

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:	MONTH
		YEAR	April
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	May 4, 2018

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.

It was a cold (5° to 6° below normal) and dry April across eastern Oklahoma and northwest Arkansas. For the State of Oklahoma and Tulsa, OK, April 2018 was the second coldest April on record. This April was the record coldest in Fayetteville, AR and 3rd coldest in Fort Smith, AR. There were also no tornadoes in Oklahoma in April (for only the third time), breaking the previous record of April 26, 1962 as the latest first date of a tornado in the state (the 1st tornado of 2018 in OK occurred on May 1 near Buffalo). Normal precipitation for the month of April ranges from 3.1 inches in Pawnee County to 4.7 inches in Latimer County. The Ozark region of northwest Arkansas averages 4.3 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 April 2018 ranged from around 1" to isolated amounts around 6" across eastern OK and northwest AR. This corresponds to 20-90% of the normal April rainfall for most of eastern OK and northwest AR (Fig. 1b). However, portions of Okmulgee, Okfuskee, Muskogee, northern Le Flore, and Sebastian Counties were near normal to near 200% of the normal April rainfall.

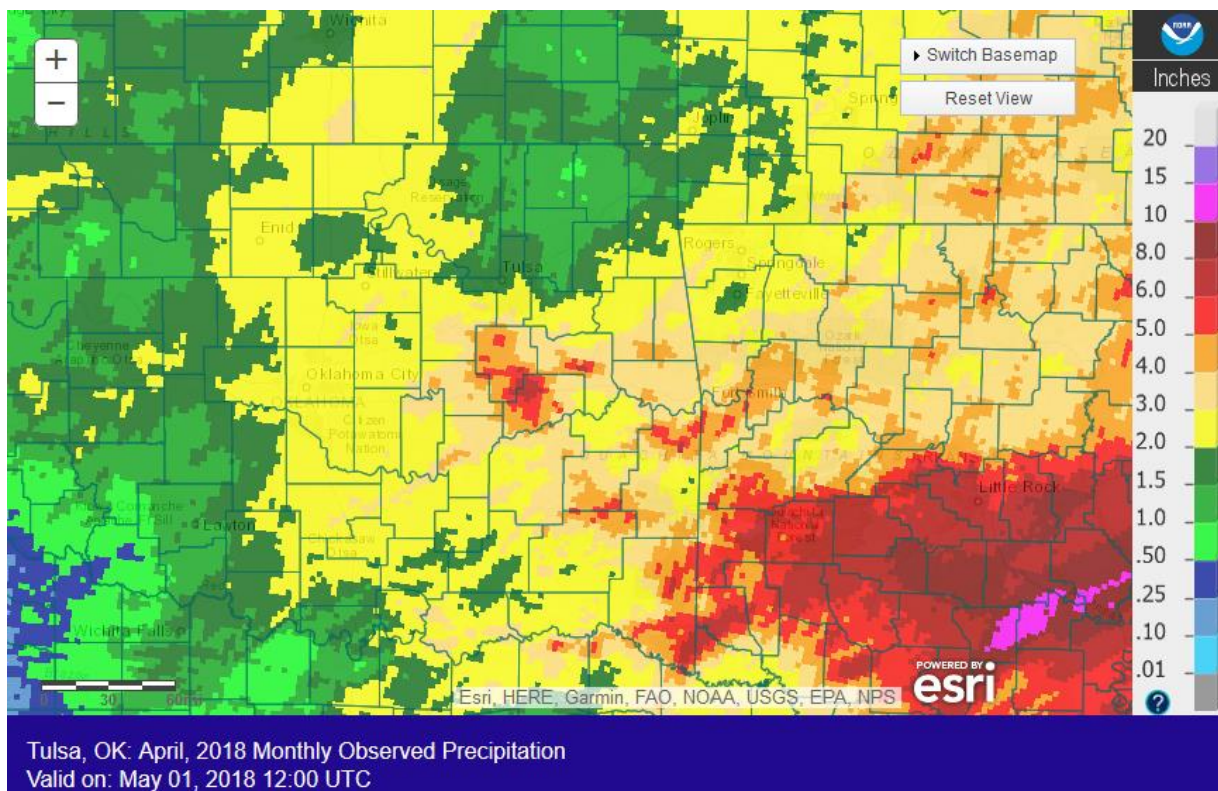


Fig. 1a. Estimated Observed Rainfall for April 2018

