

NWS FORM E-5 (11-88) (PRES. by NWS Instruction 10-924)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL WEATHER SERVICE	HYDROLOGIC SERVICE AREA (HSA)	
		Tulsa, Oklahoma (TSA)	
MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS		REPORT FOR:	YEAR
		MONTH July	2017
TO: Hydrometeorological Information Center, W/OH2 NOAA / National Weather Service 1325 East West Highway, Room 7230 Silver Spring, MD 20910-3283		SIGNATURE Steven F. Piltz (Meteorologist-in-Charge)	
		DATE August 11, 2017	

When no flooding occurs, include miscellaneous river conditions, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (NWS Instruction 10-924)

An "X" in the box indicates no flood stages were reached in this Hydrologic Service Area (HSA) during the month above.

Several rounds of heavy rain impacted primarily southeast OK during July 2017, with much of the remaining portion of the region receiving below normal rainfall. The July average temperature was near normal this month. Normal rainfall for the month of July ranges from 2.6 inches in McIntosh County to 3.4 inches in Ottawa County. The Ozark region of northwest Arkansas averages 3.1 inches for the month. This report, past E-5 reports, and monthly hydrology and climatology summaries can be found at <http://www.weather.gov/tsa/hydro-monthly-summary>.

Monthly Summary

Using the radar-derived estimated observed precipitation from the RFCs (Fig. 1a), rainfall totals for July 2017 ranged from 0.50" to around 12". The highest totals of 6"-10" occurred over west central AR and 6" to around 12" across southeast OK, with isolated pockets of 5"-8" elsewhere. The highest rainfall areas received 125% to near 400% of the normal July rainfall, with the remaining area receiving 90% to around 25% of the normal July rainfall (Fig. 1b).

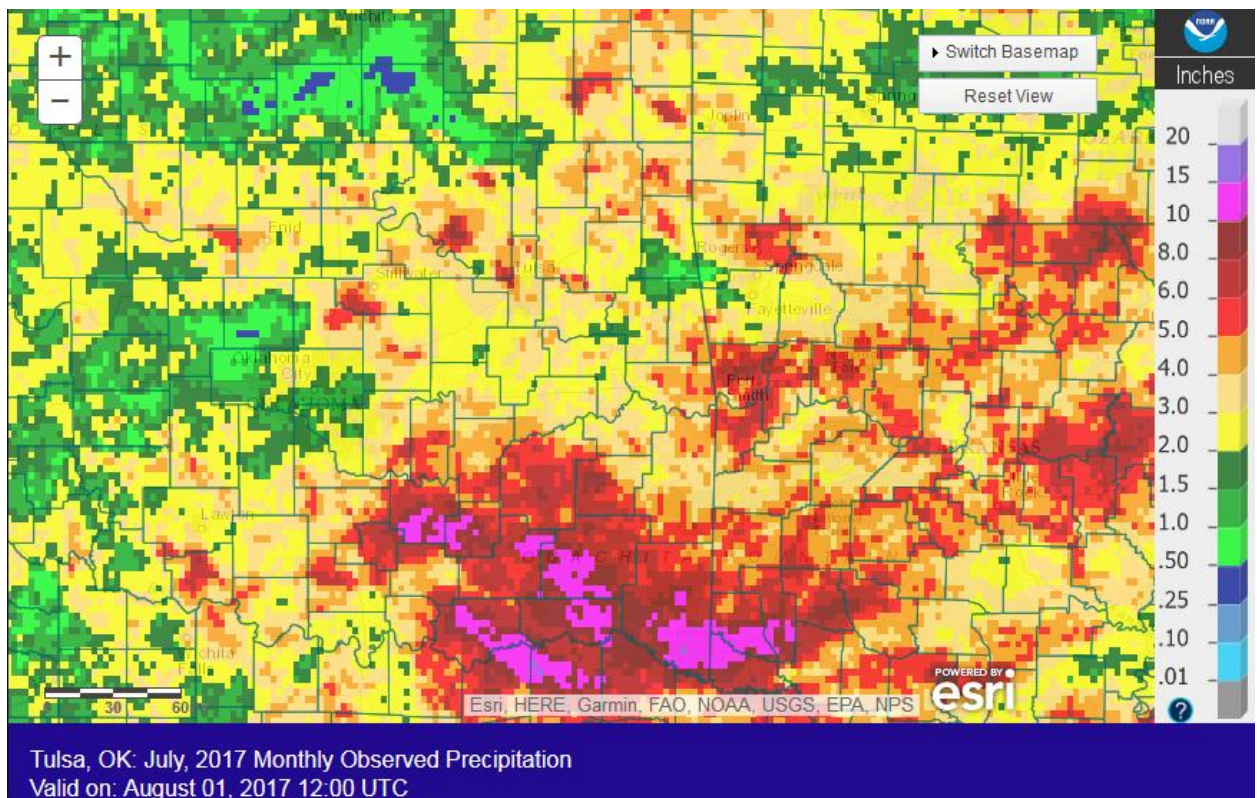


Fig. 1a. Estimated Observed Rainfall for July 2017

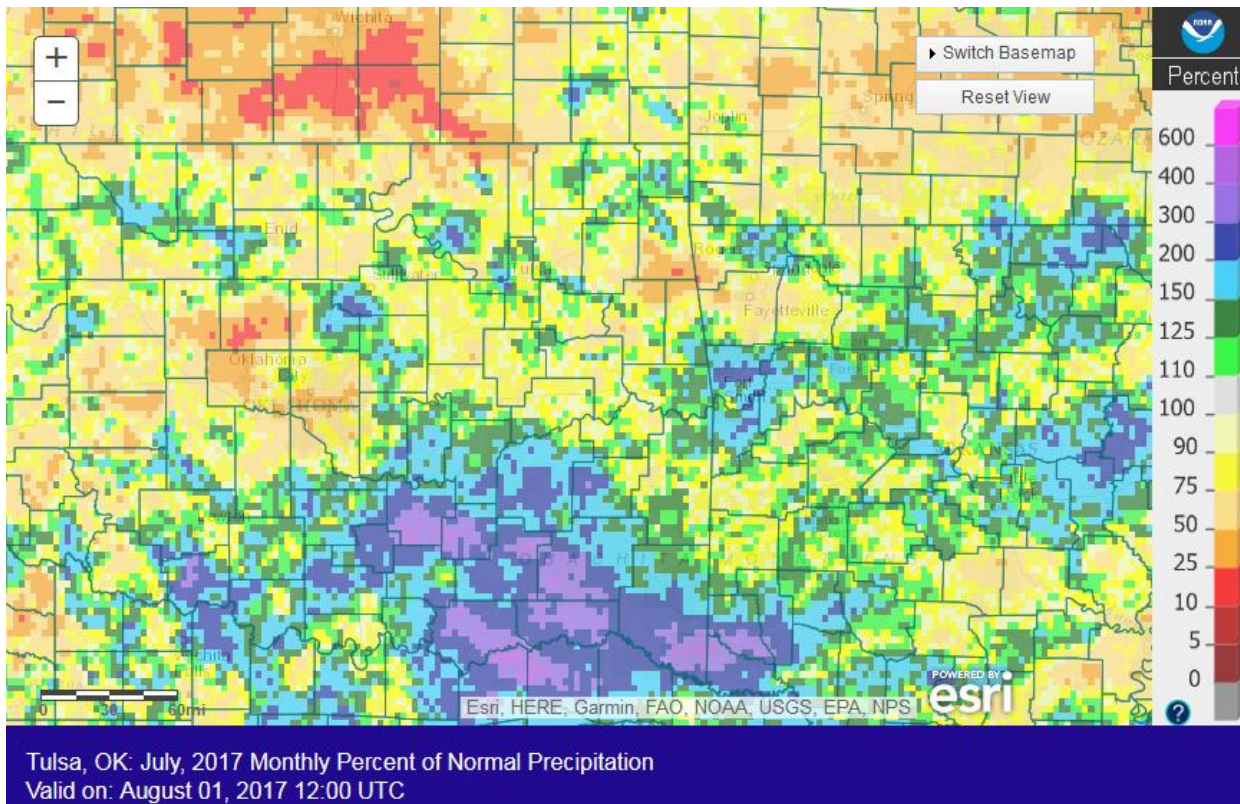


Fig. 1b. Estimated % of Normal Rainfall for July 2017

In Tulsa, OK, July 2017 ranked as the 46th warmest July (83.6°F, tied 1939, 1919; since records began in 1905) and the 57th driest July (2.23"; since records began in 1888). Fort Smith, AR had the 36th warmest July (83.4°F, tied 1956, 1941; since records began in 1882) and the 32nd wettest July (4.53"; since records began in 1882). Fayetteville, AR had the 28th coldest (77.7°F, tied 2008, 2002, 1990) and the 28th driest (2.19", tied 2000) July since records began in 1950.

