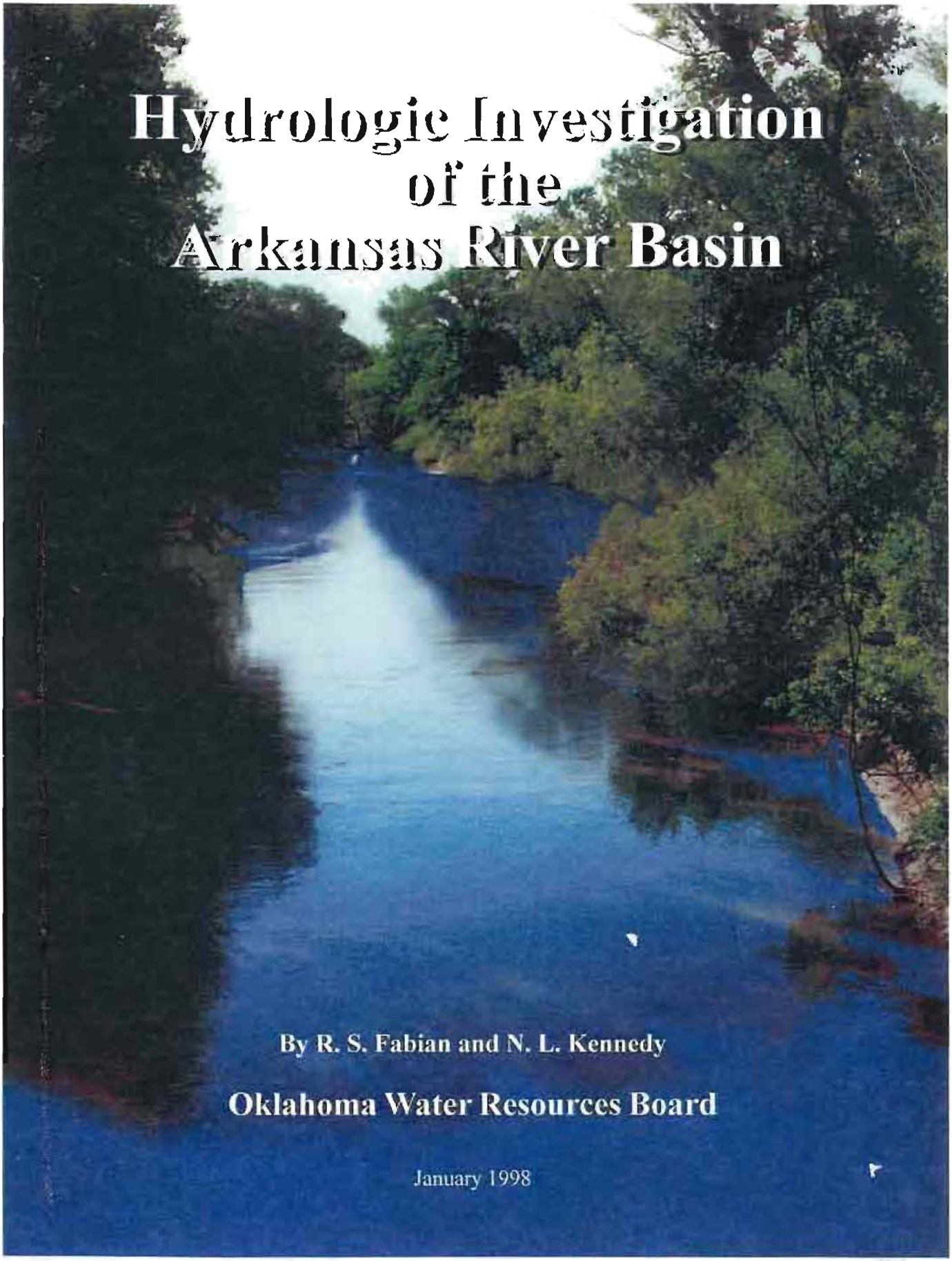

# Hydrologic Investigation of the Arkansas River Basin

By R. S. Fabian and N. L. Kennedy

Oklahoma Water Resources Board

January 1998

# HYDROLOGIC INVESTIGATION OF THE ARKANSAS RIVER BASIN

by
Robert S. Fabian
Nancy L. Kennedy

**Technical Report 98 - 2**

Oklahoma Water Resources Board
Duane A. Smith
Executive Director

January 1998

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# HYDROLOGIC INVESTIGATION OF THE ARKANSAS RIVER BASIN

## INTRODUCTION

This report describes the hydrologic investigation of the stream water resources of the Arkansas River Basin in Oklahoma. Oklahoma Statutes (Title 82, O.S. Supp. 1981, Sec. 105.12) set forth the criteria for determining whether or not an application for the use of surface water will be approved. An accurate determination of the amounts and distribution of water available within a stream system is a necessity for determining if water is available for appropriation and for assessing the impact of a proposed appropriation of water on existing users. To facilitate these determinations, the Arkansas River Basin in Oklahoma is subdivided into17 stream systems, designated as Stream System 2-1 through Stream System 2-17. Three of these stream systems (2-5, 2-9 and 2-15) are further divided into stream subsystems.

Water available for appropriation within every stream system is being determined on a statewide basis to develop a comprehensive, updated reference for use by the Oklahoma Water Resources Board and the public. The new updates will replace the published Hydrologic Investigations of the past that were completed using different methods for calculating water available for appropriation in a stream. The revised hydrologic investigations use the mean annual stream flow from stream gauges located within the various stream systems. Where stream gauge data is unavailable, then mean annual precipitation runoff is used or data from a nearby watershed with comparable hydrologic characteristics may be used.

The primary purpose of this study is to provide data to assist the Oklahoma Water Resources Board in the day-to-day management of the state's surface water resources. This study determines water available for appropriation in the Arkansas River Basin stream systems and subsystems, provides data on the major reservoirs and lakes in these stream systems and provides other reference data useful to the Board and the public.

Data used to calculate the figures in this report were obtained from records of the U.S. Geological Survey stream gauges on tributaries and rivers in this basin. Other data were obtained from the Oklahoma Water Resources Board, the U.S. Army Corps of Engineers and the Natural Resources Conservation Service.

## BASIN DESCRIPTION

The Arkansas River Basin encompasses 42,167 square miles ($mi^2$ ) in Oklahoma. Stream flow in this basin enters Oklahoma from the states of Texas, New Mexico, Colorado, Kansas, Missouri and Arkansas. These bordering states contribute an additional 105,231 $mi^2$ of drainage area. The Arkansas River Basin flow then discharges from Oklahoma into Arkansas.

## STREAM SYSTEM BOUNDARIES AND DRAINAGE AREAS

Stream system boundaries and drainage areas used in this study are generally those from previously published Hydrologic Investigations by the Oklahoma Water Resources Board. There are instances, however, where the stream system boundaries presented in these past publications differ noticeably from those of the U.S. Geological Survey's (USGS) hydrologic unit boundaries shown on the Digital Atlas of Oklahoma (U.S. Geological Survey, 1997). Where such inconsistencies occur, the USGS's Hydrologic Unit boundaries from the Digital Atlas of Oklahoma were adopted. In addition, the USGS's Hydrological Unit Code watershed numbering system was used for subdivisions of the stream systems.

## SURFACE WATER GAUGE DATA

Whenever possible, USGS gauge data are used in this study (U.S. Geological Survey, 1996). The gauges selected are in operation and located on the main drainage stems of the stream systems as close as possible to the outlets of the stream systems. The importance of using current data is emphasized as parts of the state have experienced a significant change in annual precipitation over the past decade. In addition, recently observed shifts in base flows and changing upstream out-of-state influences are being reflected in the current gauge data. Stream gauge data from a nearby watershed having similar hydrologic characteristics are used where current stream gauge data are unavailable or inadequate.

The gauge data reflects water that flows past the gauge and is a function of the dynamics of water within the watershed above the gauge. These water dynamics include water diverted for use, return flows from users, base flow contribution by groundwater, precipitation runoff, water stored in lakes, water lost to an aquifer and water lost due to evaporation. Water that is present before any of it is removed by appropriated users needs to be determined. The Oklahoma Water Resources Board database is used to calculate the average amount of permitted water rights in the drainage area above the gauge for the years that encompass the gauge data. The annual mean discharge recorded by the gauge then is adjusted upward by the annual mean upstream water right appropriations to derive the adjusted gauge flow.

If the drainage areas of the gauge and stream system are not the same, the flow calculation at the gauge is adjusted proportionally to reflect the total drainage area of the stream system. If no major reservoirs exist between a gauge and the entrance or outlet to the stream system, the proportionality is based on contributing drainage areas. However, if a major reservoir is present between these points, the surface area of the conservation pool of the reservoir is omitted when calculating this proportionality.

One of the goals of utilizing stream systems and subsystems in the stream water appropriation process is to maintain a balance between the total amount of water available within a large drainage area and water that may be appropriated for use within that area. Many of the stream systems and subsystems are hydrologically connected as one drains into another. The total amount of water within a stream system or subsystem is called the Total Estimated Available Water (TEAW).

There is one stream system in this study, Stream System 2-2, that does not have a stream gauge available for data analysis. In this case, extrapolated gauge data from a similar watershed, Stream System 2-17, are utilized.

## RESERVOIRS AND LAKES

The Oklahoma Water Resources Board maintains a large database of reservoirs and lakes in Oklahoma. This database consists of reservoirs and lakes that are associated with water use permits. The yield of many of these structures is known while others have yet to be determined. Only those reservoirs and lakes contained in this database and therefore deemed to have or to potentially have a significant role in supplying the water needs of the area, are presented in this study. Information about these reservoirs and lakes is from the Oklahoma Water Resources Board files, Oklahoma Water Atlas (Oklahoma Water Resources Board, 1990) and Civil Works Projects (U.S. Army Corps of Engineers, 1993).

There are approximately 2,080 impoundments constructed by the Soil Conservation Service (SCS), now called the Natural Resources Conservation Service (NRCS), in Oklahoma. Oklahoma Statutes provide that the Oklahoma Water Resources Board provide a priority based on beneficial use of that portion of the water designated by the NRCS as necessary for the sediment pool. NRCS structures that do not have a known yield are allocated water from the reservoir's sediment pool by the Oklahoma Water Resources Board after multiplying the volume by an adjustment that takes into consideration the reservoir's drainage area and the area's mean precipitation runoff. This adjustment is known as the reservoir refill factor ($\alpha$). The calculated estimated value of $\alpha$ for the stream system or subsystem is included in this study.

The sediment pool storage of SCS structures and the storage necessary to accommodate the dependable yields in other reservoirs and lakes are subtracted from the TEAW. The resulting value is the Adjusted Total Estimated Available Water (ATEAW), which is the amount of water available for appropriation from the river. Water available for appropriation from reservoirs or lakes is then based on the dependable yields, sediment pool storage or other appropriate storage value.

## ADDITIONAL PRESENTED DATA

The major tributaries listed in each stream system or subsystem are those named on the Hydrologic Unit Base Map (U.S. Geological Survey, 1974); map scale is 1:500,000.

The mean annual runoff is presented for each stream system and subsystem. This number is calculated by dividing the gauge flow adjusted for upstream water use by the contributing drainage area above the gauge.

The mean annual net lake evaporation data are derived from a map titled Average Annual Net Lake Evaporation, Pre-1988 (Natural Resources Conservation Service, date unknown).

A table and graph is included for each stream system which shows the percent exceedance flows for each stream gauge used in determining the mean annual flow for a stream. The percent exceedance represents that percentage of time a particular flow value may be exceeded. As an example for stream gauge 07198000 on the Arkansas River in Stream System 2-2, the flow rate of 831 cubic feet per second was exceeded 50 percent of the time over the period of record for this gauge. The calculations were done on a personal computer based software program written for the Oklahoma Water Resources Board by the Bureau of Reclamation under the Technical Assistance to the States Program.

## REFERENCES

Natural Resources Conservation Service, date unknown, Average Annual Net Lake Evaporation, Pre-1988, map.

Oklahoma Water Resources Board, 1990, Oklahoma Water Atlas, Publication 135, Oklahoma City, Oklahoma, 360 p.

U.S. Army Corps of Engineers, 1993, Civil Works Projects, Pertinent Data, Tulsa, Oklahoma, 146 p.

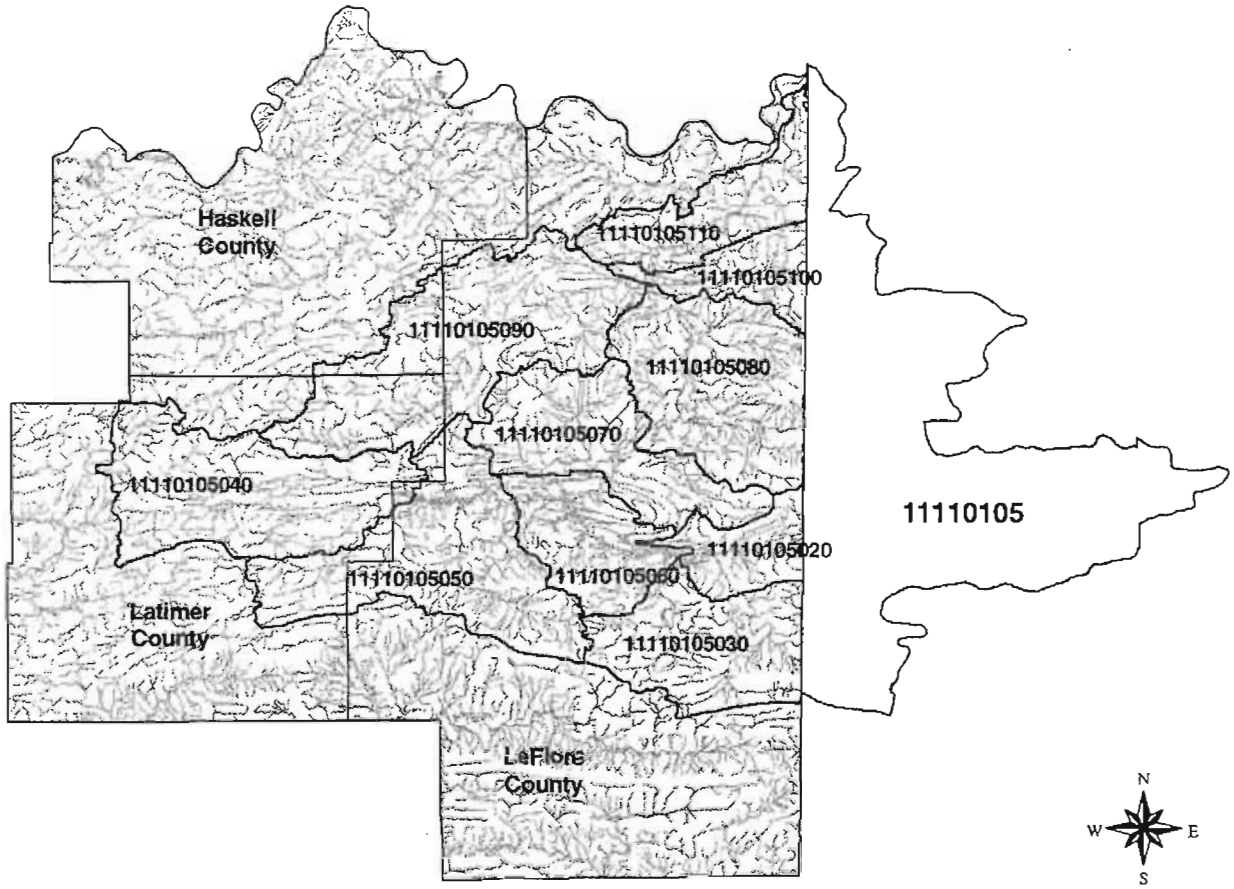
U.S. Geological Survey, 1996, Water Resources Data Oklahoma, Volume 1., Arkansas River Basin, U.S. Geological Survey-Data Report-95-1.

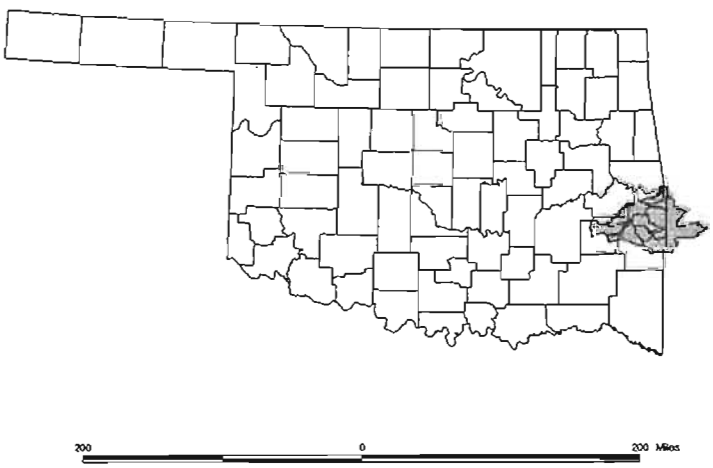
U.S. Geological Survey, 1997. Digital Atlas of Oklahoma, Oklahoma City, Oklahoma, 1 CD.

# APPENDIX A

## HYDROLOGIC DATA AND DETERMINATION OF AVAILABLE WATER WITHIN THE ARKANSAS RIVER BASIN

# STREAM SYSTEM 2-1: POTEAU RIVER



## STREAM SYSTEM 2-1: POTEAU RIVER

### General Information

Stream system area - 1,345 $mi^2$ — Hydrologic Unit Code for Watershed - 1111 0105

| Watersheds - | | |
|---|---|---|
| | 1111 0105 020 | 54 $mi^2$ |
| | 1111 0105 030 | 129 $mi^2$ |
| | 1111 0105 040 | 189 mi2 |
| | 1111 0105 050 | 199 $mi^2$ |
| | 1111 0105 060 | 92 $mi^2$ |
| | 1111 0105 070 | 137 $mi^2$ |
| | 1111 0105 080 | 171 $mi^2$ |
| | 1111 0105 090 | 231 $mi^2$ |
| | 1111 0105 100 | 52 $mi^2$ |
| | 1111 0105 110 | 90 $mi^2$ |
| | 1111 0105 120 | 1 $mi^2$ |

Total drainage area for Poteau River - 1,894 $mi^2$ (1,345 $mi^2$ in OK; 549 $mi^2$ in AR)

Major tributaries - Big Creek, Black Fork, Long Creek, Holson Creek, Fourche Maline, Caston Creek, Riddle Creek, Bear Creek, Owl Creek, Negro Creek, Brazil Creek, James Fork

Major reservoirs or lakes - Wister Lake, Lloyd Church Lake

Mean annual runoff based on adjusted gauge flow - 23.8 inches
Mean annual net lake evaporation for stream system - 3.3 inches
Estimated reservoir refill factor ($\alpha$) for stream system - 2.0

### Estimated Available Water

USGS gauge 07249413 Poteau River near Panama, OK.

Gauge Location: SE SE Sec.15-T8N-R25EIM, LeFlore County - 1,767 $mi^2$ drainage area
Data From Water Years 1989 - 1995:

Mean annual gauge flow - 3,085 cfs; 2,234,034 acre-feet/year
Mean annual runoff for 136 $mi^2$ below USGS gauge - 172,445 acre-feet/year
Mean annual flow for stream system - 2,406,479 acre-feet/year

Mean annual gauge flow adjusted for upstream water use - 2,412,968 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07249413 (WY 1989-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 284,518 | April | 258,972 | July | 25,217 | October | 30,506 |
| February | 236,763 | May | 447,134 | August | 17,959 | November | 139,455 |
| March | 243,986 | June | 193,678 | September | 47,973 | December | 227,257 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem

Total storage within stream system - 9,805 acre-feet
Total dependable yield within stream system - 32,887 acre-feet
SCS storage within stream system - 8,327 acre-feet/year

**Total Estimated Available Water Within Stream System - 2,412,968 acre-feet/year**
**Total Estimated Storage/Dependable Yields - 41,214 acre-feet/year**
**Adjusted Total Estimated Available Water - 2,371,754 acre-feet/year**

| Watershed Code | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1111 0105 020 | 54 $mi^2$ | 96,878 acre-feet/year |
| 1111 0105 030 | 129 $mi^2$ | 231,430 acre-feet/year |
| 1111 0105 040 | 189 mi2 | 339,071 acre-feet/year |
| 1111 0105 050 | 199 $mi^2$ | 357,023 acre-feet/year |
| 1111 0105 060 | 92 $mi^2$ | 165,051 acre-feet/year |
| 1111 0105 070 | 137 $mi^2$ | 245,782 acre-feet/year |
| 1111 0105 080 | 171 $mi^2$ | 306,779 acre-feet/year |
| 1111 0105 090 | 231 $mi^2$ | 414,421 acre-feet/year |
| 1111 0105 100 | 52 $mi^2$ | 93,289 acre-feet/year |
| 1111 0105 110 | 90 $mi^2$ | 161,463 acre-feet/year |
| 1111 0105 120 | 1 $mi^2$ | 1,794 acre-feet/year |

## WISTER LAKE

**Poteau River - Stream System 2-1**

Hydrologic Unit Code - 1111 0105

Located on the Poteau River
LeFlore County

Drainage area - 993 $mi^2$
Surface area, flood pool - 23,366 acres
Surface area, conservation pool - 6,745 acres

Flood control storage - 388,399 acre-feet
Conservation storage - Seasonally adjusted (ranges from 39,082 to 61,423 acre-feet)

Water supply storage - 14,000 acre-feet
Water supply dependable yield - 31,364 acre-feet/year

**OWRB Reservoir ID #65**

## LLOYD CHURCH LAKE
## Fourche Maline Watershed Site #7

**Poteau River - Stream System 2-1**

Hydrologic Unit Code - 1111 0105

Located on a tributary to Bandy Creek
Latimer County

Surface area, conservation pool - 160 acres

Water supply storage - 3,060 acre-feet
Water supply dependable yield - 1,523 acre-feet/year

