

A mild July seemed in store for much of Oklahoma after a rainy beginning but it would seem Mother Nature had other plans. The first part of the month brought rains, often times torrential downpours, which kept temperatures on the mild side. A classic summertime pattern followed quickly thereafter, however, and left plenty of steamy, hot weather in its place. While traditional severe weather culprits such as tornadoes, large hail and high winds were scarce, flash flooding was not. Three deaths due to drowning were reported with the numerous instances of flash flooding across the state.

The result of the transition from wet-and-mild to hot-and-dry is reflected in the temperature data from the Oklahoma Mesonet. The statewide average temperature matched the normal reading at 81.6 degrees, ranking the month as the 52nd warmest July since records began in 1895. The wet conditions early on buoyed the statewide average precipitation total to 4.52 inches, 1.78 inches above normal to rank as the 16th wettest July on record. Southwestern Oklahoma came in with its wettest July on record with an average rainfall of 7.34 inches, more than 5 inches above normal. The Mesonet site at Hobart recorded a whopping 14.28 inches of rain while Buffalo, which is currently experiencing severe drought conditions, brought up the rear with 1.16 inches.

### July 2010 Statewide Extremes

Description	Extreme	Station	Day
High Temperature	105°F	Buffalo, (Hooker)	13, 17, (13)
Low Temperature	55°F	Beaver	6
High Precipitation	14.28 in.	Hobart	
Low Precipitation	1.16 in.	Buffalo	

Even though actual air temperatures did not reach extreme levels during the month, the heat index was a different story. The highest temperature for the month of 105 degrees was recorded by the Oklahoma Mesonet sites at Buffalo and Hooker. The heat index – or how hot the air feels when combined with humidity – regularly exceeded 110 degrees from July 13-18. The Mesonet site at Nowata won the prize for most miserable day with a heat index of 116 degrees on the 17th.

## PRECIPITATION

The bounty experienced by many parts of the state was not had by all. Extreme northwestern Oklahoma was a bit on the dry side to rank as the 50th driest July on record for that region. Along with the southwest, west central Oklahoma had a wet time of things with an average total of well over 5 inches, more than 3 inches above normal and ranked as the 5th wettest July on record. The season was off to a wet start with a June-July average across the state at well over 8 inches, more than an inch above normal and the 33rd wettest on record. That is once again buoyed by the moisture received by southwestern and west central Oklahoma with rankings of 11th- and 17th-wettest for the June-July period, respectively. The year thus far finished fairly close to normal, if not a tad below normal, and ranked as the 48th wettest January-July period on record.

### July 2010 Statewide Statistics

#### Temperature

	Average	Depart.	Rank (1895-2010)
Month (July)	81.6°F	0.0°F	52nd Warmest
Season-to-Date (Jun-Jul)	81.1°F	2.0°F	20th Warmest
Year-to-Date (Jan-Jul)	58.8°F	-0.4°F	56th Coolest

#### Precipitation

	Average	Depart.	Rank (1895-2010)
Month (July)	4.52 in.	1.78 in.	16th Wettest
Season-to-Date (Jun-Jul)	8.42 in.	1.42 in.	33rd Wettest
Year-to-Date (Jan-Jul)	21.56 in.	-0.33 in.	48th Wettest

Depart. = departure from 30-year normal

## TEMPERATURE

Areas with abundant rainfall tended to be cooler, although that was not an absolute rule. Central Oklahoma was wetter than normal but also finished with perfectly normal to rank as the 46th warmest July on record for that area. The southwest fell more than a degree below normal to rank as the 44th coolest

for that area. The season thus far was very warm with a statewide average of 81.1 degrees, 2 degrees above normal and the 20th warmest such period on record. The year was still on the cool side, however, and ranked as the 56th coolest on record.

## JULY DAILY HIGHLIGHTS

**JULY 1-9:** Deep tropical moisture from two Gulf storms provided the fuel for very heavy rains over much of the state, especially for early July. Tropical storm Alex provided the first round of drenching rainfall with another shot later from an unnamed storm (tropical depression #2). Nearly a foot of rain fell in Hobart over this period, including 6.39 inches on the sixth. Much of that rain fell very quickly and produced extreme flash flooding. Southwest Oklahoma City was next on the eighth when very heavy rains fell in just a few short hours that flooded troublesome Lightning Creek. Many areas of the state saw between 4-6 inches. The extreme northwest and the central Panhandle were largely left out of this rainy period with less than an inch of rainfall in those areas. The month's lowest temperature of 55 degrees occurred at Beaver on the sixth.

**JULY 10-14:** The 10th saw a brief break in the rainy weather as showers from the night before dissipated. A few storms later that day contained strong winds and small hail. High temperatures were mostly in the 80s. Showers and storms the next couple of nights brought additional heavy rains to parts of the state. The sun came out during this period and produced very uncomfortable weather due to all the moisture from previous rains. Highs in the 80s and 90s combined with the extreme humidity to produce heat indices in the 105-115 degrees range. The month's highest temperature of 105 degrees was first recorded on the 13th at Buffalo and Hooker.

**JULY 15-17:** A sagging cold front that entered northwestern Oklahoma on the 15th gave the only relief during this period. Showers and storms fired along that front and brought some nice rains to the northern one-fifth of the state, but the remainder of Oklahoma stayed hot and dry. Highs were in the upper-90s and low-100s while lows were generally in the upper-70s. The winds made for blast furnace conditions, gusting to over 30 mph at times. The third instance of 105 degrees was recorded at Buffalo on the 17th.

**JULY 18-23:** This six-day period was, simply put, hot and muggy with very little in the way of rainfall. Lows flirted with remaining in the 80s while highs were generally in the mid-90s to lower-100s. A ridge of high pressure was the culprit, typical for late July.

**JULY 24-28:** A weak frontal boundary allowed a bit of relief for a few locations, otherwise the weather continued hot. Isolated storms along that boundary produced some severe weather on the 24th. Lows were in the mid-70s for the most part and the highs climbed into the 90s, although some 80s were scattered around, especially near the rainfall.

**JULY 29-31:** The month finished with blazing hot and dry weather. Highs in the 90s and 100s were common under blue skies as the summertime upper-level ridge of high pressure dominated the area. The month's final day saw a few showers and storms out in western Oklahoma. The rain totals were light but the rain-cooled air was a welcome relief for some.

