

Records were threatened, tornadoes were spotted, and ice crippled half of the state while the other half flooded, all thanks to two powerful storm systems during one of the wildest stretches of November weather in state history. The first system struck around mid-month and resembled a classic springtime severe weather setup. A series of supercells sprung up across the High Plains and marched east, dropping as many as five tornadoes in Oklahoma and many more across Texas and Kansas. The system then produced a squall line that marched across the state with

Oklahoma counties. Widespread tree damage was reported, and more than 150,000 electrical utility customers were without power at one point. The pervasive flooding in the southeastern half of the state was somewhat overshadowed by the ice. While the northwestern one-half of the state saw from 2-4 inches of moisture, the southeastern half reported widespread amounts of 4-8 inches, with Hugo leading the way at 9.84 inches. Governor Fallin declared a state of emergency for all 77 counties in Oklahoma due to the ice and flooding.

November 2015 Statewide Extremes

Description	Extreme	Station	Day
High Temperature	84°F	Beaver, Waurika	3,10
Low Temperature	15°F	Kenton	19
High Precipitation	14.95 in.	Mt. Herman	--
Low Precipitation	0.68 in.	Boise City	--

heavy rainfall, large hail and severe winds. An estimated gust of 80 mph was reported near Hydro late on the 16th, and the Mesonet site at Red Rock recorded a gust of 99 mph early on the 17th. In its final act, the backside of the storm produced blizzard conditions across the High Plains, including Cimarron County where Boise City reported 6 inches of snow and visibilities down to one-eighth of a mile at times. Two other tornadoes had touched down previously on the fifth to bring the month's preliminary total to seven and the annual total to 105.

The second storm system came just in time for the Thanksgiving holiday, slowly approaching from the west as strong southerly winds pumped abundant moisture into the Southern Plains from the Gulf of Mexico. This storm system also had help from the remnants of Pacific Hurricane Sandra which had moved northwest into Mexico. A strong cold front blasted thorough the state, setting the stage for a bout with freezing rain, sleet and flooding rainfall. Interstate 44 seemed to be the general dividing line between ice versus liquid water as the freezing line slowly fluctuated to the northwest and southeast. Radial ice thicknesses of more than an inch were reported in parts of western and central Oklahoma, particularly across Grady, Canadian and western

November 2015 Statewide Statistics

Temperature

	Average	Depart.	Rank (1895-2015)
Month (November)	50.9°F	1.6°F	27th Warmest
Season-to-Date (Sep-Nov)	63.7°F	2.8°F	10th Warmest
Year-to-Date (Jan-Nov)	62.5°F	0.6°F	34th Warmest

Precipitation

	Total	Depart.	Rank (1895-2015)
Month (November)	5.91 in.	3.47 in.	2nd Wettest
Season-to-Date (Sep-Nov)	10.81 in.	1.23 in.	30th Wettest
Year-to-Date (Jan-Nov)	48.00 in.	13.11 in.	1st Wettest

Depart. = departure from 30-year normal

The rain from those two systems spurred the statewide average for November to historic levels. According to preliminary data from the Oklahoma Mesonet, the month tied 2004 as the wettest November since records began in 1895 with a statewide average of 5.97 inches, 3.46 inches above normal. Mt. Herman led the Mesonet with 14.95 inches, although 10 additional sites had at least 10 inches of rainfall. The January-November statewide average surged into first place with the additional moisture at 47.53 inches, 13.09 inches above normal. That leaves 2015 just 0.35 inches behind 1957's mark of 47.88 inches as Oklahoma's wettest calendar year on record. The Tishomingo Mesonet site has recorded 77.1 inches for the year thus far, enough to break the Mesonet's calendar year record of 76.41 inches from Broken Bow in 2009. The Mesonet's precipitation records date to 1994. The NWS cooperative observing site at

Tuskahoma holds the record for highest annual total for any observing site in the state with 88.27 inches in 1990. Those records date back to the 1880s. By the end of November, drought was all but eliminated in the state thanks to the abundant moisture.

Despite the late-month arctic plunge, temperatures were well above normal during November with a statewide average of 50.8 degrees, 1.5 degrees above normal to rank as the 27th warmest on record. The January-November average of 62.5 degrees stood 0.6 degrees above normal to rank as the 34th warmest such period on record.

NOVEMBER 2015 DAILY SUMMARIES

NOVEMBER 1-3: Although November started with light rain, temperatures gradually increased with mostly sunny skies in the west. Fog blanketed portions of southeast OK on the evening of the 1st, central and southwest OK early on the 2nd, and across many areas of Oklahoma on the morning of the 3rd. The warmest maximum temperatures increased from 79 degrees (Buffalo) to 84 degrees (Beaver) over this three day period. The coolest maximum temperatures fluctuated in the 60s. The warmest daily minimum temperatures in the state were fairly consistent, averaging 59 degrees; the lowest minimum temperatures increased from 35 degrees in the northeast to 42 degrees in the panhandle. The maximum daily rainfall measurement on the 1st was .21 inches in Clayton. Rainfall was negligible the following two days. The highest daily average wind speeds increased from 12mph on the 1st, to 15mph on the 2nd, and finally 17mph on the 3rd.

