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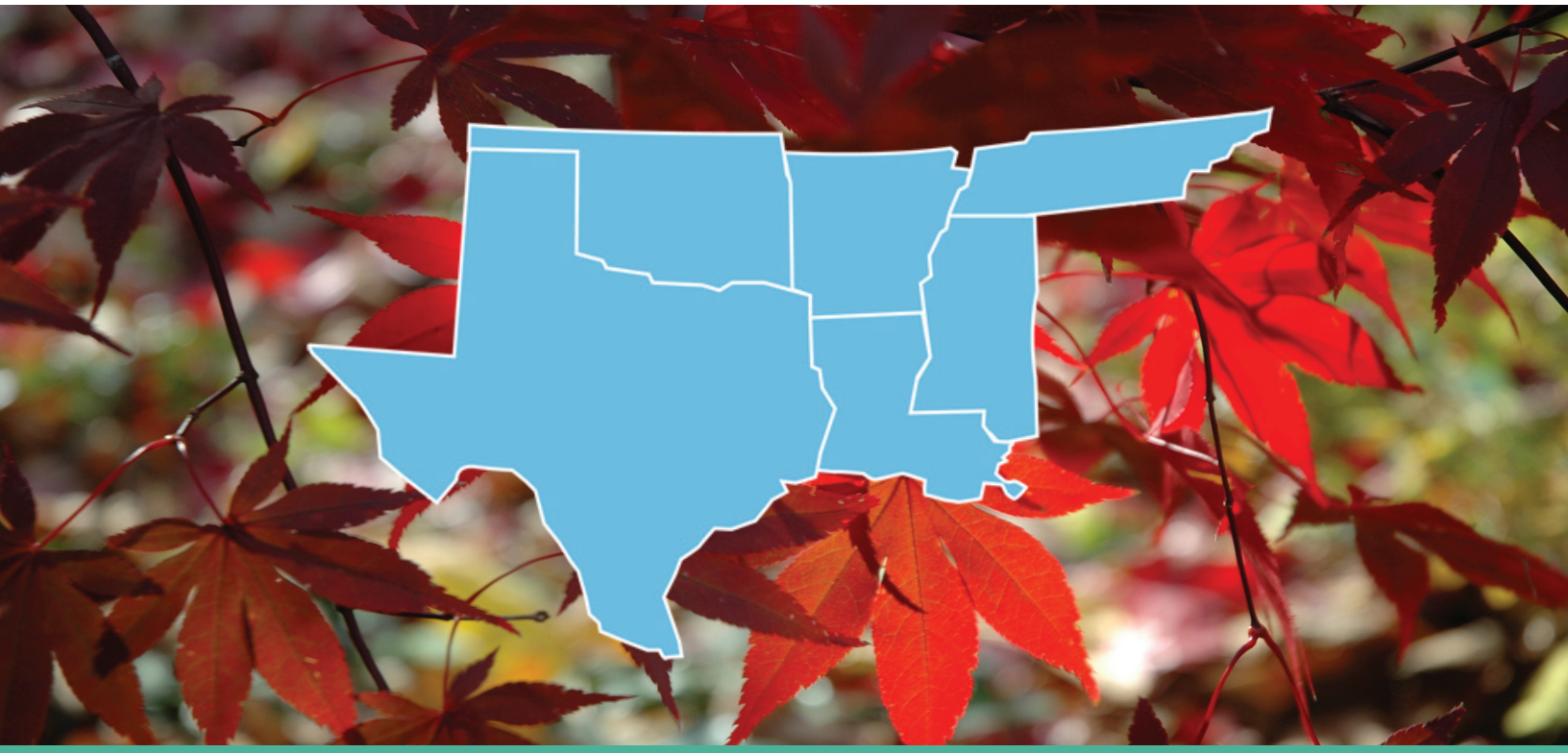

In This Issue:

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Constructing Green Cities in the Central United States

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Green City?

"Green City" is a term that is widely used to describe cities that are implementing sustainable development into their infrastructure and lifestyle. Ideally, the Green City would include more than just environmental efforts but also societal and economic efforts. A "green wave" is moving through the U.S., but it appears at times to be shallow; corporations utilize the wave due to it being rather a "meaningless, but profitable, commodity" (Lorr 2012, 7) and cities are marketing "surface level greening" (Lorr 2012, 4). While greening must begin somewhere, there is a need for deeply rooted sustainability efforts.

