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: **March** YEAR: **2025**
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 **April 15, 2025**

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.**

March 2025 was very warm and dry, with a day of extreme winds and fire. However, one heavy rain event did result in minor river flooding along the Neosho River. Normal precipitation for March ranges from 3.1 inches in Pawnee County to 4.3 inches in Le Flore County. In the Ozark region of northwest Arkansas, the normal precipitation for the month is 4.4 inches. 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 March 2025 ranged from around 1" to 4.5" across eastern OK and northwest AR. These rainfall totals correspond to 25% to 140% of the normal March rainfall, with most of the area receiving 25%-85% of normal for the month (Fig. 1b).

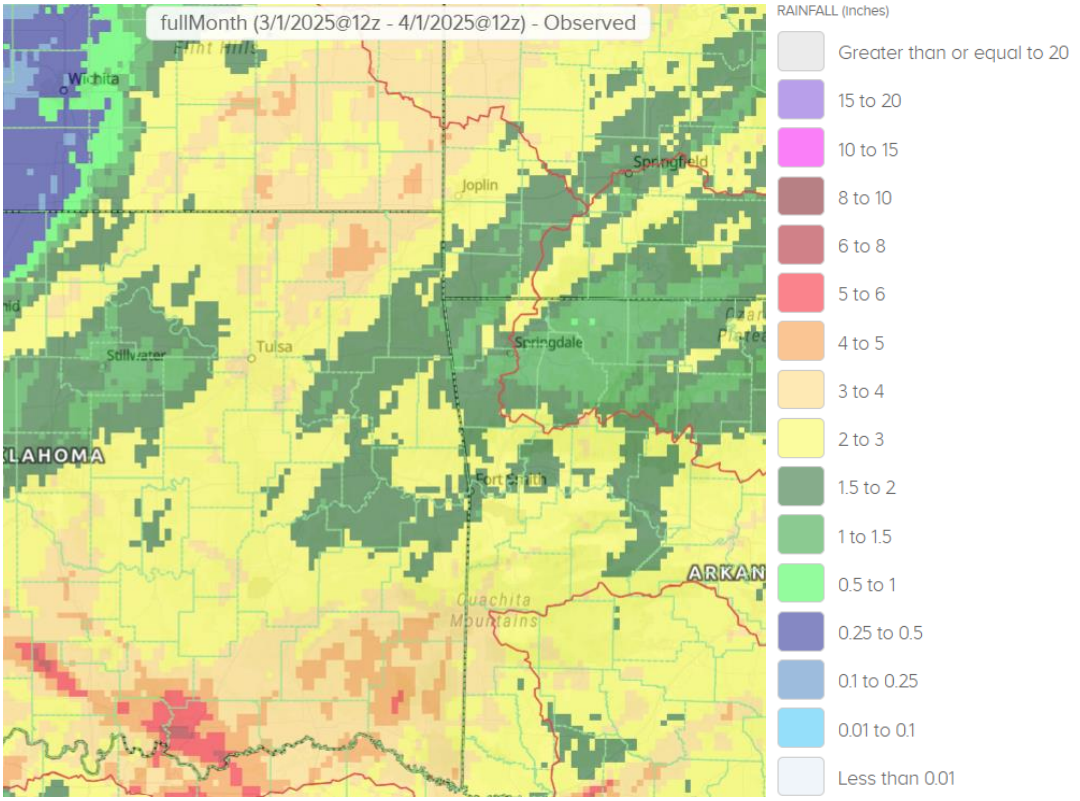


Fig. 1a. Estimated Observed Rainfall for March 2025

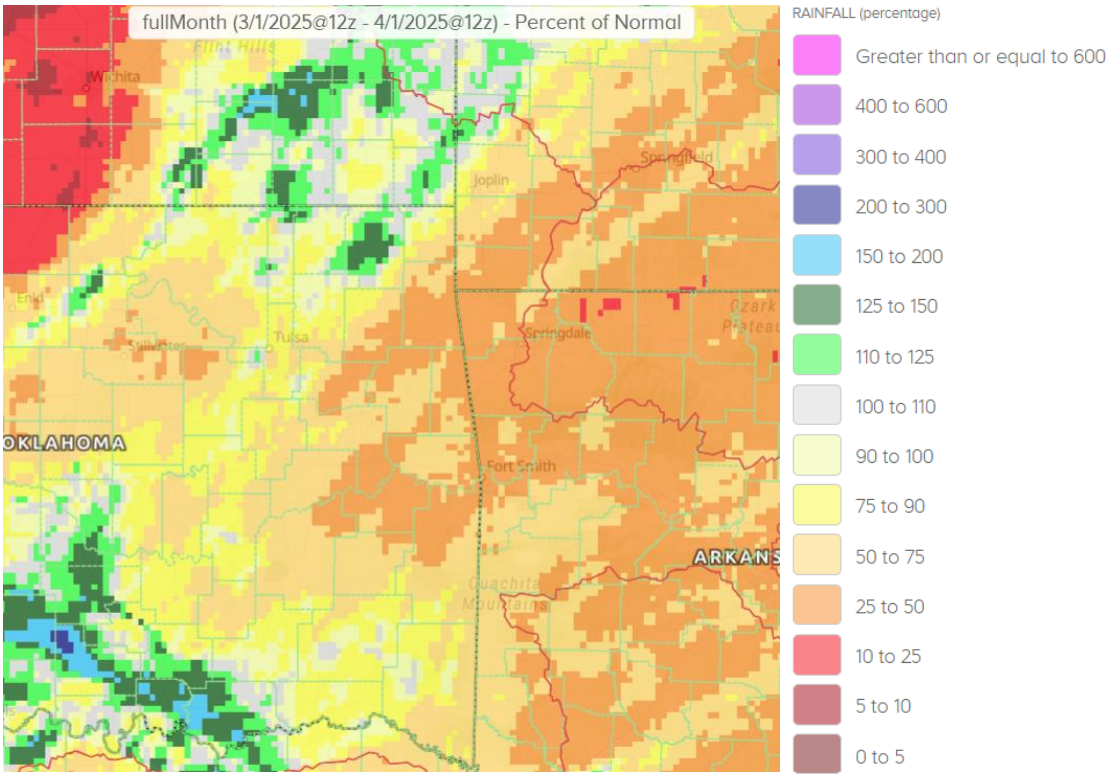


Fig. 1b. Estimated % of Normal Rainfall for March 2025

In Tulsa, OK, March 2025 ranked as the 9th warmest March (57.3°F; since records began in 1905), the 66th wettest March (2.96"; since records began in 1888), and both the 44th least and most snowy March (Trace; tied 39 other years; since records began in 1900). Fort Smith, AR had the 7th warmest March (59.4°F, tied 1908; since records began in 1883) and the 29th driest March (1.70"; since records began in 1883). Fayetteville, AR had the 4th warmest (55.1°F), the 8th driest (1.66"), and both the 27th least and most snowy (Trace, tied 23 other years) March since records began in 1950.

