

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

REPORT FOR:

MONTH **September** YEAR **2009**

SIGNATURE

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(Meteorologist-in-Charge)

DATE

October 1, 2009

TO: Hydrometeorological Information Center, W/OH2
NOAA / National Weather Service
1325 East West Highway, Room 7230
Silver Spring, MD 20910-3283

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)

September 2009 was another wet month across most of the Hydrologic Service Area (HSA). 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.

Summary of Rain Events

September 1-7:

An upper level low was positioned over the region for the first week of September 2009, bringing waves of showers and thunderstorms to eastern OK and northwest AR. Most of this activity occurred during the overnight and morning hours in response to the low-level jet. On the 1st, generally light rain affected most of northeast and east central OK, with rainfall totals around one half inch or less. Higher amounts up to around 1.5 inches were estimated in Rogers County. Heavier and more widespread rainfall affected the entire HSA on the 2nd, where 24-hour rainfall totals around 1 inch were common. A few locations in eastern OK received 2 to 3 inches (see Fig. 1). Light rain again fell across much of the area on the 3rd, with the highest amounts of around 1 inch falling across far southeast OK.

A decaying mesoscale convective system (MCS) brought showers and thunderstorms to locations primarily along and north of I-40 on the morning of Sept. 4. Rainfall amounts of around 0.5 to 1.5 affected locations from Tulsa Co., through Adair Co., to Madison Co., with lighter amounts elsewhere. Scattered showers and thunderstorms developed on the 5th, affecting the southeast half of the HSA. While the rainfall was generally light, 1.5 to 2.5 inches was estimated over Adair Co. and western Washington Co., AR. Isolated to widely scattered convection developed along the higher terrain areas during the heat of the afternoon through the remainder of the Labor Day weekend (Sept 6-7). Rainfall was generally light, though locally heavier amounts near an inch were estimated.

Tulsa, OK (TSA): 9/3/2009 1-Day Observed Precipitation
Valid at 9/3/2009 1200 UTC- Created 9/4/09 10:32 UTC

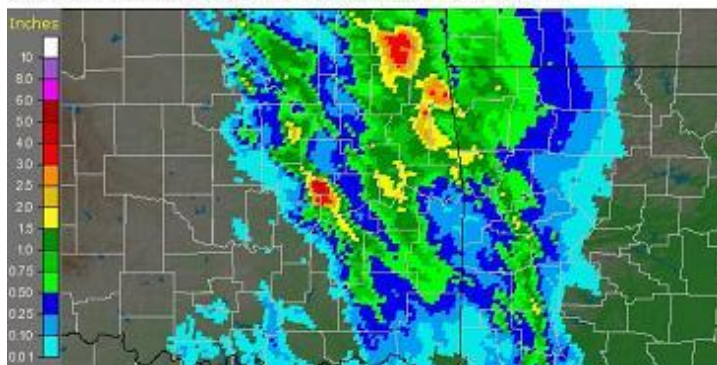


Fig. 1. Estimated 24-hr rainfall ending 7am 9/3/2009.



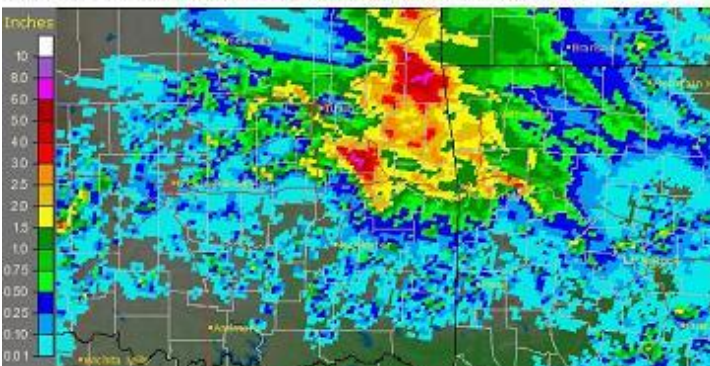
Fig. 2. Hydrograph for Neosho River near Commerce.