Green cities could be a key puzzle piece in efforts to deal with climate change. The United Nations states that by the year 2050, nearly seventy percent of the world's population will be in cities (World Economic and Social Survey 2013). As Steven Cohen discusses in his book The Sustainable City (2017), cities are an elastic concept, made from natural, built, and cultural components that are all connected to one another. As urban areas grow, their influence on the climate increases, and as such, according to Cohen, cities have an important responsibility in curbing environmental degradation. There usually is a focus on larger cities when discussing sustainable development strategies and tactics. Kent Portney (Taking Sustainable Cities Seriously 2013) points out that many of the largest cities in the U.S. are taking steps towards becoming green, but that it is difficult to assess what is working and what is not. Medium to smaller municipalities receive less attention in such discussions, however.

Here, we will look briefly into the ambiguity of definitions of green cities and briefly explore three case studies, located in the central United States, that range from small to medium in size: Greensburg, Kansas; Georgetown, Texas; and Dubuque, Iowa.

Green Definitions?

Green (or sustainable) cities have yet to be given their own distinct and universal definition. A survey of green cities on the Internet (e.g., Bernardo 2017; K. Hunt 2015; Kearns 2017; Ross 2015; Svoboda 2008; E/The Environmental Magazine 2009) indicates that many definitions include some combination of the keywords of the three pillars of sustainability: societal, economic, and ecological. The United Nations has issued varying definitions for urban sustainability, sustainable development, and green cities that are then used as near synonyms.

Huang et al. (2015) surveyed various academic and government definitions of sustainable cities and development. A particularly useful definition there, from Munier in 2007, indicates that a sustainable city "is one in which the community has agreed to a set of sustainable principles" and that those principles must work towards "quality of life, a livable city with affordable education, healthcare, housing and transportation" (cited in Huang 2015, 1178). This definition focuses on the need for community members to have a say in what they envision

and to work towards their own green development. This is what we have found for the three cities we looked at.

Three Cities

Greensburg, Kansas (fig. 1), is a small town that is the county seat for Kiowa County. It has a long history in agriculture and railroads that continues to this day. In 2007, the town was destroyed by a massive tornado. It was from this calamity that a rebirth of the town came. The community decided that the rebuild needed to be resilient. This led Greensburg to consider a sustainable community design. At the first City Council meeting after the tornado, the idea to rebuild a green city was introduced and became a topic of discussion and research. The town utilized federal aid to create long term response plans and through meeting weekly with stakeholders, citizens, and various sectors of the town. A Sustainable Comprehensive Plan was developed and served as a blueprint for the green city development that took place.

Figure 1: Greensburg, Kansas, City Hall. http://www.greensburgks.org/visitors/photo-tour.

Figure 2: Mayor Dale Ross, Georgetown, Texas. Fidelis Publishing Group, LLC

Georgetown, Texas (fig. 2), sought sustainability for strictly economics-based reasons. The mayor of the town, Dale Ross, made the decision to switch his town to renewable energy in 2015. The town signed a 25-year deal with SunEdison to buy 150 megawatts of solar power (Malewitz 2015). This was made possible because transmission lines had been constructed linking wind farms in West Texas to the electrical grid. Georgetown, which prides itself on conservative politics, has 40 percent of its residents above the age of 50, including many retirees. Due to this demographic, Moss wanted a stable and reliable energy source (Shapiro 2017). Ross also implemented water conserving strategies and is considering electric vehicles for the municipal government.

In the 1980s, Dubuque, Iowa (fig. 3), was a town in the middle of a devastating recession with "double-digit unemployment, declining population, vacant storefronts, and deteriorating neighborhoods" (Carstens 2010, 11). It was this crisis that caused town leaders to look for a different way. Efforts started at a grassroots level to address various problems plaguing the town. The city planner described the town and community as an "ecosystem, where everything is connected to everything else" (Carstens 2010, 11). The Dubuque

Comprehensive Plan was created and since 1995 has reflected the three pillars of sustainability. The town also kept its citizens informed about every aspect of its transformation to a greener city. It developed community definitions for sustainability that reflected the values and goals that the town's people had for themselves and their future. It was in 2006 that the community decided that sustainability was truly one of its top priorities, leading to the creation of the Sustainable City Task Force, made up of representatives from across the town. Its work culminated in "Dubuque 2.0," which is a "venue to present sustainable ideas, share best practices, and measure results from the community's sustainability efforts" (Carstens 2010, 13).

Figure 3: Sustainable Dubuque web page. http://www.sustainabledubuque.org/.

