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 **March** YEAR **2009**
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 2, 2009**

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)

Despite several periods of rain and record-breaking snowfall this month, much of the Tulsa HSA ended March 2009 below normal. Normal precipitation for March ranges from 3.1 inches in Pawnee County to 4.3 inches in Le Flore County. In the Ozark region of northwest Arkansas, the normal precipitation for the month is 4.4 inches.

Summary of Rain Events

Thunderstorms developed near a warm front on the evening of March 9th as the front lifted north through the HSA. Rainfall primarily affected locations northwest of Interstate 44, with rainfall totals of a few hundredths to near half an inch. Bands of 0.50 to near 1 inch of rain affected portions of southern Pawnee and northwestern Osage Counties. The next day, a cold front swept through the region, bringing additional showers and thunderstorms southeast OK and west central AR. The front became nearly stationary south of the HSA, with overrunning precipitation north of the front continuing to bring much needed rain to southeast OK and west central AR. Rainfall totals from the 10th through 11th ranged from 0.1 to 0.5 inches along and south of a McAlester, OK to Fayetteville, AR line. Higher amounts of 0.5 to near 2 inches fell across Choctaw, southeast Pushmataha, and southern Le Flore Counties, with eastern Choctaw and far southeast Le Flore Counties receiving 2 to 4 inches. The majority of the storm activity had shifted south of the HSA by the 13th, though an additional 0.1 to 0.5 inches of rain fell south of I-40 in southeast OK. An upper wave moved across the southern plains on the 14th, bringing light rain to areas southeast of I-44. The highest rainfall totals were near one half inch in southeast OK.

A cold front moved across the region late on the 18th, with elevated showers and thunderstorms developing well behind the surface boundary. This activity affected locations along and south of a Bristow, to Jay, to Bentonville line on the 19th, bringing generally less than one quarter of an inch of rainfall. Isolated higher amounts near 1 inch did fall in Pushmataha and Choctaw Counties. The front then returned northward as a warm front on the 20th, bringing additional rain to areas north of I-40. The highest rainfall totals were 0.75 to 1.5 inches across portions of Craig, Ottawa, Delaware, Benton, Washington AR, and Madison Counties in northeast OK and northwest AR. An upper wave brought light precipitation to southeast OK and northwest and west central AR on the 21st, with less than one quarter inch of rainfall.

A more typical spring-time storm system developed during the evening of the 23rd and continued into the morning of the 24th. A strong upper trof moved into the central plains late on the 23rd, causing thunderstorms to develop along a cold front the stretched from central Kansas into central OK. These storms brought heavy rain, large hail, damaging winds, and even a tornado (near Pawnee, OK) to the region. Rainfall totals along and northwest of I-44 were generally between 0.5 and 1.5 inches, with several locations receiving 2 to 3 inches. Locations southeast of I-44 received widespread amounts of 0.25 to 0.75 inches, with embedded areas of around 1.5 inches of rain. The northward movement of a warm front on the 26th combined with cooler temperatures aloft brought another round of showers and thunderstorms, some of which were severe, to the entire HSA. Widespread light rain fell, with the highest totals of 0.5 to 1.5 inches across portions of southeast OK and west central AR.

Showers and thunderstorms bringing periods of heavy rain continued to affect the HSA through the 27th as a strong mid-level wave moved into the southern plains. A large portion of the area received 0.5 to 1.5 inches of

rainfall. However, locations along and west of Highway 75 received between 1.5 and 2.5 inches of precipitation.