## JULY 2010 SEVERE WEATHER

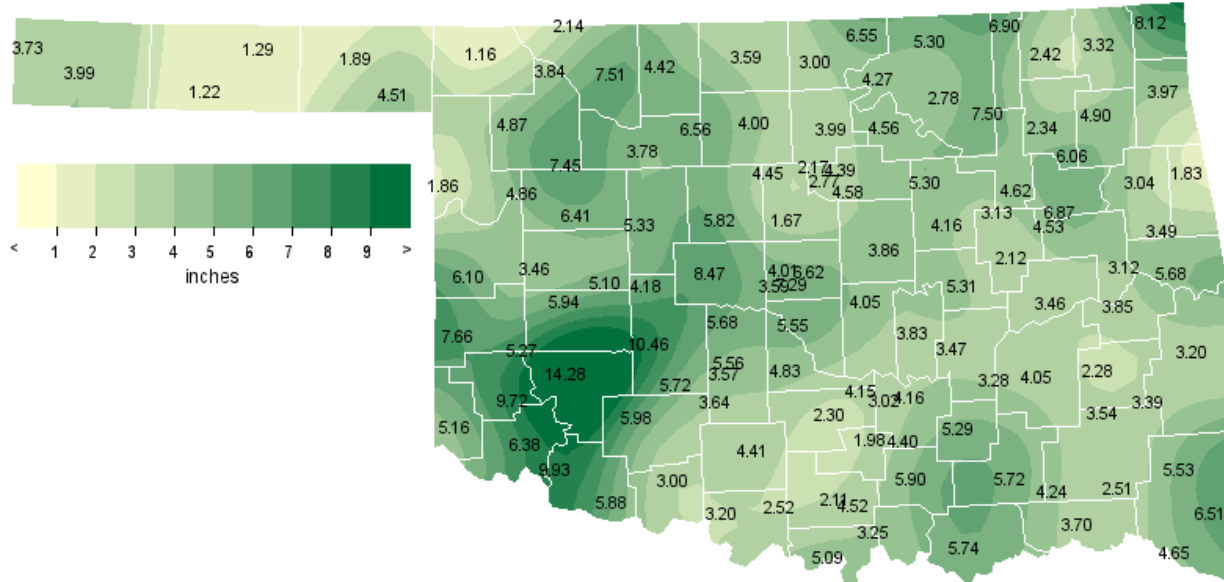
### Flooding

Location	County	Day
Hobart	Kiowa	5
Carnegie	Caddo	5
Bartlesville	Washington	6
Miami	Ottawa	6
Jenks	Tulsa	6
2 N Spavinaw	Mayes	6
3 S Pawnee	Pawnee	6
13 S Carnegie	Caddo	7
Kiowa	Pittsburg	7
8 SW Oklahoma City	Oklahoma	8
1 NW Bethany	Oklahoma	8
1 S Newcastle	McClain	8
3 SSW Quinton	Pittsburg	8
6 S Tulsa	Tulsa	8
6 SSE Tulsa	Tulsa	8
3 S Enterprise	Haskell	8
7 S Tulsa	Tulsa	8
Pensacola	Mayes	8
Tulsa	Tulsa	8
4 ENE Jenks	Tulsa	8
Keota	Haskell	9
Miami	Ottawa	12
Commerce	Ottawa	16

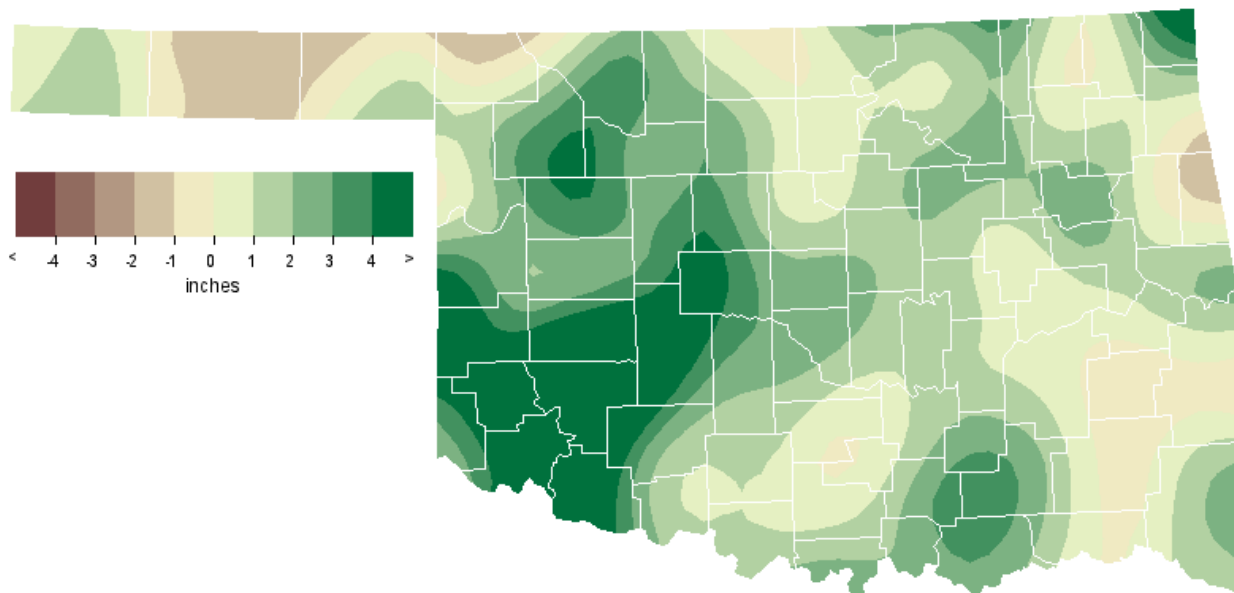
## JULY 2010 RECORD EVENTS

Description	Day	Location	Record	Previous Record	Year
Daily Rainfall	6	Oklahoma City	1.93 inches	1.84 inches	1929
Daily Rainfall	8	Tulsa	2.48 inches	1.02 inches	1906
Daily Rainfall	8	McAlester	1.26 inches	1.01 inches	1988