Greensburg

Greensburg had been struggling economically and socially before the 2007 tornado. Sustainable development could provide a new identity, a way to bring people to their town and keep citizens interested in living there. Given a clean slate to rebuild, the main environmental focus was on improving infrastructure and energy efficiency and sources. This included switching to renewable energy and building gold and platinum LEED certified homes and buildings. Economic pushes included drawing in new jobs and eco-tourism, which would greatly aid their dwindling community. Citizens worried that there would be a big tax hike to pay for the green regrowth but the promise of energy savings changed their minds (Morris 2007). This conservative community needed lots of facts and discussions before it embraced the green rebuilding. However, the town's culture also embraced independence and once the topic was "de-politicized" or "humaniz[ed]" then it took hold (Wallach 2009). Greensburg needed a new identity for rebuilding for future generations, so long-term economic stability was a driving goal.

Georgetown

Conservative Georgetown's switch to renewables required many difficult discussions. However, mayor Dale Ross, stated that the switch to solar and wind contracts was based on "cold-eyed pragmatism" because the electricity rates were lower and seen to be more stable for the next 25 years (Dart 2017). These economic incentives led to the switch, but from those came consideration of the potential environmental and societal benefits. The town is very adamant that environmental actions should not be about politics, as it believes helping the Earth and reducing emissions is where "everyone wins" and as such the town worked hard to de-politicize the issue (Rainey 2017). The town's dedication to renewable energy has made international headlines, and it is displaying signs of other sustainable actions, including composting and implementation of a city-wide bus system. Ross also stated that he has "dreams of electric municipal vehicles" (Galvin 2017). While economics is still the focus, there are signs that point to a more well-rounded sustainable future for the town.

Dubuque

With its history of economic and societal hardships, Dubuque had a strong desire to empower and better the lives of its citizens – "It is all about citizen engagement and empowerment" (M. Hunt 2014). The town held the environmental aspects of becoming sustainable close to societal ones. It implemented multiple pilot programs aiming to reduce its carbon footprint and water usage, among other things. Dubuque also performed restoration along its creeks and within its historical districts to make them less energy intensive. The town made sure to implement ecologically beneficial practices into its planning. Investing in these ideas aimed to draw in more sustainable businesses and new jobs. One pilot program involving water conservation saved about $180,000 in revenue (Wood 2013). Dubuque ended up working with IBM to install smart meters for its energy and water pilot programs, and the company brought more than one thousand jobs to the town. All of its green city development helped Dubuque become more economically competitive and stable.

Summary and Future Work

At present, we lack a clear definition and set of parameters for what constitutes a green city. Despite this, each of the three towns researched here was able to use this ambiguity to reflect on its own values and, in turn, create its own vision of a green city. While each town socially constructed "green" in its own way, each effort showed some commonality with the others, including a strong sense of community and societal driving forces that spurred rapid transformations.

Our goal is to continue identifying commonalities in order to better understand what makes green development work efficiently in these communities. From there, implementation strategies could be created to foster more widespread, meaningful green city development. Understanding local-level greening can also become a tool for investigating ways of scaling up implementation to more complex larger urban areas and their sub-communities.

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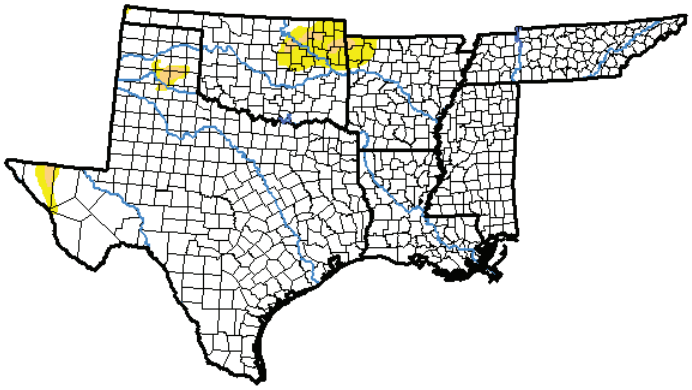
Drought Update

Kyle Brehe and Derek Thompson,
Southern Regional Climate Center

At the end of November, drought conditions improved slightly across the Southern Region. Severe drought classifications were no longer present across the region, a change from the beginning of the month. Moderate drought classifications were present in parts of extreme western and northern Texas as well as northeastern Oklahoma and northwestern Arkansas. There were no drought conditions in Tennessee, Louisiana, and Mississippi. While drought conditions decreased, there was an increase in the area experiencing abnormally dry conditions.

