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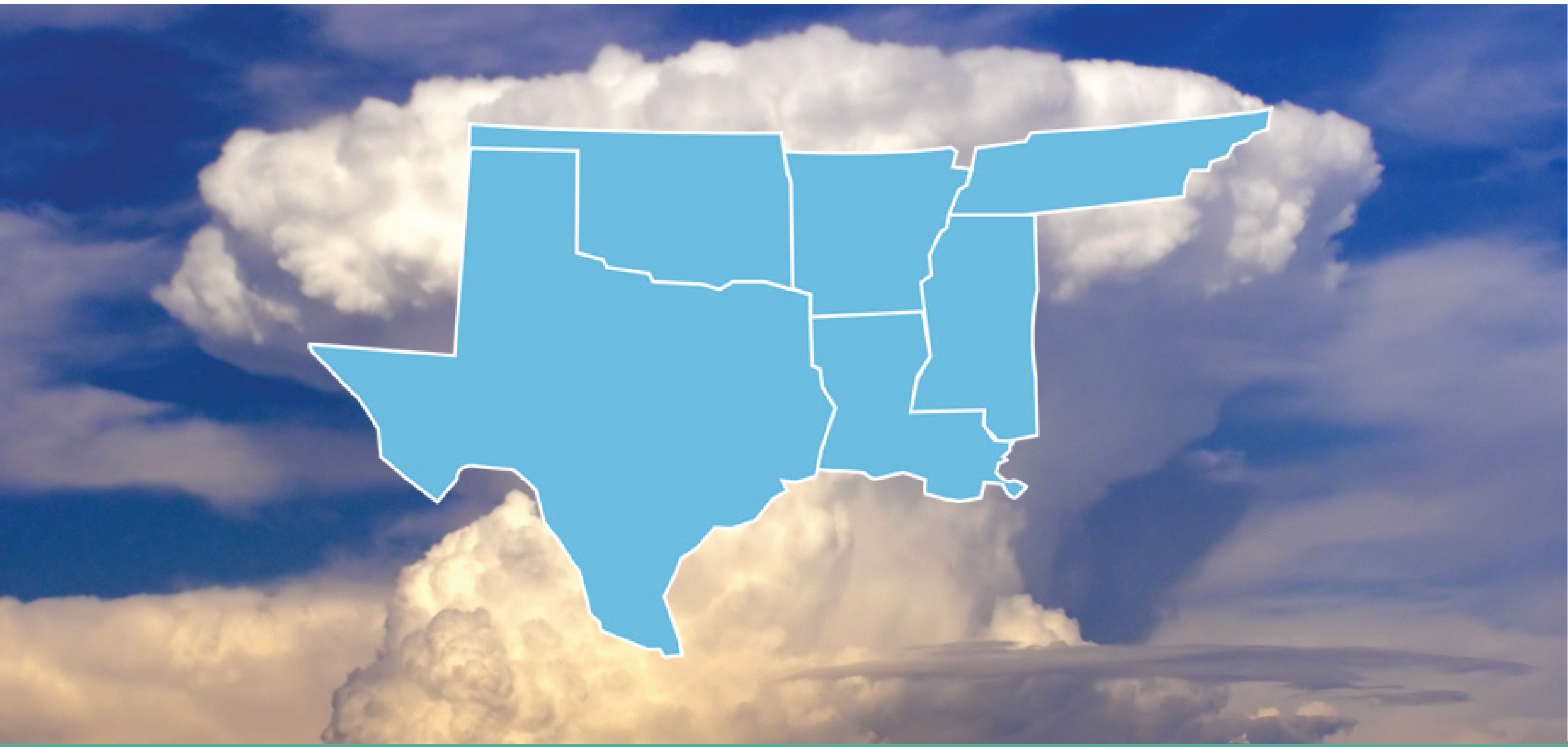

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The Southern Climate Monitor is available at
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The Influence of Individualism on Severe Weather and Tornado Preparedness Choices

Jennifer Le and Amiee L. Franklin, University of Oklahoma Political Science Department

Background

What factors influence how an individual chooses to prepare for tornadoes and severe weather? In partnership with SCIPP, researchers in the Political Science department at the University of Oklahoma conducted a study to learn what kinds of choices individuals would make when prompted with severe weather preparation options. Do they prefer to pay for weather radios and storm shelters to protect themselves? Or do they prefer government provided options that may benefit themselves and/or the whole community? And are they willing to provide additional resources in order to do so? Using citizens in the SCIPP region, this study answered these questions to provide a better understanding of what people want when it comes to severe weather preparation. Overall, we found that the best predictors of severe weather and tornado preparation preferences were an individualistic cultural worldview and perceptions related to changes in climate change leading to more severe weather.