NOVEMBER 4: Temperatures were much cooler on the 4th with highs ranging from 65 degrees in Cheyenne, Elk City, and Arnett to 77 degrees in Goodwell and Webbers Falls. Lows were between 42 degrees and 62 degrees. Patchy fog continued in portions of the state during the morning hours. The highest amounts of precipitation occurred in the panhandle with Slapout reporting .40 inches, Hooker reporting .39 inches, and Goodwell reporting .31 inches. Wind speeds were gusty, averaging between 5 and 21mph. The highest peak wind gust of 48mph was reported in Hooker.

NOVEMBER 5-8: A cold front moved in from the northwest, bringing rain, thunderstorms, and severe weather to the state. The highest maximum temperatures fell from 84 degrees in Waurika on the 5th to 67 degrees in Broken Bow on the 8th. The lowest maximum temperatures fluctuated between 53 degrees and 60 degrees. The highest minimum temperatures decreased from 64 degrees in the southeast to 44 degrees in Madill and Medicine Park. Southeast Oklahoma received the most rainfall with the top three amounts measuring 2.62 inches in Mt. Herman,

2.28 inches in Broken Bow, and 1.90 inches in Durant. A severe thunderstorm wind gust of 70mph was reported in Haworth and weak tornadoes were spotted in Okfuskee and McCurtain County. Daily average wind speeds were generally less than 15mph; however, winds were fairly calm on the 6th at less than 9mph.

NOVEMBER 9-11: Temperatures rebounded from the previous cold front just in time for two new cold fronts to make their way back through the state on the 11th. The warmest maximum in the state increased from 70 degrees in Hollis to 82 degrees in Webbers Falls by the 11th. The coolest maximum temperatures were in the mid-60s, but fell to 51 degrees by the third day. The warmest minimums increased from 46 degrees in Durant and Tipton to 56 degrees in Ilabel and Valliant. The lowest minimum was 23 degrees in Kenton on the 9th, 33 degrees in Kenton on the 10th, and 26 degrees again in Kenton on the 11th. McAlester tied its daily high temperature record on the 11th at 82 degrees. The days were rain-free until passing cold fronts on the 11th caused as much as .39 inches of rain in Broken Bow, .24 inches in Ilabel, and .23 inches in Cloudy. The highest daily average wind speeds increased from 16mph in Cheyenne on the 9th, to 20mph in Watonga on the 10th, and 22mph in Freedom, Talala, and Medford on the 11th. Peak wind gusts were in the 50s in north-central and northwest OK on the 11th.

NOVEMBER 12-17: Although temperatures started off much cooler on the 12th, a warming trend ensued. The highest temperatures climbed from a mild 68 degrees in Waurika and Burneyville on the 12th to a much warmer 74 degrees in Wister and Clayton on the 17th. The lowest maximum temperatures increased from the low 50s to the low 60s from the 12th through the 16th; however, with the rain-cooled air, Boise City and Kenton only warmed to 40 degrees on the 17th. The highest minimum temperatures increased from 45 degrees to 52 degrees and the lowest minimum temperatures climbed from 22 degrees to 39 degrees by the 16th. Again by the 17th, the lowest minimum temperature was much cooler at 28 degrees. Skies were rain-free on the 12th and 13th. As rain pushed through the area the following days, as much as .13 inches fell in Medicine Park on the 14th, .66 inches in Haskell on the 15th, 2.25 inches in Mangum on the 16th, and a hefty 3.71 inches in Miami on the 17th. Tulsa and McAlester broke their daily rainfall records on the 17th at 1.28 inches and 1.75 inches, respectively. That same day, snow fell in the panhandle with as much as 6 inches accumulating in Boise City. Severe thunderstorms initiated on the 16th and continued in full force on the 17th. An 80mph wind gust was reported in Hydro on the 16th and the following day, a severe wind gust was reported in Lawton (73mph), Tonkawa (75mph), and Red Rock (99mph). Weak tornadoes occurred in Beaver, Ellis, and Harper County on the 16th and in McIntosh County on the 17th. The highest daily average wind speeds increased to 10mph, 13mph, 16mph, 21mph, 22mph, and 24mph each subsequent day.

NOVEMBER 18-20: Temperatures started out cool again before gradually warming. The highest maximum temperatures increased from 70 degrees to 74 degrees and the lowest maximum temperatures increased from 48 degrees to 62 degrees. The highest minimum temperatures were in the mid-upper 40s and the lowest minimum temperatures in the state were 20 degrees in Kenton on the 18th, 15 degrees in Kenton on the 19th, and 25 degrees in Kenton again on the 20th. Rainfall was much less intense during this period with the highest amounts measuring .27 inches in Kenton (Nov. 18) and .19 inches in Burbank (Nov. 20). The highest daily average wind speeds were 14-16mph. The highest peak wind gusts were 40mph in Arnett on the 18th, 43mph in Medicine Park on the 19th, and 51mph in Hollis on the 20th. November 21-22: A strong cold front made its way through Oklahoma on the 21st, causing temperatures to plummet and light snow and rain to fall in northern Oklahoma. Despite the warmest temperatures in the state remaining in the low 60s and the coolest maximum temperatures increasing from 40 to 49 degrees, the cold front was evident in the minimum temperatures. The highest minimum temperature decreased from 34 degrees in Hugo to 30 degrees in Spencer and Oklahoma City. The lowest minimum temperatures were well below freezing at 18 degrees each day in Camargo. The highest liquid precipitation measurement was .31 inches in Vinita on the 21st. The highest wind gust also occurred on the 21st at 54mph in Minco. Daily average wind speeds were less than 22mph on the 21st and less than 14mph on the 22nd.

