

# Oklahoma Water Resources Bulletin & Summary of Current Conditions



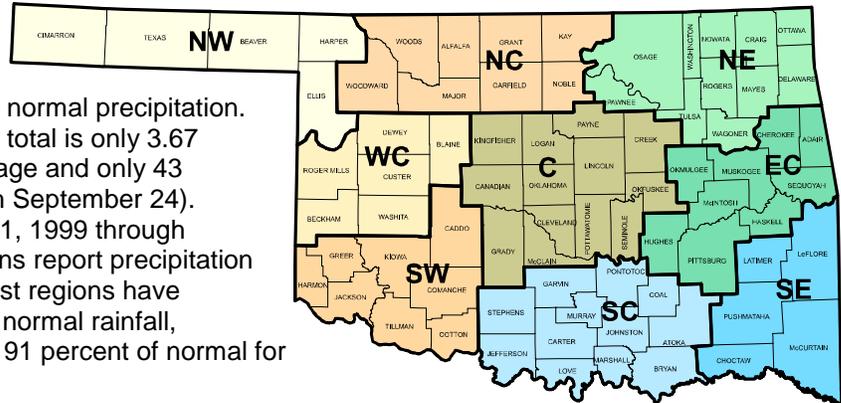
SEPTEMBER 27, 2000

OKLAHOMA WATER RESOURCES BOARD

## Statewide Precipitation & General Summary

Despite the rainfall over much of Oklahoma late last week, the state remains very dry. According to preliminary Mesonet weather station data provided by the [Oklahoma Climatological Survey](#) and National Weather Service (see below), the areas experiencing the lowest percent of normal rainfall since July 1 are the West Central and Southwest climate divisions (24 and 27 percent of normal, respectively). Six regions have received less than one-half of their normal precipitation. The current state-averaged precipitation total is only 3.67 inches, which is 4.93 inches below average and only 43 percent of normal for the period (through September 24).

For the current water year (October 1, 1999 through September 24, 2000), six climate divisions report precipitation deficits. The South Central and Southeast regions have received only 71 and 76 percent of their normal rainfall, respectively. The state averaged total is 91 percent of normal for that period.



**PRELIMINARY STATEWIDE PRECIPITATION  
BY CLIMATE DIVISION**  
(IN INCHES)

DIVISION (#)	WATER YEAR			JULY 1 – SEPTEMBER 24, 2000			RAINFALL SINCE SEPTEMBER 17
	OCTOBER 1, 1999 – TOTAL RAINFALL	SEPTEMBER 24, 2000 DEPARTURE FROM NORMAL	PERCENT OF NORMAL	TOTAL RAINFALL	DEPARTURE FROM NORMAL	PERCENT OF NORMAL	
Northwest (1)	16.07	-3.26	83	2.48	-4.03	38	0.04
North Central (2)	28.48	0.91	103	3.24	-5.22	38	0.04
Northeast (3)	40.34	0.99	103	5.38	-4.59	54	0.66
West Central (4)	26.23	0.34	101	1.77	-5.60	24	0.04
Central (5)	32.06	-1.54	95	4.76	-3.73	56	1.11
East Central (6)	39.50	-2.99	93	5.23	-4.07	56	2.14
Southwest (7)	26.25	-1.14	96	2.01	-5.32	27	0.73
South Central (8)	26.47	-10.76	71	3.02	-5.46	36	0.69
Southeast (9)	37.00	-11.50	76	4.35	-5.88	42	2.06
<b>STATE-AVERAGED</b>	<b>30.27</b>	<b>-3.17</b>	<b>91</b>	<b>3.67</b>	<b>-4.93</b>	<b>43</b>	<b>0.82</b>

Information and data contained in this update of Oklahoma's water resource conditions are courtesy of the National Weather Service, Climate Prediction Center, Oklahoma Climatological Survey, State Department of Agriculture, Oklahoma Forestry Services, Agricultural Statistics Service, U.S. Army Corps of Engineers, U.S. Department of Agriculture/Forest Service, U.S. Geological Survey, Western Drought Coordination Council and National Drought Mitigation Center. This publication is issued weekly during times of specific concern regarding statewide or regional water situations and periodically -- biweekly or monthly -- the remainder of the year.  
For more information, visit <http://www.state.ok.us/~owrb/features/drought.html>.

