

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 November	YEAR 2014
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 4, 2014	

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.

November 2014 was a dry, cold month across eastern OK and northwest AR, with the average monthly temperature running about 5°F below normal. All of the HSA except for Okfuskee County received below normal rainfall this month. Normal precipitation for November ranges from 2.6 inches in Pawnee County to 4.4 inches in Haskell County. Normal precipitation for the Ozark region of northwest Arkansas averages 4.2 inches. This report, past E-5 reports, and monthly hydrology and climatology summaries can be found at <http://www.srh.noaa.gov/tsa/?n=hydro-monthly-summary>.

Monthly Summary

Using the radar-derived estimated observed precipitation from the RFCs (Fig. 1a), rainfall totals for November 2014 ranged from around 1" to around 4" across eastern OK and northwest AR. The majority of the HSA received 1.5"-3" of rain this month. The entire HSA, except for Okfuskee County, received below normal rainfall this month (Fig. 1b), only getting 10%-90% of the normal November rain. Much of Choctaw and Sebastian Counties, as well as portions of Pushmataha, Le Flore, and far southern Franklin Counties, only received 10%-25% of the normal rainfall this month. Okfuskee County ended the month at 100% to just over 125% of normal for November.

Tulsa, OK (TSA): November, 2014 Monthly Observed Precipitation
 Valid at 12/1/2014 1200 UTC - Created 12/1/14 18:26 UTC

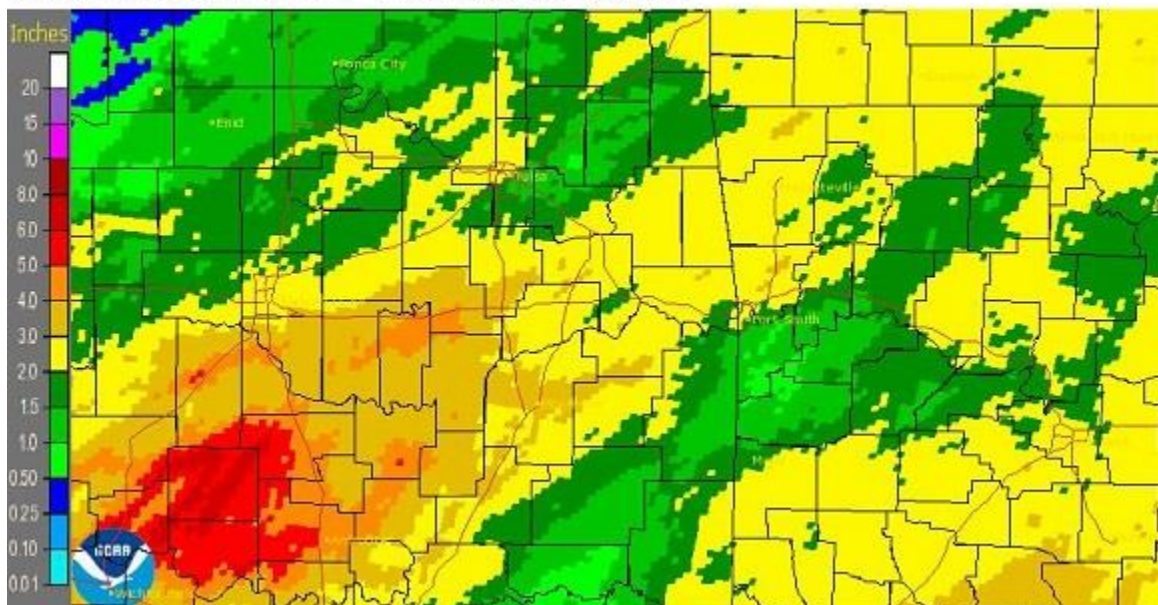


Fig. 1a. Estimated Observed Rainfall for November 2014

Tulsa, OK (TSA): November, 2014 Monthly Percent of Normal Precipitation
 Valid at 12/1/2014 1200 UTC- Created 12/1/14 18:27 UTC

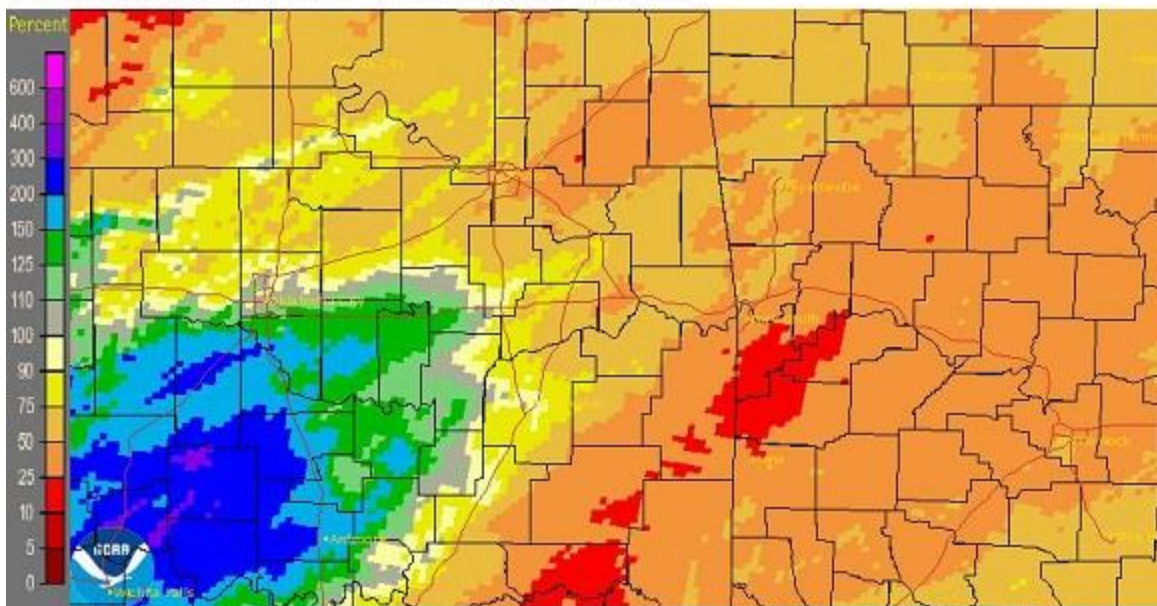


Fig. 1b. Estimated % of Normal Rainfall for November 2014

In Tulsa, OK, November 2014 ranked as the 11th coldest November (45.1°F; since records began in 1905), the 58th wettest November (2.10"; since records began in 1888), and the 20th snowiest November (0.4", tied 1988, 1923; since records began in 1900). Fort Smith, AR had the 11th coldest November (46.6°F, tied 1993; since records began in 1882), the 35th driest November (1.58"; since records began in 1882), and the 18th snowiest (Trace, tied several years; since records began in 1883). Fayetteville, AR had the 6th coldest (41.9°F), the 29th driest (2.50"), and the 15th snowiest (Trace, tied with several years) November since records began in 1949.

In Tulsa, OK, Autumn 2014 ranked as the 44th coldest Autumn (61.4°F, tied 1935; since records began in 1905) and the 63rd wettest Autumn (9.11", tied 2008; since records began in 1888). Fort Smith, AR had the 53rd coldest Autumn (62.3°F, tied 2006, 1989, 1950, 1908, 1907, 1886; since records began in 1882) and the 16th wettest Autumn (16.38"; since records began in 1882). Fayetteville, AR had the 13th coldest (56.9°F, tied 2006, 1997) and the 26th wettest (13.31") Autumn since records began in 1949.