As the storm system progressed to the east on the 28th, very cold temperatures aloft overspread the region, bringing significant snowfall to northeast OK. Warm advection wrapping back into the cold core helped to enhance the snowfall, with thundersnow observed across northeast OK. Snowfall totals from the 28th can be seen in Fig. 1. The highest totals of 7 to 10 inches were reported in portions of Pawnee, Creek, and Tulsa Counties. After several days of precipitation (see Fig. 2), in addition to the very wet snow that melted quickly on the 29th, two river forecast points reached minor flood stage and one reached moderate flood stage. Please refer to the E3 report for specific stage information on the river flooding that occurred along the Neosho River near Commerce and the Caney River near Ramona and Collinsville. The last round of rainfall this month occurred from late on the 30th into the morning of the 31st as a line of severe thunderstorms developed along a cold front that moved through the area. Widespread rainfall totals of 0.25 to around 0.5 inches affected eastern OK and northwest AR, with some locations receiving as much as one inch of rain.

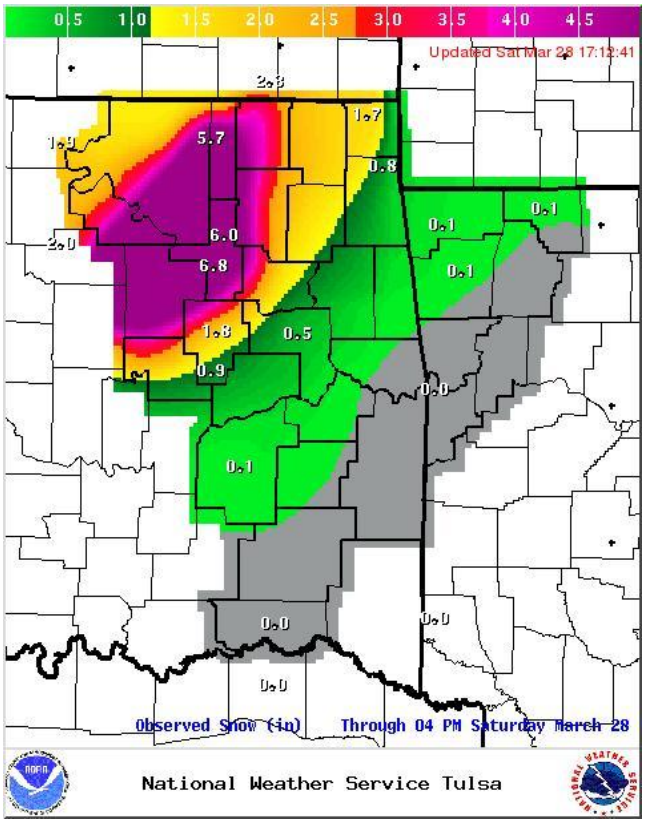


Fig. 1. Snowfall Totals for March 28, 2009

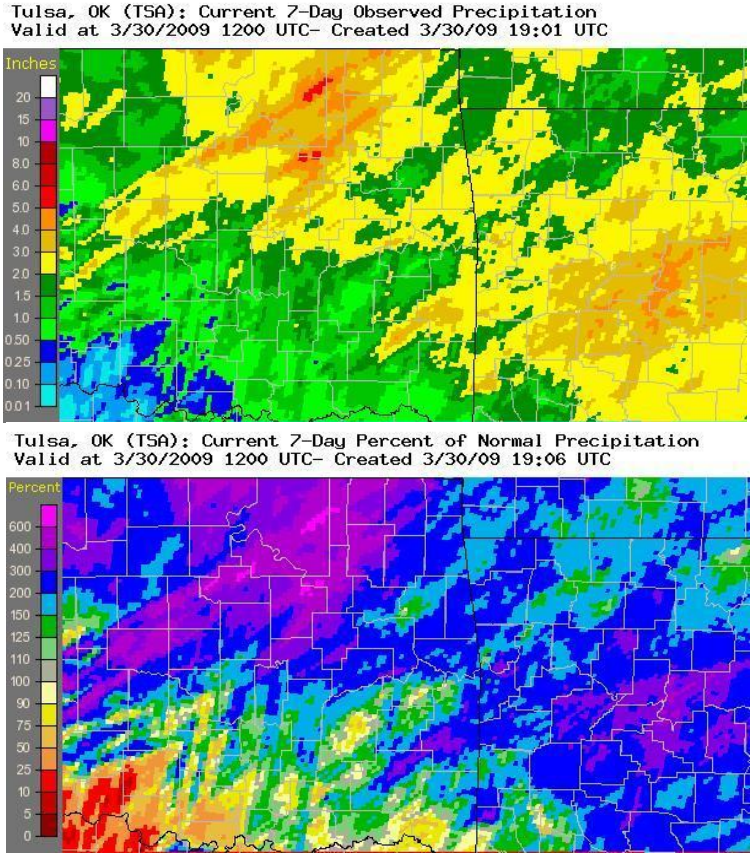


Fig. 2. 7-Day Precipitation Total (top) and Percent of Normal (bottom) ending at 7am March 30.