Some of the larger precipitation reports (in inches) for July 2017 included:

Antlers 6.3SE, OK (coco)	12.55	Antlers, OK (meso)	10.69	Hugo, OK (meso)	10.61
Hindsville 10NNE, AR (coop)	10.26	Vian 5.3ENE, OK (coco)	9.02	Cloudy, OK (meso)	8.79
Riverdale 4.2E, AR (coco)	8.43	Wilburton, OK (meso)	8.38	Charleston 1.7E, AR (coco)	8.26

Some of the lowest precipitation reports (in inches) for July 2017 included:

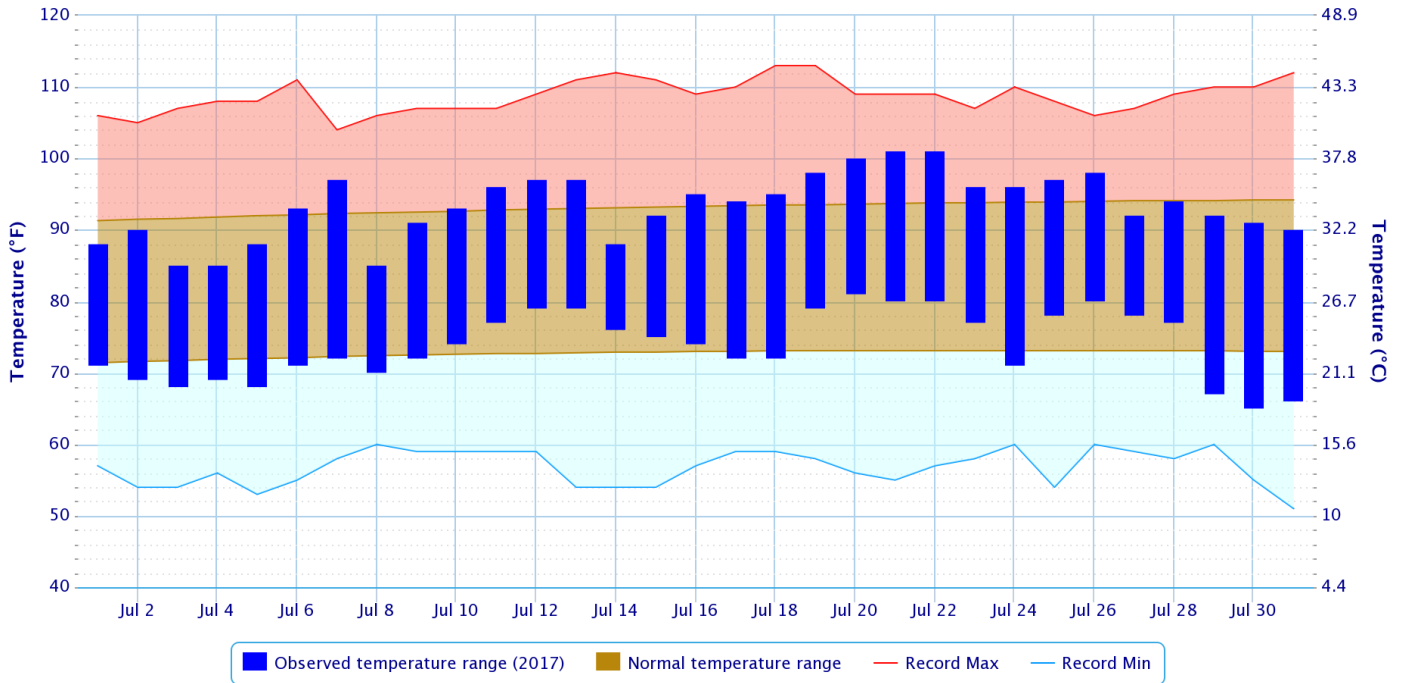
Copan, OK (meso)	1.59	Sand Springs 4.6WNW, OK (coco)	1.69	Foraker, OK (meso)	1.74
Bartlesville, OK (ASOS)	1.75	Viney Grove 2.4NW, AR (coco)	1.97	Burbank, OK (meso)	2.06
Talala, OK (meso)	2.13	Fayetteville Drake Field Arpt (ASOS)	2.19	Tulsa, OK (ASOS)	2.23

According to statistics from the [Oklahoma Climatological Survey \(OCS\)](#) Mesonet:

Rank since 1921	Last 30 Days (Jul 2 – Jul 31)	Summer-to-Date (Jun 1 – Jul 31)	Last 120 Days (Apr 3 – Jul 31)	Warm Growing Season (Mar 1 – Jul 31)	Year-to-Date (Jan 1 – Jul 31)	Last 180 Days (Feb 2 – Jul 31)	Water Year-to-Date (Oct 1 – Jul 31)	Last 365 Days (Aug 1, 2016–Jul 31, 2017)
Northeast OK	47 th driest	25 th driest	10th wettest	14 th wettest	12 th wettest	15 th wettest	19 th wettest	33 rd wettest
East Central OK	33 rd wettest	34 th wettest	6th wettest	10th wettest	10th wettest	9th wettest	39 th wettest	48 th wettest
Southeast OK	7th wettest	13 th wettest	25 th wettest	24 th wettest	31 st wettest	24 th wettest	34 th driest	38 th driest
Statewide	31 st wettest	42 nd driest	25 th wettest	23 rd wettest	17 th wettest	23 rd wettest	44 th wettest	43 rd wettest

Daily Temperature Data – Tulsa Area, OK (ThreadEx)