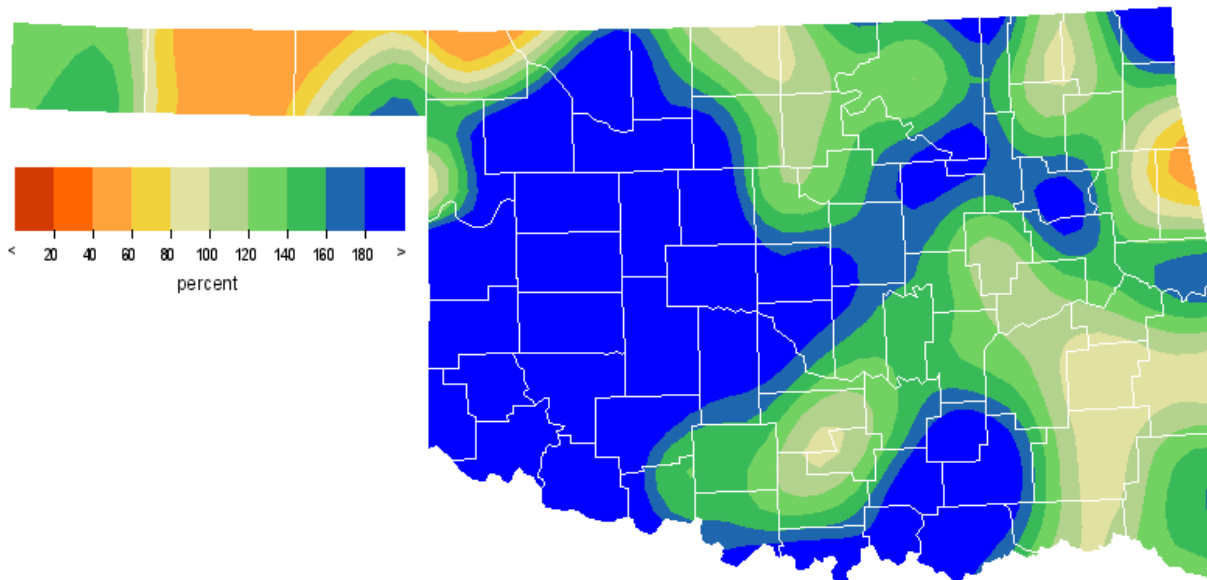
## JULY 2010 OBSERVED PRECIPITATION



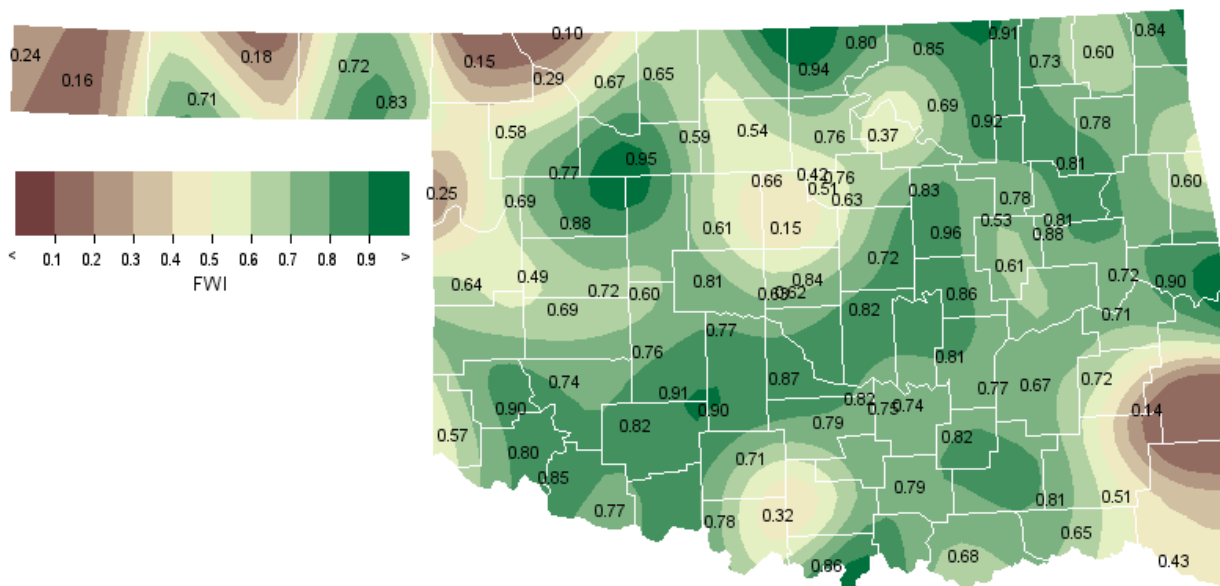
## JULY 2010 DEPARTURE FROM NORMAL PRECIPITATION



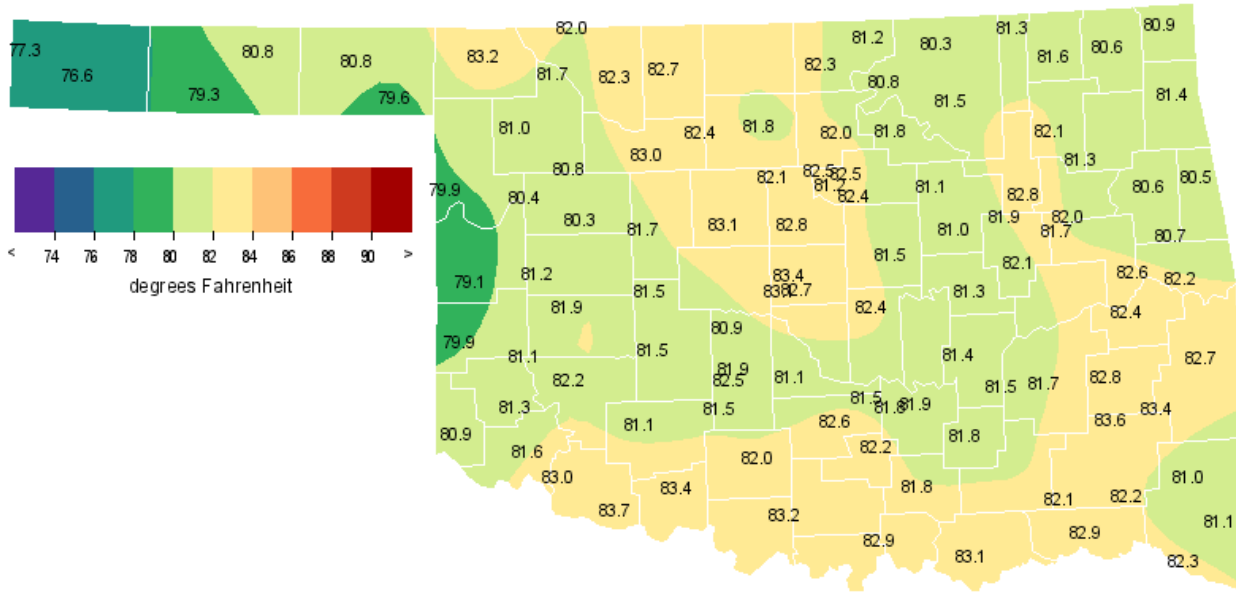
## JULY 2010 PERCENT OF NORMAL PRECIPITATION



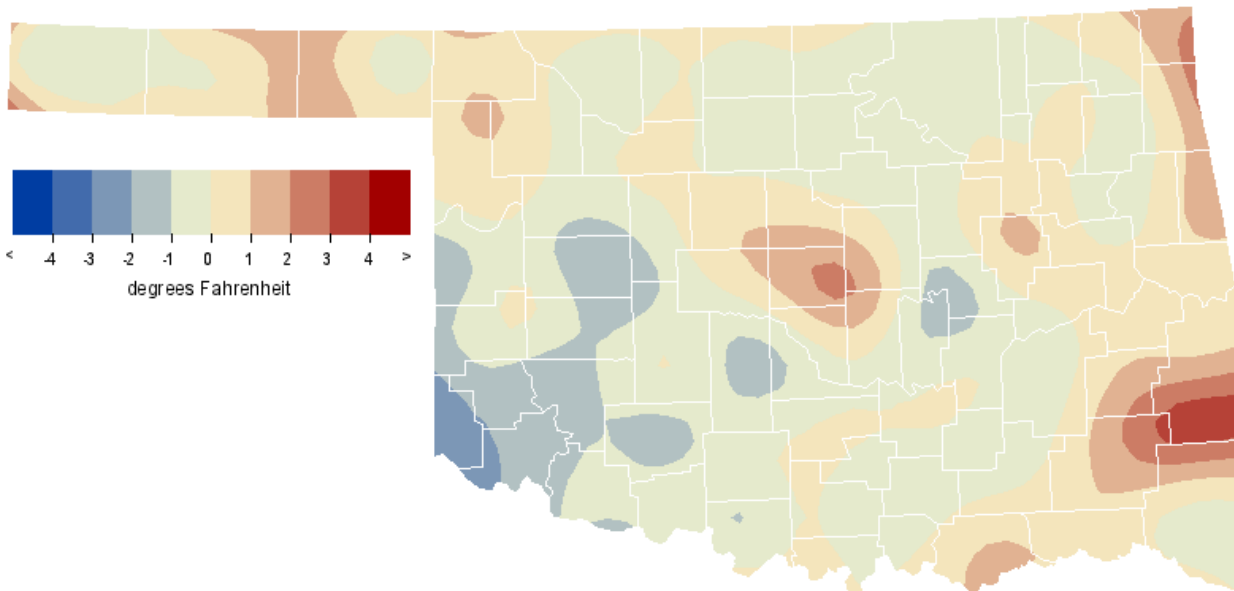
## JULY 2010 AVERAGE SOIL MOISTURE AT 25CM



