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 **October** YEAR **2010**
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 **November 1, 2010**

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)

[X] An "X" in the box indicates no flood stages were reached in this Hydrologic Service Area (HSA) during the month above.

October 2010 was very dry across eastern OK and northwest AR, with the total monthly rainfall 2" to 4" below normal across most of the area. October is climatologically the fourth wettest month for most the Tulsa HSA, except the Ozark region which stays a little drier than the rest of the Hydrologic Service Area (HSA). Normal rainfall for October ranges from 2.9 inches in Pawnee County to 4.4 inches in Sequoyah County. 3.7 inches is normal across the Ozark region of northwest Arkansas. West central Arkansas averages just under 4 inches, while southeast Oklahoma averages slightly higher amounts of 4.5 inches.

Monthly Summary

Using the radar-derived estimated observed precipitation from the RFCs (Fig. 1a.), rainfall totals for October 2010 ranged from around 3" to less than 0.5" across the HSA. The entire HSA received below normal rainfall this month, with most locations receiving less than 50% of the normal October rainfall (Fig. 1b). Portions of northeast OK and eastern Carroll County were the driest, recording only 5% to 25% of the normal October rain. According to the Oklahoma Climatological Survey (OCS), northeast OK ranked as the 11th driest October on record (see table below).

In Tulsa, OK, October 2010 ranked as the 45th warmest October (63.2°F, since records began in 1905) and was the 23rd driest October (1.23", since records began in 1888). Fort Smith, AR was the 47th warmest October (63.8°F) and was the 38th driest October (1.70") since records began in 1882.

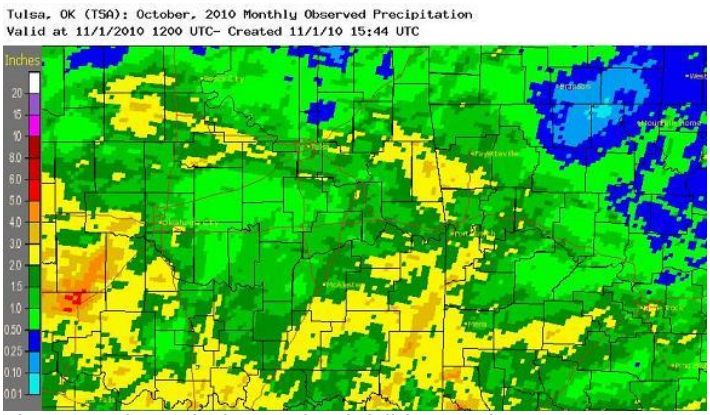
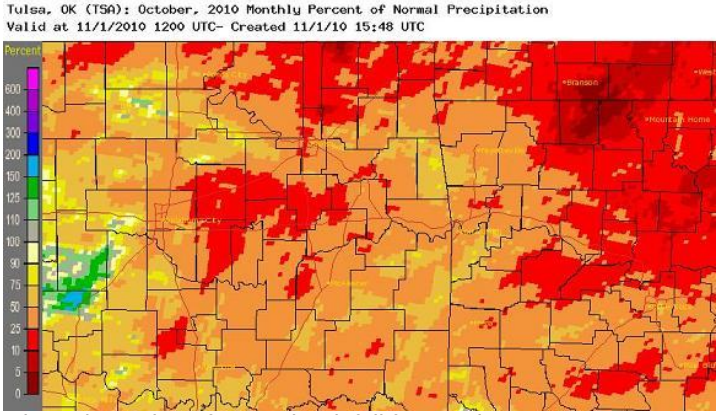


Fig. 1a. Estimated Observed Rainfall for October 2010



1b. Estimated % of Normal Rainfall for October 2010

Some of the larger precipitation reports (in inches) for October 2010 included:

Talihina, OK (meso)	2.63	Westville, OK (meso)	2.50	Tuskahoma, OK (coop)	2.48
Greenwood, AR (coop)	2.44	Odell, AR 2N (coop)	2.37	Clayton, OK (meso)	2.31
Oilton, OK (meso)	2.21	Fayetteville, AR (ASOS)	2.07	Natural Dam, AR (coop)	1.97

According to the U.S. Drought Monitor (USDM) from October 26, 2010, abnormally dry conditions (D0) continued across portions of Pushmataha, Latimer, Le Flore, Okfuskee, and Creek Counties (see Figs. 2 and 3). This is an improvement over the drought conditions at the end of September since the rain this October fell primarily on those areas experiencing the worst drought conditions.

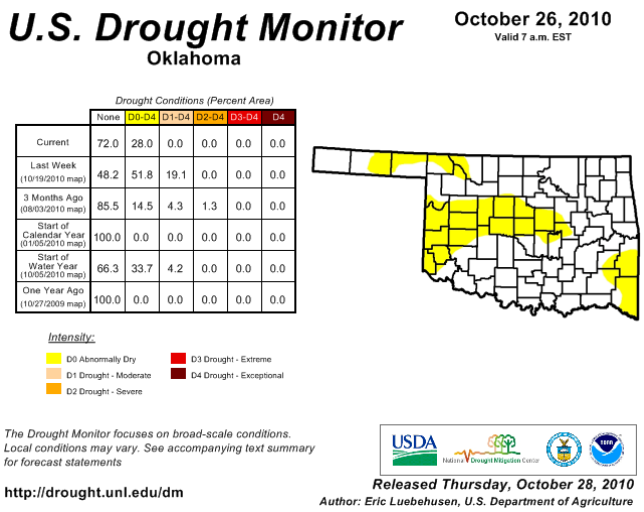


Fig. 2. Drought Monitor for Oklahoma

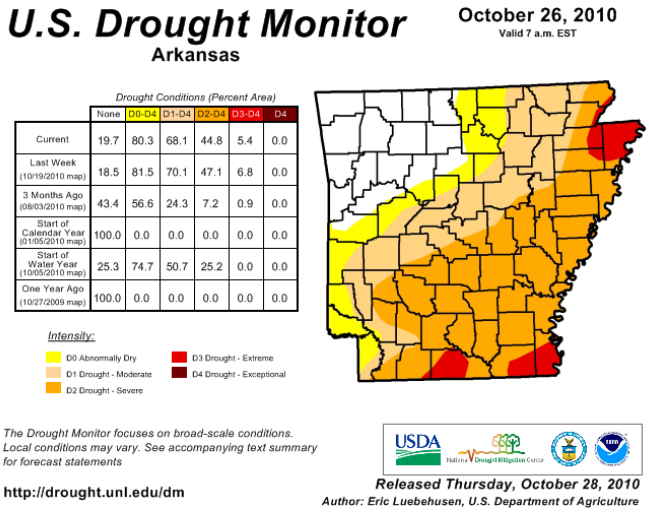


Fig. 3. Drought Monitor for Arkansas

Most of the major reservoirs in the Tulsa HSA were reporting below their normal conservation pools as of November 1, 2010, though a few reported pools that were 95% - 100% full. Well below normal rainfall this month led to considerable drops in pool levels at several reservoirs since the end of October. Conservation pool deficits: Hugo Lake 54%, Ft. Gibson Lake 54%, Heyburn Lake 76%, Wister Lake 88%, Keystone Lake 89%, Skiatook Lake 89%, Eufaula Lake 90%, Birch Lake 90%, Copan Lake 92%, Sardis Lake 92%, and Tenkiller Lake 94%.

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

Rank since 1921 ("Last XX days" ending October 31, 2010)	October 2010	Last 60 days (Sep 2 – Oct 31)	Last 90 Days (Aug 3 – Oct 31)	Last 180 Days (May 5 – Oct 31)	Year-to-Date 2010	Water Year (Oct 1, 2010 – Oct 31, 2010)
Northeast OK	**11th driest**	30th driest	34th driest	40th wettest	41st wettest	**11th driest**
East Central OK	23rd driest	28th wettest	44th driest	44th wettest	32nd driest	23rd driest
Southeast OK	24th driest	26th driest	20th driest	**14th driest**	**13th driest**	24th driest

The Climate Prediction Center (CPC) outlook for November 2010 (issued October 31, 2010) indicates an enhanced chance for above average temperatures and an enhanced chance for below median precipitation. For the 3-month period Nov-Dec-Jan 2010-11, CPC is forecasting an enhanced chance for above average temperatures and a slightly enhanced chance for below median precipitation (outlook issued October 21, 2010). The enhanced chance for above average temperatures and below median precipitation for the 1- and 3-month outlooks are consistent with La Niña impacts across the southern Plains. However, the precipitation signal across the HSA for La Niña is not strong. This means that during some La Niñas, eastern OK and northwest AR experience wetter than median precipitation, while for others it is drier than the median.

According to CPC, La Niña conditions strengthened during late September and early October and are currently of moderate strength (just shy of strong). For this time of year, the observed ENSO indices are close to a record. La Niña events typically peak in December, and current computer models indicate that La Niña conditions will strengthen further and at least last through winter 2010-11, and very likely into spring 2011. A La Niña Advisory continues, meaning La Niña conditions have been observed and are expected to continue.

Summary of Rain Events
October 1 - 20:

The first rainfall of October 2010 began in the afternoon of October 10th and continued through the 11th as a slow moving cold front and upper-level low moved across the HSA. Most of eastern OK received rain from this event, with more widely scattered activity across northwest AR. Rainfall totals were generally less than 0.5", though a few areas received upwards of 0.75". A few isolated showers developed on the 12th on the backside of the departing low, bringing only very light rainfall amounts. High pressure then dominated the region for several days.

Showers and thunderstorms returned from the evening of 18th through the 19th as another cold front traversed the area. Precipitation was widespread with this event, with rainfall totaling 0.25" to 1" as most locations. The axis of highest rainfall, where 1" to 2" fell, was located from Pawnee County, through Adair County, to Franklin County (see Figs. 4, 5).

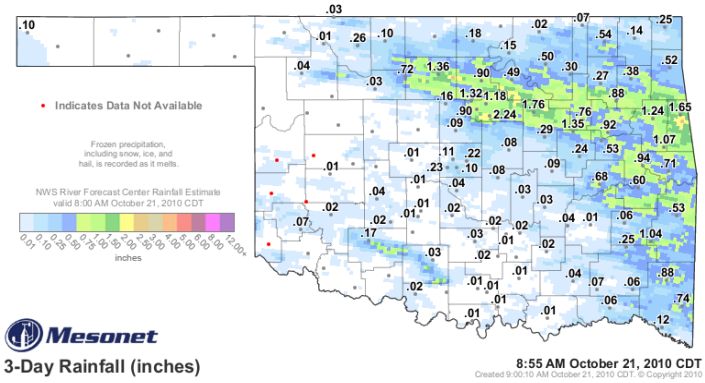


Fig. 4. Radar and rain gage rainfall totals from Oct. 18-19, 2010.

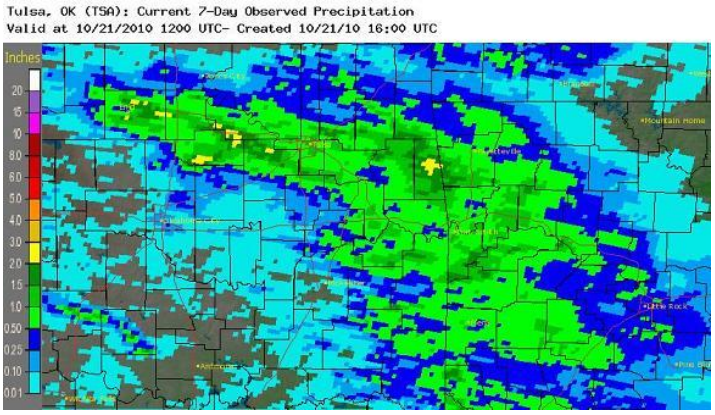


Fig. 5. Estimated Observed Rainfall for Oct. 18-19, 2010

October 21 - 31:

Scattered showers, with rainfall amounts of around 0.25" or less, affected eastern OK on the 22nd as an upper low moved through the central plains. A more potent upper-level trough moved across the region on the 23rd, bringing widespread showers and thunderstorms along and southeast of I-44. Rainfall totals were generally around 1" or less (see Fig. 6.), with higher totals of 1.5" – 2.5" across far southeast OK.

A line of storms developed near I-44 from Miami to Tulsa during the late evening hours of the 25th as a cold front progressed eastward. As the front continue to move east, the showers and thunderstorms built south along the boundary. Intense, but brief, rainfall brought less than 0.5" to far eastern OK and western AR through the overnight hours. Damaging winds also occurred across portions of northern Benton County with this line of storms. This line of storms was the beginning of a widespread severe weather outbreak across the Midwest and Southeast US on the 26th-28th. The low pressure system responsible for this weather was exceptionally strong, and the minimum central pressure of 28.21" (955.2 mb; reported from Bigfork, Minnesota at 5:13pm CDT 10/26/2010) was one of the lowest pressures ever recorded in the continental US by a non-tropical system; refer to http://www.crh.noaa.gov/dlh/?n=101026_pressurerecords for more information on this extratropical cyclone).

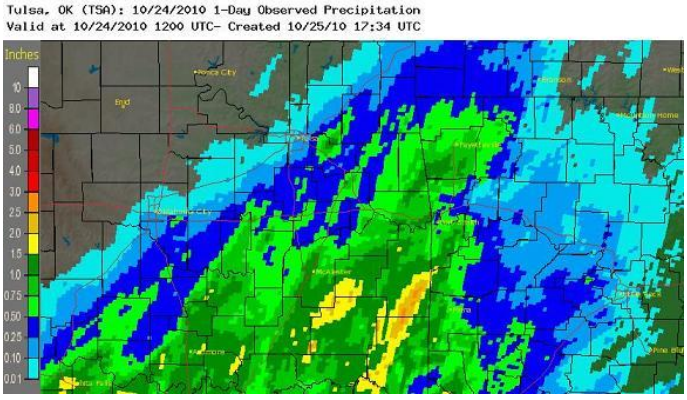


Fig. 6. Estimated Observed Rainfall for Oct. 23, 2010

Written by:
Nicole M^{c}Gavock,
Service Hydrologist
WFO Tulsa

Products issued:

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)
0 Drought Information Statements (DGT)