

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 November	2020
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 December 8, 2020

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.

Nearly all of eastern OK and northwest AR received below normal rainfall in November 2020, and monthly average temperatures were above normal. Normal precipitation for November ranges from 2.6" in Pawnee County to 4.4" in Haskell County. Normal precipitation for the Ozark region of northwest Arkansas averages 4.2". 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 November 2020 ranged from around 0.50" to near 4" across eastern OK and northwest AR. These rainfall totals correspond to 10% to 75% of the normal November rainfall for eastern OK and northwest AR south of Highway 412, and 50% to 110% north of Highway 412 (Fig. 1b).

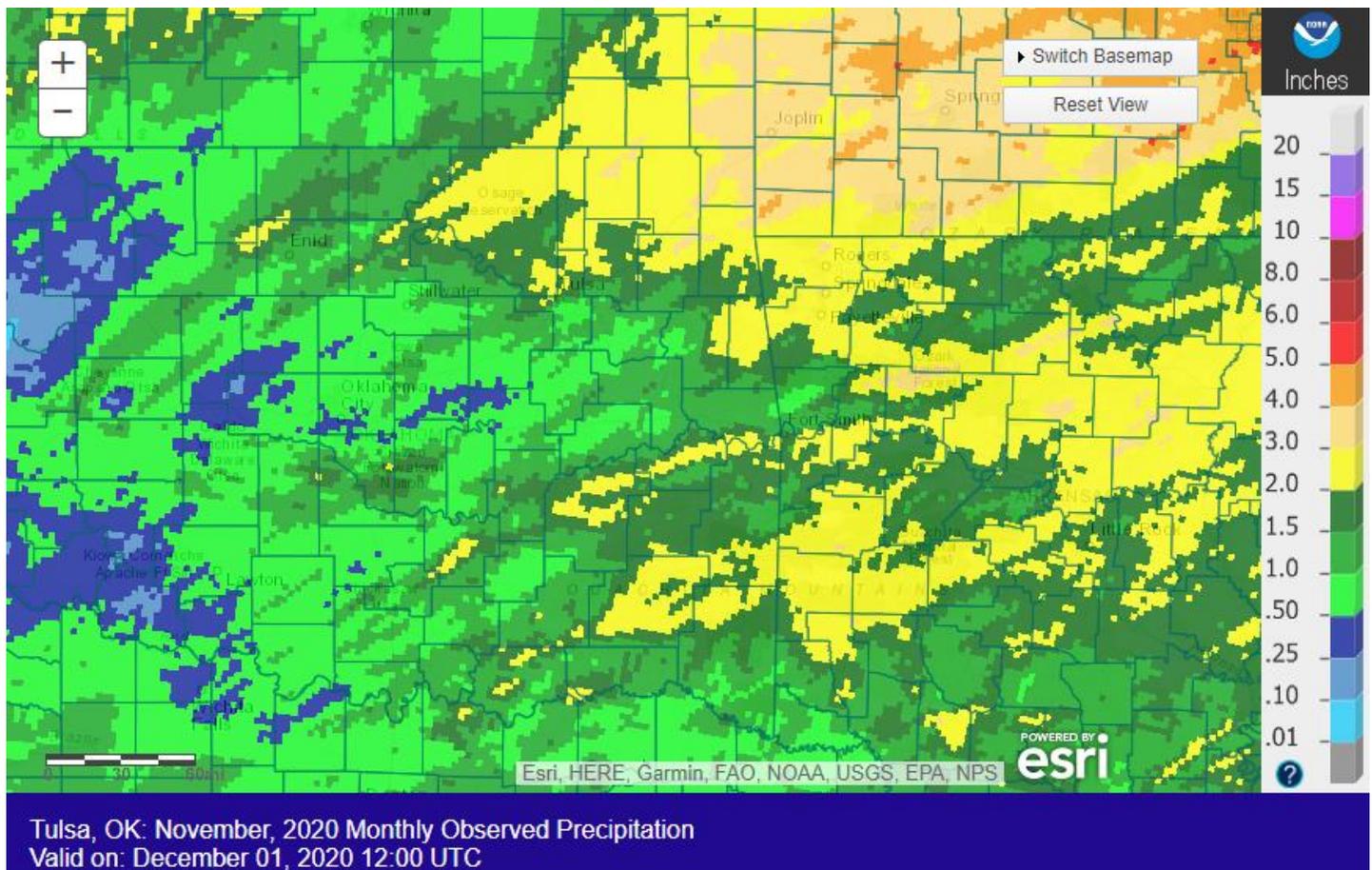
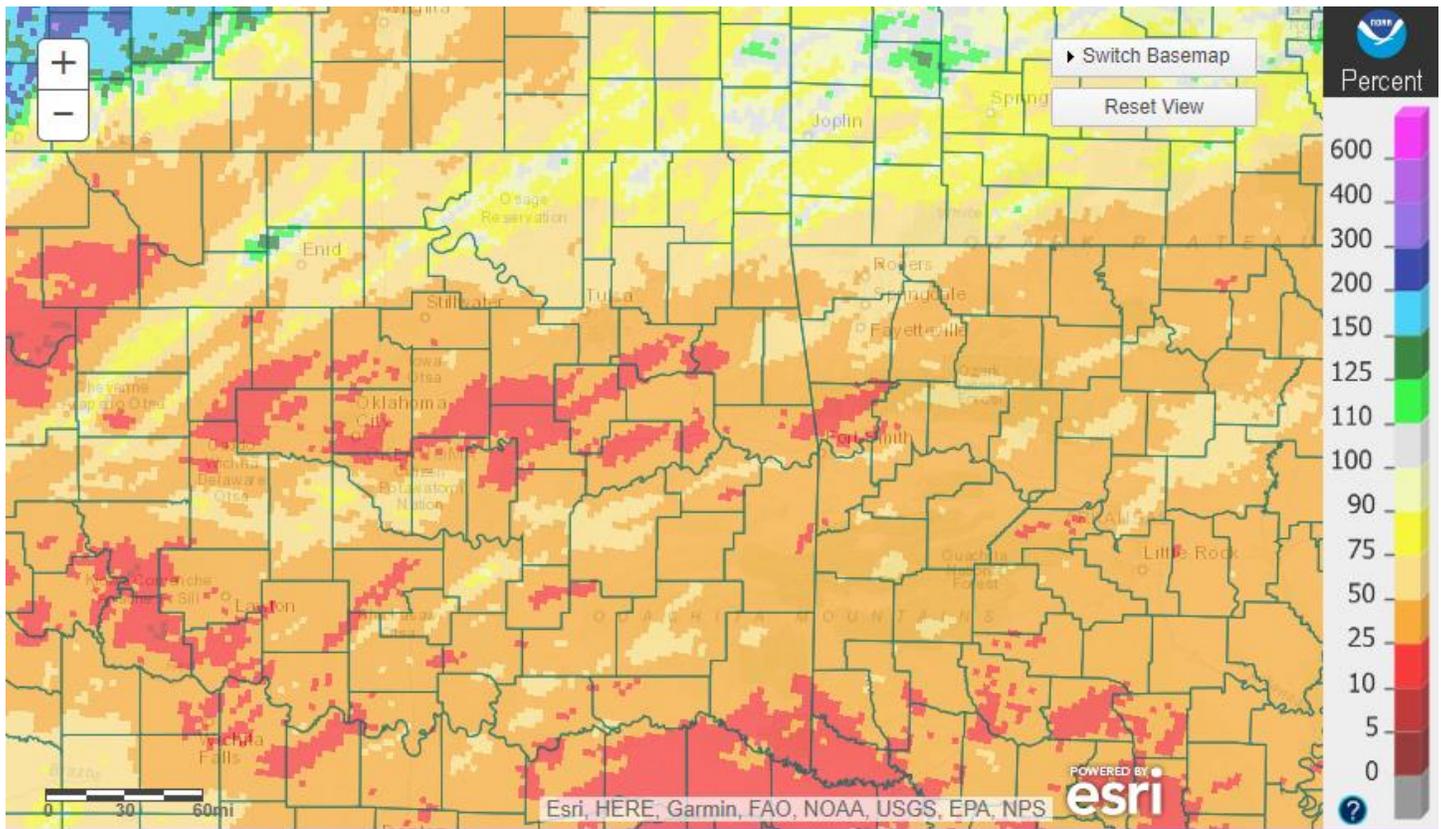


Fig. 1a. Estimated Observed Rainfall for November 2020



Tulsa, OK: November, 2020 Monthly Percent of Normal Precipitation
Valid on: December 01, 2020 12:00 UTC

Fig. 1b. Estimated % of Normal Rainfall for November 2020

In Tulsa, OK, November 2020 ranked as the 11th warmest November (54.5°F; since records began in 1905) and the 64th driest November (1.92"; since records began in 1888). Fort Smith, AR had the 14th warmest November (54.9°F, tied 2015; since records began in 1882) and the 45th driest November (1.95", tied 1912; since records began in 1882). Fayetteville, AR had the 6th warmest (51.8°F, tied 2016) and the 28th driest (2.16") November since records began in 1949.

Some of the larger precipitation reports (in inches) for November 2020 included:

Miami, OK (meso)	3.44	Rogers 2.4SSW, AR (coco)	3.24	Pea Ridge 0.2WSW, AR (coco)	3.22
Holiday Island 1.3SSW, AR (coco)	3.13	Fayetteville 1.0E, AR (coco)	3.12	Fayetteville 5.2NNE, AR (coco)	3.09
Upper Spavinaw Port, OK (coop)	3.03	Springdale 2.3S, AR (coco)	3.00	Bentonville 6.6SSW, AR (coco)	2.94

Some of the lowest precipitation reports (in inches) for November 2020 included:

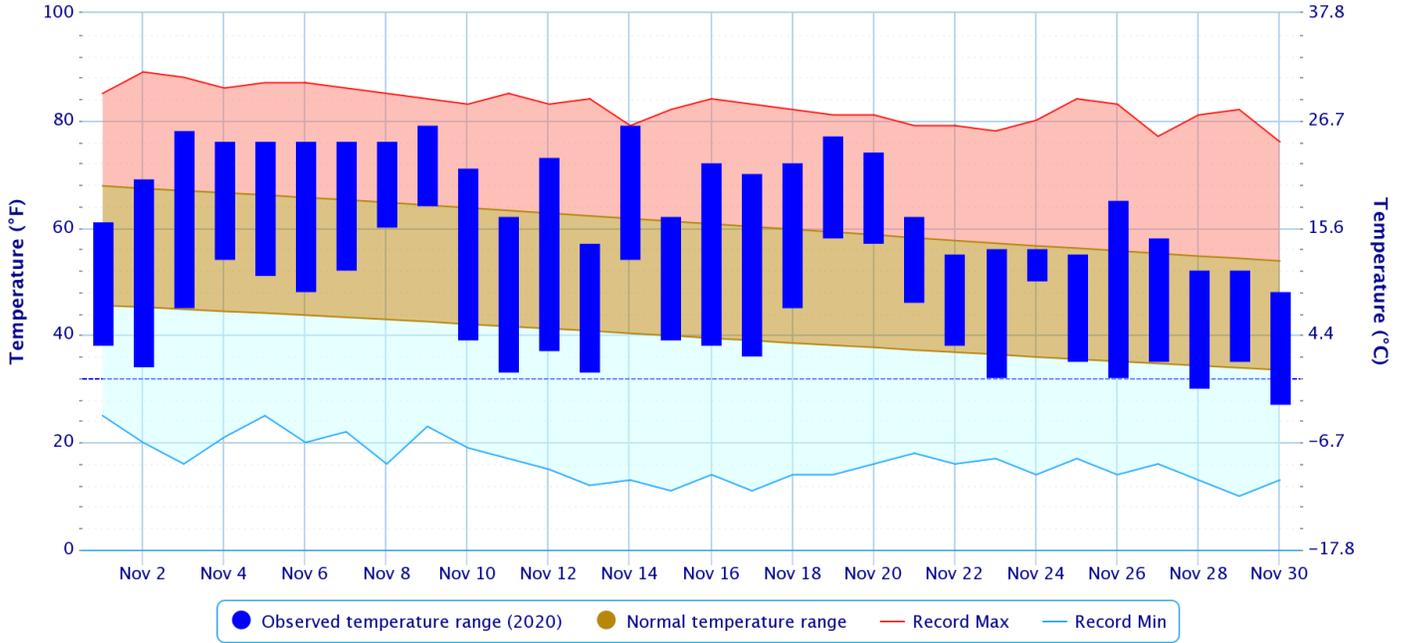
Okemah, OK (meso)	0.62	Jenks Riverside Arpt, OK (ASOS)	0.70	Haskell, OK (meso)	0.81
Bristow, OK (meso)	0.86	Porter, OK (meso)	0.88	Tulsa 7.7SSE, OK (coco)	0.95
Tulsa 6.3S, OK (coco)	0.98	Hectorville, OK (meso)	0.98	Okmulgee, OK (meso)	0.99

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

Rank since 1921	November 2020	Autumn 2020 (Aug 1 – Nov 30)	Last 120 Days (Aug 3 – Nov 30)	Last 180 Days (Jun 4 – Nov 30)	Year-to-Date (Jan 1 – Nov 30)	Water Year-to-Date (Oct 1, 2020 – Nov 30, 2020)	Last 365 Days (Dec 2, 2019 – Nov 30, 2020)
Northeast OK	44 th driest	50 th driest	44 th driest	43 rd driest	24 th wettest	34 th wettest	25 th wettest
East Central OK	28 th driest	50 th wettest	32 nd wettest	38 th wettest	7th wettest	43 rd driest	11 th wettest
Southeast OK	22 nd driest	46 th wettest	22 nd driest	32 nd wettest	11 th wettest	21 st driest	14 th wettest
Statewide	31 st driest	50 th wettest	49 th driest	49 th driest	30 th wettest	42 nd driest	35 th wettest

Daily Temperature Data – Tulsa Area, OK (ThreadEx)

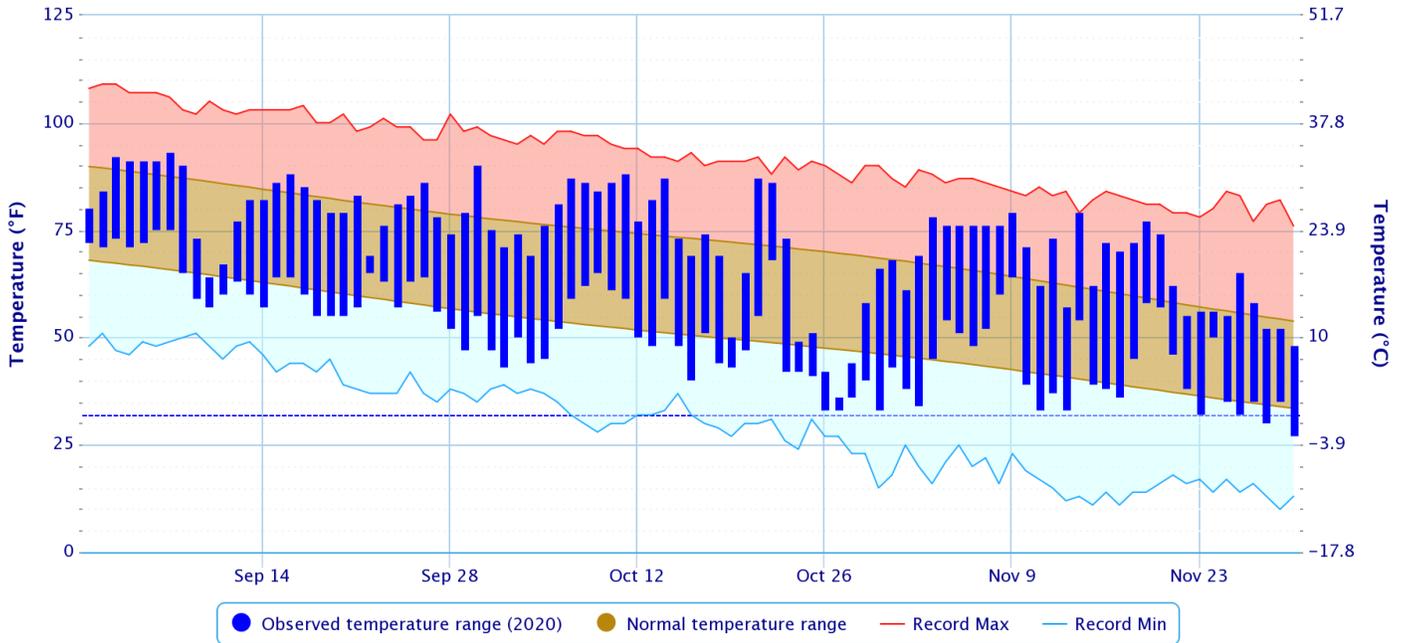
Period of Record – 1905-01-06 to 2020-12-02. Normals period: 1981-2010. Click and drag to zoom chart.



Powered by ACIS

Daily Temperature Data – Tulsa Area, OK (ThreadEx)

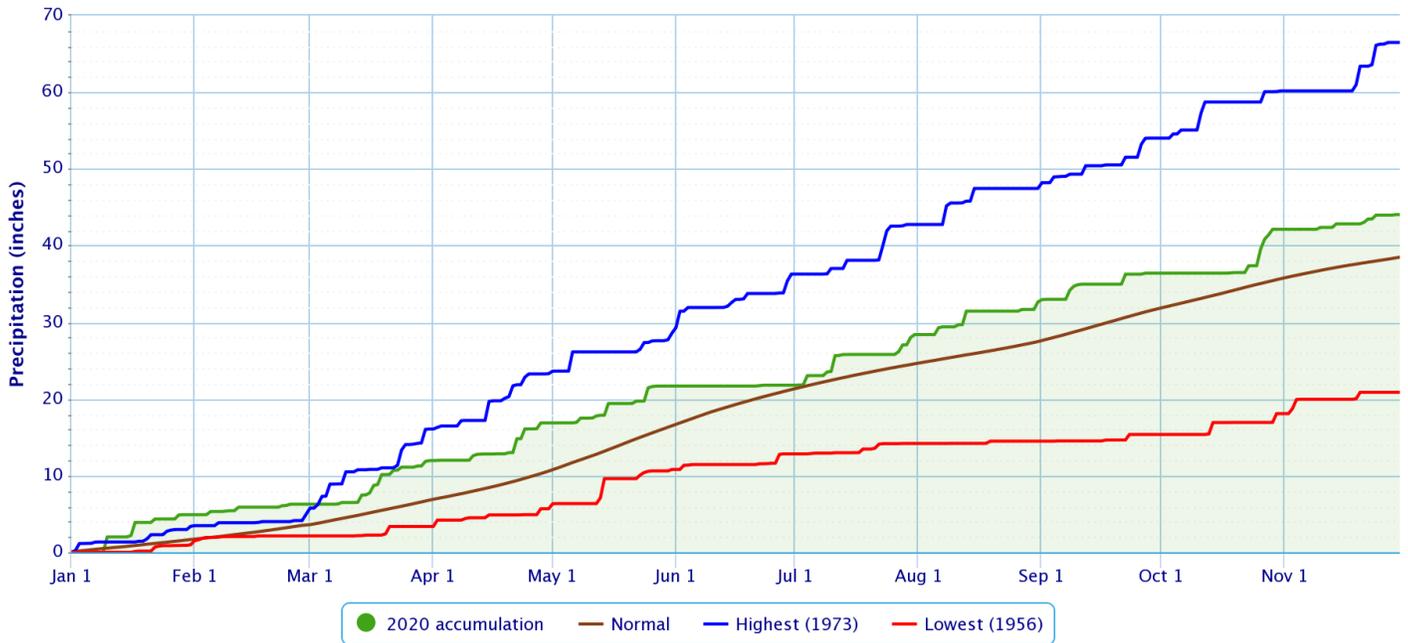
Period of Record – 1905-01-06 to 2020-12-02. Normals period: 1981-2010. Click and drag to zoom chart.



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Accumulated Precipitation – Tulsa Area, OK (ThreadEx)

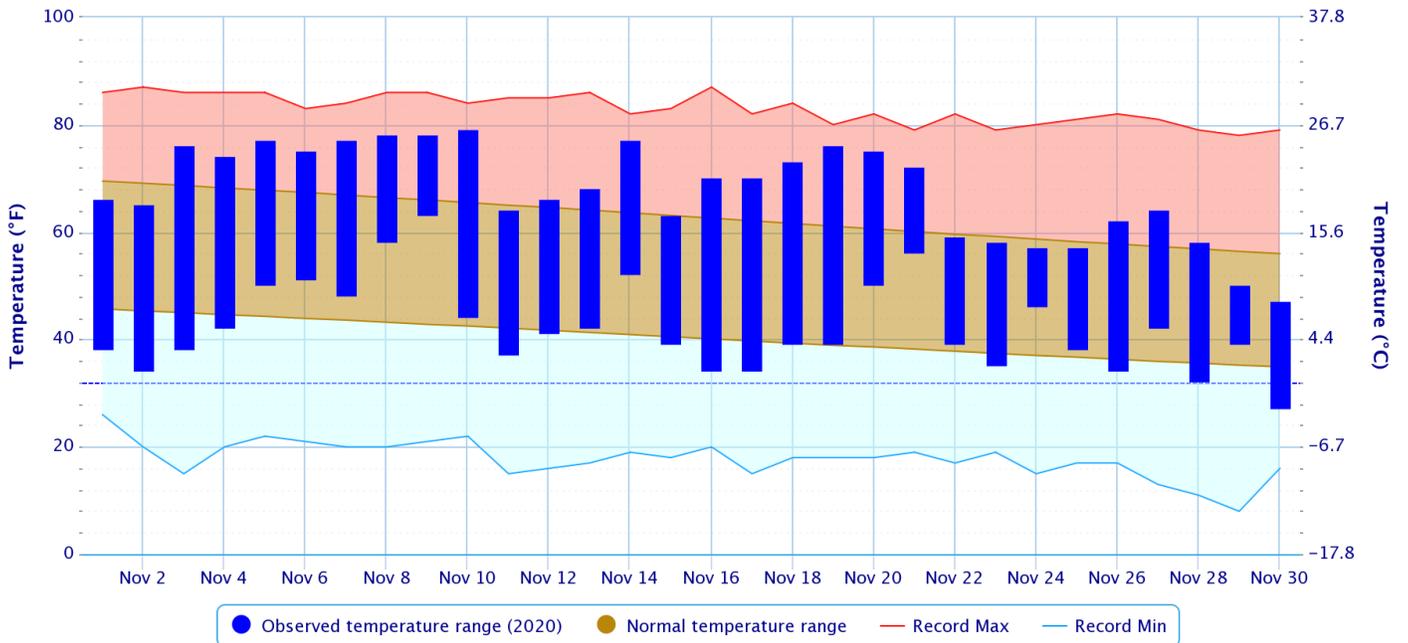
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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

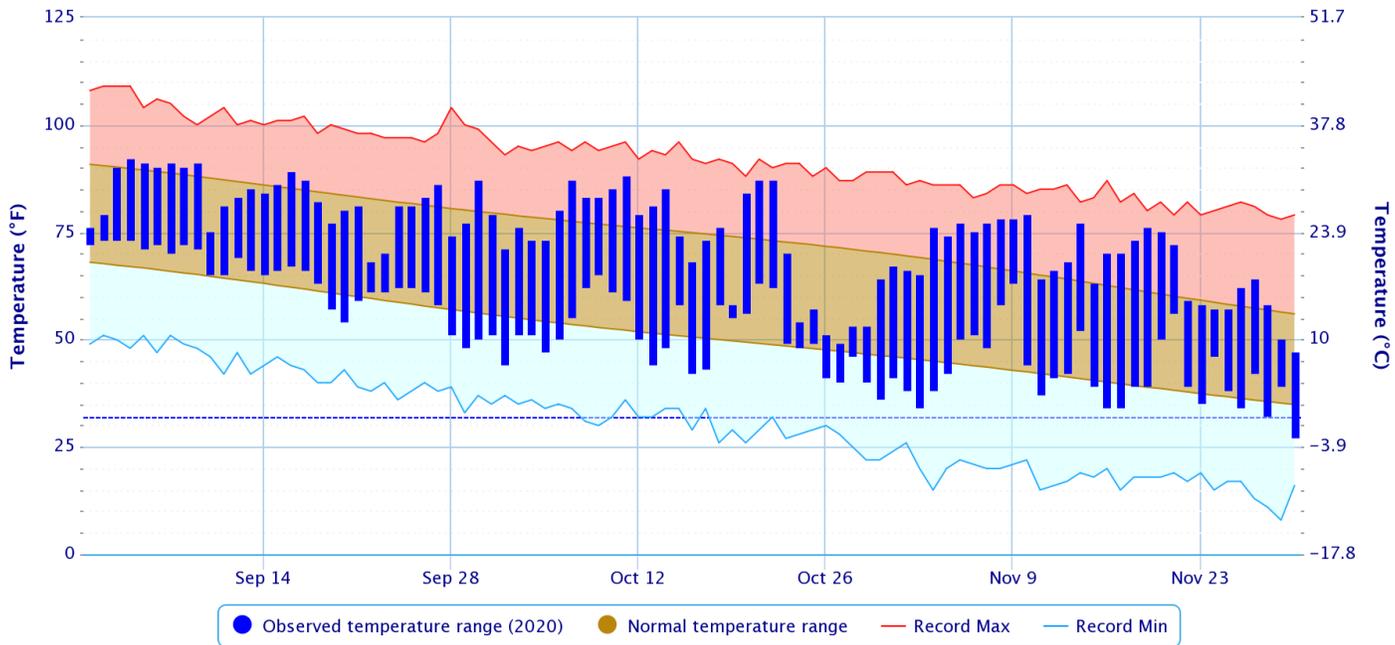
Period of Record – 1882-06-01 to 2020-12-02. Normals period: 1981-2010. Click and drag to zoom chart.



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

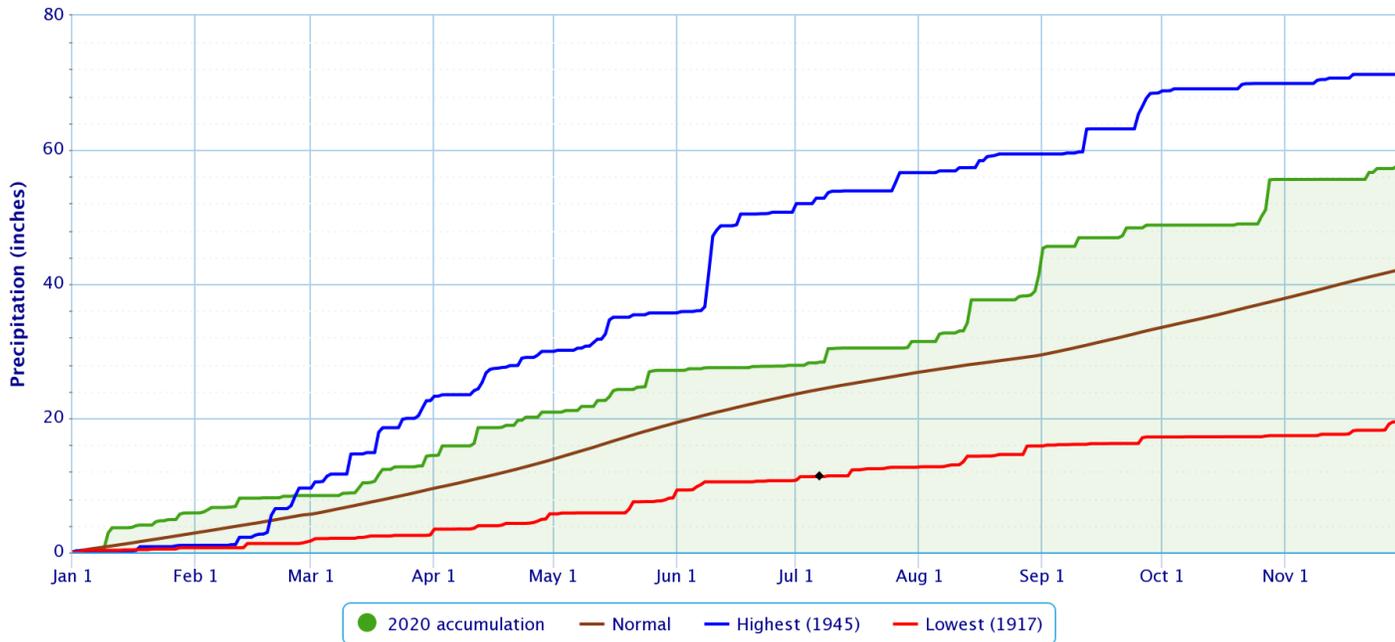
Period of Record – 1882-06-01 to 2020-12-02. Normals period: 1981-2010. Click and drag to zoom chart.



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Accumulated Precipitation – Fort Smith Area, AR (ThreadEx)

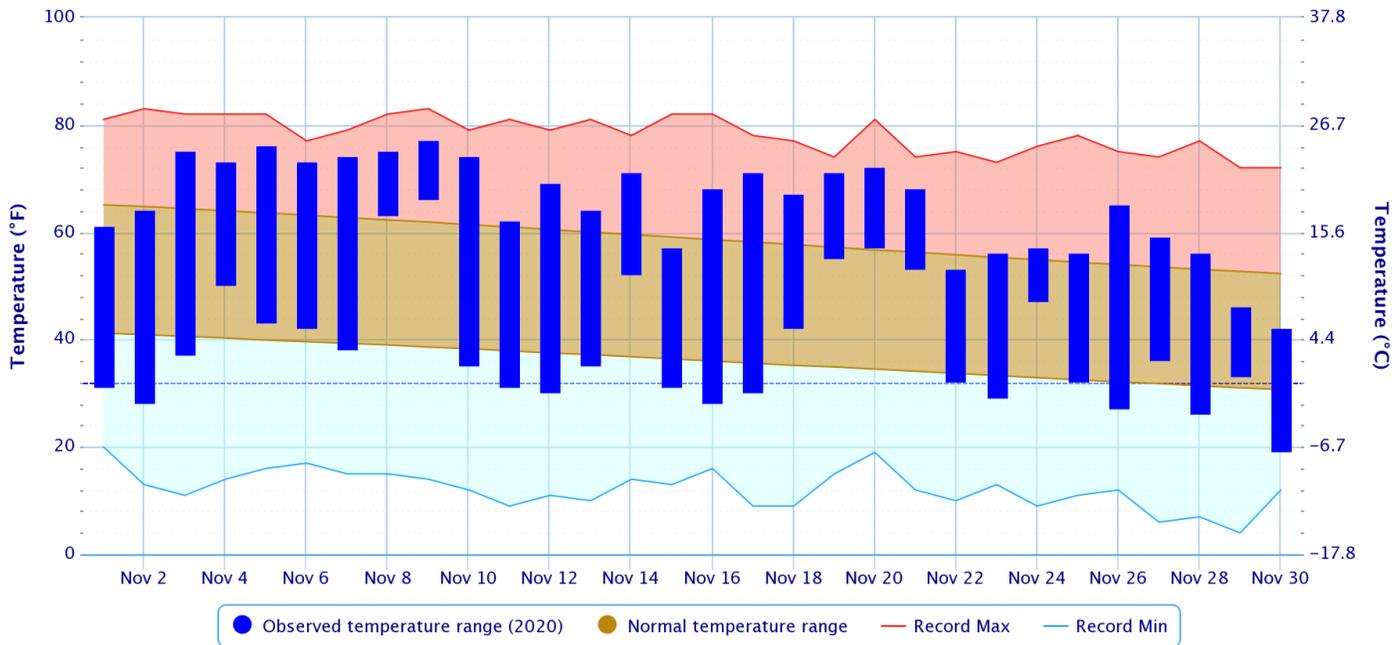
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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Daily Temperature Data – FAYETTEVILLE DRAKE FIELD, AR

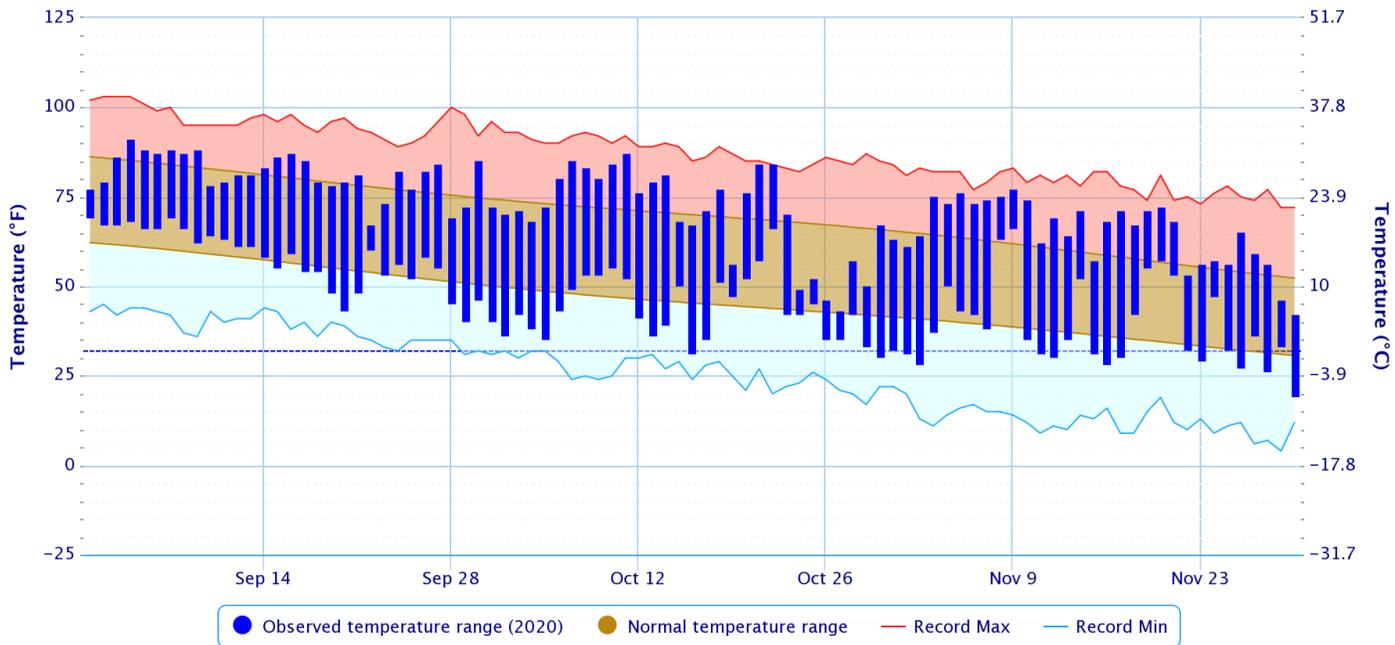
Period of Record – 1949-07-14 to 2020-12-02. Normals period: 1981-2010. Click and drag to zoom chart.



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Daily Temperature Data – FAYETTEVILLE DRAKE FIELD, AR

Period of Record – 1949-07-14 to 2020-12-02. Normals period: 1981-2010. Click and drag to zoom chart.



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Autumn 2020 (September-October-November)

In Tulsa, OK, Autumn 2020 ranked as the 53rd coldest Autumn (61.8°F, tied 1989, 1985, 1962; since records began in 1905) and the 40th wettest Autumn (11.39"; since records began in 1888). Fort Smith, AR had the 58th warmest Autumn (63.3°F, tied 1930; since records began in 1882) and the 18th wettest Autumn (16.13"; since records began in 1882). Fayetteville, AR had the 23rd warmest (59.2°F, tied 2010, 1962) and the 34th driest (11.45", tied 2013) Autumn since records began in 1949.

Using the radar-derived estimated observed precipitation from the RFCs (Fig. 2a), rainfall totals for Autumn 2020 ranged from around 4" to near 20" across eastern OK and northwest AR, with most of the area receiving 8"-15". These rainfall totals correspond to 25% to 125% of the normal Autumn rainfall for eastern OK and northwest AR, though most of the area had 25% to 90% of the normal Autumn rainfall (Fig. 2b).

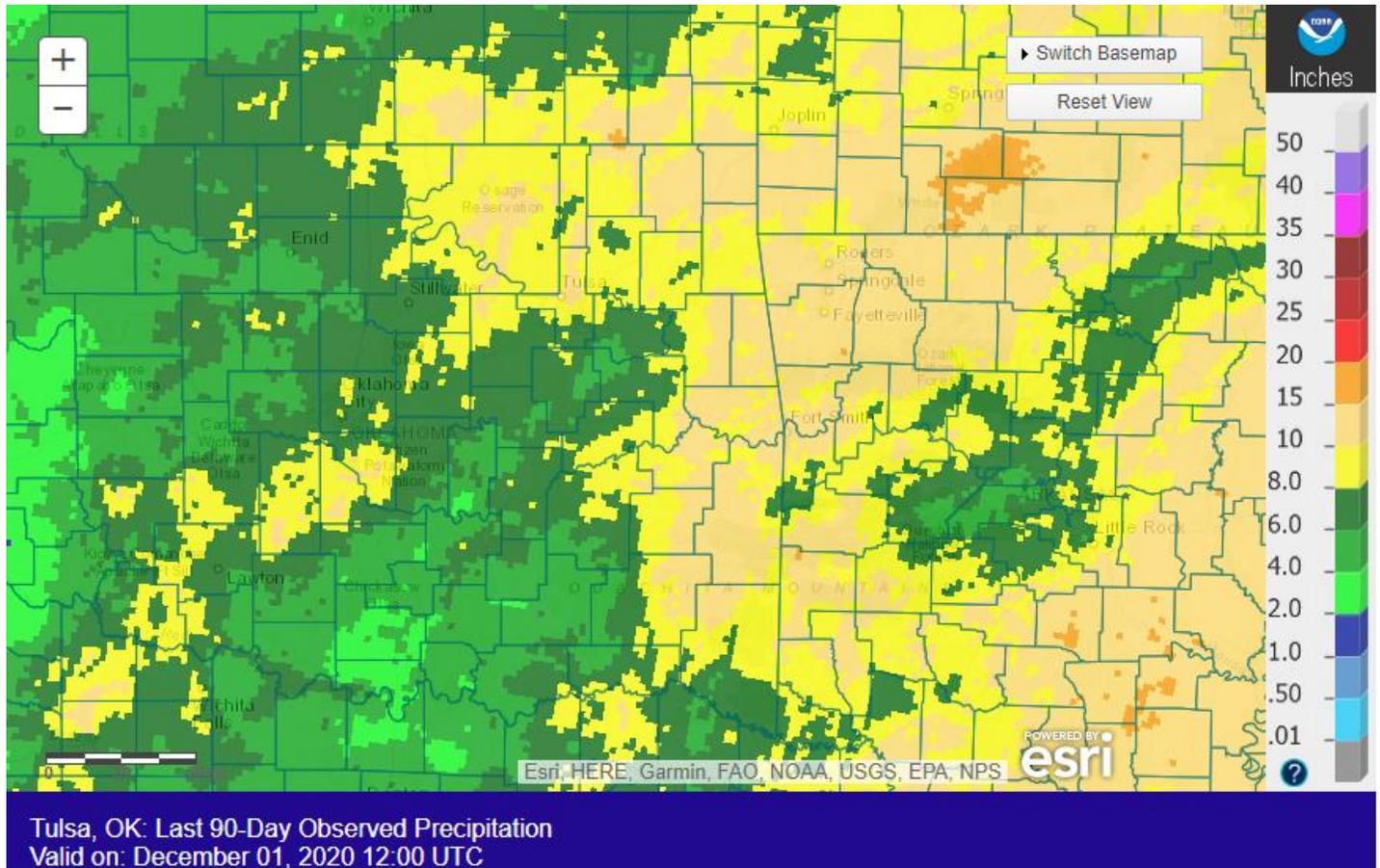
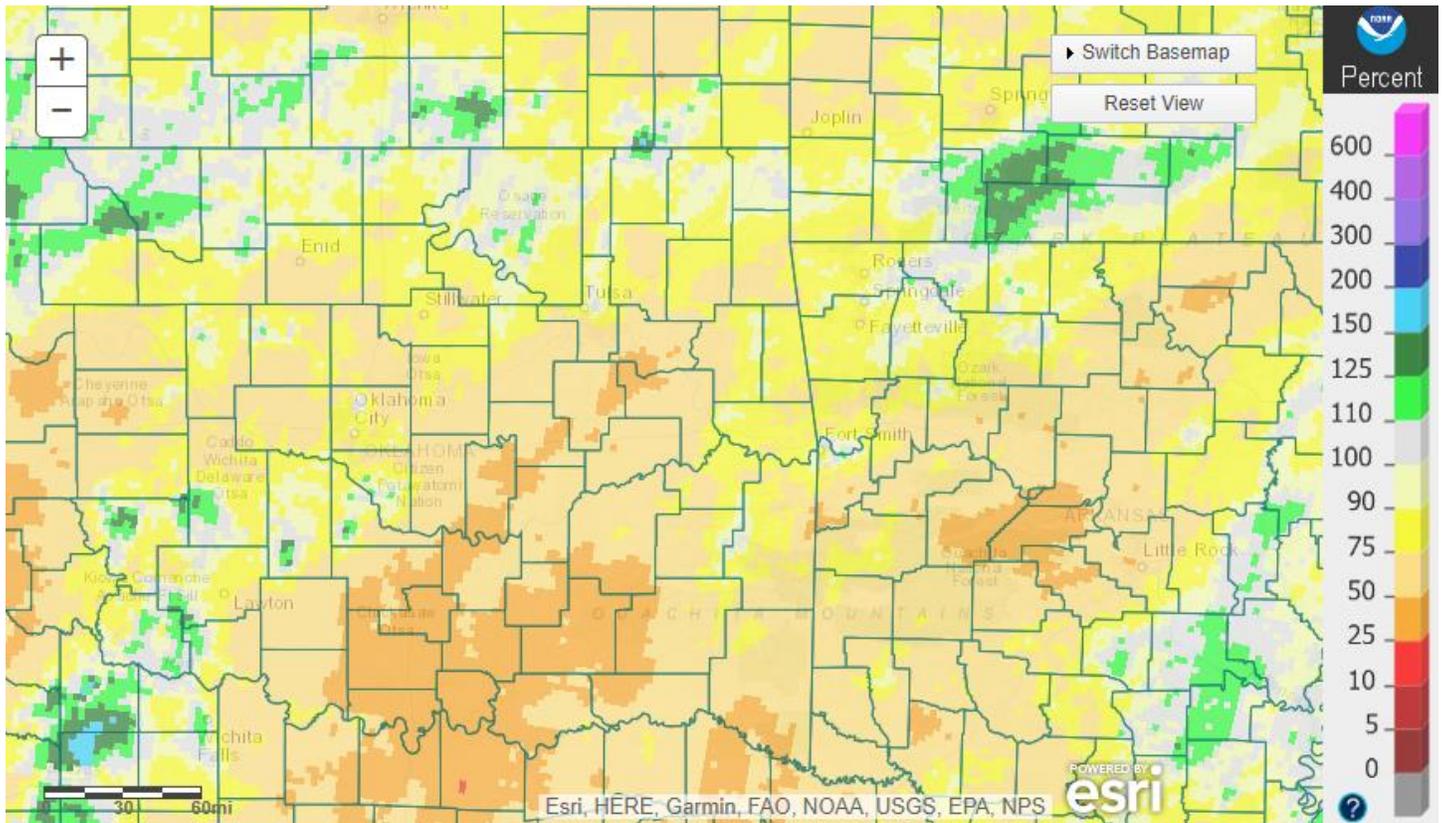


Fig. 2a. Estimated Observed Rainfall for Autumn 2020



Tulsa, OK: Last 90-Day Percent of Normal Precipitation
 Valid on: December 01, 2020 12:00 UTC

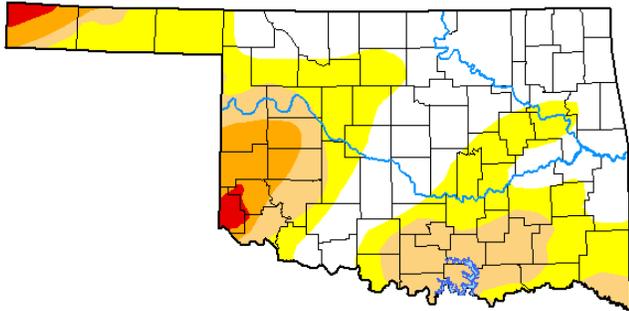
Fig. 2b. Estimated % of Normal Rainfall for Autumn 2020

Drought

According to the [U.S. Drought Monitor](#) (USDM) from December 1, 2020 (Figs. 3a, 3b), Moderate (D1) drought conditions were occurring across portions of Pittsburg, Pushmataha, and Choctaw Counties in eastern OK. Abnormally Dry (but not in drought) conditions were occurring in a portion of Wagoner, Muskogee, Okmulgee, Okfuskee, Creek, Pittsburg, Latimer, Le Flore, Pushmataha, and Choctaw Counties in eastern OK. No drought or abnormally dry conditions were depicted in northwest AR.

U.S. Drought Monitor Oklahoma

December 1, 2020
(Released Thursday, Dec. 3, 2020)
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	42.85	57.15	25.18	7.79	1.45	0.00
Last Week 11-24-2020	42.62	57.38	25.13	7.78	1.47	0.00
3 Months Ago 09-01-2020	72.39	27.61	20.55	12.45	1.66	0.00
Start of Calendar Year 12-31-2019	76.45	23.55	10.47	3.64	0.00	0.00
Start of Water Year 09-29-2020	66.79	33.21	17.71	11.97	1.55	0.00
One Year Ago 12-03-2019	65.35	34.65	14.27	3.67	0.00	0.00

Intensity:

- None
- 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. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

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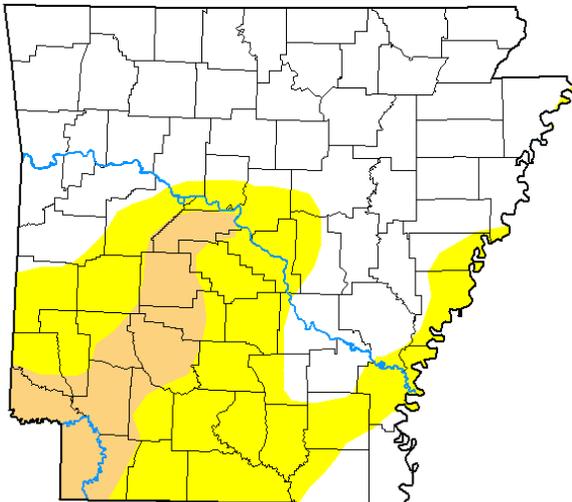


droughtmonitor.unl.edu

Fig. 3a. Drought Monitor for Oklahoma

U.S. Drought Monitor Arkansas

December 1, 2020
(Released Thursday, Dec. 3, 2020)
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	59.54	40.46	10.71	0.00	0.00	0.00
Last Week 11-24-2020	59.39	40.61	14.07	0.00	0.00	0.00
3 Months Ago 09-01-2020	97.89	2.11	0.00	0.00	0.00	0.00
Start of Calendar Year 12-31-2019	86.68	13.32	4.35	0.31	0.00	0.00
Start of Water Year 09-29-2020	96.07	3.93	0.62	0.00	0.00	0.00
One Year Ago 12-03-2019	91.66	8.34	0.00	0.00	0.00	0.00

Intensity:

- None
- 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. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

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droughtmonitor.unl.edu

Fig. 3b. Drought Monitor for Arkansas

Outlooks

The [Climate Prediction Center](#) (CPC) outlook for December 2020 (issued November 30, 2020) 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 largely based on dynamical model output combined with the influence from La Niña.

For the 3-month period December-January-February 2020-21, CPC is forecasting an enhanced chance for above normal temperatures across all of eastern OK and northwest AR, an equal chance for above, near, and below median precipitation across northwest AR and far northeast/east central OK, and an enhanced chance for below median precipitation across the remainder of eastern OK (outlook issued November 19, 2020). This outlook is based strongly on La Niña impacts, as well as incorporating both statistical and dynamical forecast tools. According to CPC, the combined effect of the ocean-atmosphere system is consistent with La Niña conditions. There is a 95% chance of La Niña continuing through the Northern Hemisphere winter 2020-21 and a 65% chance of La Niña continuing into spring. This La Niña is likely to be a moderate to strong event. 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

A cold front moved into the region and became stalled from northern Benton County west-southeast to central Creek County by the morning of the 21st. Widely scattered showers occurred near and north of the front during the morning hours. Showers and thunderstorms increased near and north of the front during the afternoon and evening hours. The front then began to move southeast quickly during the late evening and overnight hours as the main mid-level trough entered the Southern Plains. Showers persisted near the front through the overnight, before moving out of the region by noon on the 22nd. Rainfall totals were generally around 0.50" to around 1.5" north of Highway 412 in northeast OK and across northwest AR (Fig. 4). Totals of 0.25" to around 1.5" also occurred near I-40 and south (Fig. 4). There was a minimum in rainfall across east central OK and near the Red River.

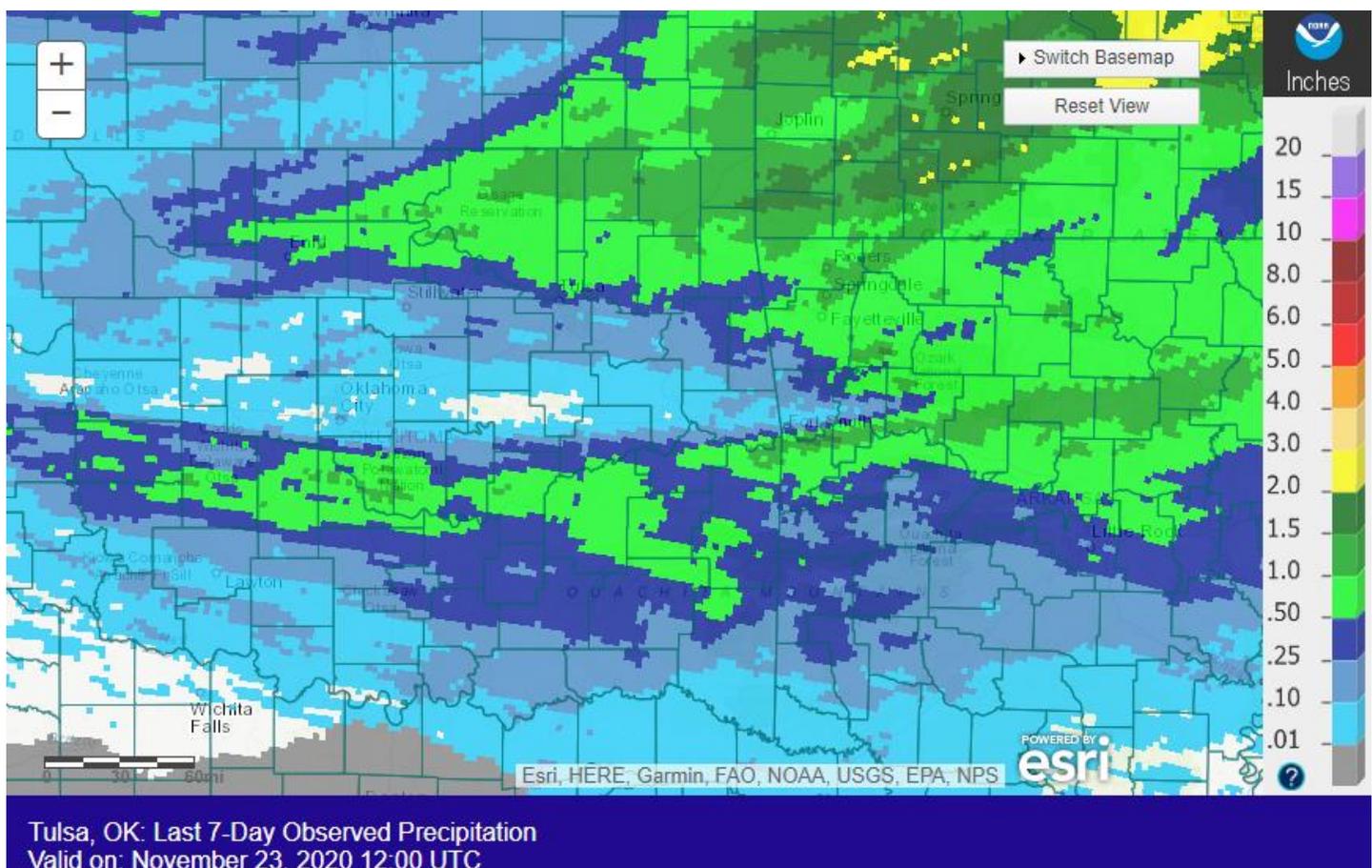


Fig. 4. 7-Day Estimated Observed Rainfall ending at 6am CST 11/23/2020.

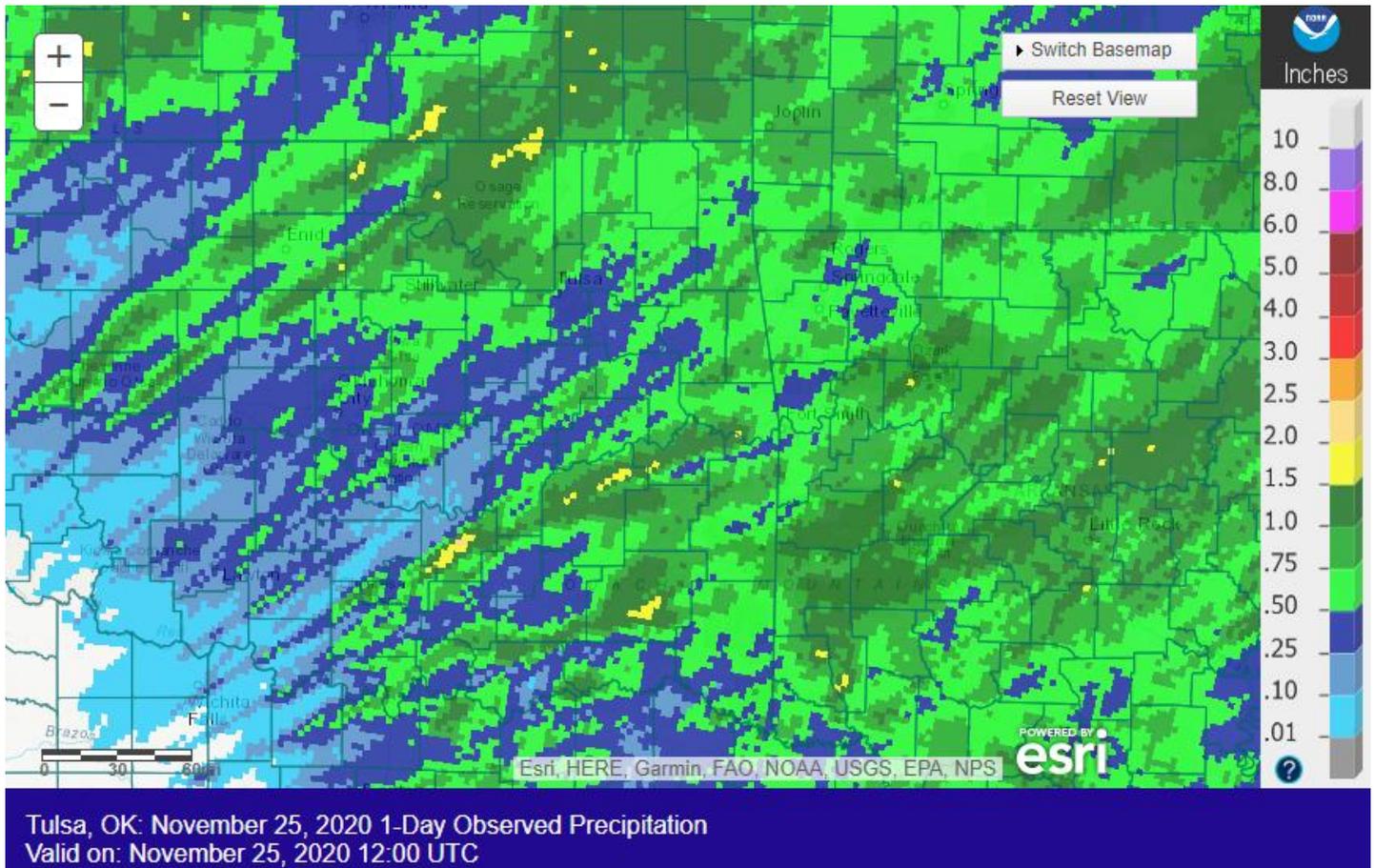


Fig. 5. 24-hour Estimated Observed Rainfall ending at 6am CST 11/25/2020.

Convection that had developed in the TX Panhandle moved into northeast OK at mid-morning of the 24th. Scattered showers then continued to move east across eastern OK and northwest AR through late-afternoon with the aid of warm air advection. A line of stronger thunderstorms, stretching from KS to TX along a cold front, then tracked east across OK, moving into eastern OK during the early evening hours. This line quickly moved through all of eastern OK and western AR, exiting the area just after midnight on the 25th. One thunderstorm within the line produced two EF-1 tornadoes in Haskell and Le Flore Counties, which was an area of high dew points and higher surface-based instability (see <https://arcg.is/WOfzC0> for additional details). Rainfall totals ranged from around 0.50" to around 1.5" (Fig. 5).

Written by:

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Products issued in November 2020:

- *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

- 0 Flash Flood Warnings (FFW)
- 0 Flash Flood Statements (FFS)
- 0 Flash/Areal Flood Watches (FFA) (0 Watch FFA CON/EXT/EXA/EXB/CAN)

- 1 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) (9 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:

None