**OWRB Reservoir ID #84**

**STREAM SYSTEM 2-1:** Poteau River

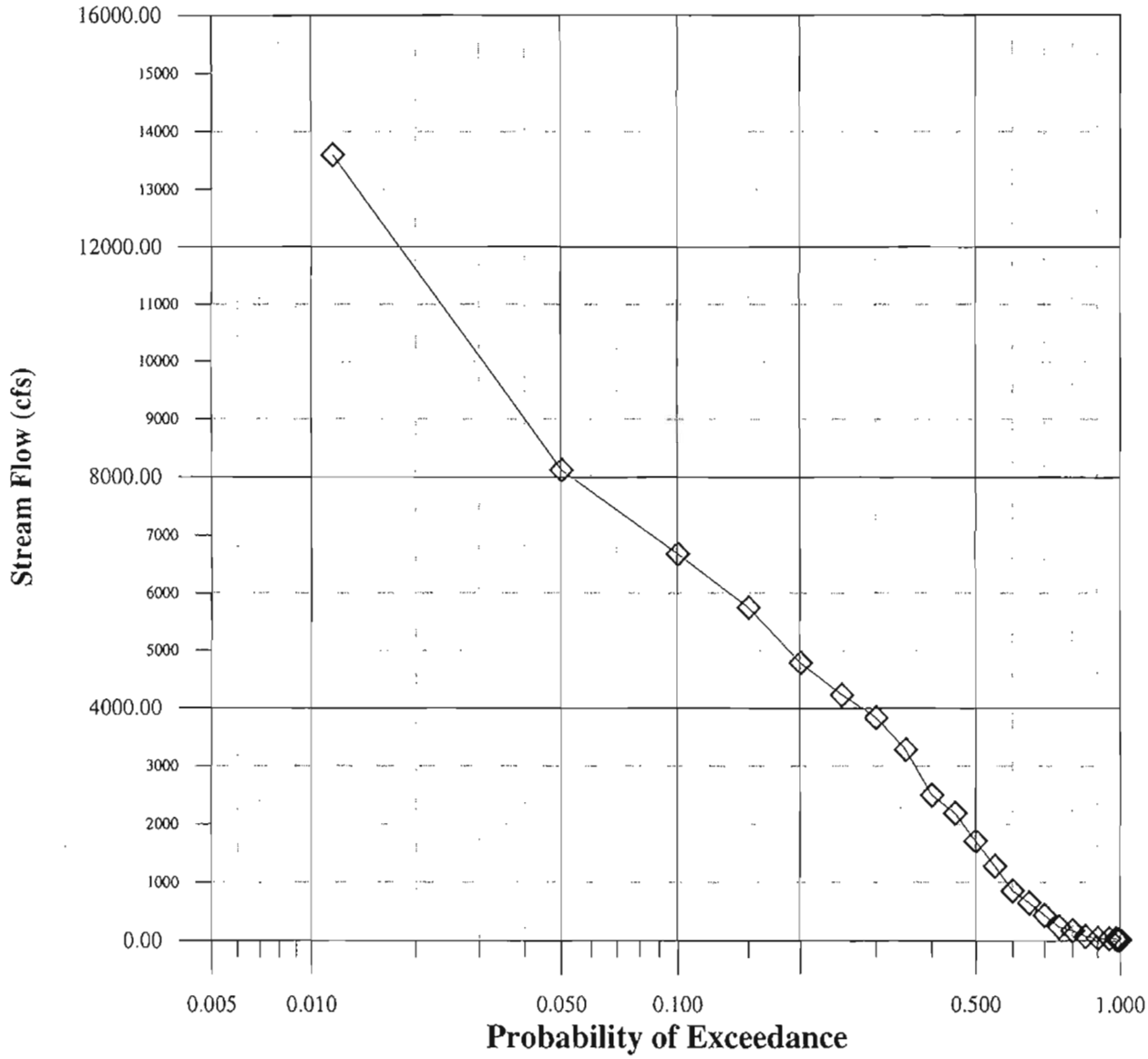
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Poteau River near Panama, OK |
| Station number | 07249413 |
| latitude (degrees, minutes, and seconds) | 350956 |
| longitude (degrees, minutes, and seconds) | 0943910 |
| hydrologic unit code | 11110105 |
| drainage area (square miles) | 1767 |
| contributing drainage area (square miles) | 1767 |
| gauge datum (feet above NGVD) | 387.96 |
| period of record | May 1992 - September 1993 |

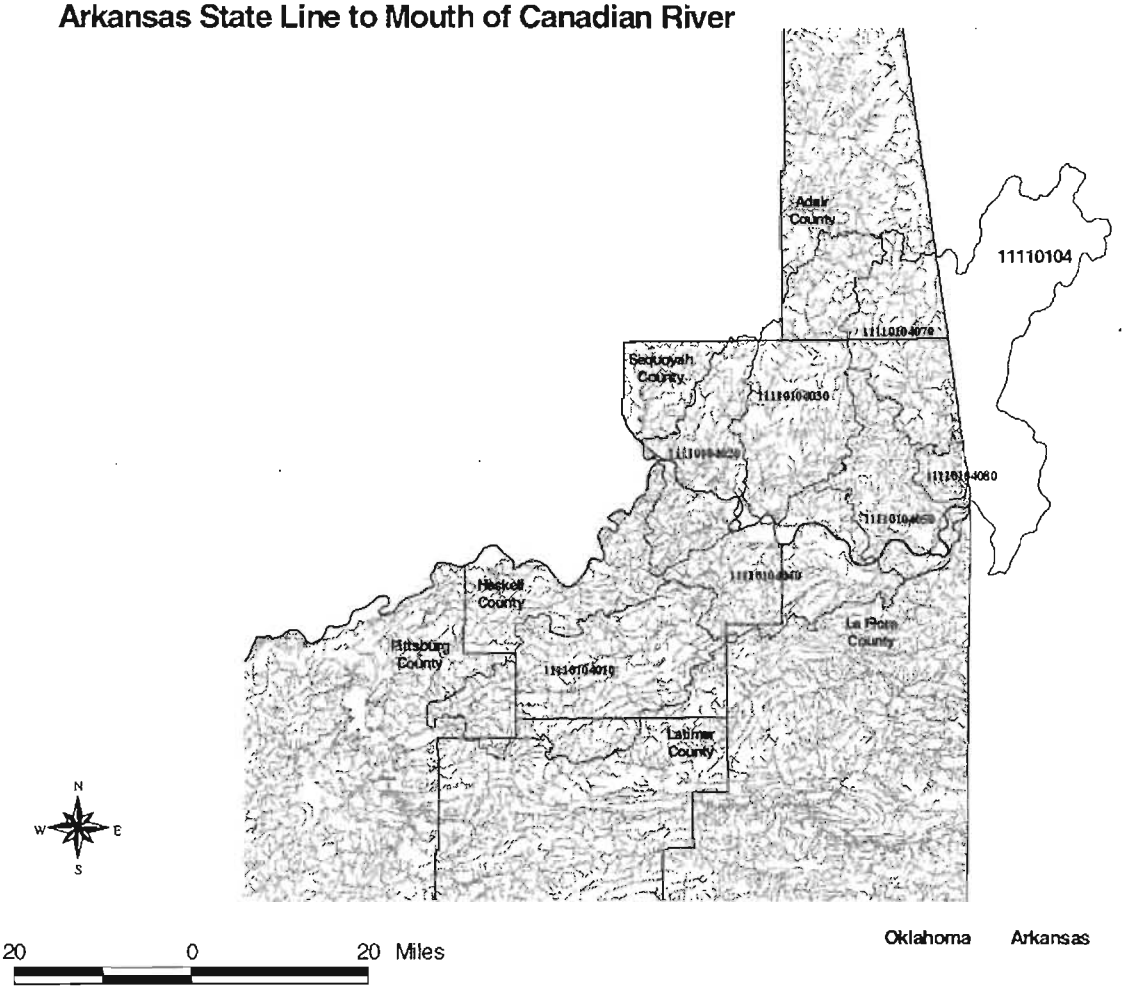
| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 13600.000 |
| 5 percent = | 8120.000 |
| 10 percent = | 6680.000 |
| 15 percent = | 5750.000 |
| 20 percent = | 4790.000 |
| 25 percent = | 4230.000 |
| 30 percent = | 3840.000 |
| 35 percent = | 3290.000 |
| 40 percent = | 2500.000 |
| 45 percent = | 2190.000 |
| 50 percent = | 1710.000 |
| 55 percent = | 1280.000 |
| 60 percent = | 854.000 |
| 65 percent = | 646.000 |
| 70 percent = | 435.000 |
| 75 percent = | 236.000 |
| 80 percent = | 174.000 |
| 85 percent = | 76.000 |
| 90 percent = | 44.000 |
| 95 percent = | 39.000 |
| 98 percent = | 36.000 |
| 99 percent = | 26.000 |
| 99.5 percent = | 21.000 |
| 99.9 percent = | 20.000 |

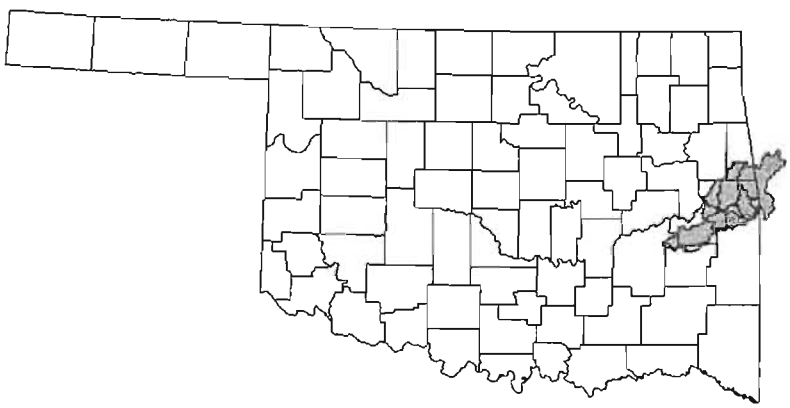
| | |
|---|---|
| Minimum flow: | 20.000 |
| Maximum flow: | 22,800.000 |
| Mean annual flow: | 2,708.373 |

# STREAM SYSTEM 2-1, POTEAU RIVER



## STREAM SYSTEM 2-2: MAIN STEM OF THE ARKANSAS RIVER
### Arkansas State Line to Mouth of Canadian River



## STREAM SYSTEM 2-2: ARKANSAS RIVER
## Main Stem From Arkansas State Line to Mouth of Canadian River

### General Information

Stream system area - 1,448 $mi^2$ — Hydrologic Unit Code for Watershed - 1111 0104

| Watershed - | | |
|---|---|---|
| | 1111 0104 010 | 345 $mi^2$ |
| | 1111 0104 020 | 180 $mi^2$ |
| | 1111 0104 030 | 290 $mi^2$ |
| | 1111 0104 040 | 243 $mi^2$ |
| | 1111 0104 050 | 170 $mi^2$ |
| | 1111 0104 070 | 190 $mi^2$ |
| | 1111 0104 080 | 30 $mi^2$ |

Total drainage area for Arkansas River - 148,325 $mi^2$ (43,655 $mi^2$ in OK; 104,670 $mi^2$ in TX, NM, CO, KS, MO, and AR)

Major tributaries - Vian Creek, Little Sans Bois Creek, Brushy Creek, Sallisaw Creek, Little Sallisaw Creek, Beaver Creek, Mountain Fork, Sans Bois Creek, Cache Creek, Little Lee Creek, Lee Creek

Major reservoirs or lakes - Stilwell City Lake, Brushy Creek Reservoir, Robert S. Kerr Reservoir

Mean annual runoff based on adjusted gage flow - 13.4 inches
Mean annual net lake evaporation for stream system - 1.0 inch
Estimated pond refill factor ($\alpha$) for stream system - 2.0

### Estimated Available Water

USGS gauge 07198000 Illinois River near Gore:

Analogous Gauge Location: NE SW Sec.27-T13N-R21EIM, Sequoyah County - 1,626 $mi^2$ drainage area
Data From Water Years 1954 - 1995:

Mean annual gauge flow - 1,567 cfs; 1,134,759 acre-feet
Mean annual gauge flow adjusted for upstream water use - 1,149,806 acre-feet
Mean annual runoff based on adjusted gauge flow including correction for Tenkiller Ferry Lake evaporation - 13.4 inches

Mean annual runoff for 1,448 $mi^2$ in 2-2 based on analogous gauge - 1,034,837 acre-feet
Mean annual net lake evaporation for Stilwell City Lake, Brushy Creek Reservoir, and Stream System 2-2 arm of Robert S. Kerr Reservoir (64.5 $mi^2$ total ) - 6,565 acre-feet

Mean annual flow - 1,028,272 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07198000 (WY 1954-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 101,154 | April | 160,142 | July | 80,101 | October | 50,025 |
| February | 91,975 | May | 145,532 | August | 51,322 | November | 75,379 |
| March | 122,883 | June | 107,573 | September | 41,063 | December | 105,083 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem

Total storage within stream system - 6,368 acre-feet
Total dependable yield within stream system - 0 acre-feet/year
SCS storage within stream system - 9,243 acre-feet/year

**Total Estimated Available Water - 1,028,272 acre-feet/year**
**Total Estimated Storage/Dependable Yields - 9,653 acre-feet/year**
**Adjusted Total Estimated Available Water - 1,018,619 acre-feet/year**

| Watershed Code | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1111 0104 010 | 345 $mi^2$ | 244,996 acre-feet/year |
| 1111 0104 020 | 180 $mi^2$ | 127,824 acre-feet/year |
| 1111 0104 030 | 290 $mi^2$ | 196,285 acre-feet/year |
| 1111 0104 040 | 243 $mi^2$ | 172,562 acre-feet/year |
| 1111 0104 050 | 170 $mi^2$ | 120,723 acre-feet/year |
| 1111 0104 070 | 190 $mi^2$ | 134,925 acre-feet/year |
| 1111 0104 080 | 30 $mi^2$ | 21,304 acre-feet/year |

## STILWELL CITY LAKE
## Sallisaw Creek Watershed Site #18

**Lower Arkansas River - Stream System 2-2**

Hydrologic Unit Code - 1111 0104

Located on an unnamed tributary of Sallisaw Creek
Sequoyah County

Surface area, conservation pool - 188 acres

Water supply storage - 3,110 acre-feet
Water supply dependable yield - Unknown

**OWRB Reservoir ID #93**

## BRUSHY CREEK RESERVOIR
### Sallisaw Creek Watershed Site #29

**Lower Arkansas River - Stream System 2-2**

Hydrologic Unit Code - 1111 0104

Located on Brushy Creek
Sequoyah County

Surface area, conservation pool - 358 acres

Water supply storage - 3,258 acre-feet
Water supply dependable yield - Unknown

**OWRB Reservoir ID #68**

## ROBERT S. KERR RESERVOIR/LOCK AND DAM

**Lower Arkansas River - Stream System 2-2**
**Canadian River to the North Canadian River - Stream System 2-3**
**Middle Arkansas River - Stream System 2-4**
**Illinois River - Stream System 2-17**

Hydrologic Unit Code - 1111 0104
1109 0204
1111 0102
1111 0103

Located on the Arkansas River
Sequoyah and LeFlore Counties

Drainage area - 147,756 $mi^2$ of which 22,241 $mi^2$ is noncontributing
Surface area, power pool - 32,800 acres

Top of power pool - 525,700 acre-feet
Power pondage - 84,700 acre-feet

Water supply storage - 0 acre-feet
Water supply dependable yield - 0 acre-feet/year

**OWRB Reservoir ID #49**

**STREAM SYSTEM 2-2**: Arkansas River main stem from Arkansas State Line to mouth of Canadian River

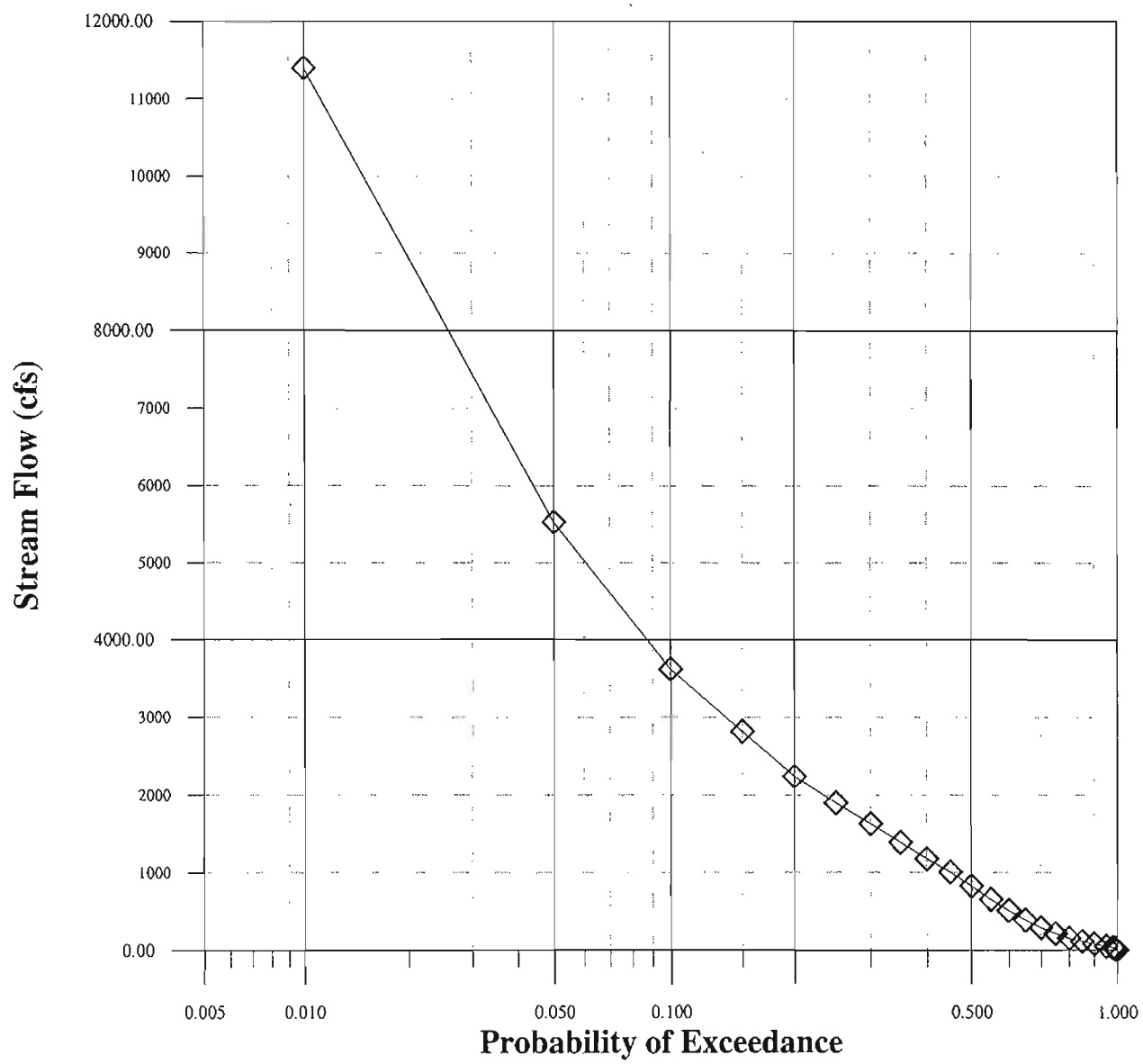
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Illinois River near Gore, OK |
| Station number | 07198000 |
| latitude (degrees, minutes, and seconds) | 353423 |
| longitude (degrees, minutes, and seconds) | 0950407 |
| hydrologic unit code | 11110103 |
| drainage area (square miles) | 1626 |
| contributing drainage area (square miles) | 1626 |
| gauge datum (feet above NGVD) | 468.00 |
| period of record | April 1939 - September 1993 |

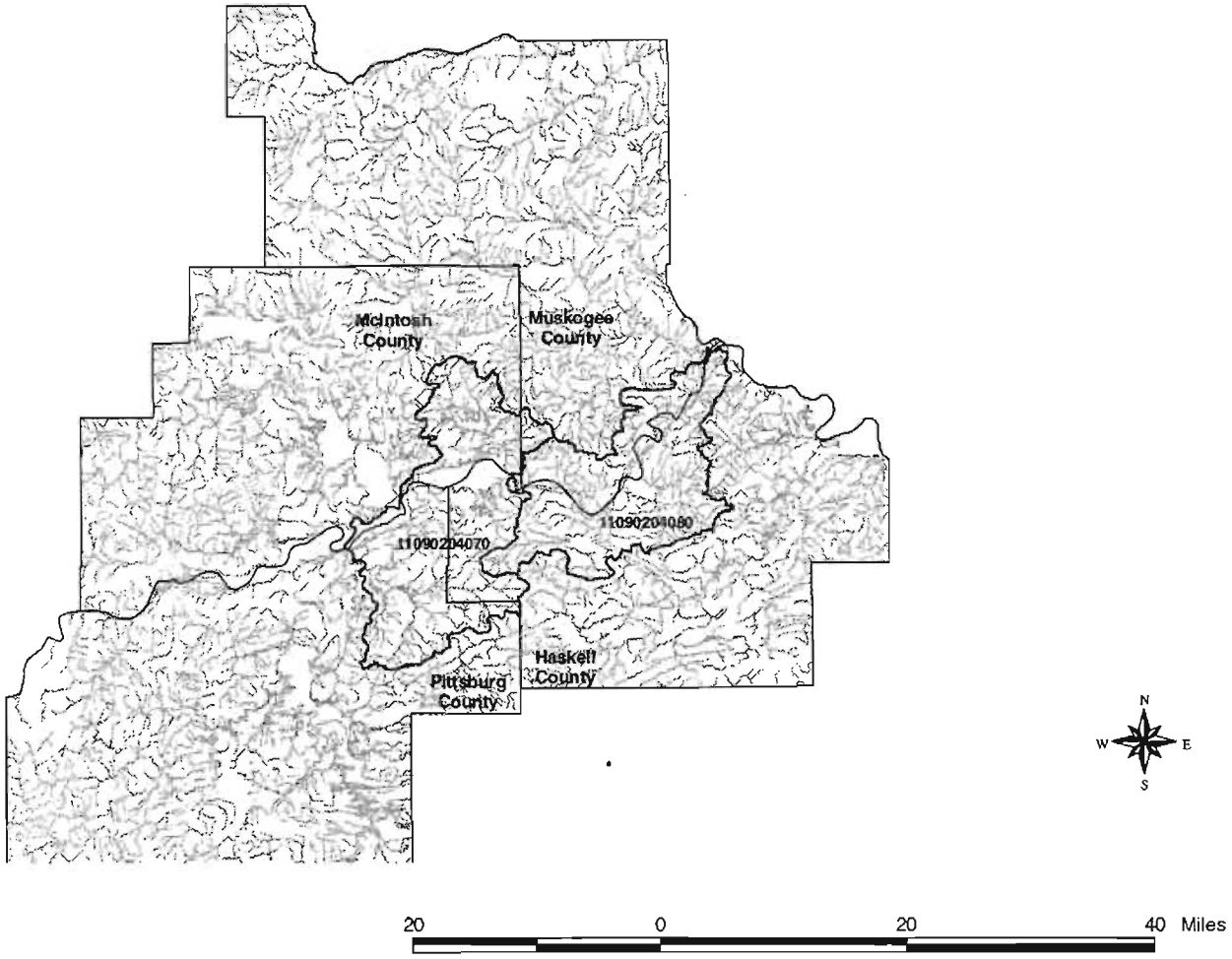
| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 11400.000 |
| 5 percent = | 5530.000 |
| 10 percent = | 3620.000 |
| 15 percent = | 2820.000 |
| 20 percent = | 2240.000 |
| 25 percent = | 1900.000 |
| 30 percent = | 1630.000 |
| 35 percent = | 1390.000 |
| 40 percent = | 1180.000 |
| 45 percent = | 1010.000 |
| 50 percent = | 831.000 |
| 55 percent = | 655.000 |
| 60 percent = | 513.000 |
| 65 percent = | 389.000 |
| 70 percent = | 292.000 |
| 75 percent = | 217.000 |
| 80 percent = | 157.000 |
| 85 percent = | 115.000 |
| 90 percent = | 84.000 |
| 95 percent = | 56.000 |
| 98 percent = | 37.000 |
| 99 percent = | 28.000 |
| 99.5 percent = | 19.000 |
| 99.9 percent = | 5.200 |