In November, there were a total of 151 storm reports across Texas, Oklahoma, Arkansas, Louisiana, Mississippi, and Tennessee. There were 25 tornado reports, 15 hail reports, and 111 wind reports. Tennessee tallied the most tornado (10) and wind (46) reports while Oklahoma tallied the most hail (3) reports. Tennessee tallied the most reports total (56) while Louisiana tallied the least (11). Every state reported at least one tornado. Three states (Arkansas, Louisiana, and Tennessee) did not record any hail reports. Every state except for Louisiana (4) had more than 10 wind reports. There were only 9 days in November where a storm report of any type was reported in the Southern Region, with 137 of the 151 total reports occurring on two days (80 on November 5, 57 on November 30).

On November 30, 2018, there were 3 tornado reports, 9 hail reports, and 45 wind reports across Arkansas, Tennessee, Oklahoma, and Texas. One EF-2 and two EF-1 tornadoes were reported in Crawford and Hepstead counties, Arkansas. Also, wind gusts of 67 mph (107.83 kph) were reported in Sallisaw, Oklahoma and Flippin, Arkansas.



Released Thursday, November 29, 2018
Richard Heim, NCEI/NOAA

Above: Drought Conditions in the Southern Region. Map is valid for November 27, 2018. Image is courtesy of the National Drought Mitigation Center.

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	95.70	4.30	0.93	0.00	0.00	0.00
Last Week *11-20-2018*	97.68	2.32	0.69	0.00	0.00	0.00
3 Months Ago *08-28-2018*	40.21	59.79	38.33	18.89	4.43	0.15
Start of Calendar Year *01-02-2018*	31.09	68.91	42.64	15.33	0.30	0.00
Start of Water Year *09-25-2018*	70.82	29.18	12.09	4.10	0.48	0.00
One Year Ago *11-28-2017*	27.70	72.30	41.44	13.44	1.59	0.00

Intensity:

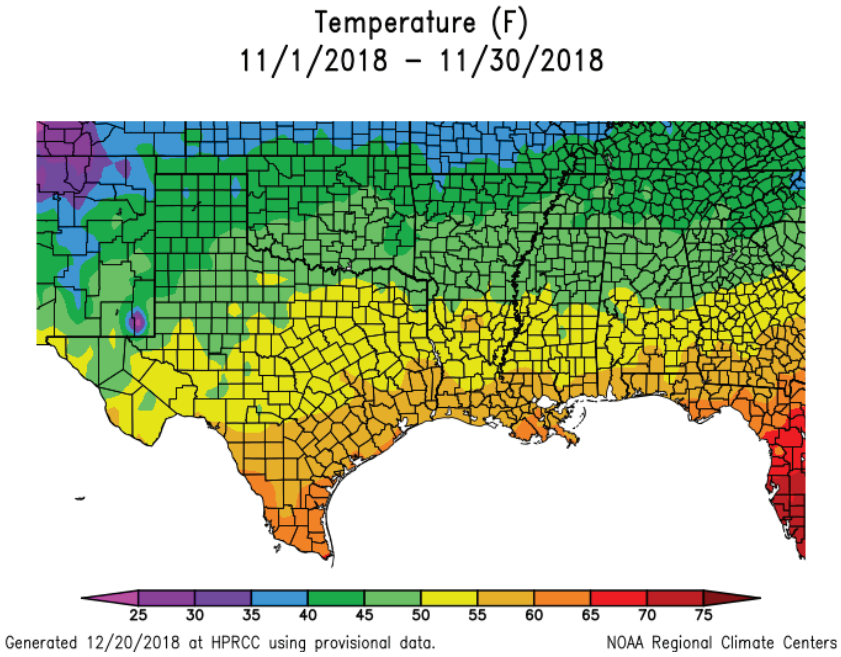
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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