## JULY 2010 AVERAGE TEMPERATURE

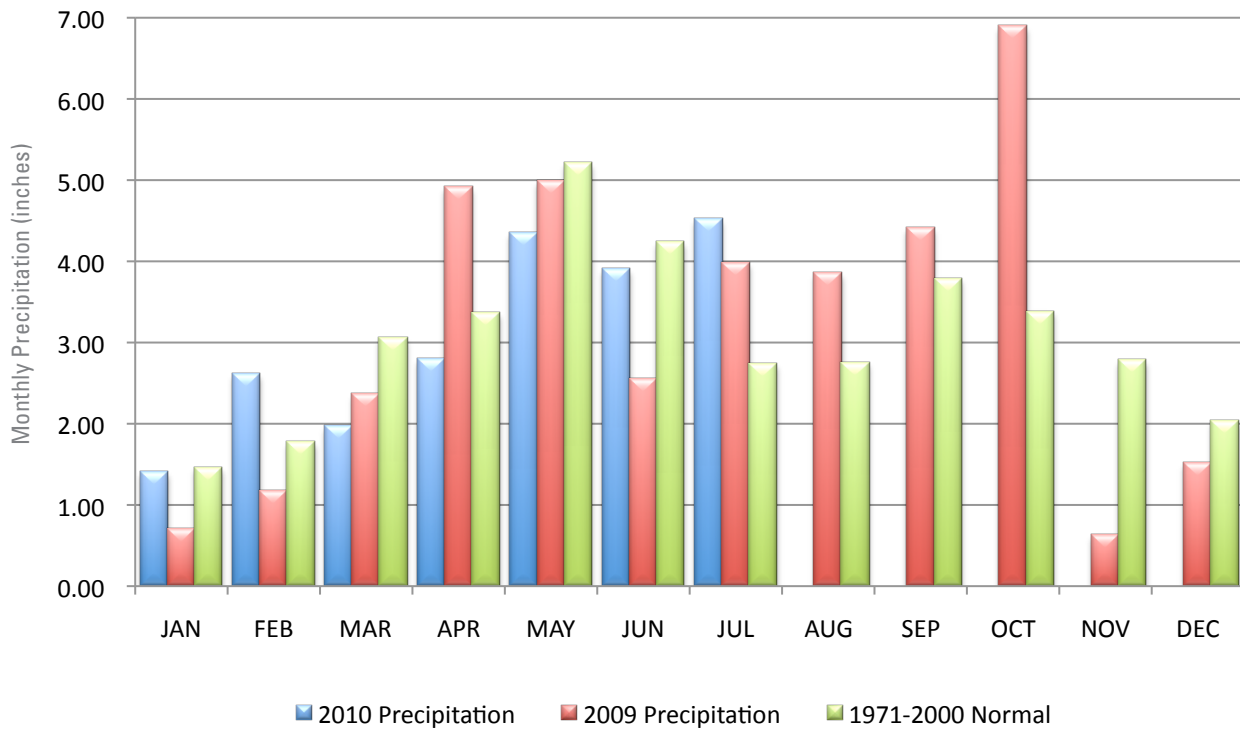


## JULY 2010 DEPARTURE FROM NORMAL TEMPERATURE





## 2009 AND 2010 STATEWIDE PRECIPITATION MONTHLY TOTALS VS. NORMAL

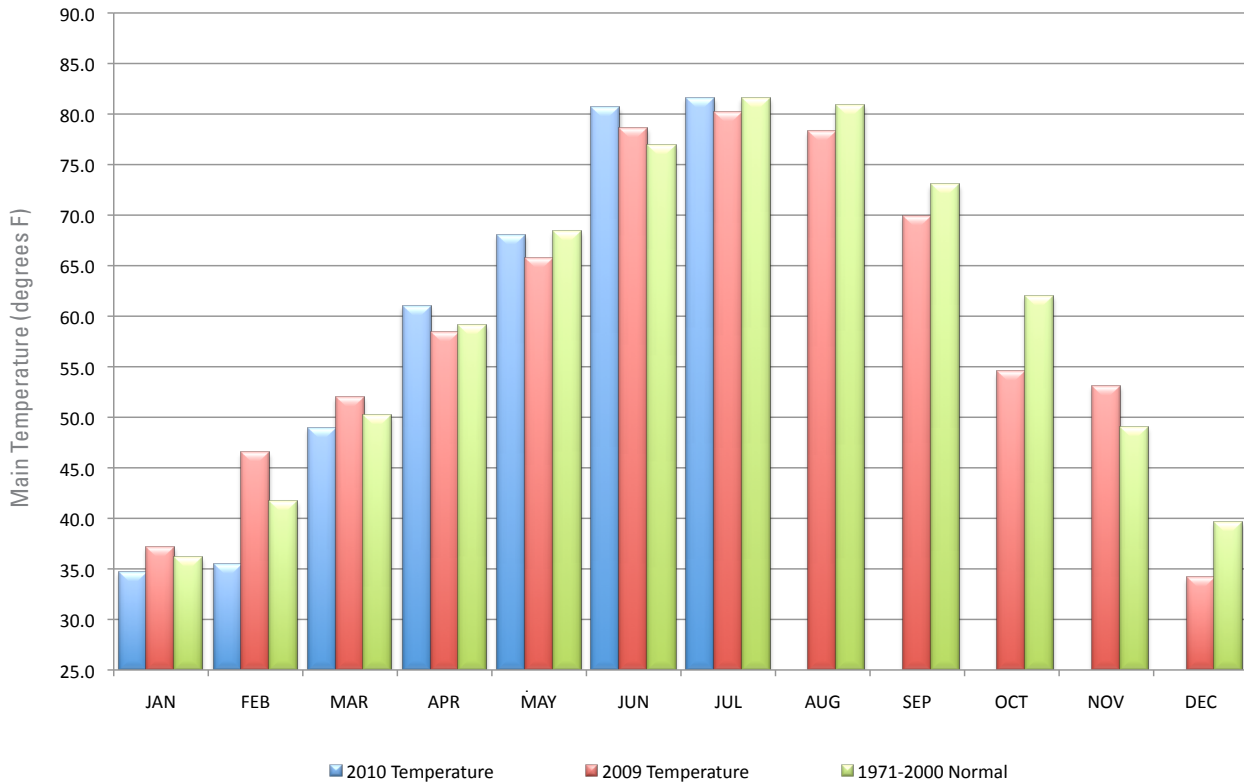


## July 2010 Mesonet Precipitation Comparison

Climate Division	Precipitation (inches)	Departure from Normal (inches)	Rank since 1895	Wettest on Record (Year)	Driest on Record (Year)	Jun-09
Panhandle	2.46	-0.06	50th Driest	9.79 (1950)	0.37 (1935)	2.72
North Central	4.75	1.77	17th Wettest	9.06 (1950)	0.13 (1983)	2.60
Northeast	4.93	1.77	20th Wettest	9.31 (1959)	0.00 (1914)	4.13
West Central	5.57	3.44	5th Wettest	7.21 (1950)	0.05 (1936)	4.21
Central	4.63	2.06	21st Wettest	10.17 (1950)	0.16 (1980)	4.77
East Central	3.47	0.49	44th Wettest	10.15 (1950)	0.17 (1930)	3.30
Southwest	7.34	5.16	1st Wettest	6.30 (1975)	0.03 (1980)	3.77
South Central	3.99	1.45	27th Wettest	8.45 (1950)	0.08 (1998)	4.38
Southeast	3.96	0.38	47th Wettest	13.02 (1950)	0.00 (1930)	6.06
Statewide	4.52	1.78	16th Wettest	9.26 (1950)	0.41 (1980)	3.98



## 2009 AND 2010 STATEWIDE TEMPERATURE MONTHLY TOTALS VS. NORMAL



## July 2010 Mesonet Temperature Comparison

Climate Division	Average Temp (F)	Departure from Normal (F)	Rank since 1895	Hottest on Record (Year)	Coldest on Record (Year)	Jun-09 (F)
Panhandle	79.7	0.1	46th Warmest	85.4 (1980)	73.2 (1906)	79.2
North Central	81.9	-0.3	54th Warmest	89.6 (1954)	75.8 (1950)	80.2
Northeast	81.4	0.5	44th Warmest	89.2 (1954)	75.0 (1906)	77.5
West Central	80.7	-1.0	t-47th Coolest	88.1 (1954)	75.8 (1906)	80.7
Central	82.0	0.0	46th Warmest	88.6 (1954)	75.8 (1906)	80.7
East Central	81.6	0.3	45th Warmest	88.7 (1954)	75.9 (1906)	79.2
Southwest	82.0	-1.2	44th Coolest	89.1 (1980)	77.9 (1906)	82.2
South Central	82.3	-0.4	58th Warmest	89.1 (1998)	77.2 (1906)	81.3
Southeast	82.4	1.5	36th Warmest	87.5 (1954)	76.4 (2004)	79.8
Statewide	81.6	0.0	52nd Warmest	88.1 (1954)	75.9 (1906)	80.1

## MESONET EXTREMES FOR JULY 2010

Climate Division	High Temp (F)	Day	Station	Low Temp (F)	Day	Station	High Monthly Rainfall (inches)	Station	High Daily Rainfall (inches)	Day	Station
	Panhandle	105	17th	Buffalo	55	6th	Beaver	4.51	Slapout	1.97	11th
North Central	102	17th	May Ranch	59	1st	Seiling	7.51	Alva	3.70	4th	Alva
Northeast	101	31st	Claremore	61	1st	Jay	8.12	Miami	3.45	6th	Copan