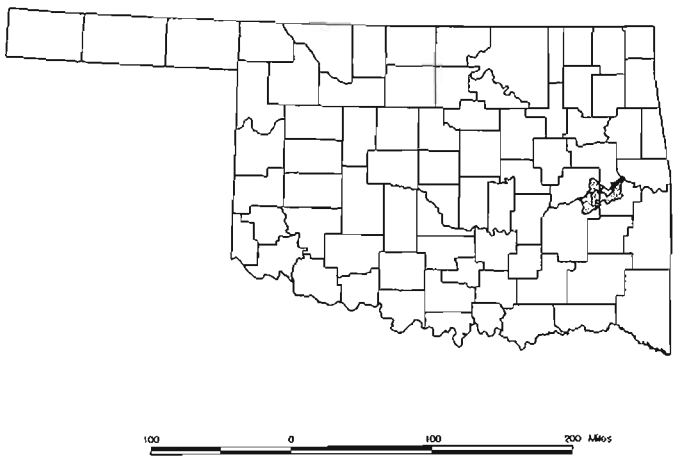
| | |
|---|---|
| Minimum flow: | 2.100 |
| Maximum flow: | 147,000.000 |
| Mean annual flow: | 1,589.200 |

## STREAM SYSTEM 2-2, ARKANSAS RIVER
## From Arkansas State Line to Canadian River



# STREAM SYSTEM 2-3: CANADIAN RIVER
## From Confluence With Arkansas River to Mouth of North Canadian River



## STREAM SYSTEM 2-3: CANADIAN RIVER
## From Confluence With Arkansas River to Mouth of North Canadian River

### General Information

Stream system area - 410 $mi^2$ — Hydrologic Unit Code - 1109 0204
Watersheds - 1109 0204 070 — 226 $mi^2$
1109 0204 080 — 184 $mi^2$

Total drainage area - 47,753 $mi^2$ (18,608 $mi^2$ in OK; 29,145 $mi^2$ in KS, NM, and TX)

Major tributaries - Taloka Creek

Major reservoirs or lakes - Eufaula Lake, Robert S. Kerr Reservoir

Mean annual runoff based on adjusted gauge flow - 2.6 inches
Mean annual net lake evaporation for stream system - 1.0 inch
Estimated reservoir refill factor ($\alpha$) for stream system - 2.0

### Estimated Available Water

USGS gauge 07245000 Canadian River near Whitefield, OK:

Gauge Location: SE SE Sec.12-T9N-R19EIM, Haskell County - 47,576 $mi^2$ drainage area of which 9,700 $mi^2$ is probably noncontributing
Data From Water Years 1968 - 1995:

Mean annual gauge flow - 6,902 cfs; 4,998,152 acre-feet
Mean annual runoff for 174.8 $mi^2$ below USGS gauge - 23,773 acre-feet
Mean annual net lake evaporation for 2-3 arm of Robert S. Kerr Reservoir (2.2 $mi^2$) - 292 acre-feet
Mean annual flow for entire stream system - 5,021,633 acre-feet/year (includes flow from stream system 2-3, 2-5, 2-6, 2-7 and 2-8)
Mean annual gauge flow adjusted for upstream water use - 5,150,841 acre-feet

Mean annual gauge flow for stream system 2-3 - 2,174,741 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07245000 (WY 1968-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 372,284 | April | 536,275 | July | 297,433 | October | 174,671 |
| February | 338,923 | May | 841,990 | August | 222,706 | November | 344,978 |
| March | 574,755 | June | 708,288 | September | 157,371 | December | 428,314 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem

Total storage within stream system - 0 acre-feet (excludes portion of power supply pool storage allocated to water supply from Eufaula Reservoir)

Total dependable yield within stream system - 336 acre-feet/year

SCS storage within stream system - 0 acre-feet/year

**Total Estimated Available Water - 2,174,741 acre-feet/year**
**Total Estimated Storage/Dependable Yields - 336 acre-feet/year**
**Adjusted Total Estimated Available Water - 2,174,405 acre-feet/year**

| Watershed Code | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1109 0204 070 | 226 $mi^2$ | 1,198,424 acre-feet/year |
| 1109 0204 080 | 184 $mi^2$ | 975,981 acre-feet/year |

## EUFAULA LAKE

**Canadian River to the North Canadian River - Stream System 2-3**
**Deep Fork River - Stream System 2-7**
**Lower North Canadian River - Stream Subsystem 2-5-1**
**Lower Canadian River - Stream Subsystem 2-6-1**

Hydrologic Unit Code - 1109 0204
1110 0303
1110 0302

Located on the Canadian River
Haskell and McIntosh Counties

Drainage area - 47,522 $mi^2$
Surface area, flood pool - 143,000 acres
Surface area, conservation pool - 46,100 acres

Flood control storage - 1,510,800 acre-feet
Power storage - 1,463,000 acre-feet
Inactive storage - 851,600 acre-feet

Water supply dependable yield - 56,000 acre-feet/year (water supply yield to taken out of the 1,463,000 acre-feet of power supply storage)
Proportion of water supply yield within Stream System 2-3 - 336 acre-feet/year (0.6% of total yield)

**OWRB Reservoir ID #18**

## ROBERT S. KERR RESERVOIR/LOCK AND DAM

**Canadian River to the North Canadian River - Stream System 2-3**
**Middle Arkansas River - Stream System 2-4**
**Illinois River - Stream System 2-17**
**Lower Arkansas River - Stream System 2-2**

Hydrologic Unit Code - 1109 0204
1111 0102
1111 0103
1111 0104

Located on the Arkansas River
Sequoyah and LeFlore Counties

Drainage area - 147,756 $mi^2$ of which 22,241 $mi^2$ is noncontributing
Surface area, power pool - 32,800 acres

Top of power pool - 525,700 acre-feet
Power pondage - 84,700 acre-feet

Water supply storage - 0 acre-feet
Water supply dependable yield - 0 acre-feet/year

**OWRB Reservoir ID #49**

**STREAM SYSTEM 2-3:** Canadian River from confluence with Arkansas River to mouth of the North Canadian River

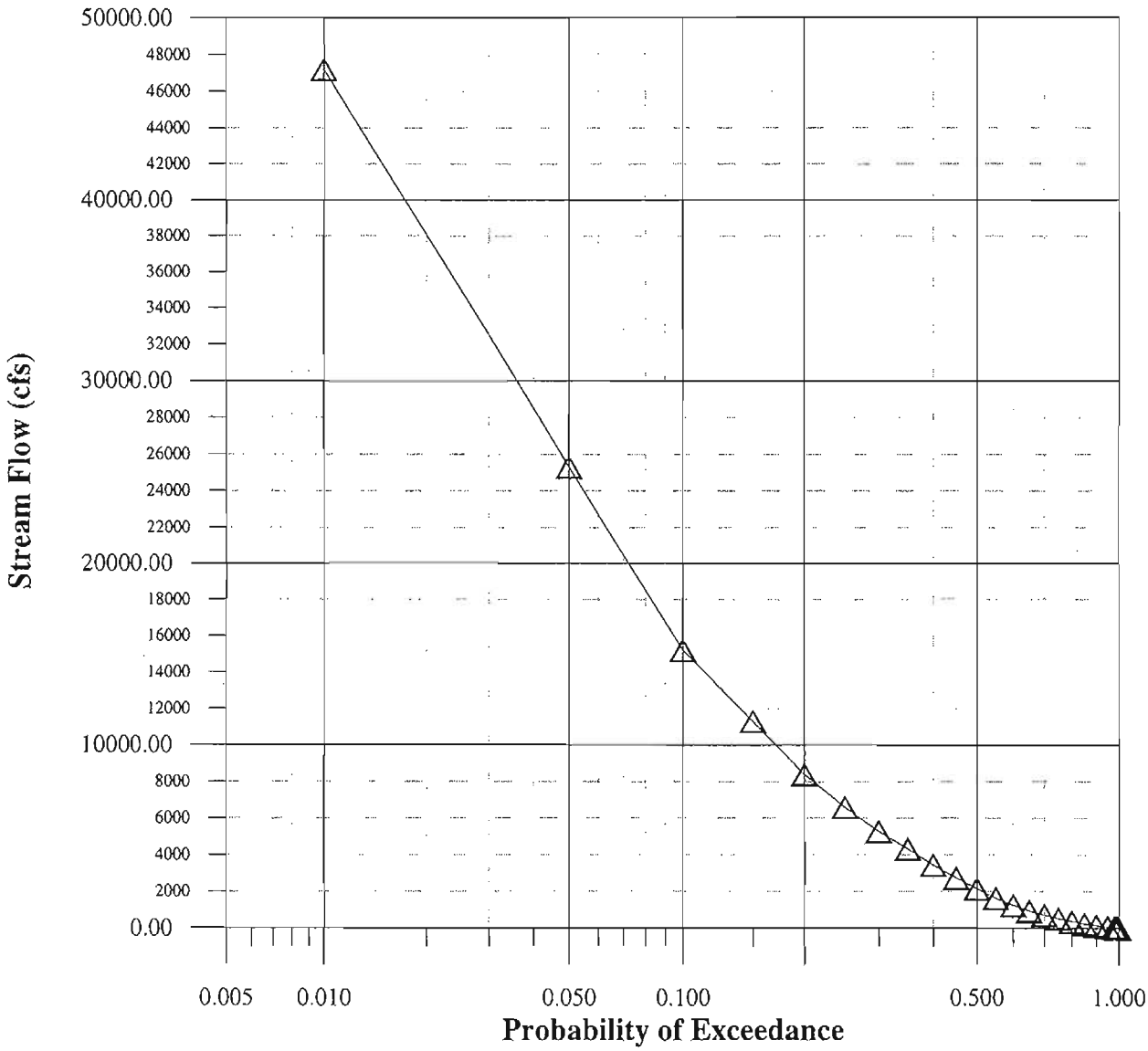
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Canadian River near Whitefield, OK |
| Station number | 07245000 |
| latitude (degrees, minutes, and seconds) | 351550 |
| longitude (degrees, minutes, and seconds) | 0951421 |
| hydrologic unit code | 11090204 |
| drainage area (square miles) | 47576 |
| contributing drainage area (square miles) | 37876 |
| gauge datum (feet above NGVD) | 473.16 |
| period of record | October 1938 - September 1993 |

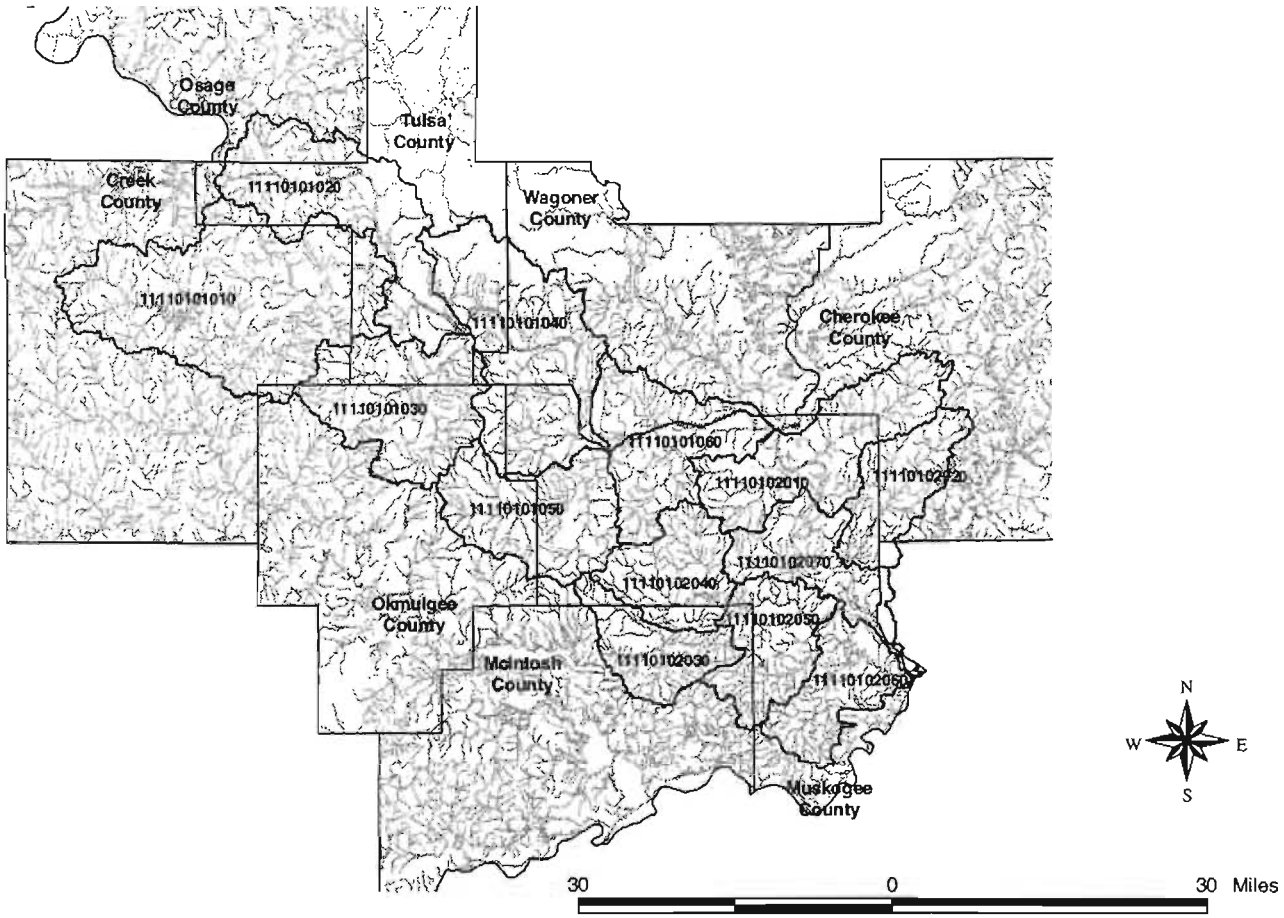
| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 47200.000 |
| 5 percent = | 25300.000 |
| 10 percent = | 15200.000 |
| 15 percent = | 11300.000 |
| 20 percent = | 8380.000 |
| 25 percent = | 6590.000 |
| 30 percent = | 5260.000 |
| 35 percent = | 4310.000 |
| 40 percent = | 3440.000 |
| 45 percent = | 2740.000 |
| 50 percent = | 2150.000 |
| 55 percent = | 1640.000 |
| 60 percent = | 1240.000 |
| 65 percent = | 938.000 |
| 70 percent = | 713.000 |
| 75 percent = | 524.000 |
| 80 percent = | 354.000 |
| 85 percent = | 222.000 |
| 90 percent = | 131.000 |
| 95 percent = | 72.000 |
| 98 percent = | 34.000 |
| 99 percent = | 13.000 |
| 99.5 percent = | 5.500 |
| 99.9 percent = | 1.300 |

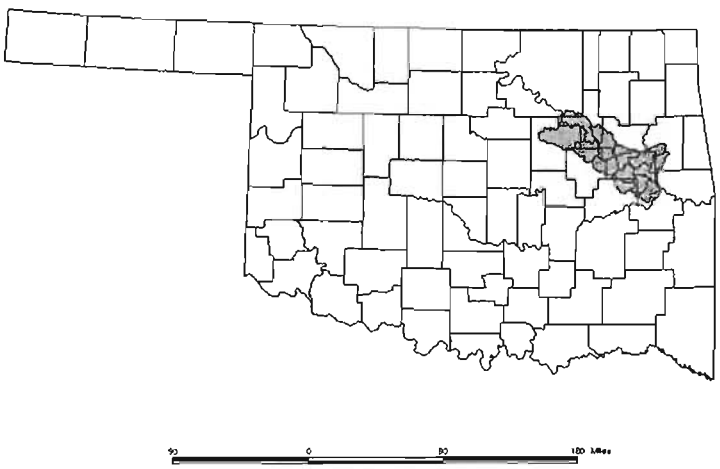
| | |
|---|---|
| Minimum flow: | 0.400 |
| Maximum flow: | 239,000.000 |
| Mean annual flow: | 6,030.766 |

# STREAM SYSTEM 2-3, CANADIAN RIVER
## From Mouth of Canadian River to Mouth of North Canadian River



# STREAM SYSTEM 2-4: ARKANSAS RIVER
## Main Stem from Mouth of Canadian River to Keystone Dam



## STREAM SYSTEM 2-4: ARKANSAS RIVER
## Main Stem From Mouth of Canadian River to Keystone Dam

### General Information

Stream system area - 2,161 $mi^2$ — Hydrologic Unit Code - 1111 0101 and 1111 0102

| Watershed - | | |
|---|---|---|
| | 1111 0101 010 | 371 $mi^2$ |
| | 1111 0101 020 | 208 $mi^2$ |
| | 1111 0101 030 | 181 $mi^2$ |
| | 1111 0101 040 | 249 $mi^2$ |
| | 1111 0101 050 | 159 $mi^2$ |
| | 1111 0101 060 | 208 $mi^2$ |
| | 1111 0102 010 | 173 $mi^2$ |
| | 1111 0102 020 | 99 $mi^2$ |
| | 1111 0102 030 | 89 $mi^2$ |
| | 1111 0102 040 | 108 $mi^2$ |
| | 1111 0102 050 | 109 $mi^2$ |
| | 1111 0102 060 | 99 $mi^2$ |
| | 1111 0102 070 | 108 $mi^2$ |

Total drainage area - 97,467 $mi^2$ (22,717 $mi^2$ in OK; 74,750 $mi^2$ in NM, CO, KS, MO, and AR)

Major tributaries - Browns Creek, Rock Creek, Polecat Creek, Duck Creek, Snake Creek, Haikey Creek, Ash Creek, Cane Creek, Cloud Creek, Pecan Creek, Coody Creek, Bayou Manard, Greenleaf Creek, Georges Fork, Dirty Creek

Major reservoirs or lakes - Heyburn Lake, Webbers Falls Reservoir, Greenleaf Lake, Robert S. Kerr Reservoir

Mean annual runoff based on adjusted gauge flow - 2.3 inches
Mean annual net lake evaporation for stream system - 8.6 inches
Estimated reservoir refill factor ($\alpha$) for stream system - 2.0

### Estimated Available Water

USGS gauge 07165570 Arkansas River near Haskell, OK:

Gauge Location: SW NW Sec.32-T16N-R16EIM, Wagoner, County - 75,473 $mi^2$ drainage area of which 12,541 $mi^2$ is probably noncontributing
Data From Water Years 1973 - 1995:

- Mean annual gauge flow - 10,340 cfs; 7,487,814 acre-feet
- Mean annual runoff for 1,120.3 $mi^2$ below USGS gauge - 135,010 acre-feet
- Mean annual net lake evaporation for Webbers Falls Reservoir (18.2 $mi^2$), Greenleaf Lake (1.4 $mi^2$), and 2-4 arm of Robert S. Kerr Reservoir (4.1 $mi^2$) -3,494 acre-feet
- Mean annual flow for entire stream system - 7,619,330 acre-feet/year (includes flow from stream systems 2-4, 2-9, 2-10, 2-11 and 2-12)
- Mean annual gauge flow adjusted for upstream water use - 7,584,302 acre-feet

Mean annual flow for stream system 2-4 - 1,485,317 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07165570 (WY 1973-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 384,462 | April | 880,301 | July | 609,689 | October | 561,593 |
| February | 403,196 | May | 1,121,833 | August | 393,564 | November | 468,363 |
| March | 860,441 | June | 1,114,214 | September | 338,609 | December | 355,924 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem

Total storage within stream system - 16,720 acre-feet
Total dependable yield within stream system - 1,904 acre-feet/year
SCS storage within stream system - 2,551 acre-feet/year

**Total Estimated Available Water - 1,485,317 acre-feet/year**
**Total Estimated Storage/Dependable Yields - 4,455 acre-feet/year**
**Adjusted Total Estimated Available Water - 1,480,862 acre-feet/year**

| Watershed Code | Area | Adjsuted Total Estimated Available Water |
|---|---|---|
| 1111 0101 010 | 371 $mi^2$ | 253,095 acre-feet/year |
| 1111 0101 020 | 208 $mi^2$ | 142,964 acre-feet/year |
| 1111 0101 030 | 181 $mi^2$ | 124,406 acre-feet/year |
| 1111 0101 040 | 249 $mi^2$ | 170,873 acre-feet/year |
| 1111 0101 050 | 159 $mi^2$ | 107,006 acre-feet/year |
| 1111 0101 060 | 208 $mi^2$ | 142,964 acre-feet/year |
| 1111 0102 010 | 173 $mi^2$ | 118,908 acre-feet/year |
| 1111 0102 020 | 99 $mi^2$ | 68,046 acre-feet/year |
| 1111 0102 030 | 89 $mi^2$ | 61,172 acre-feet/year |
| 1111 0102 040 | 108 $mi^2$ | 74,231 acre-feet/year |
| 1111 0102 050 | 109 $mi^2$ | 74,919 acre-feet/year |
| 1111 0102 060 | 99 $mi^2$ | 68,046 acre-feet/year |
| 1111 0102 070 | 108 $mi^2$ | 74,231 acre-feet/year |

## HEYBURN LAKE

**Middle Arkansas River - Stream System 2-4**

Hydrologic Unit Code - 1111 0101

Located at river mile 48.6 on Polecat Creek
Creek County

Drainage area - 123 $mi^2$
Surface area, flood pool - 3,740 acres
Surface area, conservation pool - 880 acres
Surface area, top of inactive pool - 520 acres

Flood control storage - 48,290 acre-feet
Conservation storage - 4,140 acre-feet
Sediment reserve - 1,800 acre-feet
Inactive pool storage - 2,965 acre-feet

Water supply storage - 2,000 acre-feet
Water supply dependable yield - 1,904 acre-feet/year