Some of the larger precipitation reports (in inches) for November 2014 included:

Okemah, OK (meso)	3.88	McAlester, OK (meso)	3.48	Mountainburg 2NE, AR (coop)	3.17
St Paul, AR (coop)	3.08	Winslow 7NE, AR (coop)	2.86	McAlester, OK (ASOS)	2.83
Muskogee, OK (ASOS)	2.80	Stigler, OK (meso)	2.78	Tahlequah, OK (meso)	2.75

Some of the lowest precipitation reports (in inches) for November 2014 included:

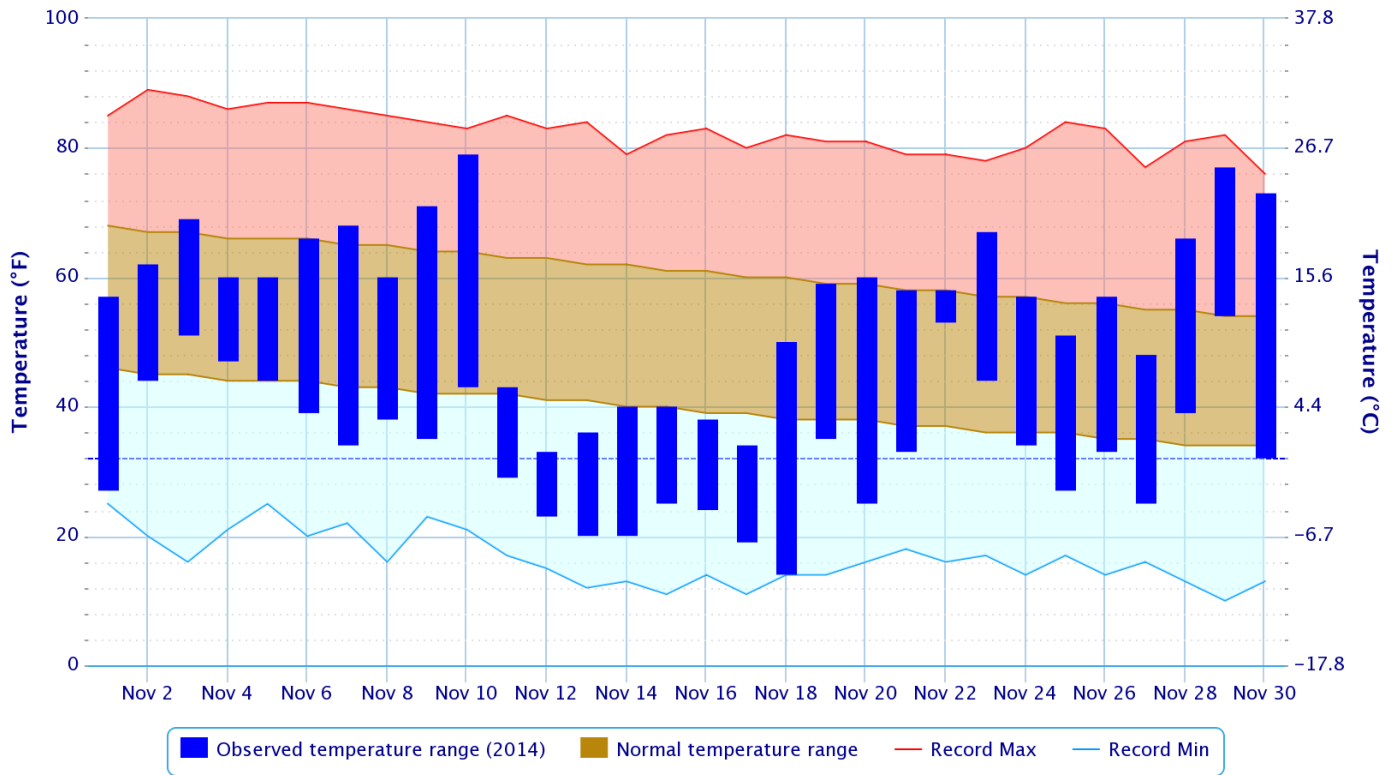
Hugo, OK (meso)	1.04	Cloudy, OK (meso)	1.09	Burbank, OK (meso)	1.42
Foraker, OK (meso)	1.47	Pryor, OK (meso)	1.48	Copan, OK (meso)	1.49
Fort Smith, AR (ASOS)	1.58	Antlers, OK (meso)	1.63	Jenks-Riverside Aprt, OK (ASOS)	1.68

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

Rank since 1921	November 2014	Autumn-to-Date (Sep 1 – Nov 30)	Water Year-to-Date (Oct 1 – Dec 1)	Last 120 Days (Aug 4 – Dec 1)	Last 180 Days (Jun 5 – Dec 1)	Year-to-Date (Jan 1 – Nov 30)	Last 365 Days (Dec 2, 2013 – Dec 1, 2014)
Northeast OK	37 th driest	31 st wettest	24 th wettest	45 th wettest	38 th wettest	19 th driest	21 st driest
East Central OK	44 th driest	43 rd wettest	34 th wettest	40 th driest	40 th wettest	26 th driest	23 rd driest
Southeast OK	24 th driest	47 th wettest	38 th driest	33 rd driest	29 th wettest	33 rd driest	34 th driest
Statewide	43 rd wettest	46 th driest	40 th wettest	27 th driest	35 th wettest	18 th driest	17 th driest

Daily Temperature Data – Tulsa Area, OK (ThreadEx)

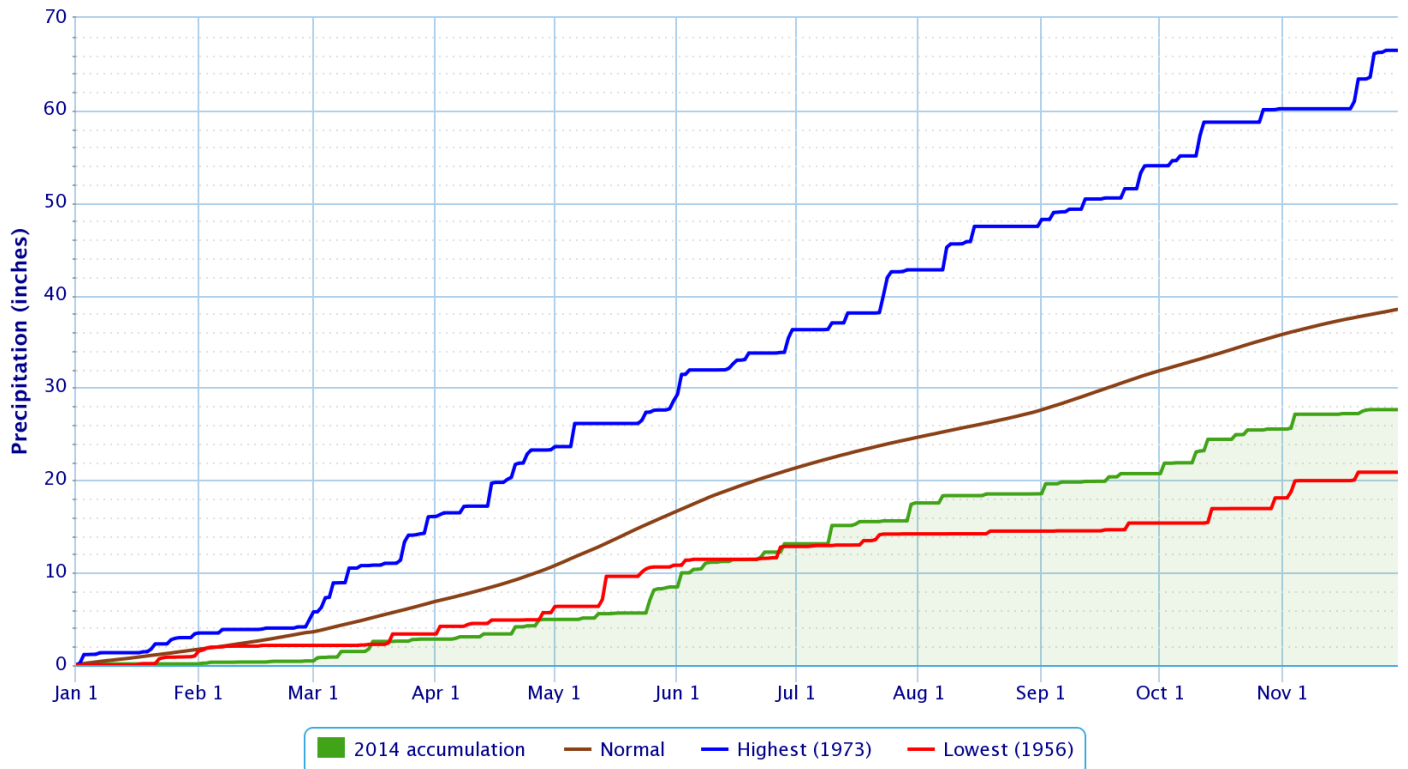
Period of Record – 1905-01-06 to 2014-11-30. Normals period: 1981-2010. Click and drag to zoom chart.