NOVEMBER 23-25: Skies cleared and temperatures warmed. The highest maximum temperatures were 69 degrees on the 23rd and 24th, and 76 degrees on the 25th. The warmest temperatures in the state occurred in the panhandle. The lowest maximum temperatures crept up by a single degree each day, starting at 58 degrees on the 23rd. The highest maximum temperatures drastically increased from 38 degrees in Spencer to 60 degrees in Burneyville. The lowest maximum temperatures rose from 21 degrees on the 23rd to 28 degrees on the 25th. Daily average wind speeds were less than 14mph that Monday and less than 23mph the following Tuesday and Wednesday. The highest wind gust during this period was 48mph in Fairview on the 25th.

NOVEMBER 26-29: A cold front moved into the region and created some very intense weather conditions. Temperatures dropped and heavy rain and thunderstorms developed throughout the state. The warmest temperatures in OK fell from 73 degrees in Hugo on the 26th to 50 degrees in Broken Bow and Idabel on the 29th. The lowest maximum temperatures were a much cooler 35 degrees on the 26th (Boise City), 23 degrees on the 27th (Boise City), 27 degrees on the 28th (Boise City), and 30 degrees on the 29th (Hooker). The highest minimum temperatures dropped from 65 degrees to the upper 40s and the lowest minimum temperatures were in the panhandle, measuring 23 degrees

(Nov. 26th), 19 degrees (Nov. 27th), 20 degrees (Nov. 28th), and 26 degrees (Nov. 29th). Rainfall records were shattered during this period with the highest daily Mesonet amounts measuring 2.61 inches in Copan on the 26th, 5.50 inches in Hugo on the 27th, 1.86 inches in Broken Bow on the 28th, and 1.04 inches in Medford on the 29th. McAlester and Tulsa both broke their daily maximum rainfall records on the 27th with 2.7 inches and 2.61 inches, respectively. Tulsa's previous record of 2.5 inches was established over 100 years ago in 1896. Flooding was reported in Pittsburg, Wagoner, Okmulgee, Ottawa, and McCurtain County on the 27th and in Choctaw County on the 28th. With chilling temperatures and the freezing line moving in from the northwest, freezing rain and drizzle fell throughout the region and covered parts of the state in ice. Daily average wind speeds gradually declined with the highest in the state being 22mph on the 26th, 17mph on the 27th, 13mph on the 28th, and 9mph on the 29th.

NOVEMBER 30: Rainfall persisted, but temperatures slightly increased. Highs ranged from 36 degrees in Putnam to 54 degrees in Idabel and Talihina. Lows ranged from 20 degrees in Boise City and Kenton to 46 degrees in Idabel and Broken Bow. The top three liquid precipitation amounts were .99 inches in Watonga, .96 inches in Alva, and .92 inches in Lahoma. Average wind speeds were calm, measuring 3-7mph.

NOVEMBER 2015 SEVERE WEATHER

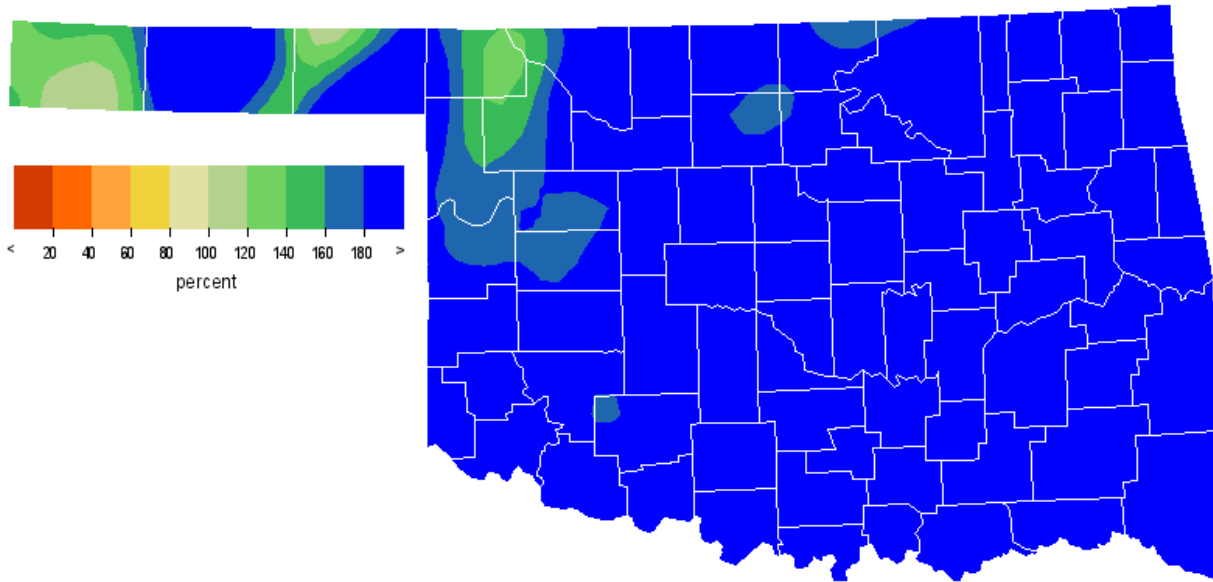
Wind Gusts (70 mph or greater)