**OWRB Reservoir ID #28**

## WEBBERS FALLS RESERVOIR/LOCK AND DAM

### Middle Arkansas River - Stream System 2-4

Hydrologic Unit Code - 1111 0102

Located at navigation mile 366.6 on the Arkansas River
Muskogee County

Drainage area - 97,033 $mi^2$
Surface area, power pool - 11,640 acres

Top of power pool - 170,100 acre-feet
Power pondage - 32,420 acre-feet

Water supply storage - 0 acre-feet
Water supply dependable yield - 0 acre-feet/year

### OWRB Reservoir ID #64

## GREENLEAF LAKE

**Middle Arkansas River - Stream System 2-4**

Hydrologic Unit Code - 1111 0102

Located on Greenleaf Creek
Muskogee County

Surface area, conservation pool - 920 acres

Water supply storage - 14,720 acre-feet
Water supply dependable yield - 0 acre-feet/year

**OWRB Reservoir ID #26**

## ROBERT S. KERR RESERVOIR/LOCK AND DAM

**Middle Arkansas River - Stream System 2-4**
**Illinois River - Stream System 2-17**
**Canadian River to the North Canadian River - Stream System 2-3**
**Lower Arkansas River - Stream System 2-2**

Hydrologic Unit Code - 1111 0102
1111 0103
1109 0204
1111 0104

Located on the Arkansas River
Sequoyah and LeFlore Counties

Drainage area - 147,756 $mi^2$ of which 22,241 $mi^2$ is noncontributing
Surface area, power pool - 32,800 acres

Top of power pool - 525,700 acre-feet
Power pondage - 84,700 acre-feet

Water supply storage - 0 acre-feet
Water supply dependable yield - 0 acre-feet/year

**OWRB Reservoir ID #49**

**STREAM SYSTEM 2-4:** Arkansas River main stem from mouth of Canadian River to Keystone Dam

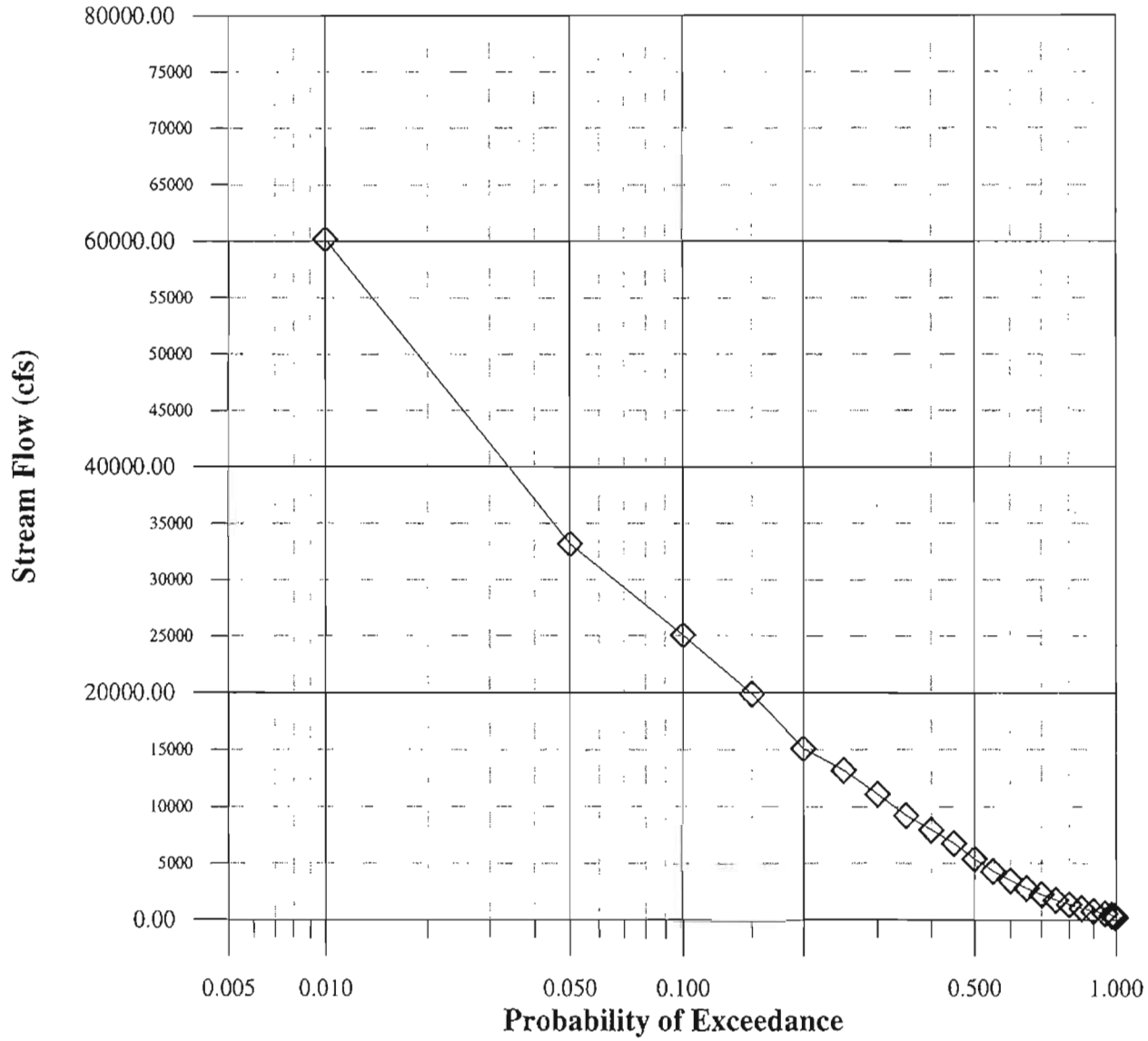
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Arkansas River near Haskell, OK |
| Station number | 07165570 |
| latitude (degrees, minutes, and seconds) | 354915 |
| longitude (degrees, minutes, and seconds) | 0953819 |
| hydrologic unit code | 11110101 |
| drainage area (square miles) | 75473 |
| contributing drainage area (square miles) | 62932 |
| gauge datum (feet above NGVD) | 530 |
| period of record | June 1972 - September 1993 |

| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 60200.000 |
| 5 percent = | 33200.000 |
| 10 percent = | 25100.000 |
| 15 percent = | 19900.000 |
| 20 percent = | 15100.000 |
| 25 percent = | 13200.000 |
| 30 percent = | 11100.000 |
| 35 percent = | 9230.000 |
| 40 percent = | 7950.000 |
| 45 percent = | 6760.000 |
| 50 percent = | 5390.000 |
| 55 percent = | 4290.000 |
| 60 percent = | 3460.000 |
| 65 percent = | 2780.000 |
| 70 percent = | 2230.000 |
| 75 percent = | 1730.000 |
| 80 percent = | 1360.000 |
| 85 percent = | 1040.000 |
| 90 percent = | 770.000 |
| 95 percent = | 584.000 |
| 98 percent = | 442.000 |
| 99 percent = | 363.000 |
| 99.5 percent = | 303.000 |
| 99.9 percent = | 179.000 |

| | |
|---|---|
| Minimum flow: | 87.000 |
| Maximum flow: | 243,000.000 |
| Mean annual flow: | 9,993.172 |

# STREAM SYSTEM 2-4, ARKANSAS RIVER
## Main Stem from Mouth of Canadian River to Keystone Dam



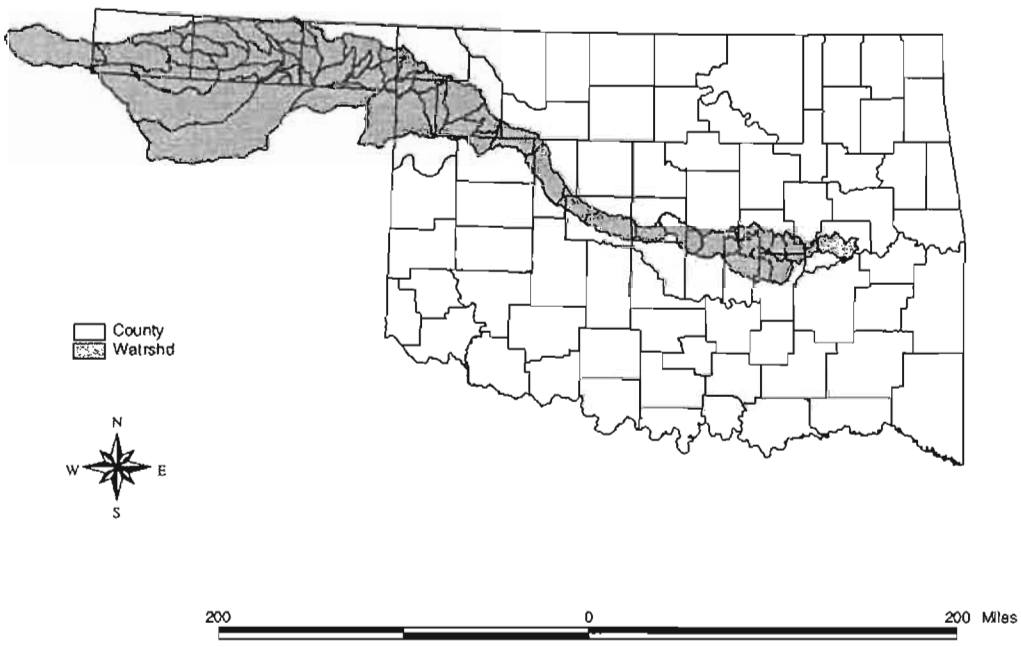
## STREAM SYSTEM 2-5: NORTH CANADIAN RIVER

### General Information

Stream system area - 9,363 $mi^2$

Total drainage area - 15,300 $mi^2$ (9,363 $mi^2$ in OK; 5,937 $mi^2$ in NM, TX, and KS)

Major reservoirs and lakes - Optima Lake, Fort Supply Lake, Canton Lake, Lake Overholser, Shawnee Twin Lakes, Shawnee Twin Lakes, Eufaula Lake




Index map showing Stream System 2-5: North Canadian River.

### Estimated Available Water

Total Estimated Available Water:

| | |
|---|---|
| Stream Subsystem 2-5-4 | 8,839 acre-feet/year |
| Stream Subsystem 2-5-3 | 114,257 acre-feet/year |
| Stream Subsystem 2-5-2 | 55,529 acre-feet/year |
| Stream Subsystem 2-5-1 | 537,546 acre-feet/year |
| Stream System 2-5 | 716,171 acre-feet/year |

Adjusted Total Estimated Available Water:

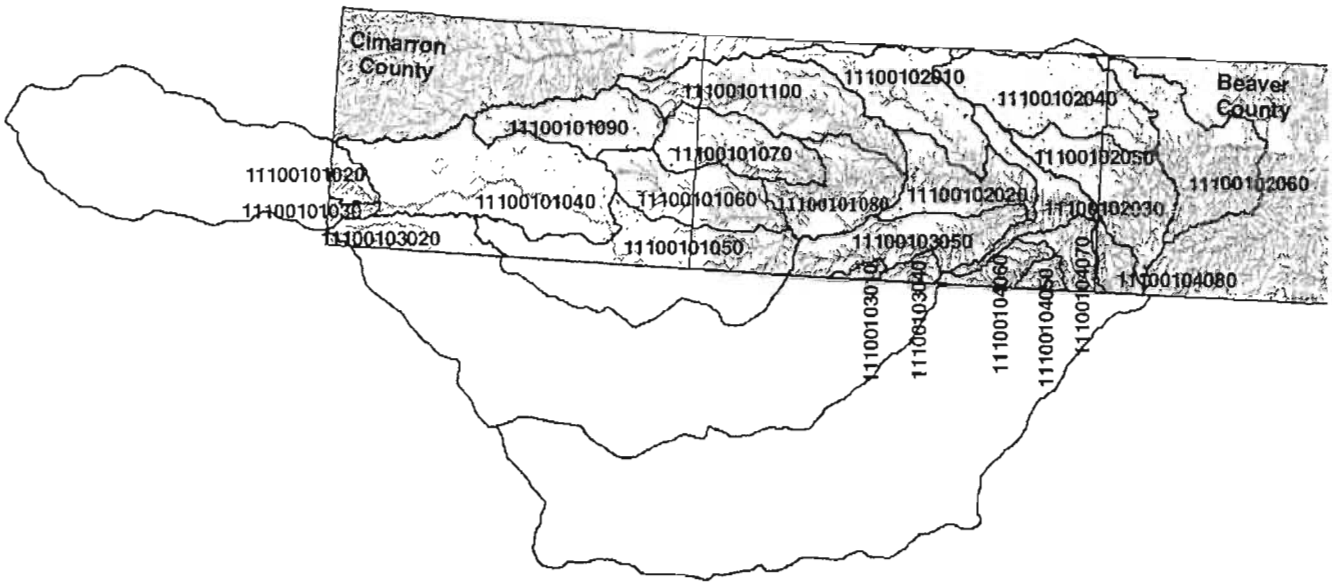
| | |
|---|---|
| Stream Subsystem 2-5-4 | 8,839 acre-feet/year |
| Stream Subsystem 2-5-3 | 95,351 acre-feet/year |
| Stream Subsystem 2-5-2 | 49,820 acre-feet/year |
| Stream Subsystem 2-5-1 | 487,226 acre-feet/year |
| Stream System 2-5 | 641,236 acre-feet/year |

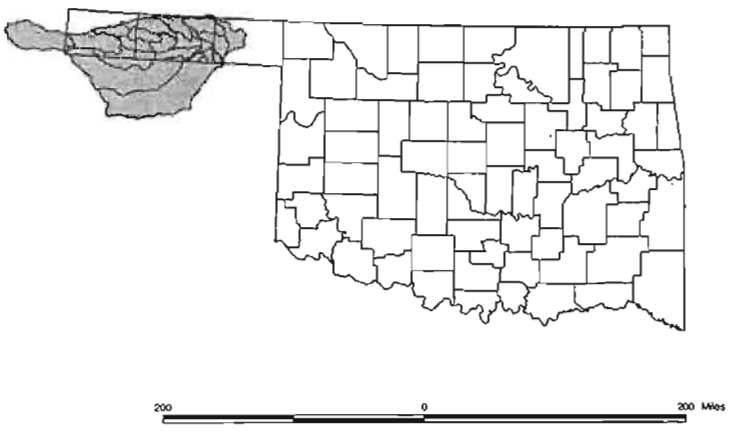
Total Estimated Storage/Dependable Yields Within Stream System:

Optima Lake water supply dependable yield - 0 acre-feet/year
Fort Supply Lake water supply dependable yield - 224 acre-feet/year
Canton Lake water supply dependable yield - 18,480 acre-feet/year
Lake Overholser water supply dependable yield - 5,000 acre-feet/year
Shawnee Twin Lakes water supply dependable yield - 4,400 acre-feet/year
Eufaula Lake water supply dependable yield - 13,328 acre-feet/year within Stream System 2-5 (total dependable yield for the entire reservoir is 56,000 acre-feet/year)

Total water supply storage - 279,720 acre-feet (excludes portion of power supply pool storage allocated to water supply from Eufaula Reservoir)
Total water supply dependable yields - 41,432 acre-feet/year
SCS sediment pool storage - 33,503 acre-feet

# STREAM SUBSYSTEM 2-5-4: BEAVER-NORTH CANADIAN RIVER
## From Optima Dam to New Mexico State Line



## STREAM SUBSYSTEM 2-5-4: NORTH CANADIAN RIVER
## From Optima Dam to New Mexico State Line

### North Canadian River Headwaters

### General Information

Stream subsystem area - 3,660 $mi^2$

Hydrologic Unit Code - 1110 0101; 1110 0102; and 1110 0103

| Watersheds - | | |
|---|---|---|
| | 1110 0101 020 | 41 $mi^2$ |
| | 1110 0101 030 | 19 $mi^2$ |
| | 1110 0101 040 | 450 $mi^2$ |
| | 1110 0101 050 | 258 $mi^2$ |
| | 1110 0101 060 | 200 $mi^2$ |
| | 1110 0101 070 | 183 $mi^2$ |
| | 1110 0101 080 | 185 $mi^2$ |
| | 1110 0101 090 | 175 $mi^2$ |
| | 1110 0101 100 | 305 $mi^2$ |
| | 1110 0102 010 | 234 $mi^2$ |
| | 1110 0102 020 | 166 $mi^2$ |
| | 1110 0102 030 | 108 $mi^2$ |
| | 1110 0102 040 | 293 $mi^2$ |
| | 1110 0102 050 | 235 $mi^2$ |
| | 1110 0102 060 | 257 $mi^2$ |
| | 1110 0103 010 | 13 $mi^2$ |
| | 1110 0103 020 | 109 $mi^2$ |
| | 1110 0103 040 | 27 $mi^2$ |
| | 1110 0103 050 | 207 $mi^2$ |
| | 1110 0104 050 | 25 $mi^2$ |
| | 1110 0104 060 | 55 $mi^2$ |
| | 1110 0104 070 | 66 $mi^2$ |
| | 1110 0104 080 | 49 $mi^2$ |

Total drainage area - 6,080 $mi^2$ (3,660 $mi^2$ in OK; 2,420 $mi^2$ in NM and TX)

Major tributaries - Corrumpa Creek, Seneca Creek, Sand Creek, Tepee Creek, Cow Creek, Goff Creek, Pony Creek, Agua Fria Creek, Frisco Creek, Coldwater Creek

Major reservoirs or lakes - Optima Lake

Mean annual runoff based on adjusted gauge flow - 0.1 inch
Mean annual net lake evaporation for stream subsystem - 47.3 inches
Estimated reservoir refill factor ($\alpha$) for stream subsystem - 0.5

**Estimated Available Water**

USGS gauge 07234000 Beaver River at Beaver, OK:

Gauge Location: SW Sec. 7-T4N-R24EIM, Beaver County - 7,955 $mi^2$ drainage area of which 4,270 $mi^2$ is probably noncontributing

Data From Water Years 1979 - 1995:

Mean annual gauge flow - 17.7 cfs; 12,818 acre-feet

Mean annual gauge flow adjusted for upstream water use - 13,914 acre-feet

Mean annual gauge flow adjusted for total drainage area of stream subsystm 2-5-4 - 8,839 acre-feet

**Table of monthly mean flows (acre-feet) from USGS gauge 07234000 (WY 1979-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 216 | April | 958 | July | 1,070 | October | 557 |
| February | 328 | May | 3,580 | August | 256 | November | 114 |
| March | 621 | June | 4,226 | September | 738 | December | 143 |

Reservoir's Storage/Dependable Yields Within Stream System or Sub-system

Total storage within stream subsystem - 117,650 acre-feet

Total dependable yield within stream subsystem - 0 acre-feet/year

SCS storage within stream sub-system - 0 acre-feet/year

**Total Estimated Available Water - 8,839 acre-feet/year**
**Total Estimated Storage/Dependable Yields - 0 acre-feet/year**
**Adjusted Total Estimated Available Water - 8,839 acre-feet/year**

| Watershed Codes | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1110 0101 020 | 41 $mi^2$ | 99 acre-feet/year |
| 1110 0101 030 | 19 $mi^2$ | 46 acre-feet/year |
| 1110 0101 040 | 450 $mi^2$ | 1,087 acre-feet/year |
| 1110 0101 050 | 258 $mi^2$ | 623 acre-feet/year |
| 1110 0101 060 | 200 $mi^2$ | 483 acre-feet/year |
| 1110 0101 070 | 183 $mi^2$ | 442 acre-feet/year |
| 1110 0101 080 | 185 $mi^2$ | 447 acre-feet/year |
| 1110 0101 090 | 175 $mi^2$ | 423 acre-feet/year |
| 1110 0101 100 | 305 $mi^2$ | 737 acre-feet/year |
| 1110 0102 010 | 234 $mi^2$ | 565 acre-feet/year |
| 1110 0102 020 | 166 $mi^2$ | 401 acre-feet/year |
| 1110 0102 030 | 108 $mi^2$ | 261 acre-feet/year |

| Watershed Codes | Area | Total Estimated Available Water (adjusted) |
|---|---|---|
| 1110 0102 040 | 293 $mi^2$ | 708 acre-feet/year |
| 1110 0102 050 | 235 $mi^2$ | 568 acre-feet/year |
| 1110 0102 060 | 257 $mi^2$ | 621 acre-feet/year |
| 1110 0103 010 | 13 $mi^2$ | 31 acre-feet/year |
| 1110 0103 020 | 109 $mi^2$ | 263 acre-feet/year |
| 1110 0103 040 | 27 $mi^2$ | 65 acre-feet/year |
| 1110 0103 050 | 207 $mi^2$ | 500 acre-feet/year |
| 1110 0104 050 | 25 $mi^2$ | 60 acre-feet/year |
| 1110 0104 060 | 55 $mi^2$ | 133 acre-feet/year |
| 1110 0104 070 | 66 $mi^2$ | 159 acre-feet/year |
| 1110 0104 080 | 49 $mi^2$ | 118 acre-feet/year |

## OPTIMA LAKE

**North Canadian River Headwaters - Stream Subsystem 2-5-4**

Hydrologic Unit Code - 1110 0102
1110 0103

Located on the Beaver River
Texas County

Drainage area - 5, 029 $mi^2$ of which 2,688 $mi^2$ is noncontributing
Surface area, flood pool - 7,640 acres
Surface area, conservation pool - 5,340 acres
Surface area, inactive pool - 1,340 acres

Flood control storage - 100,500 acre-feet
Inactive pool storage - 11,350 acre-feet

Water supply storage - 117,650 acre-feet (includes entire 100-year sediment pool)
Water supply dependable yield - 0 acre-feet/year; conservation pool never has filled

**OWRB Reservoir ID #43**

**STREAM SUBSYSTEM 2-5-4**: North Canadian River from Optima Dam to New Mexico State Line - North Canadian River Headwaters

