

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

REPORT FOR:
 MONTH **September** YEAR **2012**

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
October 1, 2012

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.

Hot and dry conditions dominated the first half of September 2012, while rainfall began to make a return to the region by the end of the month. Normal rainfall for September ranges from 4.2 inches in Okmulgee County to 5.4 inches in Delaware County. In the Ozark region of northwest Arkansas, rainfall averages 4.5 inches for the month.

Monthly Summary

Using the radar-derived estimated observed precipitation from the RFCs (Fig. 1a), rainfall totals for September 2012 ranged from around 1" in a few spots of northeast OK to around 8" in isolated areas of eastern OK and west central AR. Most of the HSA received 1.5" to 4" of rain this month. Western Okfuskee and most of Franklin Counties received above normal rainfall this September, while the remainder of the area only saw 25%-75% of the normal rainfall for September (Fig. 1b). Portions of Osage and Washington Counties in northeast OK were very dry, only getting 10%-25% of the normal rainfall this month.

Tulsa, OK (TSA): September, 2012 Monthly Observed Precipitation
 Valid at 10/1/2012 1200 UTC- Created 10/1/12 13:43 UTC

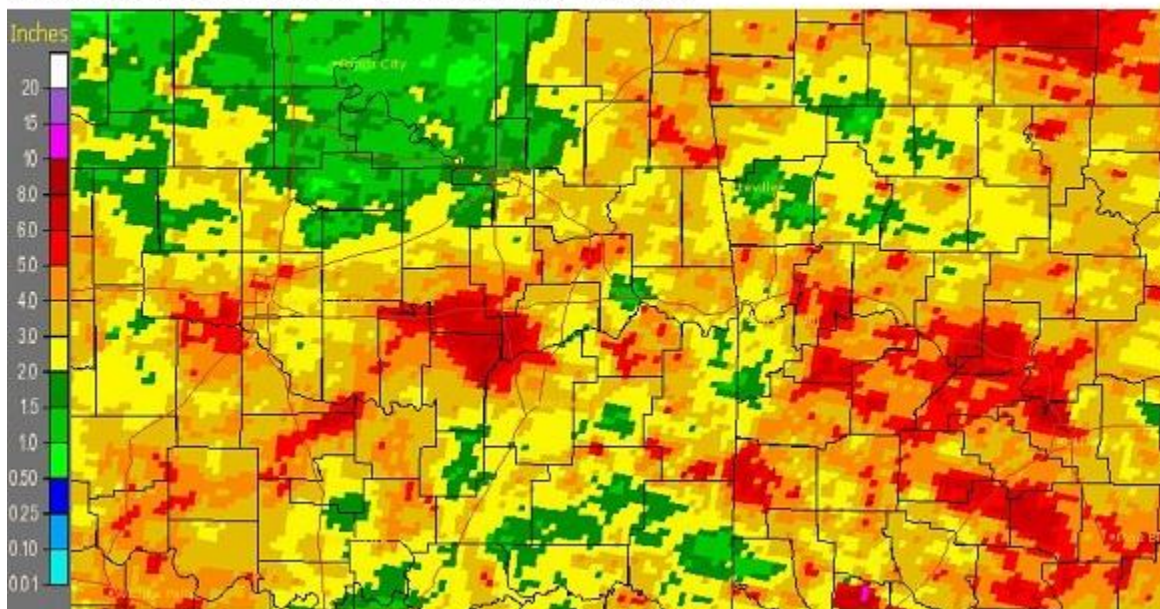


Fig. 1a. Estimated Observed Rainfall for September 2012

Tulsa, OK (TSA): September, 2012 Monthly Percent of Normal Precipitation
 Valid at 10/1/2012 1200 UTC- Created 10/1/12 13:46 UTC