September 8-11:

An MCS that dominated over Kansas brought showers and thunderstorms to the northern counties of the HSA on the 8th and early into the 9th. Rainfall totals of 1-2 inches were common in the affected area, with 3-4 inches estimated over portions of Ottawa, Craig, Nowata, and Washington Counties in northeast OK. Heavy rain continued to affect these same locations through the morning hours of the 9th as a stationary front draped over the area enhanced the lift in the a moist atmosphere. This round of storms led to some flash flooding along the Oklahoma-Kansas state line. All of this rain also led to quickly rising river levels in the Neosho and Verdigris Basins. The Neosho River near Commerce rose from 5 ft at 6 am Sept. 9, to 15 ft (flood stage) at around 230 pm that afternoon. The river continued to rise and exceeded moderate flood stage (18 ft) by 330 am on Sept. 10. The river then remained above flood stage for about 6 days due to the wet weather pattern over the region (see Fig. 2). The Verdigris River near Lenapah rose nearly 20ft in a 12-hour period on the 9th, with the river just barely reaching flood stage on the morning of the 10th. Please refer to the E-3 report for additional details on the river flooding.

Persistent low pressure over Oklahoma and Texas brought a steady stream of tropical moisture into the southern plains from September 10-17. During the day on the 9th and into the early morning of the 10th, rain fell between I-44 and I-40 in northeast and east central OK and west central AR. Rainfall totals of 1.5 to 3 inches were common, causing flash flooding in these areas (see Fig. 3). Radar and raingage estimates from the Arkansas-Red Basin River Forecast Center (ABRFC) indicated that most of Delaware County and a large portion of Muskogee County received between 3 and 8 inches of rain in a 24-hour period. The Oktaha cooperative observer reported 4.22 inches of rain from 7 am on the 9th to 7 am on the 10th. Rain continued on the 10th in the vicinity of the stationary front. While widespread rainfall totals were around one half inch or less, portions of Tulsa, Wagoner, Muskogee, McIntosh, Choctaw and Franklin Counties received 1 to 2 inches.

Tulsa, OK (TSA): 9/10/2009 1-Day Observed Precipitation
Valid at 9/10/2009 1200 UTC- Created 9/11/09 10:32 UTC



Tulsa, OK (TSA): 9/22/2009 1-Day Observed Precipitation
Valid at 9/22/2009 1200 UTC- Created 9/22/09 14:45 UTC



Fig. 3. Estimated 24-hr rainfall ending 7am 9/10/2009. Fig. 4. Rainfall estimate from 7am 9/21 to 7am 9/22.

September 12-20:

After one day with little rainfall in the HSA, heavy rain again affected the region on the 12th. Most of the precipitation remained along and south of I-40, where rainfall totals ranged from around 1 to around 2.5 inches. Slow and steady rain continued on the 13th through 16th as the surface low remained entrenched over the Arklatex region. Showers affected all but the far northwest portion of the HSA on the 13th, with widespread rainfall totals of 0.25 to 0.75 inches and isolated higher amounts of 1 to around 1.5 inches. On the 14th, light rain primarily affected far eastern OK and northwest and west central AR. Higher precipitation totals of 0.5 to 2 inches were estimated on the 15th along and southeast of a Clayton, OK to Bentonville, AR line. Less than half an inch fell elsewhere. The spiraling bands of showers shifted slightly further west on the 16th, bringing widespread 1 to 2 inches of rain to locations south of I-40. The remainder of the area received around one half inch of rain or less, with little to no rain near the Oklahoma/Kansas border. On the 17th through 20th, the shower activity became less widespread. The precipitation was generally confined to the area between I-44 and I-40 on the 17th. Rainfall was less than half an inch, except across Tulsa County and far southern Choctaw County where around one inch of rain fell. On the 18th through 20th, only isolated areas of light rain fell.