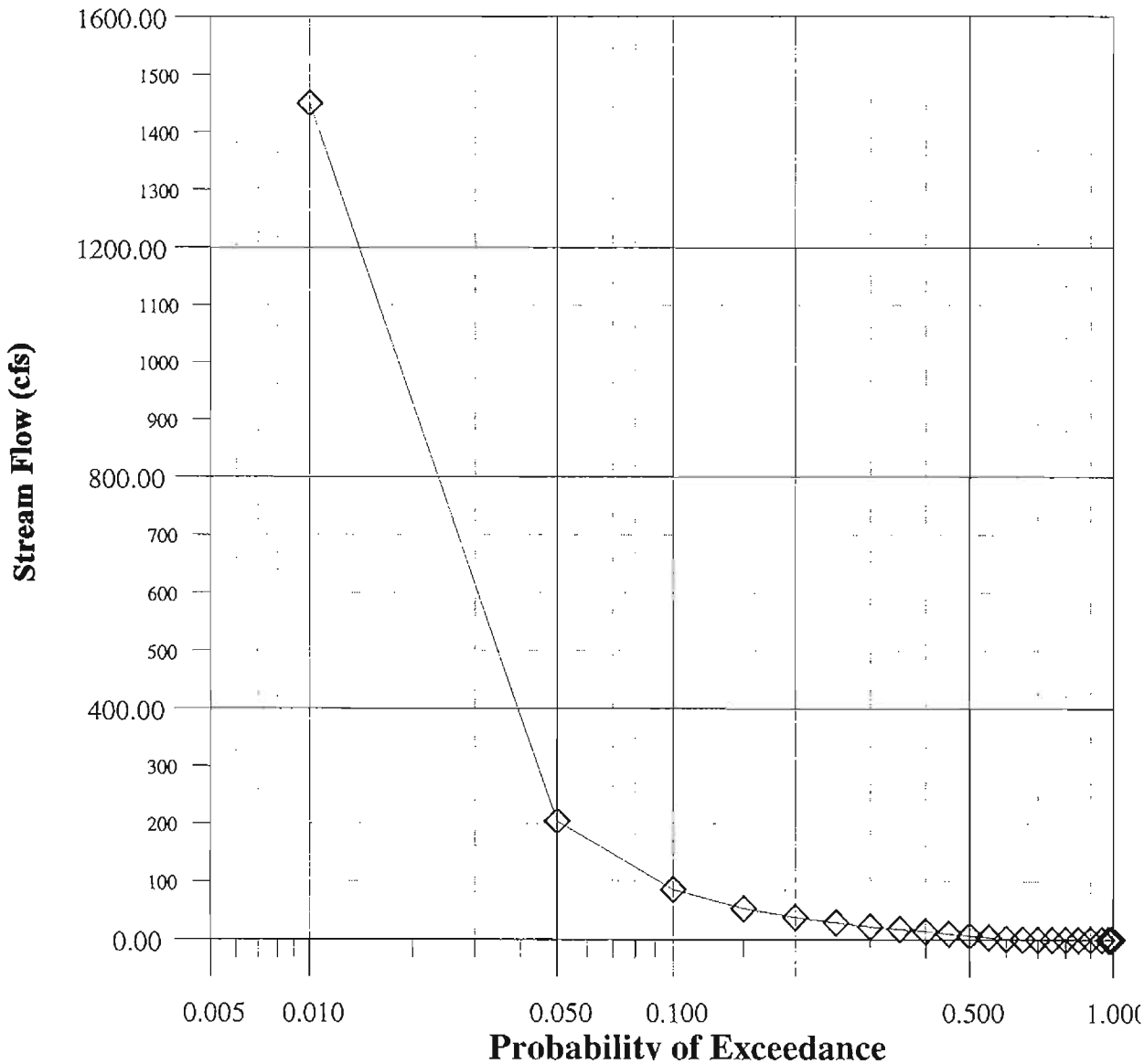
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Beaver River at Beaver, OK |
| Station number | 07234000 |
| latitude (degrees, minutes, and seconds) | 364920 |
| longitude (degrees, minutes, and seconds) | 1003108 |
| hydrologic unit code | 11100102 |
| drainage area (square miles) | 7955 |
| contributing drainage area (square miles) | 3685 |
| gauge datum (feet above NGVD) | 2368.16 |
| period of record | October 1937 - September 1993 |

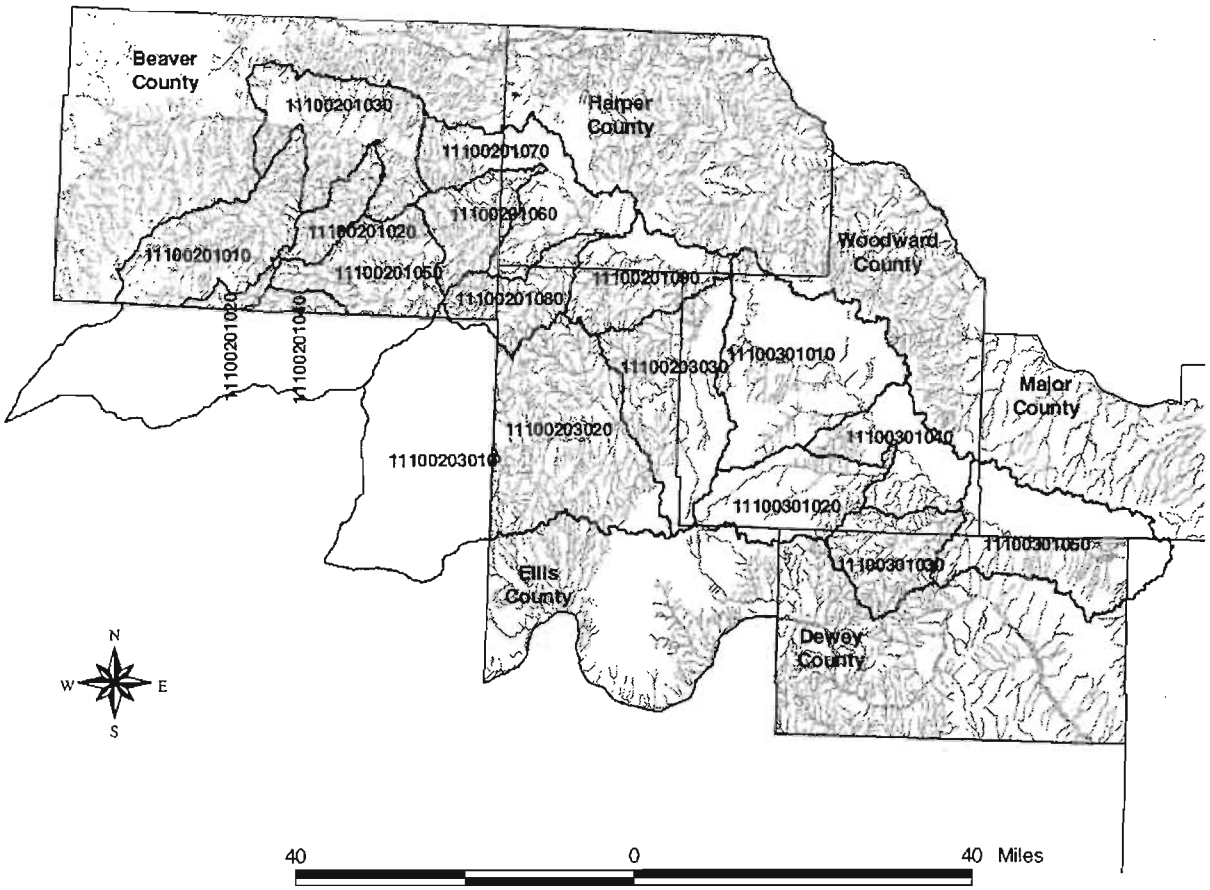
| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 1450.000 |
| 5 percent = | 204.000 |
| 10 percent = | 86.000 |
| 15 percent = | 53.000 |
| 20 percent = | 38.000 |
| 25 percent = | 29.000 |
| 30 percent = | 22.000 |
| 35 percent = | 18.000 |
| 40 percent = | 14.000 |
| 45 percent = | 10.000 |
| 50 percent = | 6.500 |
| 55 percent = | 3.800 |
| 60 percent = | 1.300 |
| 65 percent = | 0.330 |
| 70 percent = | 0.150 |
| 75 percent = | 0.010 |
| 80 percent = | 0.000 |
| 85 percent = | 0.000 |
| 90 percent = | 0.000 |
| 95 percent = | 0.000 |
| 98 percent = | 0.000 |
| 99 percent = | 0.000 |
| 99.5 percent = | 0.000 |
| 99.9 percent = | 0.000 |

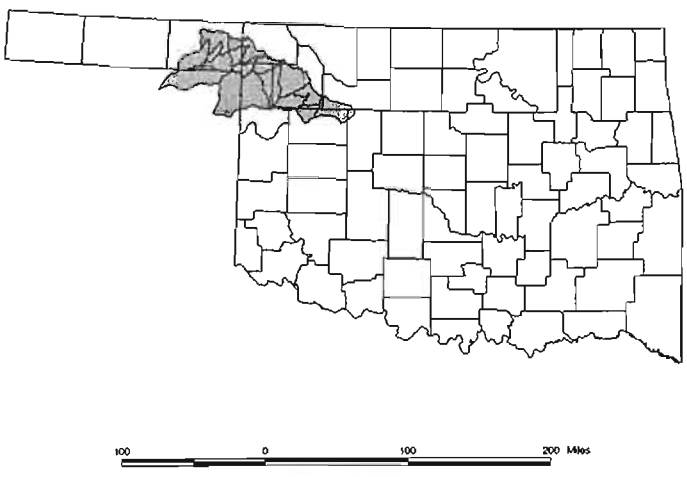
| | |
|---|---|
| Minimum flow: | 0.000 |
| Maximum flow: | 39,900.000 |
| Mean annual flow: | 80.741 |

# STREAM SUBSYSTEM 2-5-4, NORTH CANADIAN RIVER
## From Optima Dam to New Mexico State Line



# STREAM SUBSYSTEM 2-5-3: NORTH CANADIAN RIVER
## From Canton Dam to Optima Dam



## STREAM SUBSYSTEM 2-5-3: NORTH CANADIAN RIVER
## From Canton Dam to Optima Dam

### Upper North Canadian River

### General Information

Stream subsystem area - 3,080 $mi^2$

Hydrologic Unit Code - 1110 0201; 1110 0203; and 1110 0301

| | | |
|---|---|---|
| Watersheds - | 1110 0201 010 | 218 $mi^2$ |
| | 1110 0201 020 | 86 $mi^2$ |
| | 1110 0201 030 | 242 $mi^2$ |
| | 1110 0201 040 | 24 $mi^2$ |
| | 1110 0201 050 | 163 $mi^2$ |
| | 1110 0201 060 | 107 $mi^2$ |
| | 1110 0201 070 | 219 $mi^2$ |
| | 1110 0201 080 | 110 $mi^2$ |
| | 1110 0201 090 | 160 $mi^2$ |
| | 1110 0203 010 | 1 $mi^2$ |
| | 1110 0203 020 | 387 $mi^2$ |
| | 1110 0203 030 | 272 $mi^2$ |
| | 1110 0301 010 | 344 $mi^2$ |
| | 1110 0301 020 | 172 $mi^2$ |
| | 1110 0301 030 | 131 $mi^2$ |
| | 1110 0301 040 | 157 $mi^2$ |
| | 1110 0301 050 | 287 $mi^2$ |

Total drainage area - 12,677 $mi^2$ (6,740 $mi^2$ in OK; 5,937 $mi^2$ in NM, TX, and KS)

Major tributaries - Hackberry Creek, Palo Duro Creek, Jackson Creek, Willow Creek, Sixmile Creek, North and South Forks of Clear Creek (Beaver Co.), Clear Creek (Beaver Co.), Duck Pond Creek, Coon Creek, Camp Creek, Kiowa Creek, Clear Creek (Beaver, Ellis, and Harper Cos.), Otter Creek, Sand Creek, Ivanhoe Creek, Twentyfive Mile Creek, Little Wolf Creek, Boggy Creek, Sixteen Mile Creek, Wolf Creek, Turkey Creek

Major reservoirs or lakes - Fort Supply Lake, Canton Lake

Mean annual runoff based on adjusted gauge flow - 0.3 inches
Mean annual net lake evaporation for stream subsystem - 39.8 inches
Estimated reservoir refill factor ($\alpha$) for stream subsystem - 0.5

**Estimated Available Water**

USGS gauge 07239300 North Canadian River below Weavers Creek near Watonga:

Gauge Location: NE NE Sec.1-T15N-R12WIM, Blaine County - 12,736 $mi^2$ drainage area of which 4,899 $mi^2$ is probably noncontributing

Data From Water Years 1984 - 1995:

Mean annual gauge flow - 171 cfs; 123,831 acre-feet

Mean annual gauge flow adjusted for upstream use - 126,935 acre-feet (includes flow from stream subsystems 2-5-3 and 2-5-4)

Mean annual gauge flow adjusted for total drainage area of stream subsystem 2-5-3 - 123,096 acre-feet

**Table of monthly mean flows (acre-feet) from USGS gauge 07239300 (WY 1984-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 6,827 | April | 14,225 | July | 11,809 | October | 5,308 |
| February | 9,610 | May | 14,084 | August | 11,378 | November | 5,607 |
| March | 11,194 | June | 18,868 | September | 9,166 | December | 5,615 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem

Total storage within stream subsystem - 111,070 acre-feet

Total dependable yield within stream subsystem - 18,928 acre-feet/year

SCS storage within stream subsystem - 202 acre-feet/year

**Total Estimated Available Water - 114,257 acre-feet/year**
**Total Estimated Storage/Dependable Yields - 19,130 acre-feet/year**
**Adjusted Total Estimated Available Water - 95,127 acre-feet/year**

| Watershed Codes | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1110 0201 010 | 218 $mi^2$ | 8,087 acre-feet/year |
| 1110 0201 020 | 86 $mi^2$ | 3,190 acre-feet/year |
| 1110 0201 030 | 242 $mi^2$ | 8,753 acre-feet/year |
| 1110 0201 040 | 24 $mi^2$ | 890 acre-feet/year |
| 1110 0201 050 | 163 $mi^2$ | 6,047 acre-feet/year |
| 1110 0201 060 | 107 $mi^2$ | 3,969 acre-feet/year |
| 1110 0201 070 | 219 $mi^2$ | 7,922 acre-feet/year |
| 1110 0201 080 | 110 $mi^2$ | 4,081 acre-feet/year |
| 1110 0201 090 | 160 $mi^2$ | 5,935 acre-feet/year |
| 1110 0203 010 | 1 $mi^2$ | 37 acre-feet/year |

| Watershed Codes | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1110 0203 020 | 387 $mi^2$ | 14,356 acre-feet/year |
| 1110 0203 030 | 272 $mi^2$ | 10,090 acre-feet/year |
| 1110 0301 010 | 344 $mi^2$ | 12,761 acre-feet/year |
| 1110 0301 020 | 172 $mi^2$ | 6,381 acre-feet/year |
| 1110 0301 030 | 131 $mi^2$ | 4,860 acre-feet/year |
| 1110 0301 040 | 157 $mi^2$ | 5,824 acre-feet/year |
| 1110 0301 050 | 287 $mi^2$ | - 8,057 acre-feet/year |

## FORT SUPPLY LAKE

**Upper North Canadian River - Stream Subsystem 2-5-3**

Hydrologic Unit Code - 1110 0203

Located on Wolf Creek
Woodward County

Drainage area - 1,735 $mi^2$ of which 241 $mi^2$ is noncontributing
Surface area, flood pool - 5,730 acres
Surface area, conservation pool - 1,820 acres

Flood control storage - 86,800 acre-feet

Water supply storage - 13,900 acre-feet
Water supply dependable yield - 224 acre-feet/year

**OWRB Reservoir ID #21**

## CANTON LAKE

**Upper North Canadian River - Stream Subsystem 2-5-3**

Hydrologic Unit Code - 1110 0301

Located on the North Canadian River
Blaine County

Drainage area - 14,483 $mi^2$ of which 6,883 $mi^2$ is noncontributing
Surface area, flood - 15,710 acres
Surface area, conservation pool - 7,910 acres
Surface area, inactive pool - 2,710 acres

Flood control storage - 265,790 acre-feet
Inactive pool storage - 14,140 acre-feet

Water supply storage - 97,170 acre-feet
Water supply dependable yield - 18,704 acre-feet/year*
(originally 16,240 acre-feet/year for water supply and 2,240 acre-feet/year for irrigation)

*The Water Resources Development Act of 1990 reassigned all municipal and industrial storage as well as all irrigation storage to Oklahoma City. This was incorporated into stream water right #19390055 in stream subsystem 2-5-2 held by Oklahoma City for 40,000 acre-feet/year for public water supply and industrial uses from Canton Lake and the North Canadian River. Water is released from Canton Lake and imported to Lake Hefner (Stream Subsystem 2-9-2) via Lake Overholser (Stream Subsystem 2-5-2).

**OWRB Reservoir ID #10**

**STREAM SUBSYSTEM 2-5-3:** North Canadian River from Canton Dam to Optima Dam - Upper North Canadian River

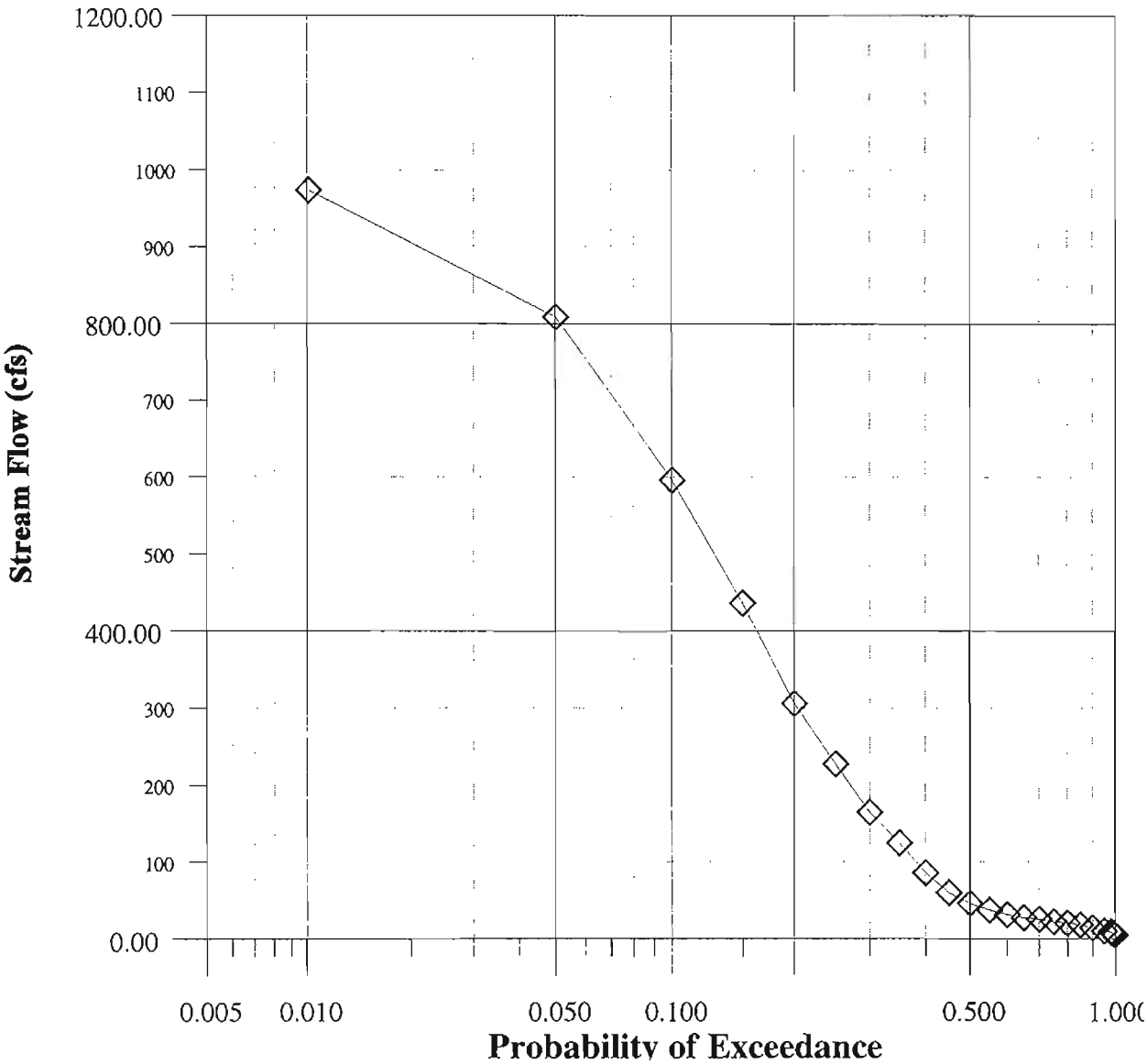
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | North Canadian River below Weavers Creek near Watonga |
| Station number | 07239300 |
| latitude (degrees, minutes, and seconds) | 354843 |
| longitude (degrees, minutes, and seconds) | 0985148 |
| hydrologic unit code | 11100301 |
| drainage area (square miles) | 12736 |
| contributing drainage area (square miles) | 7837 |
| gauge datum (feet above NGVD) | 1453.60 |
| period of record | October 1983 - September 1993 |

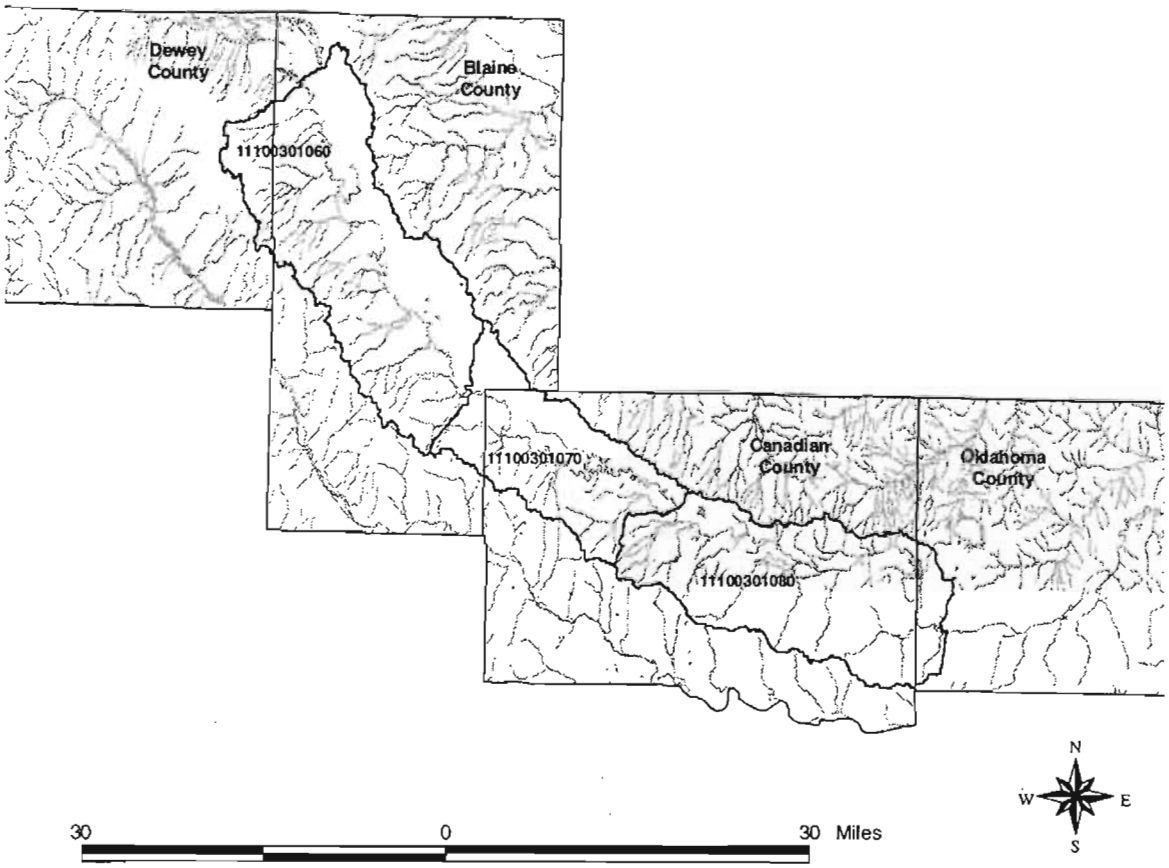
| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 974.000 |
| 5 percent = | 809.000 |
| 10 percent = | 596.000 |
| 15 percent = | 436.000 |
| 20 percent = | 306.000 |
| 25 percent = | 228.000 |
| 30 percent = | 165.000 |
| 35 percent = | 125.000 |
| 40 percent = | 86.000 |
| 45 percent = | 60.000 |
| 50 percent = | 46.000 |
| 55 percent = | 37.000 |
| 60 percent = | 31.000 |
| 65 percent = | 27.000 |
| 70 percent = | 25.000 |
| 75 percent = | 22.000 |
| 80 percent = | 20.000 |
| 85 percent = | 18.000 |
| 90 percent = | 14.000 |
| 95 percent = | 10.000 |
| 98 percent = | 8.700 |
| 99 percent = | 7.400 |
| 99.5 percent = | 6.000 |
| 99.9 percent = | 5.200 |