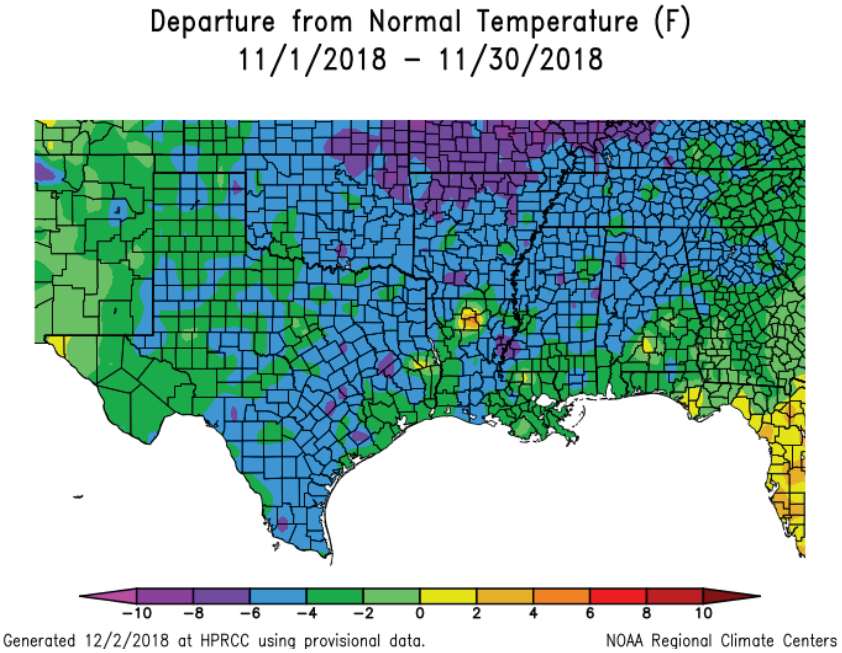
Temperature Summary

Kyle Brehe and Derek Thompson,
Southern Regional Climate Center

Temperatures for the month of November were below normal throughout the Southern Region. Parts of northeastern Oklahoma and northwestern Arkansas experienced temperatures 8 to 10 degrees F (4.44 to 5.56 degrees C) below normal. Parts of northeastern and southern Oklahoma, northern, eastern, western, and southern Arkansas, northern, eastern, and southern Texas, northeastern and northwestern Louisiana, north-central and southwestern Mississippi, and northern, northwestern, and southwestern Tennessee experienced temperatures 6 to 8 degrees F (3.33 to 4.44 degrees C) below normal. Parts of northern, western, central, southern, northeastern, and southeastern Texas, southwestern, western, and northeastern Oklahoma, central and southern Arkansas, northern, northeastern, western, and southeastern Louisiana, southern, western, eastern, and northeastern Mississippi, and eastern, central, and southeastern Tennessee experienced temperatures 2 to 4 degrees (1.11 to 2.22 degrees C) below normal. Parts of northern Louisiana experienced temperatures 4 to 6 degrees F (2.22 to 3.33 degrees C) above normal. The statewide monthly average temperatures were as follows: Arkansas – 45.20 degrees F (7.33 degrees C), Louisiana – 54.50 degrees F (12.50 degrees C), Mississippi – 50.30 degrees F (10.17 degrees C), Oklahoma – 44.10 degrees F (6.72 degrees C), Tennessee – 45.00 degrees F (7.22 degrees C), and Texas – 51.30 degrees F (10.72 degrees C). The statewide temperature rankings for November were as follows: Arkansas (seventh coldest), Louisiana (twenty-third coldest), Mississippi (twelfth coldest), Oklahoma (ninth coldest), Tennessee (twenty-fifth coldest), and Texas (sixteenth coldest). All state rankings are based on the period spanning 1895-2018.