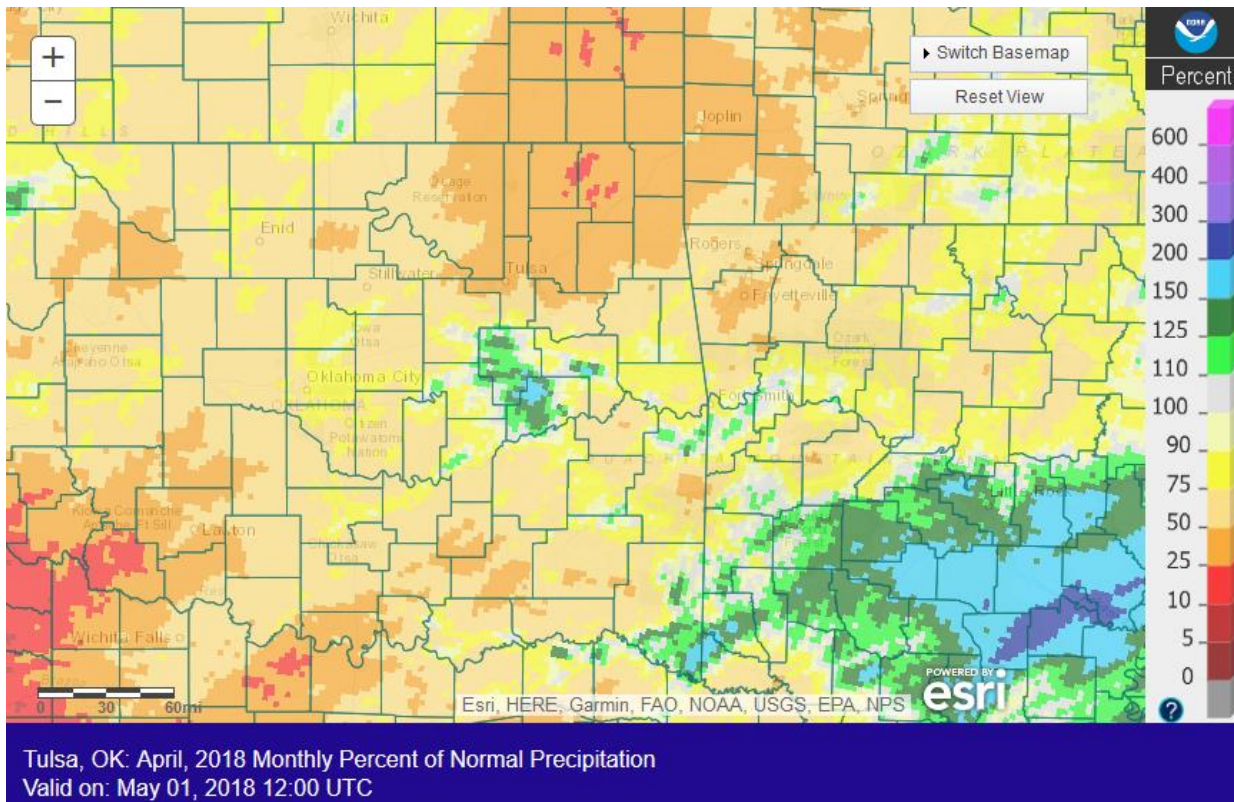


Fig. 1b. Estimated % of Normal Rainfall for April 2018

In Tulsa, OK, April 2018 ranked as the 2nd coldest April (54.1°F, record is 53.4°F in 1907; since records began in 1905), the 20th driest April (1.76"; since records began in 1888), and the 4th snowiest April (0.1"; since records began in 1900). Fort Smith, AR had the 3rd coldest April (56.5°F; since records began in 1883) and the 63rd driest April (3.63"; since records began in 1883). No snow fell in April. Fayetteville, AR had the Record coldest (51.5°F; previous record 51.6°F in 1983), the 5th driest (1.54"), and the 3rd snowiest (Trace, tied 14 other years) April since records began in 1950.

Some of the larger precipitation reports (in inches) for April 2018 included:

Greenwood 1.4W, AR (coco)	5.45	Okmulgee, OK (meso)	5.35	Morris 2.4SW, OK (coco)	5.17
Ozark, AR (coop)	5.13	Eufaula, OK (meso)	4.90	Greenwood 1.9WNW, AR (coco)	4.86
Clayton, OK (meso)	4.60	Eufaula 4.6ENE, OK (coco)	4.57	Charleston 1.7E, AR (coco)	4.53

Some of the lowest precipitation reports (in inches) for April 2018 included:

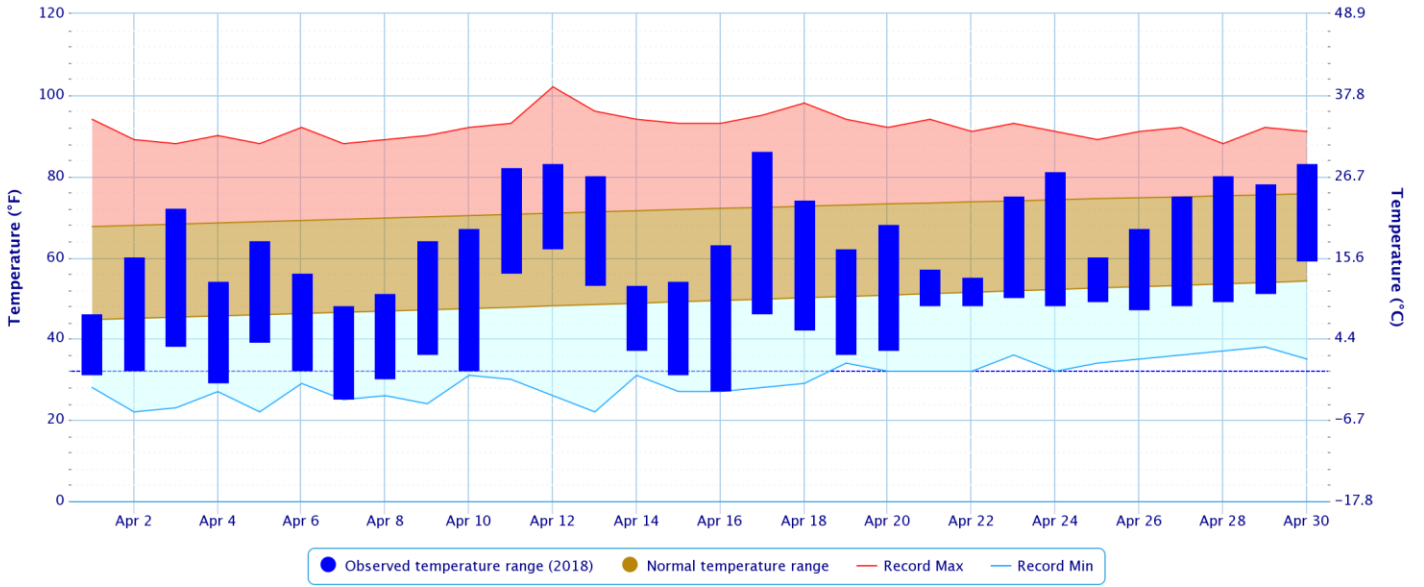
Vinita, OK (meso)	1.17	Nowata, OK (meso)	1.20	Talala, OK (meso)	1.35
Bartlesville, OK (ASOS)	1.49	Copan, OK (meso)	1.50	Skiatook, OK (meso)	1.52
Claremore 2ENE, OK (coop)	1.52	Fayetteville Drake Fld, AR (ASOS)	1.54	Sperry 6.7WNW, OK (coco)	1.57