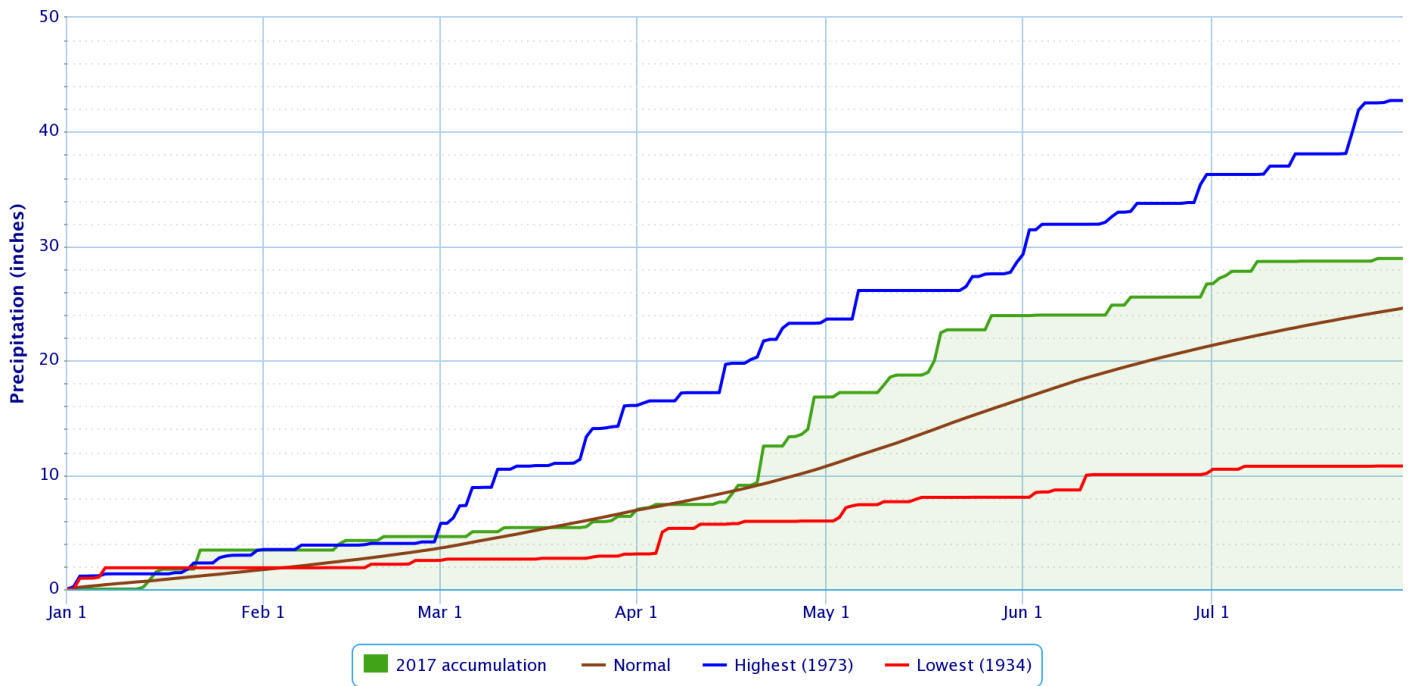
Period of Record – 1905-01-06 to 2017-08-07. Normals period: 1981-2010. Click and drag to zoom chart.



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Accumulated Precipitation – Tulsa Area, OK (ThreadEx)

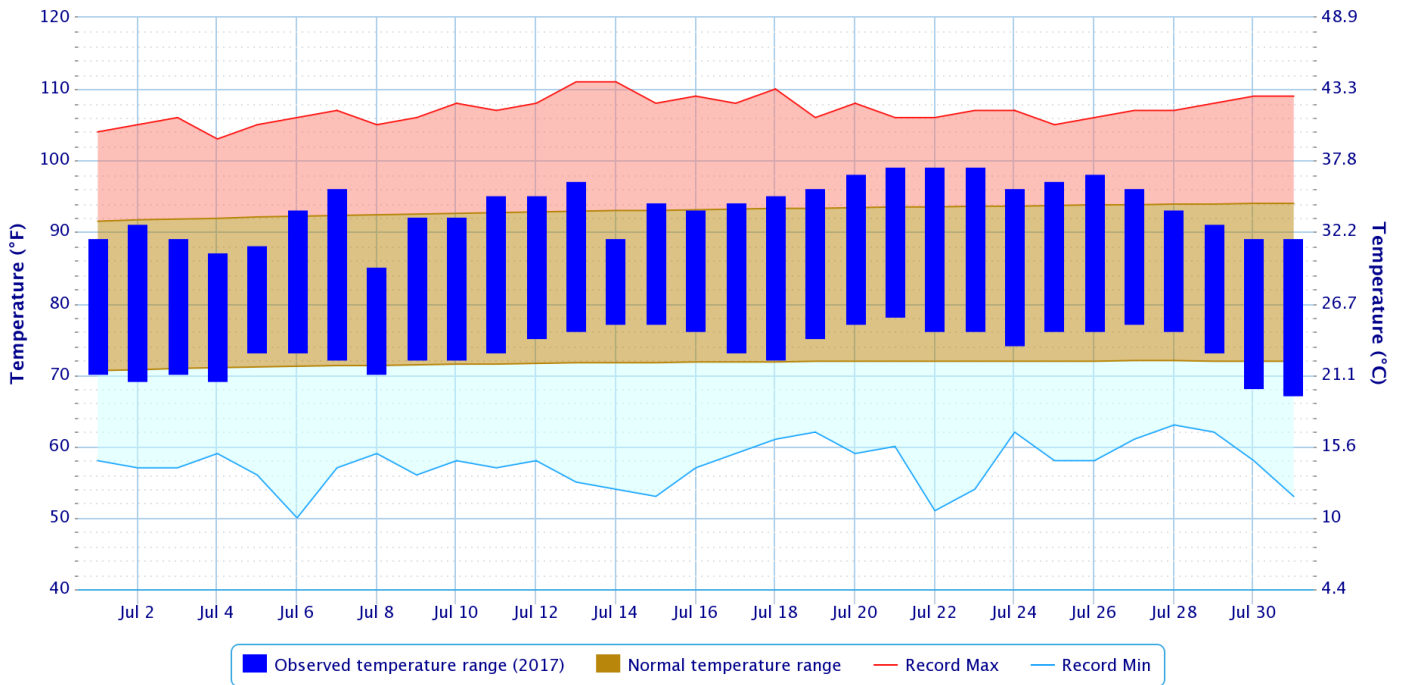
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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Daily Temperature Data – Fort Smith Area, AR (ThreadEx)

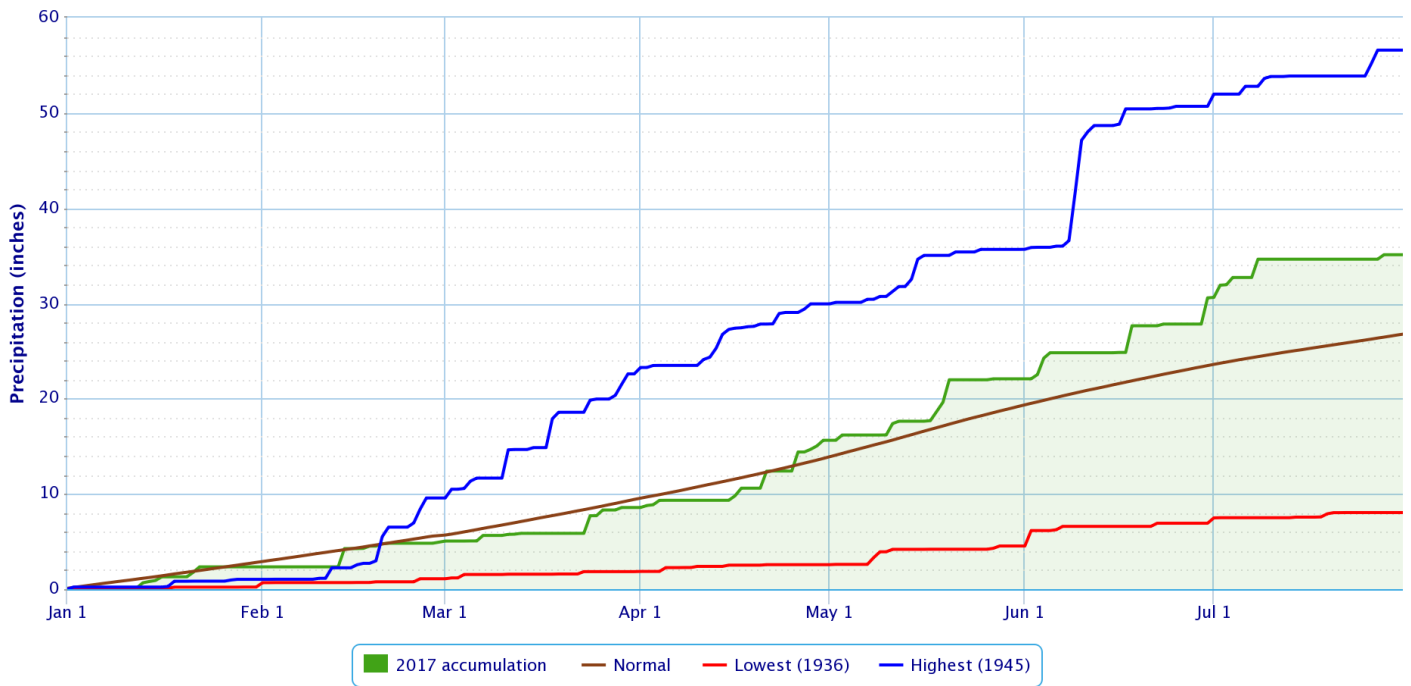
Period of Record – 1882-06-01 to 2017-08-07. Normals period: 1981-2010. Click and drag to zoom chart.