Powered by ACIS

Accumulated Precipitation – Tulsa Area, OK (ThreadEx)

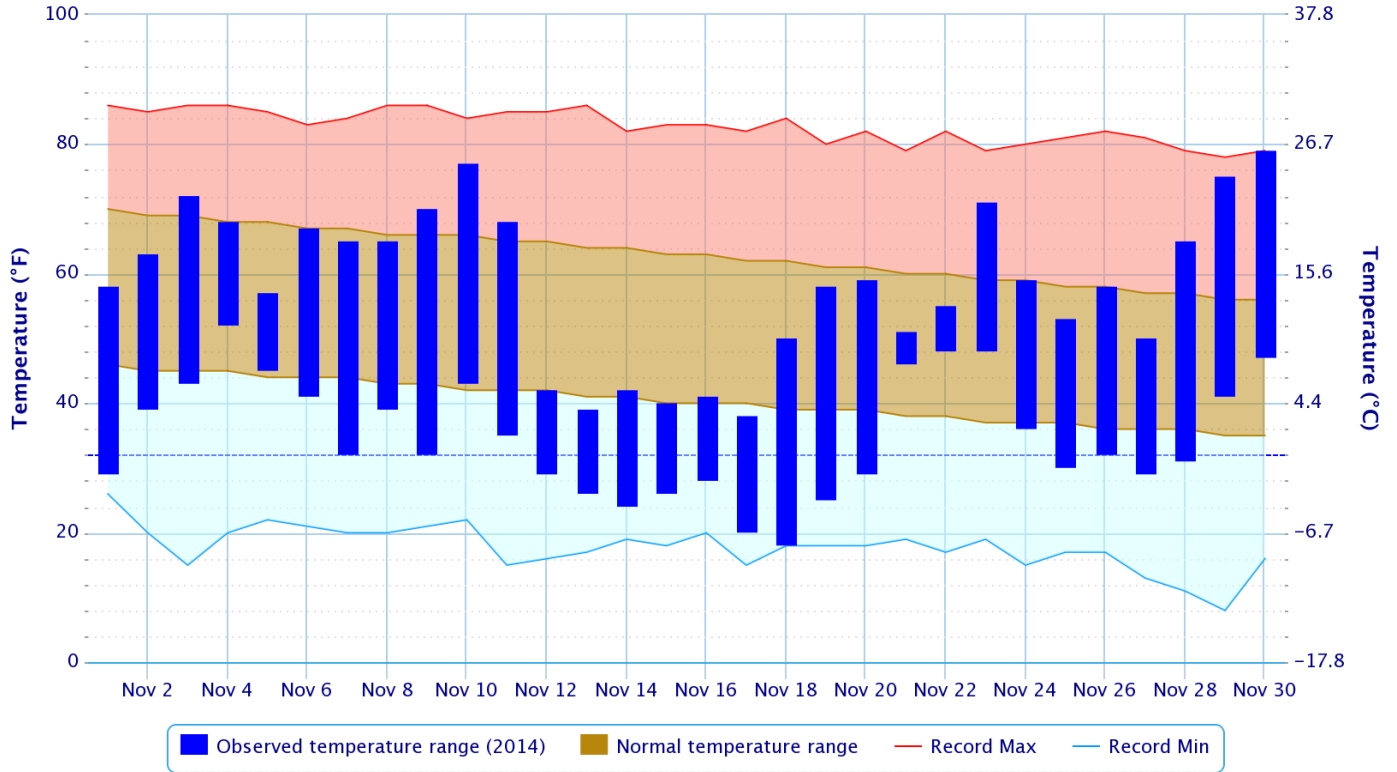
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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

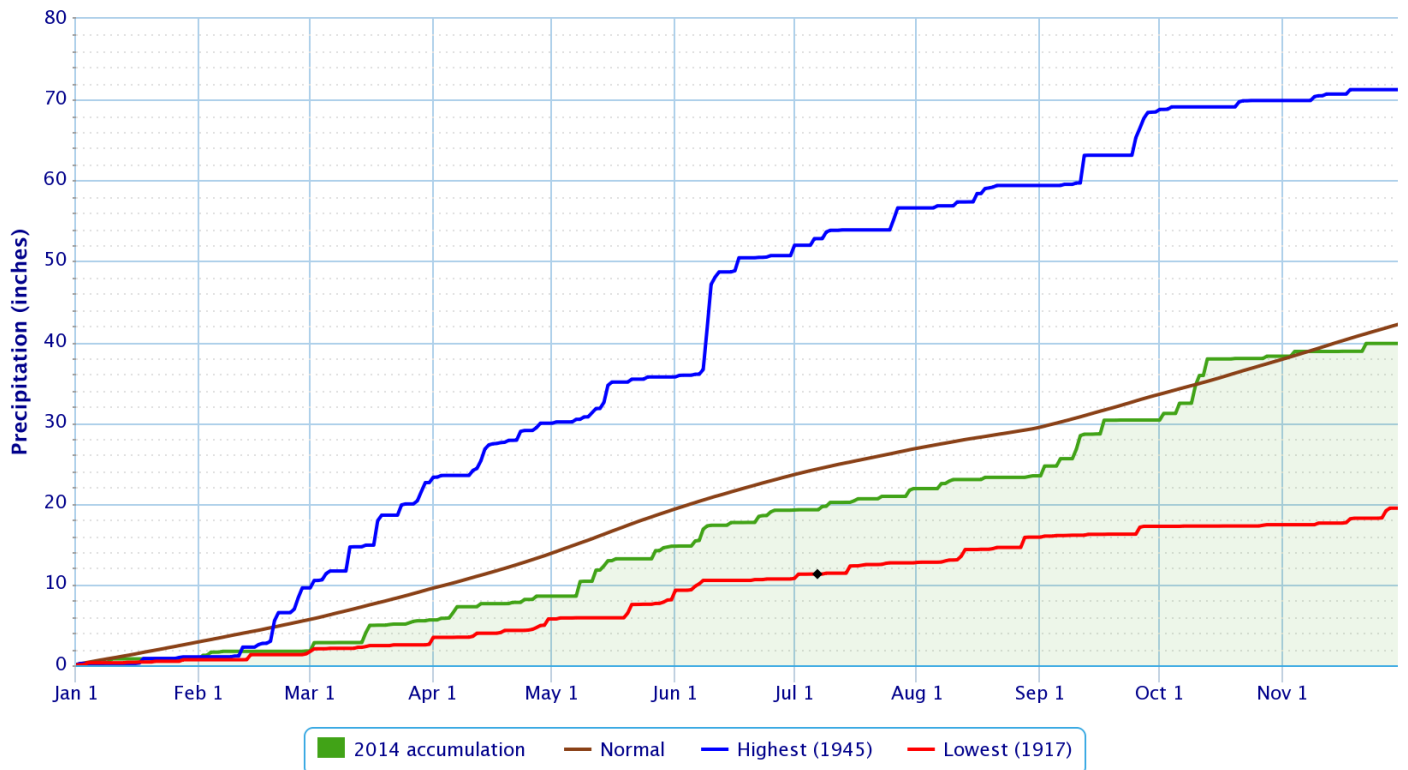
Period of Record – 1882-06-01 to 2014-11-30. Normals period: 1981-2010. Click and drag to zoom chart.