September 21-30:

A cold front moved into the region on September 21, bringing widespread heavy rain and severe weather to all of eastern Oklahoma and northwest Arkansas. Most of the area received at least 1.5 inches of rain, with many

locations reporting 3 to over 5 inches of rain (see figs. 4 and 5). The rain generally fell within a few hours at any one location, causing widespread flash flooding across portions of northeast OK and northwest AR. Several water rescues were needed as cars became stalled while driving through high water, though no major injuries were reported. Tulsa set a new daily rainfall record of 4.42 inches on September 21st, breaking the old record of 3.50 inches from 1902. The cooperative observers in Odell, AR recorded 4.06 and in St. Paul, AR recorded 4.03 inches on the 21st. Several ALERT rain gages around the City of Tulsa measured over 2 inches of rain in 1 hour and rates of 2.5 to over 3 inches per hour. 3-hour rainfall totals exceeding 4 inches were measured at many of the gages. Additionally, fast rises occurred along area rivers and creeks. The Neosho River near Commerce once again exceeded flood stage at around 4 am on the 22nd and crested at 18.13 feet, leading to moderate flooding early on the 23rd (see E3 report for additional details). Very light rain continued across portions of eastern OK and northwest AR on the 22-24. High pressure kept the last week of the month dry.

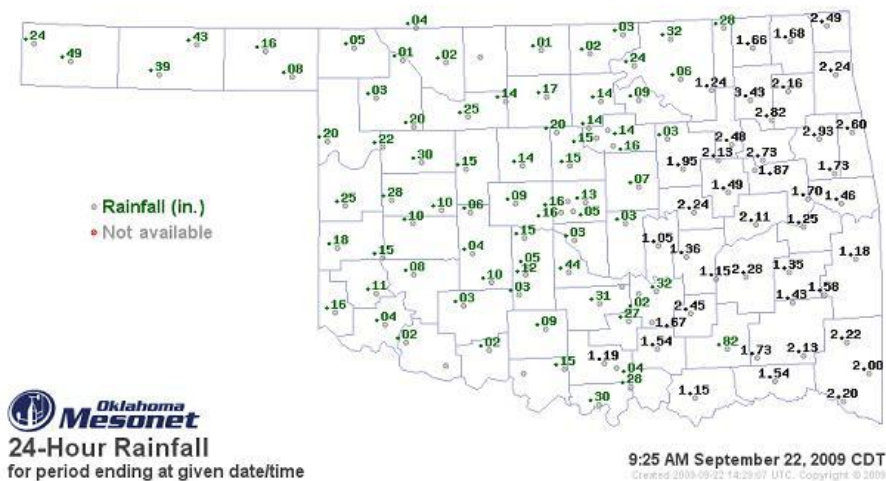


Fig. 5. 24-hour rainfall totals ending at 9:25 am 9/22. Courtesy of the Oklahoma Climatological Survey.

Monthly Summary

Using the radar-derived estimated observed precipitation from the RFCs (Fig. 6a.), a large portion of the HSA received between 5 and 8 inches of rain during September 2009, and several areas received over 10 inches of rain. The lowest rainfall totals occurred northwest of a Bristow to Nowata line, where rainfall estimates ranged from 1 to 3 inches for the month. Overall, most of the area received between 125% and 300% of the normal September rainfall (Fig. 6b.). However, locations northwest of a Bristow to Nowata line generally received only 25% to 75% of the normal September rainfall. Eastern Kay, western Osage, and western Pawnee Counties had the biggest deficits, receiving only 10% to 25% of normal precipitation for the month.

Tulsa recorded 8.29 inches of rain for September 2009, making this the 13th wettest September since records began in 1888. Fort Smith tied as the 9th wettest September since records began in 1882, with 7.23 inches reported in September 2009. The cooperative observer in Spavinaw, OK reported the highest rainfall in the HSA this month, with 12.05 inches. This observer recorded 5 days with over 1 inch of rain and 2 days with over 3 inches of rain this month.