West Central	103	31st	Bessie	59	1st	Camargo	7.66	Erick	2.19	5th	Weatherford
Central	103	18th	Kingfisher	63	1st	Oilton	8.47	El Reno	3.14	6th	Spencer
East Central	101	31st	Hectorville	62	1st	Westville	5.68	Sallisaw	2.03	7th	McAlester
Southwest	104	31st	Grandfield	63	26th	Mangum	14.28	Hobart	6.39	5th	Hobart
South Central	103	31st	Ringling	67	1st	Ada	5.90	Tishomingo	3.27	8th	Burneyville
Southeast	104	31st	Talihina	64	1st	Clayton	6.51	Broken Bow	2.36	3rd	Mt Herman
Statewide	105	17th	Buffalo	55	6th	Beaver	14.28	Hobart	6.39	5th	Hobart

# AUGUST OUTLOOK

According to published daily normal temperatures, the hottest period of the long Oklahoma summer extends from mid-July through mid-August. The gradually shortening days and the occasional arrival of cooler weather from the North frequently bring the state modest relief from the heat by late August. Overall, August, the third and final month of the climatological summer, is Oklahoma's second hottest, fifth driest, and least windy month. Tornado frequency is at its lowest of the March-through-October warm season. Lightning deaths are more frequent in August than during any other month.

## Temperature

<b>Mean</b>	80.9 degrees
<b>Hottest August</b>	1936, 87.9 degrees
<b>Coollest August</b>	1915, 73.9 degrees
<b>Hottest location</b>	Waurika, 84.1 degrees
<b>Coollest location</b>	Boise City, 75.3 degrees
<b>Hottest recorded</b>	120 degrees, Poteau, August 10, 1936 Altus, August 12, 1936
<b>Coldest recorded</b>	41 degrees, Goodwell, August 15, 1915

The normal statewide monthly temperature is 80.9 degrees Fahrenheit. Oklahoma's hottest August, according to National Weather Service records that date from 1892, occurred in 1936 when the state's average monthly temperature was a scorching 87.2 degrees. This is the second highest statewide-averaged monthly temperature (all months) recorded in Oklahoma during the 111 years with comprehensive records. The state's record daily maximum temperature of 120 degrees was equaled at Altus and Poteau on August 12 and 10, 1936, respectively. Relatively cool weather prevailed during August 1915, when the state recorded its lowest August statewide-average monthly temperature, 73.2 degrees. The lowest daily minimum temperature of 39 degrees was recorded at Dacoma on August 26, 1910.