About the Research

An 80-question survey was distributed online to the residents in the six-state SCIPP region: Oklahoma, Texas, Arkansas, Louisiana, Mississippi, and Tennessee. 340 responses were analyzed. Academic literature guided expectations of what factors would influence individual choices, including socio-economic factors, previous severe weather experience, risk perceptions of future severe weather, and cultural worldviews. These relationships are shown in Figure 2.

As previously mentioned, respondents were asked for socioeconomic information to control for differences in lifestyles. Upon examining the control variable means, we determined that the mean respondent was middle aged and middle income (28% federal tax bracket), with 60% reporting being married. More than 80% were homeowners and the average number of people living in the residence was three. Approximately 15% have an elderly or disabled person in the residence. Due to high inter-correlations for these socio-economic variables, we used marital status only for future calculations.

Respondents were asked to choose an answer for eight sets of questions that asked which preparation option they would prefer (as shown in figure 1). These choices contained options that benefited the community versus those that benefited the individual, with varying costs that were placed on either the individual or community, with varying term lengths (short term versus long term).

Four questions were asked to determine the current level of protective measures for each respondent. These included using a text or weather alert app (82%), owning a weather radio (40%), hearing tornado sirens from their homes (59%), and having a tornado shelter in their home (15%). Using these four measures, we created an additive index of current protective measures ranging from 0-4. The average was 1.98, meaning that most respondents had two of the four protective measures. However, 25 (7%) had no protective measures. We explored the current level of protective measures to see if there were connections between the

Figure 1: Preparation Options

			Benefits			
			Short-Term (ST)		Long Term (LT)	
			Individuals	Community	Individuals	Community
Costs	ST	Individuals	1: Paying for a subscription to a weather app **76%**	2: Sharing severe weather alerts in a group text	3: 25% increase in insurance for replacement coverage **64%**	4: Assisting in developing cmty education materials
		Community	5: Buying a weather radio because a discount is offered **46%**	6: Govt giving every household a free weather radio	7: Installing a tornado shelter then govt gives a tax break **53%**	8: Supporting research funding to improve severe weather alerts
	LT	Individuals	9: Paying for a premium subscription to get tornado weather forecasts **32%**	10: Donating money to buy land for parks in tornado prone areas	11: Moving to an area with a lower risk of tornado **42%**	12: Approving stronger building codes to lower tornado damage
		Community	13: Paying additional taxes for safe rooms for elderly and disabled persons **37%**	14: Govt building community shelters for use by all residents	15: Financing a tornado shelter in your mortgage **51%**	16: Supporting research funding for community adaptation to climate change

This table showe the short-term and long-term benefits for individuals and their respective communites in regards to severe weather preparedness.

characteristics of the person answering the survey, their past experience and future risk perceptions. The current level of protective measures was expected to be a predictor for choices about severe weather preparations that benefitted the individual.

A respondent's past experience with tornadoes and severe weather was established by asking if they had previously heard tornado sirens (71%), taken shelter during a tornado (61%), had tornado damage (30%) or filed a tornado-related insurance claim (17%). Most people had heard sirens and taken shelter. A weighted index measure with a possible range of 0 to 10 was created based on the increasing severity of past experiences. The average past experience was 3.53. We expected more protective measures for those with higher levels of experience and fewer individual-benefitting preparation choices when the survey taker was already well prepared.

Fifty-eight percent 58% of respondents answered "Yes" and an additional 25% answered "Maybe" to a question asking if they believe climate change will lead to more tornadoes and severe weather. Only 16% concluded that climate change will not change the frequency of severe weather. These results are similar to perceptions about future tornado frequency increasing (49%), staying the same (49%) or decreasing (2%). Combining the questions, 40% of respondents anticipated more tornadoes and severe weather caused by climate change, while only three respondents (1%) think there will be fewer tornadoes and no severe weather impacts caused by climate change. It was expected that those with higher levels of risk perception of future severe weather caused by climate change and those expecting increased incidents of severe weather would currently have higher levels of protective measures and this would impact the level of protection desired.

We asked this question to determine how strongly a person held an individualistic worldview: "It is best to let people succeed or fail on their own, even if some are disadvantaged." 34% of respondents fell into the category of having an individualistic worldview, and they selected individual options 35% of the time (versus 45% for those who disagree). We expected that people with more of an individualistic worldview would choose more individual options.

Results

Figure 2 displays the expectations of the relationship between variables. The numbers listed below the variables are the actual numbers resulting from the research. Although some of the expectations were confirmed, some were not. The main findings from this research are:

1. Being married did influence current preparation. In addition, those reporting being married chose individual actions 60% of the time, supporting our prediction.

2. Contrary to expectations, higher levels of previous experience with severe weather and tornadoes did not significantly impact preparation preferences.