### Drought Indices

According to the latest [Palmer Drought Severity Index](#) (September 23, below), moisture/drought conditions in Oklahoma have actually improved in some areas for the first time in many weeks. **However, eight climate divisions remain in various stages of drought, including the Northwest and South Central regions, which are in the “severe drought” category.** The Southeast, Southwest and West Central climate divisions are all experiencing “moderate drought.” Only three of the nine climate divisions have undergone PDSI moisture decreases since September 16; for the second straight week, the North Central (“near normal”) climate division experienced the greatest decrease during the period.

The latest monthly [Standardized Precipitation Index](#) (through August, below) indicates that the South Central and Southeast climate divisions are experiencing long-term dryness, at least over the last 12 months. Although no other regions are experiencing long-term moisture deficits, virtually all areas are experiencing very dry to extremely dry SPI conditions throughout the past two months. The 6-, 9- and 12-month SPI time periods reflect “moderately dry” conditions in the South Central region and the 12-month SPI indicates “moderately dry” conditions in the Southeast. No other regions experienced a dry SPI reading among the selected time periods.

The latest [Keetch-Byram Drought Index](#) (September 25, below), which measures the state of near-surface soil moisture (within the uppermost eight inches of soil) as well as the amount of fuel available for fires, indicates that drought-related fire conditions in Oklahoma have temporarily improved. Statewide, 14 of the more than 110 Mesonet stations in Oklahoma report KBDI values in excess of 700, indicating severe fire/drought conditions (36 stations had readings above 700 on September 18). Ringling, in the South Central climate division, retains the highest KBDI value (776), followed by Mt. Herman (768; Southeast) and Grandfield (749; Southwest).

According to the Oklahoma Department of Agriculture (Forestry Services), [Statewide Wildfire Preparedness](#) remains at Level 4 (very high to extreme fire danger). Although widespread fires have persisted in many areas during the last few weeks, all are currently contained, according to the Oklahoma Department of Civil Emergency Management. **A Burn Ban remains in effect for all of Oklahoma and includes all outdoor burning. The rainfall received last weekend will provide only temporary relief and a return to dry, windy conditions will soon signal a return to high fire danger.**

***Presented on the following page is a special message from state forestry, emergency management and weather officials concerning the fire danger, Burn Ban and related issues.***

CLIMATE DIVISION (#)	PALMER DROUGHT SEVERITY INDEX				STANDARDIZED PRECIPITATION INDEX THROUGH AUGUST			
	CURRENT STATUS 09/23/2000	VALUE		CHANGE IN VALUE	3-MONTH	6-MONTH	9-MONTH	12-MONTH
Northwest (1)	SEVERE DROUGHT	-3.08	-2.94	-0.14	NEAR NORMAL	NEAR NORMAL	NEAR NORMAL	NEAR NORMAL
North Central (2)	NEAR NORMAL	-0.39	0.08	-0.47	NEAR NORMAL	MODERATELY WET	MODERATELY WET	MODERATELY WET
Northeast (3)	MILD DROUGHT	-1.20	-1.34	0.14	NEAR NORMAL	MODERATELY WET	MODERATELY WET	NEAR NORMAL
West Central (4)	MODERATE DROUGHT	-2.06	-1.91	-0.15	NEAR NORMAL	NEAR NORMAL	MODERATELY WET	NEAR NORMAL
Central (5)	MILD DROUGHT	-1.44	-1.73	0.29	NEAR NORMAL	NEAR NORMAL	NEAR NORMAL	NEAR NORMAL
East Central (6)	INCIPIENT DROUGHT	-0.80	-1.75	0.95	MODERATELY WET	NEAR NORMAL	NEAR NORMAL	NEAR NORMAL
Southwest (7)	MODERATE DROUGHT	-2.22	-2.46	0.24	NEAR NORMAL	NEAR NORMAL	NEAR NORMAL	NEAR NORMAL
South Central (8)	SEVERE DROUGHT	-3.00	-3.02	0.02	NEAR NORMAL	MODERATELY DRY	MODERATELY DRY	MODERATELY DRY
Southeast (9)	MODERATE DROUGHT	-2.45	-2.73	0.28	NEAR NORMAL	NEAR NORMAL	NEAR NORMAL	MODERATELY DRY

### KEETCH-BYRAM DROUGHT FIRE INDEX

MESONET STATION	COUNTY	CLIMATE DIVISION	CURRENT VALUE 09/25/2000	ANTICIPATED IMPACT
Ringling	Jefferson	South Central	776	600-800: often associated with more severe drought; increased wildfire occurrence; intense deep burning fires with significant downwind spotting; live fuels also expected to burn actively.
Mt. Herman	McCurain	Southeast	768	
Grandfield	Tillman	Southwest	749	

14 total stations with KBDI values above 700

*The PDSI may underestimate or overestimate the severity of ongoing dry periods. The SPI, more sensitive than the PDSI, provides a comparison of precipitation over a specified period with precipitation totals from that same period for all years included in the historical record. The 3-month SPI provides a seasonal estimation of precipitation while the 6-month SPI can be very effective in showing precipitation over distinct seasons. The Keetch-Byram Drought Index provides a gauge of dead fuel currently available for potential fires.*

## **Questions and Answers Concerning Drought, Rain and the Burn Ban**

### **How much rain do we need to lift the Burn Ban?**

Generally, more than one inch is needed to remove the Burn Ban from any one county. However, that depends on a variety of factors, including the depth of the drought, intensity and duration of the rain event, forecast for the week following the rain and the response of vegetation to the rain. Rather than a single rain event, what is needed is development of a wet pattern. Amounts of two to three inches from a single storm are insufficient, although that amount from several events over a week's period could be enough.

### **Why can't we just lift the Burn Ban as soon as it rains?**

The Burn Ban is a legal proclamation by the Governor. Only the Governor (or, in his absence, the Lieutenant Governor) can remove it. The Oklahoma Department of Civil Emergency Management or Forestry Services lack the authority to remove it without following certain legal steps and requirements. Also, it takes time for wildland fuels to recover moisture. Fuel conditions are closely related to drought conditions. The drier and deeper the drought, the longer the recovery. This has been one of the driest and hottest periods in Oklahoma history. Drought recovery will take time.

Live fuels will respond to rain until a freeze or frost puts them into winter dormancy. Live Fuel Moisture should be above 150% to have a significant dampening effect on fire behavior. Currently, herbaceous live fuel moistures are generally below 100% and shrub live fuel moistures are generally below 120%. The response these fuels make to rain are a key factor in any decision to remove or amend the Burn Ban.

Oklahoma's dead fine fuels (dead grasses and fallen leaves) have been drought-cured, meaning they are in a condition similar to late winter or early spring. These are generally the fuels that carry the fire in Oklahoma. When grasses and leaves reach this condition, they respond quickly to changes in moisture. They gain moisture in about an hour and lose it in about the same amount of time. These fuels can carry a wildland fire in the afternoon following an inch of rain in the morning. Windy conditions have a heavy impact on the moisture content of these fuels. Rainfall is only a temporary influence on these fuels as they respond very quickly to changes in relative humidity.

Our larger fuels (branches, limbs and logs) are also critically dry. These fuels contribute intensity (or heat) to the fires. When these fuels reach a condition below 12%, they are considered extremely dry. As a result, it takes very little heat to ignite them and, once started, they burn longer with a higher energy release than grasses and leaves. These fuels respond very slowly to rain or changes in humidity. Occasionally, they will smolder through a rain event and restart a fire two weeks later. These fuels have an important role in the need for a Burn Ban because they tend to make fires more difficult to contain and extinguish.

### **It rained two inches at my house. Why am I still included in the Burn Ban?**

The Burn Ban is administered on a county-wide basis and decisions are made, in part, due to state rainfall measurements obtained through the Oklahoma Mesonet, which includes more than 110 sites across the state. However, if it rains in one part of a county, but not at the Mesonet site, it appears that the entire county received no rain.

### **Who will monitor the need for removal of the Burn Ban?**

Forestry and Emergency Management Officials will monitor rainfall amounts very closely and remove appropriate counties from the Burn Ban. It required many weeks to reach these critically dry conditions; a few hours of light rain or a few minutes of heavy rain cannot remedy the situation.

### **Can I get a special exemption for the Burn Ban?**

There are no exemptions under the Burn Ban. All revisions must be specifically spelled out and authorized in the Governor's proclamation.

### **Now that it has rained, what happens if we have a big wildfire in our area?**

The fire danger will remain high to extreme in areas of the state that received little or no rain last weekend. As a result, the State EOC and the Oklahoma Multi-agency Coordination Group remain functional. Additional firefighters and resources remain on hand.

### ***Streamflow Conditions***

For the current water year (beginning October 1, 1999), flows in virtually all state rivers and streams are reflecting the impacts of much below normal precipitation and runoff. Considering overall trends as well as current flows, the most recent data (September 21, attached) from the six [U.S. Geological Survey/OWRB](#) stream gage sites selected to monitor the general condition of Oklahoma streams (daily streamflow since October 1, 1999 compared to long-term, normal/median daily discharges) indicate **much below average flow** in *southeast* (Glover River in McCurtain County), *central* (Canadian River in McClain County) and *south central* (Washita River in Carter County) Oklahoma; **below average flow** in the *southwest* (North Fork/Red River in Beckham County) and *northwest* (Cimarron River in Beaver County) regions; and **near average flow** in the *northeast* (Baron Fork in Cherokee County).

### ***Weather Forecast***

The National Weather Service [6- to 10-day outlook](#) (October 1-5) calls for no precipitation for virtually all of Oklahoma but the far northeastern corner of the state, where normal rainfall is anticipated. Above normal temperatures are expected for generally the southern two-thirds of the state; normal temperatures are anticipated for northern Oklahoma during the period. The Climate Prediction Center forecasts a chance for above normal precipitation for the entire state for the October through December period.

Current models indicate that the persistent cold water phenomenon in the equatorial Pacific Ocean, referred to as La Niña, has virtually disappeared and tropical Pacific sea levels, which indicate how much heat is stored in the ocean, have returned to near normal after three years of dramatic fluctuations.

### ***Crop Report***

September 24 – The weekend was welcome as large grass and wildfires devastated many areas early last week. The cool, wet weather should provide some relief to stressed crops and pastures, but more rain is needed to improve critically short soil moisture conditions.

Wheat seeding progressed slightly last week and is now 12 percent planted, behind the five-year average of 21 percent. Wheat fields that were dusted in should benefit from the rains, but future moisture is needed to achieve good emergence of the crop. Major wheat producing areas, including the Panhandle, west central and north central regions, received only small amounts of rainfall, generally less than one-tenth of an inch. Most wheat farmers will need more rain in order to make major progress with planting the 2001 crop.

The persistence of hot and dry conditions has afflicted great stress on Oklahoma's dryland row crops, although the recent moisture should help. The corn harvest continued at a blistering pace last week as 74 percent of the crop has been harvested. Sorghum is in mostly good to fair condition. Fifty-six percent of the crop is mature and 33 percent has been harvested. Soybeans are in mostly poor condition and the harvest totals 35 percent statewide. Cotton and peanuts are rated in mostly fair condition. Cool temperatures and moisture have kicked off sclerotinia blight in some peanut fields. Digging continues slowly, primarily in the southwest, and a few fields have been combined. Cotton growers applied defoliant to their crop before the weekend rains and isolated harvesting continued as well.

Both alfalfa and all other hay are in mostly fair condition. The fourth cutting of alfalfa continues at 75 percent complete while the fifth cutting of alfalfa has made good progress and was 30 percent cut by week's end. Producers in the areas that received rainfall hope the moisture will stimulate growth in their hay crop.

Absence of adequate pastures continues to be a problem statewide, although areas that received beneficial rain may exhibit much-needed improvement. Fresh forage will allow cattle to gain a little weight before winter arrives. Both hay and protein feeding continue in critical areas. Pasture conditions are rated in mostly poor condition, with the south being the most affected.

Livestock remain in mostly good to fair condition statewide. However, the lack of proper forage and water has caused some cattle herds to exhibit signs of stress. Many producers are implementing different feeding programs to their stock to get through the extended dry period. Stock water levels continue to decline across the state and hauling water in critical areas has become necessary. Cattle auctions reported slightly above average marketings last week with feeder steer and heifer prices mostly steady. Culling occurred in some herds and future stock reduction remains a consideration. Insect pressures on cattle continue to be moderate to light statewide.

### **Reservoir Storage**

Reservoir storage levels throughout much of Oklahoma continue to slowly decline. As of September 25, the combined normal conservation pools of 31 selected major federal reservoirs across Oklahoma (see below) are approximately 86.9 percent full, a 0.6 percent decrease over that measured on September 18, according to information from the [U.S. Army Corps of Engineers \(Tulsa District\)](#). Twenty-seven reservoirs have experienced lake level decreases since that time. In addition, for the second straight week, all 31 reservoirs are currently operating at less than full capacity. However, only three reservoirs (Lugert-Altus, only 31.9 percent; Keystone, 69.7 percent; and Tom Steed, 71.3 percent) are below 80 percent capacity. Conversely, only 10 are above 90 percent capacity.

<b>Storage in Selected Oklahoma Lakes &amp; Reservoirs as of September 25, 2000</b>				
<b>Climate Division Lake or Reservoir</b>	<b>Conservation Storage (acre-feet)</b>	<b>Present Storage (acre-feet)</b>	<b>Percent of Storage conservation flood</b>	
<b>NORTH CENTRAL</b>				
Fort Supply	13,900	12,383	89.1	0.00
Great Salt Plains	31,420	25,315	80.6	0.00
Kaw*	387,712	381,556	98.4	0.00
Keystone	505,381	352,105	69.7	0.00
<b>Regional Totals/Averages</b>	<b>938,413</b>	<b>771,359</b>	<b>82.2</b>	<b>0.00</b>
<b>NORTHEAST</b>				
Birch	19,225	16,676	86.7	0.00
Copan	43,400	36,933	85.1	0.00
Fort Gibson	365,200	342,000	93.6	0.00
Grand	1,672,000	1,484,761	88.8	0.00
Hudson	200,300	197,515	98.6	0.00
Hulah	31,160	25,014	80.3	0.00
Oologah	552,210	510,342	92.4	0.00
Skiatook	322,700	294,624	91.3	0.00
<b>Regional Totals/Averages</b>	<b>3,206,195</b>	<b>2,907,865</b>	<b>90.7</b>	<b>0.00</b>
<b>WEST CENTRAL</b>				
Canton	111,310	98,946	88.9	0.00
Foss	165,480	154,588	93.4	0.00
<b>Regional Totals/Averages</b>	<b>276,790</b>	<b>253,534</b>	<b>91.6</b>	<b>0.00</b>
<b>CENTRAL</b>				
Arcadia	27,520	24,450	88.8	0.00
Heyburn	7,105	5,948	83.7	0.00
Thunderbird	119,600	110,062	92.0	0.00
<b>Regional Totals/Averages</b>	<b>154,225</b>	<b>140,460</b>	<b>91.1</b>	<b>0.00</b>
<b>EAST CENTRAL</b>				
Eufaula*	2,368,223	1,989,647	84.0	0.00
Tenkiller	654,100	569,560	87.1	0.00
<b>Regional Totals/Averages</b>	<b>3,022,323</b>	<b>2,559,207</b>	<b>84.7</b>	<b>0.00</b>
<b>SOUTHWEST</b>				
Fort Cobb	80,010	74,694	93.4	0.00
Lugert-Altus	132,830	42,430	31.9	0.00
Tom Steed	88,970	63,474	71.3	0.00
<b>Regional Totals/Averages</b>	<b>301,810</b>	<b>180,598</b>	<b>59.8</b>	<b>0.00</b>
<b>SOUTH CENTRAL</b>				
Arbuckle	72,400	65,802	90.9	0.00
McGee Creek	113,930	100,547	88.3	0.00
Texoma*	2,539,946	2,274,267	89.5	0.00
Waurika*	180,036	148,633	82.6	0.00
<b>Regional Totals/Averages</b>	<b>2,906,312</b>	<b>2,589,249</b>	<b>89.1</b>	<b>0.00</b>
<b>SOUTHEAST</b>				
Broken Bow*	958,180	800,916	83.6	0.00
Hugo*	158,617	132,688	83.7	0.00
Pine Creek*	56,222	49,366	87.8	0.00
Sardis	274,330	258,480	94.2	0.00
Wister	60,162	51,668	85.9	0.00
<b>Regional Totals/Averages</b>	<b>1,507,511</b>	<b>1,293,118</b>	<b>85.8</b>	<b>0.00</b>
<b>STATE TOTALS</b>	<b>12,313,579</b>	<b>10,695,390</b>	<b>86.9</b>	<b>0.00</b>

\* indicates seasonal pool operation; actual storage figures/percentages may vary.

