

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)
		REPORT FOR: MONTH July YEAR 2024
MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS		SIGNATURE Steven F. Piltz (Meteorologist-in-Charge)
TO: Hydrometeorological Information Center, W/OH2 NOAA / National Weather Service 1325 East West Highway, Room 7230 Silver Spring, MD 20910-3283		DATE August 16, 2024

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.

Overall, July 2024 was a dry month despite a few heavy rain events. 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 https://www.weather.gov/tsa/climo_summary_e5list.

Monthly Summary

Using the radar-derived estimated observed precipitation from the RFCs (Fig. 1a), rainfall totals for July 2024 ranged from around 0.50" to 7" across eastern OK and northwest AR, with much of the area receiving 2"-4". These rainfall totals correspond to 20% to 200% of the normal July rainfall, with most of the area below normal for the month (Fig. 1b).

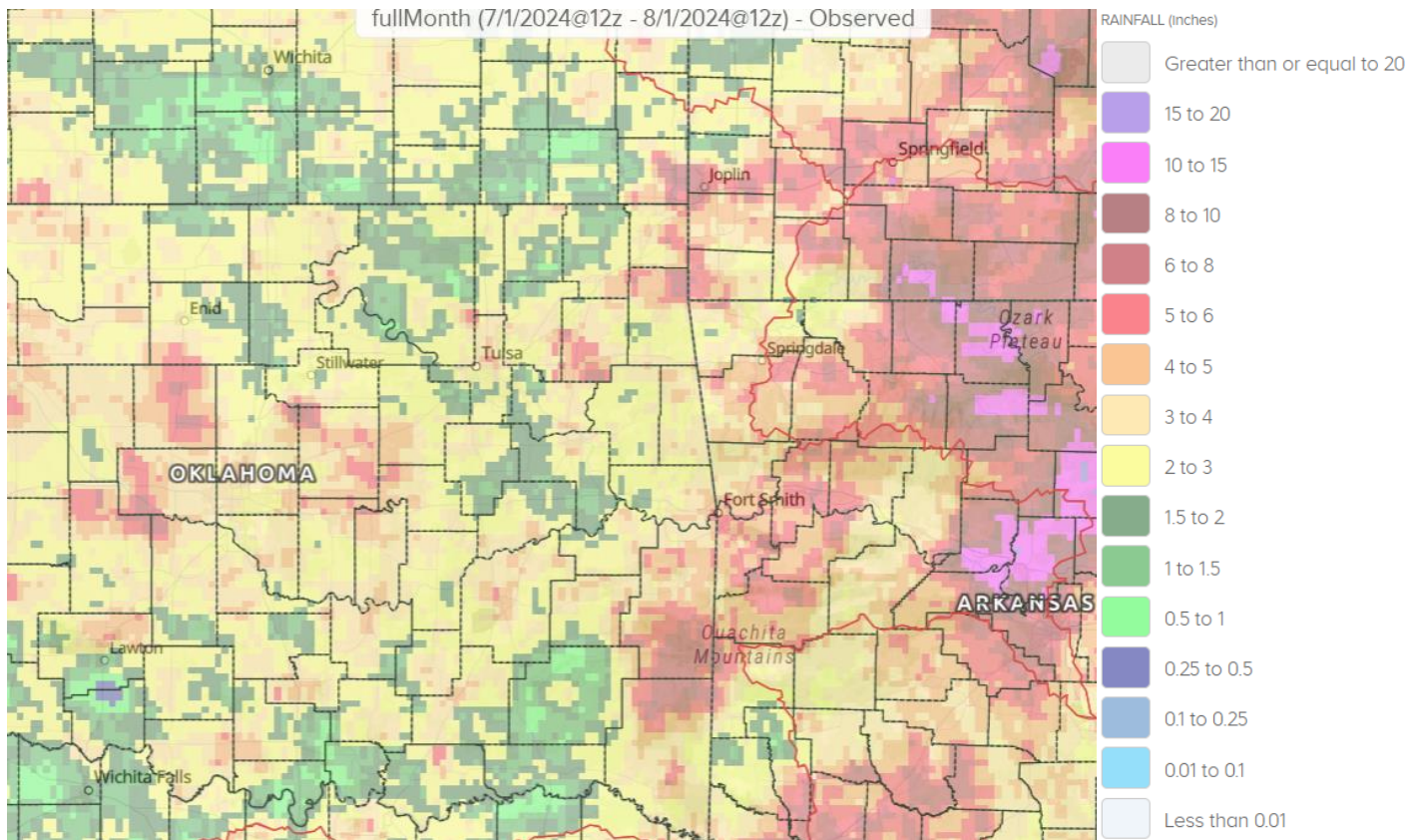


Fig. 1a. Estimated Observed Rainfall for July 2024

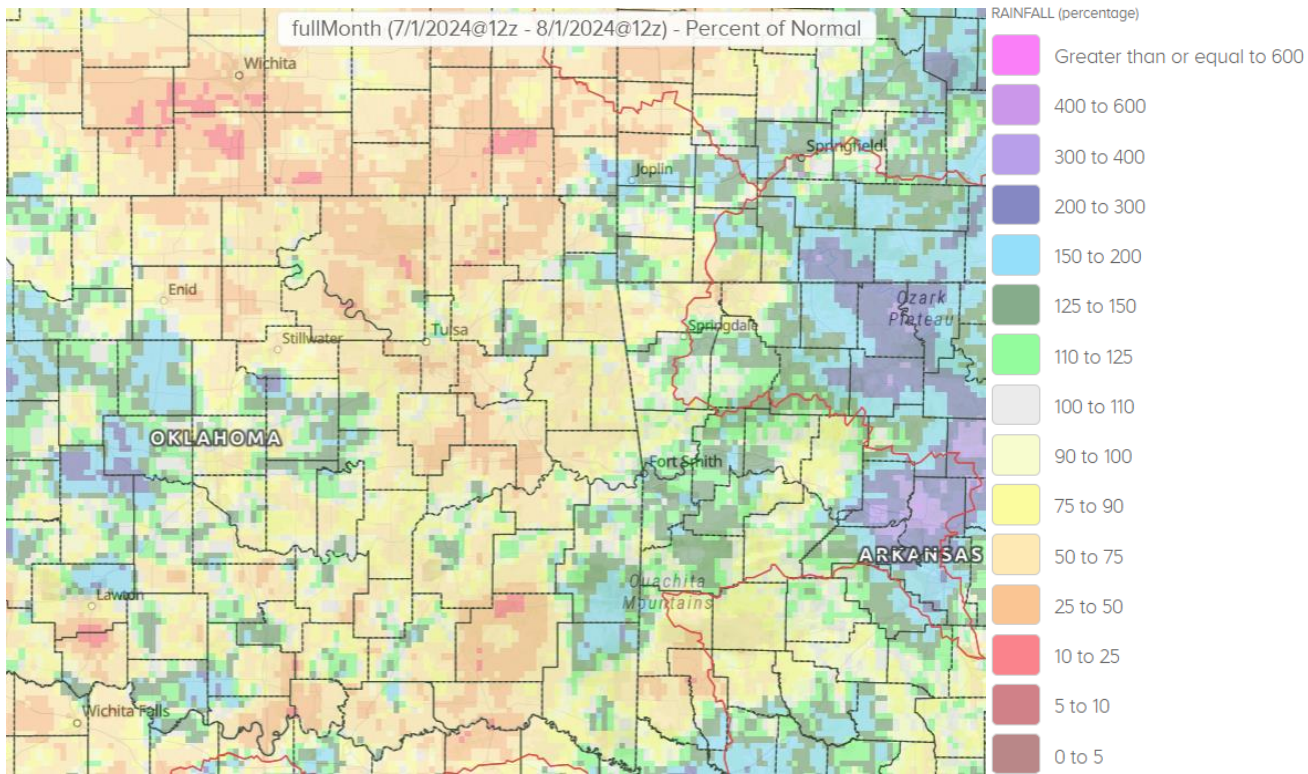


Fig. 1b. Estimated % of Normal Rainfall for July 2024

In Tulsa, OK, July 2024 ranked as the 58th warmest July (82.6°F, tied 1929; since records began in 1905) and the 26th wettest July (5.13", tied 1924; since records began in 1888). Fort Smith, AR had the 46th warmest July (83.1°F, tied 1949, 1914; since records began in 1882) and the 28th wettest July (5.24"; since records began in 1882). Fayetteville, AR had the 22nd warmest (79.5°F) and the 14th wettest (5.99") July since records began in 1950.

Some of the larger precipitation reports (in inches) for July 2024 included:

Vinita 8.6ESE, OK (coco)	6.24	Fayetteville Drake Field, AR(ASOS)	5.99	Greenwood 0.9S, AR (coco)	5.96
Jay 3.3NNE, OK (coco)	5.74	Springdale 0.6E, AR (coco)	5.70	Pryor 2.2SE, OK (coco)	5.66
Talihina, OK (meso)	5.56	Rye Hill 1.1E, AR (coco)	5.39	Fayetteville 1.8NE, AR (coco)	5.32

Some of the lowest precipitation reports (in inches) for July 2024 included:

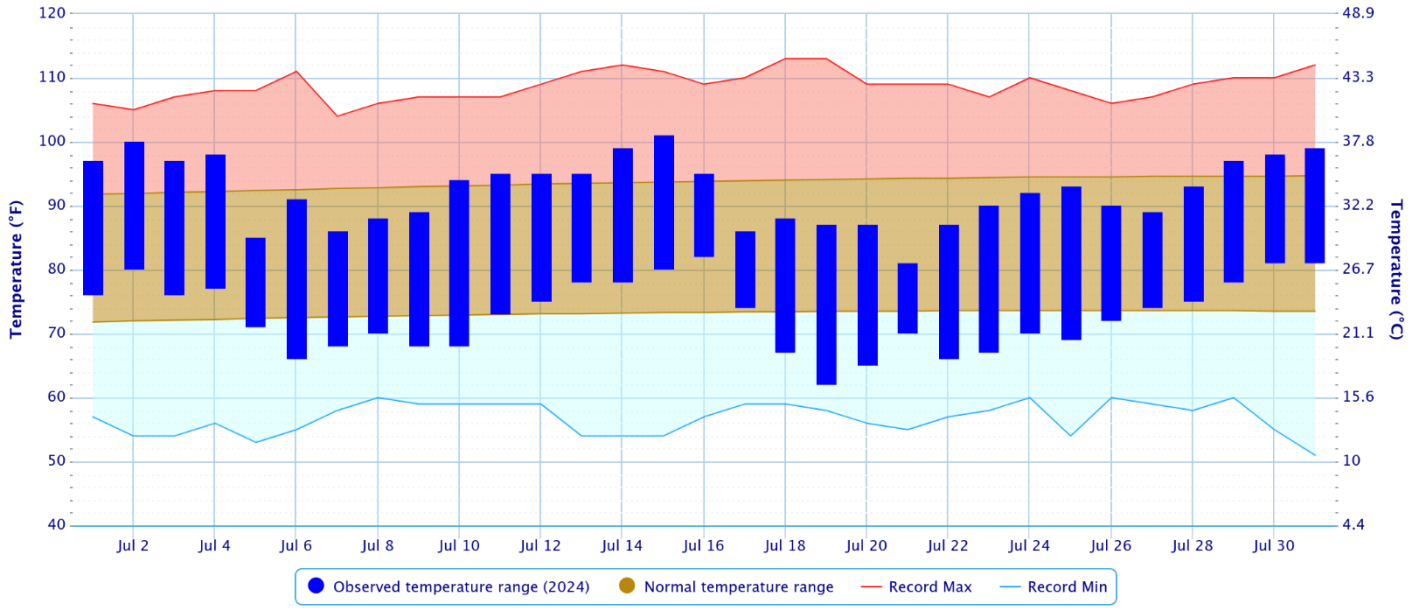
Clayton, OK (meso)	0.72	Antlers, OK (coop)	0.76	Antlers 5NW, OK (meso)	1.13
Talala, OK (meso)	1.21	Foraker, OK (meso)	1.32	Bartlesville, OK (ASOS)	1.33
Vinita, OK (meso)	1.55	Stigler, OK (meso)	1.62	Haskell, OK (meso)	1.63

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

Rank since 1921	Last 30 Days (July 2 – 31, 2024)	Summer-to-Date (Jun 1 – Jul 31)	Warm Growing Season (Mar 1 – Jul 31)	Water Year-to-Date (Oct 1, 2023 – Jul 31, 2024)	Year-to-Date (Jan 1 – Jul 31)	Last 90 Days (May 3 – Jul 31)	Last 365 Days (Aug 2, 2023 – Ju1 31, 2024)
Northeast OK	45 th driest	25 th driest	51 st driest	43 rd driest	48 th wettest	43 rd driest	50 th wettest
East Central OK	47 th driest	49 th driest	42 nd wettest	44 th wettest	45 th wettest	50 th driest	48 th wettest
Southeast OK	49 th driest	44 th wettest	28 th wettest	44 th wettest	37 th wettest	42 nd wettest	42 nd wettest
Statewide	47 th wettest	42 nd driest	48 th driest	50 th wettest	50 th wettest	48 th driest	49 th wettest

Daily Temperature Data – Tulsa Area, OK (ThreadEx)

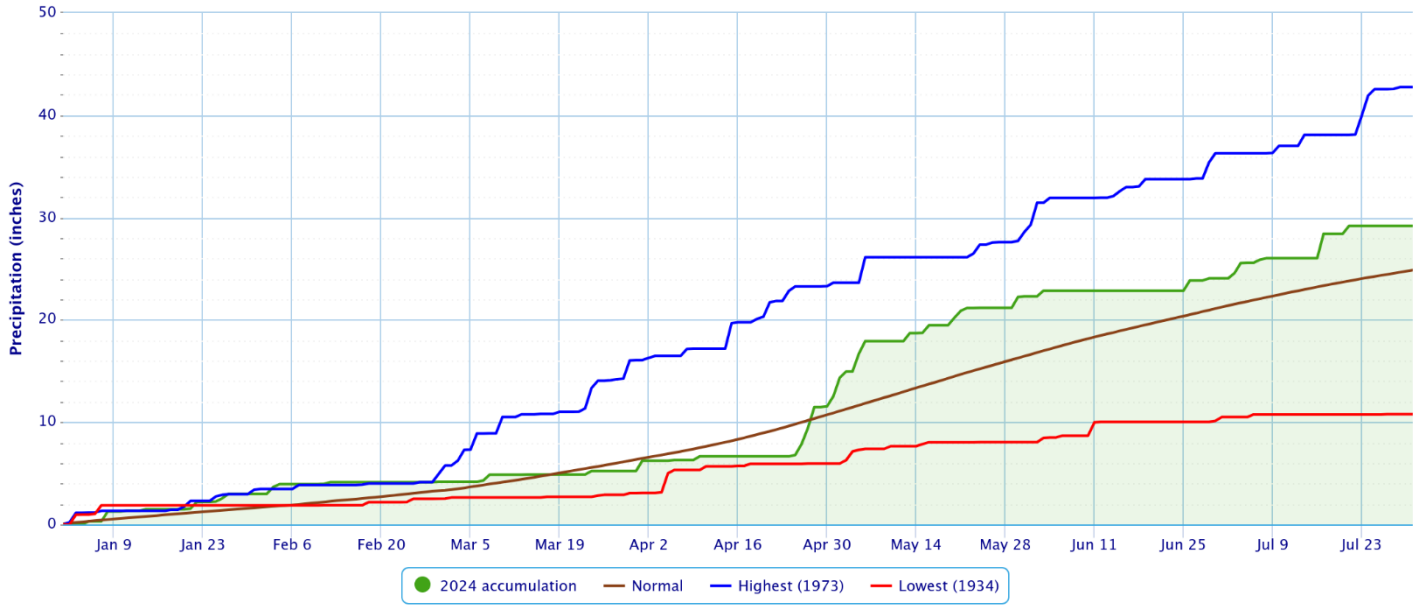
Period of Record – 1905-01-06 to 2024-08-08. Normals period: 1991-2020. Click and drag to zoom chart.



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Accumulated Precipitation – Tulsa Area, OK (ThreadEx)

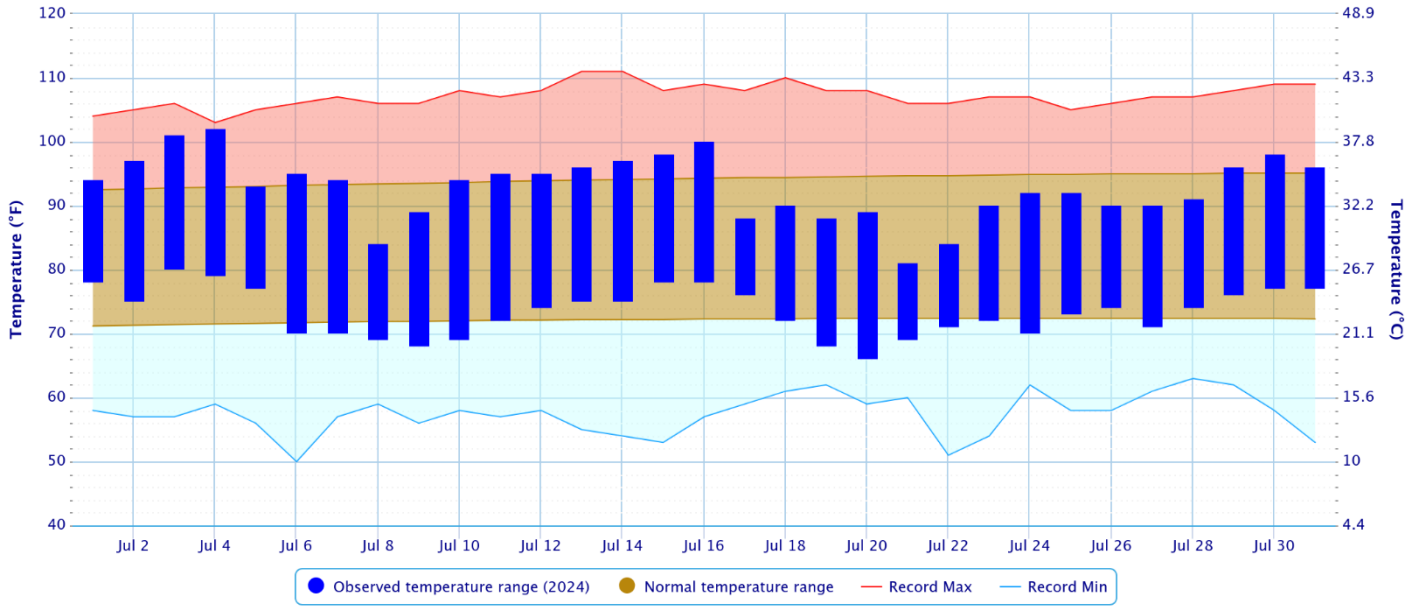
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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

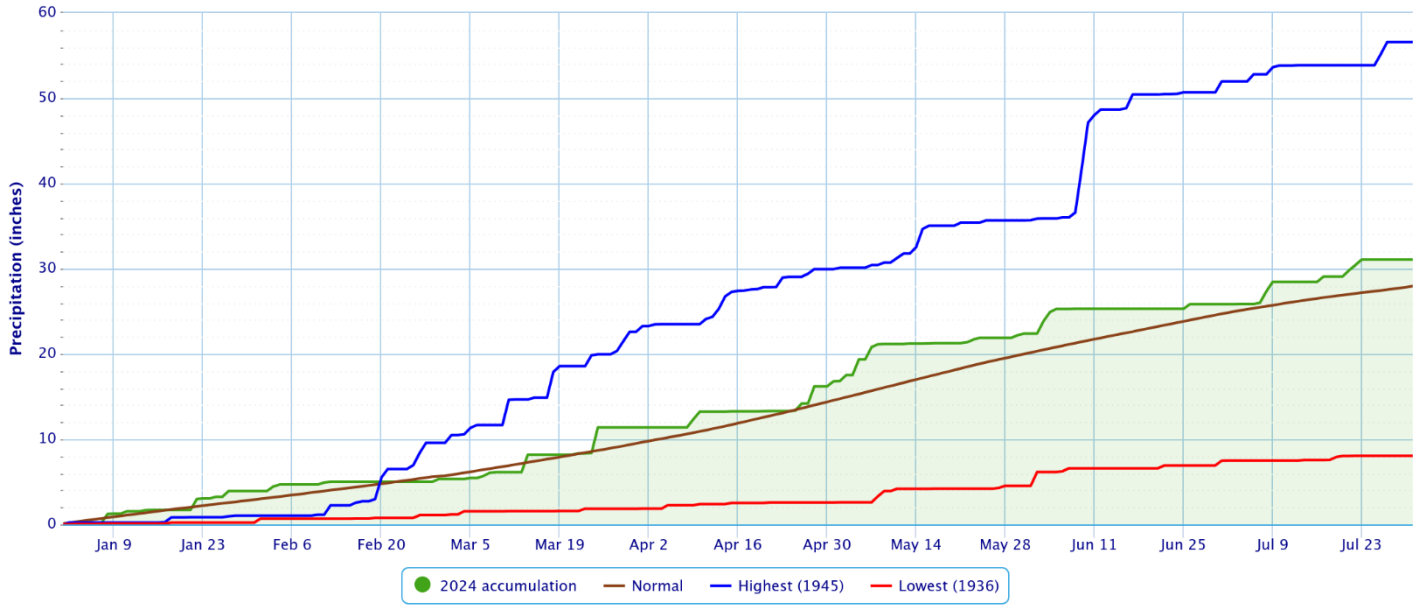
Period of Record – 1882-06-01 to 2024-08-08. Normals period: 1991-2020. Click and drag to zoom chart.



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Accumulated Precipitation – Fort Smith Area, AR (ThreadEx)

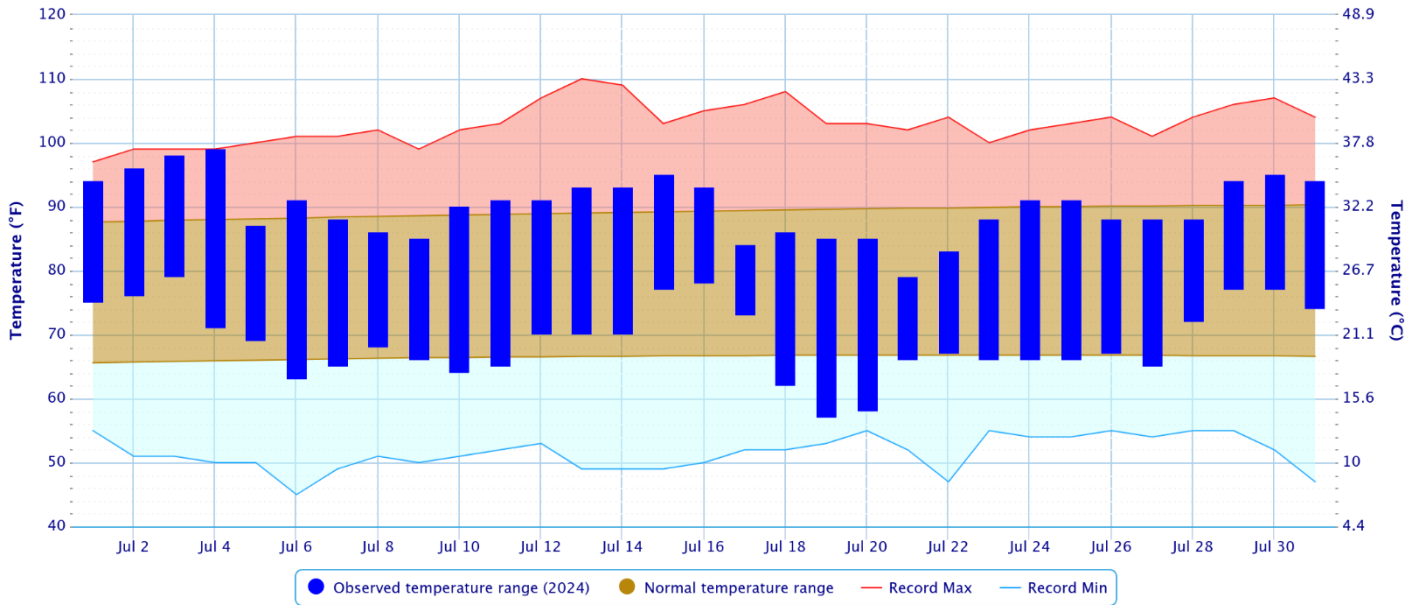
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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Daily Temperature Data – FAYETTEVILLE DRAKE FIELD, AR

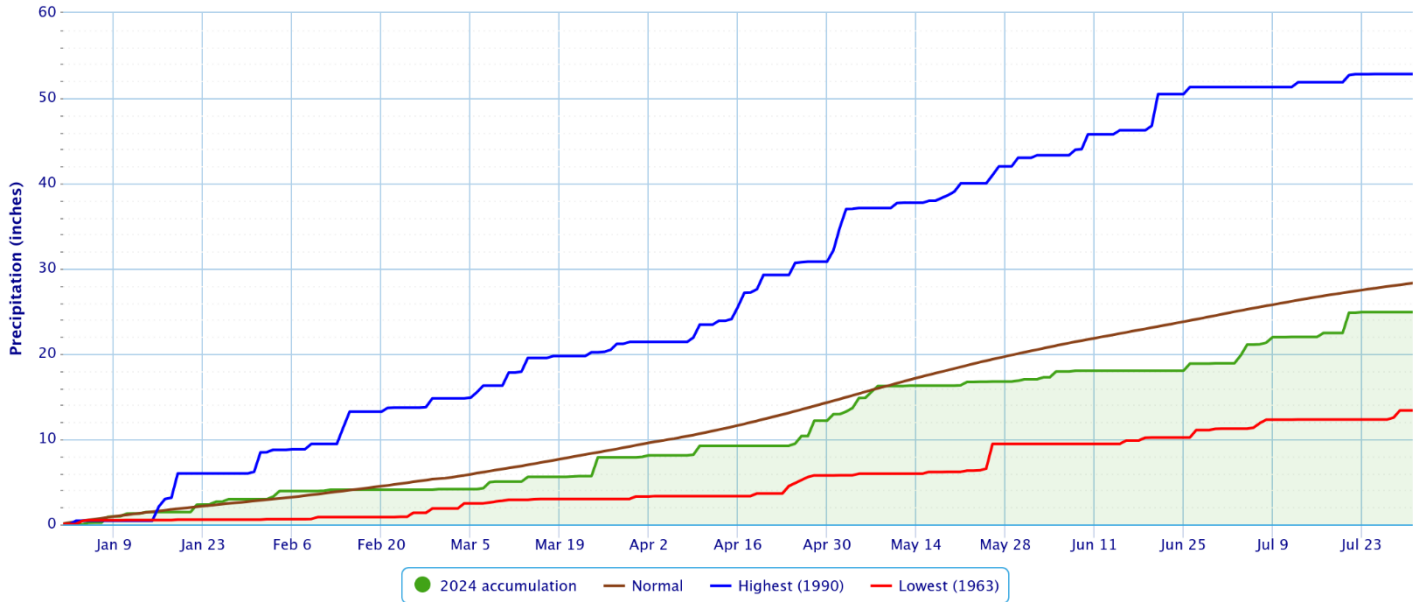
Period of Record – 1949-07-14 to 2024-08-08. Normals period: 1991-2020. Click and drag to zoom chart.



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Accumulated Precipitation – FAYETTEVILLE DRAKE FIELD, AR

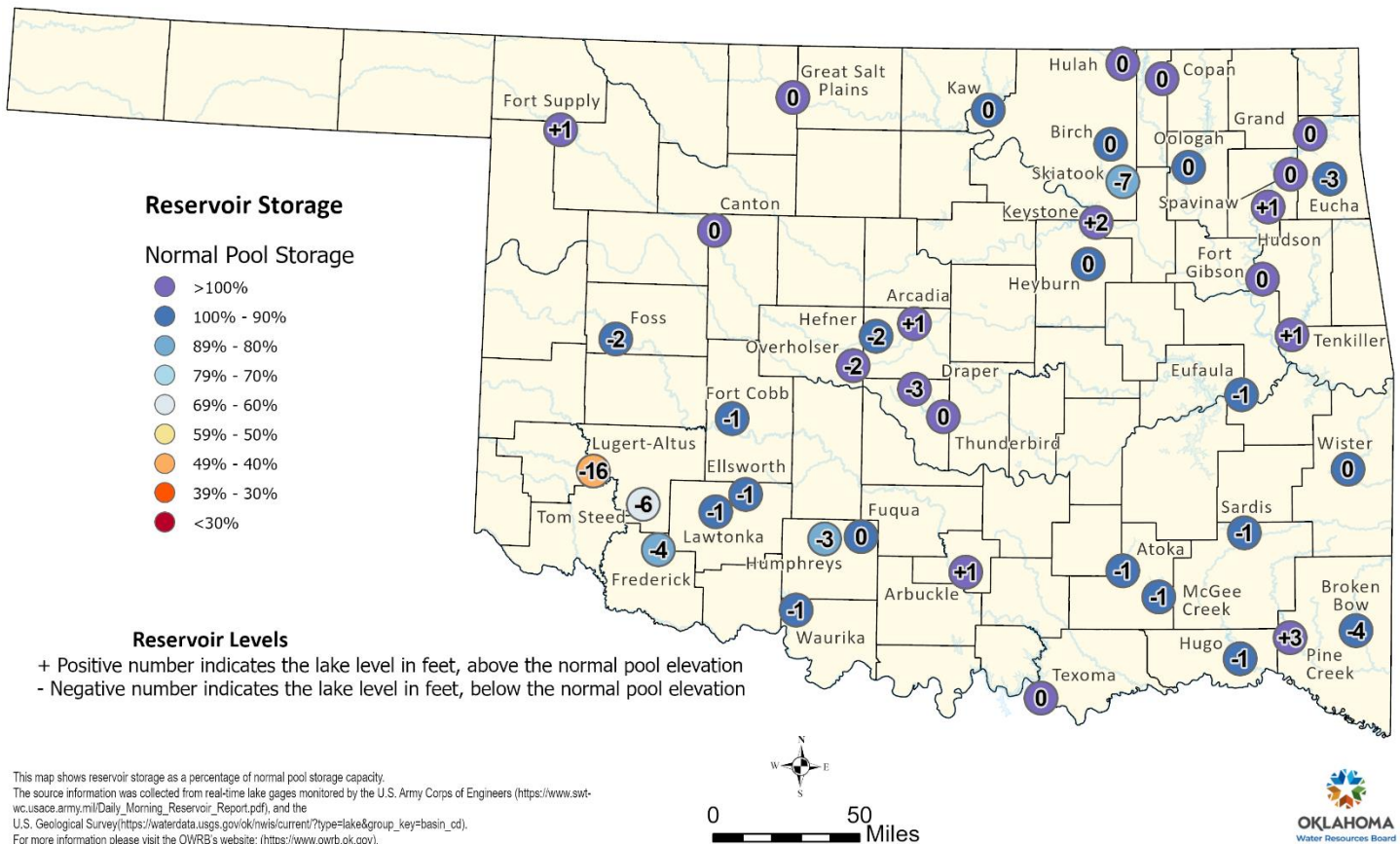
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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Reservoirs

Oklahoma Reservoir Levels and Storage as of 7/29/2024



This map shows reservoir storage as a percentage of normal pool storage capacity. The source information was collected from real-time lake gages monitored by the U.S. Army Corps of Engineers (https://www.swt-wc.usace.army.mil/Daily_Morning_Reservoir_Report.pdf), and the U.S. Geological Survey (https://waterdata.usgs.gov/ok/nwis/current/?type=lake&group_key=basin_cd). For more information please visit the OWRB's website: (<https://www.owrb.ok.gov>).



According to the USACE, several of the lakes in the HSA were below 3% of top of their conservation pools as of 8/01/2024: Ft. Gibson Lake 74%, Skiatook Lake 80%, Heyburn Lake 87%, Hugo Lake 88%, Wister Lake 92%, Beaver Lake 93%, Eufaula Lake 94%, and Kaw Lake 96%. One lake was above 3% of the top of its conservation pool: Hudson Lake 5%.

Drought

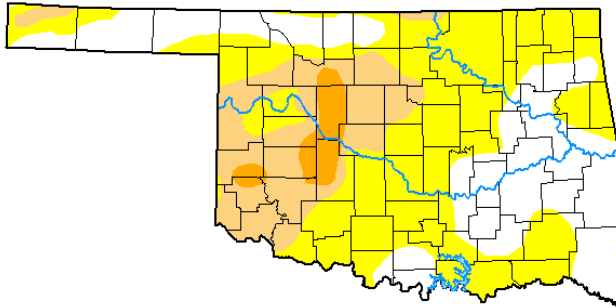
According to the [U.S. Drought Monitor](#) (USDM) from July 30, 2024 (Figs. 2, 3), Moderate (D1) drought conditions were occurring across portions of eastern Kay County in eastern Oklahoma. Abnormally Dry (D0) but not in drought conditions were occurring in parts of Osage, Kay, Pawnee, Creek, Okmulgee, Okfuskee, Tulsa, Washington, Nowata, Craig, Rogers, Mayes, Wagoner, Ottawa, Delaware, Cherokee, Adair, Sequoyah, Muskogee, Pittsburg, Latimer, Pushmataha, and Choctaw Counties in eastern OK and Benton, Washington, Crawford, Carroll, and Madison Counties in northwest AR.

U.S. Drought Monitor Oklahoma

July 30, 2024

(Released Thursday, Aug. 1, 2024)

Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	30.79	69.21	22.00	3.78	0.00	0.00
Last Week <i>07-23-2024</i>	37.26	62.74	17.79	3.78	0.00	0.00
3 Months Ago <i>04-30-2024</i>	41.10	58.90	28.10	9.12	0.00	0.00
Start of Calendar Year <i>01-02-2024</i>	55.32	44.68	21.64	3.08	0.00	0.00
Start of Water Year <i>09-26-2023</i>	34.29	65.71	46.76	30.93	12.91	0.00
One Year Ago <i>08-01-2023</i>	52.33	47.67	17.90	7.58	2.58	0.00

Intensity:



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Lindsay Johnson
National Drought Mitigation Center



droughtmonitor.unl.edu

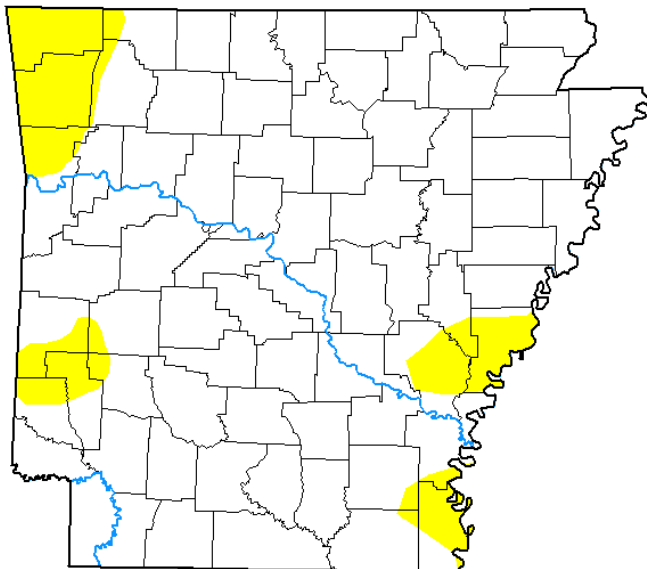
Fig. 2. Drought Monitor for Oklahoma

U.S. Drought Monitor Arkansas

July 30, 2024

(Released Thursday, Aug. 1, 2024)

Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	89.44	10.56	0.00	0.00	0.00	0.00
Last Week <i>07-23-2024</i>	91.51	8.49	0.25	0.00	0.00	0.00
3 Months Ago <i>04-30-2024</i>	75.53	24.47	6.46	0.64	0.00	0.00
Start of Calendar Year <i>01-02-2024</i>	15.06	84.94	44.54	23.39	13.71	0.79
Start of Water Year <i>09-26-2023</i>	38.45	61.55	25.37	3.70	0.00	0.00
One Year Ago <i>08-01-2023</i>	85.42	14.58	4.18	0.00	0.00	0.00

Intensity:



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Lindsay Johnson
National Drought Mitigation Center



droughtmonitor.unl.edu

Fig. 3. Drought Monitor for Arkansas

Outlooks

The [Climate Prediction Center](#) (CPC) outlook for August 2024 (issued July 31, 2024) indicates an enhanced chance for above normal temperatures and an enhanced chance for below median precipitation across all of eastern OK and northwest AR. This outlook was based on dynamical and statistical model output along with long-term trends and soil moisture conditions. The Madden-Julian Oscillation (MJO) and ENSO did not influence this month's outlook.

For the 3-month period August-September-October 2024, CPC is forecasting an enhanced chance for below median precipitation northwest of I-44 in northeast OK and an equal chance of above, near, or below median precipitation elsewhere across eastern OK and northwest AR. This outlook also calls for an increased chance of above normal temperatures across eastern OK and northwest AR (outlook issued July 18, 2024). This outlook is based on long-term trends, ENSO state, and incorporates suite of statistical and dynamical forecast tools. According to CPC, "ENSO-neutral is expected to continue for the next several months, with La Niña favored to emerge during August-October (70% chance) and persist into the Northern Hemisphere winter 2024-25 (79% chance during November-January)." CPC continues the La Niña Watch.

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

Widely scattered showers and thunderstorms developed near a cold front from central OK into far northwest AR on July 4th, just in time to affect holiday celebrations. The individual storms moved to the northeast, while the overall area of storms shifted to the southeast with the front. The precipitation finally shifted east of the area by sunrise of the 5th. Rainfall totals ranged from a few hundredths to 4" (Fig. 4).

A mesoscale convective system (MCS) moved into northeast OK mid-morning of the 7th. The MCS continued eastward, affecting a large portion of eastern OK and northwest AR before weakening in the late afternoon. By evening, what little rain remained was east of the area. A couple hours after midnight, new showers and thunderstorms developed along I-44 in northeast OK, which then quickly moved northeast into MO. Rainfall totals by 7am July 8th ranged from around 0.10" to around 2" (Fig. 5).

Some scattered storms developed in the vicinity of I-44 on the morning of the 8th near a weak 850-mb front that was in advance of an approaching trough. Meanwhile, Hurricane Beryl was located to the south near Houston, TX. As the tropical system moved northeast, bands of rain entered southeast OK and northwest AR around noon, with periods of heavy rain from the very moist tropical atmosphere continuing through the afternoon hours. The Oklahoma Mesonet station in Talihina measured over 2" of rain in one hour (Fig. 6). By evening, the showers and thunderstorms had spread north to the I-44 corridor. Widespread showers and thunderstorms continued primarily across far eastern OK and northwest AR through the evening and overnight hours as the core of Beryl moved through the ARLATX. The precipitation finally shifted east of the area by mid-morning of the 9th. Rainfall totals from this tropical activity ranged from around 0.50" to near 6" in the affected areas (Figs. 7, 8). A large portion of Le Flore, Sequoyah, Crawford, Sebastian, Franklin, and Madison Counties in southeast OK and west central AR received 1.5"-4". Despite the heavy rain, there were no reports of flooding.

Just before midnight of the 12th, thunderstorms developed over southeast KS as a weak wave was interacting with the nose of the low-level jet. These storms continued over far southeast KS, while also spreading south into far northeast OK and east into southwest MO and northwest AR, through sunrise. This activity then quickly dissipated as the low-level jet weakened during the mid-morning hours. While the rainfall totals within the NWS Tulsa area ranged from a few hundredths to 1", just across the border in KS and MO, 1"-6" of rain fell (Fig. 9). This rainfall was in the Neosho River basin and resulted in a rise above action stage for the Neosho River near Commerce (see preliminary hydrograph at the end of this report). However, the river remained below flood stage.

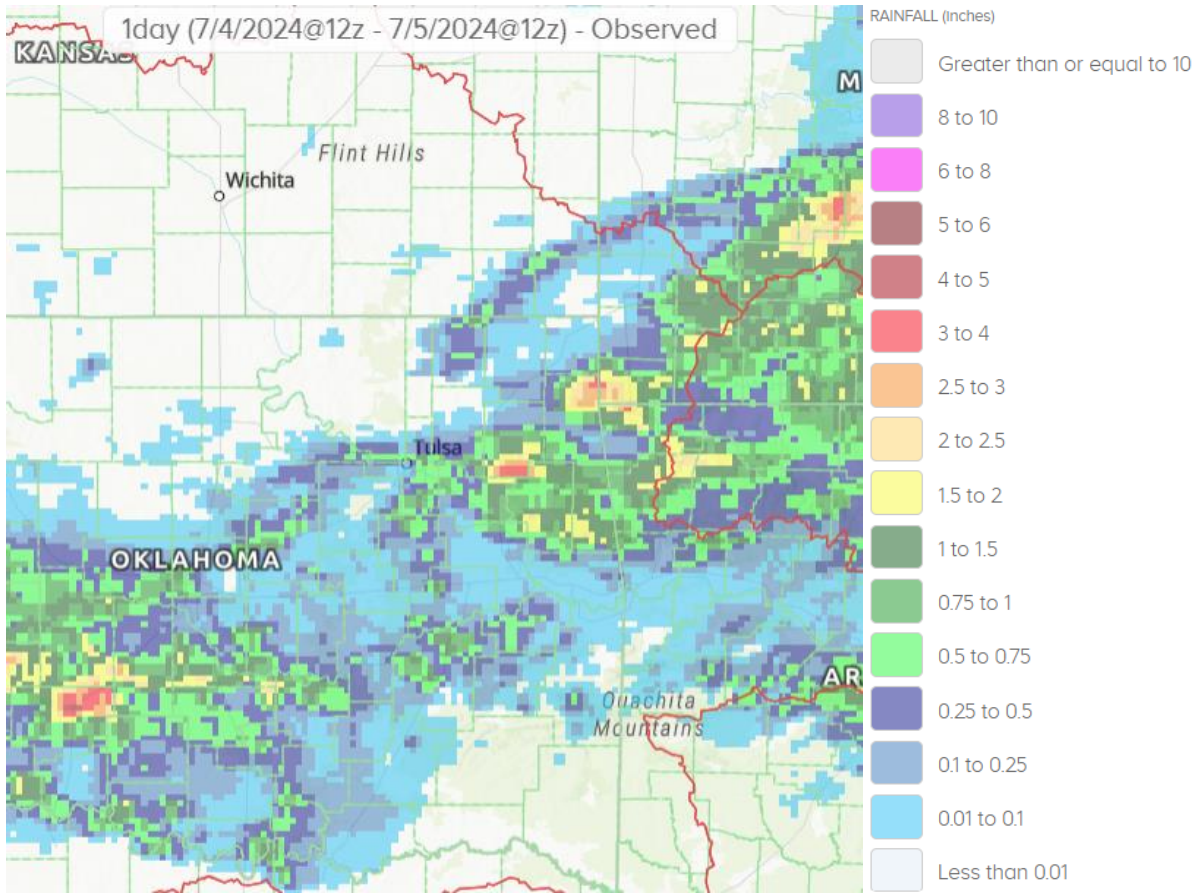


Fig. 4. 24-hour Estimated Observed Rainfall ending at 7am CDT 07/05/2024.

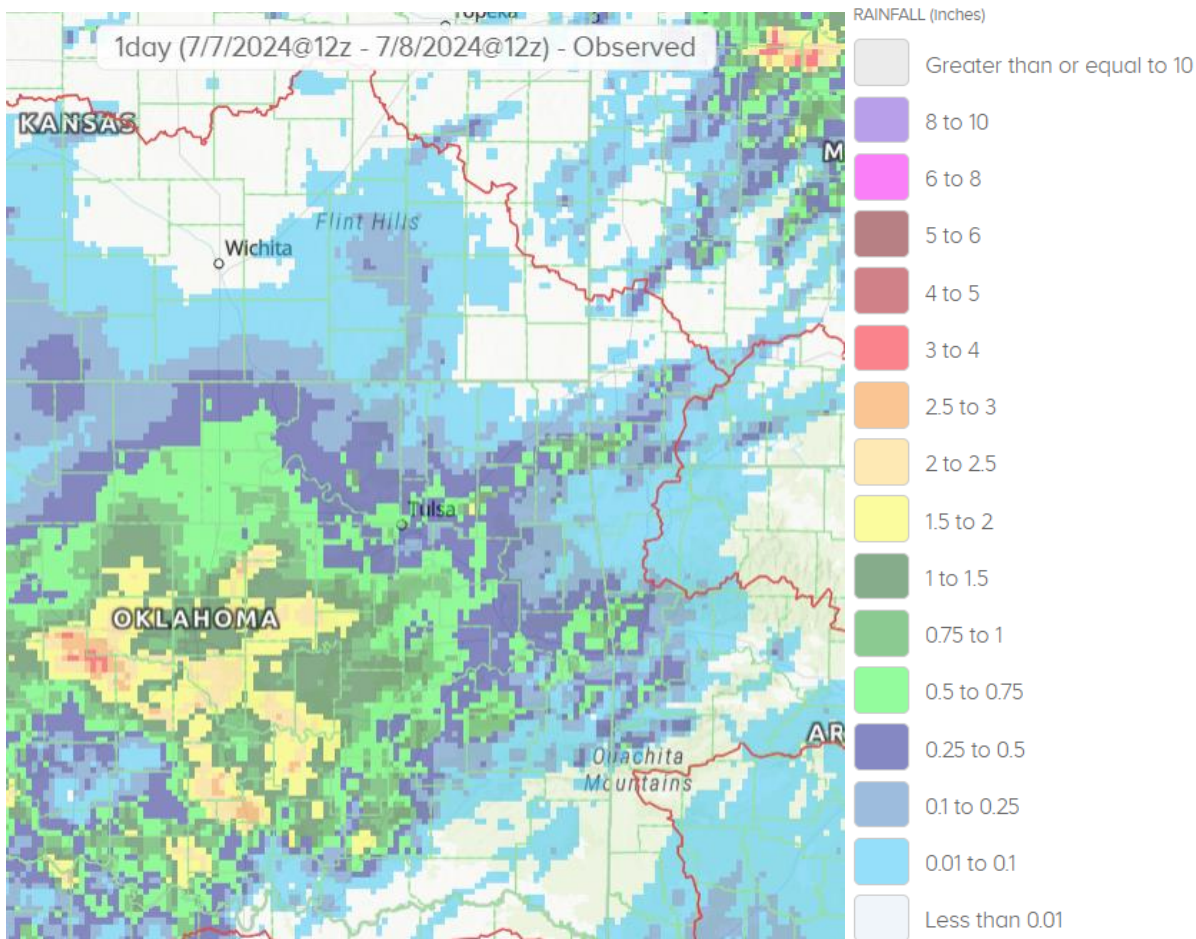
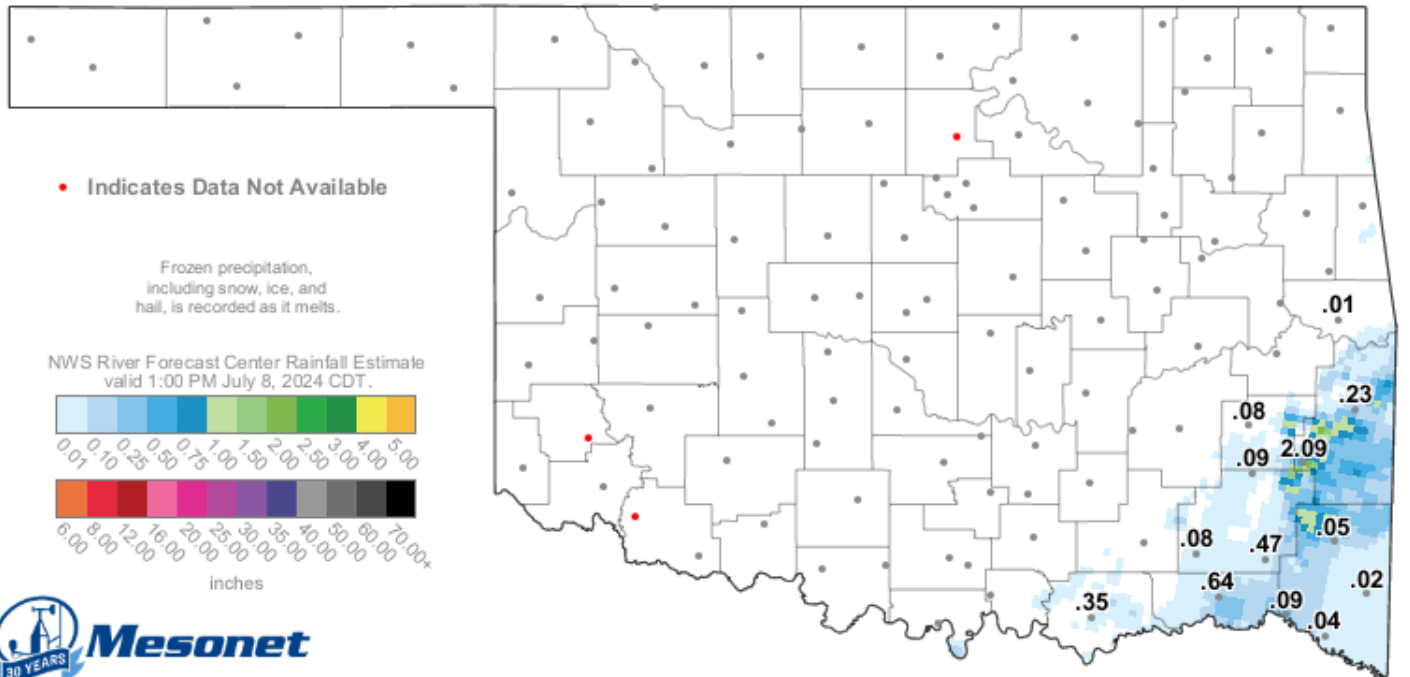


Fig. 5. 24-hour Estimated Observed Rainfall ending at 7am CDT 07/08/2024.

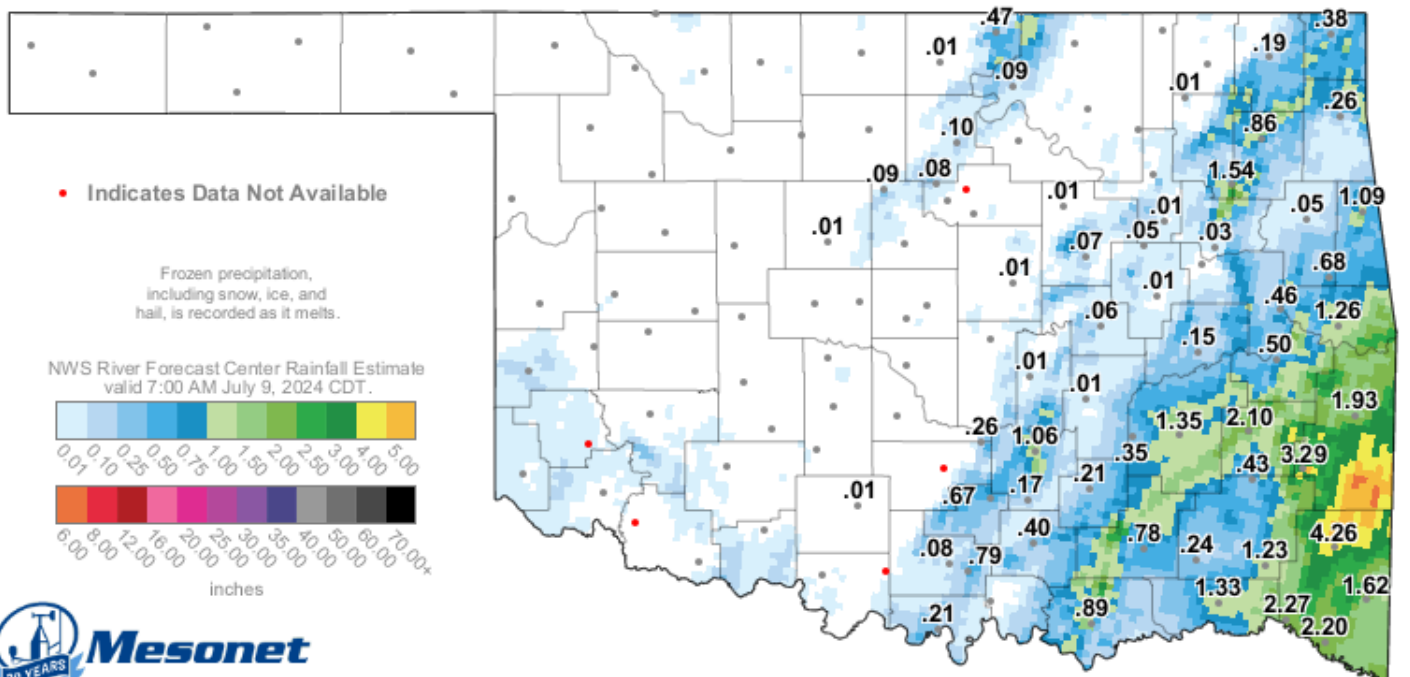


1-Hour Rainfall Accumulation (inches)

1:50 PM July 8, 2024 CDT

Created 1:58:08 PM July 8, 2024 CDT. © Copyright 2024

Fig. 6. OK Mesonet (values) and NWS RFC rainfall estimate (image) 1-hour rainfall ending at 1:50 pm CDT 07/08/2024.



24-Hour Rainfall Accumulation (inches)

8:05 AM July 9, 2024 CDT

Created 8:12:49 AM July 9, 2024 CDT. © Copyright 2024

Fig. 7. OK Mesonet (values) and NWS RFC rainfall estimate (image) 24-hour rainfall ending at 8:05 am CDT 07/09/2024.

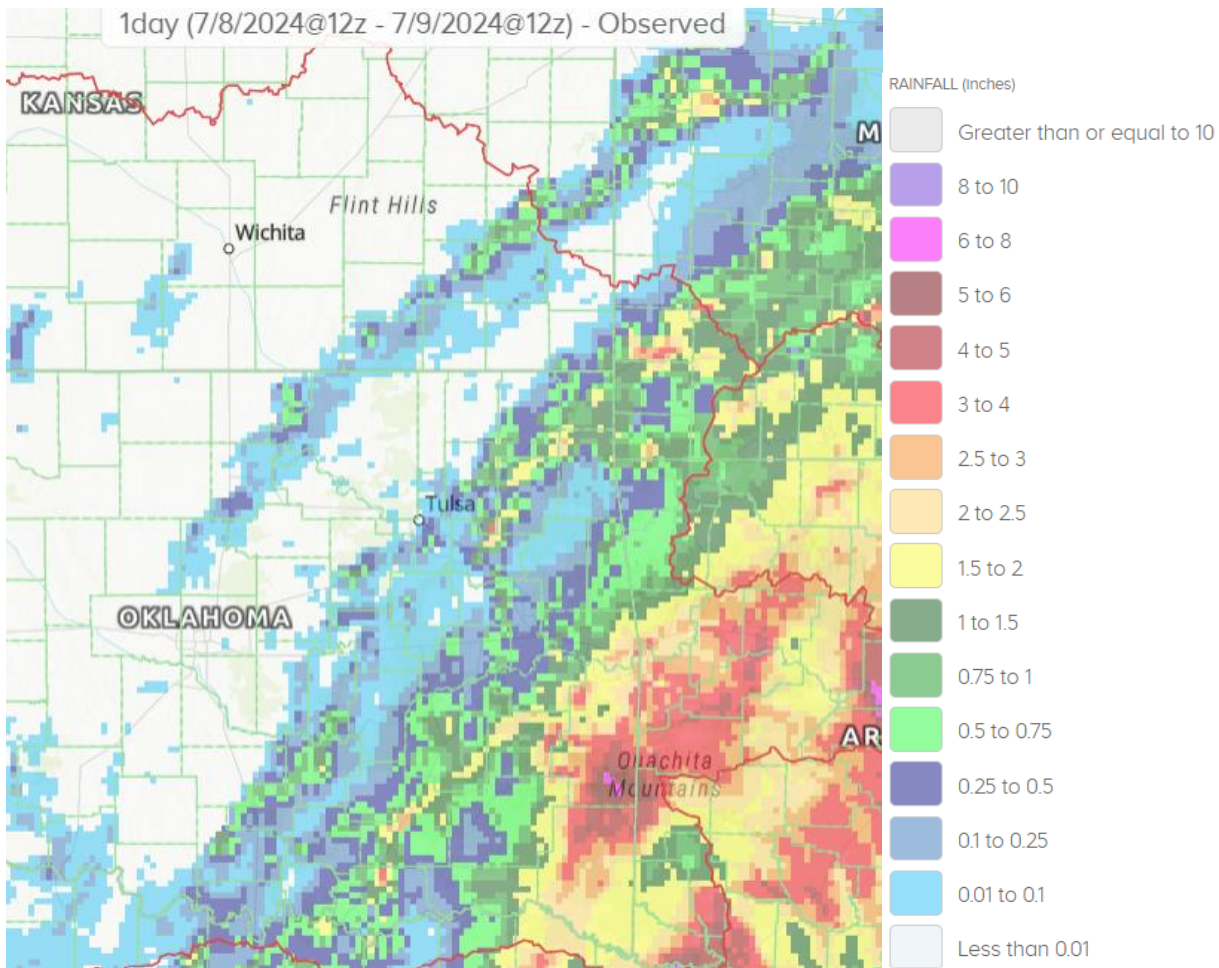


Fig. 8. 24-hour Estimated Observed Rainfall ending at 7am CDT 07/09/2024.

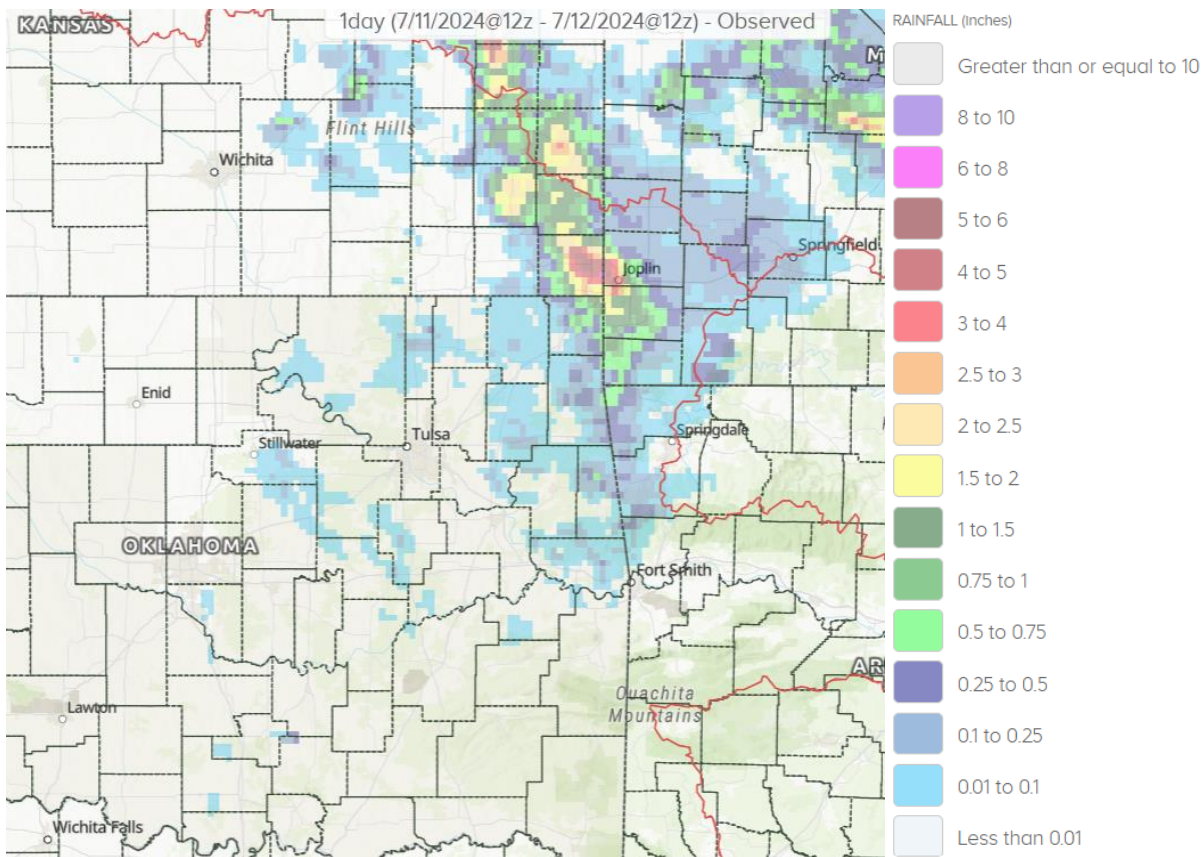


Fig. 9. 24-hour Estimated Observed Rainfall ending at 7am CDT 07/12/2024.

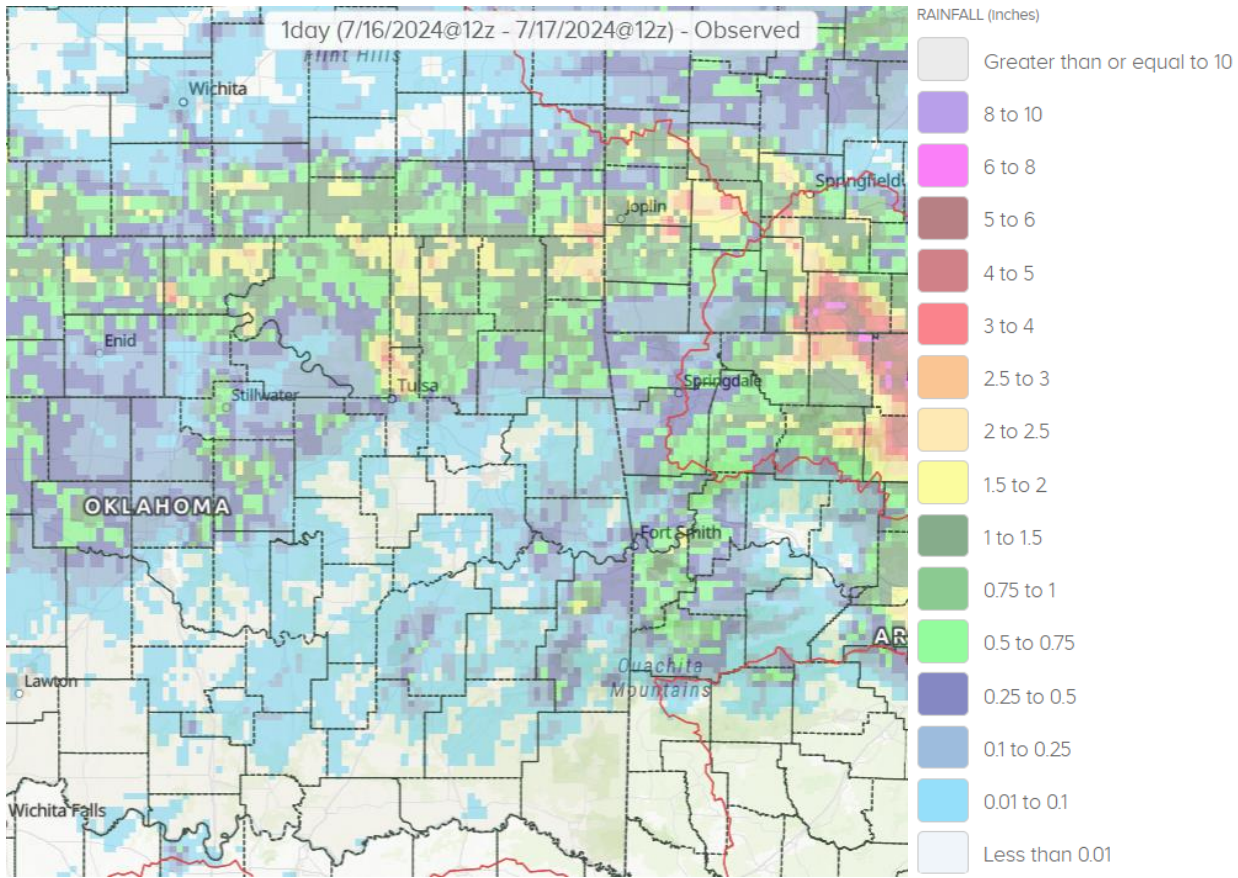


Fig. 10. 24-hour Estimated Observed Rainfall ending at 7am CDT 07/17/2024.

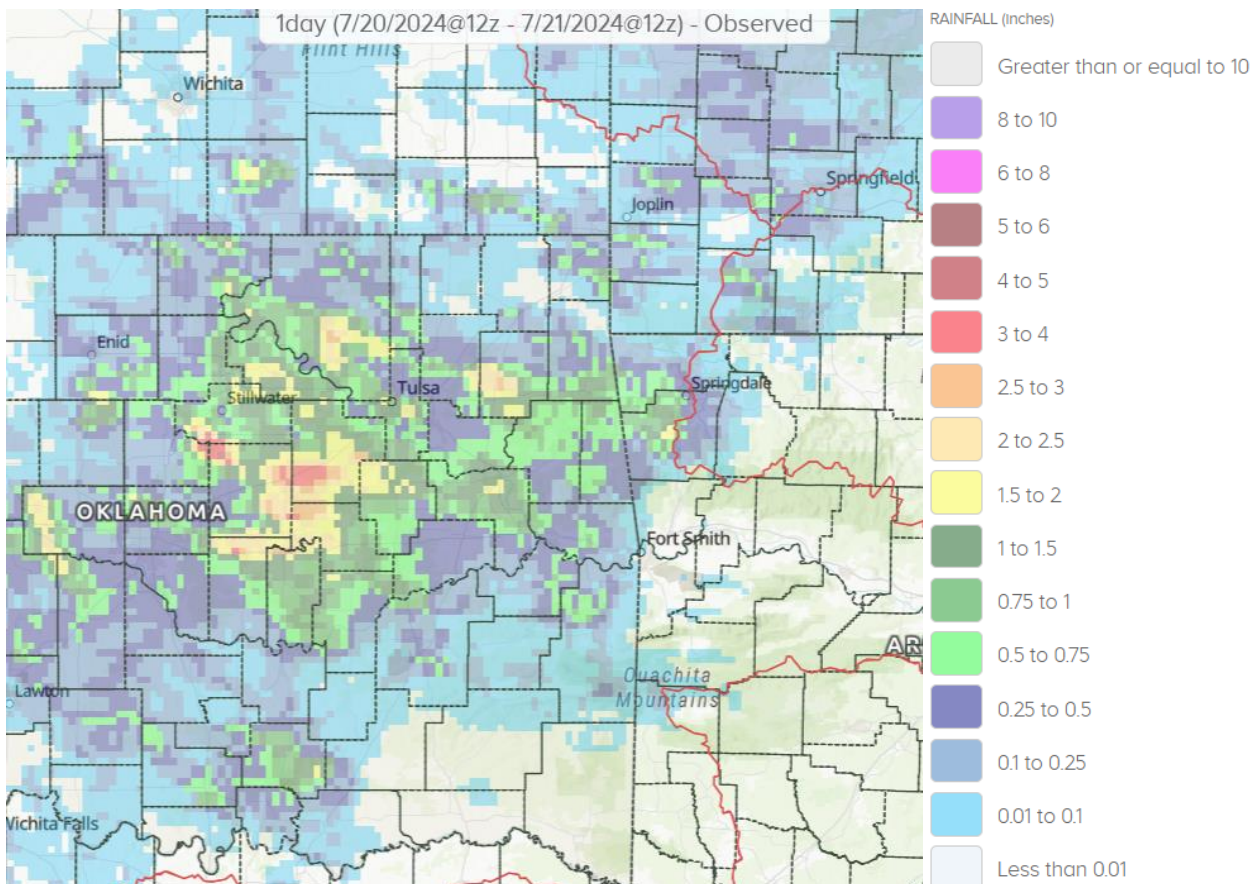


Fig. 11. 24-hour Estimated Observed Rainfall ending at 7am CDT 07/21/2024.

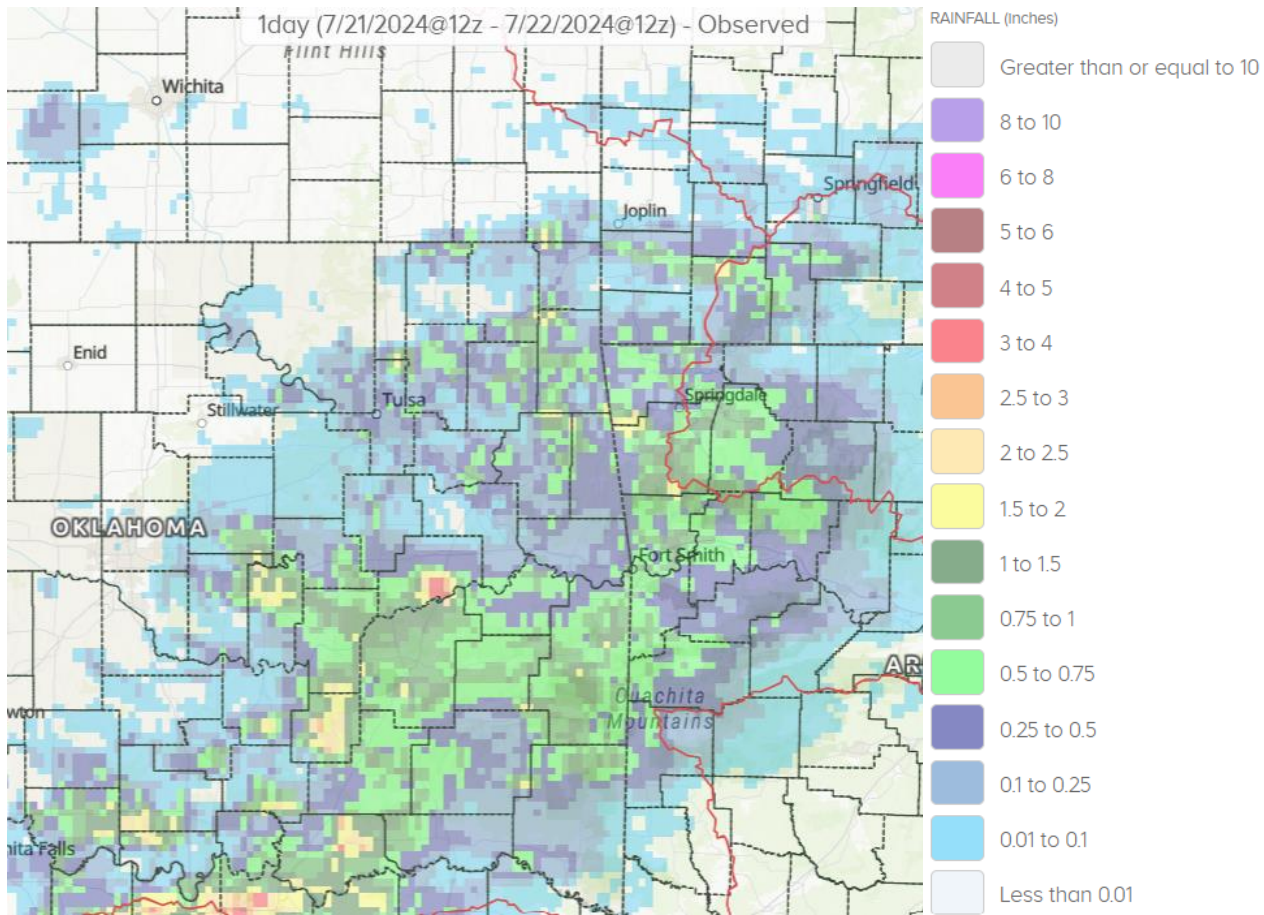


Fig. 12. 24-hour Estimated Observed Rainfall ending at 7am CDT 07/22/2024.

Written by:

Nicole McGavock
 Service Hydrologist
 WFO Tulsa

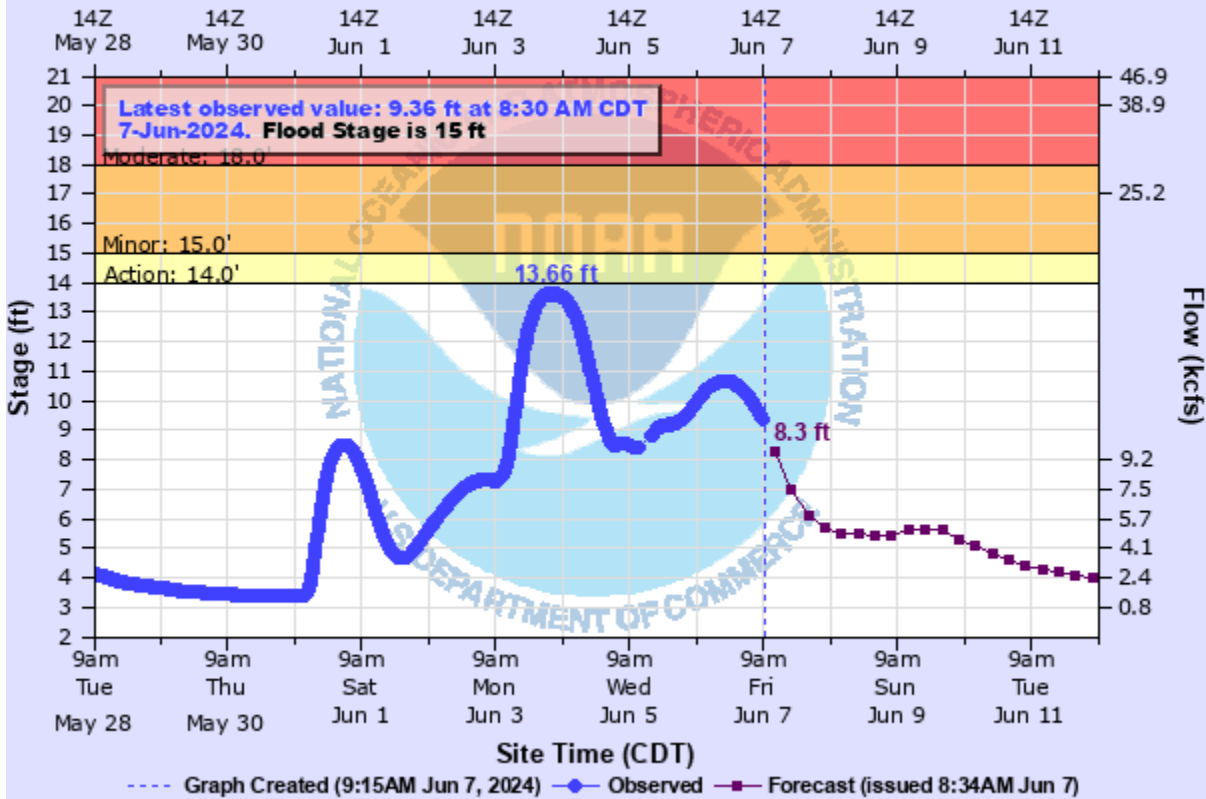
Products issued in July 2024:

- 3 Flash Flood Warnings (FFW)
- 2 Flash Flood Statements (FFS)
- 2 Flash/Areal Flood Watches (FFA) (8 Watch FFA CON/EXT/EXA/EXB/CAN)
- 14 Urban and Small Stream Advisories (FLS)
- 0 Areal Flood Warnings (FLW)
- 0 Areal Flood Statements (FLS)
- 0 River Flood Warnings (FLW) (includes category increases)
- 0 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:

NEOSHO RIVER NEAR COMMERCE

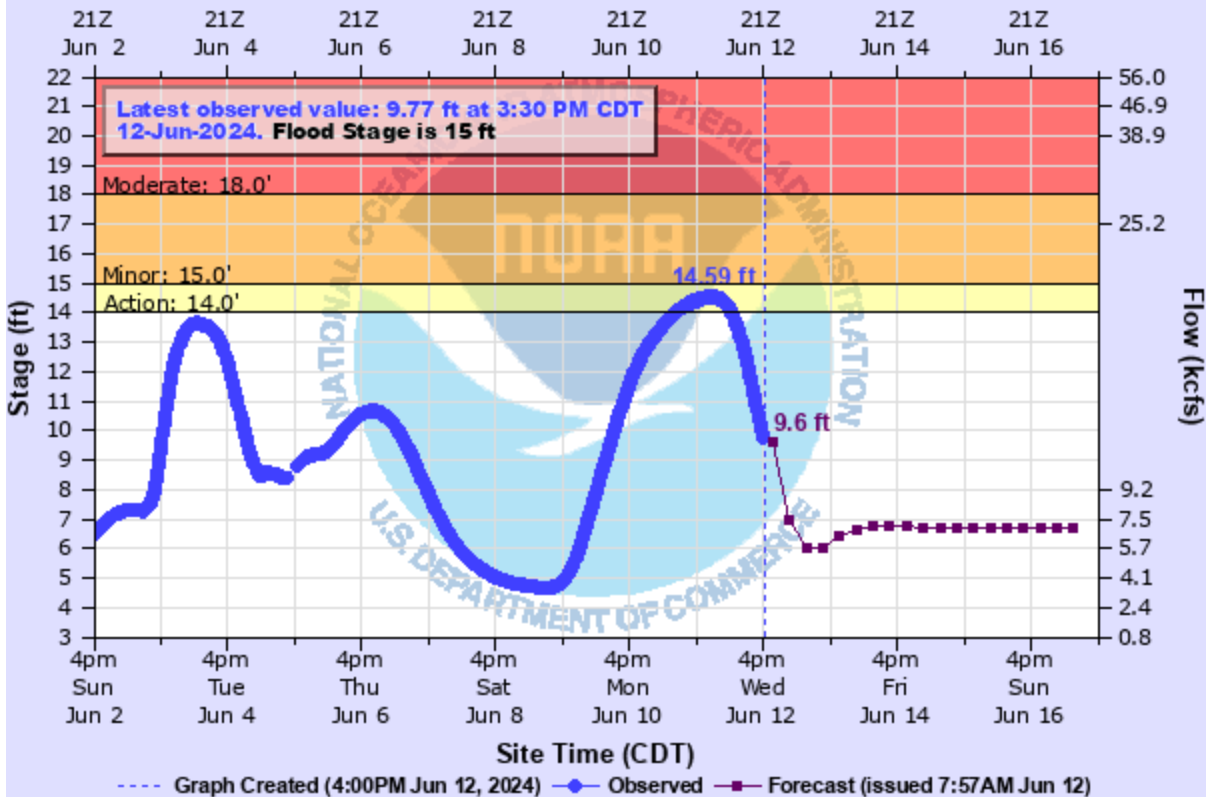
Universal Time (UTC)



COMO2(plotting HGIRG) "Gage 0" Datum: 749.1'

NEOSHO RIVER NEAR COMMERCE

Universal Time (UTC)



COMO2(plotting HGIRG) "Gage 0" Datum: 749.1'