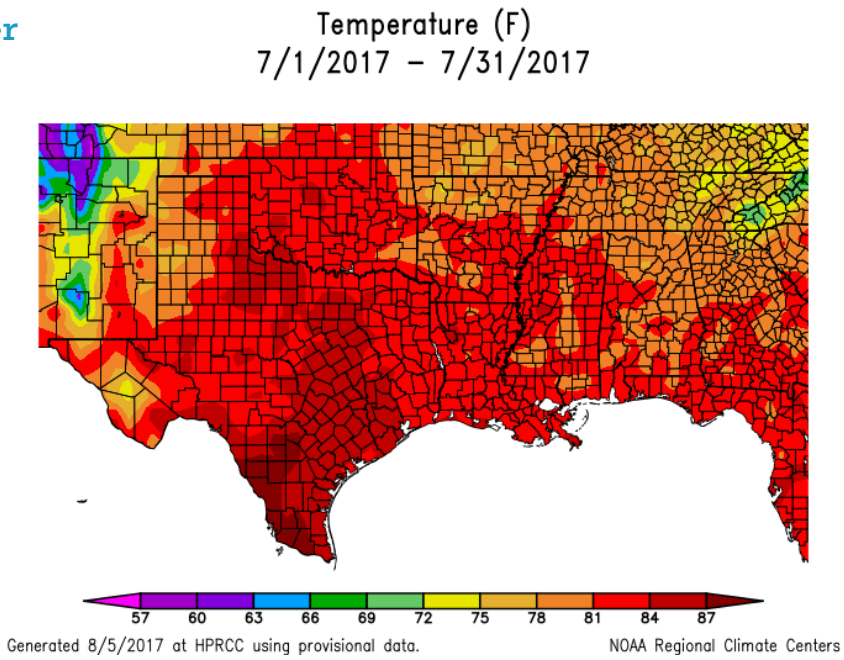


Figure 1: Average Temperature for the month of July, 2017 across the Southern Region

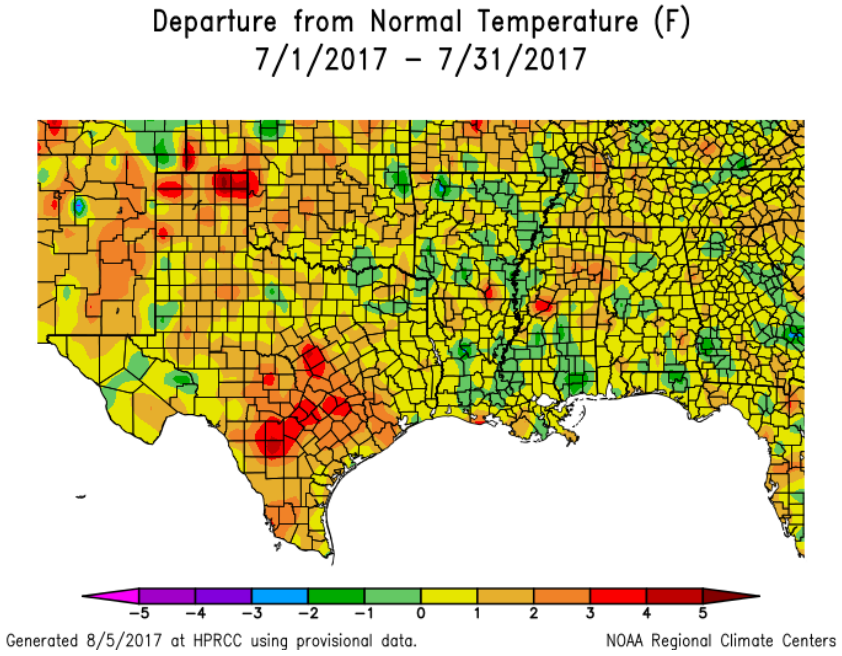


Figure 2: Departure from normal temperatures for the month of July, 2017 in the Southern Region.

