

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 YEAR
		March	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	April 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)

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

March 2011 was extremely dry across the HSA, which led to an increase in wildfire activity and worsening drought conditions by the end of the month. Normal precipitation for the month of April ranges from 3.1 inches in Pawnee County to 4.7 inches in Latimer County. The Ozark region of northwest Arkansas averages 4.3 inches for the month.

Monthly Summary

Using the radar-derived estimated observed precipitation from the RFCs (Fig. 1a), rainfall totals for March 2011 ranged from around 0.10" in portions of Okfuskee, Okmulgee, and Pittsburg Counties to near 4" in far northeast OK. However, most of the HSA received 0.50" to 2" of rain this month (see Fig. 1a), which equates to 2"- 4" below the normal March rainfall. All of eastern OK and northwest AR received below normal rainfall this month, with locations southwest of a Pawnee to Tulsa to Fort Smith line receiving 25% or less of the normal March rainfall (see Fig. 1b). Sadly, portions of Okmulgee and Pittsburg Counties had less than 5% of their normal March rainfall. The McAlester Regional Airport (MLC) in Pittsburg County recorded only 0.52" of rain this month, making this the all-time driest March on record (previous record 0.62" March 1954; records began in 1954).

In Tulsa, OK, March 2011 ranked as the 39th warmest March (52.5°F, tied with 1933; since records began in 1905) and the 20th driest March (1.00"; since records began in 1888). Fort Smith, AR was the 20th warmest March (56.2°F) and the 5th driest March (0.80") since records began in 1883.

Tulsa, OK (TSA): March, 2011 Monthly Observed Precipitation
 Valid at 4/1/2011 1200 UTC- Created 4/1/11 15:49 UTC

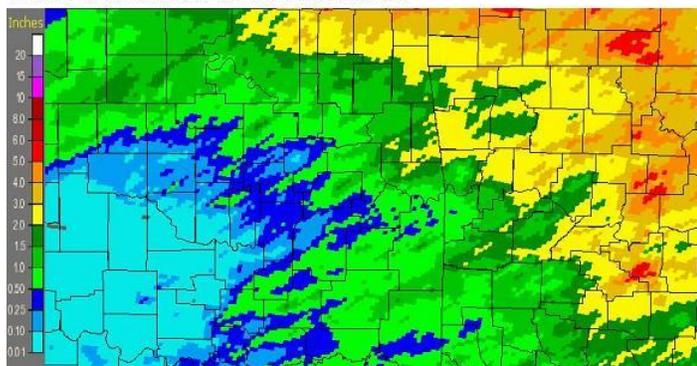
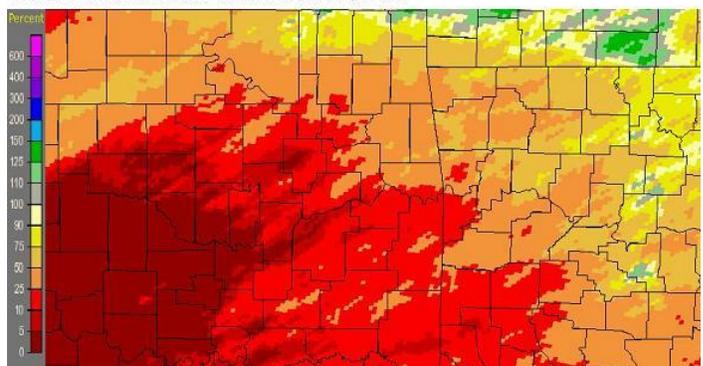


Fig. 1a. Estimated Observed Rainfall for March 2011

Tulsa, OK (TSA): March, 2011 Monthly Percent of Normal Precipitation
 Valid at 4/1/2011 1200 UTC- Created 4/1/11 15:53 UTC



1b. Estimated % of Normal Rainfall for March 2011

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

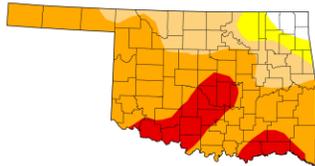
Miami, OK (meso)	3.36	Berryville, AR 5NW (coop)	3.35	Bartlesville, OK (ASOS)	3.25
Vinita, OK (meso)	3.23	Copan, OK (meso)	3.06	Nowata, OK (meso)	2.94
Eureka Springs, AR (coop)	2.84	Miami, OK (coop)	2.81	Jay, OK (meso)	2.68

According to the [U.S. Drought Monitor](#) (USDM) from March 29, 2011, extreme (D3) drought conditions were affecting Choctaw and southern Pushmataha Counties in southeast OK. Severe (D2) drought conditions were affecting most of southeast OK and west central AR south of I-40, in addition to Okfuskee and Creek Counties. Abnormally dry (D0) and moderate drought (D1) conditions were affecting all of the remainder of eastern OK and northwest AR (see Figs. 2 & 3). The U.S. Geological Survey (USGS) VegDRI and 7-day average streamflow (Fig. 4) also illustrates deteriorating drought conditions across eastern OK and northwest AR.