Speed (m.p.h)	Location	County	Day
70.00	Haworth	McCurtain	5
80.00	5 ESE Hydro	Caddo	16
73.00	Lawton	Comanche	17
75.00	2 NW Tonkawa	Kay	17
99.00	7 SSE Red Rock	Noble	17

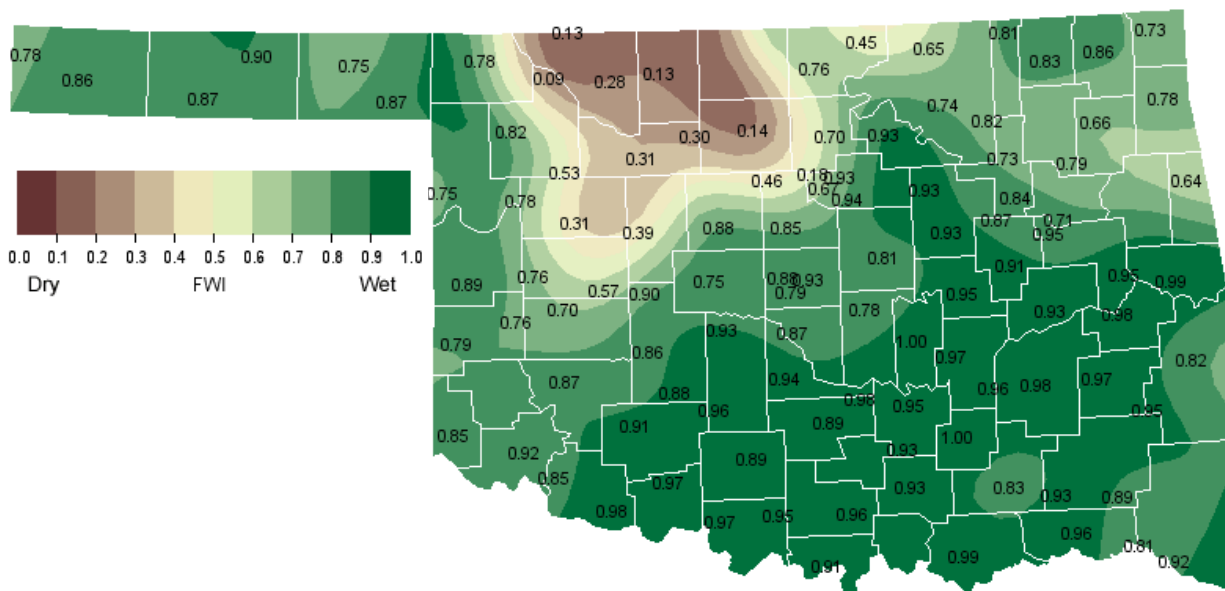
Flooding

Location	County	Day
McAlester	Pittsburg	27
10 ENE Broken Arrow	Wagoner	27
2 SW Haileyville	Pittsburg	27
Okmulgee	Okmulgee	27
2 NE Afton	Ottawa	27
Idabel	McCurtain	27
10 N Broken Bow	McCurtain	27
Grant	Choctaw	28