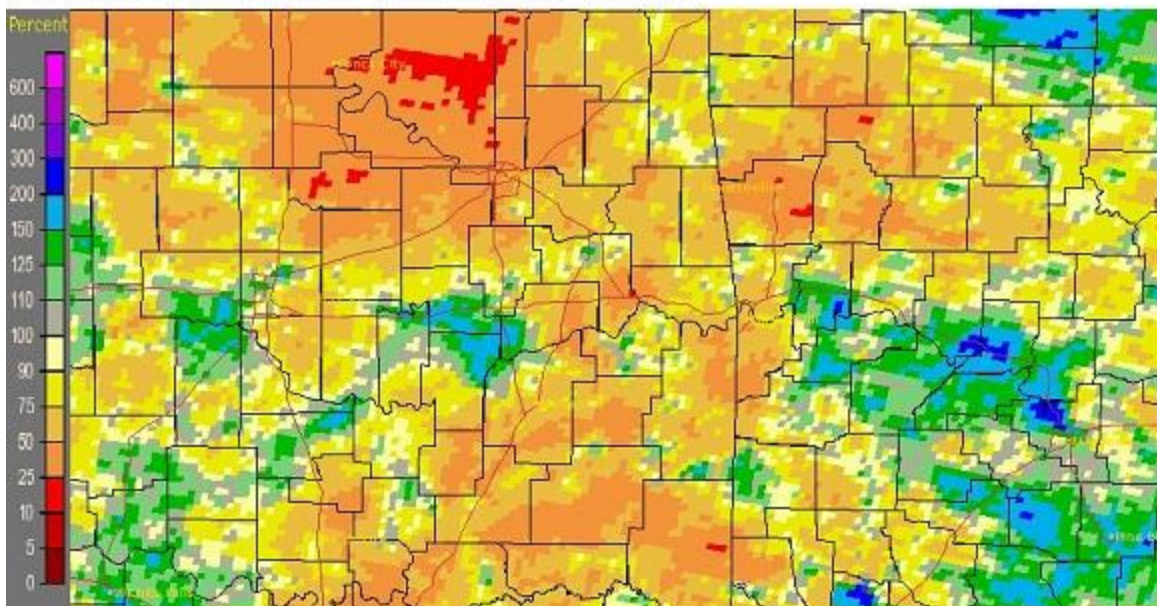


Fig. 1b. Estimated % of Normal Rainfall for September 2012

In Tulsa, OK, September 2012 ranked as the 27th warmest September (75.9°F; since records began in 1905) and the 33rd driest September (1.78"; since records began in 1888). Fort Smith, AR was the 19th warmest September (77.3°F) and the 35th driest September (1.79") since records began in 1882. Fort Smith was ≥100°F on 6 days, ranking as the 3rd most number of days in September (tied with 1925, 2000); Tulsa had 5 days ≥100°F, ranking as the 11th highest number of days (tied with 1913, 1978, 1998).

Some of the larger precipitation reports (in inches) for September 2012 included:

Okemah, OK (meso)	6.91	Mountainburg 2NE, AR (coop)	6.16	Stigler, OK (meso)	5.95
Ozark, AR (coop)	5.32	Okmulgee, OK (meso)	5.13	Muskogee, OK (ASOS)	4.92
Jay, OK (meso)	4.82	Spavinaw, OK (coop)	4.74	Cookson, OK (meso)	4.69

Some of the lowest precipitation reports (in inches) for September 2012 included:

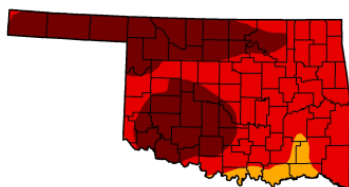
Ralston, OK (coop)	1.05	Bartlesville, OK (ASOS)	1.06	Wynona, OK (meso)	1.11
Foraker, OK (meso)	1.22	Pawnee, OK (coop)	1.27	Burbank, OK (meso)	1.33
Copan, OK (meso)	1.40	Pawnee, OK (meso)	1.47	Clayton 14 WNW, OK (coop)	1.61

U.S. Drought Monitor

September 25, 2012
Valid 7 a.m. EST

Oklahoma

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	99.98	95.33	42.09
Last Week (09/18/2012 map)	0.00	100.00	100.00	99.87	95.33	42.09
3 Months Ago (06/26/2012 map)	0.32	99.68	48.03	17.00	3.90	0.00
Start of Calendar Year (12/27/2011 map)	14.83	85.17	78.76	50.55	27.48	3.33
Start of Water Year (09/27/2011 map)	0.00	100.00	100.00	100.00	78.97	66.42
One Year Ago (09/20/2011 map)	0.00	100.00	100.00	100.00	90.00	66.42



Intensity:
 D0 Abnormally Dry
 D1 Drought - Moderate
 D2 Drought - Severe
 D3 Drought - Extreme
 D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://droughtmonitor.unl.edu>

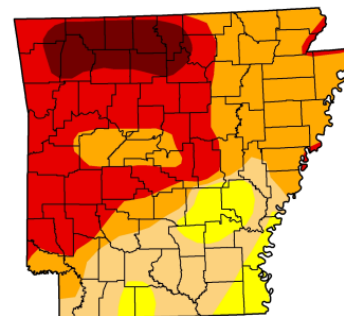


U.S. Drought Monitor

September 25, 2012
Valid 7 a.m. EST

Arkansas

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.11	99.89	91.37	73.93	41.99	8.74
Last Week (09/18/2012 map)	0.11	99.89	91.37	73.93	41.99	8.74
3 Months Ago (06/26/2012 map)	0.00	100.00	98.55	87.29	31.73	0.00
Start of Calendar Year (12/27/2011 map)	86.20	13.80	3.95	1.06	0.23	0.00
Start of Water Year (09/27/2011 map)	1.21	98.79	75.99	39.48	18.92	1.53
One Year Ago (09/20/2011 map)	2.18	97.82	76.51	32.02	15.82	1.53



Intensity:
 D0 Abnormally Dry
 D1 Drought - Moderate
 D2 Drought - Severe
 D3 Drought - Extreme
 D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://droughtmonitor.unl.edu>



Fig. 2. Drought Monitor for Oklahoma

Fig. 3. Drought Monitor for Arkansas

According to the [U.S. Drought Monitor](http://droughtmonitor.unl.edu) (USDM) from September 25, 2012 (Figs 2, 3), all of eastern OK and northwest AR was in severe to Exceptional drought. Severe (D2) drought was present across Choctaw and western Pushmataha Counties. Exceptional (D4) drought was occurring over portions of Osage and northern

Pawnee Counties in eastern OK and eastern Benton, eastern Washington, Carroll, and Madison Counties in northwest AR. Extreme drought (D3) conditions existed across the remainder of the area.