Some of the larger precipitation reports (in inches) for March 2025 included:

Copan, OK (meso)	4.26	Hugo 1.9ENE, OK (coco)	4.22	Vinita, OK (meso)	4.20
Cloudy, OK (meso)	4.06	Antlers 6.3SE, OK (coco)	3.90	Vinita 4.9WNW, OK (coco)	3.86
Claremore 7.5W, OK (coco)	3.78	Hugo, OK (meso)	3.74	Owasso 4.6ENE, OK (coco)	3.57

Some of the lowest precipitation reports (in inches) for March 2025 included:

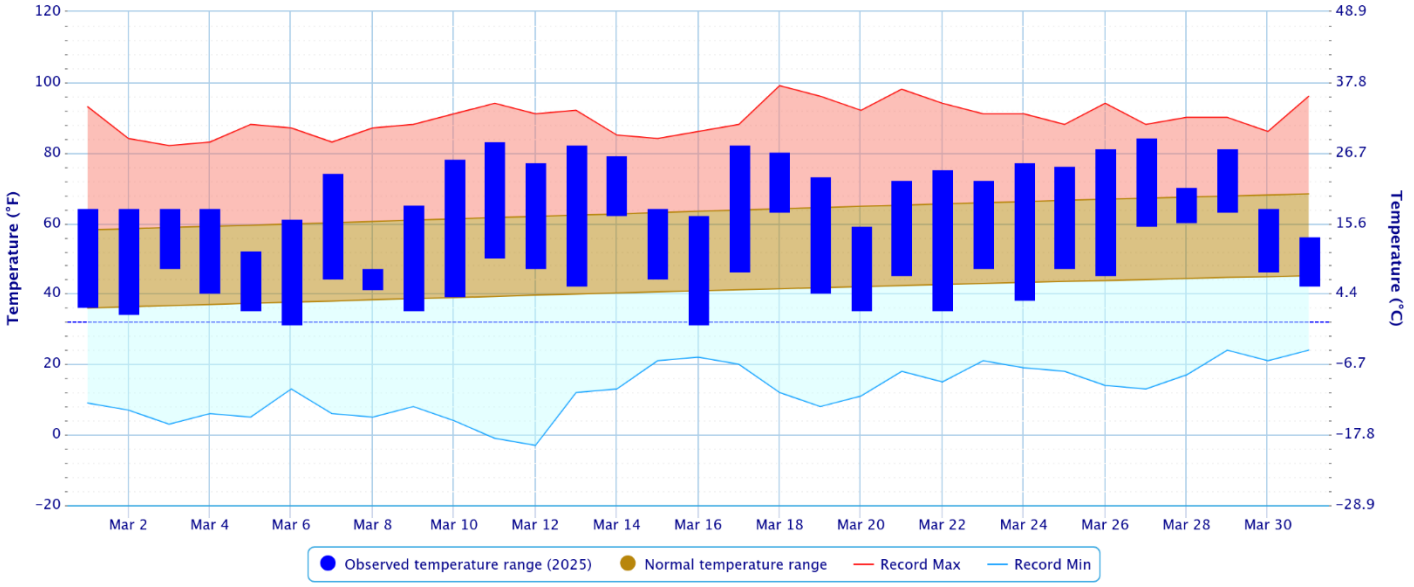
Bella Vista 2.2E, AR (coco)	1.23	Elkins 1.7SE, AR (coco)	1.30	Oilton, OK (meso)	1.34
Tulsa 12.2SE, OK (coco)	1.41	Gentry 5.6ENE, AR (coco)	1.42	Drumright 0.6SW, OK (coco)	1.45
Centerton 1.0E, AR (coco)	1.45	Porter, OK (meso)	1.46	Springdale 6.4WSW, AR (coco)	1.47

According to statistics from the Oklahoma Climatological Survey (OCS) Mesonet:

Rank since 1921	March 2025	Last 60 Days (Jan 31 – Mar 31)	Water Year-to-Date (Oct 1, 2024 – Mar 31, 2025)	Last 120 Days (Dec 2 – Mar 31)	Year-to-Date (Jan 1 – Mar 31)	Last 365 Days (Apr 1, 2024 – Mar 31, 2025)
Northeast OK	47th driest	28th driest	34th wettest	14th driest	26th driest	52nd wettest
East Central OK	27th driest	21st driest	44th wettest	31st driest	21st driest	36th wettest
Southeast OK	37rd driest	25th driest	42nd wettest	34th wettest	46th driest	52nd wettest
Statewide	37th driest	19th driest	35th wettest	21st driest	21st driest	49th wettest

Daily Temperature Data – Tulsa Area, OK (ThreadEx)

Period of Record – 1905-01-06 to 2025-04-07. Normals period: 1991-2020. Click and drag to zoom chart.



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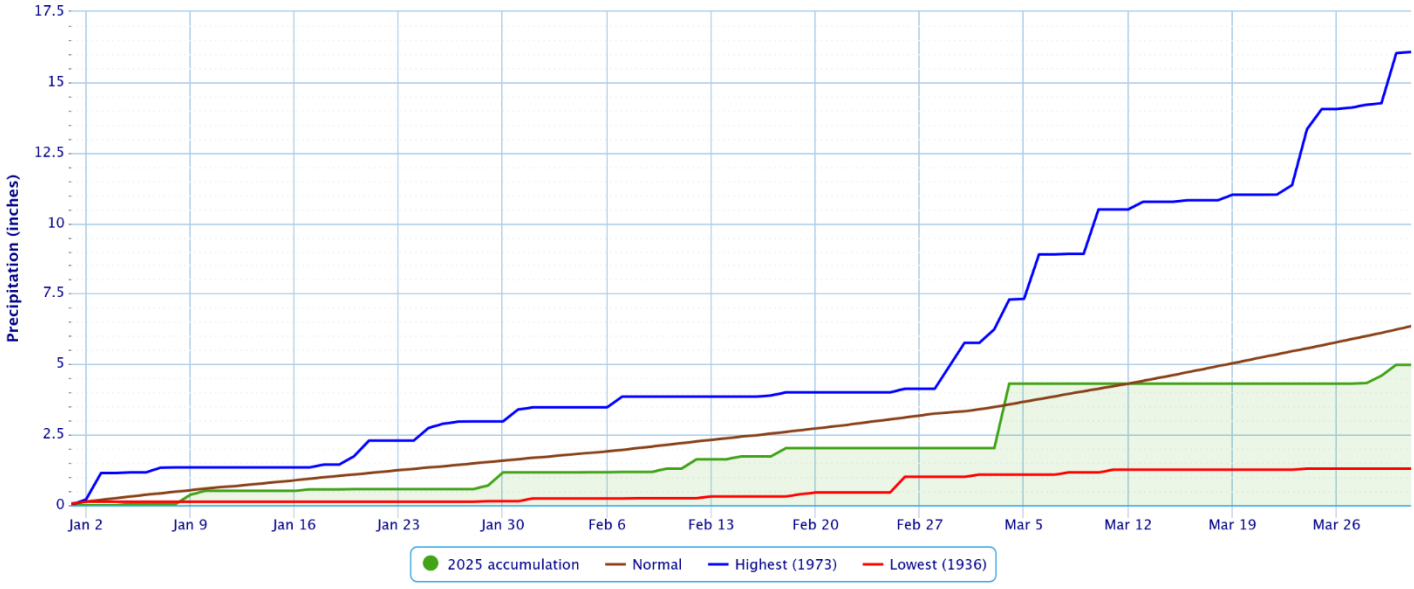
Accumulated Precipitation – Tulsa Area, OK (ThreadEx)

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



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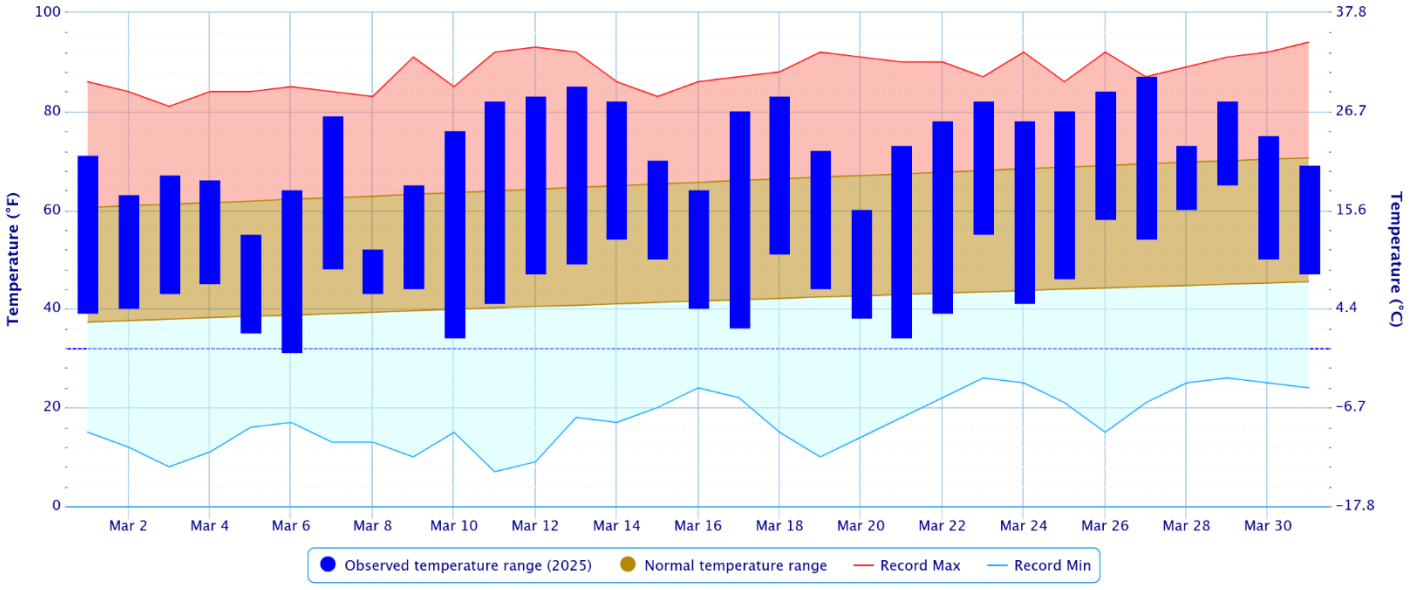
Daily Temperature Data – Fort Smith Area, AR (ThreadEx)

Period of Record – 1882-06-01 to 2025-04-07. Normals period: 1991-2020. Click and drag to zoom chart.



