Mesonet
www.mesonet.org
connection
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Rainfall Variability

–by Stephanie Bowen

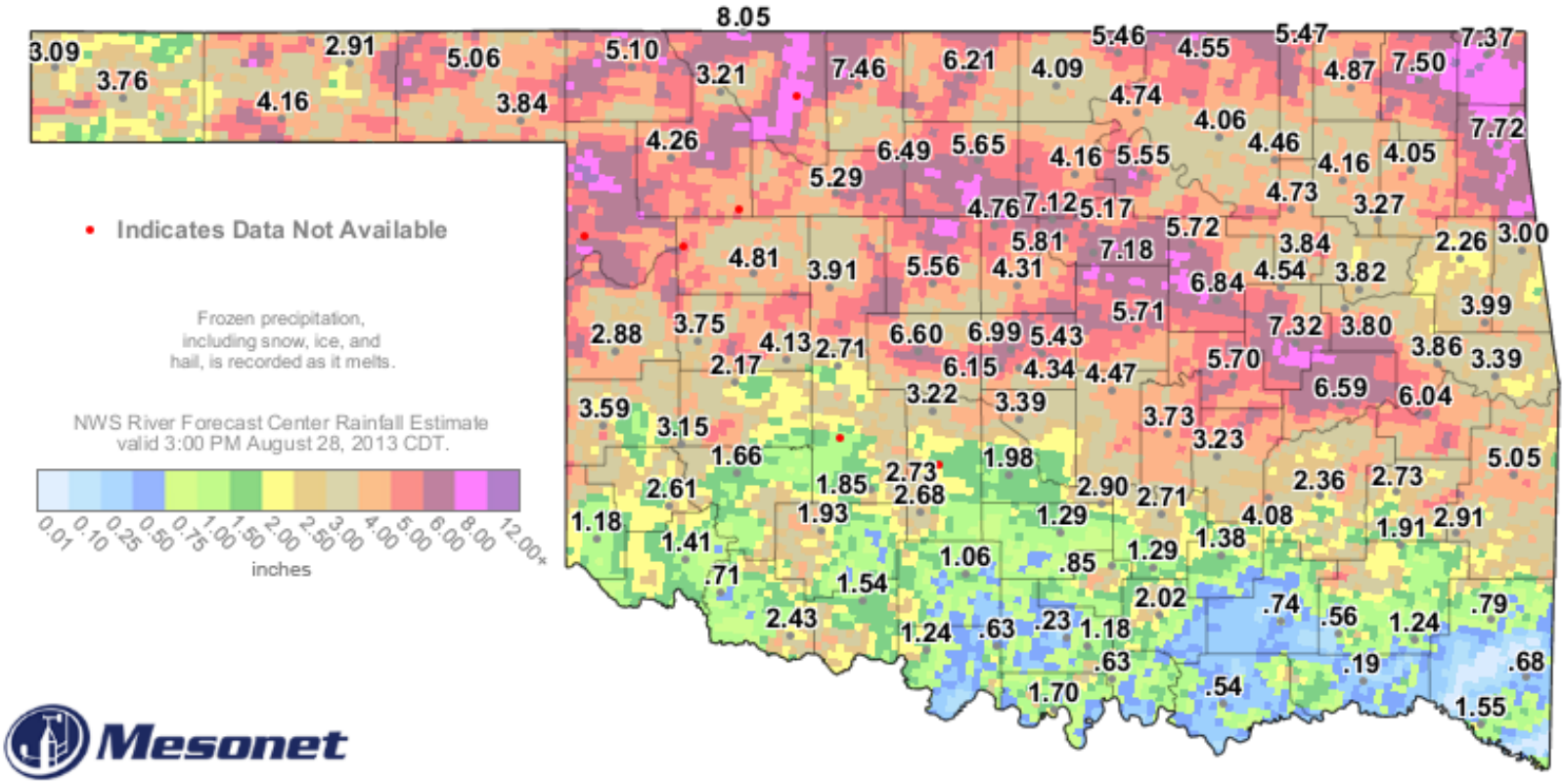
HAVE YOU EVER WATCHED a rain shower on radar move straight for your town, only to see it dissipate or veer away from your location at the last minute? During the warm season, convective precipitation can cause one part of town to receive flooding rains while another side receives little or none. Just a few weeks ago on August 9, the town of Norman received over 1.50 inches in its northwest neighborhoods, while the southeast side received less than 0.75 inches. These variable totals are typical of rainfall variability across a small area. The Mesonet's 120 stations reflect great contrasts in precipitation across the state, but those point measurements alone are not enough to capture the high variability across a county or city.

"The Mesonet partners with the National Weather Service River Forecast Center to provide a better assessment of rainfall across the state," said Chris Fiebrich, Manager of the Oklahoma Mesonet. "We use their radar estimates on our rainfall maps to get a more detailed analysis of rainfall between our stations."

The partnership is mutually beneficial. The River Forecast Center uses the Mesonet data to fine-tune their radar estimates. Their calibrated estimates are then used in hydrologic models to make river stage forecasts.

"The well-placed spatial network of rain gauges used by the Oklahoma Mesonet gives us outstanding ground truth that we use to calibrate radar estimates of rainfall," said Bill Lawrence, Hydrologist in Charge at the River Forecast Center. "The accurate rainfall estimates can be used by the public, by businesses, and even by ranchers that want to know how much rain fell on their 500 acres."

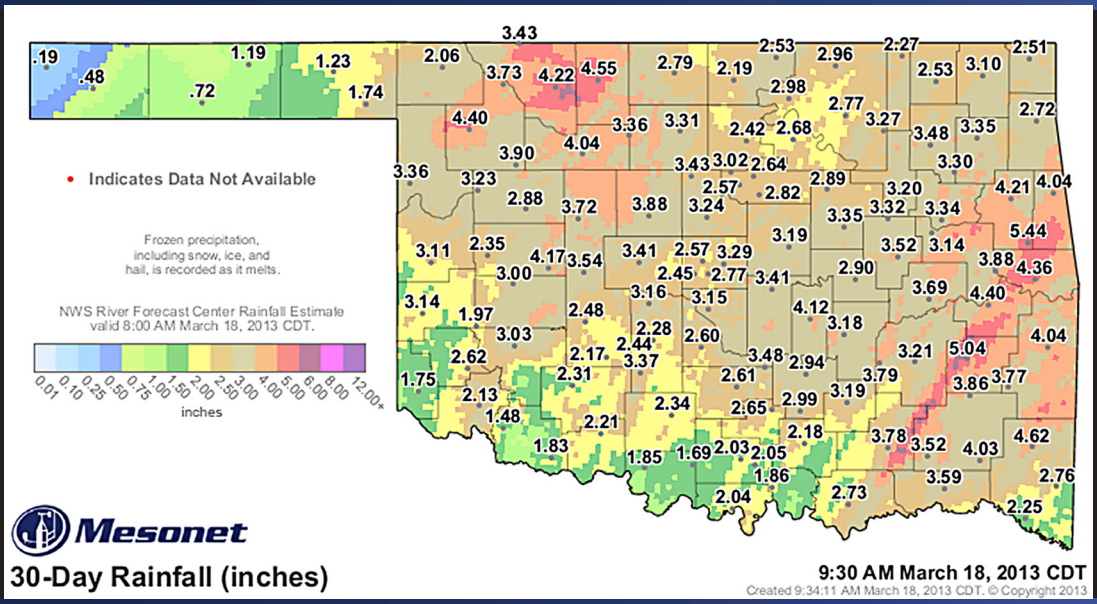
Users can view Mesonet rainfall data and the River Forecast Center radar estimates on the Rainfall Accumulation maps found at www.mesonet.org. When viewing these maps, the color gradient behind the Mesonet data reflects the River Forecast Center radar estimates. The radar data combined with Mesonet data helps give a better overall rainfall picture for the state, Fiebrich said. ■



MESONET IN PICTURES

Rainfall map

- To view rainfall maps and tables, visit http://mesonet.org. Click on Weather in the top menu bar, and select Rainfall in the side bar. Scroll down to view Rainfall Accumulation maps for various time intervals. When viewing these maps, the color gradient behind the Mesonet data reflects the National Weather Service River Forecast Center radar rainfall estimates.



Monthly Rainfall Table

- The Monthly Rainfall Table, on the right, shows monthly rainfall totals for a single Mesonet site. The table shown has estimated rainfall values in red and includes monthly Mesonet average and 30-year normal rainfall amounts. To view rainfall tables, visit http://mesonet.org. Click on Weather in the top menu bar, and select Rainfall in the side bar. Select "Monthly Rainfall Table" and select a site from the drop down menu. Click "Add Estimated Values" to view the values in red.

Mesonet Rainfall by Month Table

Remove estimated values

Select a site: Lahoma

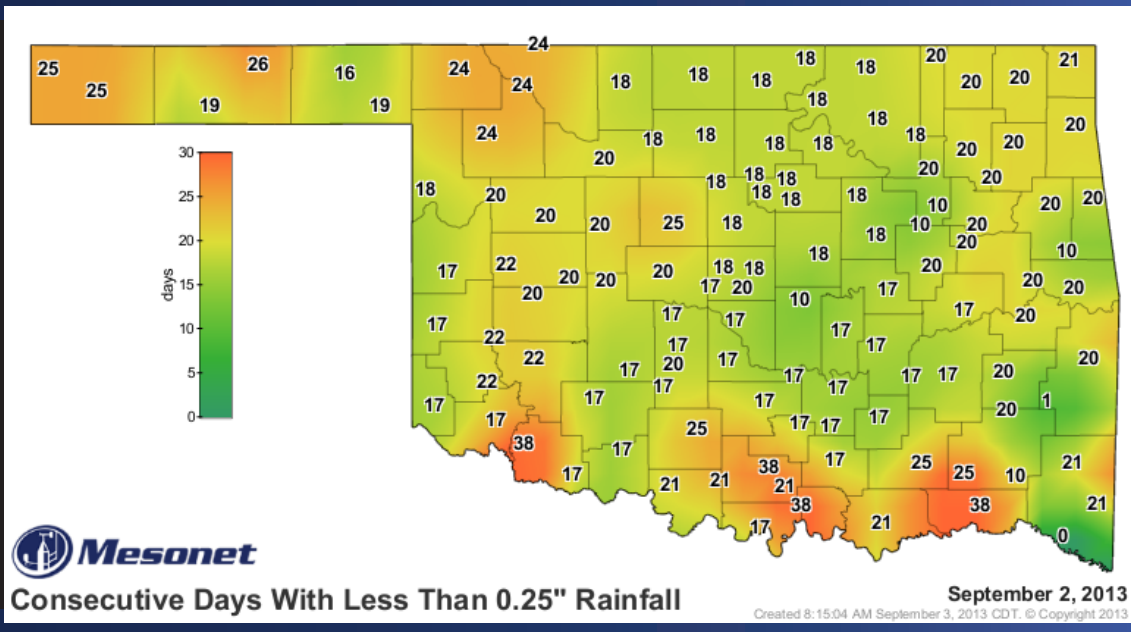
Lahoma (LAHO) rainfall in inches per month

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
1971-2000 Normal	1.04	1.45	2.70	3.00	4.71	4.09	2.94	3.18	3.10	2.99	2.17	1.33	32.70
Mesonet Average	0.84	1.33	2.27	3.10	3.31	4.23	2.83	4.05	2.56	3.14	1.50	1.20	30.37
1994	0.21	0.73	0.77	6.07	4.87	1.02	2.64	4.17	0.69	5.24	4.11	0.74	31.26
1995	0.81	0.23	2.71	3.59	4.84	8.49	2.96	8.76	3.36	0.69	0.06	1.06	37.56
1996	0.02	0.11	0.53	0.02	2.07	2.96	4.44	6.65	6.14	2.72	2.62	0.29	28.57
1997	0.21	3.40	0.55	6.45	3.64	3.37	5.57	5.14	4.31	3.41	1.12	3.74	40.91
1998	2.72	0.14	5.51	3.53	1.78	0.45	3.52	0.95	3.28	9.34	2.20	1.95	35.37
1999	1.78	1.58	3.20	6.73	4.78	6.87	2.33	4.63	3.32	1.88	1.30	3.88	42.28
2000	0.23	2.37	4.58	2.44	2.29	3.51	2.35	0.00	0.00	6.21	2.93	0.58	27.49
2001	2.34	2.24	1.10	0.32	7.24	0.94	0.15	4.71	2.61	0.00	0.49	0.10	22.24
2002	0.12	2.11	0.35	1.93	2.69	5.12	1.77	4.62	3.35	5.55	0.26	1.25	29.12
2003	0.06	0.68	1.65	2.36	2.98	2.33	0.70	4.05	1.95	1.49	0.41	1.07	19.73
2004	2.05	1.31	4.75	3.37	0.16	5.28	1.79	4.33	1.88	3.09	5.69	0.48	34.18
2005	3.28	0.99	1.18	0.63	2.17	5.09	2.65	7.14	1.15	2.50	0.07	0.39	27.24
2006	0.10	0.00	2.76	2.01	0.74	3.43	1.54	4.11	0.34	0.59	0.70	1.70	18.02
2007	0.74	0.29	4.88	2.62	5.16	9.08	3.00	1.74	4.64	3.41	0.11	1.80	37.47
2008	0.24	2.01	3.73	2.02	4.12	11.36	3.77	0.91	4.43	4.59	0.46	0.66	38.30
2009	0.08	0.31	1.20	3.54	1.36	2.32	2.57	7.57	0.51	4.98	0.25	0.20	24.89
2010	0.35	1.33	1.79	3.26	4.90	3.71	6.56	3.58	3.37	1.45	2.07	0.16	32.53
2011	0.14	0.17	1.22	1.69	5.45	2.90	0.51	1.99	1.22	2.37	3.17	2.55	23.38
2012	1.04	3.06	2.49	6.09	1.41	2.34	0.39	1.86	2.13	0.07	0.52	0.27	21.67
2013	0.37	3.56	0.55	3.24	3.61	3.96	7.45	*	*	*	*	*	*

MESONET IN PICTURES

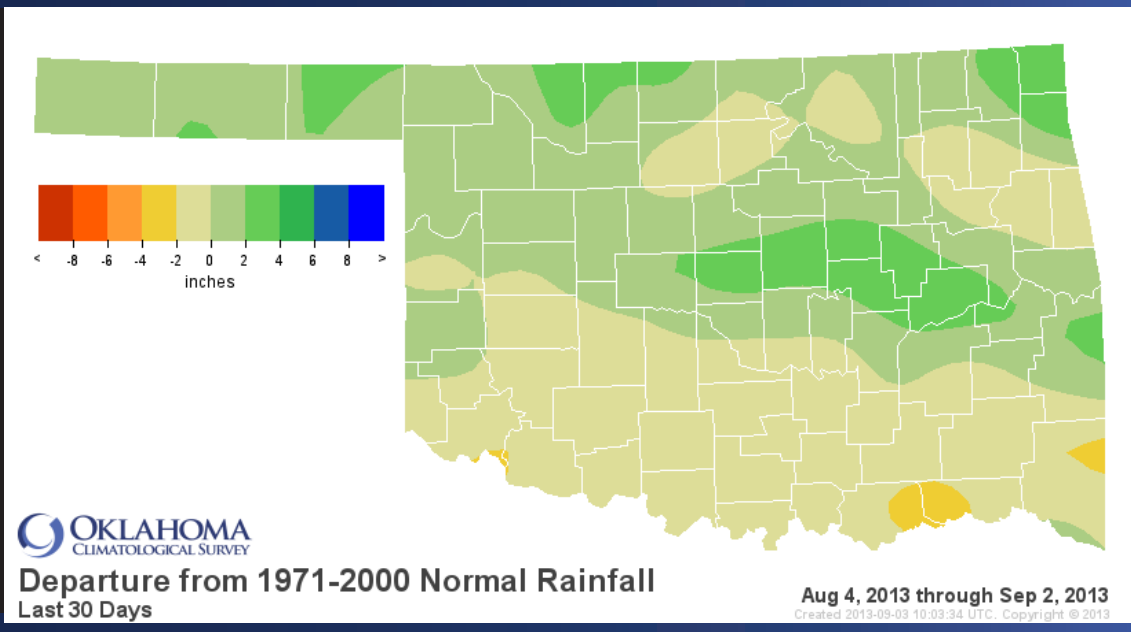
Consecutive Days with less than 0.25" Rainfall

- The Consecutive Days With Less Than 0.25" Rainfall map provides a snapshot of areas in the state that have been receiving less rainfall. You can also view the Consecutive Days With Less Than 0.10" Rainfall on the website. Go to www.mesonet.org, click on "Weather" and then click "Rainfall" to view these maps.



Departure from Normal Rainfall

- The Oklahoma Climatological Survey provides rainfall statistics over different time frames. To view rainfall statistics, click on "Rainfall Summaries (Tables and Maps)" from the Rainfall section of the Mesonet Weather tab. At the top of the page, choose a time period you would like to view. Time periods vary from Spring to Date to Last 365 Days. Scroll down to the bottom of the page to view maps for the period you chose.



Steering Committee Q&A
Fred Carr

–by Stephanie Bowen

FRED CARR SERVES ON THE MESONET STEERING COMMITTEE AND IS A PROFESSOR OF METEOROLOGY AT THE UNIVERSITY OF OKLAHOMA. HE DEVELOPED HIS INTEREST IN METEOROLOGY AT THE YOUNG AGE OF 5 BECAUSE OF HIS INTEREST IN SKIING AND NEW ENGLAND SNOWSTORMS. THESE INTERESTS ARE STILL STRONG TODAY, AS EVIDENCED BY HIS HELICOPTER SKIING TRIP TO THE CANADIAN ROCKIES LAST WINTER, PICTURED ABOVE.

Q: TELL ME A LITTLE ABOUT YOUR BACKGROUND AND YOUR INVOLVEMENT ON THE MESONET STEERING COMMITTEE. HOW DOES YOUR WORK IN THE SCHOOL OF METEOROLOGY IMPACT YOUR ROLE AS A LEADER OF THE MESONET?

A: My research activities over the years have included both observational and numerical modeling studies. Between 1986 and 1997, my students and I worked with the National Centers for Environmental Prediction (NCEP) on improving their models. I am pleased that the precipitation forecast procedure we developed back in the 1990's is still part of the operational scheme of the Global Forecast System (GFS). My interest in improving forecasts led me to studies on how to best use new observing platforms to improve the initial conditions for model forecasts, an area called objective analysis and data assimilation.

I also started serving on national committees formed to determine what new observation systems the U.S. should invest in to best improve operational analyses and forecasts. These efforts led to my serving as a member on a National Academy of Sciences panel that produced the report "Observing the Weather from the Ground Up: A Nationwide Network of Networks", known now as the "NoN report". The report found that the greatest observational needs were high resolution (in space and time) observations of wind, temperature, moisture, etc. at and below the surface, and in the lower troposphere (lowest few km). The Oklahoma Mesonet was mentioned in the report as the "gold standard" of surface observational networks that other network efforts should emulate. The report also helped stimulate Congress to fund the National Mesonet Program in the National Weather Service which provides some funds to the Oklahoma Mesonet for their use of Mesonet data each year. I have now become involved in developing observational testbeds involving surface as well as radar and other vertical profiling systems in order to determine which new systems add the most value.

Q: HOW DOES THE MESONET SERVE THE UNIVERSITY OF OKLAHOMA SCHOOL OF METEOROLOGY?

A: The Mesonet provides invaluable data to the School of Meteorology faculty and students, both for real-time use in forecasting and storm-chasing, as well as in research studies. For example, Mesonet data provided unique high-resolution data of a warm frontal passage a few years ago which helped me determine the mechanisms for how warm fronts move toward colder air. Dozens of Capstone, M.S., and Ph.D. research projects each year use Mesonet data.

***Q:** WHAT HAVE YOU GAINED BY SERVING ON THE MESONET STEERING COMMITTEE?*

A: I have really enjoyed serving on the Mesonet Steering Committee, as it provides insight on how a first-class observational network should be organized and managed. Thus, it helps me look like I know what I'm talking about when providing input to national network and testbed efforts. ■

The Two Faces of August

By Gary McManus, Associate State Climatologist

AUGUST WRAP-UP

The unusually mild and wet conditions of July continued into August for a couple of weeks, but summer returned with a vengeance to finish out the month. The rains disappeared after week two, and then a summer-like heat wave arrived during the final week. Despite that late heat, the month still managed to finish a tad on the cool side overall. According to preliminary data from the Oklahoma Mesonet, the statewide average temperature was 80.1 degrees. 0.3 degrees below normal and the 49th coolest August since records began in 1895. The abundant rainfall during the first two weeks of the month, mainly across the northern two-thirds of Oklahoma, pushed the statewide average into the surplus territory at 3.04 inches, about a quarter-inch above normal. That ranks the month as the 51st wettest August on record. The southern third of the state missed out on the bountiful moisture and finished from 20-80 percent of normal for the month. Hugo and Newport finished with less than a quarter-inch of rainfall for the month, and many other locations across southern Oklahoma saw less than an inch. The northern two-thirds of the state recorded more generous totals with numerous amounts between 5-7 inches.

The climatological summer (June-August) had two distinct rainy periods that vaulted it up the wet side of the rankings – the first half of June and then mid-July through mid-August. The statewide average for the summer finished at 12.50 inches, 2.73 inches above normal to rank as the 24th wettest on record. Oklahoma City's official measurement site at Will Rogers recorded 18.15 inches of rain from June through August to finish with its sixth wettest summer season on record. Oklahoma City records date back to 1891. Its January-August total of 45.19 inches ranks as the wettest in the city's history. In contrast, the Mesonet site at Altus recorded a paltry 4.7 inches of rain during the summer and an equally depressing 11.5 inches for the first nine months of the year. Only the Mesonet stations in the western Panhandle recorded less from January through August.

The return to a more summer-like rainfall pattern the last two weeks of the month put the brakes on any continued drought relief, and actually reversed it across parts of the state. The U.S. Drought Monitor report released on August 28 indicated that 38 percent of the state was suffering from at least moderate drought, up from 33 percent the previous week. Most of that increase came from southern Oklahoma. It is still a vastly different story than one year ago in late August when 100 percent of the state was entrenched in drought, including 90 percent in the extreme to exceptional categories, the two worst possible on the Monitor's intensity scale. Still, the summer rains allowed for great strides. As much as 59 percent of the state was experiencing drought at the end of May. The Drought Monitor's worst two categories, severe and exceptional, dropped from 27 percent at the end of May to 10 percent at the end of August.