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

Rank since 1921	Sept. 2012	Last 60 Days (Aug 2 – Sep 30)	Last 90 Days (Jul 3 – Sep 30)	Last 120 Days (Jun 3 – Sep 30)	Last 180 Days (Apr 4 – Sep 30)	Year-to-Date (Jan 1 – Sep 30)	Water Year (Oct 1, 2011 – Sep 30, 2012)
Northeast OK	32 nd driest	26 th driest	14 th driest	9 th driest	5 th driest	21 st driest	26 th driest
East Central OK	37 th driest	42 nd driest	26 th driest	15 th driest	3 rd driest	9 th driest	25 th driest
Southeast OK	30 th wettest	39 th driest	44 th driest	25 th driest	4 th driest	24 th driest	41 st driest
Statewide	38 th driest	30 th driest	16 th driest	10 th driest	3 rd driest	17 th driest	33 rd driest

Most of the major reservoirs in the Tulsa HSA were operating below 90% of their conservation pools as of October 1, 2012. However, 2 reservoirs were operating above their conservation pools: Grand/Pensacola Lake 103% and Hudson Lake 104%. Reservoirs reporting conservation pool deficits as of October 1, 2012: Heyburn Lake 39%, Hugo Lake 48%, Birch Lake 64%, Hulah Lake 65%, Beaver Lake 71%, Skiatook Lake 71%, Tenkiller Lake 72%, Eufaula Lake 73%, Keystone Lake 74%, Copan Lake 81%, Wister Lake 85%, and Oologah Lake 85%.

Water Year 2012 (October 1, 2011 – September 30, 2012)

There was generally a northwest to southeast rainfall gradient across eastern OK and northwest AR for Water Year 2012, with amounts ranging from around 25” to around 60” (Fig. 4a). For most of the HSA, these totals represented 10%-50% below normal rainfall for the water year (Fig. 4b). The largest rainfall deficits occurred over northeast OK and northwest AR, where the water year rainfall total was 8” to around 16” below normal (Fig. 4c).

Tulsa, OK (TSA): Current Water-Year (Oct 1) Observed Precipitation
Valid at 10/1/2012 1200 UTC- Created 10/1/12 13:52 UTC

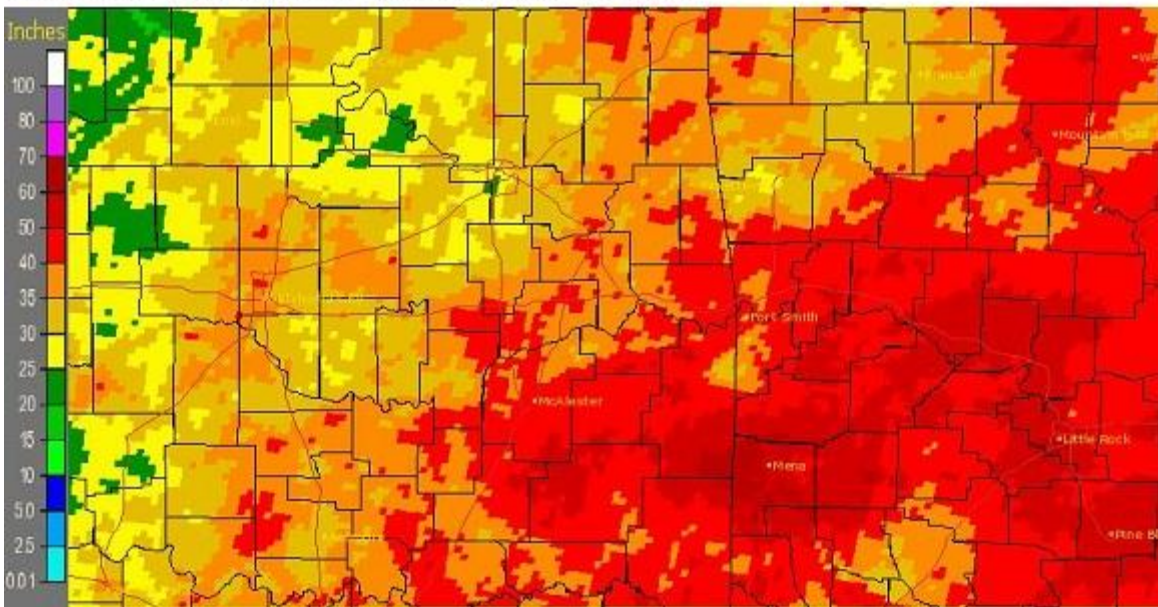


Fig. 4a. Estimated Observed Rainfall for Water Year 2012.

Tulsa, OK (TSA): Current Water-Year (Oct 1) Percent of Normal Precipitation
Valid at 10/1/2012 1200 UTC- Created 10/1/12 13:55 UTC