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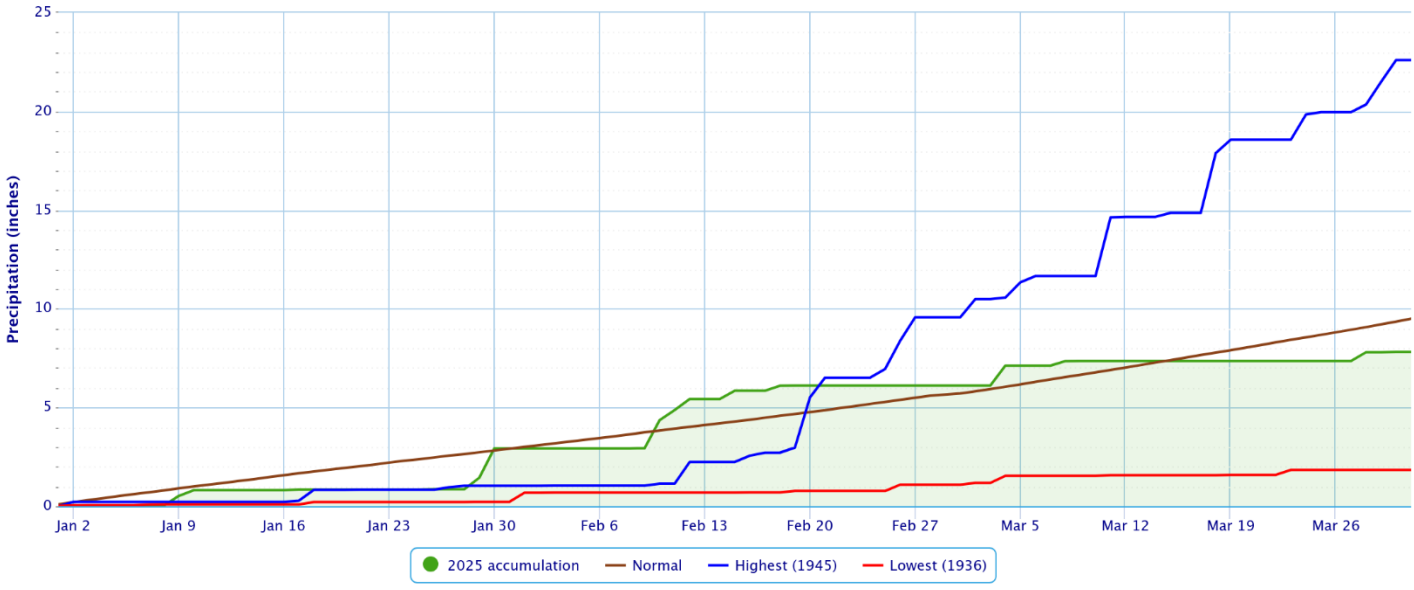
Accumulated Precipitation – Fort Smith Area, AR (ThreadEx)

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



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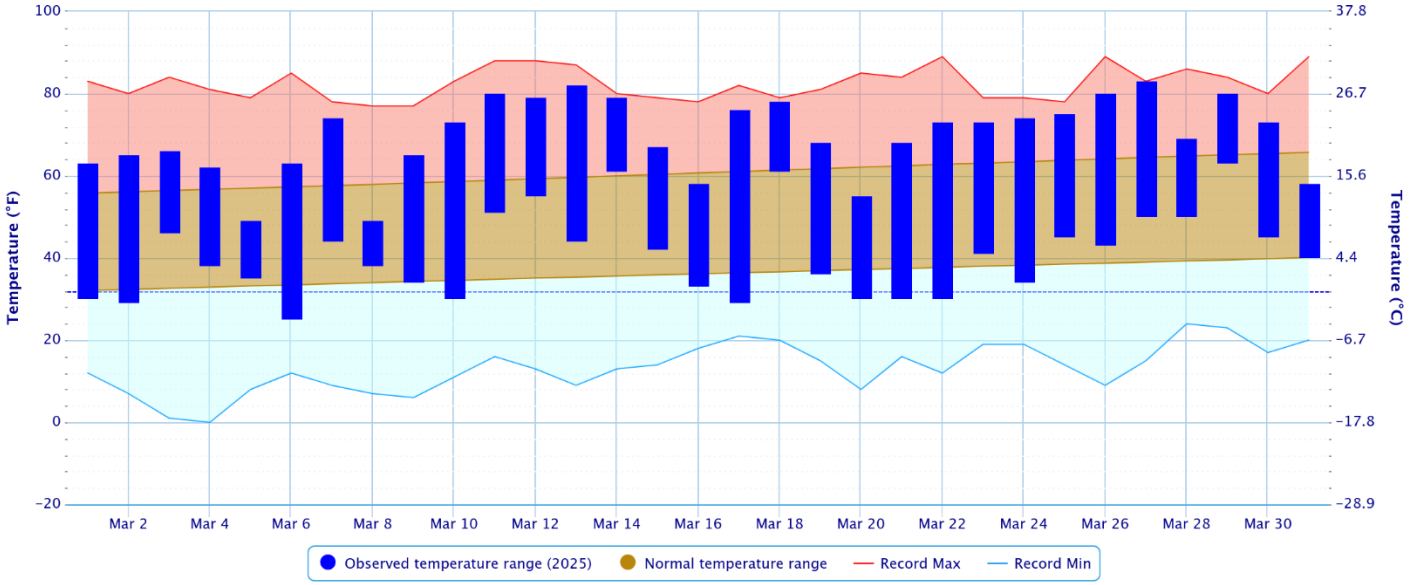
Daily Temperature Data – FAYETTEVILLE DRAKE FIELD, AR

Period of Record – 1949-07-14 to 2025-04-07. Normals period: 1991-2020. Click and drag to zoom chart.