Isolated or widely scattered thunderstorms provide most of the state's August precipitation. As a result, little systematic variation can be seen in the statewide precipitation pattern. At 3.76 inches, Pawnee has the greatest normal precipitation

for the month. Meeker, near the center of the state, has the lowest normal monthly accumulation, 1.93 inches. Statewide-averaged monthly precipitation during August has ranged from 6.54 inches in 1906 to a dismal 0.14 inch during the droughty summer of 2000. The greatest August precipitation recorded by any reporting station was 15.15 inches at Holdenville in 1906. A 10.34-inch deluge at Carter Tower in northern McCurtain County on August 28, 1947 is the greatest daily precipitation recorded at a regular observing station during

## Precipitation

<b>Mean</b>	2.84 inches
<b>Wettest August</b>	1906, 6.54 inches
<b>Driest August</b>	2000, 0.18 inches
<b>Wettest location</b>	Pawnee, 3.76 inches
<b>Driest location</b>	Meeker, 1.93 inches
<b>Most recorded</b>	15.15 inches, Holdenville, 1906

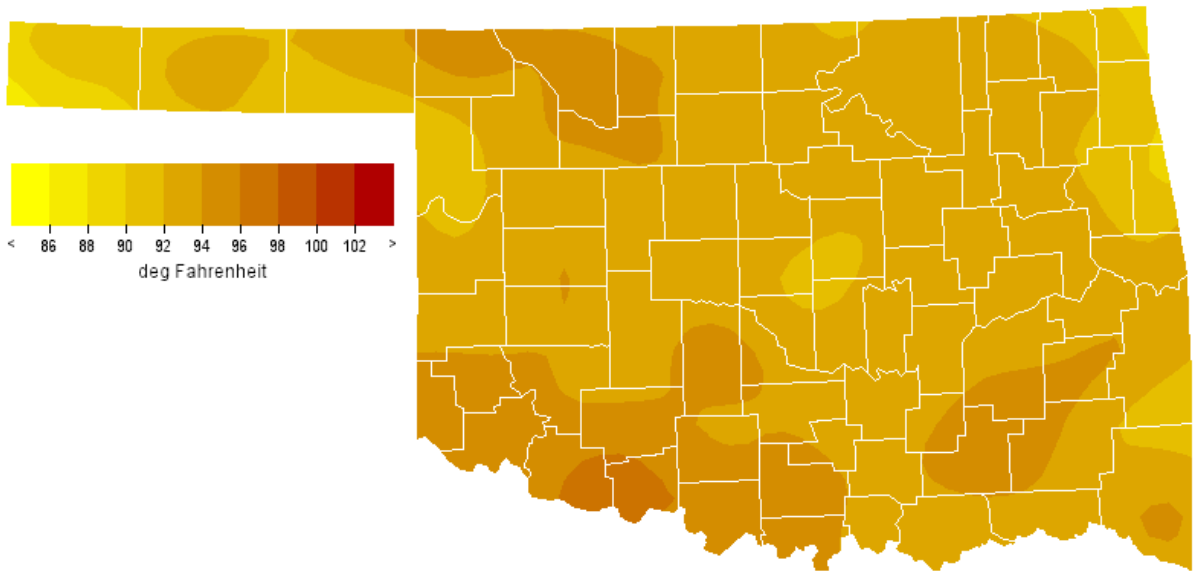
## Tornadoes

<b>Average August Tornadoes</b>	2
<b>Most</b>	13 (1979)

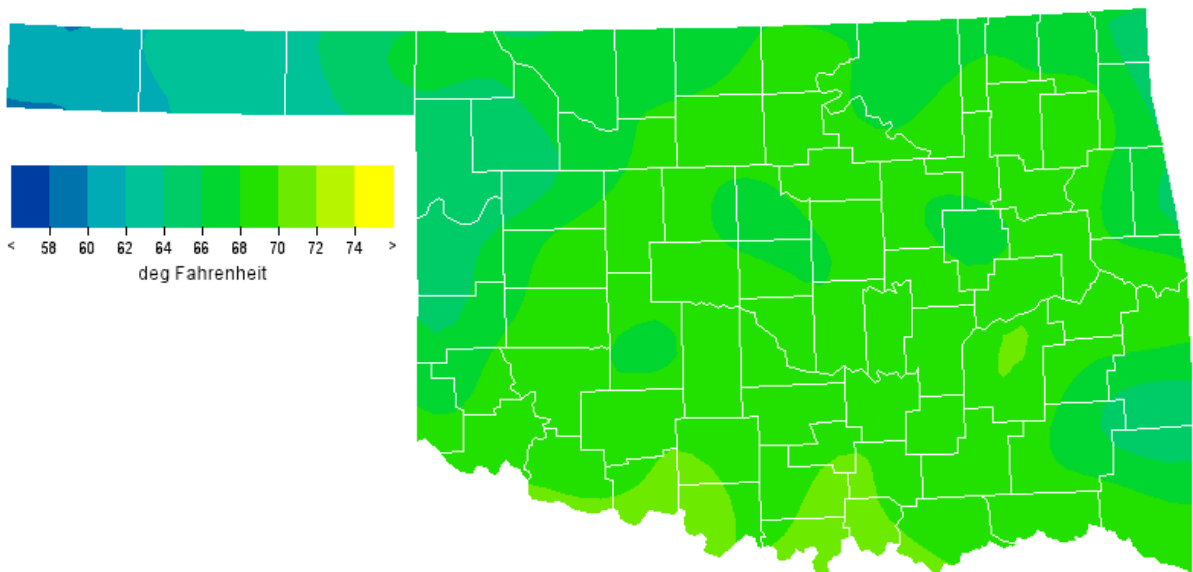
August. Precipitation is observed (.01 inch or more) on an average of as many as 7.8 days at Stilwell and as few as 3.5 days at Bixby. Daily rainfall events of two inches or greater are no more than an every-other-year occurrence everywhere in the state.

Severe weather appears in the state during August, but its effects are more notable anecdotally than they are apparent in statistics. The exception is that August has presented the state with more lightning deaths (21) than any other month since such record-keeping began in 1959. Only July among the months accounts for more total casualties (deaths and injuries) from lightning strikes. The average number of tornado for the month of August is 1.4. Of the 80 August tornadoes reported in the state between 1950 and 2003, no fatalities and only three injuries (1 in 1959 and 2 in 1982) resulted. Oklahoma's August tornado totals include a high of 13 in 1979. No tornadoes were observed during 22 of the 54 years with comprehensive statistics.

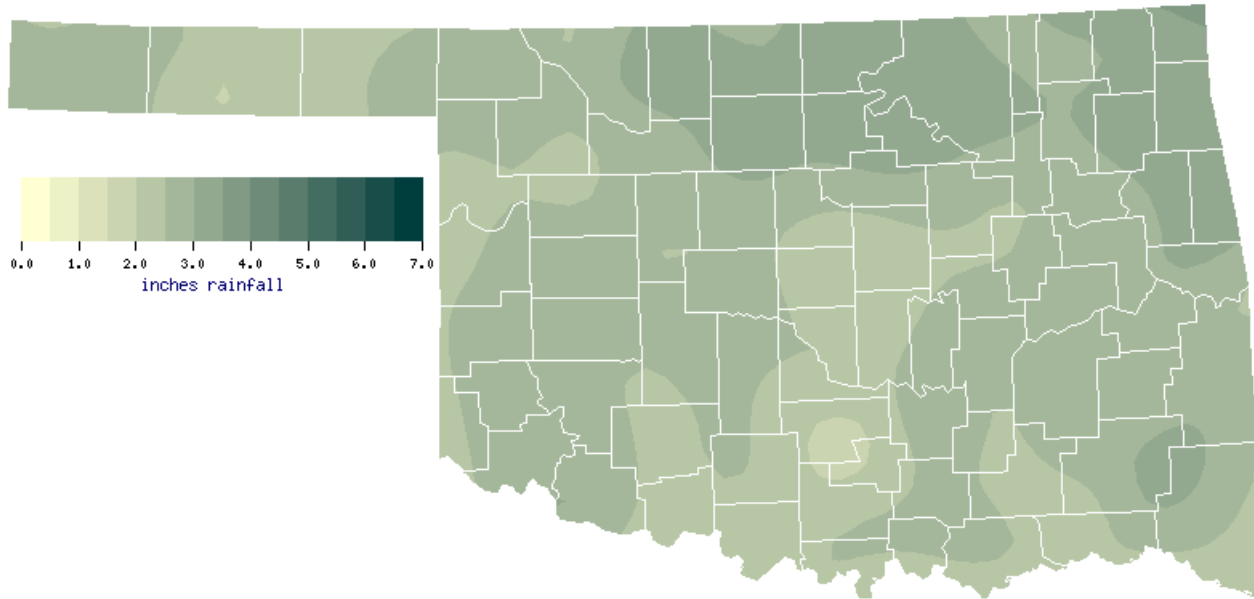
## AUGUST NORMAL DAILY MAXIMUM TEMPERATURE (1971-2000)