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

Rank since 1921	April 2018	Spring-to-Date (Mar 1 – Apr 30)	Last 90 Days (Jan 31- Apr 30)	Year-to-Date (Jan 1 – Apr 30)	Last 180 Days (Nov 2 – Apr 30)	Water-Year-to-Date (Oct 1– Apr 30)	Last 365 Days (May 1, 2017 – Apr 30, 2018)
Northeast OK	11 th driest	16 th driest	47 th wettest	38 th driest	21 st driest	44 th driest	49 th wettest
East Central OK	41 st driest	48 th wettest	8th wettest	10th wettest	35 th wettest	35 th wettest	18 th wettest
Southeast OK	41 st driest	28 th driest	7th wettest	10th wettest	28 th wettest	33 rd wettest	24 th wettest
Statewide	20 th driest	19 th driest	39 th wettest	47 th driest	20 th driest	28 th driest	45 th driest

Daily Temperature Data – Tulsa Area, OK (ThreadEx)

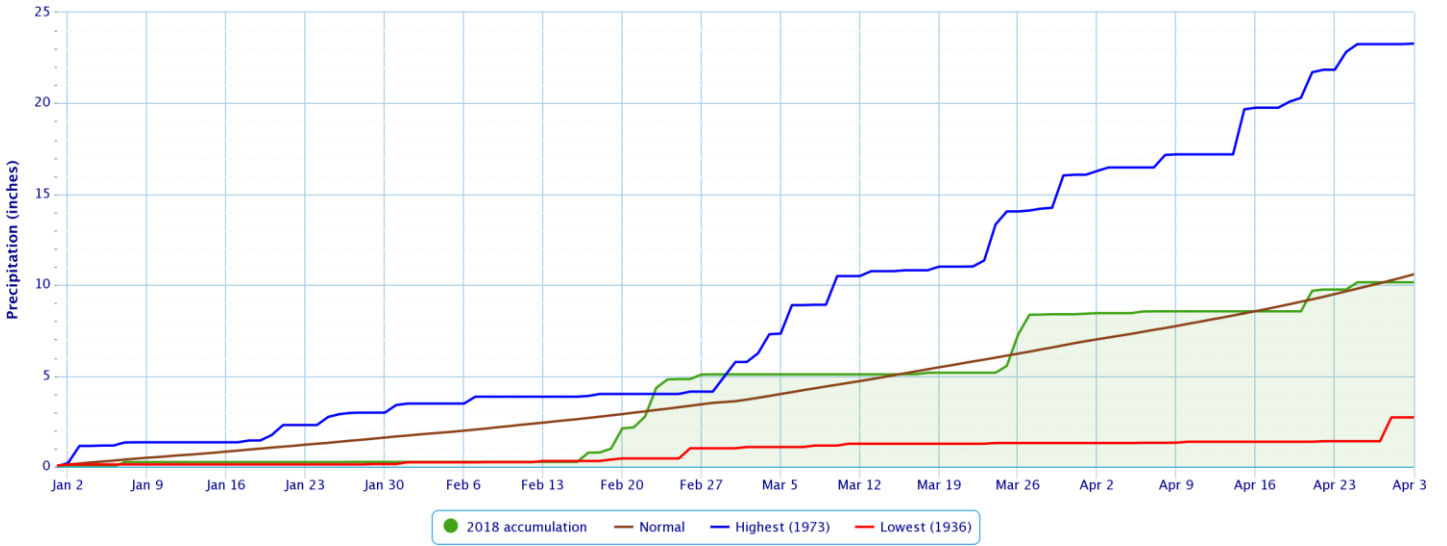
Period of Record – 1905-01-06 to 2018-04-30. Normals period: 1981-2010. Click and drag to zoom chart.



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Accumulated Precipitation – Tulsa Area, OK (ThreadEx)

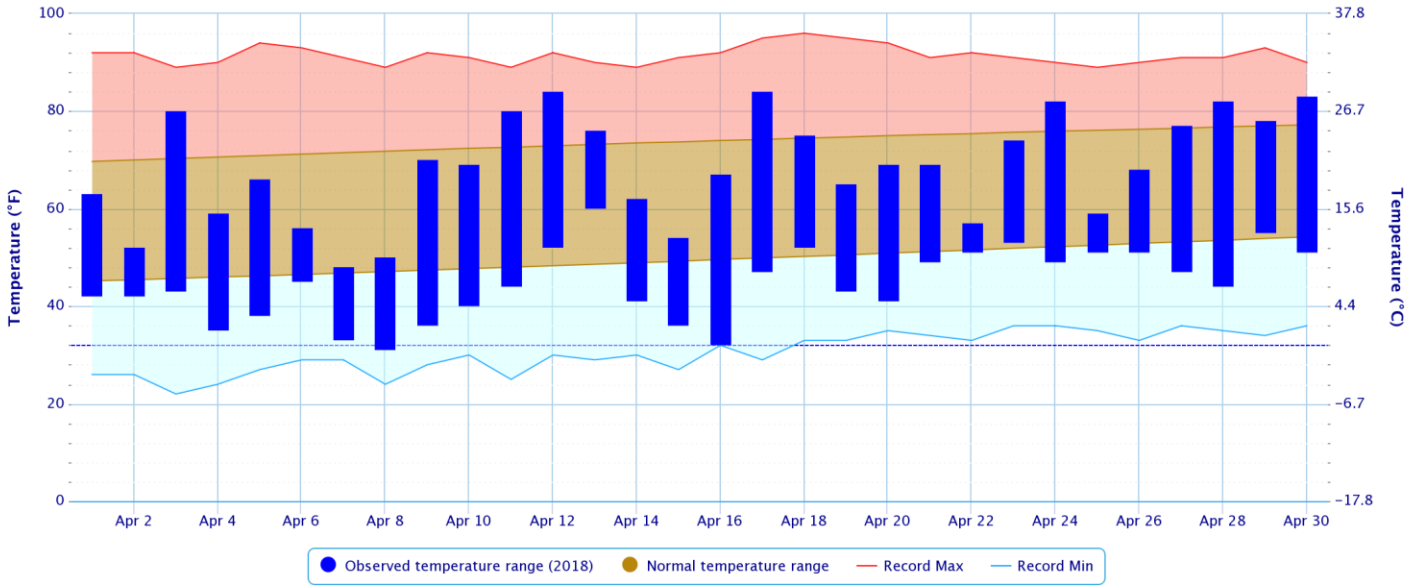
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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