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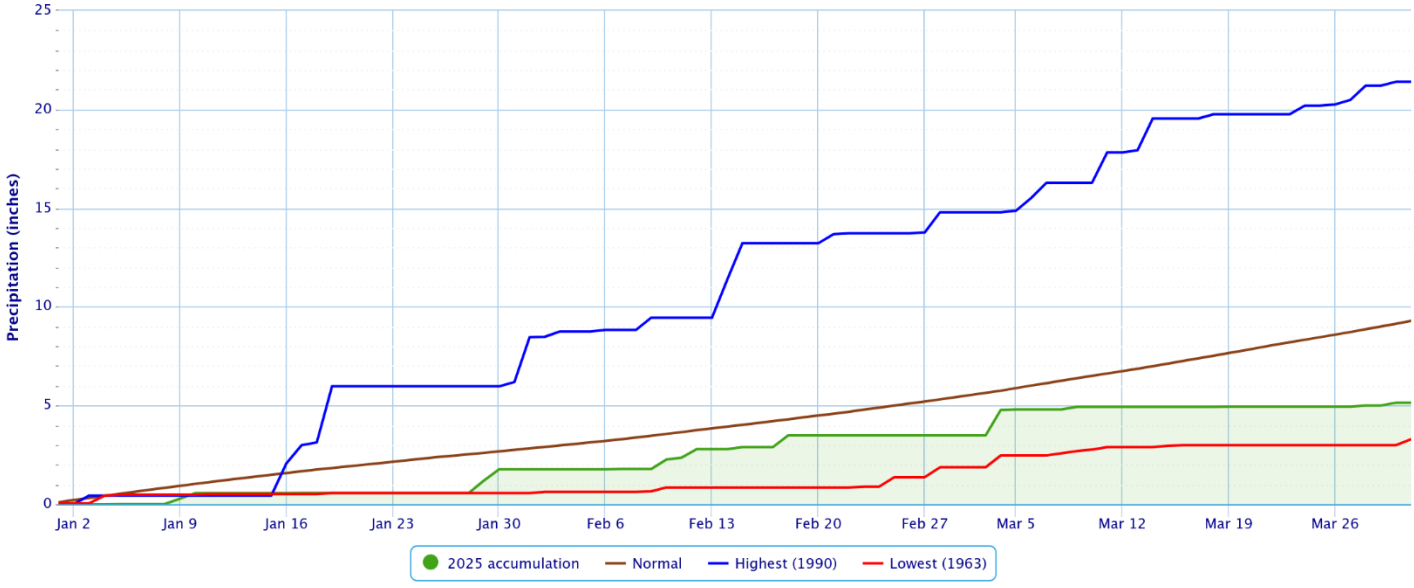
Accumulated Precipitation – FAYETTEVILLE DRAKE FIELD, AR

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



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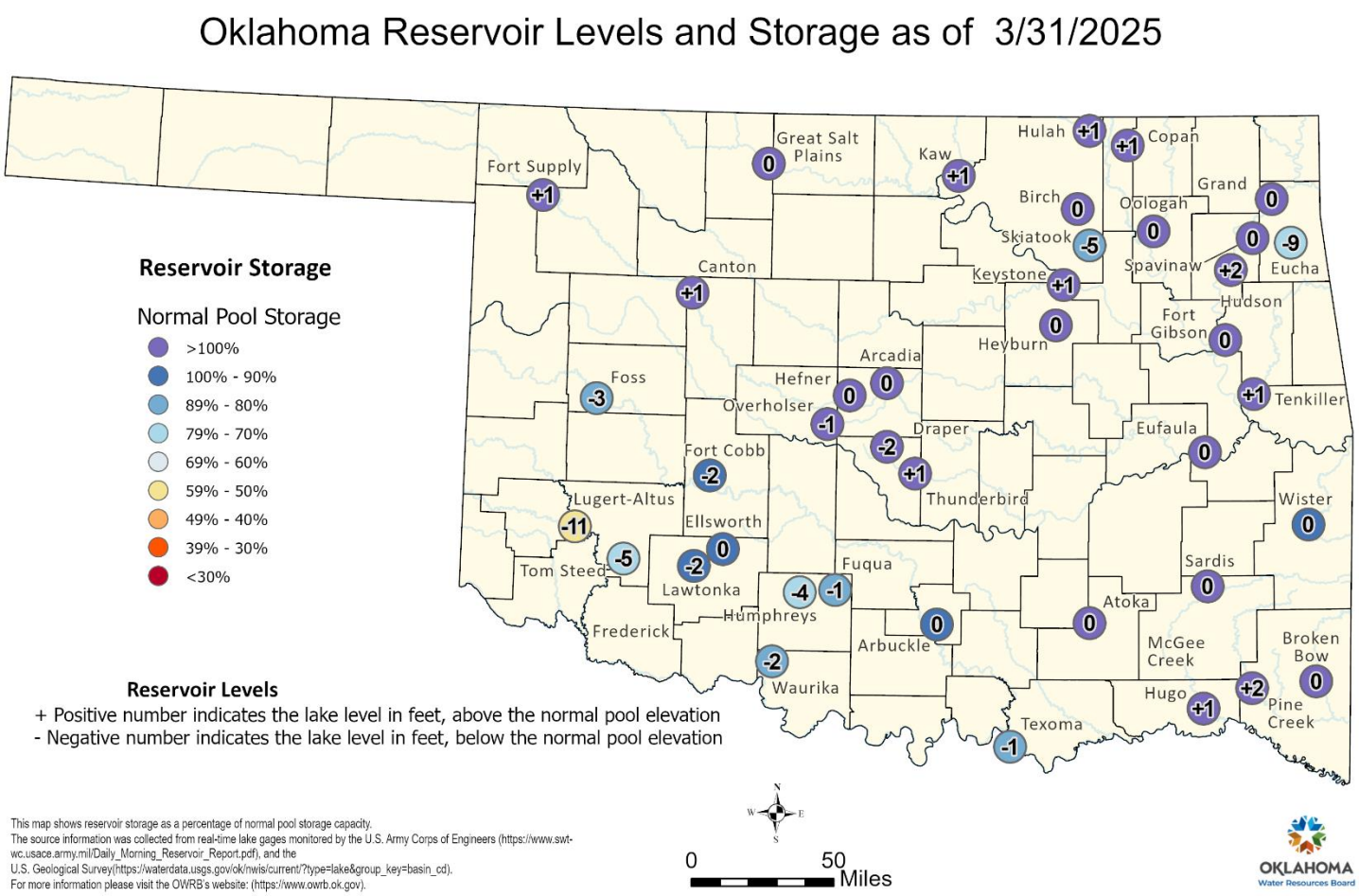
Reservoirs



According to the USACE, a couple of lakes in the HSA were above 3% of top of their conservation pools as of 3/31/2025: Hudson Lake 11% and Tenkiller Lake 3%. A couple of lakes were more than 3% below the top of their conservation pools: Skiatook Lake 86% and Wister Lake 94%.

Drought

According to the U.S. Drought Monitor (USDM) from April 1, 2025 (Figs. 2, 3), Severe (D2) Drought was present in eastern Kay, Delaware, and Adair Counties in eastern OK, and Benton County in northwest AR. Moderate (D1) drought conditions were occurring across portions of Osage, Pawnee, eastern Kay, Creek, Wagoner, Mayes, Cherokee, Adair, and Delaware Counties in eastern OK, and Benton, Washington, Madison, and Carroll Counties in northwest AR. Abnormally Dry (D0) but not in drought conditions was present in parts of Osage, Creek, Tulsa, Okmulgee, Okfuskee, Washington, Nowata, Craig, Rogers, Mayes, Ottawa, Delaware, Adair, Cherokee, Wagoner, Muskogee, McIntosh, and Sequoyah Counties in eastern OK, and Washington, Madison, and Carroll Counties in northwest AR.