Using the radar-derived observed precipitation from the RFCs (Fig. 3a.), much of the Tulsa HSA received rainfall totals of 2 to 4 inches in March 2009, with some locations receiving 5 to 7 inches. Despite the higher totals, March begins the transition to a wetter time of year and based on the radar-derived departure-from-normal graphics from the RFCs (Fig. 3b.), all but far southeast OK and locations along and northwest of I-44 only received between 90% and 50% of normal March rainfall. Locations northwest of I-44 received between 110% and 200% of normal March precipitation, with 110% to 150% received across portions of far southeast OK.

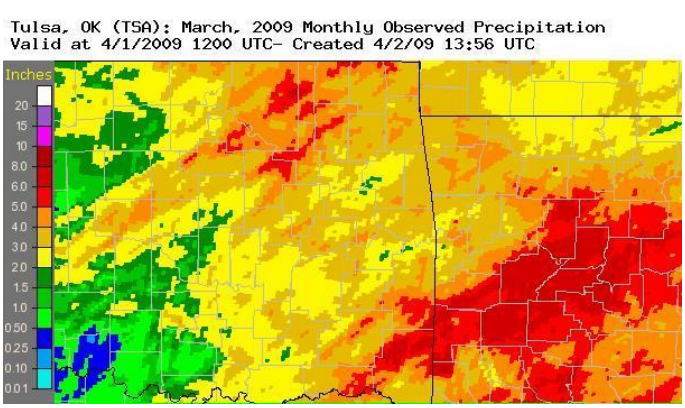
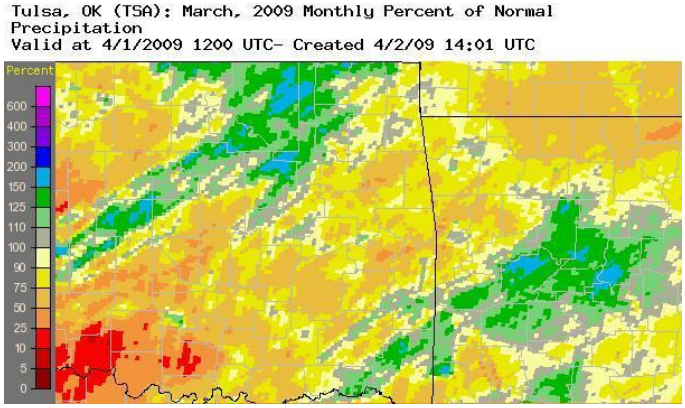


Fig. 3a. Observed Precipitation for Mar. 2009



3b. Departure from Normal Precipitation for Mar. 2009

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

Wynona OK (meso)	5.30	Pawnee OK (meso)	5.22	Tulsa OK (ASOS)	5.02
Cloudy OK (meso)	4.57	Bristow OK (meso)	4.56	Talihina OK (meso)	4.52
Nowata OK (meso)	4.45	Tuskahoma OK (coop)	4.41	Foraker OK (meso)	4.39

According to statistics from the Oklahoma Climatological Survey (OCS), northeast OK ranked as the 24th wettest March since records began in 1921, receiving 109% of its normal rainfall. However, due to the wet period during the first half of 2008, the past 12 months rank as the 7th wettest for northeast OK. East central OK was the 42nd driest March on record, ending the month with 74% of normal March rain, and ranked as the 40th driest for the past 12 months. Finally, southeast OK was the 33rd wettest March, receiving 97% of normal rainfall, and is 27th driest for the past 12 month period.