U.S. Drought Monitor Oklahoma

March 29, 2011
Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0-D1	D1-D2	D2-D3	D3-D4	D4
Current	2.83	97.17	92.03	71.84	15.82	0.00
Last Week (03/22/2011 map)	4.38	95.62	83.58	54.46	8.78	0.00
3 Months Ago (12/28/2010 map)	13.82	86.18	47.90	1.50	0.00	0.00
Start of Calendar Year (12/28/2010 map)	13.82	86.18	47.90	1.50	0.00	0.00
Start of Water Year (06/29/2010 map)	66.28	33.72	4.21	0.00	0.00	0.00
One Year Ago (03/23/2010 map)	100.00	0.00	0.00	0.00	0.00	0.00



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.



Released Thursday, March 31, 2011
Eric Luebbehusen, United States Department of Agriculture

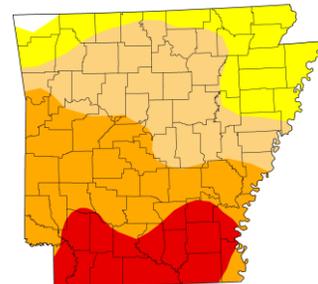
<http://drought.unl.edu/dm>

Fig. 2. Drought Monitor for Oklahoma

U.S. Drought Monitor Arkansas

March 29, 2011
Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0-D1	D1-D2	D2-D3	D3-D4	D4
Current	0.79	99.21	79.65	48.30	17.48	0.00
Last Week (03/22/2011 map)	1.55	98.45	79.51	47.84	17.37	0.00
3 Months Ago (12/28/2010 map)	0.00	100.00	85.33	69.74	13.26	0.00
Start of Calendar Year (12/28/2010 map)	0.00	100.00	85.33	69.74	13.26	0.00
Start of Water Year (06/29/2010 map)	25.16	74.84	50.68	25.16	0.00	0.00
One Year Ago (03/23/2010 map)	100.00	0.00	0.00	0.00	0.00	0.00



Intensity:
 D0 Abnormally Dry
 D1 Drought - Moderate
 D2 Drought - Severe
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Fig. 3. Drought Monitor for Arkansas