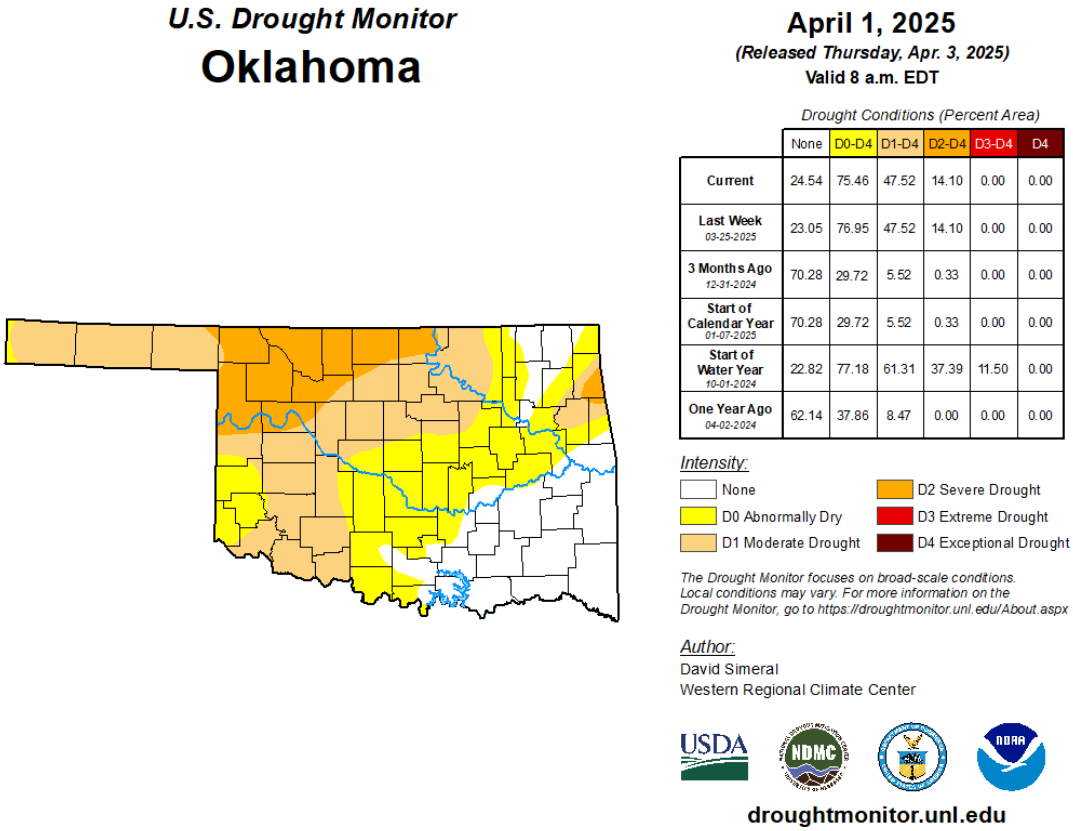


Fig. 2. Drought Monitor for Oklahoma

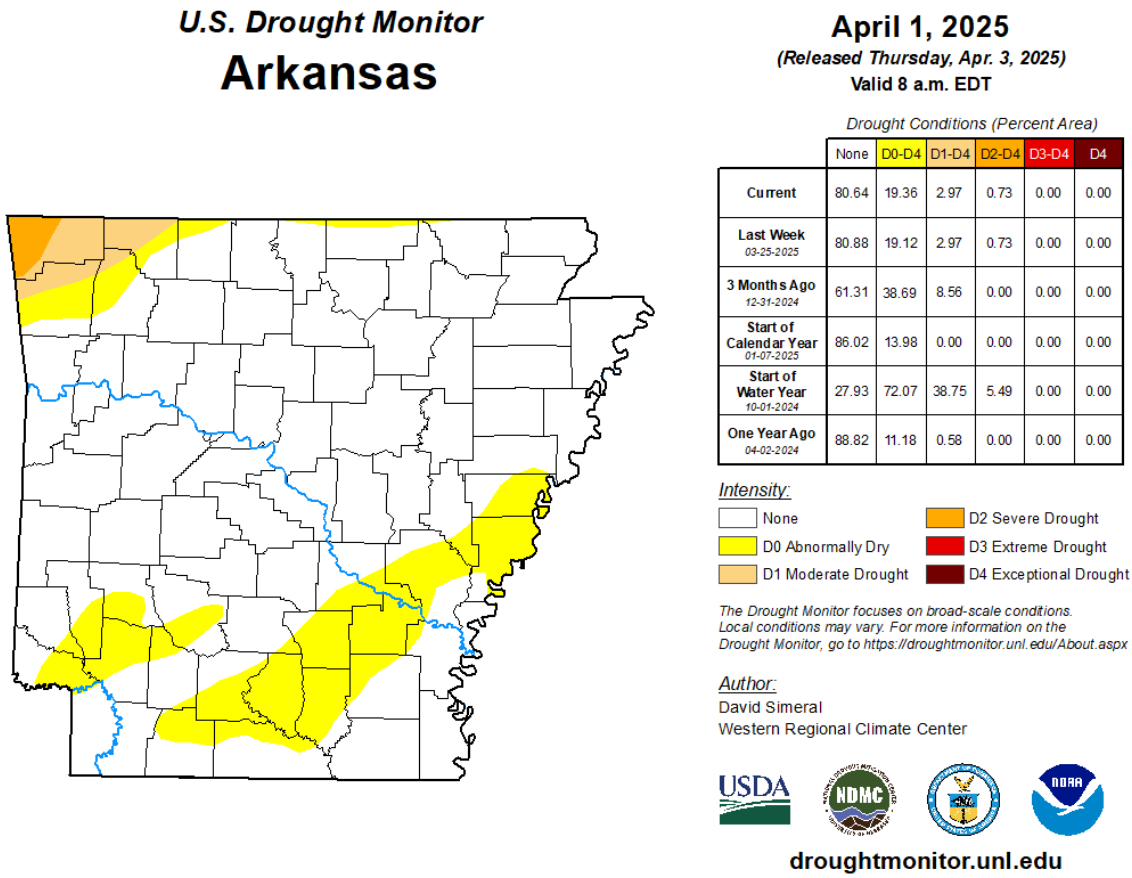


Fig. 3. Drought Monitor for Arkansas

Outlooks

The Climate Prediction Center (CPC) outlook for April 2025 (issued March 31, 2025) indicates an enhanced chance for above normal temperatures south of I-40 and equal chances of above, near, and below normal temperatures north of I-40 in eastern OK and northwest AR. This outlook also calls for an enhanced chance for above 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. The precipitation forecast is based primarily on the heavy rain forecast for the first week of April. The expected rainfall could be near or exceed the monthly average rainfall for April. The odds favor below median rainfall the second week of April.

For the 3-month period April-May-June 2025, CPC is forecasting an enhanced chance for above normal temperatures across all of eastern OK and northwest AR (outlook issued March 20, 2025). This outlook also calls for an equal chance for above, near, and below median precipitation for northwest AR, and an enhanced chance for below median precipitation for eastern OK. This outlook is based on long-term trends, ENSO state, and incorporates a suite of statistical and dynamical forecast tools. Some consideration was also given to an active Madden-Julian Oscillation (MJO) and recent Sudden Stratospheric Warming (SSW) event that occurred March 9-10. According to CPC, "ENSO-neutral is favored to develop in the next month and persist through the Northern Hemisphere summer (62% chance in June-August 2025)." La Niña conditions continued to weaken, but remain present. CPC continues the La Niña Advisory.

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

Just after midnight of the 4th, a line of showers and thunderstorms that stretched north to south across OK moved east into northeast OK. The airmass ahead of this line was moist and unstable, with very strong low-level wind shear. The line continued to progress across all of eastern OK through the early morning hours and crossed into western AR around sunrise. During this time, 6 QLCS tornadoes (4 EF-1, 2 EF-0, see https://arcg.is/1D1zrC0 for details) developed as the squall line moved across Okmulgee and McIntosh Counties. The line of storms then moved east of the region by early afternoon. Widely scattered wrap around showers and thunderstorms continued across eastern OK and northwest AR during the afternoon and evening hours as the main upper-level low passed over the region. As colder air moved in behind the front, some areas of far northeast OK and far northwest AR had light snow early on the 5th. Rainfall totals ranged from 0.75" to 4" across eastern OK and northwest AR (Figs. 4-6). The highest rainfall totals occurred over northeast OK and southeast KS, resulting in minor river flooding along the Neosho River near Commerce (see E3 and preliminary hydrographs at the end of this report).

On the morning of the 14th, an intense upper-level storm system was moving east-northeast over the OK-TX panhandles, and the associated surface low, near 980 mb, was tracking east into KS. A dryline extended from the surface low, which made steady progress east across OK. By noon, the dryline entered eastern OK and then continued to push east. Behind the dryline, a hot and very dry airmass (relative humidity values of 15%-20% in eastern OK; 20%-30% in northwest AR) moved into the region and very strong winds were mixed down to the surface. All of this resulted in extreme to historic fire spread rates and a large swath of 50-70 mph non-thunderstorm wind gusts across OK (Fig. 7). Wind gusts of 40-68 mph impacted most of eastern OK and northwest AR. According to Oklahoma State Climatologist Gary McManus in his Mesonet Ticker post from March 24, 2025: "We had one of the windiest days in Mesonet history on Friday the 14th, when 99 of our sites had a wind gust of at least 50 mph, topping the old record of 83 sites back on March 31, 2023 (Fig. 7). And 63 sites had a "severe" wind gust (NWS defined, greater than or equal to 57.4 mph), topping the old record of May 27, 2021's 49 stations. And of course those winds fueled the worst Firestorm in memory across Oklahoma that day with what I can tell was about 170,000 acres burned, with at least 400 homes damaged or destroyed by the fires, 4 lives lost, and over 200 injuries. And a dust storm that brought many people back to the Dust Bowl, whether they liked it or not." A few days later on the 19th, widespread wind gusts of 40-50 mph behind a cold front passage affected eastern OK and northwest AR (Fig. 8).