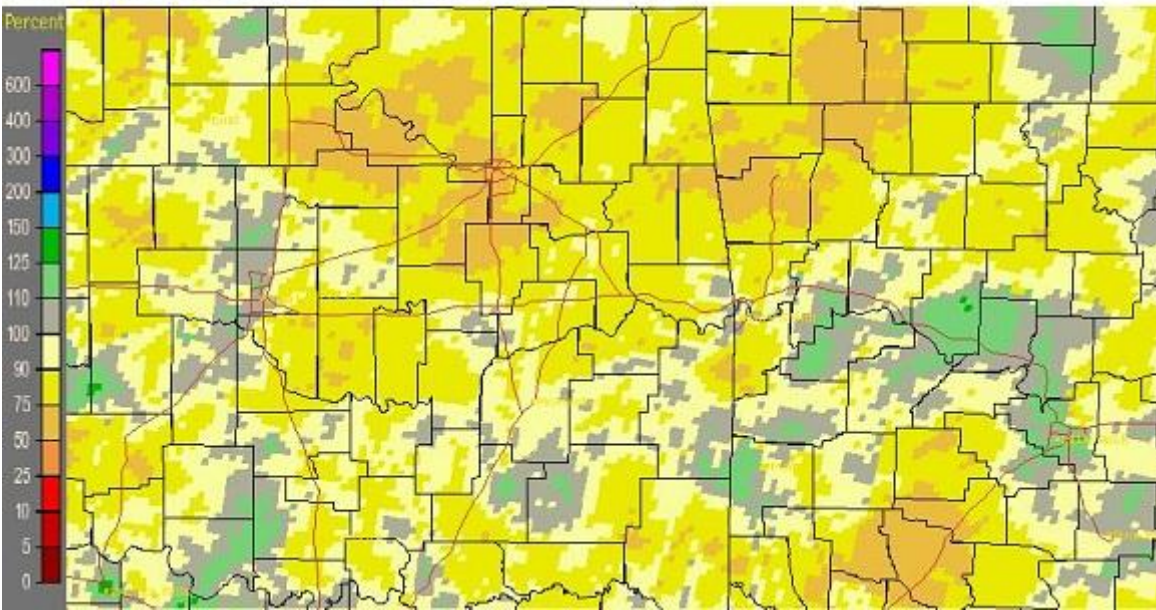


Fig. 4b. Estimated % of Normal Rainfall for Water Year 2012.

Tulsa, OK (TSA): Current Water-Year (Oct 1) Departure from Normal Precipitation
Valid at 10/1/2012 1200 UTC- Created 10/1/12 13:55 UTC

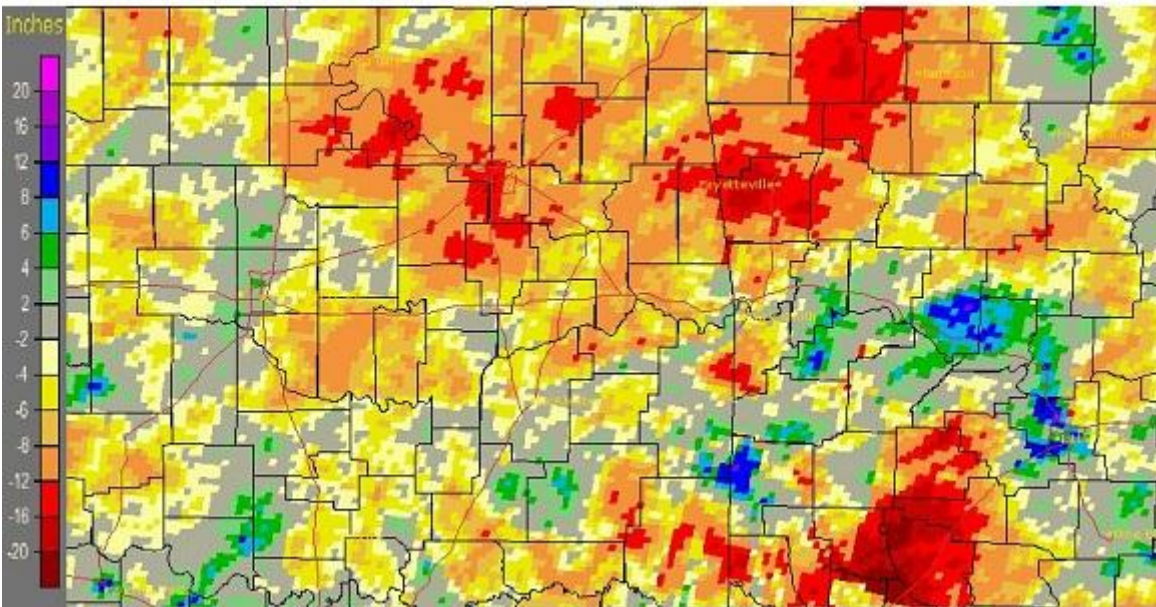


Fig. 4c. Estimated Departure from Normal Rainfall for Water Year 2012.

In Tulsa, OK, Water Year 2012 ranked as Record warmest Water Year (64.7°F; since records began in 1905; previous record 63.6°F in 1925, 1932) and the 31st driest Water Year (32.72"; since records began in 1893). Fort Smith, AR was also the Record warmest Water Year (66.4°F; previous record 64.0°F in 2011) and the 58th wettest Water Year (42.60") since records began in 1882. Fort Smith was $\geq 100^\circ\text{F}$ on 42 days this year, ranking as the 5th most number of days in a year; Tulsa had 38 days $\geq 100^\circ\text{F}$, ranking as the 10th highest number of days (tied with 1956, 1978).

According to statistics from OCS, northeast OK ranked as the 26th driest water year (since records began in 1921), east central ranked as the 25th driest, southeast OK ranked as the 41st driest, and the entire state of Oklahoma ranked as 33rd driest.

Outlooks

The [Climate Prediction Center](#) (CPC) outlook for October 2012 (issued September 30, 2012) indicates a slightly enhanced chance for below normal temperatures (wow!) and equal chances for above, near, and below median precipitation across all of eastern OK and northwest AR. The temperature outlook is based on consistent signatures from the various extended range dynamical computer models, which set up a blocking pattern in the Gulf of Alaska with a downstream trough over North America. However, there conflicting signals in the computer models regarding the rainfall pattern.