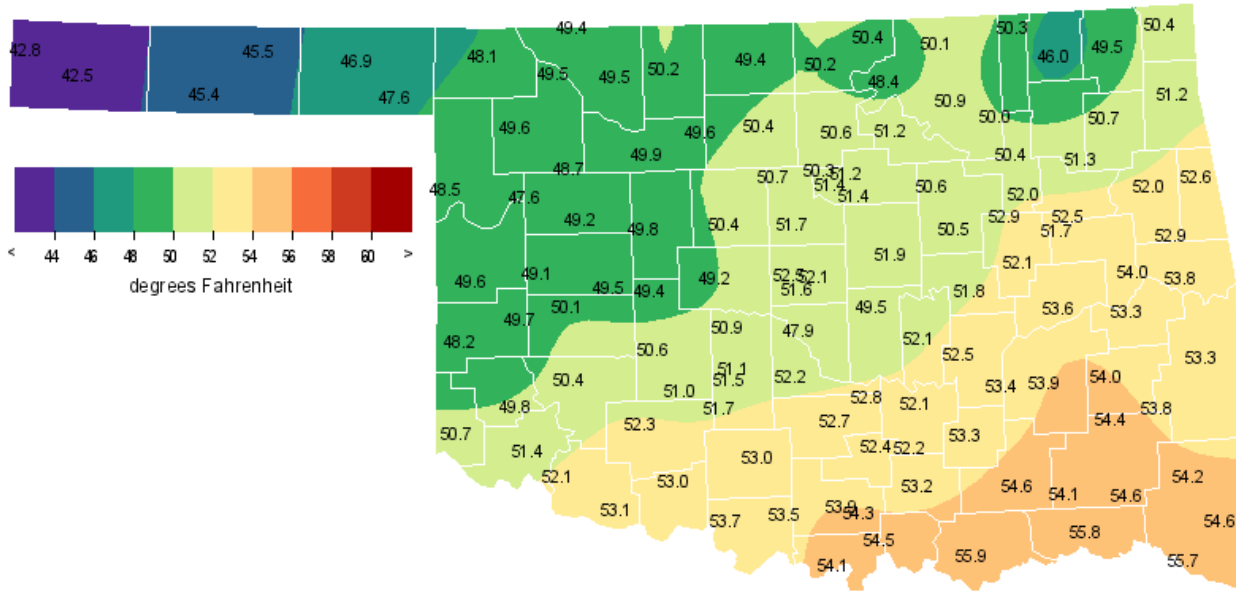
NOVEMBER 2015 PERCENT OF NORMAL PRECIPITATION



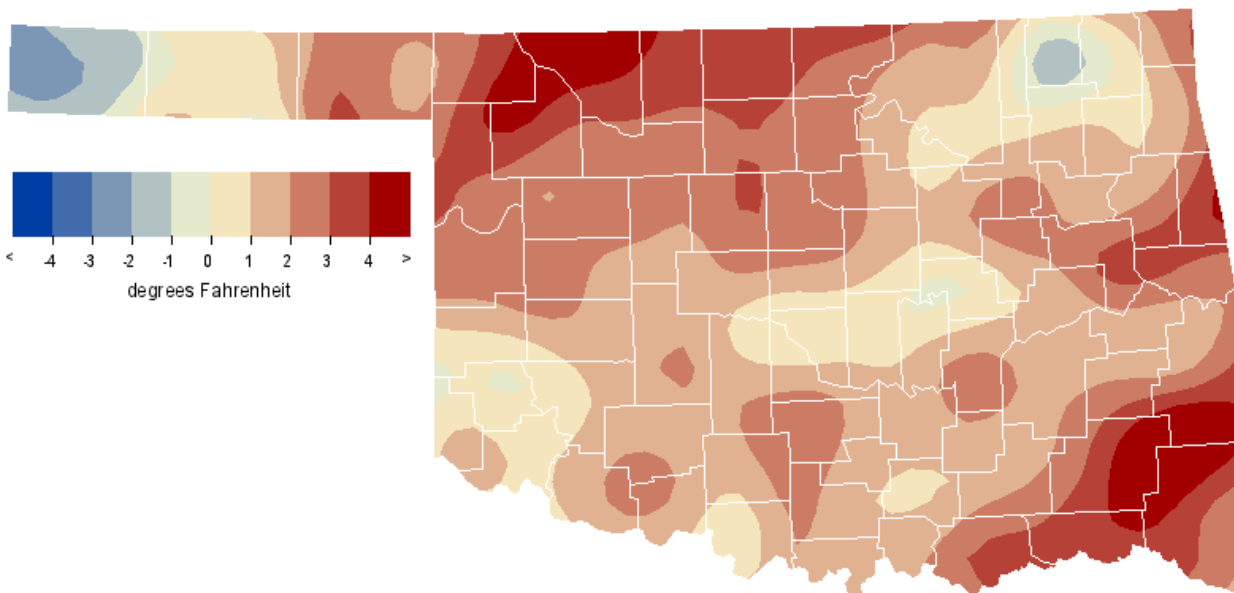
NOVEMBER 2015 AVERAGE SOIL MOISTURE AT 25CM