### **Oklahoma Weather Modification Program**

A brief summary/update of recent cloud seeding operations of the Oklahoma Weather Modification Program, including both hail suppression and rainfall enhancement, is presented below. Four individual seeding flight operations, one for rainfall enhancement and three for hail suppression, were conducted from September 20-26. The 2000 Program officially began operations on March 1, 2000.

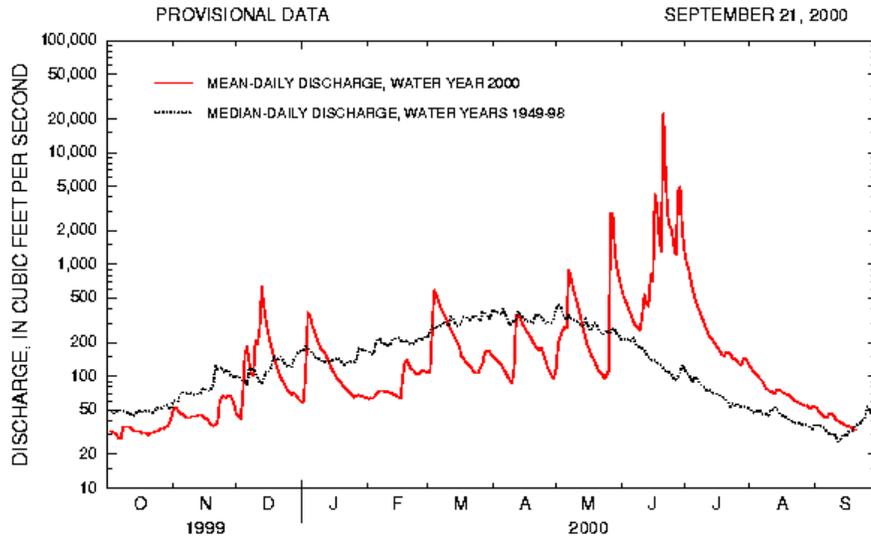
<b>RECENT WEATHER MODIFICATION ACTIVITIES</b>					
<b>SEPTEMBER 20-26, 2000</b>					
<b>Date/ Flight(s)</b>	<b>County Location(s)</b>	<b>Texas</b>	<b>Kansas</b>	<b>Hail</b>	<b>Rain</b>
22-Sep	Washita, Jackson, Greer, Kiowa, Caddo				<b>x</b>
23-Sep	Adair, Delaware, Cherokee			<b>x</b>	
23-Sep	Hughes, McIntosh, Muskogee, Haskell, Pittsburg, Seminole			<b>x</b>	
23-Sep	Johnston, Pontotoc, Coal, Pittsburg			<b>x</b>	

\* Information may not reflect the most recent operations.

*Baron Fork at Eldon, Oklahoma*

*Station No. 07197000  
Northeast Oklahoma*

*Drainage Area 307 square miles*



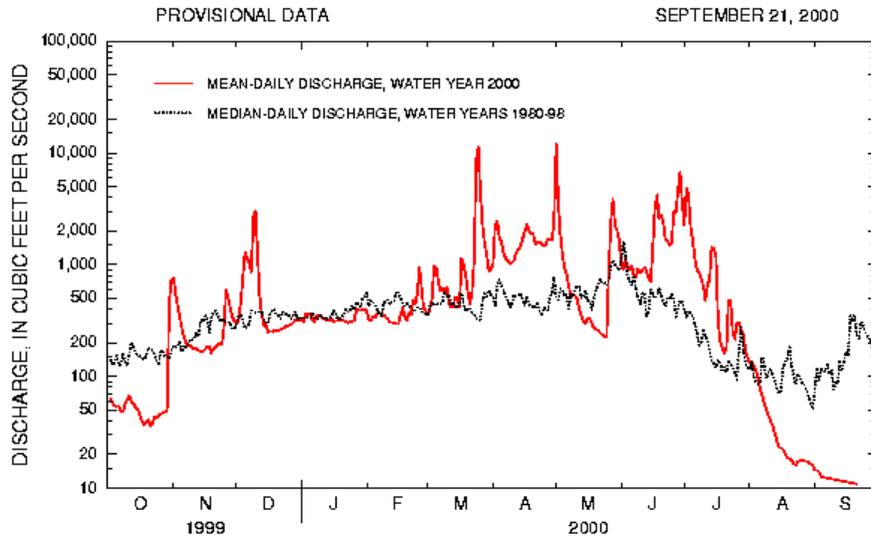
Comparison of daily discharges for water year 2000 and period of record for Baron Fork at Eldon, Oklahoma.