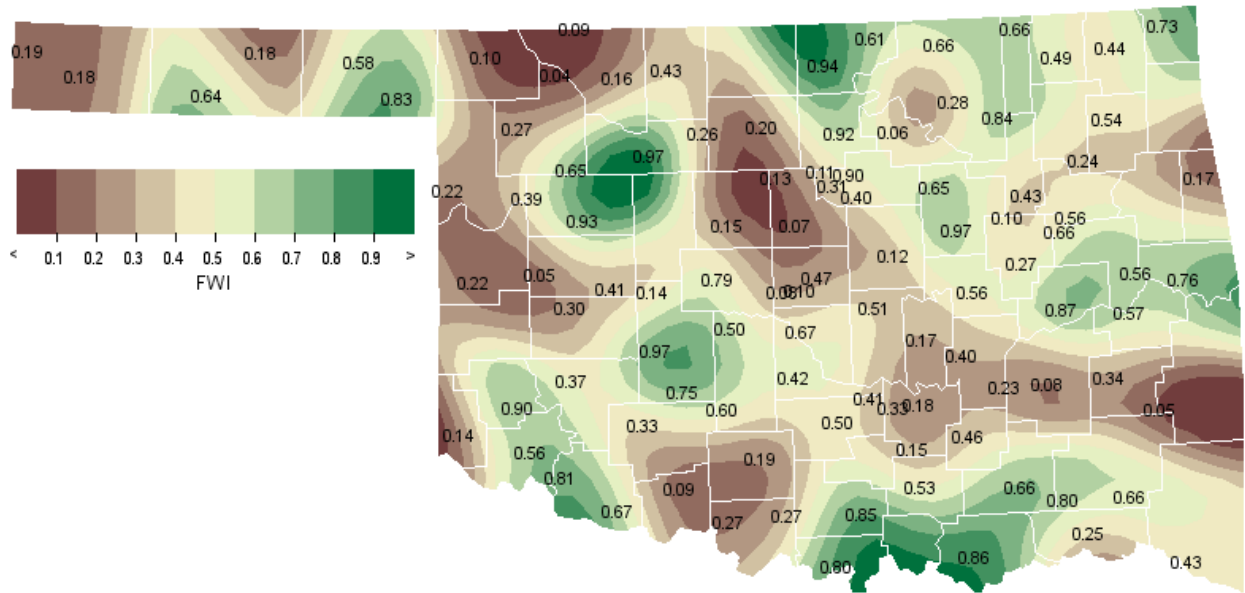
## AUGUST NORMAL DAILY MINIMUM TEMPERATURE (1971-2000)



## AUGUST NORMAL PRECIPITATION (1971-2000)



## AUGUST 1, 2010 SOIL MOISTURE CONDITIONS AT 25CM



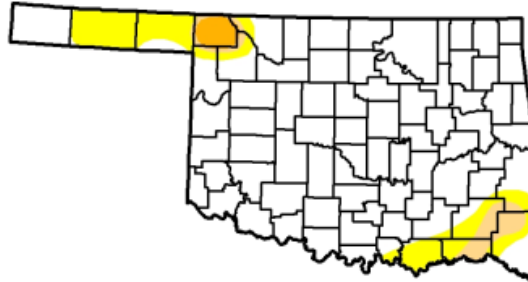
# AUGUST 2010 DROUGHT INDICES

## U.S. Drought Monitor Oklahoma

August 3, 2010  
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	85.5	14.5	4.3	1.3	0.0	0.0
Last Week (07/27/2010 map)	85.6	14.4	3.6	0.0	0.0	0.0
3 Months Ago (05/11/2010 map)	93.0	7.0	0.0	0.0	0.0	0.0
Start of Calendar Year (01/05/2010 map)	100.0	0.0	0.0	0.0	0.0	0.0
Start of Water Year (10/06/2009 map)	98.0	2.0	0.0	0.0	0.0	0.0
One Year Ago (08/04/2009 map)	69.4	30.6	15.4	5.5	0.0	0.0



Intensity:

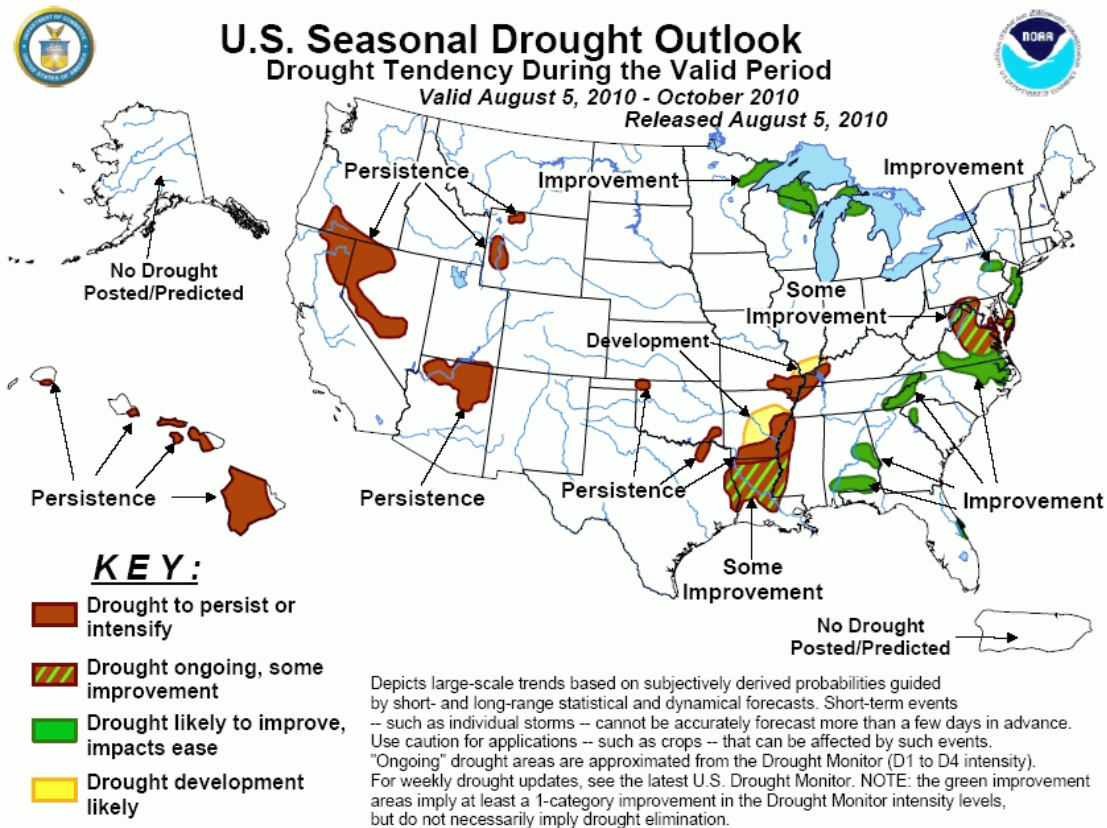


The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements

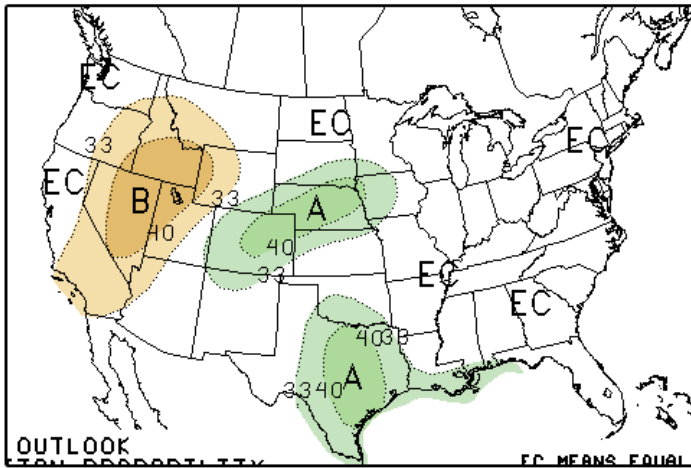


Released Thursday, August 5, 2010  
Author: D. Miskus, CPC/NOAA

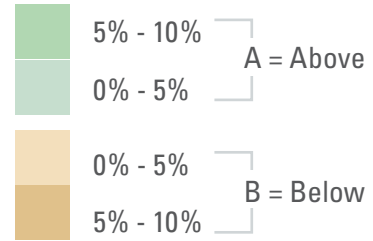
<http://drought.unl.edu/dm>



## AUGUST 2010 U.S. PRECIPITATION FORECAST

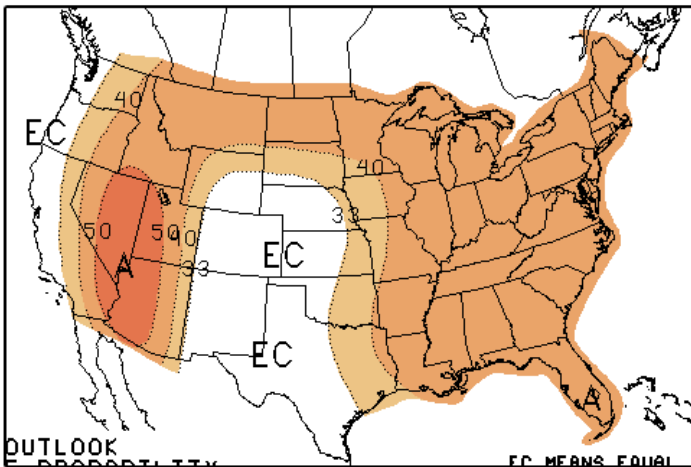


Percent Likelihood of Above or Below Average Precipitation\*

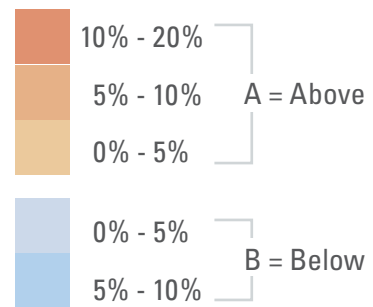


\*EC indicates no forecasted anomalies due to lack of model skill.

## AUGUST 2010 U.S. TEMPERATURE FORECAST



Percent Likelihood of Above or Below Average Temperatures\*

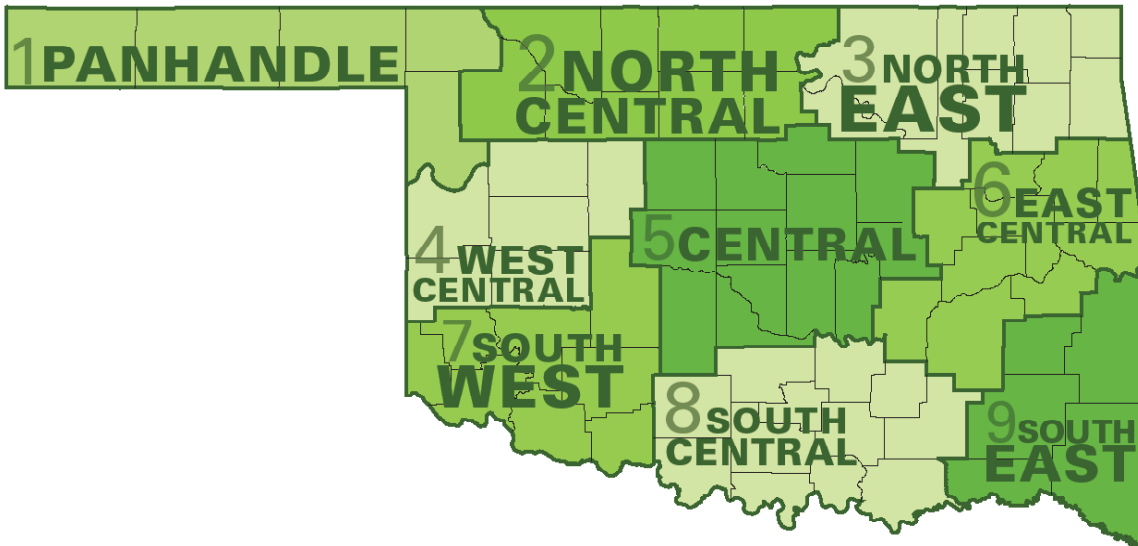


\*EC indicates no forecasted anomalies due to lack of model skill.

## AUGUST CLIMATE NORMALS

Climate Division	Max. Temperature (°F)	Min. Temperature (°F)	Avg. Temperature (°F)	Precipitation (inches)
1	92.3	64.1	78.2	2.48
2	93.4	67.6	80.6	3.01
3	92.6	68.1	80.4	3.13
4	93.0	67.7	80.4	2.63
5	93.2	68.8	81.0	2.61
6	92.6	68.5	80.6	2.77
7	94.7	68.8	81.8	2.6
8	94.1	69.5	81.8	2.49
9	93.5	67.7	80.6	2.72
Statewide	93.3	68	80.7	2.73

Oklahoma Climate Divisions





## 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 may 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 may 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](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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