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Accumulated Precipitation – Fort Smith Area, AR (ThreadEx)

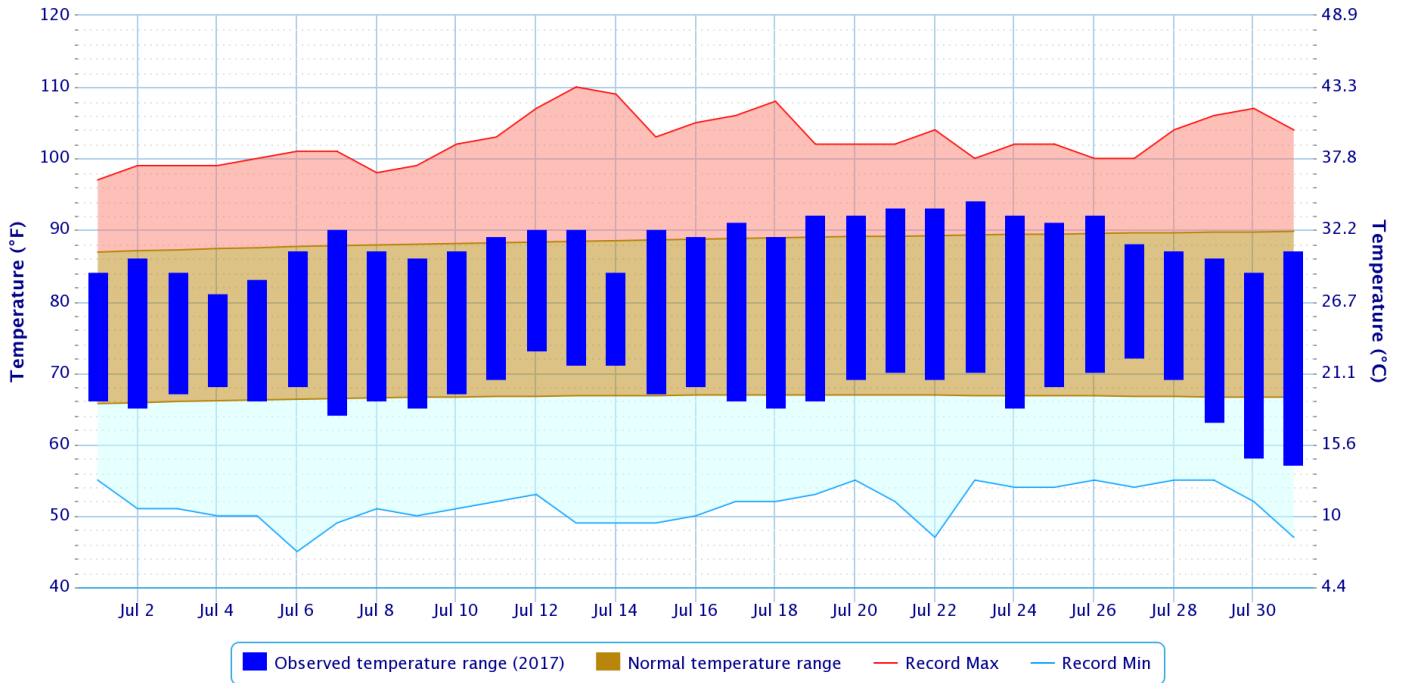
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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Daily Temperature Data – FAYETTEVILLE DRAKE FLD, AR

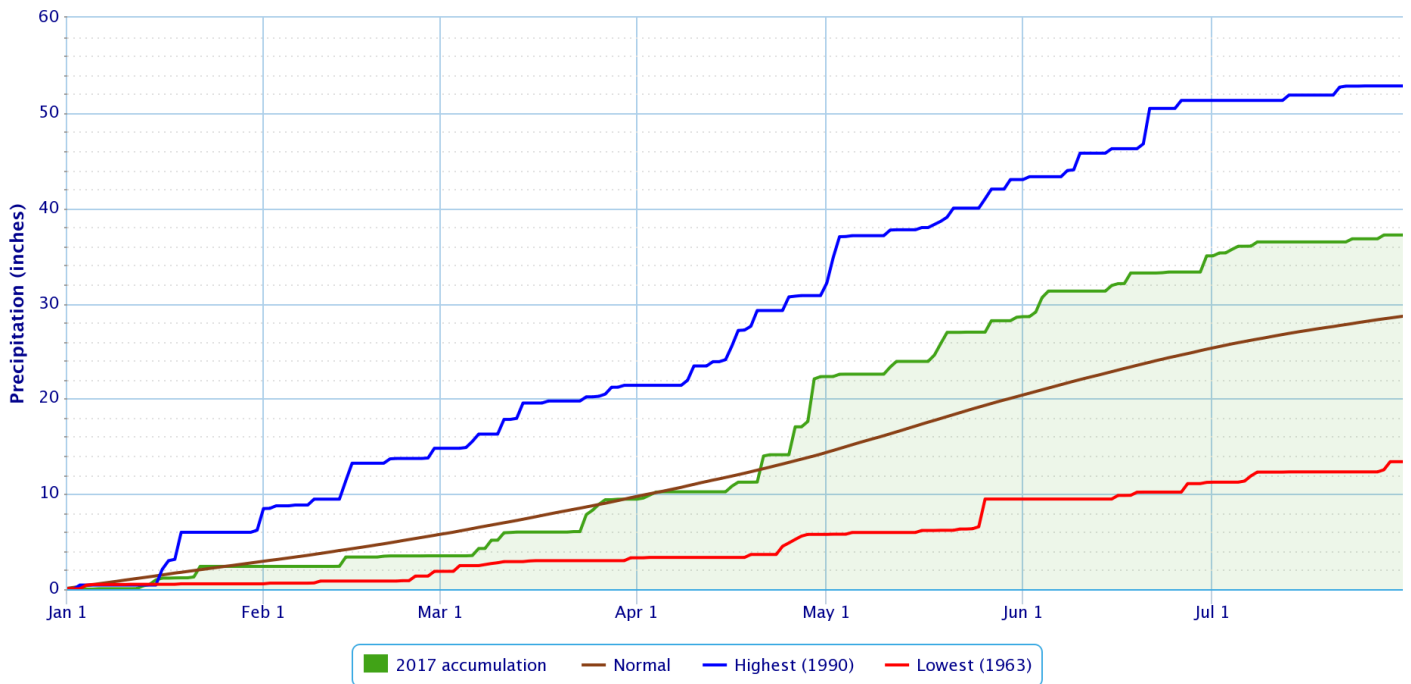
Period of Record – 1949-07-14 to 2017-08-07. Normals period: 1981-2010. Click and drag to zoom chart.