Average November 2018 Temperature across the South

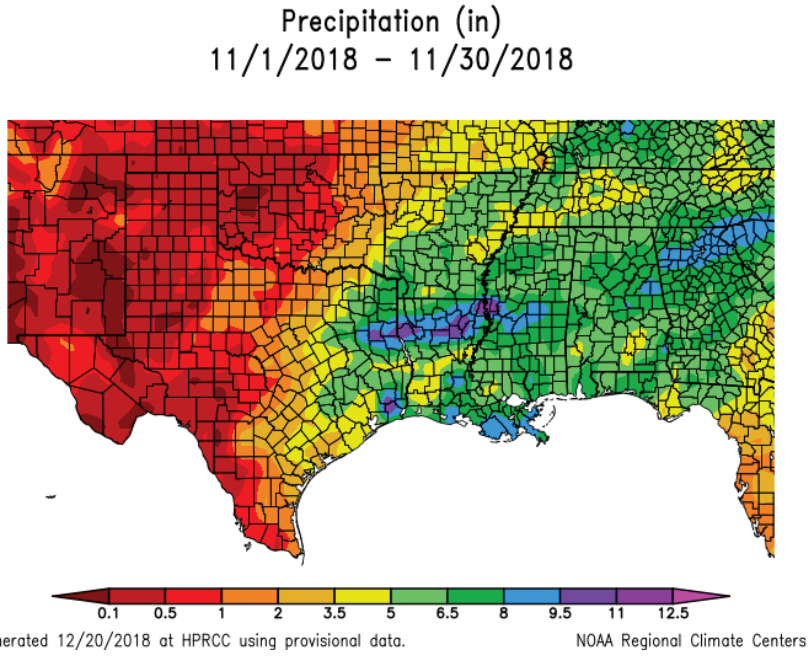


Average Temperature Departures from 1981-2010 for November 2018 across the South

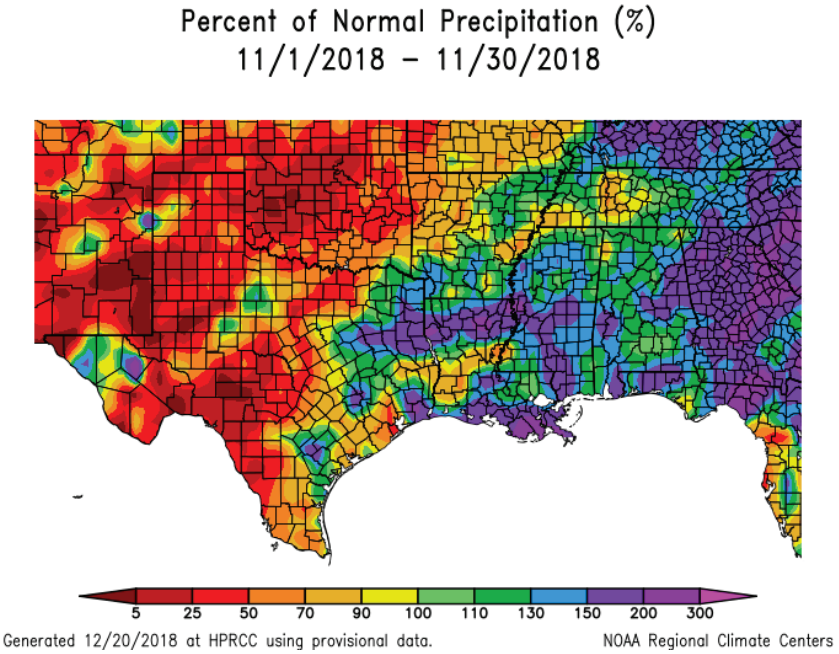
Precipitation Summary

Kyle Brehe and Derek Thompson,
Southern Regional Climate Center

Precipitation values for the month of November varied spatially across the Southern Region. Parts of southern, southwestern, and western Texas as well as part of western Oklahoma received 5 percent or less of normal precipitation. Parts of southern, southwestern, western, central, and northern Texas as well as parts of central, northern, and western Oklahoma received 25 percent or less of normal precipitation. Parts of southern, southwestern, western, northwestern, northern, central, northeastern, and southeastern Texas, most of Oklahoma, and northwestern Arkansas received 50 percent or less of normal precipitation. In contrast, parts of northwestern, southeastern, and eastern Texas, northwestern, northern, northwestern, southern, and southeastern Louisiana, central, southern, western, and northern Mississippi, southwestern and southeastern Arkansas, and eastern Tennessee received 150 percent or more of normal precipitation. Parts of southeastern Texas, northeastern and southeastern Louisiana, and western Mississippi received 200 percent or more of normal precipitation. The state-wide precipitation totals for the month were as follows: Arkansas – 5.05 inches (128.27 mm), Louisiana – 6.80 inches (172.72 mm), Mississippi – 6.57 inches (166.88 mm), Oklahoma – 1.10 inches (27.94 mm), Tennessee – 5.38 inches (136.65 mm), and Texas – 1.65 inches (41.91 mm). The state precipitation rankings for November were as follows: Arkansas (forty-fifth wettest), Louisiana (nineteenth wettest), Mississippi (nineteenth wettest), Oklahoma (thirty-sixth driest), Tennessee (twenty-eighth wettest), and Texas (sixty-second wettest). All state rankings are based on the period spanning 1895-2018.