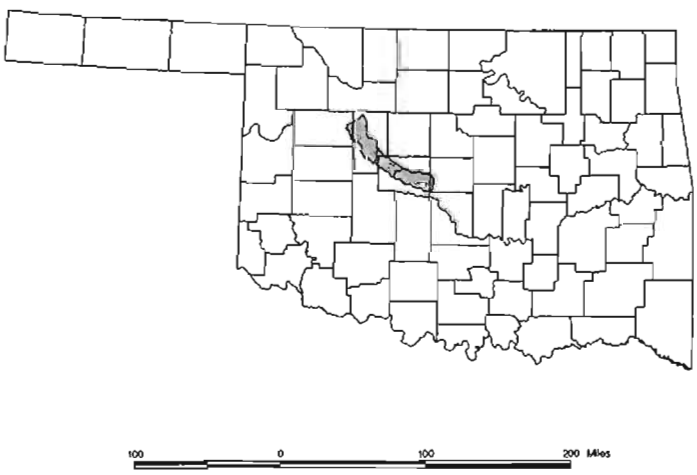
| | |
|---|---|
| Minimum flow: | 5.000 |
| Maximum flow: | 7,540.000 |
| Mean annual flow: | 181.717 |

# STREAM SUBSYSTEM 2-5-3, NORTH CANADIAN RIVER
## From Canton Dam to Optima Dam



## STREAM SYSTEM 2-5-2: NORTH CANADIAN RIVER
## From the Diversion Dam at Lake Overholser to Canton Dam



## STREAM SUBSYSTEM 2-5-2: NORTH CANADIAN RIVER FROM DIVERSION DAM AT LAKE OVERHOLSER TO CANTON DAM

### Middle North Canadian River

### General Information

Stream subsystem area - 758 $mi^2$ — Hydrologic Unit Code - 1110 0301

Watersheds - 1110 0301 060 — 326 $mi^2$
1110 0301 070 — 163 $mi^2$
1110 0301 080 — 269 $mi^2$

Total drainage area - 13,435 $mi^2$ (7,498 $mi^2$ in OK; 5,937 $mi^2$ in NM, TX, and KS)

Major tributaries - Ninemile Creek, Weavers Creek, Relay Creek, Shell Creek

Major reservoirs or lakes - Lake Overholser (intermediate import)

Mean annual runoff based on adjusted gauge flow - 0.4 inches
Mean annual net lake evaporation for stream subsystem - 29.0 inches
Estimated reservoir refill factor ($\alpha$) for stream subsystem - 1.1

### Estimated Available Water

USGS gauge 07241000 North Canadian River below Lake Overholser near Oklahoma City, OK.:

Gauge Location: NE NW Sec.31-T12N-R4WIM, Oklahoma County - 13,222 $mi^2$ drainage area of which 4,899 $mi^2$ is probably noncontributing
Data From Water Years 1953 - 1995:

Mean annual gauge flow - 158 cfs; 114,417 acre-feet
Mean annual gauge flow adjusted for upstream water use - 178,625 acre-feet (includes flow from stream subsystems 2-5-4, 2-5-3 and 2-5-2)

Mean annual gauge flow adjusted for total drainage area of stream subsystm 2-5-2 - 55,529 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07241000 (WY 1953-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 4,305 | April | 6,785 | July | 9,595 | October | 10,394 |
| February | 5,722 | May | 19,866 | August | 5,726 | November | 6,666 |
| March | 8,795 | June | 25,653 | September | 6,071 | December | 4,933 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem

Total storage within stream subystem - 17,000 acre-feet

Total dependable yield within stream subsystem - 5,000 acre-feet/year

SCS storage within stream subsystem - 709 acre-feet/year

**Total Estimated Available Water - 55,529 acre-feet/year**
**Total Estimated Dependable Yields - 5,709 acre-feet/year**
**Adjusted Total Estimated Available Water - 49,820 acre-feet/year**

| Watershed Codes | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1110 0301 060 | 326 $mi^2$ | 23,882 acre-feet/year |
| 1110 0301 070 | 163 $mi^2$ | 11,941 acre-feet/year |
| 1110 0301 080 | 269 $mi^2$ | 13,997 acre-feet/year |

## LAKE OVERHOLSER
## (Intermediate Import)

**Middle North Canadian River - Stream Subsystem 2-5-2**

Hydrologic Unit Code - 1110 0301

Located on the North Canadian River
Canadian County

Drainage area - 13,222 $mi^2$ of which 4,899 $mi^2$ is noncontributing
Surface area, conservation pool - 1,500 acres

Water supply storage - 17,000 acre-feet
Water supply dependable yield - 5,000 acre-feet/year; also Oklahoma City's import storage reservoir for water from Canton Lake (Stream Subsystem 2-5-3) bound for Lake Hefner (Stream Subsystem 2-9-2)

**OWRB Reservoir ID #44**

**STREAM SUBSYSTEM 2-5-2**: North Canadian River from diversion dam at Lake Overholser to Canton Dam - Middle North Canadian River

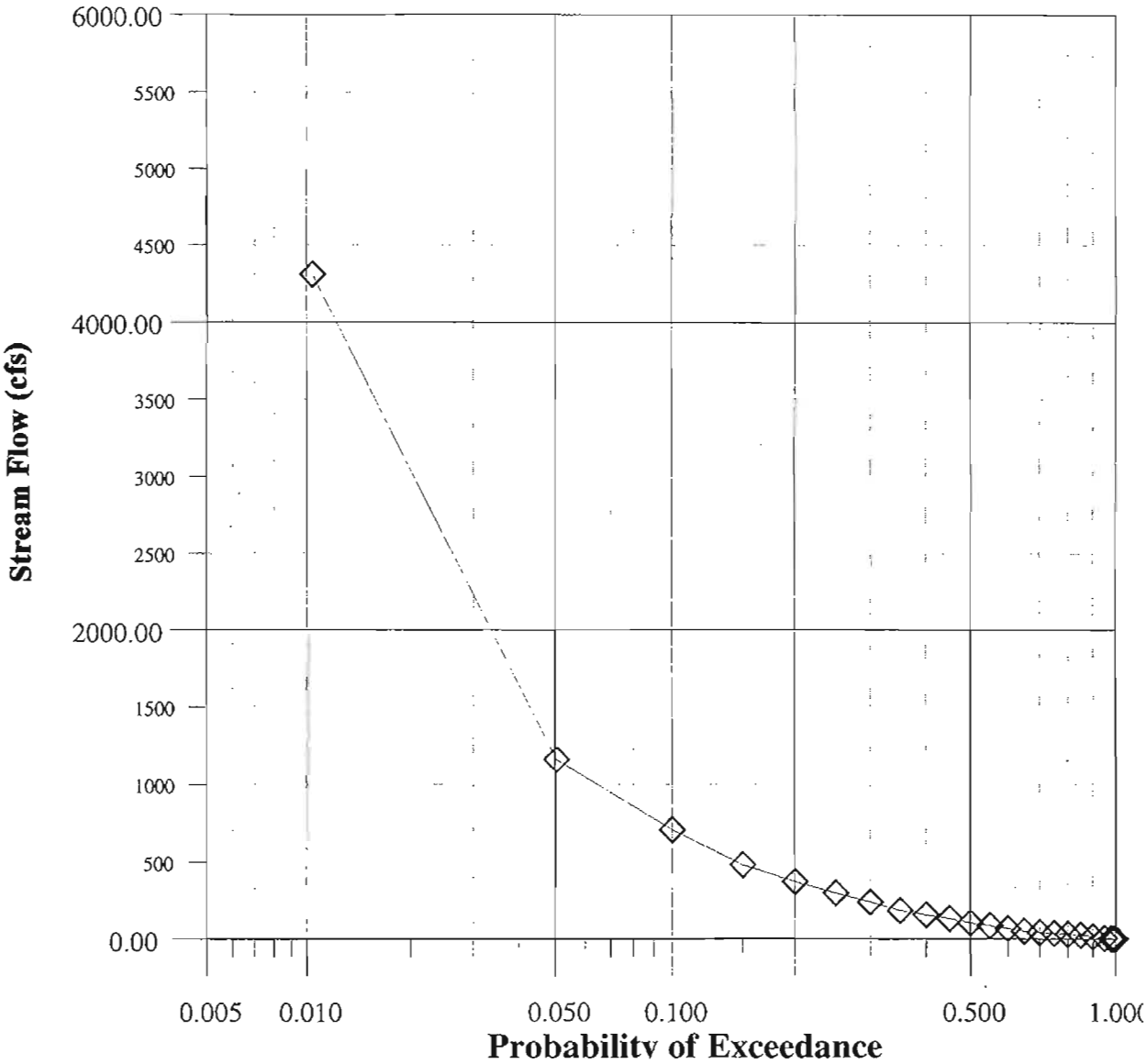
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | North Canadian River below Lake Overholser |
| Station number | 07241000 |
| latitude (degrees, minutes, and seconds) | 352843 |
| longitude (degrees, minutes, and seconds) | 0973947 |
| hydrologic unit code | 11100301 |
| drainage area (square miles) | 13222 |
| contributing drainage area (square miles) | 8323 |
| gauge datum (feet above NGVD) | 1194.66 |
| period of record | October 1988 - September 1993 |

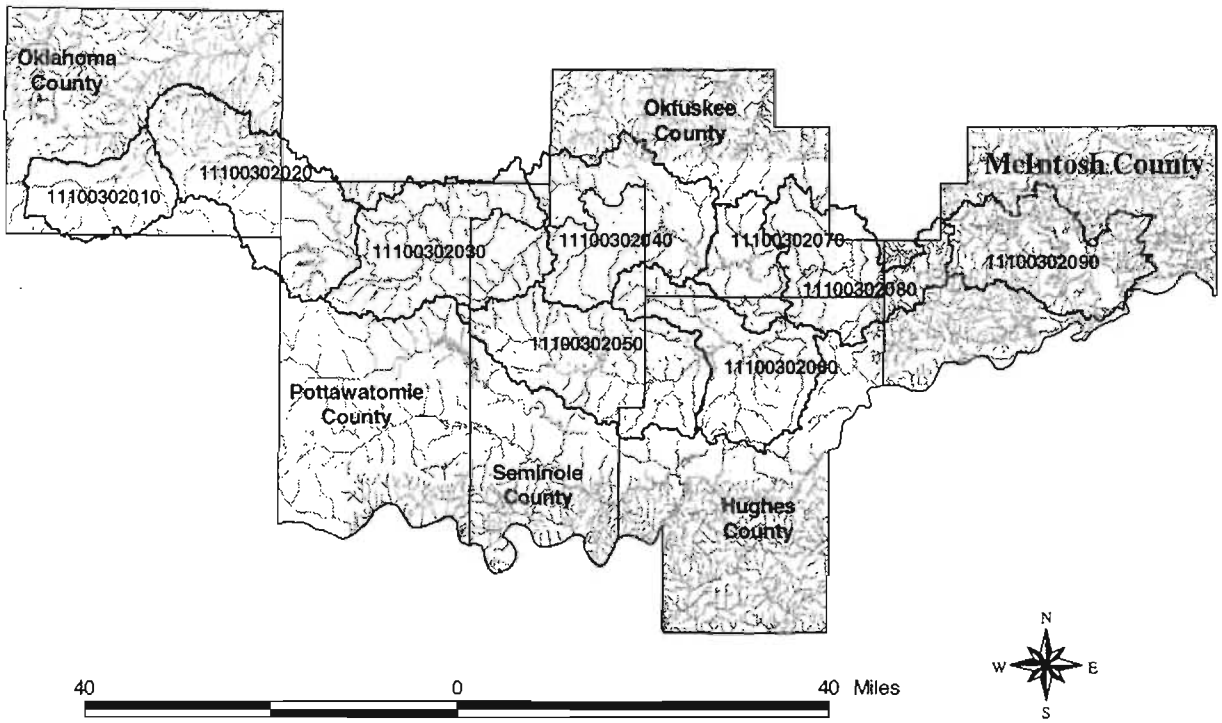
| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 4310.000 |
| 5 percent = | 1160.000 |
| 10 percent = | 708.000 |
| 15 percent = | 482.000 |
| 20 percent = | 373.000 |
| 25 percent = | 298.000 |
| 30 percent = | 238.000 |
| 35 percent = | 183.000 |
| 40 percent = | 156.000 |
| 45 percent = | 132.000 |
| 50 percent = | 104.000 |
| 55 percent = | 86.000 |
| 60 percent = | 67.000 |
| 65 percent = | 50.000 |
| 70 percent = | 41.000 |
| 75 percent = | 35.000 |
| 80 percent = | 31.000 |
| 85 percent = | 25.000 |
| 90 percent = | 15.000 |
| 95 percent = | 4.000 |
| 98 percent = | 1.500 |
| 99 percent = | 1.100 |
| 99.5 percent = | 1.000 |
| 99.9 percent = | 0.800 |

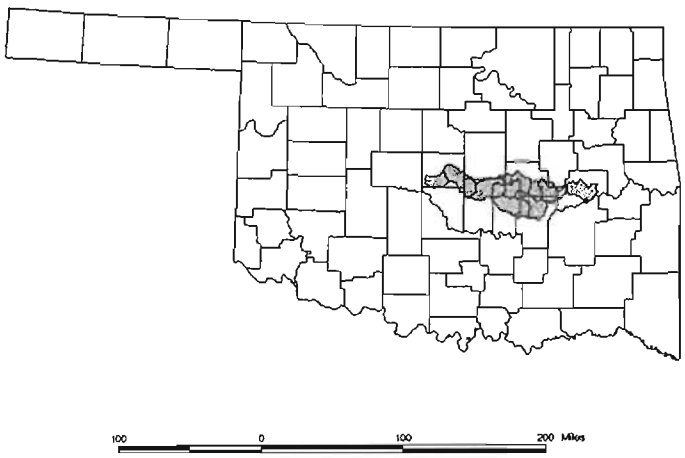
| | |
|---|---|
| Minimum flow: | 0.800 |
| Maximum flow: | 13,300.000 |
| Mean annual flow: | 317.759 |

# STREAM SUBSYSTEM 2-5-2, NORTH CANADIAN RIVER
## From Diversion Dam at Lake Overholser to Canton Dam



# STREAM SYSTEM 2-5-1: NORTH CANADIAN RIVER
## From Confluence With the Canadian River to Diversion Dam at Lake Overholser



## STREAM SUBSYSTEM 2-5-1: NORTH CANADIAN RIVER
## From Confluence With the Canadian River to Diversion Dam at Lake Overholser

### Lower North Canadian River

### General Information

Stream subsystem area - 1,865 $mi^2$

Hydrologic Unit Code - 1110 0301 and 1110 0302

| | | |
|---|---|---|
| Watersheds - | 1110 0302 010 | 124 $mi^2$ |
| | 1110 0302 020 | 270 $mi^2$ |
| | 1110 0302 030 | 271 $mi^2$ |
| | 1110 0302 040 | 249 $mi^2$ |
| | 1110 0302 050 | 263 $mi^2$ |
| | 1110 0302 060 | 207 $mi^2$ |
| | 1110 0302 070 | 91 $mi^2$ |
| | 1110 0302 080 | 190 $mi^2$ |
| | 1110 0302 090 | 200 $mi^2$ |

Total drainage area - 15,300 $mi^2$ (9,363 $mi^2$ in OK; 5,937 $mi^2$ in NM, TX, and KS)

Major tributaries - Turkey Creek, Gar Creek, Little Wewoka Creek, Graves Creek, Greasy Creek, Wewoka Creek, Bad Creek

Major reservoirs or lakes - Shawnee Twin Lakes, Eufaula Lake

Mean annual runoff based on adjusted gauge flow - 1.3 inches
Mean annual net lake evaporation for stream subsystem - 12.9 inches
Estimated reservoir refill factor ($\alpha$) for stream subsystem - 1.8

### Estimated Available Water

<u>USGS gauge 07242000 North Canadian River near Wetumka, OK.:</u>

Gauge Location: NE SW Sec.12-T9N-R10EIM, Hughes County - 14,290 $mi^2$ drainage area of which 4,899 $mi^2$ is probably noncontributing
Data From Water Years 1938 - 1995:

Mean annual gauge flow - 800 cfs; 579,328 acre-feet
Mean annual gauge flow adjusted for upstream water use - 663,653 acre-feet (includes flow from stream subsystem 2-5-4, 2-5-3, 2-5-2 and 2-5-1)
Mean annual runoff for 886.2 $mi^2$ below USGS gauge - 62,629 acre-feet
Mean annual net lake evaporation for 2-5-1 arm of Eufaula Lake (35.8 $mi^2$) - 10,111 acre-feet

Mean annual flow within stream subsystem 2-5-1 - 537,546 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07242000 (WY 1938-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 25,340 | April | 65,293 | July | 40,470 | October | 42,438 |
| February | 31,331 | May | 109,477 | August | 22,510 | November | 39,045 |
| March | 50,679 | June | 96,006 | September | 28,212 | December | 28,968 |

Reservoir's Dependable Yields Within Stream System or Subsystem

Total storage within stream subsystem - 34,000 acre-feet (excludes portion of power supply pool storage allocated to water supply from Eufaula Reservoir)

Total dependable yield within stream subsystem - 17,728 acre-feet/year

SCS storage within stream subsystem - 32,592 acre-feet/year

**Total Estimated Available Water - 537,546 acre-feet/year**
**Total Estimated Dependable Yields - 50,320 acre-feet/year**
**Adjusted Total Estimated Available Water - 487,226 acre-feet/year**

| Watershed Codes | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1110 0302 010 | 124 $mi^2$ | 35,740 acre-feet/year |
| 1110 0302 020 | 270 $mi^2$ | 59,357 acre-feet/year |
| 1110 0302 030 | 271 $mi^2$ | 78,110 acre-feet/year |
| 1110 0302 040 | 249 $mi^2$ | 71,769 acre-feet/year |
| 1110 0302 050 | 263 $mi^2$ | 62,003 acre-feet/year |
| 1110 0302 060 | 207 $mi^2$ | 54,937 acre-feet/year |
| 1110 0302 070 | 91 $mi^2$ | 26,229 acre-feet/year |
| 1110 0302 080 | 190 $mi^2$ | 54,763 acre-feet/year |
| 1110 0302 090 | 200 $mi^2$ | 44,318 acre-feet/year |

## SHAWNEE TWIN LAKES

**Lower North Canadian River - Stream Subsystem 2-5-1**

Hydrologic Unit Code - 1110 0302

Located on South Deer Creek
Pottawatomie County

Drainage area - undetermined
Surface area, conservation pool - 1,336 acres (Lake #1)
Surface area, conservation pool - 1,100 acres (Lake #2)

Water supply storage - Lake #1 - 22,600 acre-feet
Water supply storage - Lake #2 - 11,400 acre-feet
Combined Water supply dependable yield - 4,400 acre-feet/year

**OWRB Reservoir ID #53**

## EUFAULA LAKE

**Lower North Canadian River - Stream Subsystem 2-5-1**
**Deep Fork River - Stream System 2-7**
**Lower Canadian River - Stream Subsystem 2-6-1**
**Canadian River to the North Canadian River - Stream System 2-3**

Hydrologic Unit Code - 1110 0302
1110 0303
1109 0204

Located on the Canadian River
Haskell and McIntosh Counties

Drainage area - 47,522 $mi^2$
Surface area, flood pool - 143,000 acres
Surface area, conservation pool - 46,100 acres

Flood control storage - 1,510,800 acre-feet
Power storage - 1,463,000 acre-feet
Inactive storage - 851,600 acre-feet

Water supply dependable yield - 56,000 acre-feet/year (water supply yield to taken out of the 1,463,000 acre-feet of power supply storage)
Proportion of water supply yield within Stream System 2-5 - 13,328 acre-feet/year (23.8% of total yield)

**OWRB Reservoir ID #18**

**STREAM SUBSYSTEM 2-5-1:** North Canadian River from confluence with the Canadian River to diversion dam at Lake Overholser - Lower North Canadian River

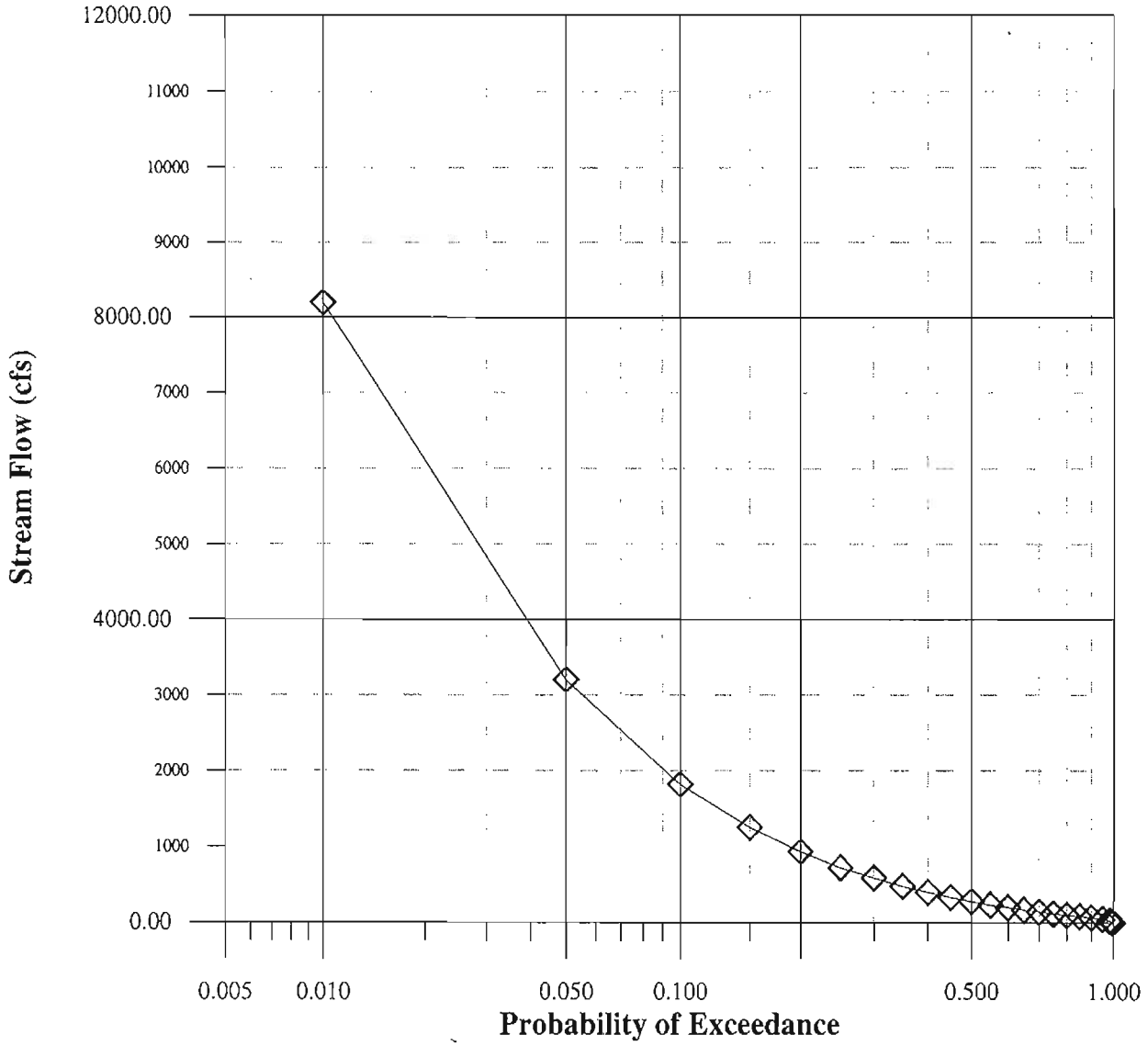
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | North Canadian River near Wetumka, OK |
| Station number | 07242000 |
| latitude (degrees, minutes, and seconds) | 351556 |
| longitude (degrees, minutes, and seconds) | 0961221 |
| hydrologic unit code | 11100302 |
| drainage area (square miles) | 14290 |
| contributing drainage area (square miles) | 9391 |
| gauge datum (feet above NGVD) | 678.28 |
| period of record | October 1937 - September 1993 |

| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 8200.000 |
| 5 percent = | 3200.000 |
| 10 percent = | 1820.000 |
| 15 percent = | 1250.000 |
| 20 percent = | 933.000 |
| 25 percent = | 719.000 |
| 30 percent = | 584.000 |
| 35 percent = | 474.000 |
| 40 percent = | 395.000 |
| 45 percent = | 327.000 |
| 50 percent = | 275.000 |
| 55 percent = | 230.000 |
| 60 percent = | 195.000 |
| 65 percent = | 165.000 |
| 70 percent = | 138.000 |
| 75 percent = | 114.000 |
| 80 percent = | 98.000 |
| 85 percent = | 82.000 |
| 90 percent = | 66.000 |
| 95 percent = | 47.000 |
| 98 percent = | 26.000 |
| 99 percent = | 16.000 |
| 99.5 percent = | 0.000 |
| 99.9 percent = | 0.000 |

| | |
|---|---|
| Minimum flow: | 0.000 |
| Maximum flow: | 55,800.000 |
| Mean annual flow: | 787.094 |

# STREAM SUBSYSTEM 2-5-1, NORTH CANADIAN RIVER
## From Confluence with Canadian River to Diversion Dam at Lake Overholser



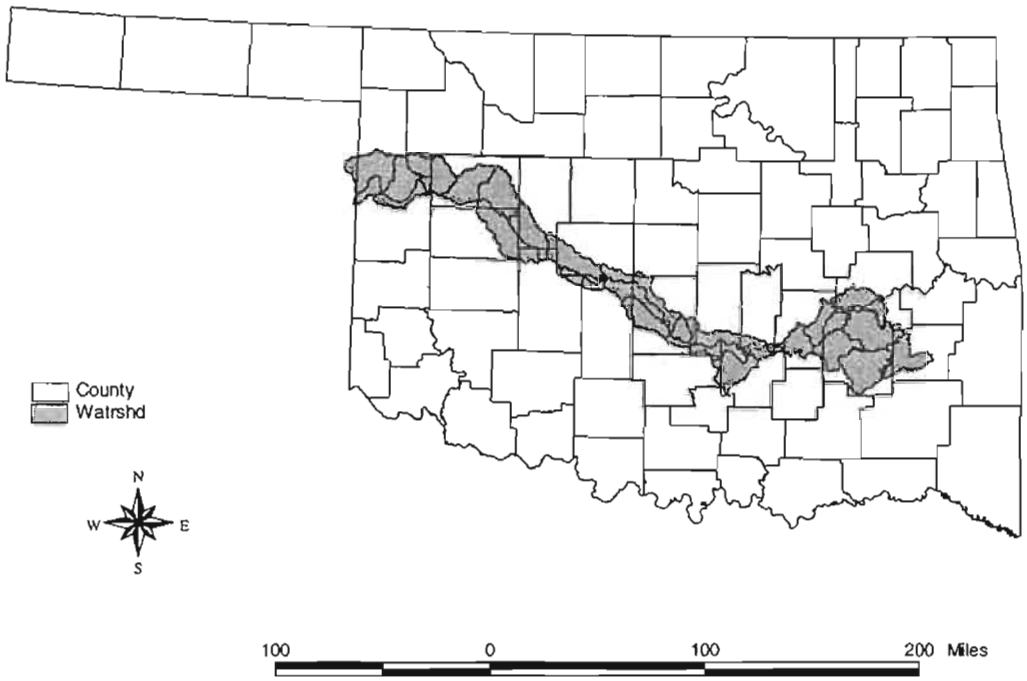
## STREAM SYSTEM 2-6: CANADIAN RIVER

### General Information

Stream system area - 5,398 $mi^2$

Total drainage area - 28,606 $mi^2$ (5,398 $mi^2$ in OK; 23,208 $mi^2$ in NM and TX)

Major reservoirs and lakes - Lake McAlester, Eufaula Lake




Index map showing Stream System 2-6: Canadian River.

### Estimated Available Water

Total Estimated Available Water:

| | |
|---|---|
| Stream Subsystem 2-6-3 | 214,851 acre-feet/year |
| Stream Subsystem 2-6-2 | 367,792 acre-feet/year |
| Stream Subsystem 2-6-1 | 516,610 acre-feet/year |
| Stream System 2-6 | 1,099,253 acre-feet/year |

Adjusted Total Estimated Available Water:

| | |
|---|---|
| Stream Subsystem 2-6-3 | 213,734 acre-feet/year |
| Stream Subsystem 2-6-2 | 367,671 acre-feet/year |
| Stream Subsystem 2-6-1 | 478,483 acre-feet/year |
| Stream System 2-6 | 1,059,888 acre-feet/year |

Total Estimated Storage/Dependable Yields Within Stream System:

Lake McAlester water supply dependable yield - 9,200 acre-feet/year

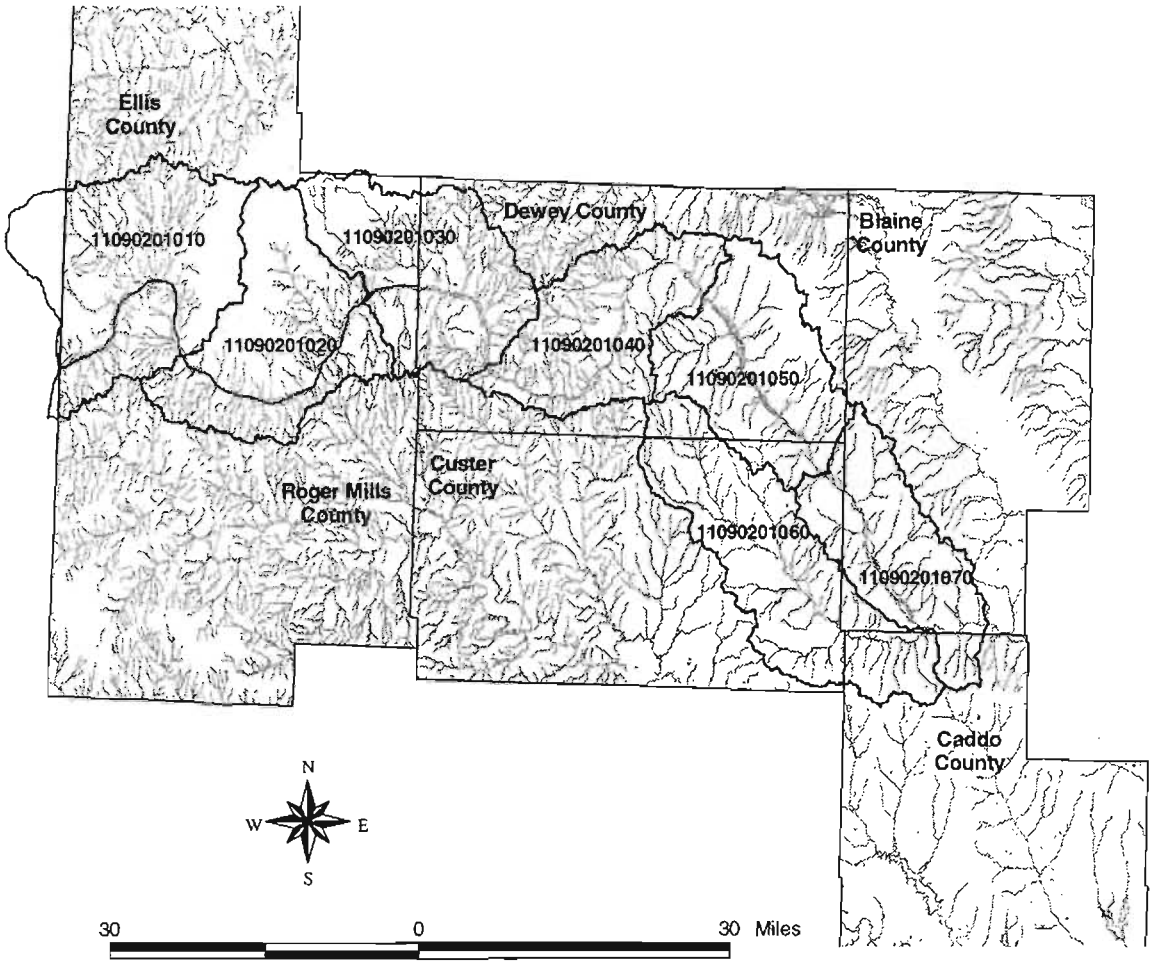
Eufaula Lake water supply dependable yield - 26,376 acre-feet/year is within Stream System 2-6 (total dependable yield for the entire reservoir is 56,000 acre-feet/year)

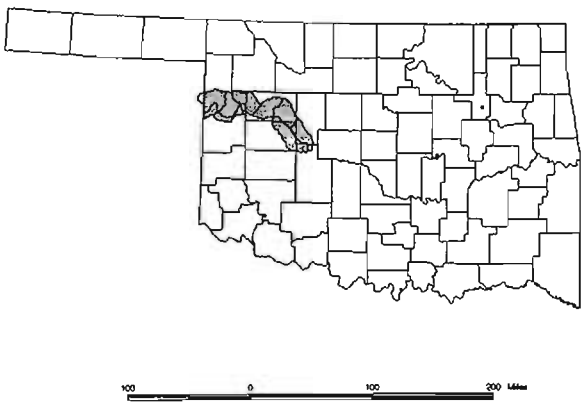
Total water supply storage - 13,398 acre-feet (excludes portion of power supply pool storage allocated to water supply from Eufaula Reservoir)

Total water supply dependable yields - 35,576 acre-feet/year

SCS sediment pool storage - 3,789 acre-feet/year

# STREAM SUBSYSTEM 2-6-3: CANADIAN RIVER
## From Near Bridgeport, OK to Texas State Line



## STREAM SUBSYSTEM 2-6-3: CANADIAN RIVER FROM NEAR BRIDGEPORT TO THE TEXAS STATE LINE

### Upper Canadian River

### General Information

Stream subsystem area - 1,994 $mi^2$ Hydrologic Unit Code - 1109 0103 and 1109 0201

| | | |
|---|---|---|
| Watersheds - | 1109 0201 010 | 322 $mi^2$ |
| | 1109 0201 020 | 307 $mi^2$ |
| | 1109 0201 030 | 287 $mi^2$ |
| | 1109 0201 040 | 241 $mi^2$ |
| | 1109 0201 050 | 271 $mi^2$ |
| | 1109 0201 060 | 340 $mi^2$ |
| | 1109 0201 070 | 226 $mi^2$ |

Total drainage area - 25,202 $mi^2$ (1,994 $mi^2$ in OK, 23,208 $mi^2$ in NM and TX)

Major tributaries - Red Bluff Creek, Hackberry Creek, Powwow Creek, Turkey Creek, Trail Creek (NW Dewey Co.), Lone Creek, Sorter Creek, Trail Creek (SE Dewey Co.), Rough Creek, Squaw Creek, Horse Creek, Deer Creek, Lariat Creek

Major reservoirs or lakes - None

Mean annual runoff based on adjusted gauge flow - 0.2 inches
Mean annual net lake evaporation for stream subsystem - 36.7 inches
Estimated pond refill factor ($\alpha$) for stream subsystem - 0.7

### Estimated Available Water

USGS gauge 07228500 Canadian River at Bridgeport, OK

Gauge Location: SE NW Sec.1-T12N-R11WIM, Caddo County - 25,276 $mi^2$ drainage area of which 4,801 $mi^2$ is probably noncontributing
Water Years 1970 - 1995:
Mean annual gauge flow - 296 cfs; 214,351 acre-feet
Mean annual gauge flow adjusted for upstream water use - 215,346 acre-feet

Mean annual gauge flow adjusted for total drainage area of stream subsystem 2-6-3 - 214,851 acre-feet

**Table of monthly mean flows (acre-feet) from USGS gauge 07228500 (WY 1970-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 12,793 | April | 19,820 | July | 7,011 | October | 12,301 |
| February | 12,444 | May | 50,126 | August | 8,611 | November | 12,916 |
| March | 26,078 | June | 33,450 | September | 9,285 | December | 9,656 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem

SCS storage within stream subsystem - 1,117 acre-feet/year

**Total Estimated Available Water - 214,851 acre-feet/year**
**Total Estimated Storage/Dependable Yields - 1,117 acre-feet/year**
**Adjusted Total Estimated Available Water - 213,734 acre-feet/year**

| Watershed Code | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1109 0201 010 | 322 $mi^2$ | 34,695 acre-feet/year |
| 1109 0201 020 | 307 $mi^2$ | 33,079 acre-feet/year |
| 1109 0201 030 | 287 $mi^2$ | 30,924 acre-feet/year |
| 1109 0201 040 | 241 $mi^2$ | 25,967 acre-feet/year |
| 1109 0201 050 | 271 $mi^2$ | 29,200 acre-feet/year |
| 1109 0201 060 | 340 $mi^2$ | 36,323 acre-feet/year |
| 1109 0201 070 | 226 $mi^2$ | 23,546 acre-feet/year |

**STREAM SUBSYSTEM 2-6-3:** Canadian River from near Bridgeport to the Texas State Line - Upper Canadian River

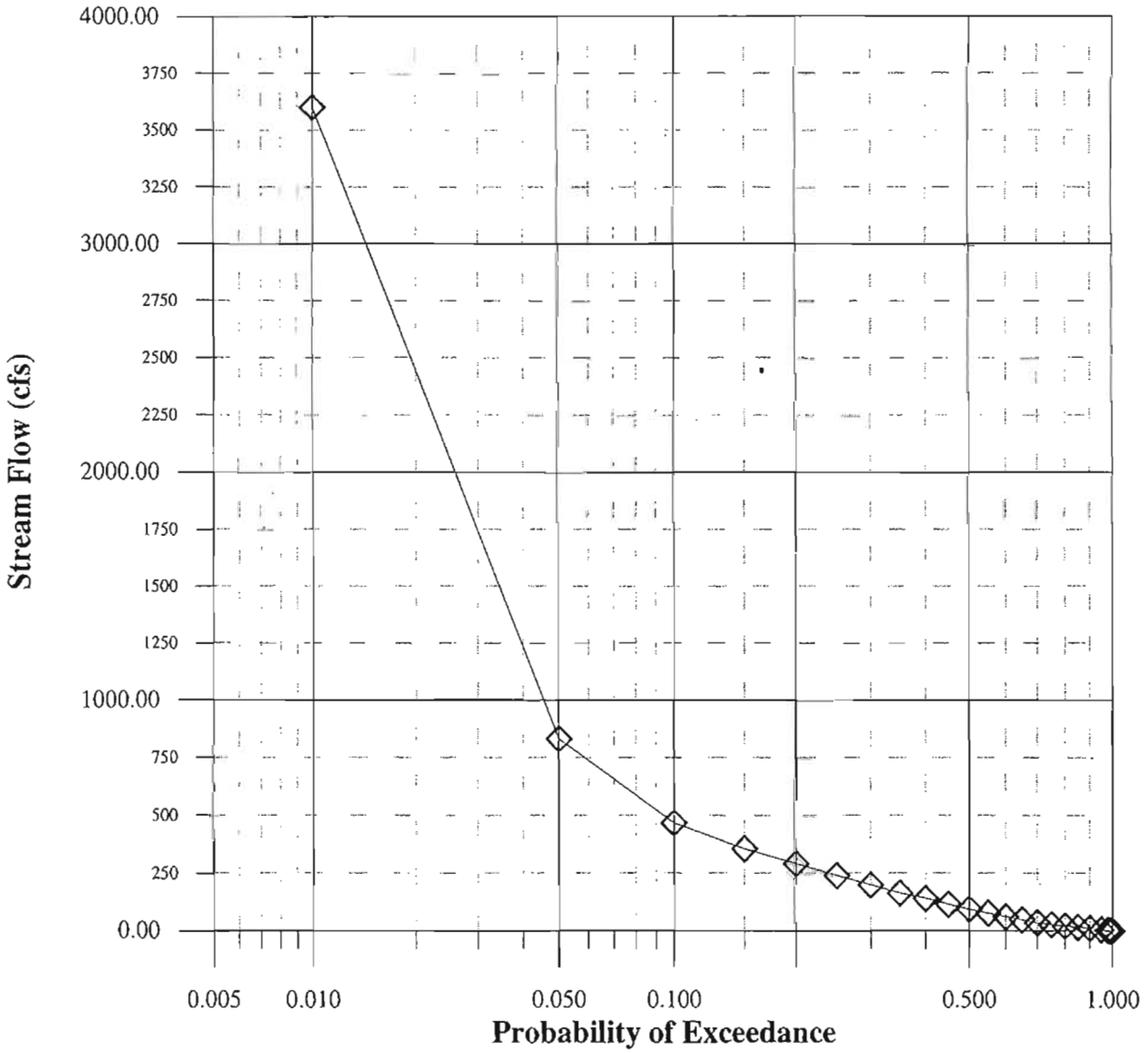
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Canadian River at Bridgeport, OK |
| Station number | 07228500 |
| latitude (degrees, minutes, and seconds) | 353237 |
| longitude (degrees, minutes, and seconds) | 0981903 |
| hydrologic unit code | 11090202 |
| drainage area (square miles) | 25276 |
| contributing drainage area (square miles) | 20475 |
| gauge datum (feet above NGVD) | 1360.00 |
| period of record | October 1969 - September 1993 |

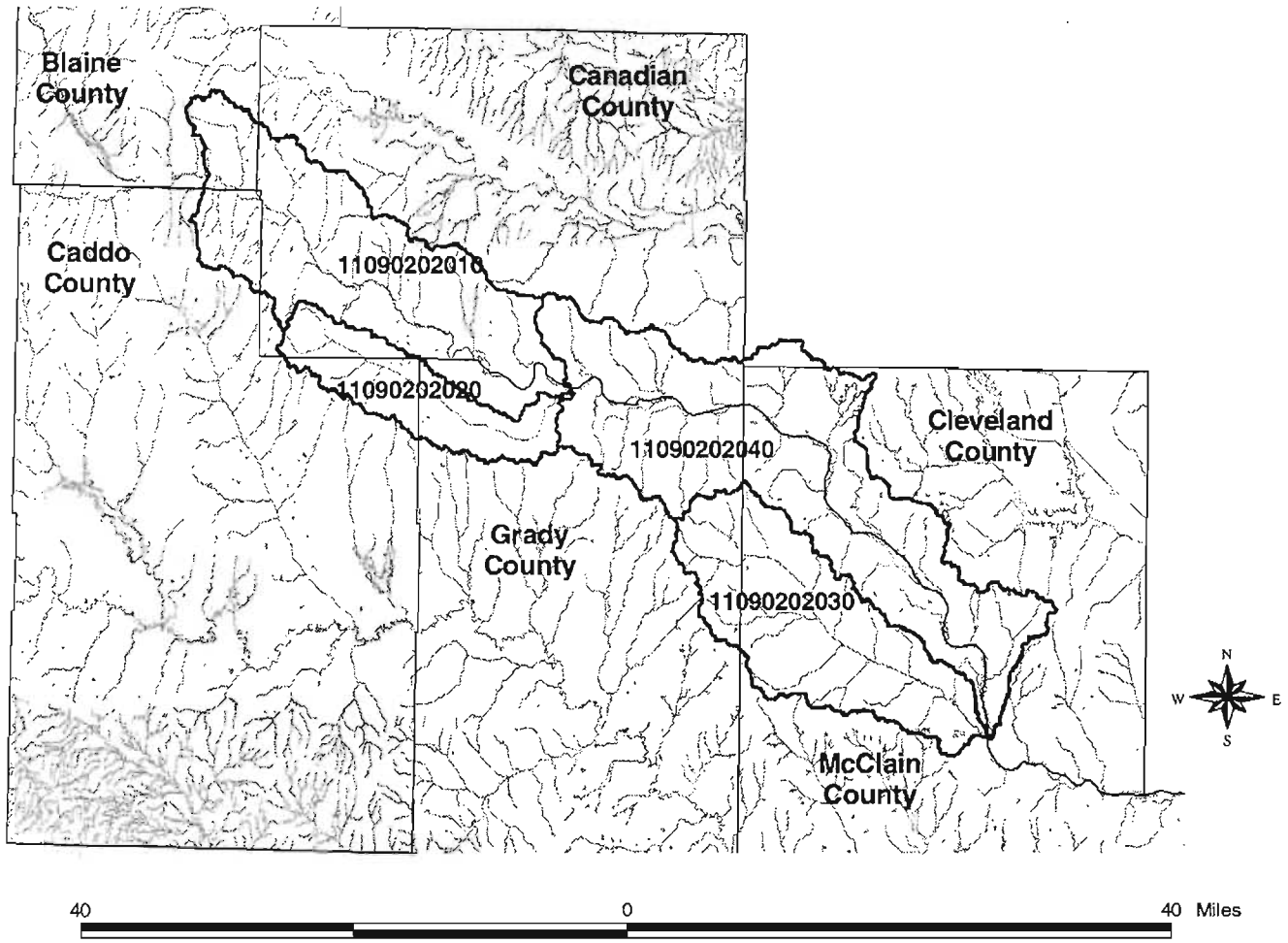
| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 3600.000 |
| 5 percent = | 830.000 |
| 10 percent = | 467.000 |
| 15 percent = | 354.000 |
| 20 percent = | 290.000 |
| 25 percent = | 239.000 |
| 30 percent = | 198.000 |
| 35 percent = | 164.000 |
| 40 percent = | 140.000 |
| 45 percent = | 114.000 |
| 50 percent = | 93.000 |
| 55 percent = | 76.000 |
| 60 percent = | 60.000 |
| 65 percent = | 47.000 |
| 70 percent = | 34.000 |
| 75 percent = | 26.000 |
| 80 percent = | 20.000 |
| 85 percent = | 15.000 |
| 90 percent = | 10.000 |
| 95 percent = | 4.500 |
| 98 percent = | 1.100 |
| 99 percent = | 0.000 |
| 99.5 percent = | 0.000 |
| 99.9 percent = | 0.000 |