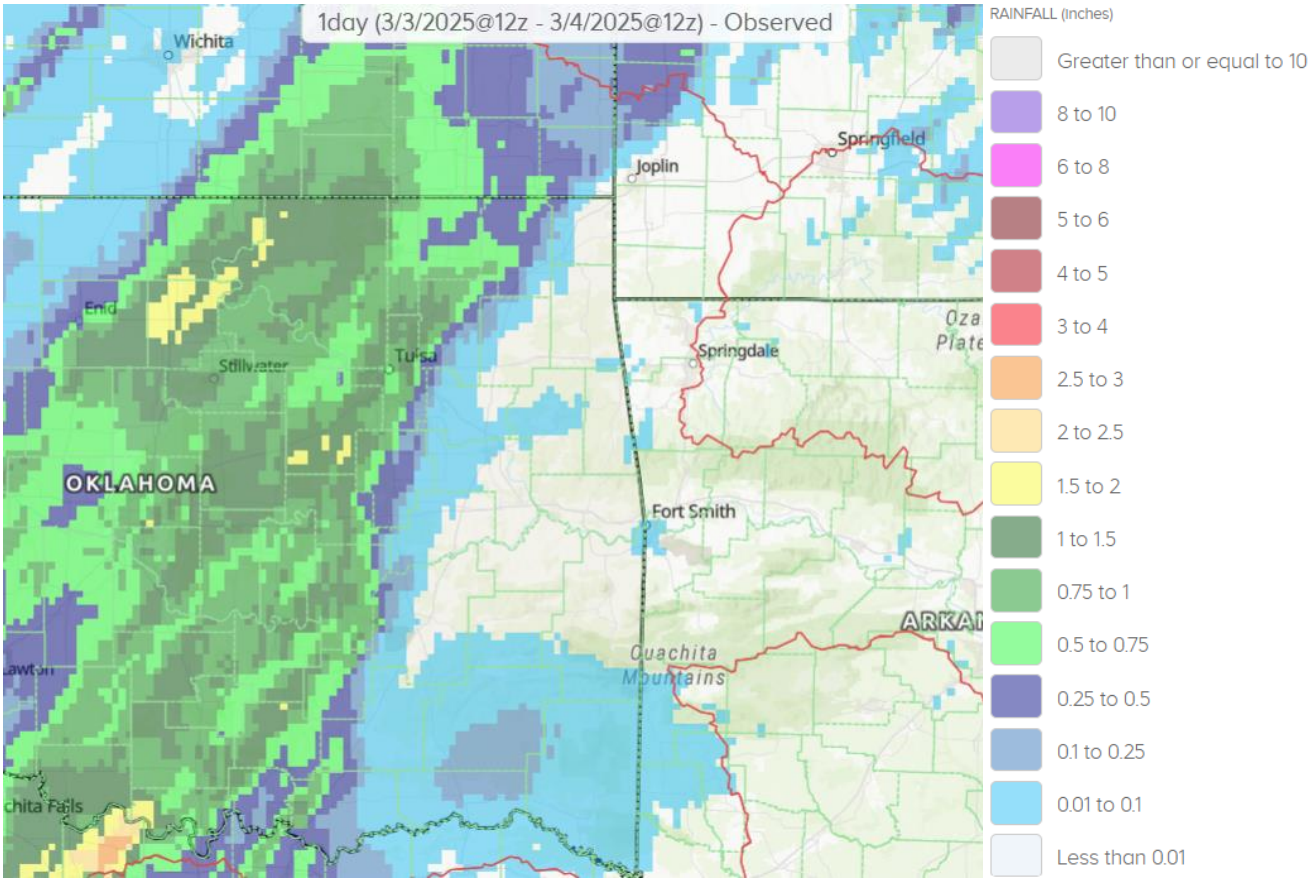


Fig. 4. 24-hour Estimated Observed Rainfall ending at 6am CST 3/04/2025.

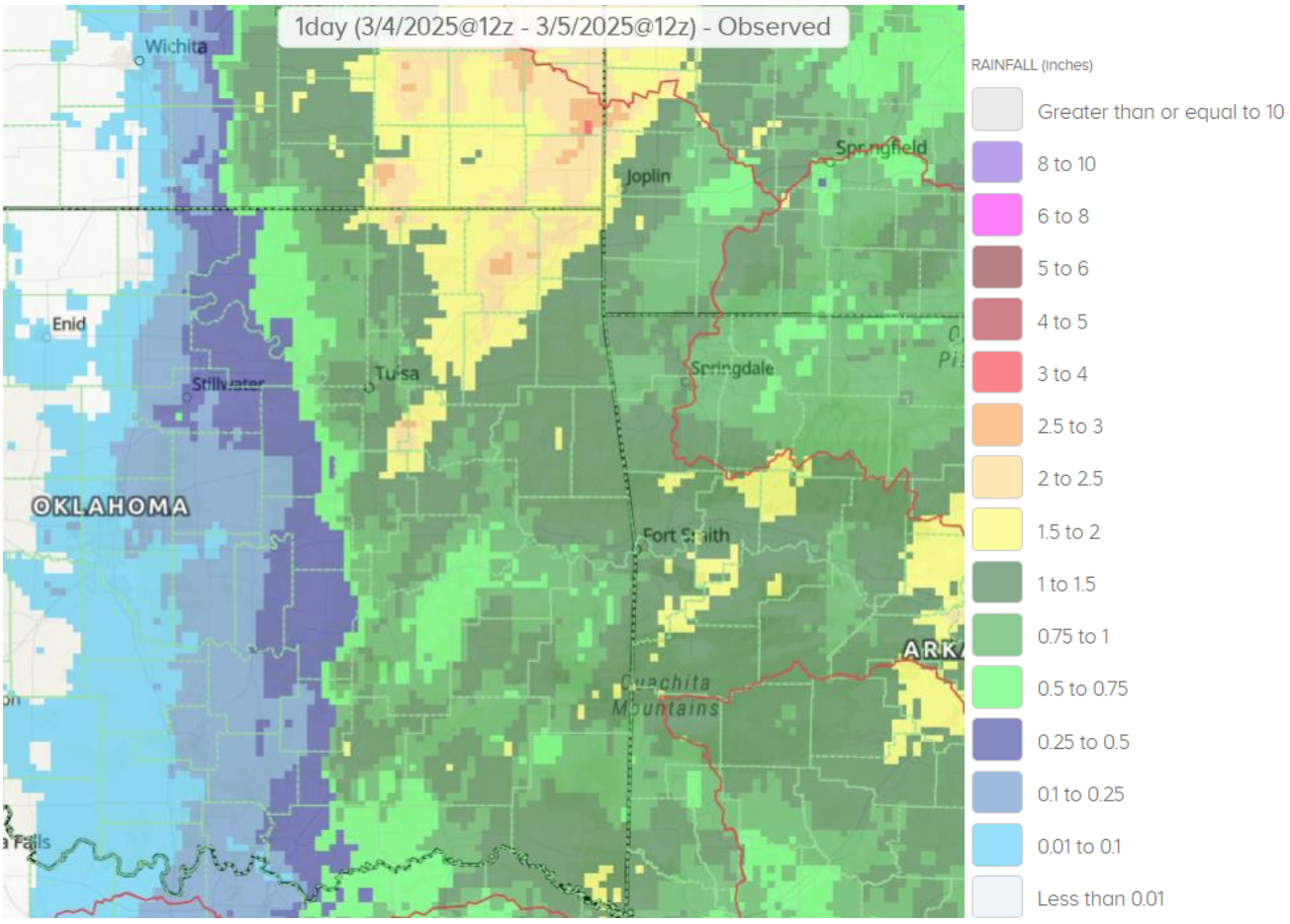


Fig. 5. 24-hour Estimated Observed Rainfall ending at 6am CST 3/05/2025.