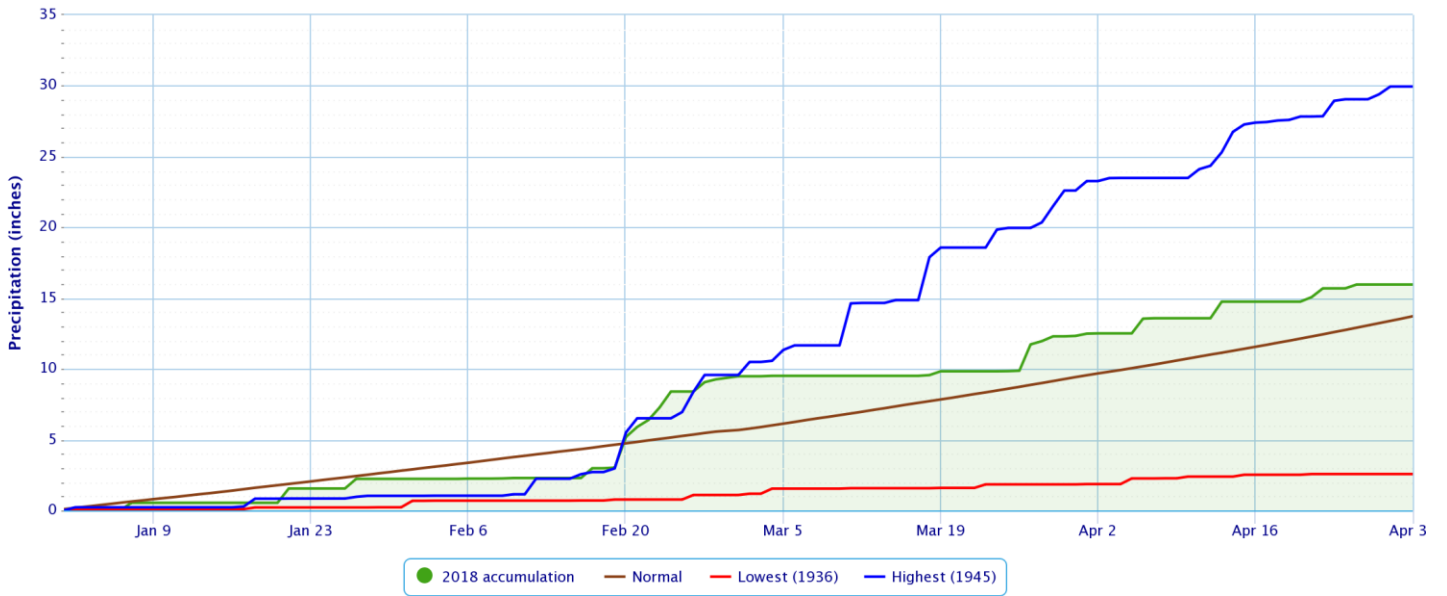
Period of Record – 1882-06-01 to 2018-04-30. Normals period: 1981-2010. Click and drag to zoom chart.



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Accumulated Precipitation – Fort Smith Area, AR (ThreadEx)

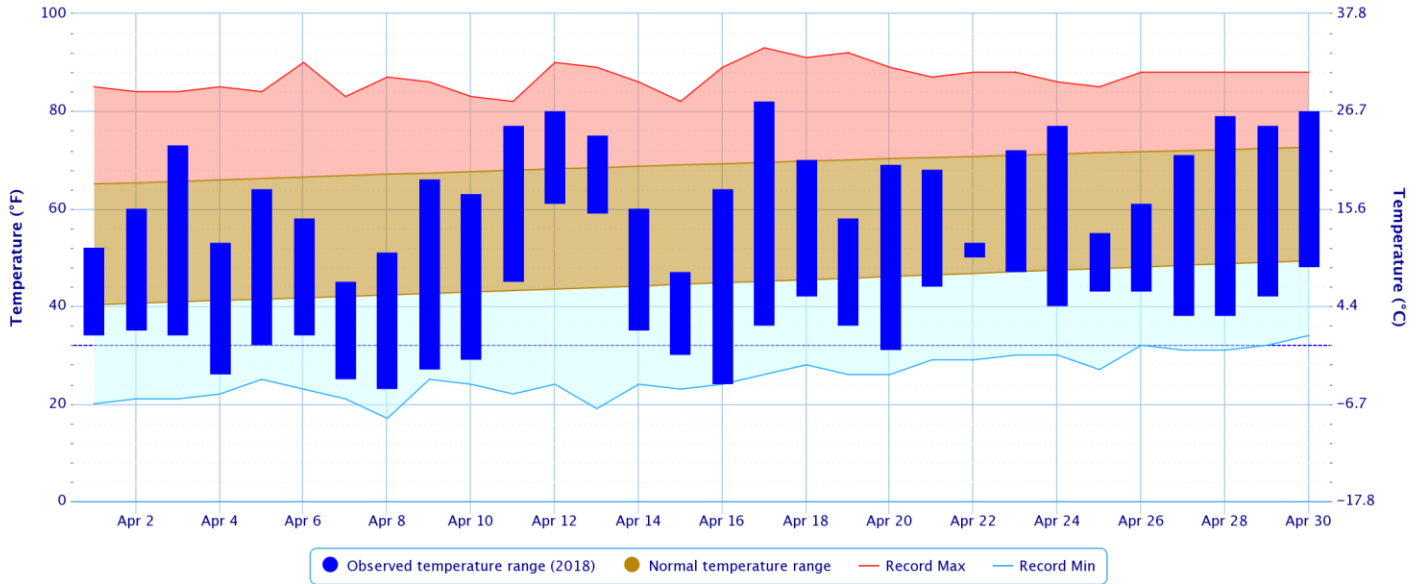
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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Daily Temperature Data – FAYETTEVILLE DRAKE FIELD, AR