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Accumulated Precipitation – FAYETTEVILLE DRAKE FLD, AR

Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values

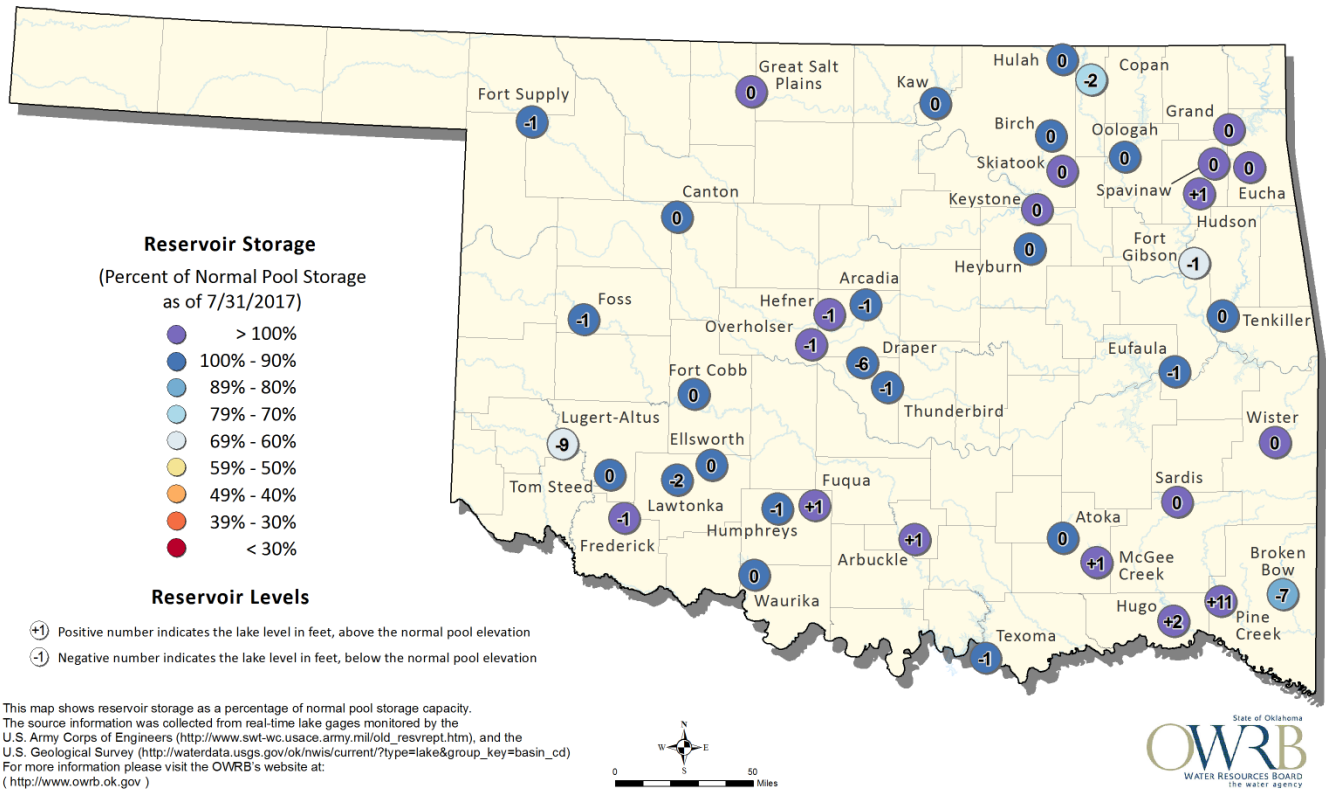


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Reservoirs

Oklahoma Surface Water Resources

Reservoir Levels and Storage as of 7/31/2017

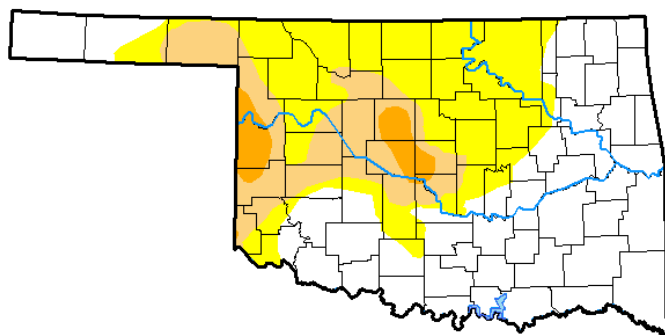


Drought

According to the [U.S. Drought Monitor](#) (USDM) from August 1, 2017 (Figs. 2, 3), D0 (abnormally dry conditions but not in drought) were present across portions of Okfuskee, Okmulgee, Creek, Tulsa, Pawnee, Osage, eastern Kay, and Washington Counties in eastern OK.

U.S. Drought Monitor Oklahoma

August 1, 2017
(Released Thursday, Aug. 3, 2017)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	51.19	48.81	18.51	3.65	0.00	0.00
Last Week 07-25-2017	47.74	52.26	16.15	3.99	0.00	0.00
3 Months Ago 05-02-2017	84.92	15.08	4.26	0.00	0.00	0.00
Start of Calendar Year 01-03-2017	5.61	94.39	83.21	55.75	5.55	0.00
Start of Water Year 09-27-2016	57.82	42.18	19.04	3.05	0.00	0.00
One Year Ago 08-02-2016	61.98	38.02	8.18	0.56	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.

Author:

Deborah Bathke
National Drought Mitigation Center

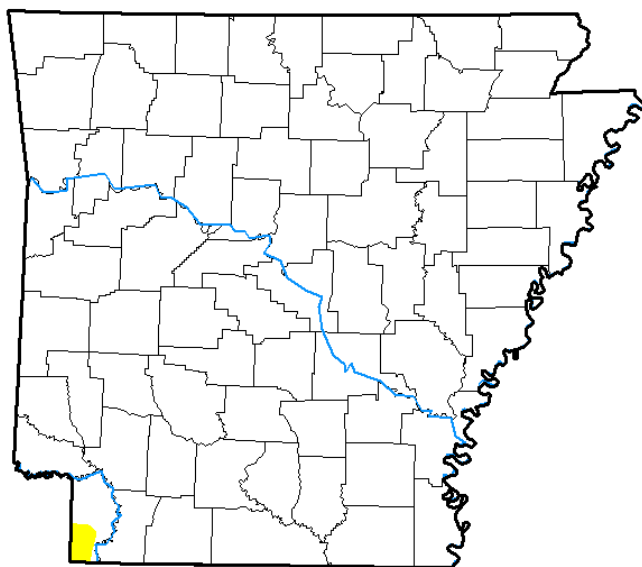


<http://droughtmonitor.unl.edu/>

Fig. 2. Drought Monitor for Oklahoma

U.S. Drought Monitor Arkansas

August 1, 2017
(Released Thursday, Aug. 3, 2017)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	99.69	0.31	0.00	0.00	0.00	0.00
Last Week 07-25-2017	100.00	0.00	0.00	0.00	0.00	0.00
3 Months Ago 05-02-2017	94.76	5.24	1.11	0.00	0.00	0.00
Start of Calendar Year 01-03-2017	27.05	72.95	39.03	7.99	2.02	0.00
Start of Water Year 09-27-2016	71.02	28.98	0.00	0.00	0.00	0.00
One Year Ago 08-02-2016	62.71	37.29	0.08	0.00	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.

Author:

Deborah Bathke
National Drought Mitigation Center



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

Fig. 3. Drought Monitor for Arkansas

Outlooks

The [Climate Prediction Center](#) (CPC) outlook for August 2017 (issued July 31, 2017) indicates an enhanced chance for below median precipitation and a slightly enhanced chance for above median rainfall across eastern OK and northwest AR. This outlook takes into account weather conditions forecast over the next 1-2 weeks, subseasonal climate signals in the weeks 3-4 time frame, and soil moisture considerations.

For the 3-month period August-September-October 2017, CPC is forecasting an enhanced chance for above normal temperatures and above median rainfall across all of eastern OK and northwest AR (outlook issued July 20, 2017). This outlook is based on both statistical and dynamical forecast tools and decadal timescale climate trends. According to CPC, Pacific sea surface temperatures along the equator continue to indicate ENSO-neutral conditions, which are favored to persist through the upcoming autumn and winter. The odds of ENSO-neutral conditions through winter is greater than 50%, while the probability of El Niño conditions developing in the fall is near 35%.