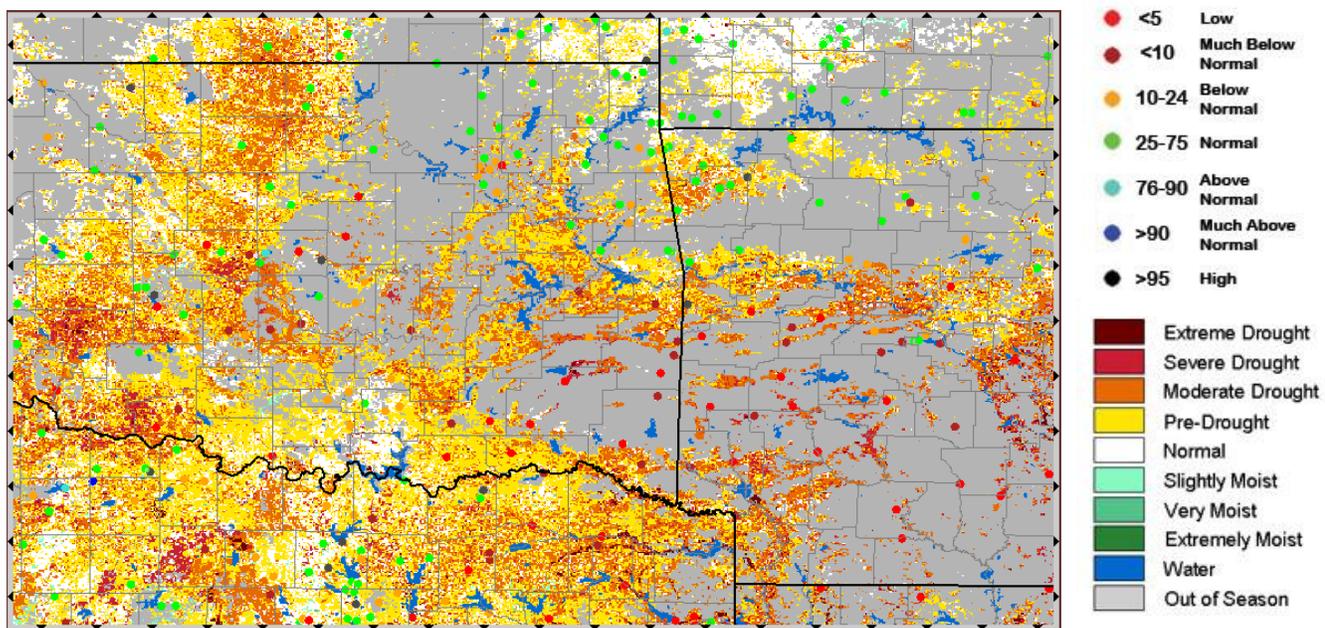


Fig. 4. USGS Vegetation Drought Response Index (VegDRI) as of 3/27/2011 and 7-day average streamflow (circles) as of 3/31/2011.

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

Rank since 1921 ("Last XX days" ending March 31, 2011)	March 2011	Last 60 days (Jan 31, 2011 – Mar 31, 2011)	Year-to-Date (Jan 1, 2011 – Mar 31, 2011)	Last 120 days (Dec 2, 2010 – Mar 31, 2011)	Water Year (Oct 1, 2010 – Mar 31, 2011)	Last 365 Days (Apr 1, 2010 – Mar 31, 2011)
Northeast OK	26 th driest	41 st driest	26 th driest	10 th driest	8 th driest	25 th driest
East Central OK	6 th driest	17 th driest	8 th driest	5 th driest	4 th driest	15 th driest
Southeast OK	1 st driest	5 th driest	3 rd driest	3 rd driest	2 nd driest	2 nd driest
Statewide	6 th driest	8 th driest	3 rd driest	1 st driest	5 th driest	12 th driest

Several of the major reservoirs in the Tulsa HSA were reporting below 95% of their normal conservation pools as of April 1, 2011, though Hudson Lake was reporting within 4% of its flood control storage. Conservation pool deficits: Eufaula Lake 77%, Beaver Lake 81%, Skiatook Lake 85%, Fort Gibson Lake 89%, Hugo Lake 90%, Tenkiller Lake 91%, Birch Lake 91%, Sardis Lake 92%, and Keystone Lake 94%.

Outlooks

The [Climate Prediction Center](#) (CPC) outlook for April 2011 (issued March 31, 2011) indicates a slightly enhanced chance for above average temperatures and an equal chance for above, near, and below median precipitation across all of eastern OK and northwest AR. For the 3-month period Apr-May-Jun 2011, CPC is forecasting a slightly enhanced chance for above average temperatures along the Red River and equal chances for above, near, and below normal temperatures elsewhere across eastern OK and northwest AR. This outlook also calls for an equal chance for above, near, and below median precipitation (outlook issued March 17, 2011). The 1- and 3-month outlooks are consistent with La Niña impacts across the southern Plains during this time of year.

According to CPC, weak La Niña conditions were observed at the end of March as negative sea surface temperature anomalies continue to weaken in parts of the Pacific Ocean. Current computer models indicate that La Niña conditions will continue to diminish through the remainder of spring 2011, with ENSO-neutral conditions likely by June 2011. A La Niña Advisory continues, meaning La Niña conditions have been observed and are expected to continue.

Summary of Precipitation Events

March 1 - 15:

The first precipitation of March 2011 developed as a cold front moved across the Southern Plains on the 4th. Showers and thunderstorms primarily affected far eastern OK and northwest AR during the afternoon and evening hours. Rainfall totals were generally from around 0.10" to 0.75", with isolated areas of Madison and Carroll Counties receiving around one inch of rain.

Strong warm air advection ahead of another cold front brought showers and isolated thunderstorms to locations northwest of I-44 during the early to mid morning hours of the 8th. Many locations received 0.25" to near 1.5" of rain during this time. Additional thunderstorm development occurred during the late afternoon and evening hours as the cold front moved across the region and a warm front lifted to near the Red River. This activity affected southeast OK and portions of west central AR and brought around one tenth to around half an inch of rain.