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Accumulated Precipitation – Fort Smith Area, AR (ThreadEx)

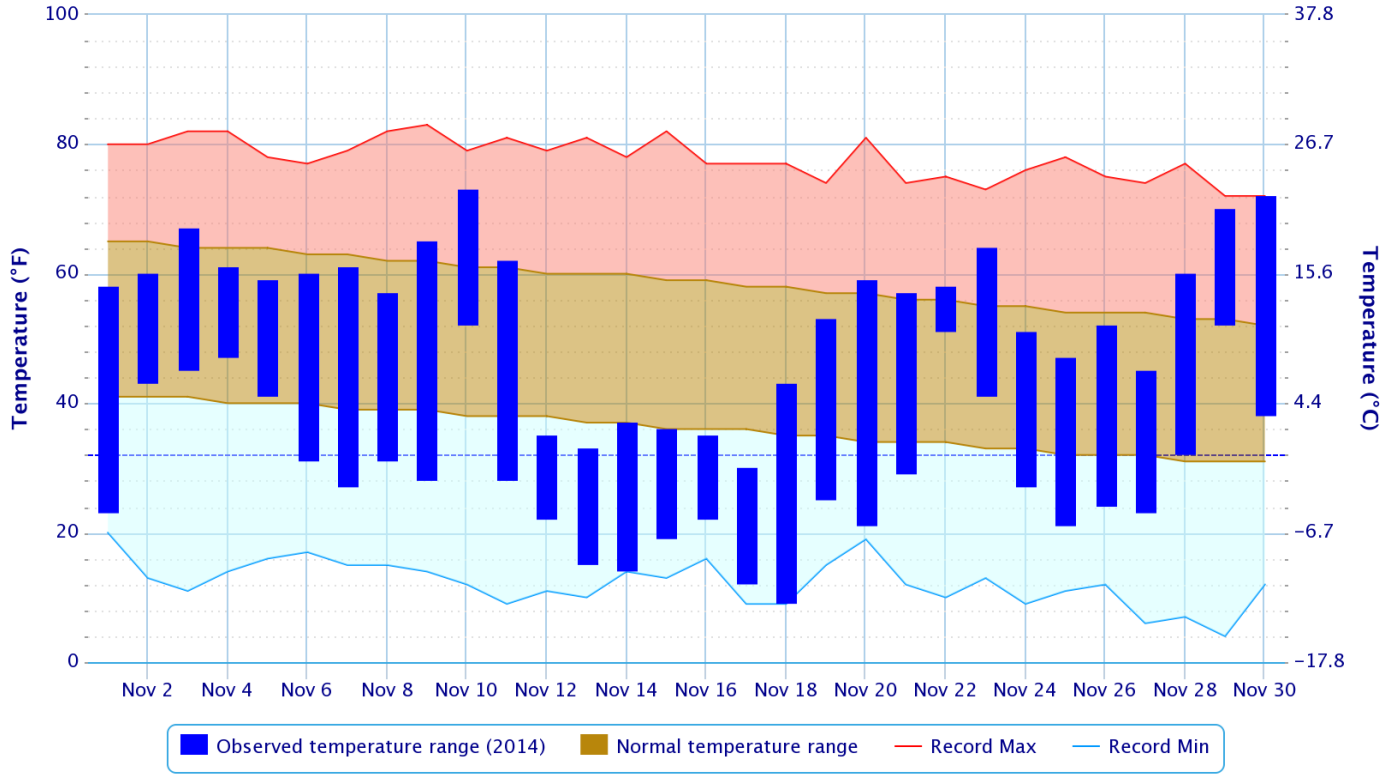
Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



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Daily Temperature Data – FAYETTEVILLE DRAKE FLD, AR

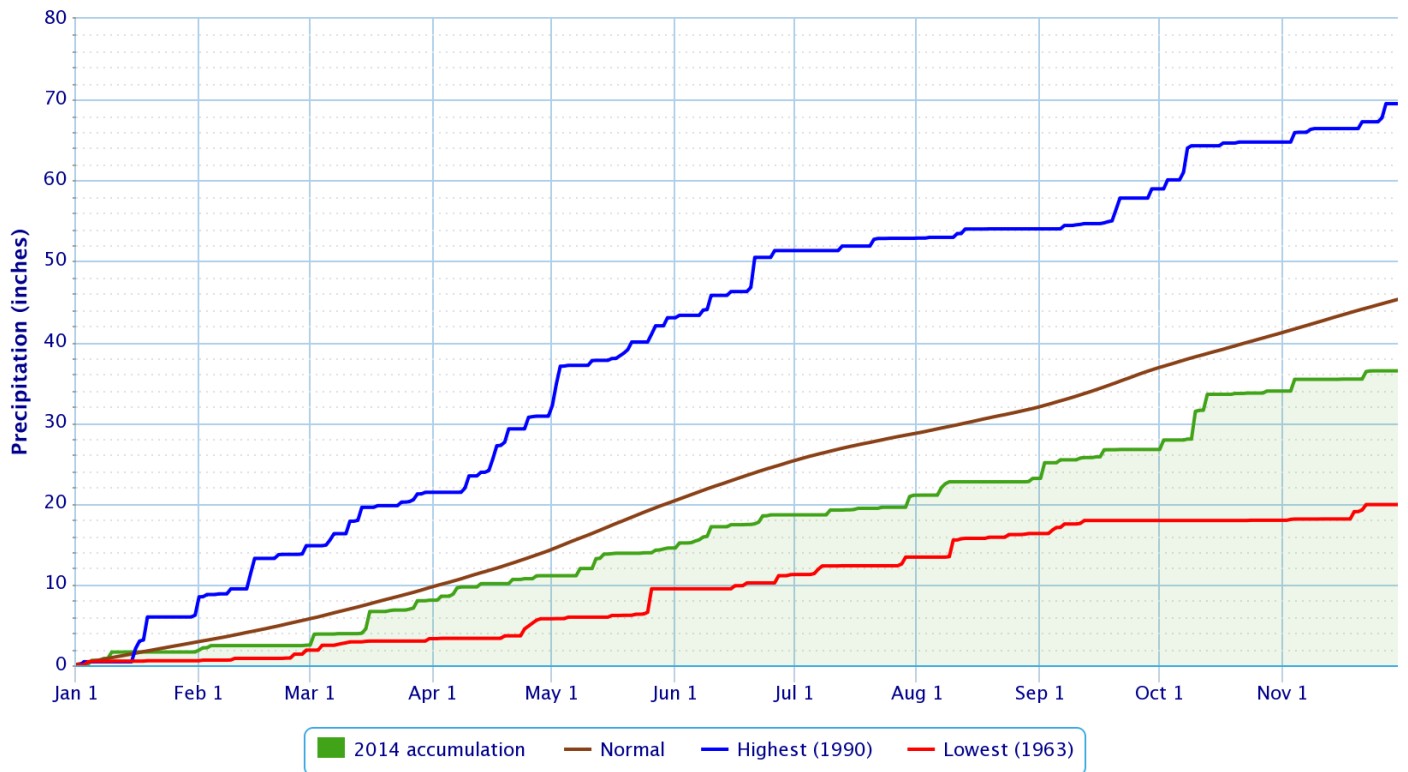
Period of Record – 1949-07-14 to 2014-11-30. Normals period: 1981-2010. Click and drag to zoom chart.