Precipitation Summary

Kyle Brehe and Rudy Bartels,
Southern Regional Climate Center

Precipitation values for the month of July varied spatially across the Southern Region. Parts of southern Oklahoma, and northern and western Texas were 300% of normal precipitation. Central Tennessee, northern and western Arkansas, southern Mississippi, western and southern Oklahoma, and northern, eastern, and western Texas reported 150 – 300% of normal precipitation. In contrast, parts of northern Mississippi, southeastern Louisiana, southeastern Arkansas, northern Oklahoma, and western and southern Texas were 0 – 50% of normal precipitation. The state-wide precipitation totals for the month are as follows: Arkansas reporting 4.48 inches (113.79 mm), Louisiana reporting 4.47 inches (113.54 mm), Mississippi reporting 4.51 inches (114.55 mm), Oklahoma reporting 3.58 inches (90.93 mm), Tennessee reporting 5.15 inches (130.81 mm), and Texas reporting 2.33 inches (59.18 mm). The state precipitation rankings for the month are as follows: Arkansas (thirty-eighth wettest), Louisiana (twenty-ninth driest), Mississippi (fifth-sixth driest), Oklahoma (thirty-ninth wettest), Tennessee (thirty-sixth wettest), and Texas (sixty-first driest). All state rankings are based on the period spanning 1895-2017.

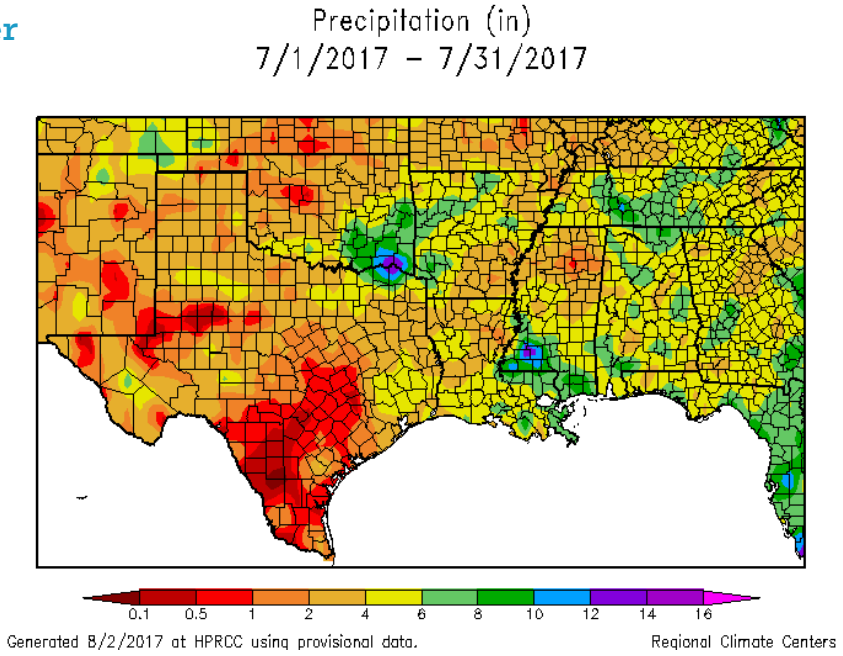


Figure 1: Total precipitation for the month of July, 2017 within the Southern Region.

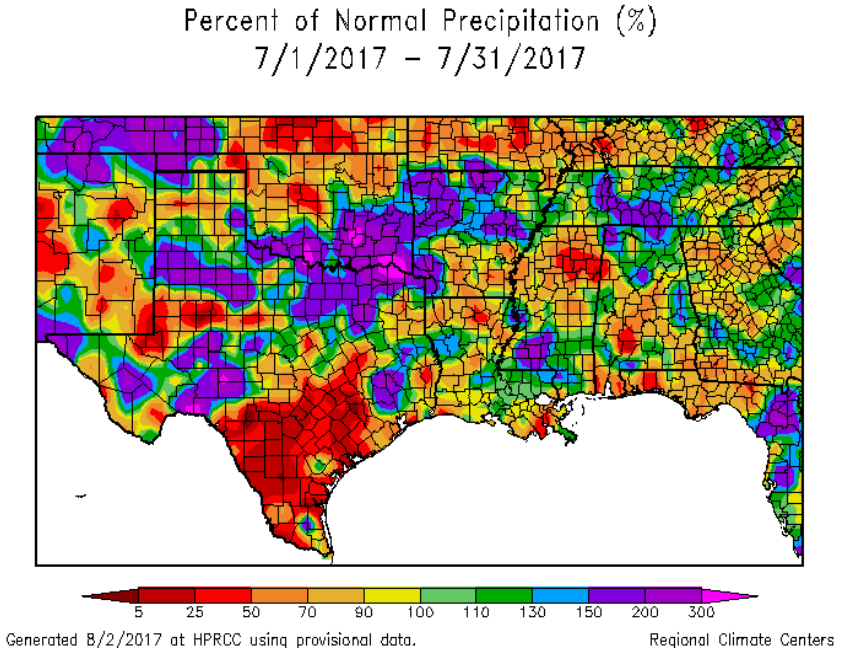
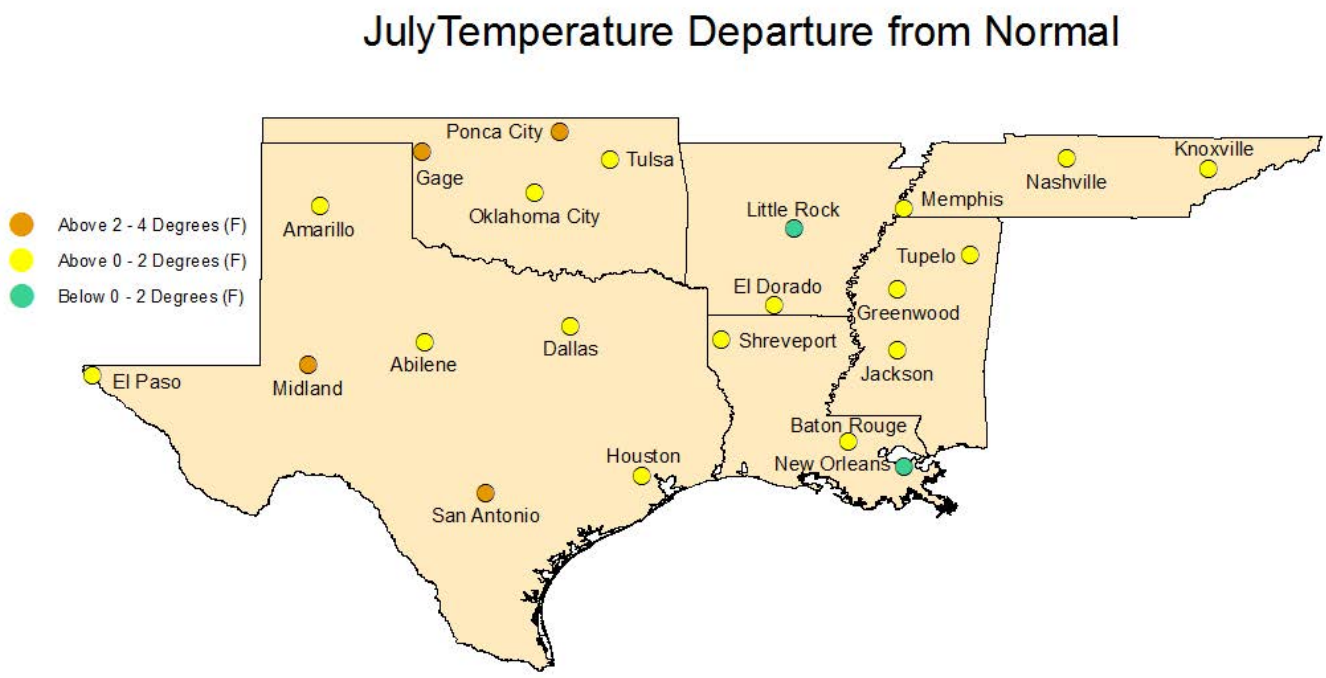
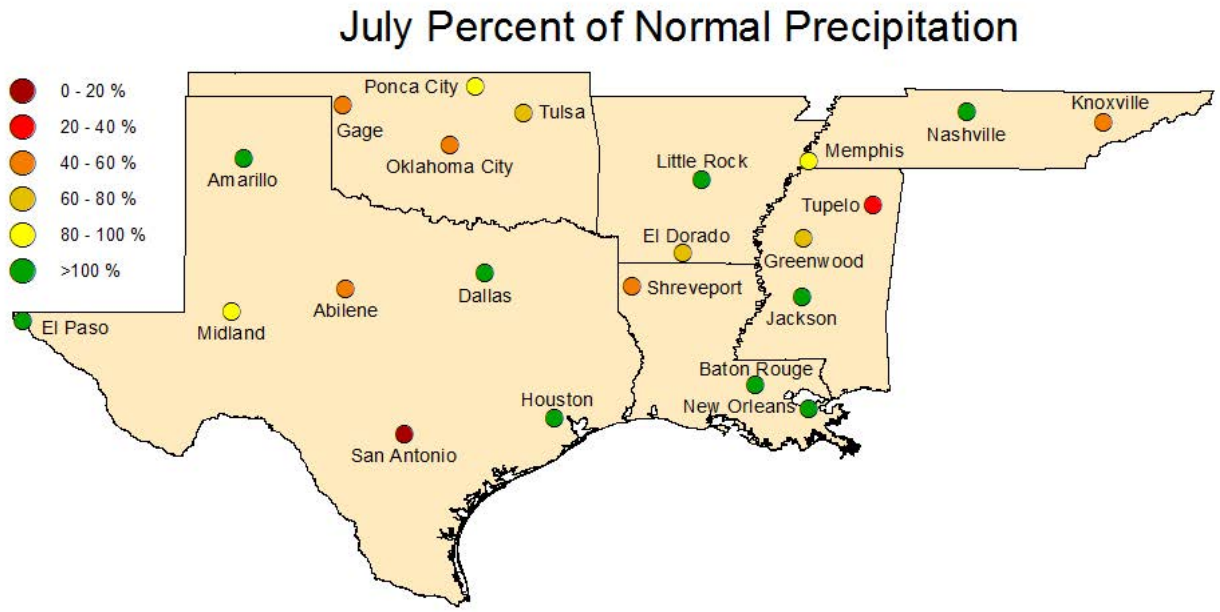


Figure 2: Percent of normal precipitation for the month of July, 2017 within the Southern Region.

Regional Climate Perspective in Pictures



July 2017 Temperature Departure from Normal from 1981-2010 for SCIPP Regional Cities



July 2017 Percent of 1981-2010 Normal Precipitation Totals for SCIPP Regional Cities

Climate Perspective

State	Temperature	Rank (1895-2017)	Precipitation	Rank (1895-2017)
Arkansas	80.50	54th Warmest	4.48	38th Wettest
Louisiana	82.40	42nd Warmest	4.47	29th Driest
Mississippi	81.30	45th Warmest	4.51	56th Driest
Oklahoma	82.40	47th Warmest	3.58	39th Wettest
Tennessee	78.10	36th Warmest	5.15	36th Wettest
Texas	83.50	27th Warmest	2.33	61st Driest

State temperature and precipitation values and rankings for July 2017. Ranks are based on the National Climatic Data Center's Statewide, Regional, and National Dataset over the period 1895-2017.

Station Summaries Across the South

Station Summaries Across the South

Station Name	Temperatures								Precipitation (inches)		
	Averages				Extremes				Totals		
	Max	Min	Mean	Depart	High	Date	Low	Date	Obs	Depart	%Norm
El Dorado, AR	92.5	71.9	82.2	0.5	97	07/21+	65	07/31+	2.36	-1.20	66
Little Rock, AR	91.4	72.1	81.8	-1.0	96	07/23+	66	07/31+	4.76	1.49	146
Baton Rouge, LA	91.9	74.1	83.0	0.0	97	07/20	70	07/31+	6.44	1.48	130
New Orleans, LA	91.0	75.4	83.2	-0.1	96	07/27+	71	07/24+	6.50	0.57	110
Shreveport, LA	93.9	74.0	83.9	0.9	100	07/28	69	07/10	1.90	-1.75	52
Greenwood, MS	92.0	72.2	82.1	0.8	97	07/21+	63	07/30	2.38	-1.22	66
Jackson, MS	92.1	73.2	82.7	1.1	97	07/20	69	07/10	7.26	2.45	151
Tupelo, MS	92.8	71.8	82.3	0.9	98	07/26+	64	07/30	1.36	-2.54	35
Gage, OK	96.8	70.1	83.5	3.3	105	07/22+	59	07/01	1.07	-0.83	56
Oklahoma City, OK	95.0	71.1	83.0	0.0	103	07/22	66	07/04	1.31	-1.62	45
Ponca City, OK	94.7	73.5	84.1	2.4	105	07/22	64	07/01	3.26	-0.07	98
Tulsa, OK	93.4	73.8	83.6	0.7	101	07/22+	65	07/30	2.23	-1.13	66
Knoxville, TN	88.5	68.4	78.4	0.0	96	07/22	62	07/31+	3.02	-2.06	59
Memphis, TN	92.3	73.9	83.1	0.4	99	07/21	67	07/30	3.91	-0.68	85
Nashville, TN	91.6	71.1	81.4	2.0	98	07/22+	63	07/30	4.23	0.59	116
Abilene, TX	95.9	71.6	83.8	0.7	103	07/29	63	07/01	1.05	-0.82	56
Amarillo, TX	94.3	65.8	80.1	1.8	100	07/26	57	07/04	3.83	0.99	135
El Paso, TX	95.0	72.4	83.7	0.9	104	07/04	68	07/29+	3.37	1.82	217
Dallas, TX	96.1	77.2	86.6	1.3	102	07/28	70	07/04+	4.12	1.95	190
Houston, TX	94.5	76.2	85.3	0.9	100	07/29	72	07/31	6.29	2.50	166
Midland, TX	96.2	72.3	84.2	2.1	102	07/30	67	07/06	1.48	-0.34	81
San Antonio, TX	98.7	76.5	87.6	3.0	105	07/30	72	07/16	0.16	-2.58	6