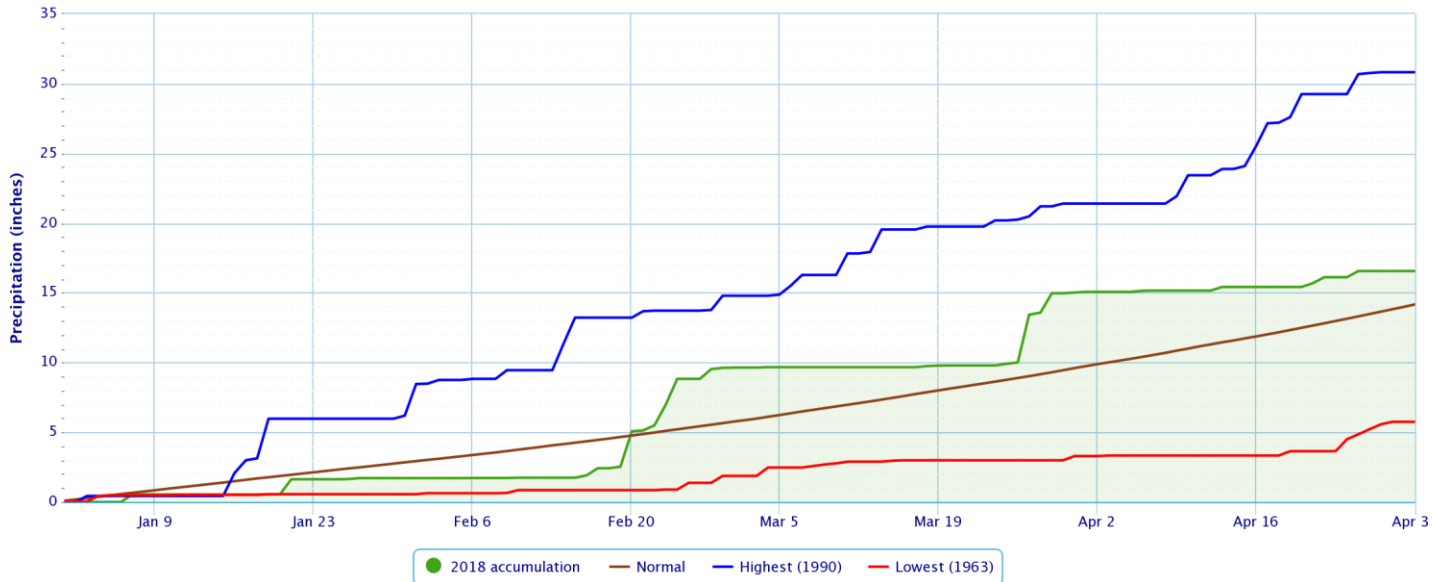
Period of Record – 1949-07-14 to 2018-04-30. Normals period: 1981-2010. Click and drag to zoom chart.



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Accumulated Precipitation – FAYETTEVILLE DRAKE FIELD, AR

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



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Drought

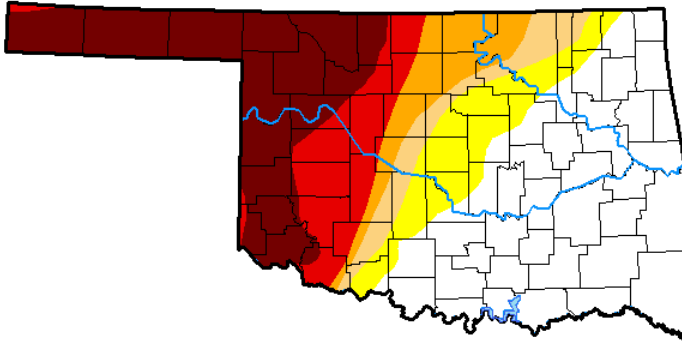
According to the [U.S. Drought Monitor](#) (USDM) from May 1, 2018 (Figs. 2, 3), Severe (D2) Drought conditions were impacting northwest Osage, far northwest Pawnee, and eastern Kay Counties in eastern OK. Moderate (D1) drought conditions were present across portions of Osage, Pawnee, Washington, and Nowata Counties in eastern OK. Abnormally Dry (D0) but not in drought conditions encompassed portions of Pawnee, Creek, Osage, Washington, Tulsa, Rogers, Nowata, and Craig Counties.

U.S. Drought Monitor Oklahoma

May 1, 2018
(Released Thursday, May 3, 2018)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	42.23	57.77	47.44	42.07	34.84	23.93
Last Week 04-24-2018	42.23	57.77	47.44	42.07	34.84	19.50
3 Months Ago 01-30-2018	0.00	100.00	99.76	81.45	21.11	0.00
Start of Calendar Year 01-02-2018	0.00	100.00	77.15	38.76	0.00	0.00
Start of Water Year 09-26-2017	64.46	35.54	0.77	0.00	0.00	0.00
One Year Ago 05-02-2017	84.92	15.08	4.26	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:

David Simeral
Western Regional Climate Center



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

Fig. 2. Drought Monitor for Oklahoma

U.S. Drought Monitor Arkansas

May 1, 2018
(Released Thursday, May 3, 2018)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	100.00	0.00	0.00	0.00	0.00	0.00
Last Week 04-24-2018	100.00	0.00	0.00	0.00	0.00	0.00
3 Months Ago 01-30-2018	7.78	92.22	66.87	30.98	2.37	0.00
Start of Calendar Year 01-02-2018	8.22	91.78	71.27	32.01	2.37	0.00
Start of Water Year 09-26-2017	39.57	60.43	0.46	0.00	0.00	0.00
One Year Ago 05-02-2017	94.76	5.24	1.11	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:

David Simeral
Western Regional Climate Center



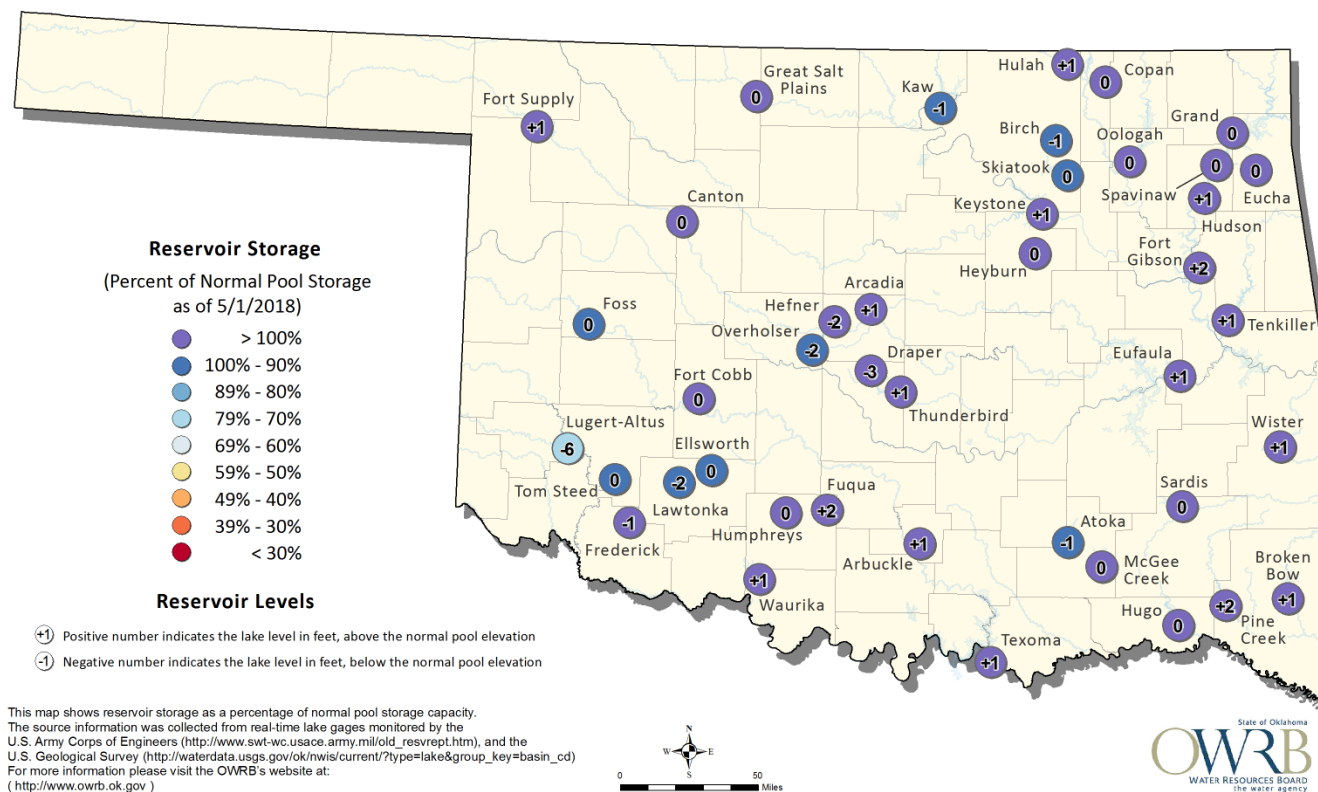
<http://droughtmonitor.unl.edu/>

Fig.3. Drought Monitor for Arkansas

Reservoirs

Oklahoma Surface Water Resources

Reservoir Levels and Storage as of 5/1/2018



According to the USACE, most lakes in the HSA were within $\pm 3\%$ of their conservation pool level. Reservoirs below 3% of their conservation pool storage as of 4/30/2018: Kaw Lake 95% and Birch Lake 94%. Reservoirs above 3% of their conservation pool storage as of 4/30/2018: Beaver Lake 175%, Eufaula Lake 107%, Hudson Lake 105%, and Fort Gibson Lake 105%.

Outlooks

The [Climate Prediction Center](#) (CPC) outlook for May 2018 (issued April 30, 2018) indicates an enhanced chance for above normal temperatures and above median precipitation across all of eastern OK and northwest AR. This outlook takes into account weather conditions forecast over the next 1-2 weeks, and sub-seasonal climate signals, including the Madden-Julian Oscillation (MJO). While the chances favor above normal temperatures for the month as a whole, periodic upper-level troughing is indicated for the Plains, which could result in periods of below normal temperatures. The precipitation outlook relies upon the areas of heavy rainfall expected at the beginning of the month. According to CPC, the monthly-average circulation over North America is expected to favor enhanced southerly flow across much of the central U.S., so precipitation events are likely to occur through the month as well.

For the 3-month period May-June-July 2018, CPC is forecasting an enhanced chance for above normal temperatures and an equal chance for above, near, and below median precipitation across all of eastern OK and northwest AR (outlook issued April 19, 2018). This outlook is based on both statistical and dynamical forecast tools and decadal timescale climate trends, as well as impacts from the ENSO state and the MJO. According to CPC, La Niña conditions continued in April, but are expected to transition to ENSO neutral during May. ENSO neutral conditions are favored to persist through the summer.

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

Showers and thunderstorms developed during the early morning hours of the 6th north of a warm front located over northern TX. This activity spread northward during the day, with most of the rain remaining south of the Highway 412 corridor. The rain changed over to light snow across northeast OK and northwest AR as colder air filtered into the region. Snowfall totals were a trace to 0.5". This was only the 4th time since 1900 that measurable snowfall occurred in Tulsa, OK in April. Rainfall totals along and south of Highway 412 ranged from around 0.50" to near 4", with the highest totals across Okmulgee, McIntosh, and Muskogee Counties (Fig. 4).

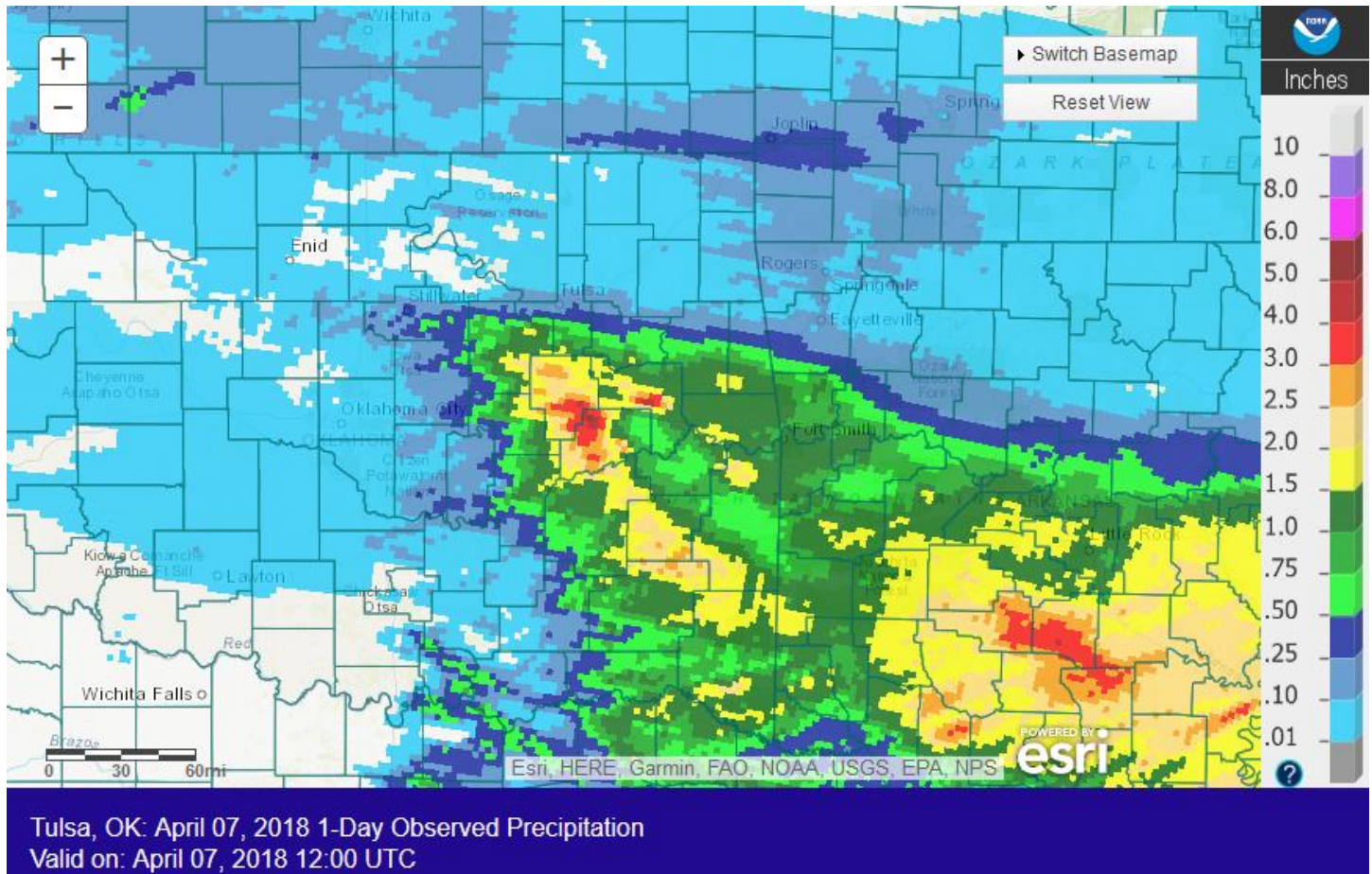
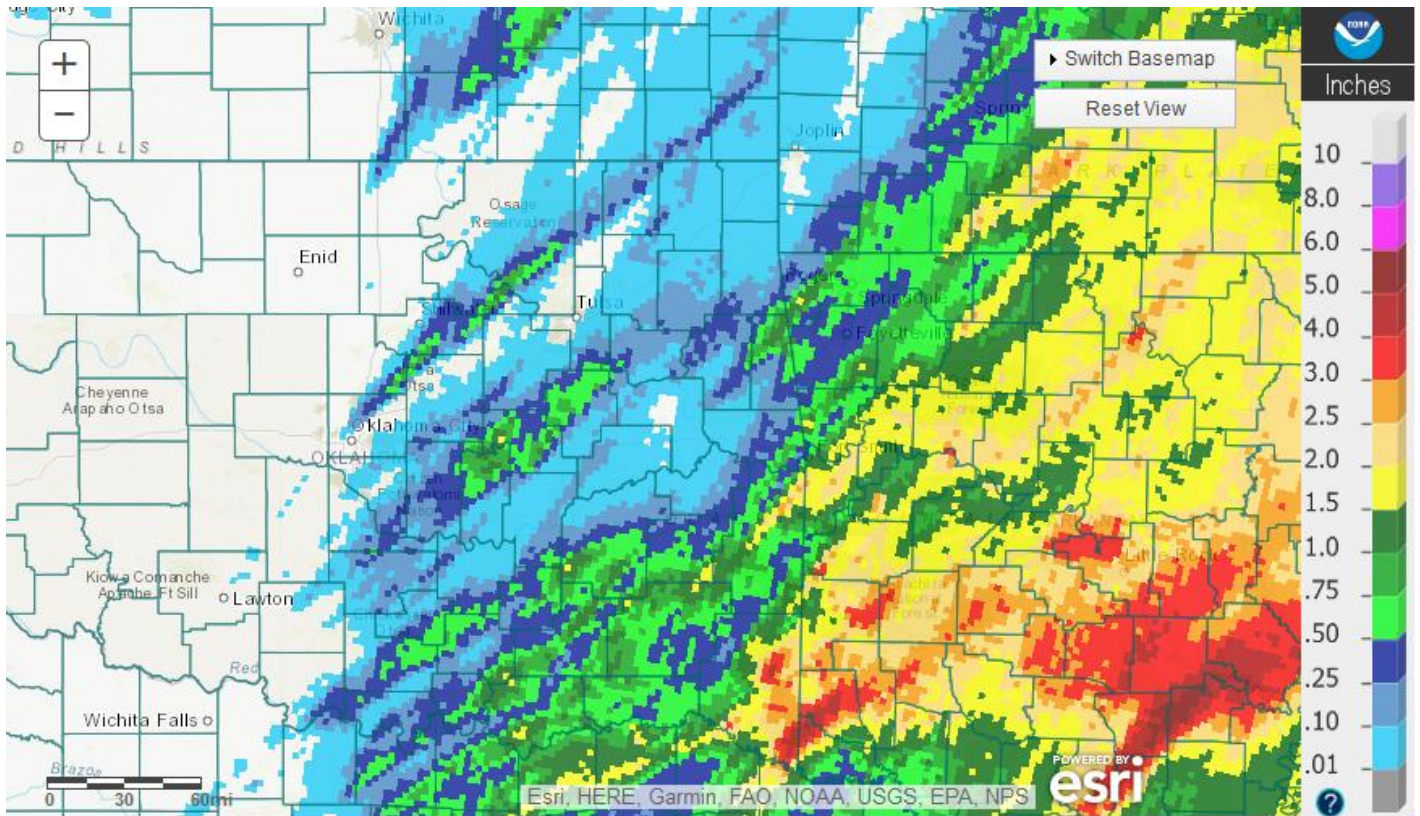


Fig. 4. 24-hour Estimated Observed Rainfall ending at 7am CDT 4/07/2018.

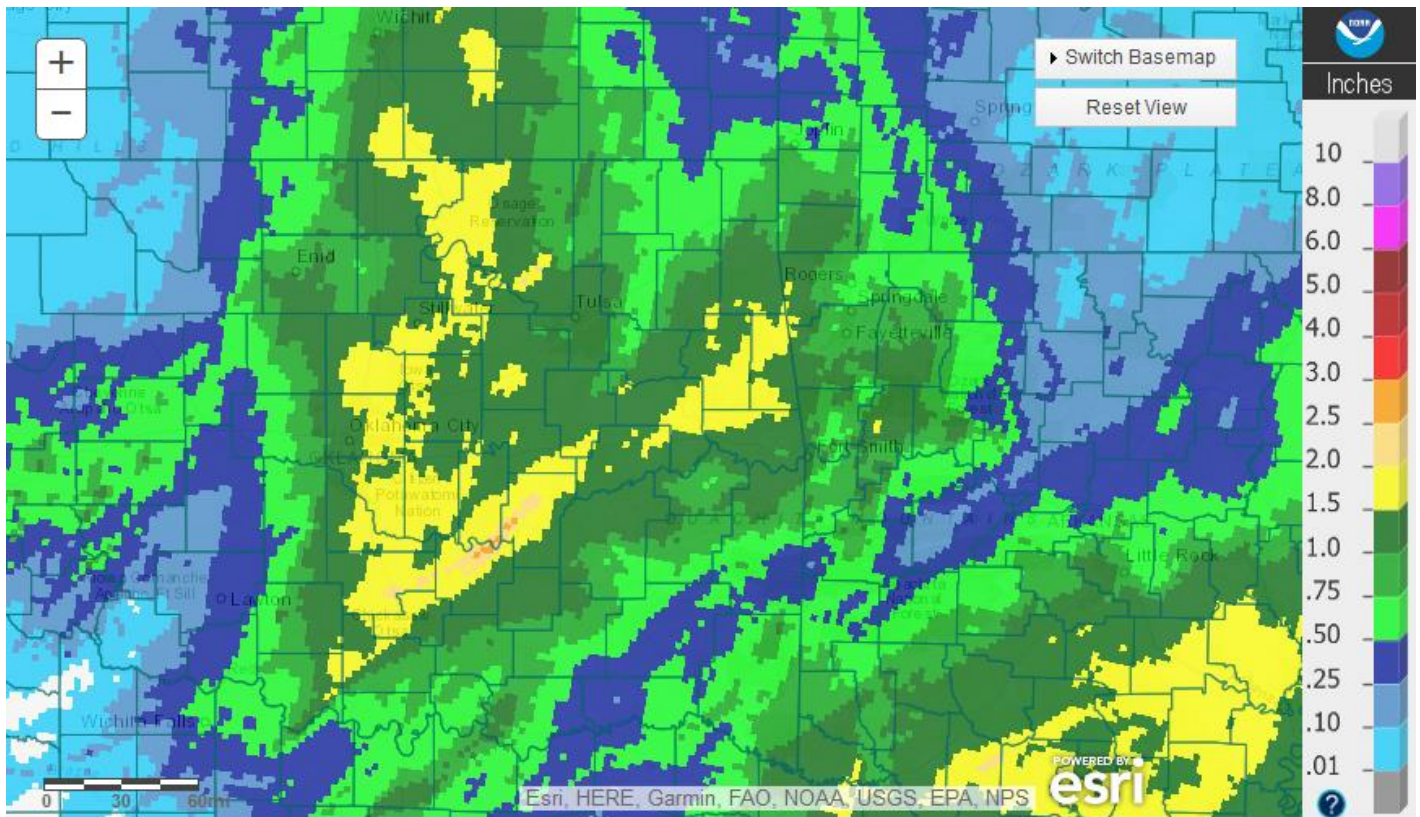
Elevated showers developed during the early morning of the 13th across southeast OK and spread north during the morning as warm air advection increased over the area. A dry line then approached from the west, igniting scattered showers and thunderstorms, some of which became severe, during the afternoon and evening hours. A supercell developed over northeastern Le Flore County Oklahoma during the afternoon. The storm intensified as it moved northeast into northern Sebastian County and southern Crawford County Arkansas, where it produced a strong tornado. Another storm produced a weak tornado over northeastern Sebastian County Arkansas and southwestern Franklin County Arkansas (for more information on the tornadoes: <https://arcg.is/1f5Ob4>). Rainfall totals ranged from a few hundredths of an inch to near 2.5" in isolated locations (Fig. 5).

A broad region of warm air advection ahead of an approaching upper-level low supported widespread showers and isolated thunderstorms through much of the afternoon and evening hours on the 21st. As the upper-level passed over the area during the night, some redevelopment occurred, primarily over far eastern OK and western AR. This activity lingered into Sunday before coming to an end. All of eastern OK and northwest AR received around 0.50" to around 1.5" (Fig. 6), which was greatly needed in the drought area northwest of I-44.



Tulsa, OK: April 14, 2018 1-Day Observed Precipitation
Valid on: April 14, 2018 12:00 UTC

Fig. 5. 24-hour Estimated Observed Rainfall ending at 7am CDT 4/14/2018.



Tulsa, OK: April 22, 2018 1-Day Observed Precipitation
Valid on: April 22, 2018 12:00 UTC

Fig. 6. 24-hour Estimated Observed Rainfall ending at 7am CDT 4/22/2018.

Written by:

Nicole McGavock
Service Hydrologist
WFO Tulsa

Products issued in April 2018:

*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

- 1 Flash Flood Warnings (FFW)
- 1 Flash Flood Statements (FFS)
- 0 Flash/Areal Flood Watches (FFA) (0 Watch FFA CON/EXT/EXA/EXB/CAN)
- 2 Urban and Small Stream Advisories (FLS)
- 0 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)
- 1 Drought Information Statements (DGT)

Preliminary Hydrographs:

None