For the 3-month period Oct-Nov-Dec 2012, CPC is forecasting a slightly enhanced chance for above average temperatures across northeast OK and northwest AR and equal chances for above, near, and below normal temperatures elsewhere. This outlook also calls for equal chances of above, near, and below median precipitation across the region (outlook issued September 20, 2012). This outlook is based on dynamic computer model output and long term trends. According to CPC, ENSO neutral conditions continued through September, but El Niño conditions should develop this fall. The latest computer models are indicating a weaker El Niño in place by the end of the year compared to model runs over the last 2 months. Therefore, it seems unlikely that strong El Niño conditions will occur. An El Niño watch remains in effect.

Summary of Precipitation Events

September 1 – 12

As the remnants of Hurricane Isaac continued to move into the Midwest, some energy on its periphery was enough to spark isolated showers and thunderstorms in Choctaw County during the heat of the day on September 1. Rainfall was 0.25" to near 2" in the affected locations.

Scattered showers and isolated thunderstorms developed across east central OK and northwest AR ahead of an upper-level disturbance on the 6th. While most locations received between 0.25" and 1", a portion of western Madison County received near 3" of rain. A very strong cold front, the first of this fall season, pushed into northeast OK on the afternoon of the 7th. Wind gusts behind the front reached 57 mph due to the very tight gradient and rapid pressure rises. Thunderstorms developed along or just ahead of the front, one of which was a supercell that developed just east of Bartlesville and tracked just north of Nowata. A broad swath of damage that extended from northwest of Nowata to east of Nowata was investigated by the NWS. Several mobile homes were destroyed in the swath, a number of permanent homes received varying degrees of mainly roof and impact damage, and numerous outbuildings, both steel and wood framed, were destroyed. Three fatalities occurred in a double wide mobile home about 2 miles north of Nowata at about 3:20 pm. Numerous trees were uprooted and numerous power poles were snapped by the wind. The orientation of all the damage within the primary swath strongly suggested a violent downburst had occurred. Wind gusts within the downburst were on the order of 80 to 100 mph at times based on some of the higher end damage within the swath. The supercell also produced hail to the size of baseballs. Eventually, the storm was absorbed into a squall line that swept east southeast across northeast OK and northwest AR. The squall line produced 60-70 mph wind over a broader swath, with numerous reports of downed trees, power lines, and roof damage to buildings. A couple of semi-tractor trailer rigs were overturned on the Will Rogers Turnpike as well. Widespread rain affected all of eastern OK and northwest AR during this event, though the higher rainfall totals of 0.25" to around 1.5" occurred across far eastern OK and western AR (see Fig. 5).

Tulsa, OK (TSA): 9/8/2012 1-Day Observed Precipitation
 Valid at 9/8/2012 1200 UTC- Created 9/18/12 7:43 UTC

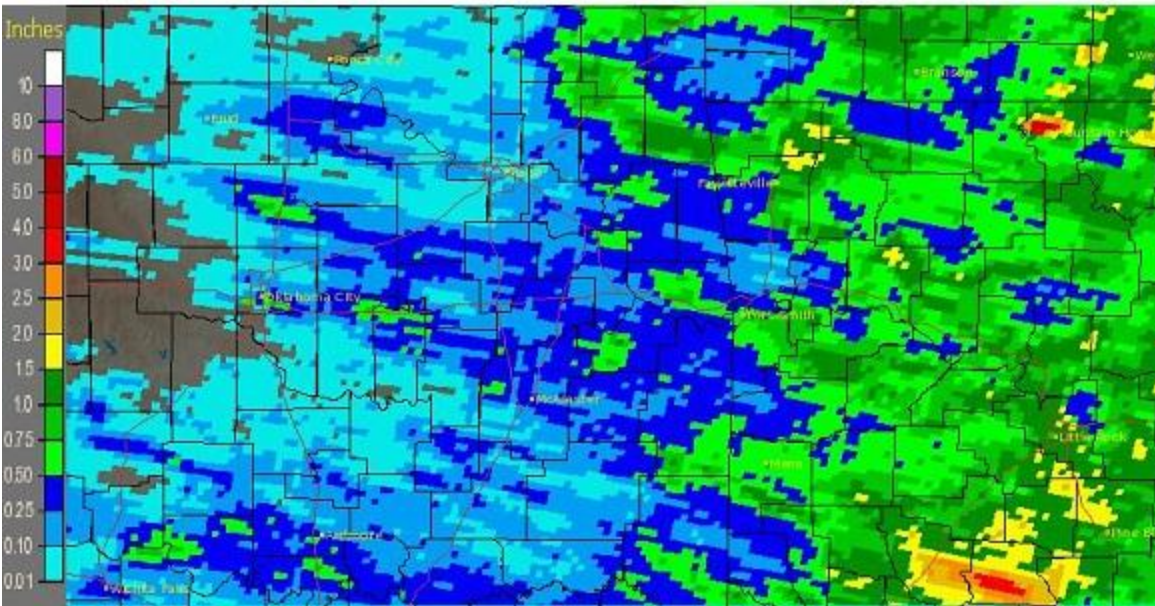


Fig. 5. Estimated 24-hr Observed Rainfall ending at 7am CDT 9/08/2012.

September 13 – 30

Another cold front moved into the region from the northwest during the morning of the 13th, and then slowly moved slowly into southeast OK and west central AR before becoming quasi-stationary in the HSA for several days. Showers and thunderstorms developed both ahead of and behind the front as good moisture continued to flow into the area and an upper-level trough continued to have influence over the region. Some of the storm activity was slow moving, allowing for higher rainfall accumulations of 1.5" to near 4" on the 13th and 14th (see Figs. 6, 7).

Measured 24-hr rainfall totals ending at 7am 9/14/2012 included:

Nowata 2.6WNW, OK	2.15"	New Eucha 5W, OK	1.95"	Nowata 3NNE, OK	1.91"
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Measured 24-hr rainfall totals ending at 7am 9/15/2012 included:

Odell 2N, AR	3.15"	Kansas 6ESE, OK	2.78"	Stigler 6SSE, OK	2.70"
Bella Vista 1.6ENE, AR	2.33"	Ratcliff, AR	2.18"	New Eucha 5W, OK	2.04"
Miami 1E, OK	2.03"	Ozark, AR	2.00"	Chewey 1W, OK	1.97"

Much lighter amounts occurred primarily due to isentropic lift on the 15th and 16th as the front became more diffuse and moved south of the area. Another front affected the region on the 17th, though due to limited moisture this time, only light rain fell in isolated locations of northeast OK. Over the 5-day period, all of the HSA received rainfall, with totals ranging from around 0.10" in southeast OK to over 4" in spots across northeast OK and northwest AR (See Fig. 8).

An active weather pattern developed for the last few days of the month. Scattered showers and thunderstorms affected northeast OK and northwest AR ahead of an approaching cold front during the morning hours of the 26th as a short-wave trough moved through the region. These morning storms set up an outflow boundary near the I-40 corridor, where additional showers and thunderstorms developed later in the afternoon and evening across east central OK. A slow moving supercell, followed by additional back-building storms, brought heavy rain to Okfuskee, far southern Okmulgee, western McIntosh, and northern Pittsburg Counties (see Fig. 9). Rainfall totals in this area were 3" to 6", causing some flash flooding. 4.48" was measured at Okemah and 3.51" was measured 3E of Okemah. An additional measurement of 4.90" was provided by the general public in Okemah. Elsewhere, rainfall totals ranged from 0.10" to around 1.5", with a large portion of northeast OK receiving 0.25" to 1" of rain.

Tulsa, OK (TSA): 9/14/2012 1-Day Observed Precipitation
Valid at 9/14/2012 1200 UTC- Created 9/16/12 23:30 UTC

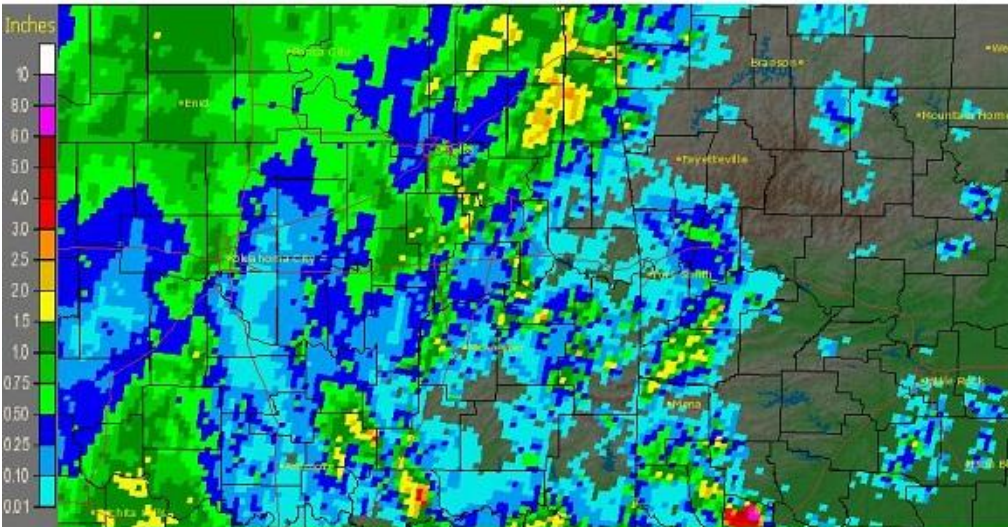


Fig. 6. Estimated 24-hr Observed Rainfall ending at 7am CDT 9/14/2012.

Tulsa, OK (TSA): 9/15/2012 1-Day Observed Precipitation
Valid at 9/15/2012 1200 UTC- Created 9/17/12 23:30 UTC

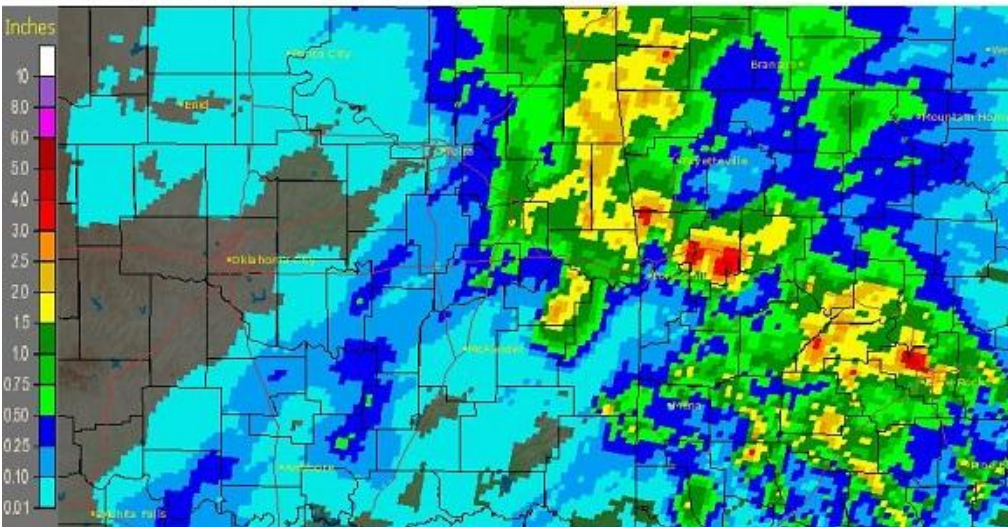


Fig. 7. Estimated 24-hr Observed Rainfall ending at 7am CDT 9/15/2012.

Tulsa, OK (TSA): Current 7-Day Observed Precipitation
Valid at 9/20/2012 1200 UTC- Created 9/20/12 17:56 UTC

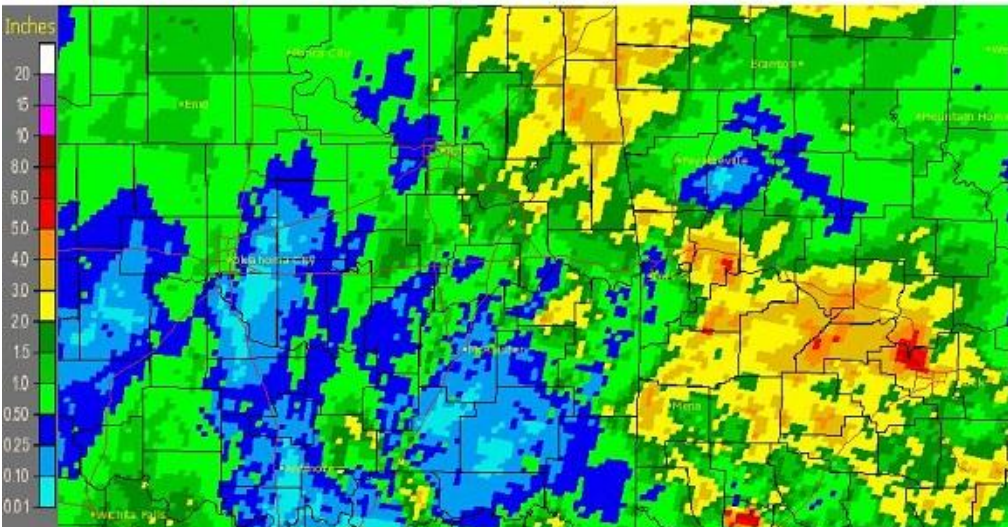


Fig. 8. Estimated 7-day Observed Rainfall ending at 7am CDT 9/20/2012 (rainfall total from Sept. 13 through 17).

Tulsa, OK (TSA): 9/27/2012 1-Day Observed Precipitation
Valid at 9/27/2012 1200 UTC- Created 9/27/12 15:41 UTC

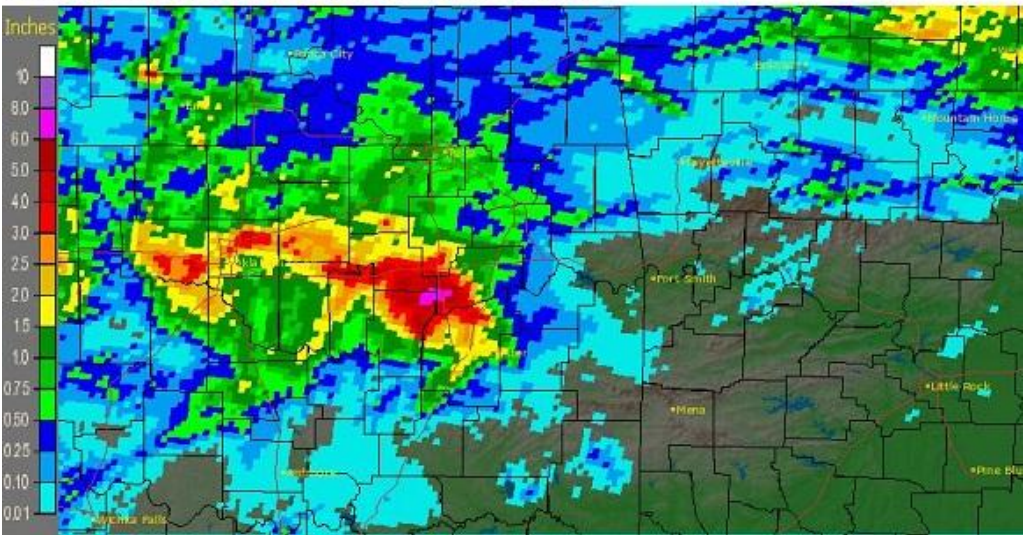


Fig. 9. Estimated 24-hr Observed Rainfall ending at 7am CDT 9/27/2012.

Tulsa, OK (TSA): Current 1-Day Observed Precipitation
Valid at 9/28/2012 1200 UTC- Created 9/28/12 17:41 UTC

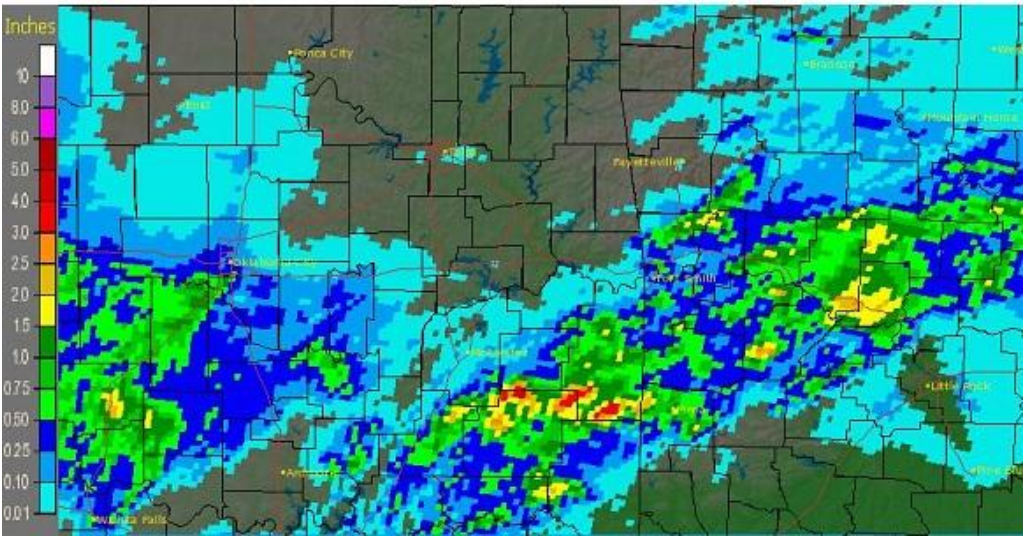


Fig. 10. Estimated 24-hr Observed Rainfall ending at 7am CDT 9/28/2012.

Tulsa, OK (TSA): 9/30/2012 1-Day Observed Precipitation
Valid at 9/30/2012 1200 UTC- Created 10/1/12 15:33 UTC

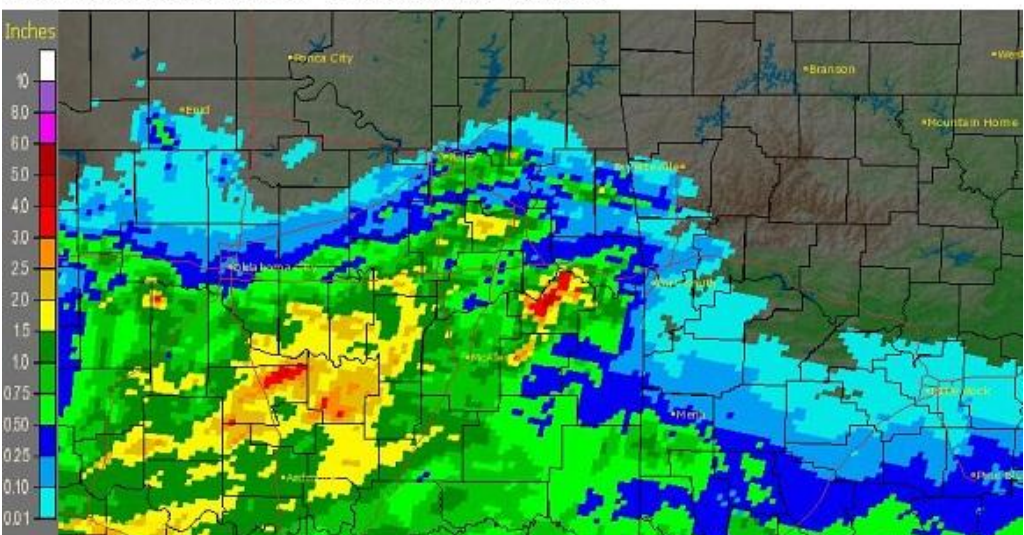


Fig. 11. Estimated 24-hr Observed Rainfall ending at 7am CDT 9/30/2012.

The front shifted further south on the 27th, before weakening near the Red River on the 28th. Pacific tropical moisture from the remnants of Miriam spread over the southern tier of states, aiding in shower and thunderstorm development on the 27th and 28th. Scattered storms developed near the front during the afternoon and evening hours of the 27th across southeast OK and west central AR, generally southeast of a McAlester, OK to Huntsville, AR line. Rainfall totals ranged from 0.25" to around 1.5", with the highest totals of around 3" in spots across far southern Latimer, southern Le Flore, and northern Pushmataha Counties (Fig. 10). Additional widely scattered shower and thunderstorm activity developed on the afternoon of the 28th where surface heating was strongest. The most widespread area affected was near and a few counties north of I-40. Rainfall totals were 0.50" to 1.5", though many affected locations received lesser amounts.

Widespread rain affected mainly eastern OK south of Hwy 412 and southeast of I-44 on the 29th as an upper-level low moved across north central TX. A band of heavy rain occurred near I-40, with much of Haskell County getting 1.5" to around 5" of rain (Fig. 11). 4.98" of rain was measured 4WNW of Stigler. This heavy rain led to some flash flooding in Stigler, where a few roads in town were briefly closed due to high water. The remainder the HSA received around 0.50" to around 1.5" of rain from this event. Light showers lingered over southeast OK on the 30th as the upper-low moved into the ARKLATX region, with an additional 0.50" or less of rainfall.

Written by:

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WFO Tulsa

Products issued in September 2012:

- 3 Flash Flood Warnings (FFW)
- 4 Flash Flood Statements (FFS)
- 0 Flash/Areal Flood Watches (FFA) (0 Watch FFA CON/EXT/CAN)
- 5 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:

No river flooding occurred this month.