Summary of Heavy Precipitation Events Daily quality controlled rainfall maps can be found at: http://water.weather.gov/precip/index.php?location_type=wfo&location_name=tsa

A line of thunderstorms developed over central OK during the afternoon of the 2th. These storms moved east, affecting all of eastern OK and northwest AR through the afternoon and evening hours. Storms lingered across far southeast OK through the overnight hours. Rainfall totals ranged from around 0.50" to around 5" (Fig. 4). Most of Choctaw County received 3"-5" of rain, with a few other isolated pockets of heavy rainfall elsewhere. Some urban flash flooding occurred in Tulsa and Bartlesville. The rain exited the region by noon on the 3rd. A few hours later, additional thunderstorms developed just south of the KS-OK state line. These storms affected northeast OK through the mid-evening hours before another line of thunderstorms moved into the area from north central OK. Once again, all of eastern OK and northwest AR was affected by the line of storms through the overnight and early morning hours. By sunrise on the 4th, only a few showers lingered near the mesoscale convective vortex (MCV) generated by the squall line. Rainfall totals ranged from 0.10" to around 2.5" for most of eastern OK and northwest AR, though south central Osage County ended up with 2"-6" of rain (Fig. 5). The City of Hominy, which received 4.57" of rain, reported waist deep water in town.

Scattered showers continued over northeast OK and northwest AR during the morning and lasting through the evening of the 4th as the MCV moved slowly across the area. This brought an additional 0.10"-2" of rain (Fig. 6). Just before midnight on the 5th, thunderstorms developed near the Red River in southeast OK near a frontal boundary and under the influence of the low-level jet. This activity continued through the mid-morning hours of the 5th. This activity produced very heavy rain, 2"-8", primarily during the pre-dawn hours over Pushmataha and Choctaw Counties (Fig. 6). This precipitation, on top of the previous days' rainfall, resulted in minor flooding along the Kiamichi River near Antlers (see preliminary hydrograph at the end of this report) and flash flooding in Pushmataha and Choctaw Counties.

During the afternoon and evening of the 8th, widespread thunderstorms developed near a cool front and affected northeast OK and northwest AR. A cluster of storms then intensified near the front in northwest AR after midnight on the 9th and moved southward. Training of storms over west central AR resulted in 2"-5" of rain over Sebastian, Crawford, and Franklin Counties (Fig. 7), while elsewhere, rainfall totals were around 2" or less. Around sunrise, additional storms fired up over northeast OK. This activity moved southeast, bringing 0.25" to around 1.5" of rain to northeast OK through west central AR.

Showers and thunderstorms developed along a cold front during the afternoon of the 23rd. This activity increased in coverage as it moved south through the evening. A large portion of the area south of an Okemah to Fayetteville line received around 0.25" to around 3" (Fig. 8).

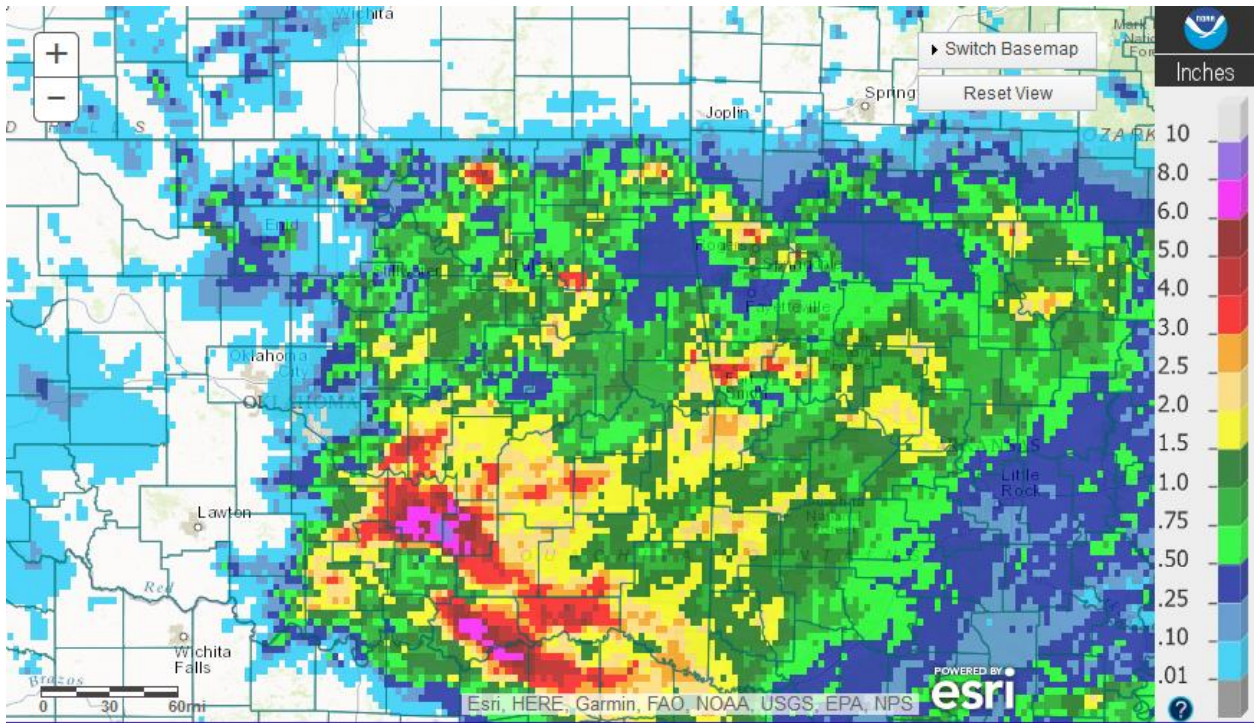


Fig. 4. 24-hour Estimated Observed Rainfall ending at 7am CDT 7/03/2017.

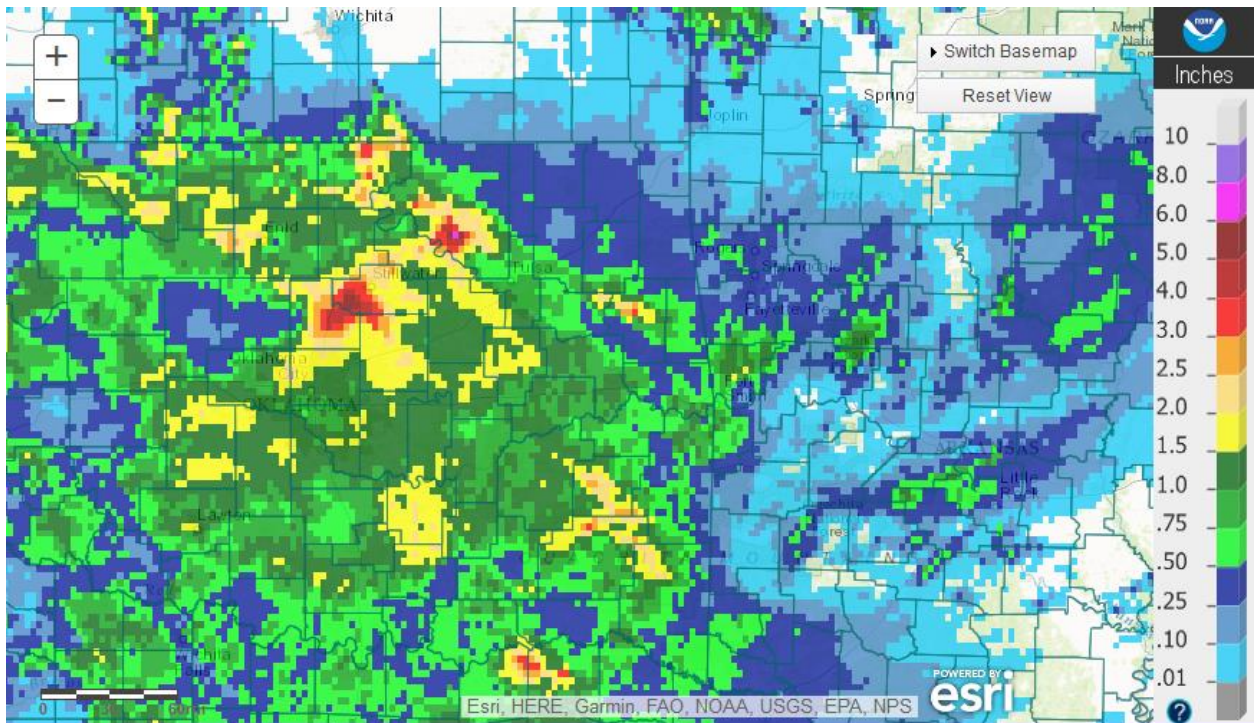


Fig. 5. 24-hour Estimated Observed Rainfall ending at 7am CDT 7/04/2017.