Data from U.S. Geological Survey

*Canadian River at Purcell, Oklahoma*

*Station No. 07229200  
Central Oklahoma*

*Drainage Area 25,939 square miles*



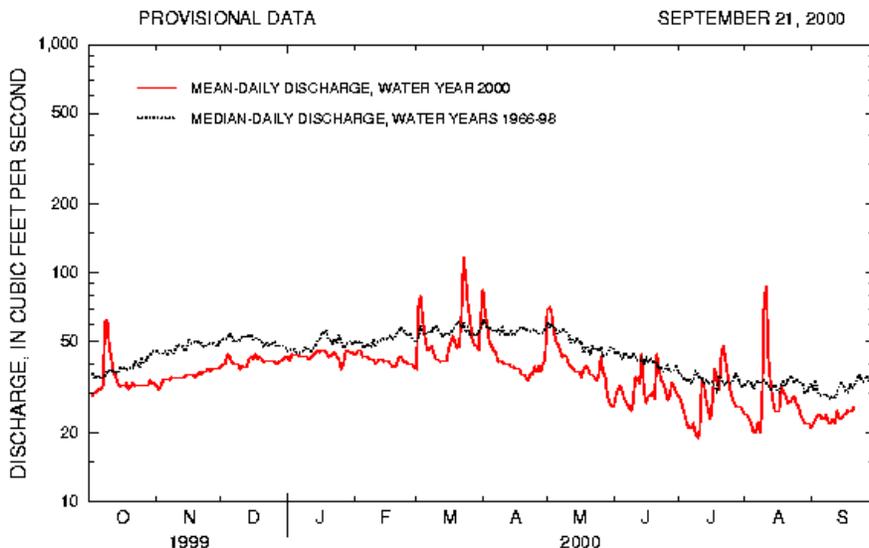
Comparison of daily discharges for water year 2000 and period of record for Canadian River at Purcell, Oklahoma.

Data from U.S. Geological Survey

*Cimarron River near Forgan, Oklahoma*

*Station No. 07156900  
Northwest Oklahoma*

*Drainage Area 8,536 square miles*



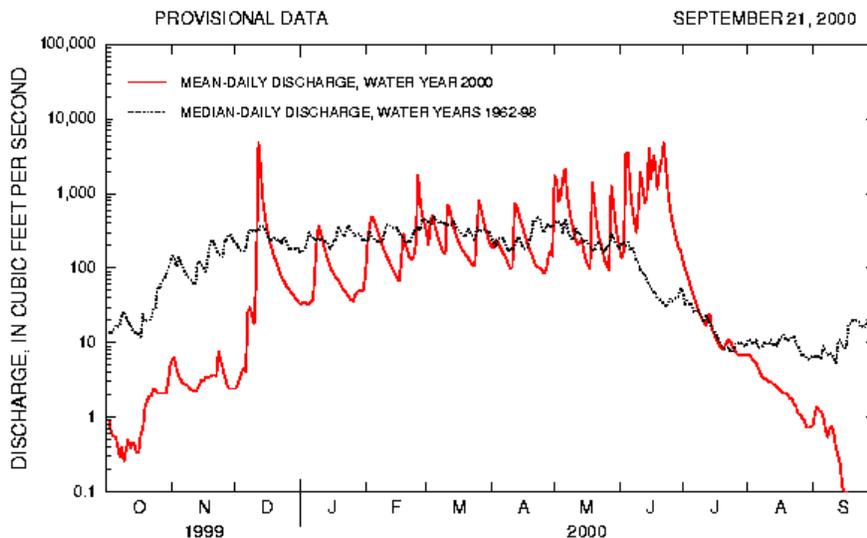
Comparison of daily discharges for water year 2000 and period of record for Cimarron River near Forgan, Oklahoma.