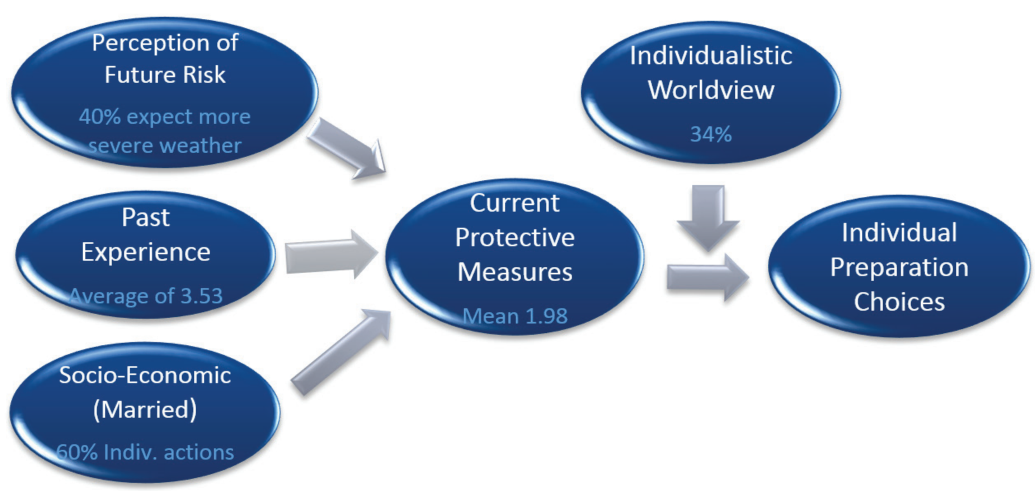
3. Perceptions of increased tornado frequencies or a belief that climate change would contribute to more severe weather reduced, rather than increased, the number of individual severe weather preparation choices.

4. The level of current protective measures one has in place was not a good predictor of the choices that someone would make when completing the survey.

5. There was a positive relationship between having an individualistic worldview and choosing preparation options that benefitted the individual as we predicted.

Overall, we found that the best predictors of severe weather and tornado preparation preferences were an individualistic cultural worldview and perceptions related to changes in climate change leading to more severe weather. These variables were found to be statistically significant and more influential in preparation choices than any other factors and had a stronger relationship to the dependent variable. Individual choices were selected by a majority of respondents for four of the eight sets of preference questions.

Figure 2: Expected Relationships



This figure displays the expectations of the relationship between variables.

Implications

These findings can directly contribute to public dialogue for severe weather preparation. Knowing that 85% of individuals do not have a shelter and that many experts now recommend sheltering in place, programs that educate people about sheltering options and their comparative costs may spur individuals to invest in protective measures. Our data indicate that individuals have preferences that could affect policy-making decisions and better serve the needs and desires of residents. For those who want to prepare through individual choices, programs that incentivize behavior may be possible. For those who think community-minded preparations are important, determining a mechanism for paying for these choices and the level of willingness to pay would be a necessary next step.

Many stakeholders may benefit from assessing the preferences for individual versus community focused options for mitigating severe weather risks. These stakeholders include emergency managers or city planners, who may use these results to formulate policies aimed at encouraging protective measures. Policymakers may use this information to adjust spending levels on risk mitigation strategies such as tax incentive programs.

Acknowledgements

This research was conducted with support from NOAA's CPO through SCIPP, a RISA team. For more information, please contact the corresponding author Aimee L. Franklin, PhD, Presidential Professor in the Department of Political Science at the University of Oklahoma. Her email is alfranklin@ou.edu.

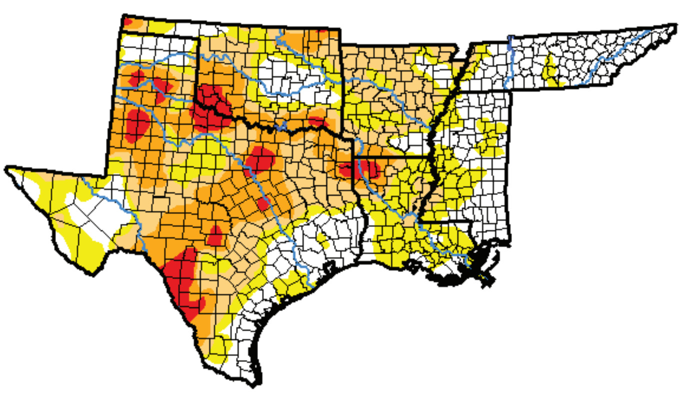
Drought Update

Kyle Brehe and Rudy Bartels,
Southern Regional Climate Center

At the end of July and into August, extreme drought classifications are still present in southwestern, extreme northwestern, and southeastern Oklahoma, southwestern, northern, central, and eastern Texas, and northwestern Louisiana. Severe drought classifications are present throughout parts of northern, central, southwestern, and northeastern Texas, southwestern, southeastern, northwestern, and northeastern Oklahoma, southwestern Arkansas, and northwestern Louisiana. Moderate drought classification is present throughout parts of central, southern, and eastern Texas, western, southern, and northeastern Oklahoma, most of Arkansas, eastern and northwestern Louisiana, northwestern Tennessee, and a part of southwestern Mississippi.