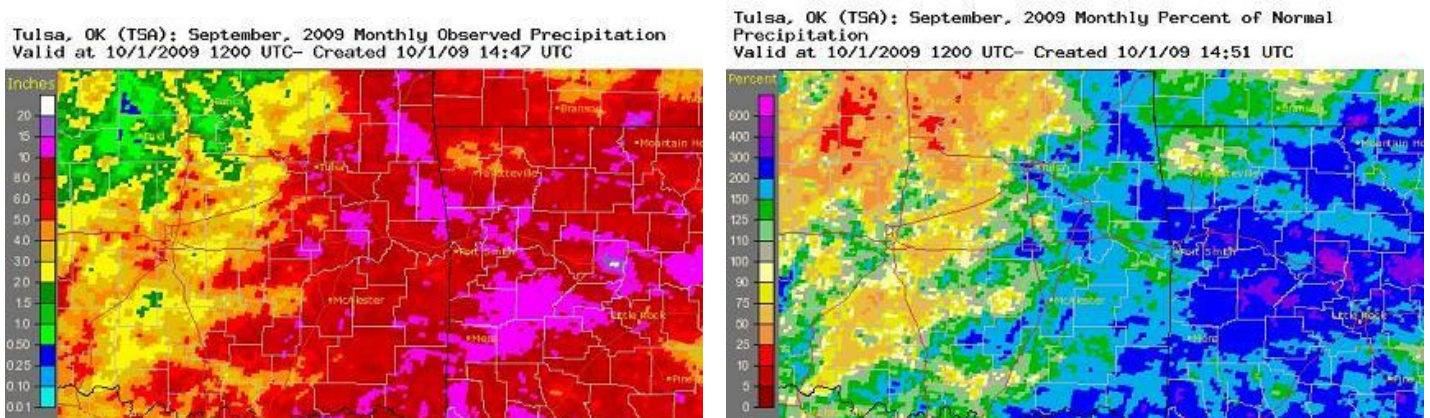


Fig. 6a. Estimated Observed Precipitation for Sep. 2009 6b. Estimated % of Normal Precipitation for Sep. 2009

Some of the larger precipitation reports (in inches) for September 2009 included:

Spavinaw, OK (coop)	12.05	Mountainburg 2NE, AR (coop)	11.72	Oktaha 2NE, OK (coop)	11.23
Odell 2N, AR (coop)	11.19	Vinita 2N, OK (coop)	11.08	Jenks Riverside Arpt, OK (ASOS)	10.44
Muskogee, OK (ASOS)	10.20	Cookson, OK (meso)	9.93	Bixby, OK (meso)	9.72

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

Rank since 1921	September 2009	Last 60 days	Last 90 days	Water Year (Oct. 1, 2008 – Sep. 30, 2009)	Year-to-Date (Jan. 1 – Sep. 30)
Northeast OK	22 nd wettest	18 th wettest	15 th wettest	33 rd wettest	24 th wettest
East Central OK	15 th wettest	9 th wettest	13 th wettest	36 th driest	26 th wettest
Southeast OK	6 th wettest	10 th wettest	4 th wettest	30 th wettest	11 th wettest

According to the U.S. Drought Monitor (USDM) from September 29, 2009, drought conditions did not exist across northeast OK and northwest AR.

The major reservoirs in the Tulsa HSA reported levels within 6% of their flood pools by September 30, 2009, with the exceptions of Pensacola Lake (19% of flood pool), Oologah Lake (16% of flood pool), and Wister Lake (10% of flood pool). Skiatook Lake was reporting 95% of its conservation pool, making it the only reservoir reporting levels below flood pool.

The Climate Prediction Center (CPC) outlook for October 2009 (issued September 30, 2009) indicates an enhanced chance for above normal precipitation and equal chances for above, near, and below normal temperatures. For the 3-month period Oct-Nov-Dec 2009, CPC is forecasting equal chances for above, near, and below normal temperature and precipitation (outlook issued September 17, 2009). Sea-surface temperatures in the equatorial Pacific indicate that weak El Niño conditions currently exist. These conditions are expected to strengthen this fall and winter, with at least a moderate El Niño expected by this coming winter. An El Niño Advisory remains in effect.

Written by:
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WFO Tulsa

Products issued:

- 4 River Flood Warnings
- 42 River Flood Statements
- 0 River Flood Advisories
- 0 River Flood Watches
- 0 River Statements
- 0 Hydrologic Outlooks
- 0 Drought Information Statements