Summary of temperature and precipitation information from around the region for July 2017. 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. Blueshaded boxes represent cooler than normal temperatures; redshaded boxes denote warmer than normal temperatures; tan shades represent drier than normal conditions; and green shades denote wetter than normal conditions.

Updated Hurricane Season Forecast Increases Storm Total

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

The Colorado State University team of Philip Klotzbach and Michael Bell recently updated their hurricane season forecast for 2017 and the news isn't terrible, but it's not good either. As shown in Table 1 below, they have upgraded the number of total storms from 11 in the April forecast to 14 in June and now they're projecting 15 named storms for this season. Note that we have already had 3 named storms in the Atlantic Basin (which includes the Gulf of Mexico), so they anticipate another 12 storms this season. What is even more disconcerting is they've upgraded the number of hurricanes from 4 in April to 6 in June, and now they're forecasting 8 hurricanes for this season, none of which have occurred. In addition, the forecast for major hurricanes just jumped from 2 to 3 over the past month. While admittedly these are just numbers and a forecast, it does suggest that the 2017 season is likely to be one that is above normal, and the more storms that form out there, the more storms we need to dodge. And I think you already know how successfully we dodged Tropical Storm Cindy.

The main reasons for the uptick in the forecast is that it is becoming increasingly clearer that El Nino will not play a role in this season. El Ninos serve to knock down the number of storms by increasing wind shear over the Atlantic hurricane breeding grounds. Also, the sea surface temperatures across the tropical and subtropical Atlantic remain above normal. So, we're not looking at a record-breaking season or anything, but above normal activity doesn't sit well either. Please contact me with any questions at keim@lsu.edu.

ATLANTIC BASIN SEASONAL HURRICANE FORECAST FOR 2017*

Forecast Parameter and 1981-2010 Median (in parentheses)	Issue Date 6 April 2017	Issue Date 1 June 2017	Issue Date 5 July 2017	Observed Activity Through June 2017	5 July Forecast for Remainder of 2017
Named Storms (NS) (12.0)	11	14	15	3	12
Named Storm Days (NSD) (60.1)	50	60	70	4	66
Hurricanes (H) (6.5)	4	6	8	0	8
Hurricane Days (HD) (21.3)	16	25	35	0	35
Major Hurricanes (MH) (2.0)	2	2	3	0	3
Major Hurricane Days (MHD) (3.9)	4	5	7	0	7
Accumulated Cyclone Energy (ACE) (92)	75	100	135	3	132
Net Tropical Cyclone Activity (NTC) (103%)	85	110	140	7	133

Table 1. Hurricane Season Forecast for 2017 from Colorado State University and the Tropical Meteorology Project found at http://webcms.colostate.edu/tropical/media/sites/111/2017/07/2017-07.pdf

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Contact Us

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 & 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 225-578-5021.

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.

SCIPP
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From Our Partners

South Central Climate Science Center

August 21, 2017 : Updated Version of "Managing for a Changing Climate" Online Course Available

The DOI South Central Climate Science Center is launching an updated version of its popular free online course "Managing for a Changing Climate." The course, which was originally launched in fall 2016, provides participants with an overview of the climate system and its impacts on natural and cultural resources. The updated version, available on August 21, 2017, contains new videos and supplemental content. The course is open to the public and can be completed at one's own pace. Course content was developed in partnership with NextThought LLC, NASA through the Oklahoma Space Grant Consortium, and the University of Oklahoma College of Atmospheric and Geographic Sciences. The project was supported by grant number G15AP00136 from the Geological Survey. For more information contact Emma Kuster, emmakuster@ou.edu

Monthly Comic Relief