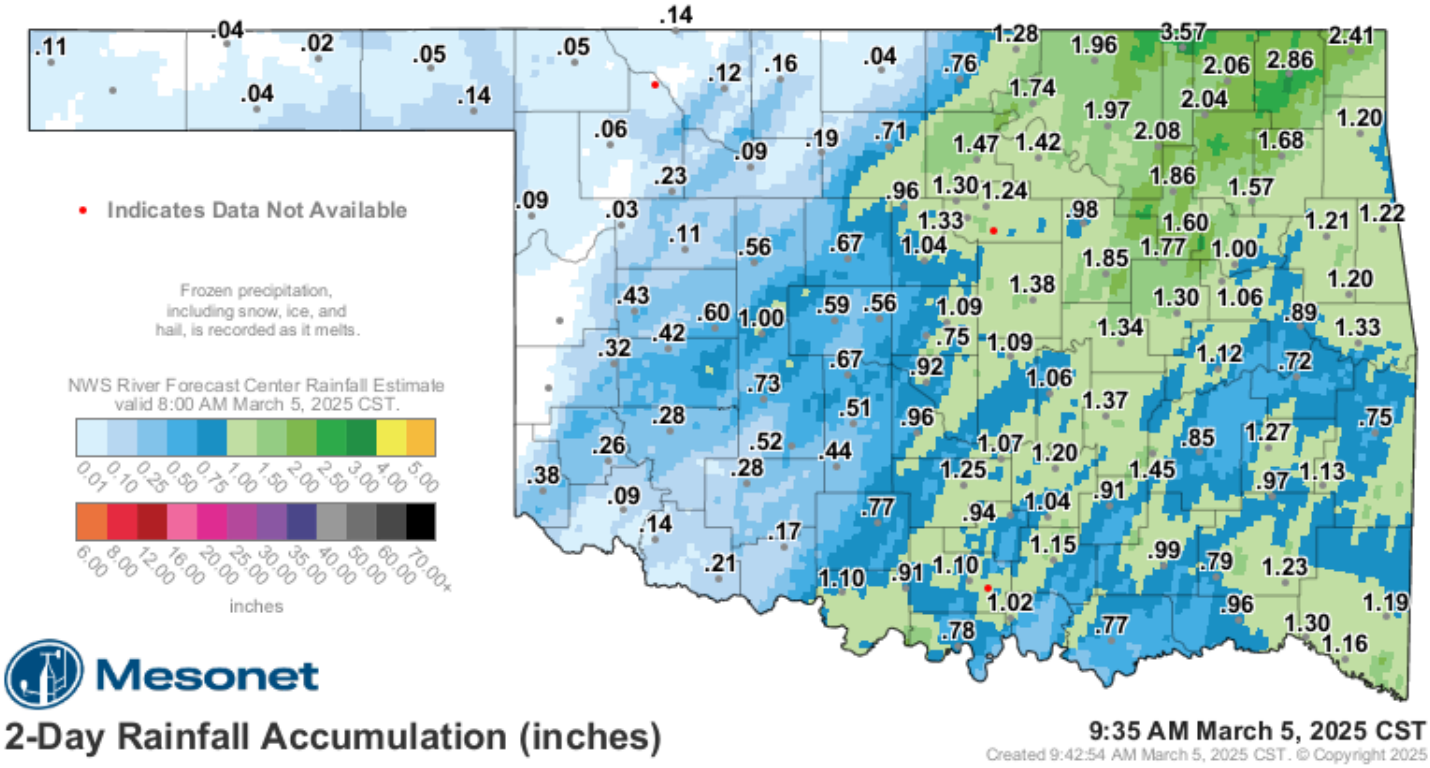


Fig. 6. OK Mesonet (values) and NWS RFC rainfall estimate (image) 48-hour rainfall ending at 9:35 am CST 3/05/2025.

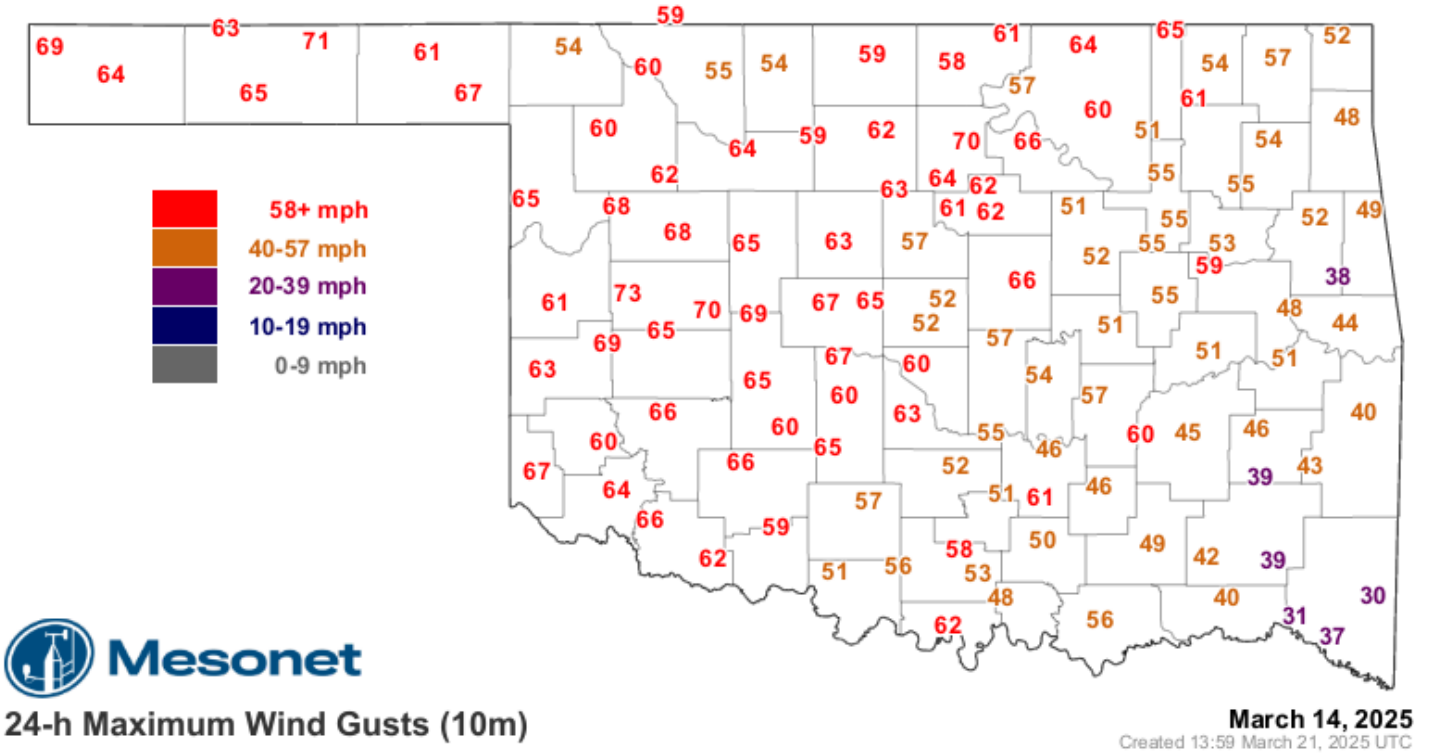


Fig. 7. OK Mesonet maximum 24-hour wind gusts (mph) on 3/14/2025.