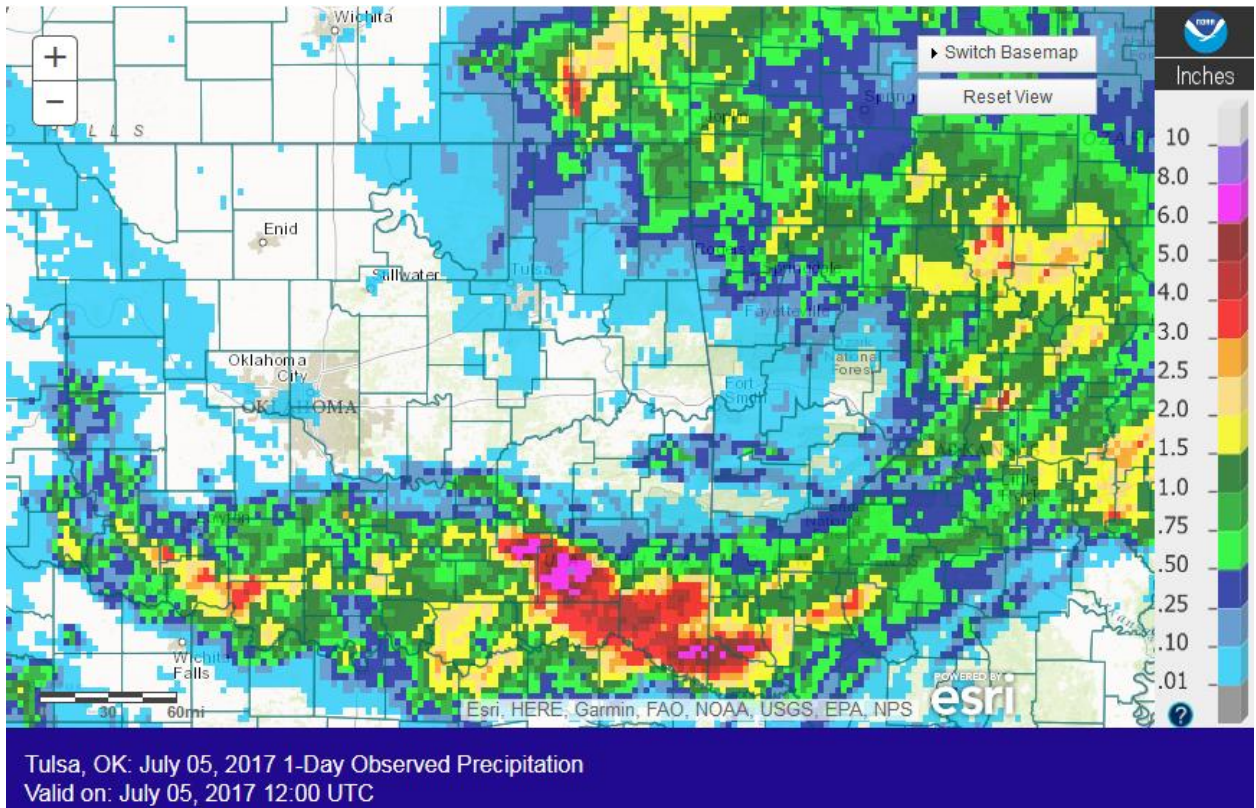


Fig. 6. 24-hour Estimated Observed Rainfall ending at 7am CDT 7/05/2017.

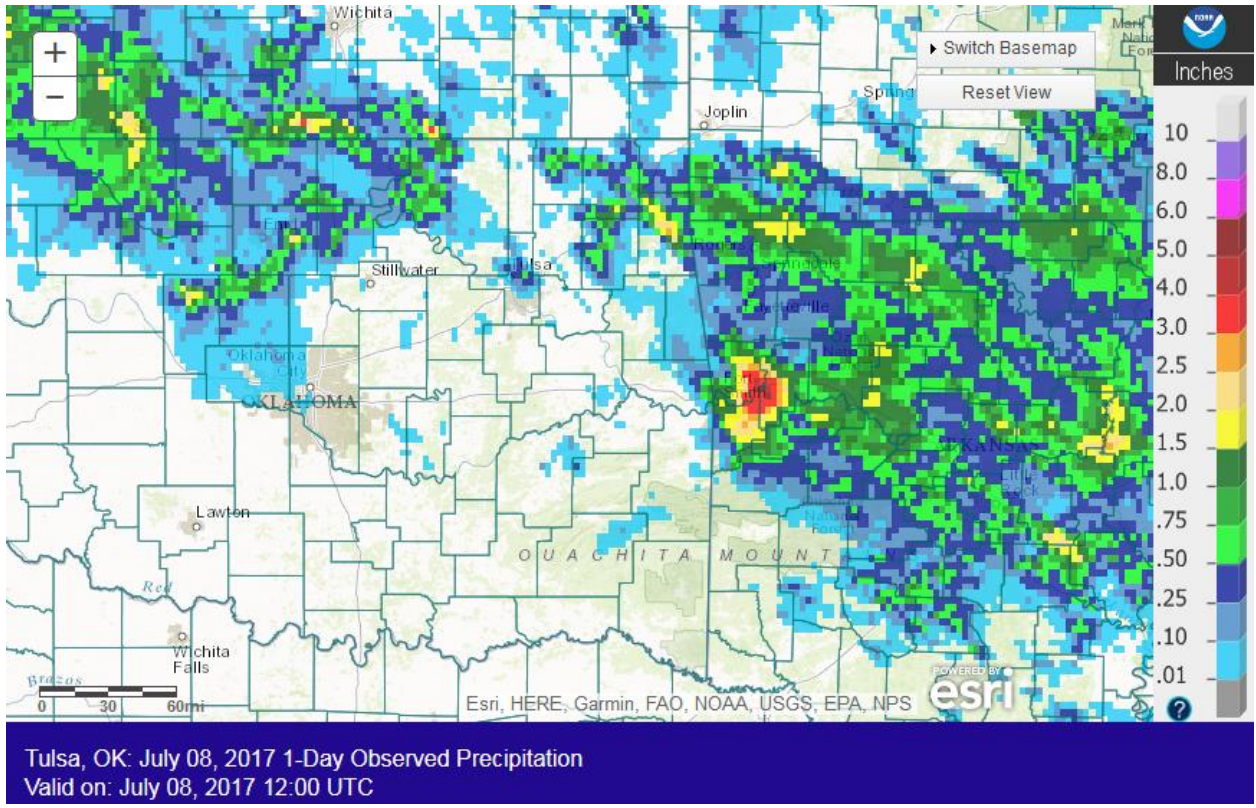


Fig. 7. 24-hour Estimated Observed Rainfall ending at 7am CDT 7/08/2017.

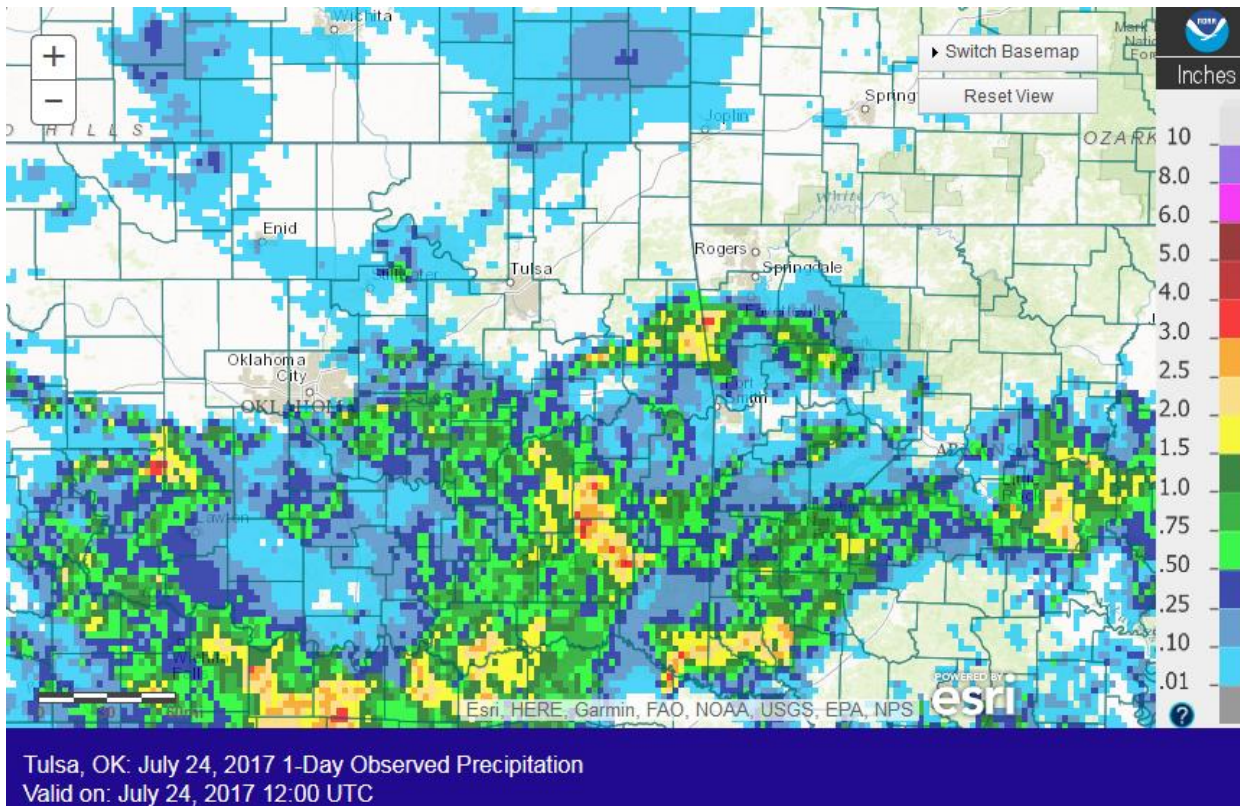


Fig. 8. 24-hour Estimated Observed Rainfall ending at 7am CDT 7/24/2017.

Written by:

Nicole McGavock
 Service Hydrologist
 WFO Tulsa

Products issued in July 2017:

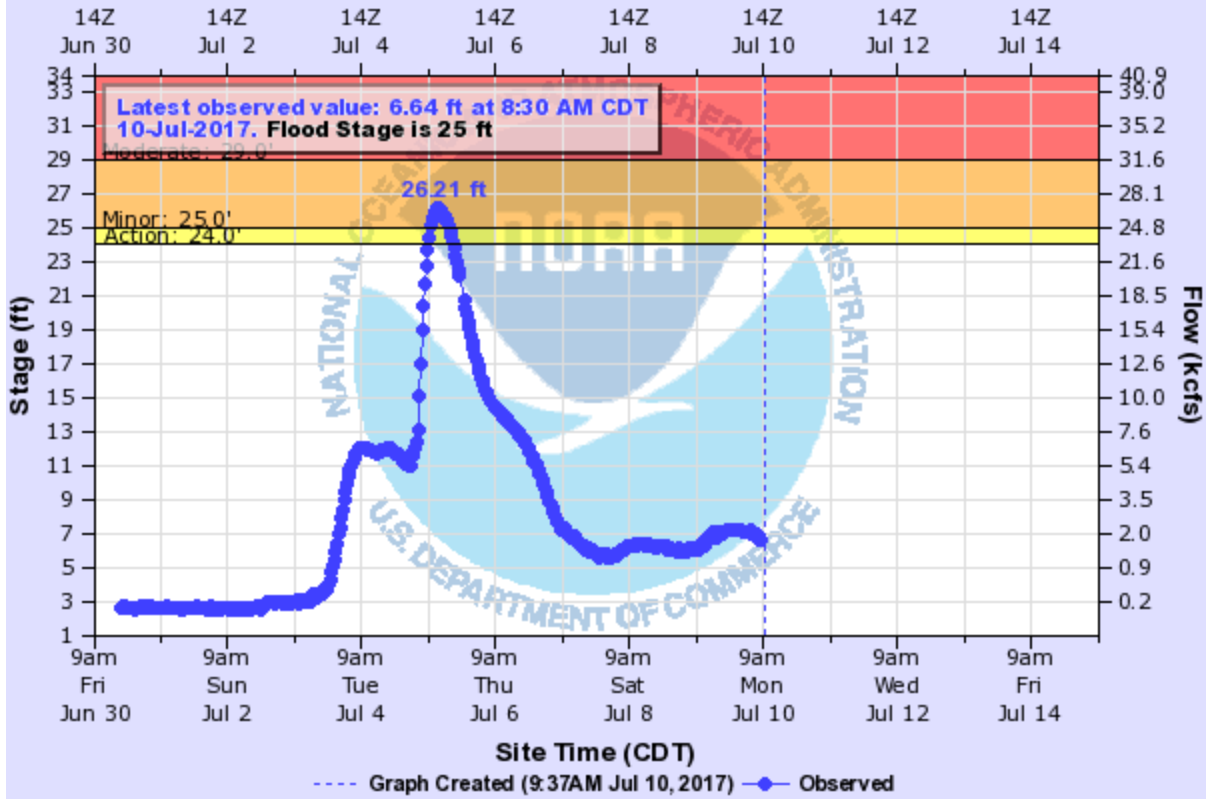
- *CWYO2 became a daily river forecast point September 7, 2016
- *MLBA4 and OZGA4 transferred to NWS Tulsa HSA February 5, 2014
- *Mixed case River Flood products began July 31, 2013

- 5 Flash Flood Warnings (FFW) (1 FFW EXT)
- 7 Flash Flood Statements (FFS)
- 0 Flash/Areal Flood Watches (FFA) (0 Watch FFA CON/EXT/EXA/EXB/CAN)
- 23 Urban and Small Stream Advisories (FLS)
- 1 Areal Flood Warnings (FLW)
- 0 Areal Flood Statements (FLS)
- 1 River Flood Warnings (FLW) (includes category increases)
- 3 River Flood Statements (FLS)
- 0 River Flood Advisories (FLS) (0 Advisory FLS CON/EXT/CAN)
- 0 River Flood Watches (FFA) (0 Watch FFA CON/EXT/CAN)
- 0 River Statements (RVS)
- 0 Hydrologic Outlooks (ESF)
- 0 Drought Information Statements (DGT)

Preliminary Hydrographs:

KIAMICHI RIVER NEAR ANTLERS

Universal Time (UTC)



ANTO2(plotting HGIRG) "Gage 0" Datum: 419.82'

Observations courtesy of US Geological Survey