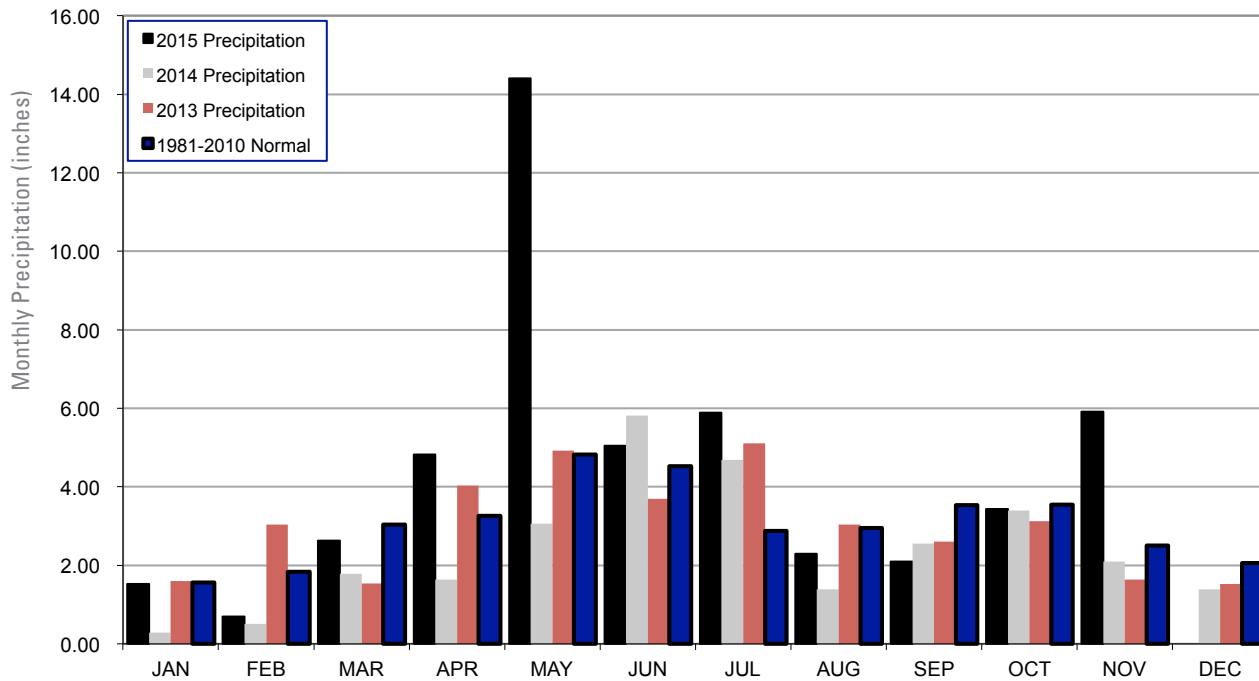
NOVEMBER 2015 AVERAGE TEMPERATURE



NOVEMBER 2015 DEPARTURE FROM NORMAL TEMPERATURE



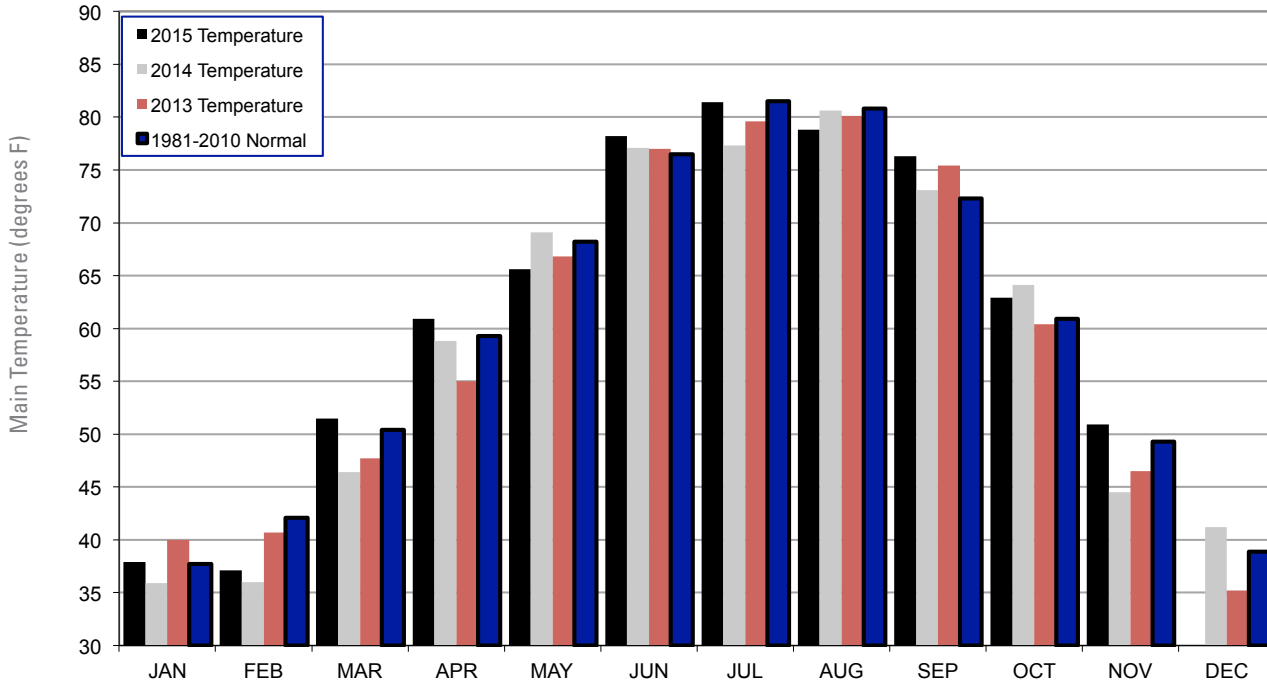
2013, 2014 AND 2015 STATEWIDE PRECIPITATION MONTHLY TOTALS VS. NORMAL