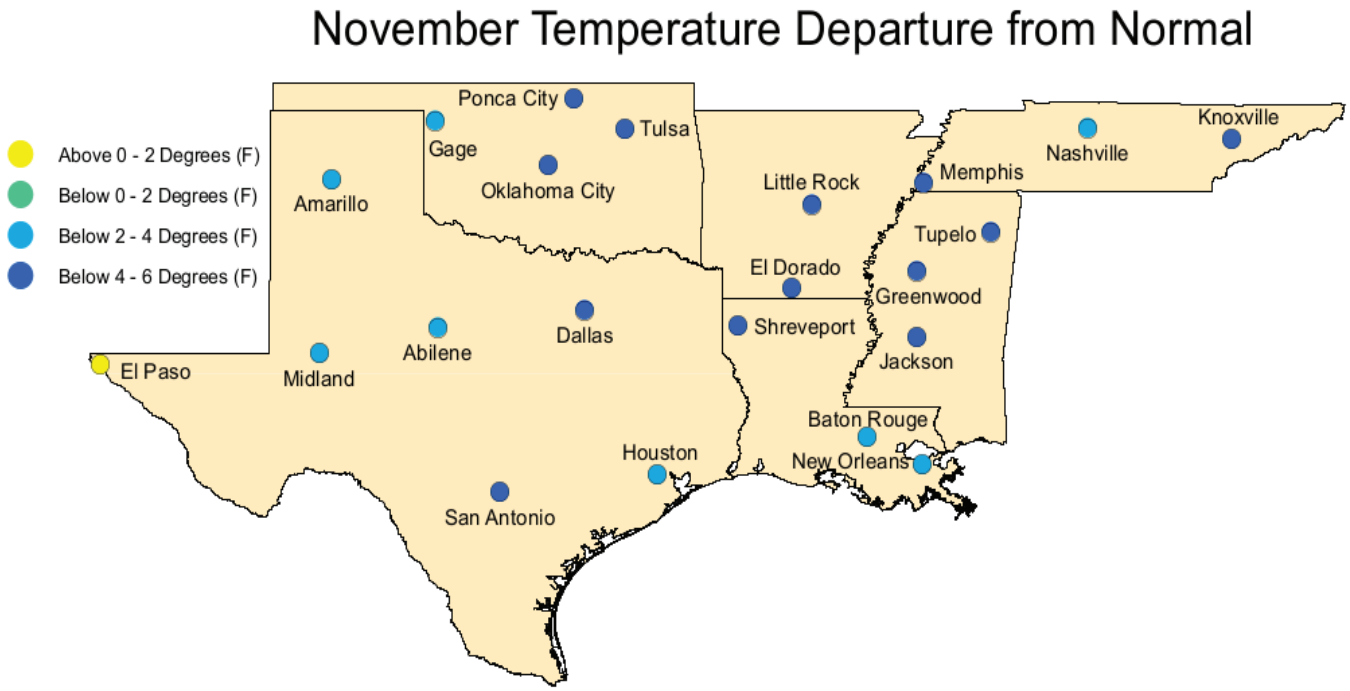


November 2018 Total Precipitation across the South

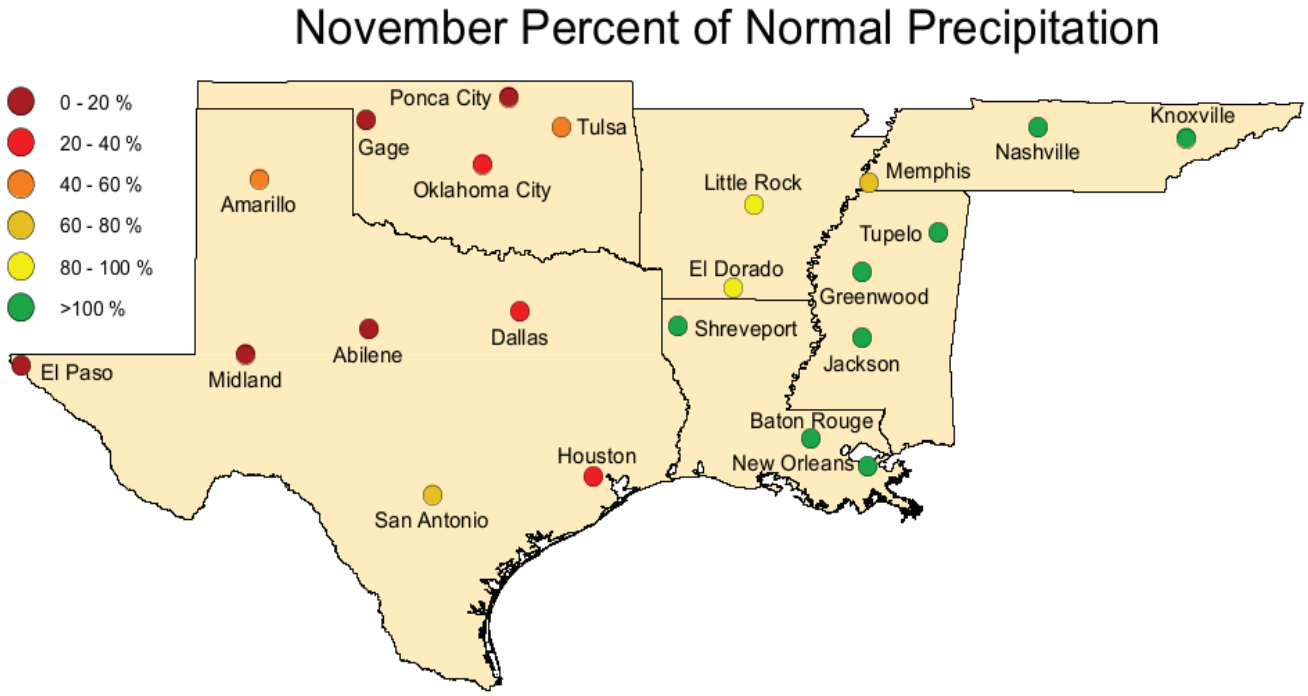


Percent of 1981-2010 normal precipitation totals for November 2018 across the South