80.1°F
average statewide temperature for August

3.04"
PRECIPITATION
statewide average for August

12.5"
RAINFALL
statewide average for summer

38
PERCENT
of the state suffering from at least moderate drought according to the U.S. Drought Monitor on August 28

CALENDAR

SEPTEMBER

- 4th-5th: OK-First Assistants Class, Norman
- 9th: NWC Tour for Research Station (Agriculture) Administrators Society, Norman
- 10th: OK-First Re-certification Class, Tulsa
- 12th: OK-First Re-certification Class, Ardmore
- 17th: OK-First Re-certification Class, McAlester
- 19th: OK-First Re-certification Class, Edmond
- 20th: OK-FIRE Lecture, OSU Fire Ecology Class
- 20th-22nd: Science of Climate Change and Variability Teacher Workshop, Biological Station, Lake Texhoma
- 25th: Field Trip for Cooper Middle School, OKC

OCTOBER

- 2nd: Canadian County Master Gardener Weather & Climate Training, NWC, Norman
- 3rd: Mesonet Booth, H2Oklahoma Water Festival, Elk City
- 11th: NWC Tour for OSU Soil Fertility faculty and students
- 19th: Mesonet Booth, Orr Family Farm Grand Reopening, Moore
- 15th-17th: Tenth Symposium on Fire and Forest Meteorology, Kentucky
- 22nd: OK Governor's Water Conference and Water Symposium, Midwest City

CONTACTS

Accessing recent (within the past 7 days) Mesonet data
Contact: Mesonet Operator

Instrumentation, telecommunications, or other technical specifications
Contact: Chris Fiebrich

Mesonet agricultural data and products
Contact: Al Sutherland

Mesonet meteorological data
Contact: OCS Data Requests

Earthstorm - K-12 educational outreach
Contact: Andrea Melvin

OK-First - Public safety outreach
Contact: James Hocker

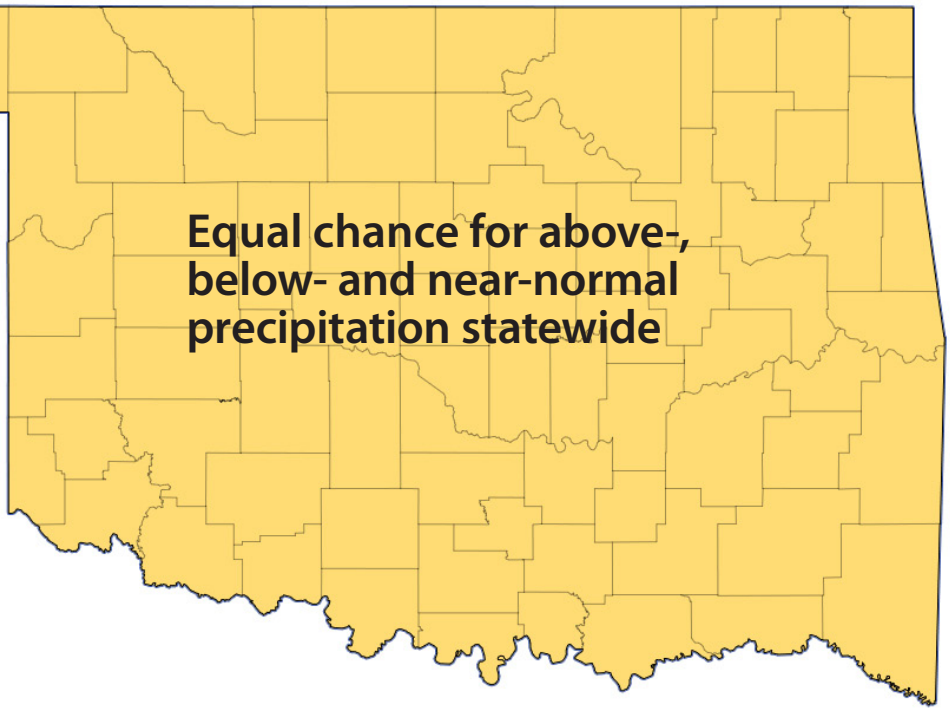
OK-FIRE - Fire management outreach
Contact: J.D. Carlson

Not sure?
Contact: 405-325-2541 or Chris Fiebrich.

FORECAST FOR SEPTEMBER *Click here to view the original maps from the Climate Prediction Center.*

Chance for above normal temperatures

DISCUSSION: Equal chance for above-, below- and near-normal precipitation for Oklahoma. Increased chance for above normal temperatures across most of the panhandle.



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