November 2015 Mesonet Precipitation Comparison

Climate Division	Precipitation (inches)	Departure from Normal (inches)	Rank since 1895	Wettest on Record (Year)	Driest on Record (Year)	Nov-14
	3.89	2.19	9th Wettest	6.84 (1923)	0.03 (2001)	1.63
Panhandle	1.49	0.66	24th Wettest	4.08 (1909)	0.00 (1921)	0.26
North Central	3.39	1.66	13th Wettest	6.61 (1964)	0.00 (1910)	0.92
Northeast	7.45	4.30	1st Wettest	7.04 (1992)	0.05 (1910)	1.99
West Central	2.87	1.38	20th Wettest	6.96 (1909)	0.00 (1949)	1.78
Central	5.45	3.04	8th Wettest	6.56 (1992)	0.01 (1955)	2.85
East Central	8.59	4.71	4th Wettest	9.86 (1946)	0.32 (1910)	2.92
Southwest	4.29	2.58	7th Wettest	6.63 (2004)	0.00 (1949)	3.01
South Central	8.25	5.36	2nd Wettest	8.87 (1902)	0.07 (1949)	3.95
Southeast	12.63	7.98	1st Wettest	12.32 (1946)	0.40 (1910)	1.93

2013, 2014 AND 2015 STATEWIDE TEMPERATURE MONTHLY TOTALS VS. NORMAL



November 2015 Mesonet Temperature Comparison

Climate Division	Average Temp (F)	Departure from Normal (F)	Rank since 1895	Hottest on Record (Year)	Coldest on Record (Year)	Nov-14 (F)
Panhandle	45.9	0.9	38th Warmest	51.5 (1999)	35.5 (1929)	41.8
North Central	49.8	2.7	19th Warmest	54.5 (1999)	39.0 (1929)	42.4
Northeast	50.3	1.4	32nd Warmest	56.4 (1999)	41.1 (1929)	42.7
West Central	49.2	1.2	36th Warmest	54.8 (1999)	39.4 (1929)	43.5
Central	51.1	1.3	38th Warmest	57.1 (1999)	42.0 (1929)	45.0
East Central	53.0	2.2	24th Warmest	58.9 (1909)	43.3 (1929)	45.7
Southwest	51.3	0.8	43rd Warmest	56.7 (1999)	42.4 (1929)	46.4
South Central	53.5	1.2	34th Warmest	58.6 (1999)	43.5 (1929)	46.9
Southeast	54.5	2.9	19th Warmest	58.3 (1909)	43.7 (1929)	45.4
Statewide	50.9	1.6	27th Warmest	56.1 (1999)	41.1 (1929)	44.4

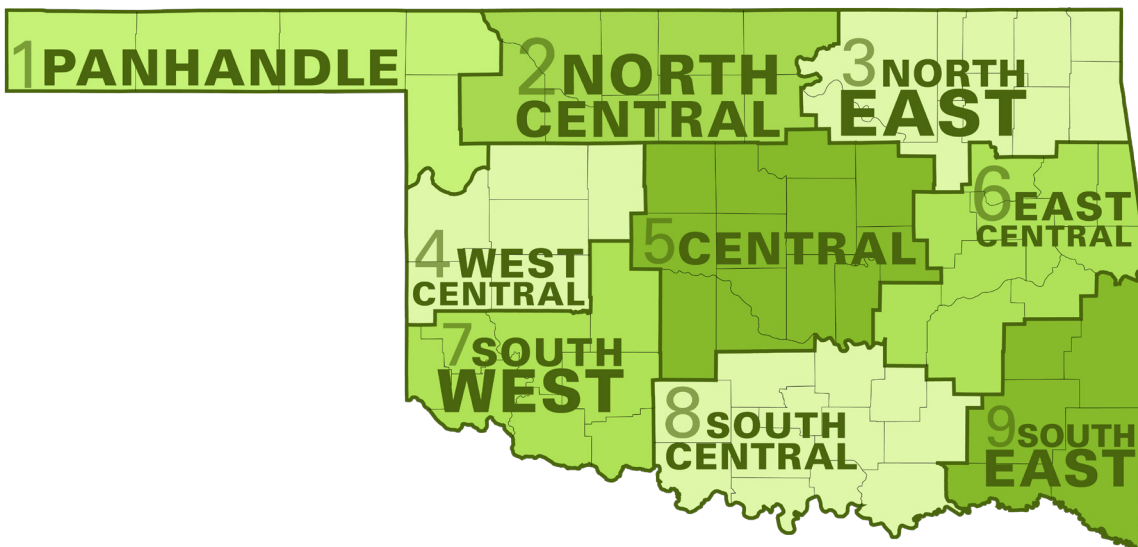
RECORD EVENT REPORTS NOVEMBER 2015

Description	Day	Location	Record	Previous Record	Year
Daily High Temperature	11	McAlester	82	82	1999
Daily Maximum Rainfall	17	Tulsa	1.28	1.24	1952
Daily Maximum Rainfall	17	McAlester	1.75	1.67	1984
Daily Maximum Rainfall	27	McAlester	2.7	1.03	1982
Daily Maximum Rainfall	27	Tulsa	2.61	2.5	1896