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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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According to the USACE, several of the major reservoirs in the HSA were operating within $\pm 3\%$ of the top of their conservation pools as of 12/01/2014. Skiatook Lake has slightly decreased in its conservation pool from 56% (698.11') at the end of October to 55% (697.68') at the end of November. This is the lowest the lake has been since it was filled in 1984. New low pool records will continue as the lake continues to fall. Several lakes were reporting below normal pool levels: Skiatook Lake 55%, Beaver Lake 79%, Eufaula Lake 80%, Keystone Lake 80%, Tenkiller Lake 88%, and Birch Lake 92%.

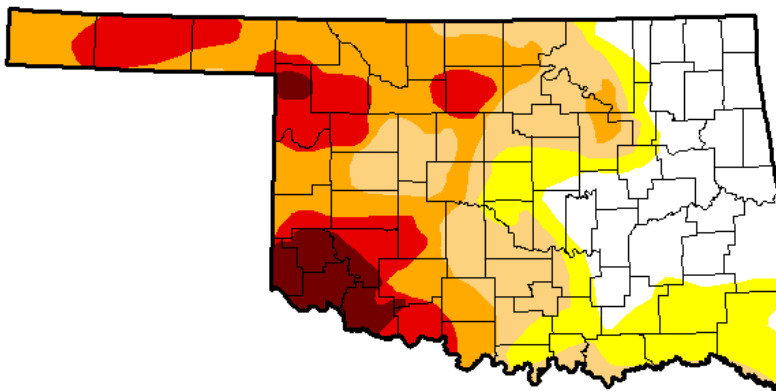
According to the [U.S. Drought Monitor](#) (USDM) from December 2, 2014 (Figs 2, 3), Severe Drought (D2) conditions were occurring across portions of southeastern Osage, eastern Pawnee, northern Creek, and far western Tulsa Counties in eastern OK. Moderate Drought (D1) conditions were present across portions of Osage, Pawnee, eastern Kay, western Tulsa, and Creek Counties in eastern OK. Abnormally Dry (D0), but not experiencing drought, conditions existed across areas of Osage, far southern Washington, Tulsa, far southern Creek, northern Okmulgee, far southern Le Flore, Pushmataha, and Choctaw Counties in eastern OK. Drought/abnormally dry conditions were not present in northwest AR.

U.S. Drought Monitor Oklahoma

December 2, 2014
(Released Thursday, Dec. 4, 2014)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	24.48	75.52	60.29	40.85	18.33	5.04
Last Week <i>11/25/2014</i>	24.48	75.52	59.85	40.85	18.33	5.04
3 Months Ago <i>9/2/2014</i>	19.50	80.50	70.40	46.15	16.51	2.25
Start of Calendar Year <i>12/1/2013</i>	50.84	49.16	38.17	18.99	4.84	2.40
Start of Water Year <i>9/30/2014</i>	8.55	91.45	73.31	58.13	20.92	4.64
One Year Ago <i>12/2/2013</i>	52.66	47.34	30.90	15.93	4.92	2.40



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:
Anthony Artusa
NOAA/NWS/NCEP/CPC

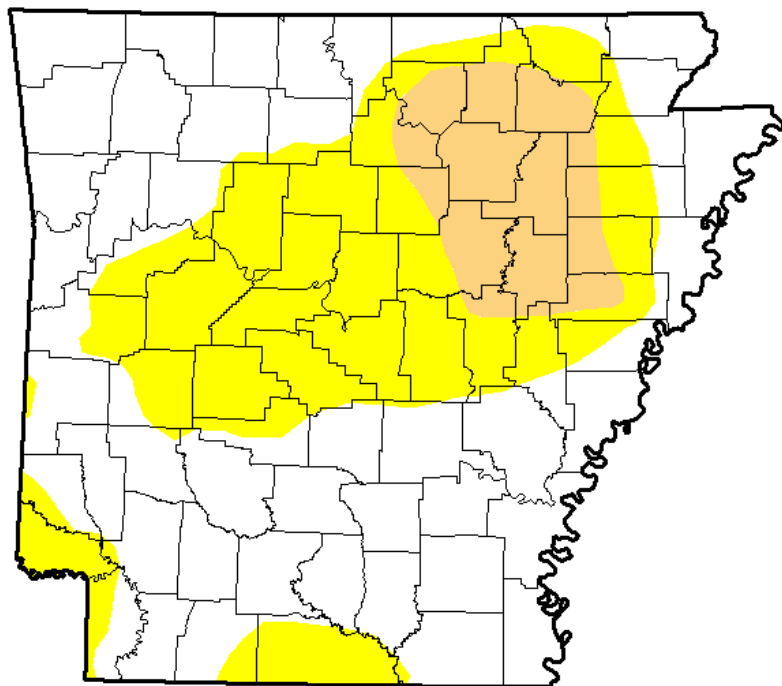


<http://droughtmonitor.unl.edu/>

Fig. 2. Drought Monitor for Oklahoma

U.S. Drought Monitor Arkansas

December 2, 2014
(Released Thursday, Dec. 4, 2014)
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	57.78	42.22	10.54	0.00	0.00	0.00
Last Week 11/25/2014	57.78	42.22	10.54	0.00	0.00	0.00
3 Months Ago 9/2/2014	86.17	13.83	2.36	0.00	0.00	0.00
Start of Calendar Year 12/1/2013	96.56	3.44	0.00	0.00	0.00	0.00
Start of Water Year 9/30/2014	54.54	45.46	9.13	0.00	0.00	0.00
One Year Ago 12/2/2013	86.07	13.93	1.99	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:
Anthony Artusa
NOAA/NWS/NCEP/CPC



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

Fig. 3. Drought Monitor for Arkansas

Outlooks

The [Climate Prediction Center](#) (CPC) outlook for December 2014 (issued November 30, 2014) indicates an enhanced chance for above median precipitation across all of northeast OK and northwest AR, with the highest chances along and south of I-40. This outlook also indicates a slightly enhanced chance for above normal temperatures across eastern OK and northwest AR, except along the Red River, where there is an equal chance for above, near, and below normal temperatures. This outlook is based on short-range forecasts of expected weather conditions, primarily during the first part of the month when a positive North Atlantic Oscillation (NAO) circulation is expected to be in place. A positive NAO usually causes the southern U.S. to be warmer than climatology.

For the 3-month period December-January-February 2014-15, CPC is forecasting an enhanced chance for below normal temperatures across all of eastern OK and northwest AR. This outlook also indicates a slightly enhanced chance for above median rainfall across far southeast OK, and equal chances for above, near, and below median precipitation across the rest of eastern OK and northwest AR (outlook issued November 20, 2014). According to CPC, current atmospheric observations continue to indicate ENSO neutral conditions; however, the oceanic observations are suggestive of El Niño conditions. Taken together, the observations indicate ENSO-neutral conditions remain. Forecast models still indicate the development of El Niño, but the continued weak atmospheric response this late in the season suggests that a weak El Niño event is most probable. CPC is forecasting a 60% chance for El Niño development and a 40% chance for a continuation of ENSO-neutral conditions through the winter. Therefore, this outlook is based on both statistical and dynamical forecast tools and considering weak El Niño conditions.

Summary of Precipitation Events

November 1-15

A cold front moved into the region and interacted with a plume of Pacific moisture, bringing widespread rain to eastern OK and northwest AR on the 3rd – 4th. The rain began during the evening of the 3rd, and became more intense and widespread over northeast OK late that night. The area of rain began to spread further south during the morning hours of the 4th, before ending northwest to southeast later in the day. A few light showers remained over far southeast OK late on the 4th and into the first part of the 5th. Most of the HSA received 1"-2" of rain during this event, with isolated areas of northeast OK getting 2"-2.5" (Figs. 4, 5). Since most of this was a slow, steady rain, no flooding problems were reported.

November 16-30

A strong cold front brought the first snow of the season to eastern OK and northwest AR on the 16th. A large portion of the HSA received a trace to half an inch of snow. Two bands of heavier bands of 1"-3" of snow developed, one near the OK/KS state line and the other along the I-40 corridor in east central OK (Figs. 6, 7). Liquid equivalent totals were only around 0.10" or less.

Scattered light showers developed as a weak warm front moved north across the area starting during the early morning hours of the 21st and continuing through the day. 0.10"-0.30" of rain fell across the affected locations, with a few isolated places in northeast OK receiving around 0.50".

More widespread rainfall occurred on the 22nd as an upper-level low over northern Mexico moved east across TX. Little rain fell northwest of I-44, while elsewhere, rainfall totals were primarily 0.25"-2". Higher totals of 2"-3" occurred across Okfuskee and southern Okmulgee Counties (Figs. 8, 9). The rain shifted east of the area by early on the 23rd. A cold front then moved through the region on the 23rd as a strong short-wave trough moved southeast across the central and southern plains. Most locations north of I-40 received 0.10" or less of rain from this system, with higher totals of 0.25" to around 1" in the northeast OK and northwest AR counties that border Missouri.

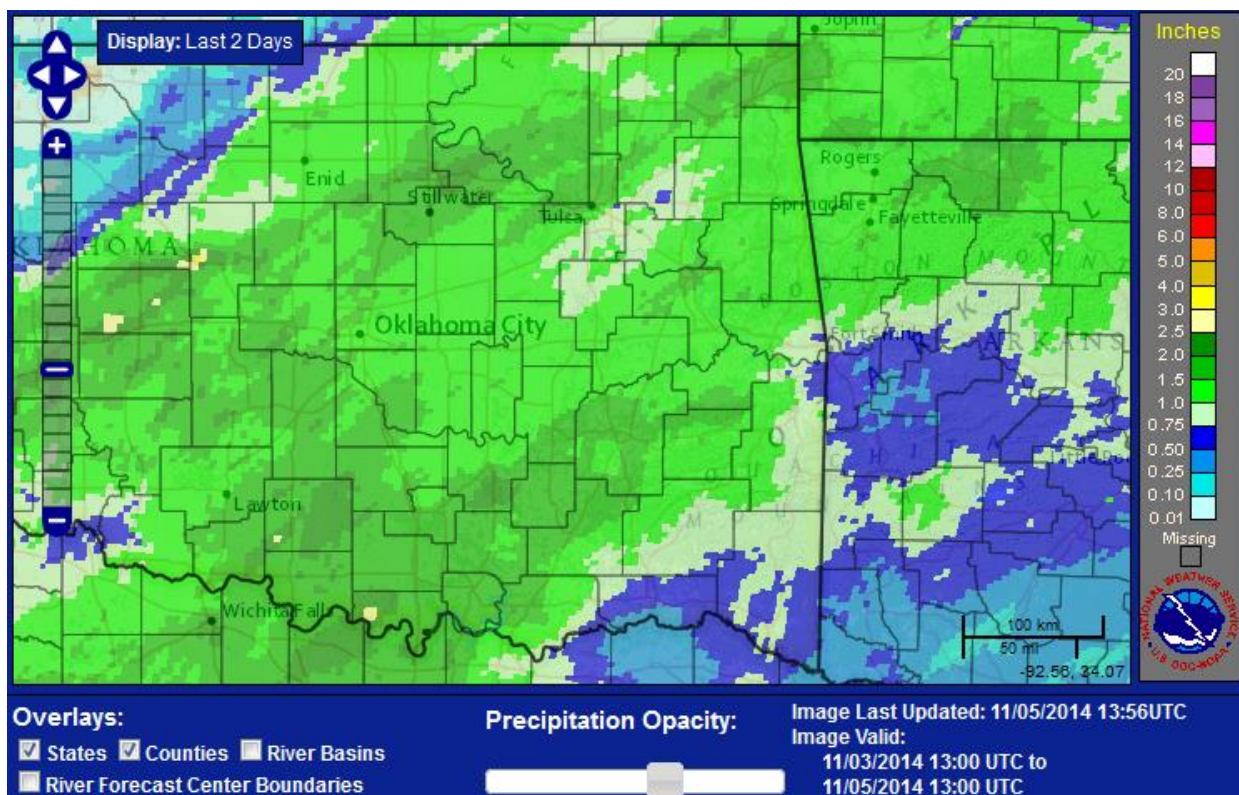
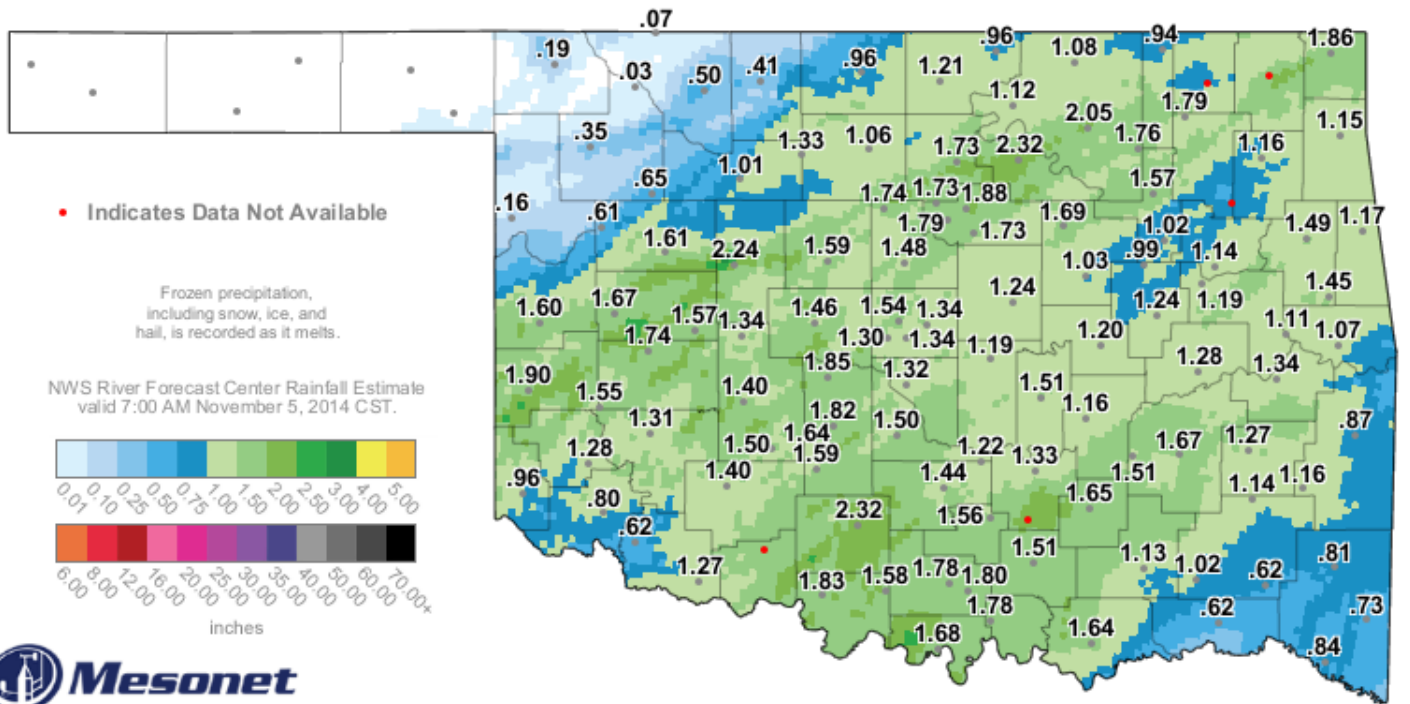


Fig. 4. 2-day Estimated Observed Rainfall ending at 9am CDT 11/05/2014.



2-Day Rainfall (inches)

Fig. 5. 2-day Estimated Observed Rainfall (image) and OK Mesonet Measurements ending at 8:25am CST 11/05/2014.

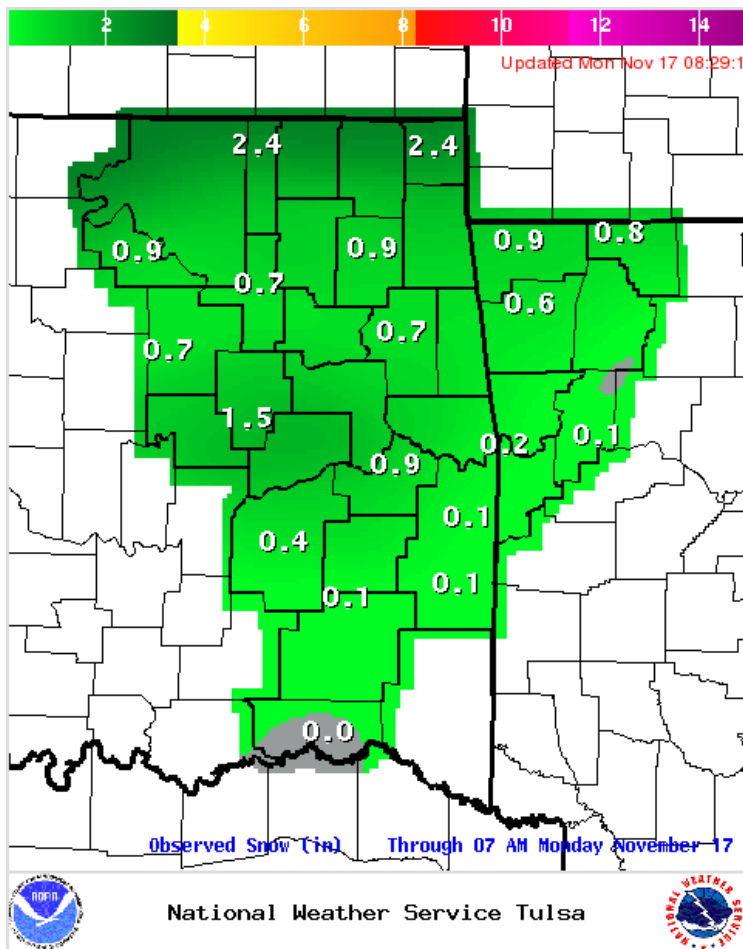


Fig. 6. Observed snowfall for 11/16/2014.

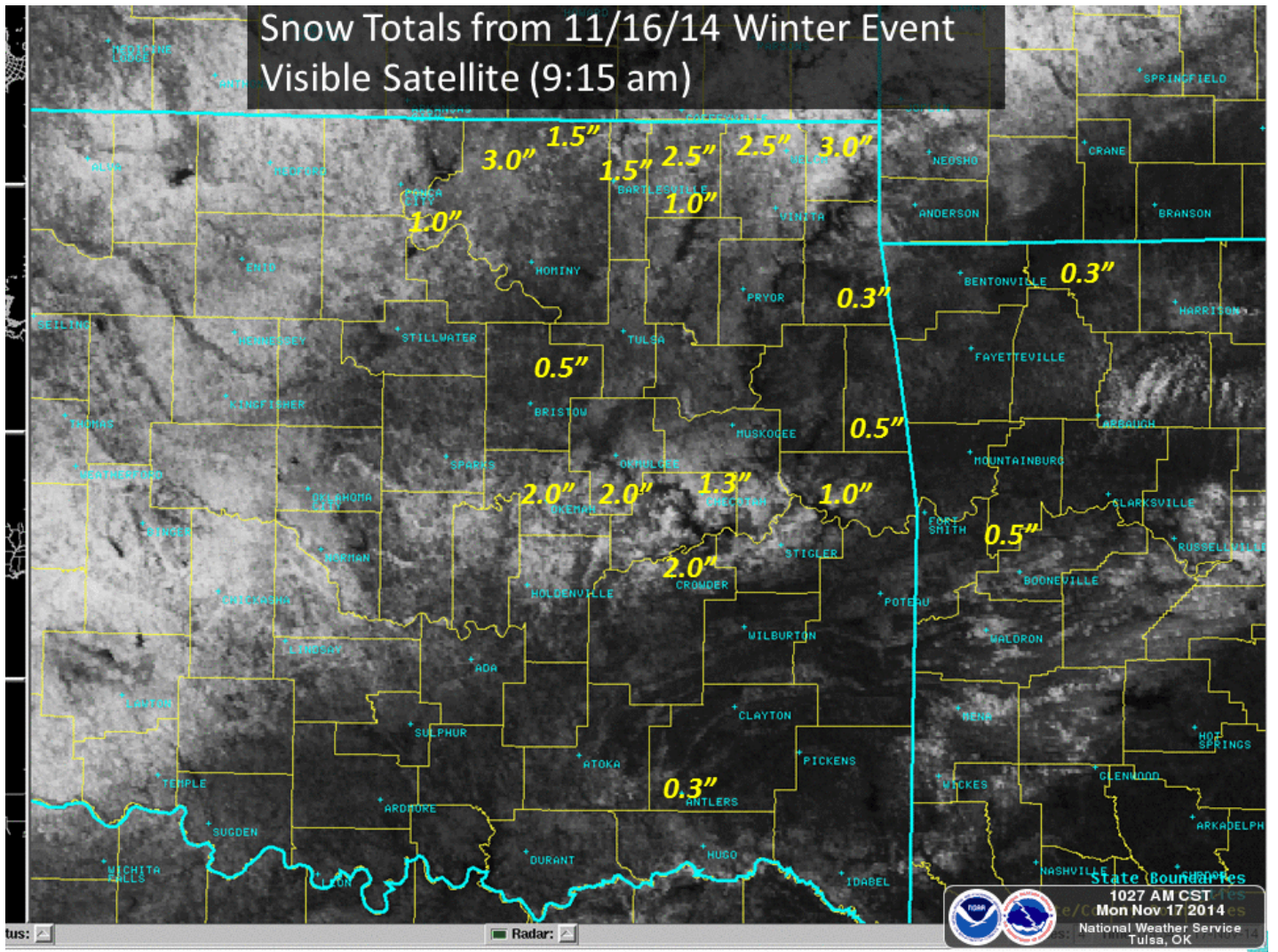


Fig. 7. Observed snowfall for 11/16/2014 and visible satellite image (9:15am 11/17/2014) showing snow (white areas).

Tulsa, OK (TSA): Current 14-Day Observed Precipitation
Valid at 12/2/2014 1200 UTC- Created 12/3/14 18:21 UTC

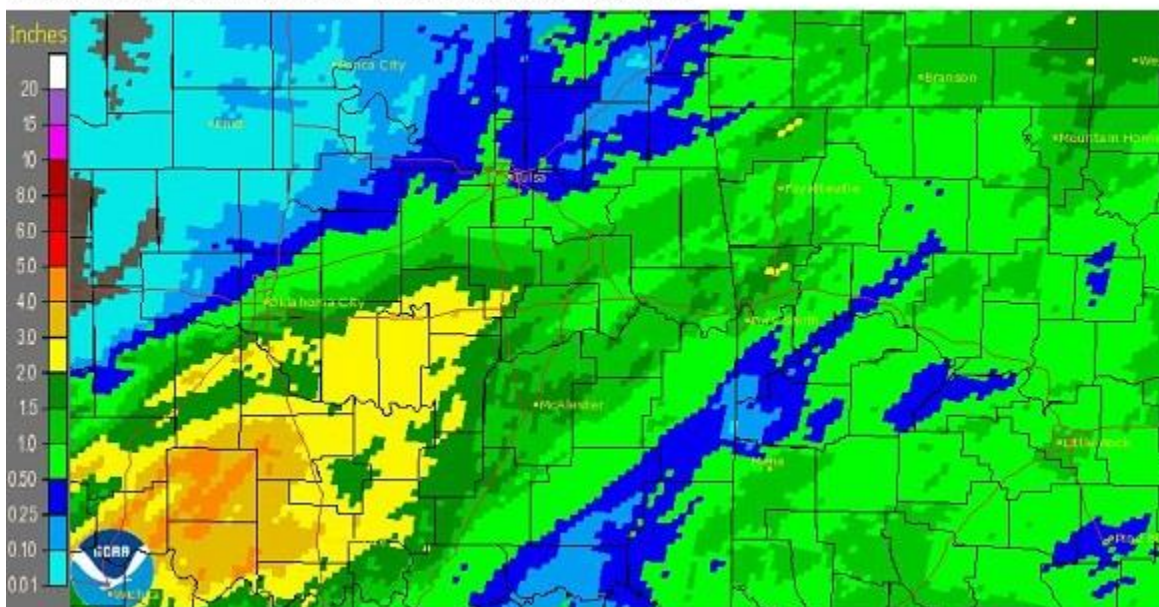


Fig. 8. 14-day Estimated Observed Rainfall ending at 7am CDT 12/02/2014 showing rainfall totals from Nov. 21-23, 2014.

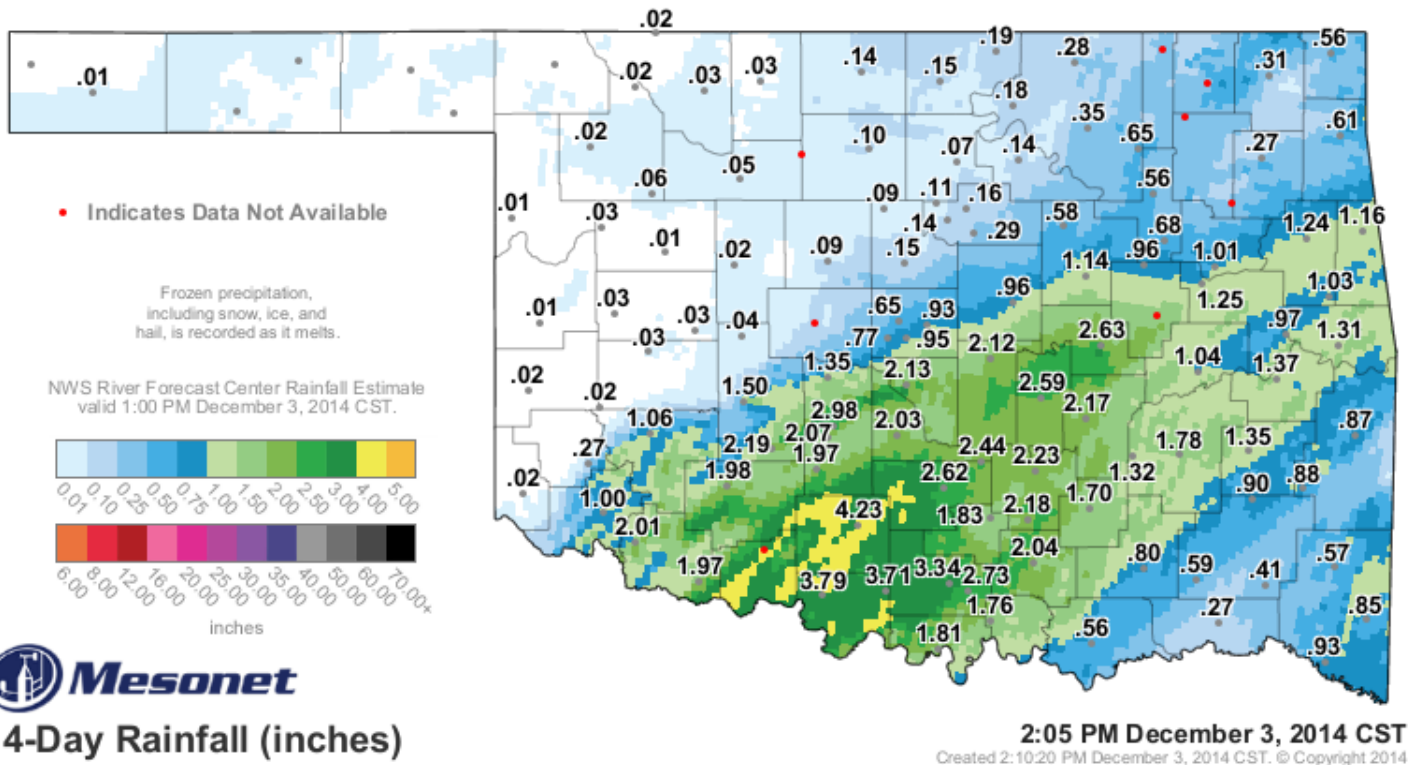


Fig. 9. 14-day Estimated Observed Rainfall (image) and OK Mesonet Measurements ending at 2:05pm CST 12/03/2014 showing rainfall totals from Nov. 21-23, 2014.

Written by:

Nicole McGavock
Service Hydrologist
WFO Tulsa

Products issued in November 2014:

*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/CAN)
- 0 Urban and Small Stream Advisories (FLS)
- 0 Areal Flood Warnings (FLW)
- 0 Areal Flood Statements (FLS)
- 0 River Flood Warnings (FLW)
- 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)
- 1 Drought Information Statements (DGT)

Preliminary Hydrographs:

None