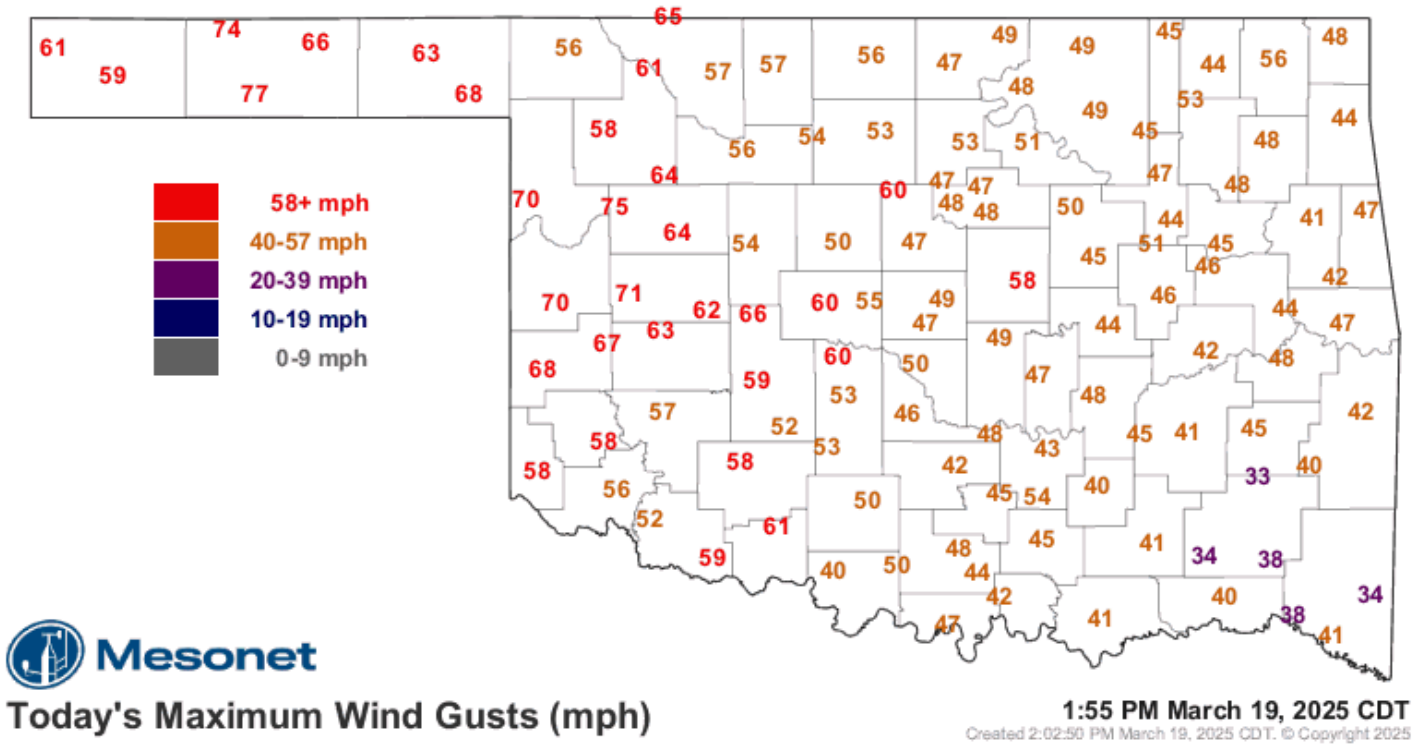


Fig. 8. OK Mesonet maximum wind gusts (mph) as of 1:55 pm CDT 3/19/2025.

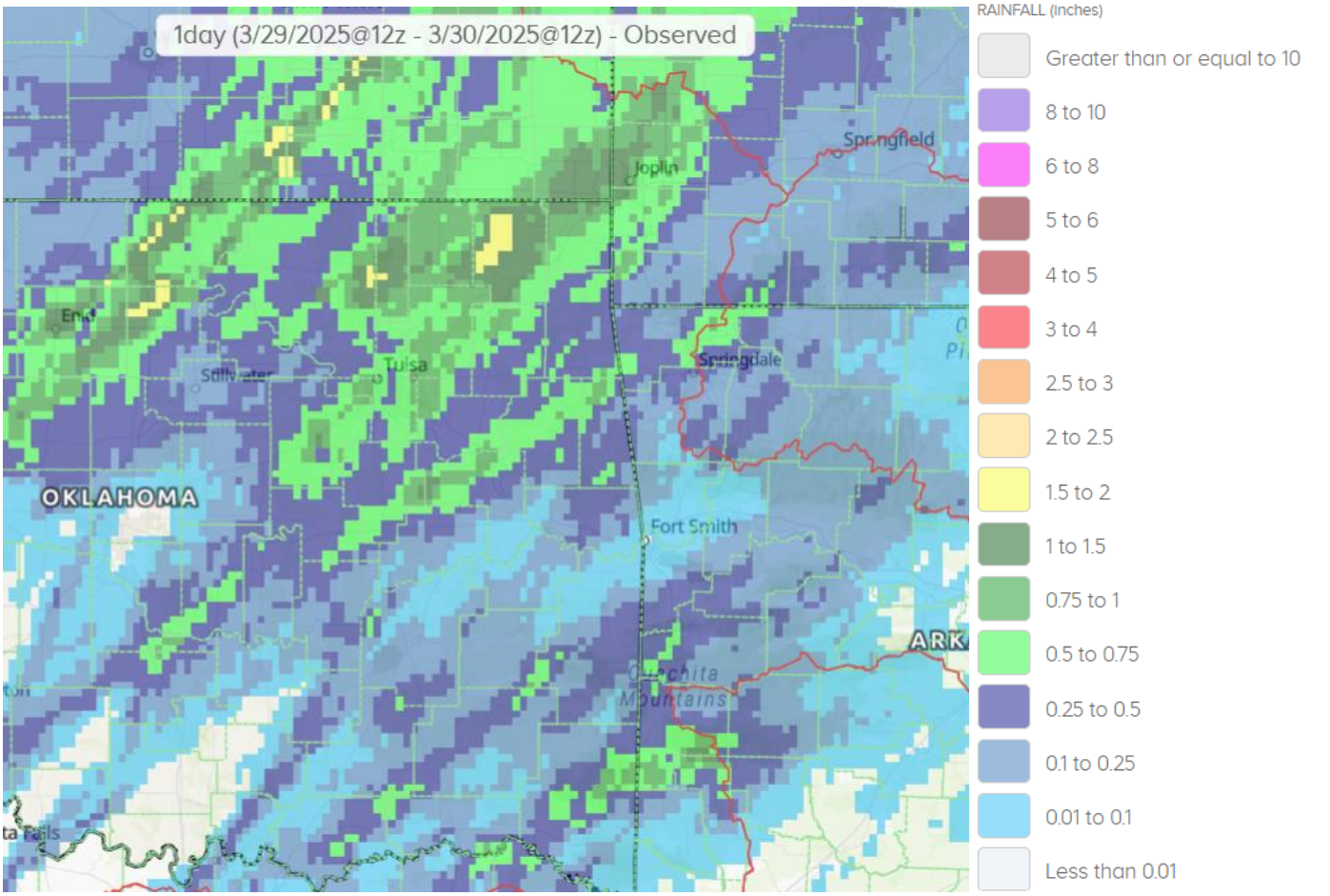


Fig. 9. 24-hour Estimated Observed Rainfall ending at 7am CDT 3/30/2025.

During the late evening of the 29th, strong to severe thunderstorms developed along an advancing cold front and dryline across central OK and quickly transitioned into a line of storms as they approached eastern OK just before midnight of the 30th. This strong to severe squall line moved rapidly eastward across eastern OK and northwest AR during the overnight hours. One EF-0 QLCS tornado occurred in Okmulgee County (see https://arcg.is/1D1zrC0 for details). Wind gusts to around 60 mph were measured and wind damage was reported in several locations from these storms. Sadly, a tree fell onto a camper near the Illinois River, trapping a couple inside and resulting in one fatality. A few scattered showers and thunderstorms lingered behind the squall line over northeast OK through sunrise. Rainfall totals ranged from around 0.1" to 2" across eastern OK and northwest AR, with the highest totals primarily over northeast OK (Fig. 9).

Written by:

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Service Hydrologist
WFO Tulsa

Products issued in March 2025:

0 Flash Flood Warnings (FFW)
0 Flash Flood Statements (FFS)
0 Flash/Areal Flood Watches (FFA) (0 Watch FFA CON/EXT/EXA/EXB/CAN)
4 Urban and Small Stream Advisories (FLS)
0 Areal Flood Warnings (FLW)
0 Areal Flood Statements (FLS)
1 River Flood Warnings (FLW) (includes category increases)
6 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: