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 **July** YEAR **2011**
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 **August 1, 2011**

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.

July 2011 featured very hot and dry conditions for eastern Oklahoma and northwest Arkansas, as a strong and persistent upper level ridge of high pressure dominated the weather pattern. July is climatologically one of the drier months of the year across the Tulsa HSA. Normal rainfall for the month of July ranges from 2.6 inches in McIntosh County to 3.4 inches in Ottawa County. The Ozark region of northwest Arkansas averages 3.1 inches for the month.

Monthly Summary

Using the radar-derived estimated observed precipitation from the RFCs (Fig. 1a), rainfall totals for July 2011 ranged from less than 0.10" to isolated areas of 5"-6". This was significantly less than the normal rainfall for July. Most of eastern Oklahoma and northwest Arkansas only received 10% to 50% of the normal July rainfall, though some areas received less than 5% (Fig. 1b). The NWS COOP observers near Bengal, Oklahoma and Okemah, Oklahoma only measured 0.10" and 0.05" for the month, respectively. The Oklahoma Mesonet sites in Wister and Sallisaw measured a meager 0.04" this month.

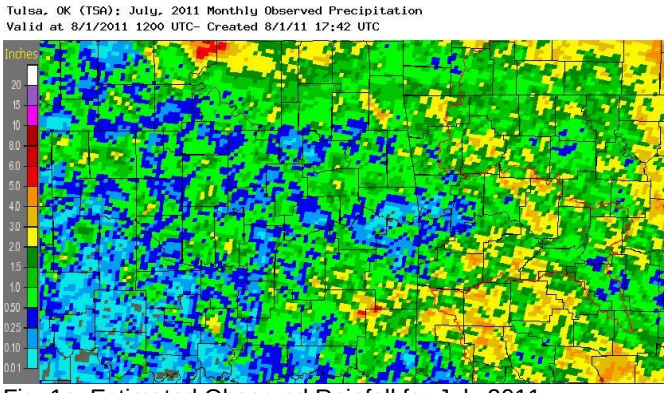
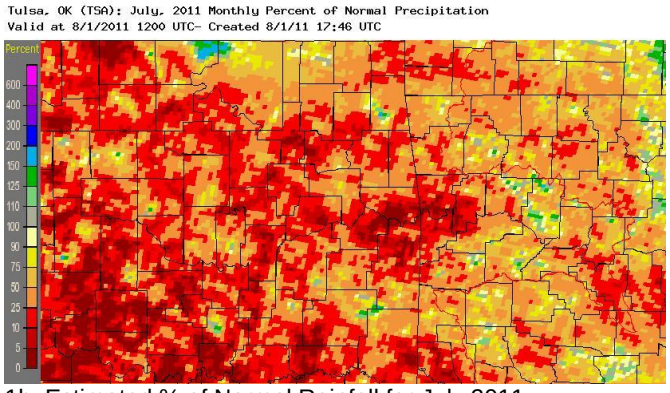


Fig. 1a. Estimated Observed Rainfall for July 2011



1b. Estimated % of Normal Rainfall for July 2011

In Tulsa, OK, July 2011 ranked as the 2nd warmest July (90.9°F; since records began in 1905) and the 14th driest July (0.36", tied with 1978) since records began in 1888. Fort Smith, AR was the warmest July (91.2°F), setting a new record, and the 7th driest July (0.22") since records began in 1882. A record number of days with temperatures ≥100°F occurred at Fort Smith July 2011, with 30 out of 31 days warming into the triple digits. The new record value of 30 days with temperatures ≥100°F far exceeded the previous record of 25 set in 1934. Fort Smith also set a record for consecutive days with temperatures ≥100°F, which began on July 5th. As of July 31st, the record streak, which is ongoing, stood at 27 days.

Some of the larger precipitation reports (in inches) for July 2011 included:

Foraker, OK (meso)	2.68	Copan, OK (meso)	2.33	Berryville, AR (coop)	2.16
Clayton, OK (meso)	2.01	Bartlesville, OK (ASOS)	1.88	Nowata, OK (meso)	1.76

According to the U.S. Drought Monitor (USDM) from July 26, 2011, extreme drought (D3) conditions expanded eastward across Pawnee, far southwestern Osage, Creek, Okfuskee, far western Tulsa, western Okmulgee, far western McIntosh, and western Pittsburg counties. Severe drought (D2) conditions encompassed the remainder of eastern Oklahoma, except Craig, Ottawa, and northeastern Delaware counties which are currently experiencing moderate drought (D1) conditions. Severe drought (D2) conditions also spread into parts of northwest Arkansas, including Sebastian, Crawford, far southwestern Washington, and far southwestern Franklin counties, with moderate drought (D1) conditions across the rest of northwest Arkansas (see Figs. 2 & 3). A very dry and hot June and July period has led to the dryness and expanding drought conditions across the region.

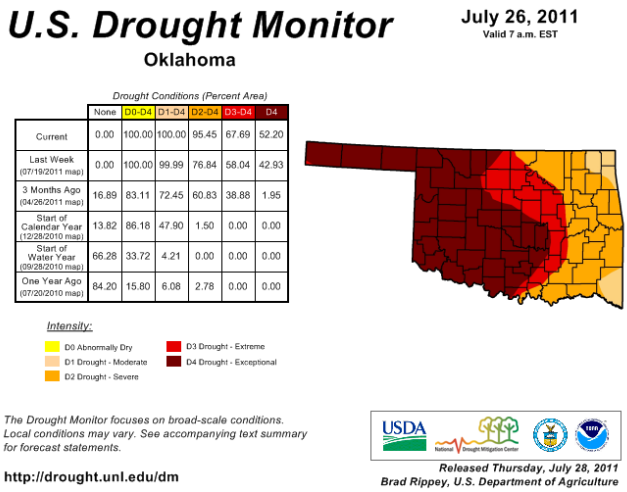


Fig. 2. Drought Monitor for Oklahoma

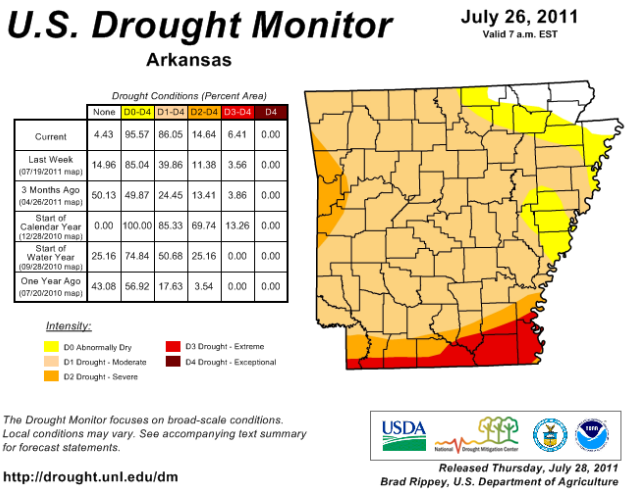


Fig. 3. Drought Monitor for Arkansas

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

Rank since 1921 ("Last XX days" ending July 31, 2011)	July 2011	Warm Growing Season (Mar 1, 2011 – Jul 31, 2011)	Last 60 days (Jun 2, 2011 – Jul 31, 2011)	Year-to-Date (Jan 1, 2011 – Jul 31, 2011)	Water Year (Oct 1, 2010 – Jul 31, 2011)	Last 365 Days (Aug 1, 2010 – Jul 31, 2011)
Northeast OK	**19th driest**	17th driest	2nd driest	16th driest	9th driest	14th driest
East Central OK	**9th driest**	36th driest	2nd driest	18th driest	11th driest	17th driest
Southeast OK	**6th driest**	21st driest	2nd driest	12th driest	7th driest	6th driest
Statewide	**6th driest**	**3rd driest**	**1st driest**	**2nd driest**	**1st driest**	**1st driest**

Most of the major reservoirs in the Tulsa HSA were within ±25% of conservation pool by the end of July 2011. After two straight very dry months, most reservoirs were showing deficits in their conservation pools. Beaver Lake continued to show levels in excess of its conservation pool, with 38% of flood control storage in use as of July 31. The following reservoirs were reporting conservation pool deficits as of July 31, 2011: Fort Gibson Lake 17%, Heyburn Lake 71%, Skiatook Lake 74%, Keystone Lake 79%, Birch Lake 80%, Eufaula Lake 89%, Tenkiller Lake 91%, Sardis Lake 94%, Hugo Lake 95%, Oologah Lake 96%, and Copan Lake 97%. Blue-green algae blooms continued to be a problem at several area lakes during July, including Keystone Lake, Skiatook Lake, Fort Gibson Lake, Tenkiller Lake, Lake Eufaula, and Grand Lake, due to the ongoing heat wave. The blooms led to the closing of beaches at several of the aforementioned lakes.

Outlooks

The Climate Prediction Center (CPC) outlook for August 2011 (issued July 31, 2011) indicates an enhanced chance for above normal temperatures across all of eastern Oklahoma and northwest Arkansas and an

enhanced chance of below normal precipitation to the south of Interstate 40 and equal chances for above, near, or below average precipitation for areas north of Interstate 40. For the 3-month period Aug-Sep-Oct 2011, CPC is forecasting an enhanced chance for above average temperatures and equal chances for above, near, and below median precipitation across eastern Oklahoma and northwest Arkansas (outlook issued July 21, 2011).

According to CPC, ENSO neutral conditions continued into early and mid July and are expected to continue into at least Fall 2011. Some recent computer model data are indicating that La Niña may redevelop during Fall 2011, but CPC indicates that ENSO neutral conditions are most likely to continue into early 2012.

Summary of Precipitation Events

July 1 – 15:

With upper level ridging persisting across the region, July began with a continuation of June's hot weather. Isolated diurnal terrain induced showers and thunderstorms developed across portions of southeast Oklahoma and northwest Arkansas on the afternoons of the 1st and 2nd with a gradual decrease in areal coverage each day. Rainfall totals were generally less than a quarter to a half an inch.

A frontal boundary approached parts of northeast Oklahoma and northwest Arkansas on the 3rd, which led to more widespread thunderstorms across areas to the north of the Interstate 40 corridor. Locations seeing these storms received up to an inch of rainfall. Across southeast Oklahoma, the diurnal terrain induced thunderstorms once again developed on the 3rd, producing less than a quarter inch of rain in any one location. More widespread thunderstorms spread into southeast Oklahoma and west central Arkansas on the 4th, with as much as an inch of rain received.

The upper level ridge prevented most shower and thunderstorm development from the 5th through the 11th. The ridge shifted to the east somewhat, allowing a tropical disturbance to move through the area on the 12th and 13th. Showers and thunderstorms affected much of eastern Oklahoma and northwest Arkansas during this period, with northeast Oklahoma and northwest Arkansas seeing the highest rainfall totals, largely an inch or less each day. Northern portions of Osage County saw heavy rain on the morning of the 12th due to training thunderstorms, with as much as 3 to 4 inches of rain in the northwest corner of the county.

The ridge reasserted itself over the region on the 14th, leading to dry weather for the 14th and 15th.

July 16 – 31:

The largely dry weather continued from the 16th through the 21st, as triple digit heat affected most of eastern Oklahoma and northwest Arkansas. Diurnal thunderstorm development began anew on the 22nd, and also occurring on the 23rd and 24th. Coverage was highest on the 24th, leaving several outflow boundaries across the area. Rainfall amounts were generally less than a quarter of an inch on the 22nd and 23rd, with some areas of northeast Oklahoma seeing up to an inch of rain from the storms on the 24th. Damaging downburst winds also occurred with the storms on the 24th, leading to damage in southern Tulsa County near Glenpool and Bixby and seriously injuring a woman in Mayes County when winds flipped the buggy she was riding in.

Morning showers and thunderstorms affected areas along a line from near Wagoner to Hugo on the 26th, resulting in up to three-quarters of an inch of rain. Diurnal thunderstorms affected parts of the area on the 28th, 29th, 30th, and 31st, with a gradual decrease in areal coverage each day. By the 30th and 31st, afternoon storms were primarily located in the higher terrain areas of far southeast Oklahoma and northwest Arkansas. Maximum daily rainfall amounts were in the half to three-quarters of an inch range. A collapsing thunderstorm on the evening of the 30th produced an 82 mph measured wind gust at Northwest Arkansas Regional Airport near Highfill in Benton County.

Written by:
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Forecaster
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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)
- 3 Drought Information Statements (DGT)