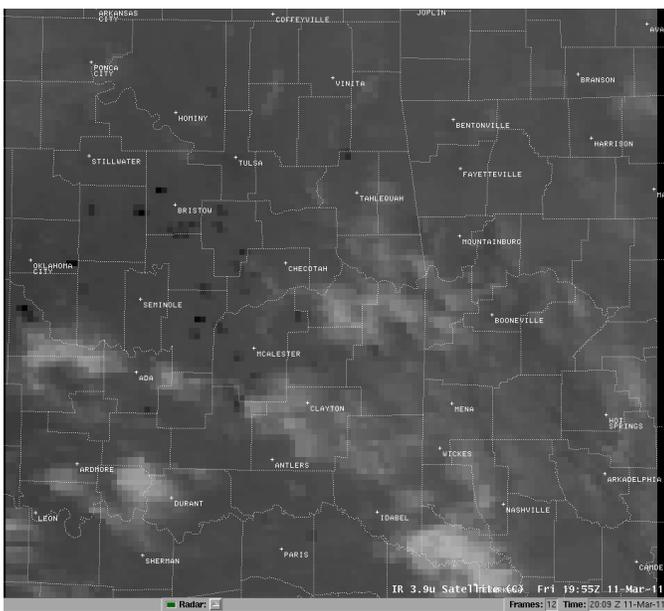


Fig. 5. Widespread fires seen as black 'spots' on infrared satellite imagery (white areas are clouds). 1:55pm CST 3/11/11.

Wildfires increased across the region on the 10th, with 33 wildfires burning a total of 1186.5 acres across eastern Oklahoma. One fire in Latimer County burned 160 acres while another fire in Haskell County burned 145 acres.

Significant and widespread wildfire activity occurred across eastern OK on the 11th as drought conditions continued across this area (see Fig. 5). Strong southerly winds with gusts of 20-30 mph, combined with temperatures in the low to mid 70s and relative humidity values below 20%, led to dangerous fire weather conditions. 42 fires burning over 8600 acres were reported in eastern Oklahoma on the 11th. Large fires were reported in Pushmataha County (1600 acres), Latimer County (1200 and 350 acres), Le Flore County (107 acres), and Pittsburg County (640, 620, and 233 acres). A fire in Beggs (Creek County) burned numerous structures and the Oklahoma National Guard had to provide water drops via Blackhawk helicopters. An additional 100+ acre fire occurred in Le Flore County (Sugarloaf Mountain area) on the 12th.

Showers and thunderstorms developed across northeast OK and northwest AR north of a weak frontal boundary during the afternoon of the 13th. This activity then spread across the entire HSA through the evening and overnight hours as lift increased with an approaching upper low. Widespread 0.5" to 1.5" of rainfall fell between I-44 and I-40 in northeast OK and northwest AR. Elsewhere, rainfall totals were generally around 0.10" to 0.50", though locally higher amounts to near 1.5" were estimated in portions of southeast OK. Wrap-around drizzle persisted into the morning hours of the 14th, with little to no additional accumulation.

March 16 - 31:

March 19th started with light rain across portions of northeast OK northwest of I-44, with an increase in convection during the late morning through afternoon hours. Rainfall totals were around 0.10" to near 0.5" northwest of I-44, with higher amounts of 0.50" to 2.0" across the OK counties that border KS. In addition, strong to severe thunderstorms produced penny- to golf ball-sized hail in this area.

Wildfire continued to be a problem on the 20th as gusty southerly winds, temperatures in the 80s, and ongoing drought conditions once again increased the fire weather danger. 70 fires, burning a total of 3910 acres, were reported on the 20th in eastern OK. 10 large fires were reported across Pittsburg, Latimer, Haskell, Adair, and Pushmataha Counties.

Active westerly flow aloft brought several fast moving upper-level waves across the plains March 24th-31st, leading to isolated to widely scattered showers and thunderstorms across the area on all but the 26th and 29th. Areas affected by the precipitation generally received around 0.5" of rain or less on any given day. However, higher totals of 0.5" to 1.5" were estimated across northwest AR on the 25th. During this week, locations in northeast OK and northwest AR northeast of a Nowata to Sallisaw line received 0.5" to around 1.5" of total rainfall, and north central Benton County received around 2". Elsewhere, most locations only received a few hundredths to around one third of an inch, though a few places did not receive any rainfall during the time.

Written by:

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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)
- 1 Hydrologic Outlooks (ESF)
- 1 Drought Information Statements (DGT)