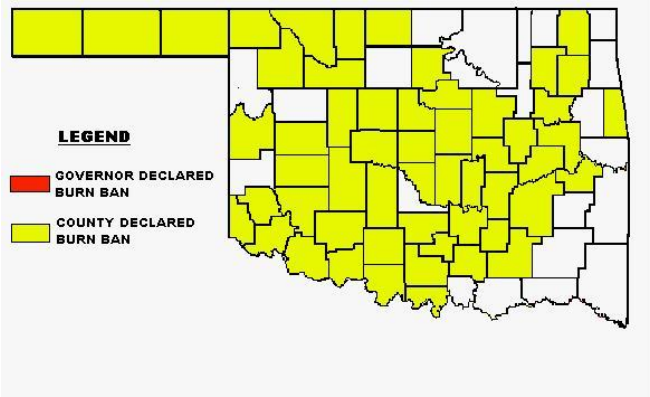


Fig. 4. OK burn bans in effect as of March 2, 2009.

According to the U.S. Drought Monitor (USDM) issued March 31st, abnormally dry conditions were still affecting Pittsburg, southern Latimer, southern Le Flore, Pushmataha, and Choctaw Counties despite the recent rains. However, the end of the month precipitation and 'greening-up' of vegetation has helped to improve the short-term fire danger across eastern OK and northwest AR. At the beginning of the March, a large portion of eastern OK was under county declared burn bans (see Fig. 4). As the month progressed, fewer burn bans were needed (see Fig. 5), and by the end of March, there were no longer any burn bans in effect across eastern OK and northwest AR.

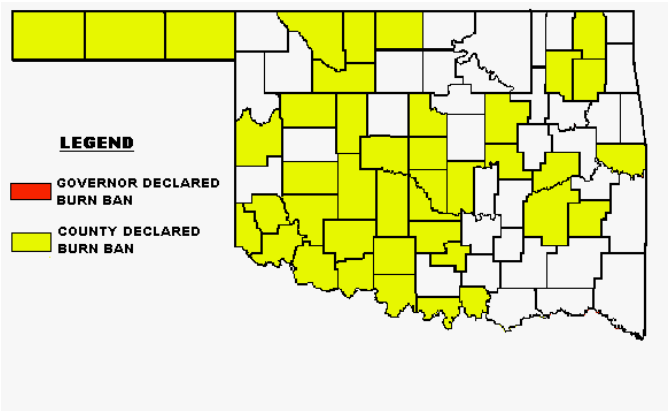


Fig. 5. OK burn bans in effect as of March 10, 2009.

The major reservoirs in the HSA were at 100% of their conservation pools by April 1, 2009, with most area reservoirs reporting levels up to 10% of their flood control pools. The reservoirs utilizing the highest percentage of their flood control pools as of April 1 were as follows: Skiatook Lake 21%, Pensacola Lake 20%, Hulah Lake 20%, Copan Lake 15%, Oologah Lake 14%, and Hudson Lake 11%.

The Climate Prediction Center (CPC) outlook for April 2009 (issued March 31, 2009) indicates an equal chance of above, near, and below normal temperatures and precipitation across the entire HSA, except for the very far portions of northeast OK and northwest AR where there is a slightly enhanced chance for above normal rainfall. For the 3-month period Apr-May-Jun 2009, CPC is outlooking an equal chance for above, near, and below

normal temperatures and precipitation (outlook issued March 19, 2009). La Niña is still ongoing; however, the La Niña conditions are expected to weaken with a return to neutral conditions through the upcoming spring.

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WFO Tulsa

Products issued:

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