Regional Climate Perspective in Pictures



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



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

Climate Perspective

State	Temperature	Rank (1895-2018)	Precipitation	Rank (1895-2018)
Arkansas	45.20	7th Coldest	5.05	45th Wettest
Louisiana	54.50	23rd Coldest	6.80	19th Wettest
Mississippi	50.30	12th Coldest	6.57	19th Wettest
Oklahoma	44.10	9th Coldest	1.10	36th Driest
Tennessee	45.00	25th Coldest	5.38	28th Wettest
Texas	51.30	16th Coldest	1.65	62nd Driest
Regional	**48.40**	**12th Coldest**	**4.42**	**33rd Wettest**

State temperature and precipitation values and rankings for November 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
Little Rock, AR	57	37.5	47.2	-5.3	72	11/30	24	11/15	4.58	-0.7	86
Baton Rouge, LA	66.5	47	56.8	-3.6	82	11/06+	30	11/15	5.66	1.56	138
New Orleans, LA	68.6	52.2	60.4	-2.3	85	11/06	36	11/15	7.58	3.09	168
Shreveport, LA	62.1	42	52	-4.4	77	11/06	27	11/15	8.44	3.91	186
Greenwood, MS	59.5	41.1	50.3	-4	75	11/06	26	11/27	6.12	1.6	135
Jackson, MS	61.4	41.6	51.5	-4.2	76	11/05	28	11/27+	8.36	3.6	175
Tupelo, MS	57.7	39.5	48.6	-4.3	72	11/06+	24	11/28	7.7	3	163
Gage, OK	56.9	26.8	41.9	-3.8	71	11/15+	6	11/13	0.17	-0.95	15
Oklahoma City, OK	57.1	32.3	44.7	-6	71	11/06	17	11/14	0.55	-1.43	27
Ponca City, OK	55.4	30.1	42.7	-5	73	11/24	12	11/13	0.06	-1.75	3
Tulsa, OK	57.5	33.4	45.5	-4.8	75	11/24	16	11/14	1.67	-1.14	59
Knoxville, TN	54.3	36.3	45.3	-4.4	75	11/01	21	11/28	5.95	1.94	148
Memphis, TN	56.4	39.3	47.9	-5.3	71	11/06	25	11/27	4.25	-1.24	77
Nashville, TN	55.7	37.2	46.4	-3.4	72	11/05	20	11/28	4.53	0.22	105
Abilene, TX	64.3	39.9	52.1	-2.5	82	11/29+	23	11/14	0.28	-1.13	19
Amarillo, TX	57.5	30.4	44	-2.3	75	11/28	15	11/13	0.4	-0.4	50
El Paso, TX	66.3	41.2	53.7	0.6	79	11/07+	23	11/14	0.01	-0.48	2
Dallas, TX	63.4	41.7	52.5	-4.1	81	11/05	25	11/14	0.86	-1.85	31
Houston, TX	68.2	49.1	58.7	-3.6	89	11/07	30	11/15	1.76	-2.58	40
Midland, TX	64.1	37.7	50.9	-2	82	11/29	24	11/14+	0.04	-0.65	5
San Antonio, TX	66.5	46.8	56.6	-4.5	83	11/07	23	11/14	1.78	-0.5	78

Summary of temperature and precipitation information from around the region for November 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

June OK Drought Plan Advisory Meeting: Summary Report

On June 6, 2018 the Oklahoma Climatological Survey hosted an Oklahoma Drought Plan Advisory Meeting to discuss updating the plan that was made more than 20 years prior. The meeting was held at the National Weather Center in Norman, Oklahoma and was attended by various collaborating agencies (local, state, and federal). The meeting was an opportunity to bring people together, spur momentum, build relationships, and determine the best approach to updating the plan. The meeting was a significant step toward updating the original State Drought Management Plan. This report provides a summary of the meeting details, discussion outcomes, key takeaways, and next steps.

You can access the report via the attachment, or under the "Latest News" section on SCIPP's homepage at http://www.southernclimate.org/. The report is also available at that same link under Resources > Meetings and Workshops > Past Meetings and Workshops.

For questions, contact Monica Mattox, Assistant State Climatologist at mmattox@mesonet.org

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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