MESONET EXTREMES FOR NOVEMBER 2015

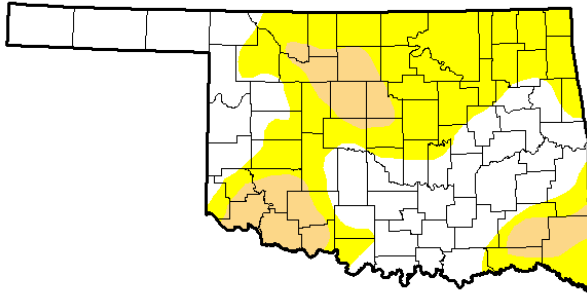
Climate Division	High Temp (F)	Day	Station	Low Temp (F)	Day	Station	High Monthly Rainfall (inches)	Station	High Daily Rainfall (inches)	Day	Station
Panhandle	84	3rd	Beaver	15	19th	Kenton	2.78	Slapout	1.45	26th	Arnett
North Central	81	3rd	Freedom	23	21st	Seiling	4.17	Alva	2.51	26th	Alva
Northeast	80	11th	Inola	21	22nd	Vinita	9.61	Miami	3.71	17th	Miami
West Central	79	5th	Butler	18	21st	Camargo	3.31	Watonga	1.78	26th	Elk City
Central	80	5th	Acme	19	22nd	Bristow	7.19	Okemah	2.68	27th	Okemah
East Central	82	11th	Webbers Falls	21	22nd	Tahlequah	9.66	Cookson	3.32	27th	Westville
Southwest	81	5th	Altus	21	21st	Mangum	5.71	Mangum	2.25	16th	Mangum
South Central	84	5th	Waurika	19	22nd	Sulphur	11.59	Durant	3.64	27th	Tishomingo
Southeast	80	11th	Hugo	20	22nd	Talihina	14.95	Mt Herman	5.50	27th	Hugo
Statewide	84	5th	Waurika	15	19th	Kenton	14.95	Mt Herman	5.50	27th	Hugo

Oklahoma Climate Divisions



NOVEMBER 2015 DROUGHT MONITOR

U.S. Drought Monitor Oklahoma



November 3, 2015

(Released Thursday, Nov. 5, 2015)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	45.55	54.45	13.80	0.00	0.00	0.00
Last Week <i>10/27/2015</i>	33.36	66.64	17.68	2.79	0.00	0.00
3 Months Ago <i>8/4/2015</i>	98.66	1.34	0.00	0.00	0.00	0.00
Start of Calendar Year <i>1/29/2015</i>	25.63	74.37	62.03	40.84	21.74	5.70
Start of Water Year <i>9/29/2015</i>	52.60	47.40	16.79	6.37	0.97	0.00
One Year Ago <i>11/4/2014</i>	22.69	77.31	64.78	48.74	21.57	6.56

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.

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NOAA/NWS/NCEP/CPC



<http://droughtmonitor.unl.edu/>

INTERPRETATION INFORMATION

MEAN DAILY TEMPERATURE: Calculated from an average of the daily maximum and minimum temperatures. Daily averages are summed for each day, and then divided by the number of valid data points – typically the number of days in the month. Although this November differ from the “true” daily average, it is consistent with historical methods of observation and comparable to the normals and extremes for stations and regions of the state.

DEGREE DAYS: Degree Days are calculated each day of the month for which there is a temperature report and the mean temperature for the day is less than (Heating Degree Days) or greater than (Cooling Degree Days) 65 degrees. Daily values are summed to arrive at a monthly total. HDD/CDD are qualitative measures of how much heating/cooling was required to maintain a comfortable indoor temperature. Missing observations November result in an artificially high or low value.

SEVERE WEATHER REPORTS: Only the most significant events are listed. Tornadoes of F2 or greater strength (on the 0-5 Fujita scale), hail of two inches diameter or greater, and wind speeds of 70 miles per hour or above are listed. National Weather Service defines storms as severe when they produce a tornado, hail of three-quarters inch or greater, or wind speeds above 57 miles per hour (50 knots). For additional reports, contact the Oklahoma Climatological Survey, Storm Prediction Center, or your local National Weather Service forecast office.

SOIL MOISTURE: The soil moisture variable displayed is the Fractional Water Index (FWI), measured at a depth of 25 cm. This unitless value ranges from very dry soil having a value of 0, to saturated soils having a value of 1.

ADDITIONAL RESOURCES

SUNRISE / SUNSET TABLES

U.S. Naval Observatory: <http://aa.usno.navy.mil/data>

SEVERE STORM REPORTS

Storm Prediction Center: <http://spc.noaa.gov/climo/>

National Climatic Data Center (more than about 4-5 months old):

<http://www4.ncdc.noaa.gov/cgi-win/wwwcgi.dll?wwEvent~Storms>

SEASONAL OUTLOOKS

Climate Prediction Center:

http://www.cpc.ncep.noaa.gov/products/OUTLOOKS_index.html

CLIMATE CALENDARS AND OTHER LOCAL WEATHER AND CLIMATE INFORMATION

Oklahoma Climatological Survey:

<http://climate.mesonet.org> or <http://climate.ok.gov/>



Oklahoma Climatological Survey is the State Climate Office for Oklahoma

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