In July, there were severe storm reports everyday throughout the Southern Region except on July 9, July 21, and July 26.

On July 20, 2018, there were 112 wind reports between Tennessee, Arkansas, and Mississippi, and there were 27 hail reports between Arkansas, Tennessee, and Oklahoma. Four injuries were reported near Mull, Arkansas, when trees were blown down onto RV campers at Buffalo Point. Baseball sized hail was observed near Elkins, Arkansas. A wind gust of 85 mph (136.79 kph) was reported near Drew, Mississippi. Damage consistent with straight-line winds between 75-80 mph (120.70 – 128.75 kph) was reported in Atkins, Arkansas.



Released Thursday, August 2, 2018
Chris Fenimore, NCEI/NESDIS/NOAA

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	29.22	70.78	46.11	23.79	5.58	0.00
Last Week *07-24-2018*	30.14	69.86	42.50	21.60	3.92	0.00
3 Months Ago *05-01-2018*	58.62	41.38	31.25	18.48	11.68	5.36
Start of Calendar Year *01-02-2018*	31.09	68.91	42.64	15.33	0.30	0.00
Start of Water Year *09-26-2017*	72.17	27.83	2.38	0.02	0.00	0.00
One Year Ago *08-01-2017*	79.98	20.02	7.46	0.85	0.00	0.00

Intensity:

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

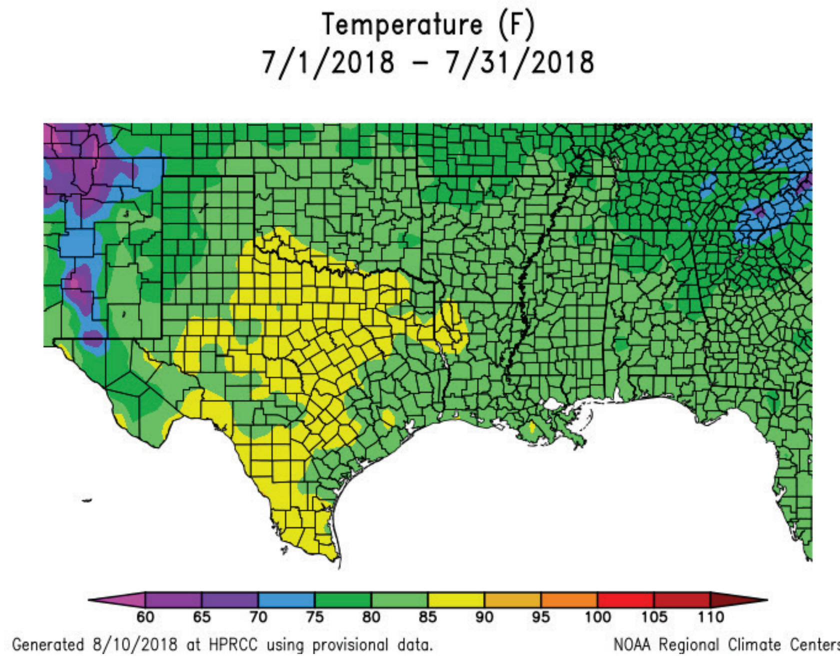
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Above: Drought Conditions in the Southern Region. Map is valid for July 31, 2018. Image is courtesy of the National Drought Mitigation Center.

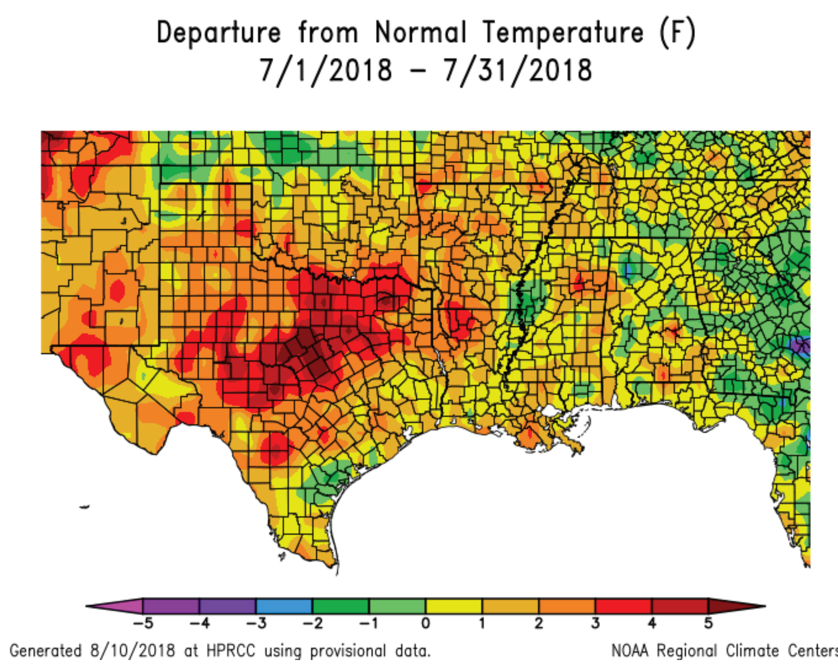
Temperature Summary

Kyle Brehe and Rudy Bartels, Southern Regional Climate Center

Temperatures for the month of July varied spatially throughout the Southern Region. Parts of extreme northwestern Oklahoma, western Mississippi, and southern Texas experienced temperatures 1 to 2 degrees F (0.56 to 1.11 degrees C) below normal. Most of Texas, southern and eastern Oklahoma, northern, central, and southern Arkansas, northern and southeastern Louisiana, northern and southern Mississippi, and southwestern and northeastern Tennessee experienced temperatures 1 to 3 degrees F (0.56 to 1.67 degrees C) above normal. Central, eastern, northeastern, and extreme western Texas, northern and southeastern Louisiana, areas in northwestern, southwestern, and northeastern Arkansas, and an area in northeastern Mississippi experienced 3 to 5 degrees F (1.67 to 2.78 degrees C) above normal temperatures. The statewide monthly average temperatures were as follows: Arkansas – 81.60 degrees F (27.56 degrees C), Louisiana – 83.40 degrees F (28.56 degrees C), Mississippi – 81.80 degrees F (27.67 degrees C), Oklahoma – 82.70 degrees F (28.17 degrees C), Tennessee – 78.10 degrees F (25.61 degrees C), and Texas – 84.40 degrees F (29.11 degrees C). The statewide temperature rankings for July were as follows: Arkansas (twenty-eighth warmest), Louisiana (fourteenth warmest), Mississippi (thirty-third warmest), Oklahoma (forty-fourth warmest), Tennessee (thirty-sixth warmest), and Texas (twelfth warmest). July was the third consecutive month where temperatures were above normal throughout the Southern Region. All state rankings are based on the period spanning 1895-2018.



Average July 2018 Temperature across the South

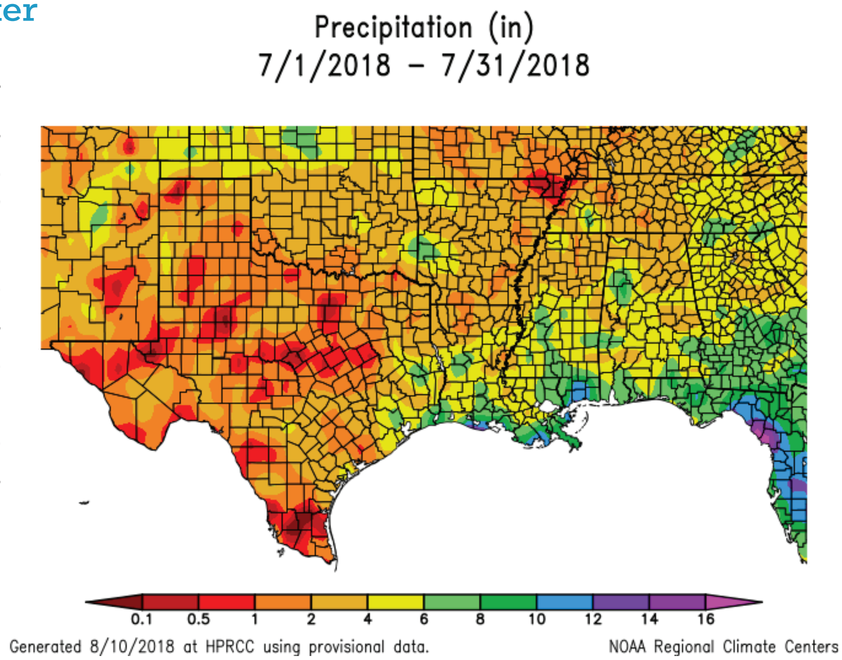


Average Temperature Departures from 1981-2010 for July 2018 across the South

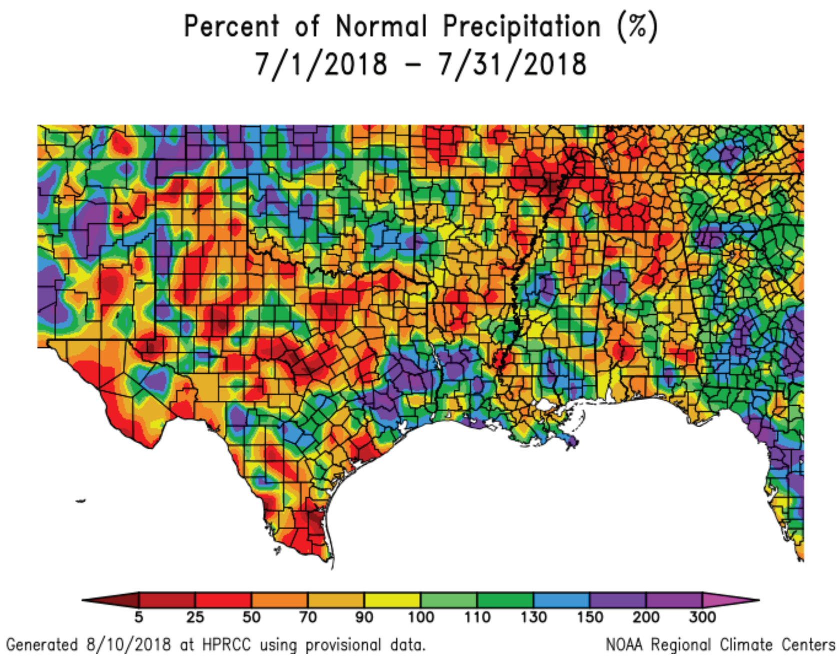
Precipitation Summary

Kyle Brehe and Rudy Bartels,
Southern Regional Climate Center

Precipitation values for the month of July varied spatially throughout the Southern Region. Parts of western, southern, and central Texas received 5 percent or less of normal precipitation. Northern, northeastern, southern, western, and central Texas, northern and eastern Louisiana, northeastern, eastern, and southern Arkansas, northwestern, western, and southern Tennessee, and areas in northern and southwestern Mississippi received 50 percent or less of normal precipitation. In contrast, parts of western, southwestern, southern, and eastern Texas, western, northern, and southeastern Oklahoma, western, southern, and extreme southeastern Louisiana, western Arkansas, northwestern and southern Mississippi, and an area in southeastern Tennessee received 150 percent or more of normal precipitation. The state-wide precipitation totals for the month were as follows: Arkansas – 3.00 inches (76.20 mm), Louisiana – 4.90 inches (124.46 mm), Mississippi – 4.61 inches (117.09 mm), Oklahoma – 3.14 inches (79.76 mm), Tennessee – 3.46 inches (87.88 mm), and Texas – 2.18 inches (55.37 mm). The state precipitation rankings for the month were as follows: Arkansas (fortieth driest), Louisiana (forty-fourth driest), Mississippi (fifty-seventh driest), Oklahoma (fifty-first wettest), Tennessee (twenty-eighth driest), and Texas (fifty-fourth driest). All state rankings are based on the period spanning 1895-2018.

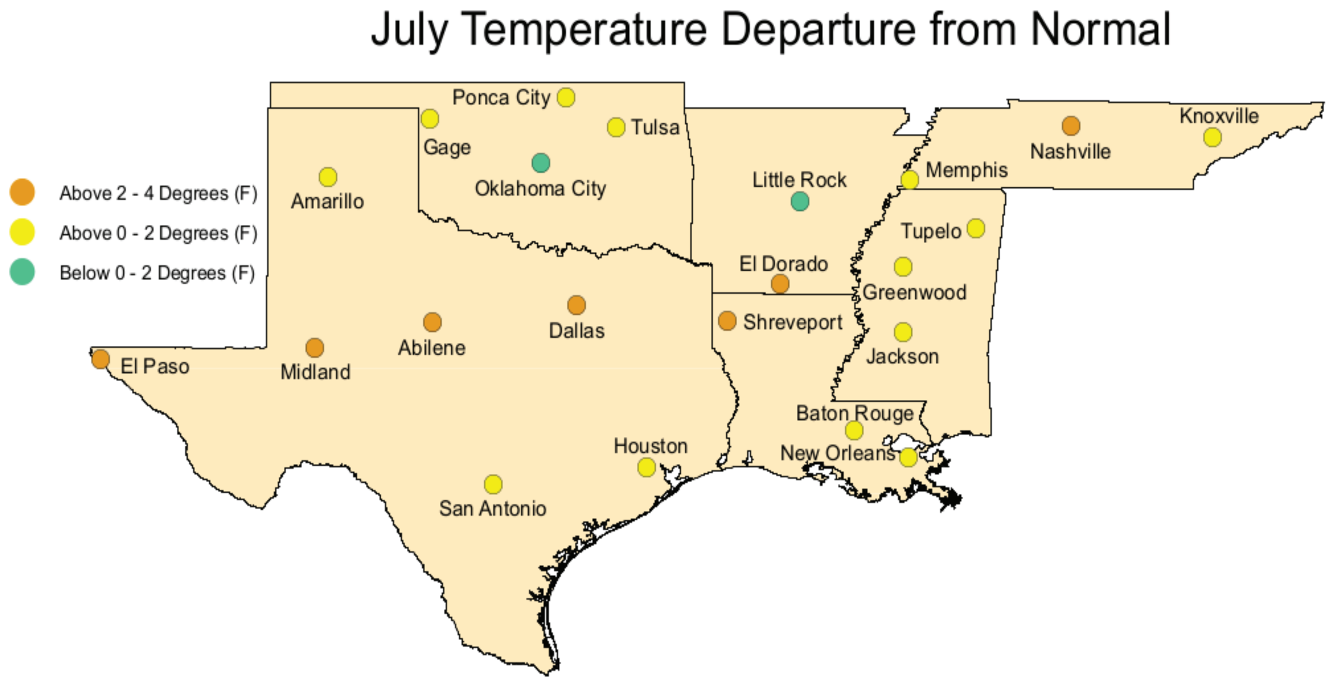


July 2018 Total Precipitation across the South

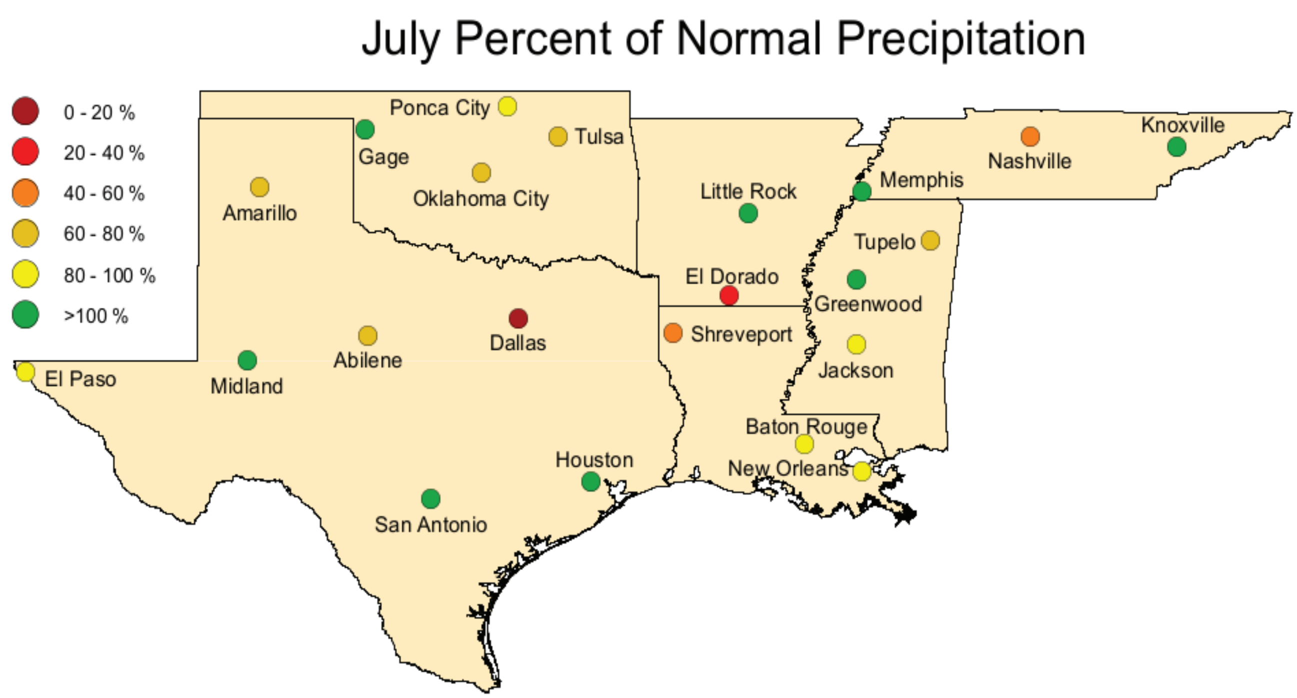


Percent of 1981-2010 normal precipitation totals for July 2018 across the South

Regional Climate Perspective in Pictures



July 2018 Temperature Departure from Normal from 1981-2010 for SCIPP Regional Cities



July 2018 Percent of 1981-2010 Normal Precipitation Totals for SCIPP Regional Cities

Climate Perspective

State	Temperature	Rank (1895-2018)	Precipitation	Rank (1895-2018)
Arkansas	81.60	28th Warmest	3.00	40th Driest
Louisiana	83.40	14th Warmest	4.90	44st Driest
Mississippi	81.80	33rd Warmest	4.61	57th Driest
Oklahoma	82.70	44th Warmest	3.14	51st Wettest
Tennessee	78.10	36th Warmest	3.46	28th Driest
Texas	84.40	12rd Warmest	2.18	54th Driest
Regional	**83.06**	**15th Warmest**	**2.96**	**49th Driest**

State temperature and precipitation values and rankings for July 2018. Ranks are based on the National Climatic Data Center's Statewide, Regional, and National Dataset over the period 1895-2018.

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	95.8	72.7	84.3	2.6	105	07/21+	66	07/30+	1.06	-2.50	30
Little Rock, AR	92.7	72.8	82.8	0.0	101	07/15	67	07/31	3.29	0.02	101
Baton Rouge, LA	93.0	74.8	83.9	0.9	98	07/27	71	07/26	4.24	-0.72	85
New Orleans, LA	92.9	77.0	84.9	1.6	97	07/27+	74	07/16+	5.17	-0.76	87
Shreveport, LA	97.7	75.1	86.4	3.4	108	07/22	71	07/30+	2.01	-1.64	55
Greenwood, MS	92.0	72.2	82.1	0.8	95	07/16+	66	07/26	6.68	3.08	186
Jackson, MS	92.6	72.0	82.3	0.7	97	07/14	66	07/27+	3.97	-0.84	83
Tupelo, MS	91.9	72.8	82.3	0.9	96	07/12	67	07/28	3.05	-0.85	78
Gage, OK	94.6	68.5	81.6	1.4	109	07/20	58	07/31	3.02	1.12	159
Oklahoma City, OK	92.9	71.4	82.2	-0.8	109	07/20	63	07/31	2.29	-0.64	78
Ponca City, OK	93.3	70.8	82.0	0.3	103	07/19	60	07/31	2.99	-0.34	90
Tulsa, OK	94.8	73.0	83.9	1.0	106	07/20	64	07/31	2.70	-0.66	80
Knoxville, TN	88.4	69.5	78.9	0.5	94	07/04	64	07/21	5.30	0.22	104
Memphis, TN	92.0	74.1	83.0	0.3	97	07/13+	68	07/31	5.00	0.41	109
Nashville, TN	91.7	71.6	81.7	2.3	99	07/04	64	07/29	2.13	-1.51	59
Abilene, TX	97.2	73.2	85.2	2.1	106	07/22+	67	07/08	1.41	-0.46	75
Amarillo, TX	94.4	66.0	80.2	1.9	105	07/20+	57	07/31	1.92	-0.92	68
El Paso, TX	97.4	74.5	86.0	3.1	107	07/22	65	07/13	1.36	-0.19	88
Dallas, TX	100.0	77.6	88.8	3.5	109	07/22+	72	07/31+	0.25	-1.92	12
Houston, TX	95.3	76.3	85.8	1.4	101	07/23	72	07/05+	6.04	2.25	159
Midland, TX	97.4	74.4	85.9	3.8	105	07/23+	69	07/31	1.86	0.04	102
San Antonio, TX	97.0	75.3	86.2	1.6	105	07/23	71	07/27+	4.87	2.13	178

Summary of temperature and precipitation information from around the region for July 2018. 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.

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From Our Partners

USDA Southern Plains Climate Hub: Southern Plains Podcast

The Southern Plains Podcast is a source of information for agricultural producers and management professionals on how they can harden their operations to the impacts of extreme weather and climate events.

Beginning in June of 2017, the United States Department of Agriculture Southern Plains Climate Hub began releasing podcasts discussing extreme weather events, talking with climate or conservation experts, or bringing to to light new research that could be used to benefit those working in the agricultural industry.

About the USDA Southern Plains Climate Hub: https://www.climatehubs.oce.usda.gov/hubs/southern-plains/about

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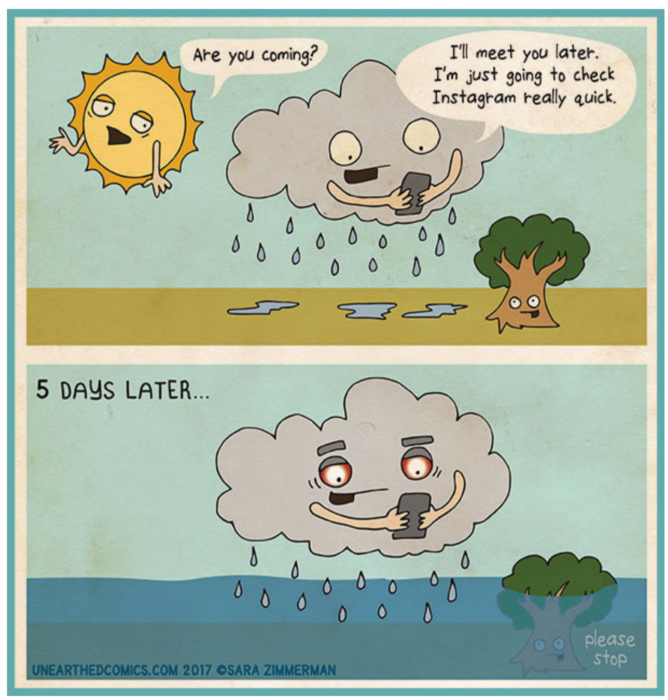
For any questions pertaining to historical climate data across the states of Oklahoma, Texas, Arkansas, Louisiana, Mississippi, or Tennessee, please contact the Southern Regional Climate Center at (225)578-5021.

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.

Monthly Comic Relief



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