Data from U.S. Geological Survey

*Glover River near Glover, Oklahoma*

*Station No. 07337900  
Southeast Oklahoma*

*Drainage Area 315 square miles*



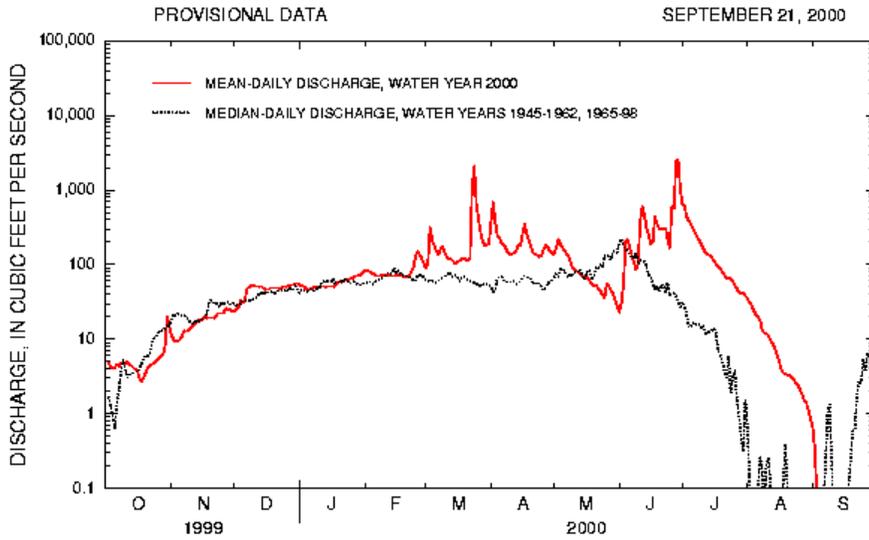
Comparison of daily discharges for water year 2000 and period of record for Glover River near Glover, Oklahoma.

Data from U.S. Geological Survey

**North Fork Red River near Carter, Oklahoma**

**Station No. 07301 500**  
**Southwest Oklahoma**

**Drainage Area 2,337 square miles**



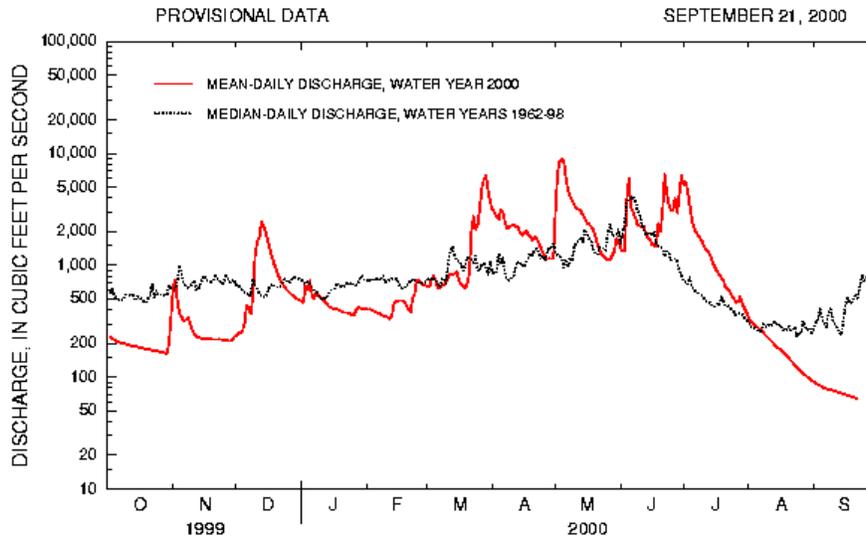
Comparison of daily discharges for water year 2000 and period of record for North Fork Red River near Carter, Oklahoma.

Data from U.S. Geological Survey

**Washita River near Dickson, Oklahoma**

**Station No. 07331 000**  
**South-Central Oklahoma**

**Drainage Area 7,202 square miles**



Comparison of daily discharges for water year 2000 and period of record for Washita River near Dickson, Oklahoma.

Data from U.S. Geological Survey