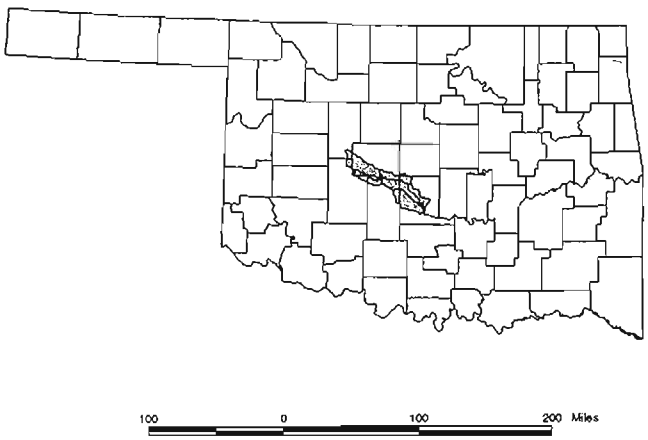
| | |
|---|---|
| Minimum flow: | 0.000 |
| Maximum flow: | 42,100.000 |
| Mean annual flow: | 294.225 |

# STREAM SUBSYSTEM 2-6-3, CANADIAN RIVER
## From Near Bridgeport, OK, to Texas State Line



## STREAM SUBSYSTEM 2-6-2: CANADIAN RIVER
## From Mouth of Walnut Creek to Near Bridgeport, OK



## STREAM SUBSYSTEM 2-6-2: CANADIAN RIVER
## From Mouth of Walnut Creek, Near Purcell, to Near Bridgeport

### Middle Canadian River

### General Information

Stream subsystem area - 948 $mi^2$ Hydrologic Unit Code - 1109 0202

| | | |
|---|---|---|
| Watersheds - | 1109 0202 010 | 268 $mi^2$ |
| | 1109 0202 020 | 96 $mi^2$ |
| | 1109 0202 030 | 203 $mi^2$ |
| | 1109 0202 040 | 381 $mi^2$ |

Total drainage area - 26,150 $mi^2$ (2,942 $mi^2$ in OK; 23,208 $mi^2$ in NM and TX)

Major tributaries - Buggy Creek, West Creek, North Fork, Walnut Creek

Major reservoirs or lakes - None

Mean annual runoff based on adjusted gauge flow - 0.5 inches
Mean annual net lake evaporation for stream subsystem - 27.2 inches
Estimated reservoir refill factor ($\alpha$) for stream subsystem - 1.3

### Estimated Available Water

USGS gauge 07229200 Canadian River at Purcell, OK.

Gauge Location: NW Sec.7-T6N-R1WIM, Cleveland County - 25, 939 $mi^2$ drainage area of which 4,801 $mi^2$ is probably noncontributing
Water Years 1980 - 1995:

Mean annual gauge flow - 793 cfs; 574,259 acre-feet
Mean annual gauge flow adjusted for upstream water use - 576,803 acre-feet (includes flow from stream subsystem 2-6-3)
Mean annual runoff for 214 $mi^2$ below USGS gauge - 5,840 acre-feet

Mean annual flow adjusted for total drainage area of stream subsystem 2-6-2 - 367,792 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07229200 (WY 1980-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 36,410 | April | 43,509 | July | 20,665 | October | 43,606 |
| February | 32,887 | May | 140,168 | August | 15,130 | November | 32,796 |
| March | 57,691 | June | 86,721 | September | 23,629 | December | 41,269 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem

SCS storage within stream subsystem - 121 acre-feet/year

**Total Estimated Available Water - 367,792 acre-feet/year**
**Total Estimated Storgae/Dependable Yields - 121 acre-feet/year**
**Adjusted Total Estimated Available Water - 367,671 acre-feet/year**

| Watershed Code | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1109 0202 010 | 268 $mi^2$ | 103,854 acre-feet/year |
| 1109 0202 020 | 96 $mi^2$ | 37,245 acre-feet/year |
| 1109 0202 030 | 203 $mi^2$ | 78,757 acre-feet/year |
| 1109 0202 040 | 381 $mi^2$ | 147,815 acre-feet/year |

**STREAM SUBSYSTEM 2-6-2:** Canadian River from mouth of Walnut Creek, near Purcell, to near Bridgeport - Middle Canadian River

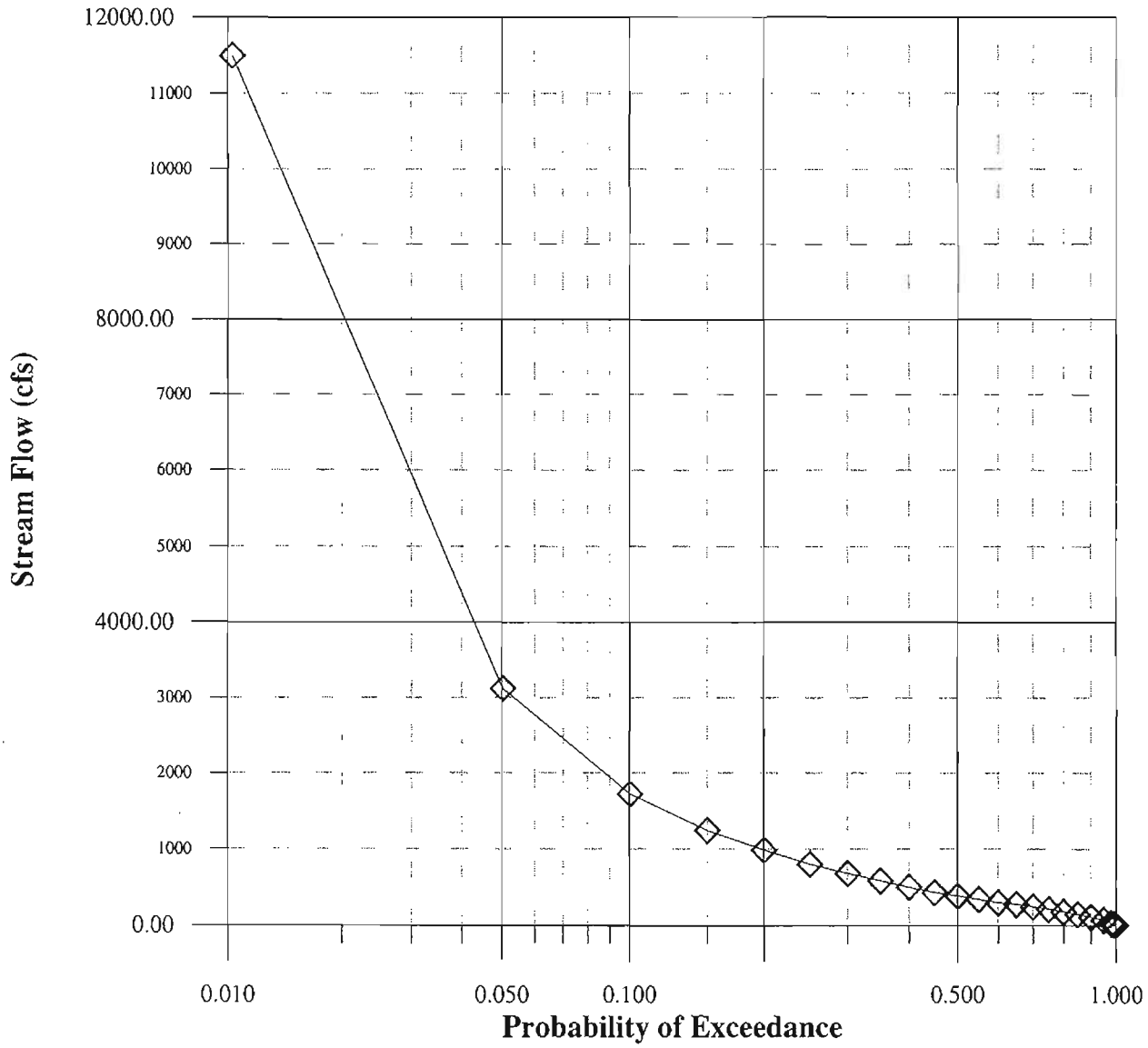
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Canadian River at Purcell, OK |
| Station number | 07229200 |
| latitude (degrees, minutes, and seconds) | 350050 |
| longitude (degrees, minutes, and seconds) | 0972050 |
| hydrologic unit code | 11090202 |
| drainage area (square miles) | 25939 |
| contributing drainage area (square miles) | 21138 |
| gauge datum (feet above NGVD) | 1017.14 |
| period of record | October 1985 - September 1993 |

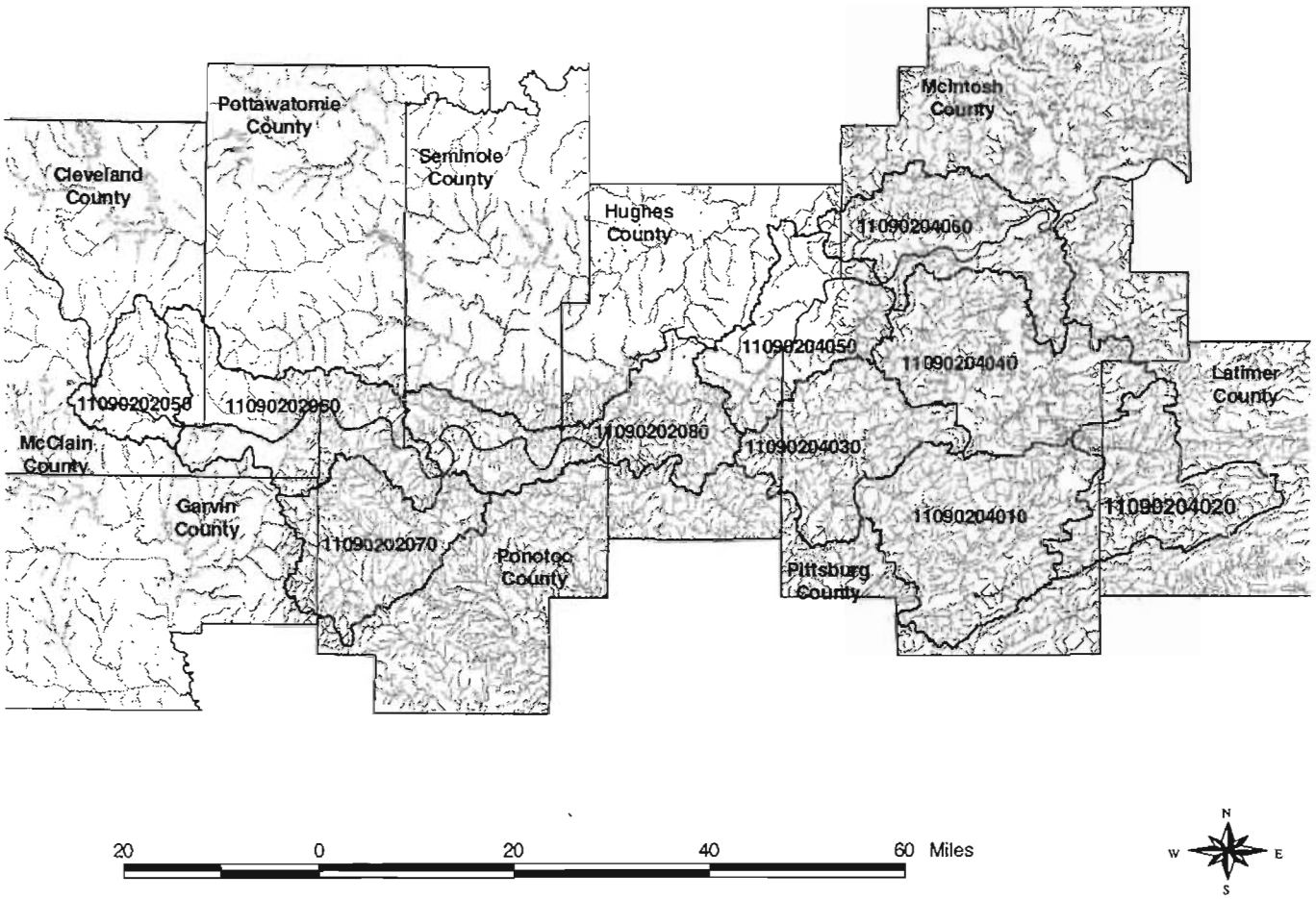
| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 11500.000 |
| 5 percent = | 3120.000 |
| 10 percent = | 1720.000 |
| 15 percent = | 1240.000 |
| 20 percent = | 985.000 |
| 25 percent = | 800.000 |
| 30 percent = | 680.000 |
| 35 percent = | 583.000 |
| 40 percent = | 500.000 |
| 45 percent = | 430.000 |
| 50 percent = | 384.000 |
| 55 percent = | 340.000 |
| 60 percent = | 300.000 |
| 65 percent = | 275.000 |
| 70 percent = | 246.000 |
| 75 percent = | 212.000 |
| 80 percent = | 180.000 |
| 85 percent = | 146.000 |
| 90 percent = | 110.000 |
| 95 percent = | 72.000 |
| 98 percent = | 32.000 |
| 99 percent = | 19.000 |
| 99.5 percent = | 11.000 |
| 99.9 percent = | 5.800 |

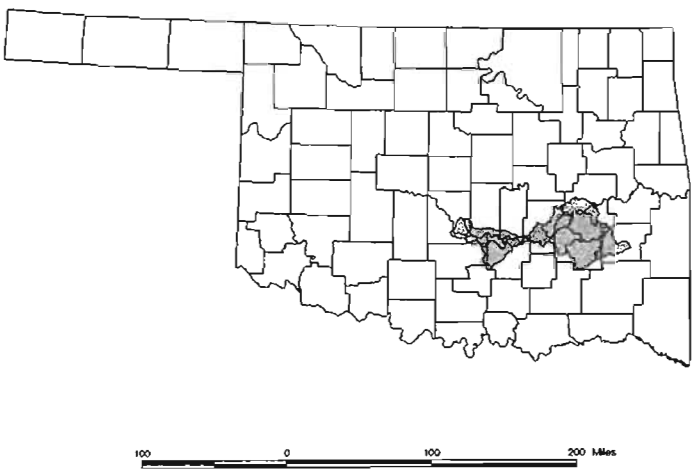
| | |
|---|---|
| Minimum flow: | 4.400 |
| Maximum flow: | 71,000.000 |
| Mean annual flow: | 986.532 |

## STREAM SUBSYSTEM 2-6-2, CANADIAN RIVER
## From Mouth of Walnut Creek to Near Bridgeport, OK



## STREAM SUBSYSTEM 2-6-1: CANADIAN RIVER
## From the Mouth of the North Canadian River to the Mouth of the Walnut Creek



## STREAM SUBSYSTEM 2-6-1: CANADIAN RIVER
## From Mouth of the North Canadian River to Mouth of Walnut Creek, Near Purcell

### Lower Canadian River

### General Information

Stream subsystem area - 2,456 $mi^2$ — Hydrologic Unit Code - 1109 0202 and 1109 0204

| Watersheds - | | |
|---|---|---|
| | 1109 0204 010 | 335 $mi^2$ |
| | 1109 0204 020 | 223 $mi^2$ |
| | 1109 0204 030 | 227 $mi^2$ |
| | 1109 0204 040 | 330 $mi^2$ |
| | 1109 0204 050 | 217 $mi^2$ |
| | 1109 0204 060 | 240 $mi^2$ |
| | 1109 0202 050 | 110 $mi^2$ |
| | 1109 0202 060 | 279 $mi^2$ |
| | 1109 0202 070 | 226 $mi^2$ |
| | 1109 0202 080 | 269 $mi^2$ |

Total drainage area - 28,606 $mi^2$ (5,398 $mi^2$ in OK; 23,208 $mi^2$ in NM and TX)

Major tributaries - Buckhead Creek, Pond Creek, Big Creek (Garvin, McClain, and Pontotoc Cos.), Spring Brook Creek, Canadian Sandy Creek, Big Creek (Hughes Co.), Salt Creek, Scipio Creek, Mill Creek, Buffalo Creek, Gaines Creek, Elm Creek, Chun Creek, Peaceable Creek, Brushy Creek, Ash Creek, Big Wildhorse Creek, Coal Creek, Rock Creek

Major reservoirs or lakes - Lake McAlester, Eufaula Lake

Mean annual runoff based on adjusted gauge flow - 1.1 inches
Mean annual net lake evaporation for stream subsystem - 9.7 inches
Estimated reservoir refill factor ($\alpha$) for stream subsystem - 1.9

### Estimated Available Water

<u>USGS gauge 07231500 Canadian River at Calvin, OK</u>

Gauge Location: NW SW Sec.22-T6N-R10EIM, Hughes County - 27,952 $mi^2$ drainage area of which 4,801 $mi^2$ is probably noncontributing
Water Years 1906 - 1995:

Mean annual gauge flow - 1798 cfs; 1,302,040 acre-feet
Mean annual gauge flow adjusted for upstream water use - 1,341,233 acre-feet (includes flow from stream subsystems 2-6-3 and 2-6-2)
Mean annual runoff for 1,672 $mi^2$ below USGS gauge - 96,867 acre-feet
Mean annual net lake evaporation for 2-6-1 arm of Eufaula Lake (77 $mi^2$) - 17,655 acre-feet

Mean annual flow adjusted for total drainage area of stream subsystem 2-6-1 - 516,610 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07231500 (WY 1906-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 51,171 | April | 147,669 | July | 84,199 | October | 103,142 |
| February | 68,218 | May | 280,089 | August | 49,388 | November | 68,686 |
| March | 111,322 | June | 201,237 | September | 72,555 | December | 62,919 |

Reservoir's Storge/Dependable Yields Within Stream System and Subsystem

Total storage within stream subsystem - 13,398 acre-feet (excludes portion of power supply pool storage allocated to water supply from Eufaula Reservoir)

Total dependable yield within stream subsystem - 35,576 acre-feet/year

SCS storage within stream subsystem - 2,551 acre-feet/year

**Total Estimated Available Water - 516,610 acre-feet/year**
**Total EstimatedStorage/Dependable Yields - 38,127 acre-feet/year**
**Adjusted Total Estimated Available Water - 478,483 acre-feet/year**

| Watershed Code | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1109 0204 010 | 335 $mi^2$ | 69,579 $mi^2$ |
| 1109 0204 020 | 223 $mi^2$ | 46,685 $mi^2$ |
| 1109 0204 030 | 227 $mi^2$ | 38,549 $mi^2$ |
| 1109 0204 040 | 330 $mi^2$ | 69,414 $mi^2$ |
| 1109 0204 050 | 217 $mi^2$ | 45,645 $mi^2$ |
| 1109 0204 060 | 240 $mi^2$ | 24,107 $mi^2$ |
| 1109 0202 050 | 110 $mi^2$ | 23,138 $mi^2$ |
| 1109 0202 060 | 279 $mi^2$ | 58,687 $mi^2$ |
| 1109 0202 070 | 226 $mi^2$ | 46,096 $mi^2$ |
| 1109 0202 080 | 269 $mi^2$ | 56,583 $mi^2$ |

## LAKE MCALESTER

### Lower Canadian River - Stream Subsystem 2-6-1

Hydrologic Unit Code - 1109 0204

Located on Bull Creek
Pittsburg County

Drainage area - undetermined
Surface area, conservation pool - 1,521 acres

Water supply storage - 13,398 acre-feet
Water supply dependable yield - 9,200 acre-feet/year

**OWRB Reservoir ID #38**

## EUFAULA LAKE

**Lower Canadian River - Stream Subsystem 2-6-1**
**Lower North Canadian River - Stream Subsystem 2-5-1**
**Deep Fork River - Stream System 2-7**
**Canadian River to the North Canadian River - Stream System 2-3**

Hydrologic Unit Code - 1109 0204
1110 0302
1110 0303

Located on the Canadian River
Haskell and McIntosh Counties

Drainage area - 47,522 $mi^2$
Surface area, flood pool - 143,000 acres
Surface area, conservation pool - 46,100 acres

Flood control storage - 1,510,800 acre-feet
Power storage - 1,463,000 acre-feet
Inactive storage - 851,600 acre-feet

Water supply dependable yield - 56,000 acre-feet/year (water supply yield to taken out of the 1,463,000 acre-feet of power supply storage)
Proportion of water supply yield within Stream System 2-6 - 26,376 acre-feet/year (47.1% of total yield)

**OWRB Reservoir ID #18**

**STREAM SUBSYSTEM 2-6-1:** Canadian River from mouth of the North Canadian River to mouth of Walnut Creek, near Purcell - Lower Canadian River

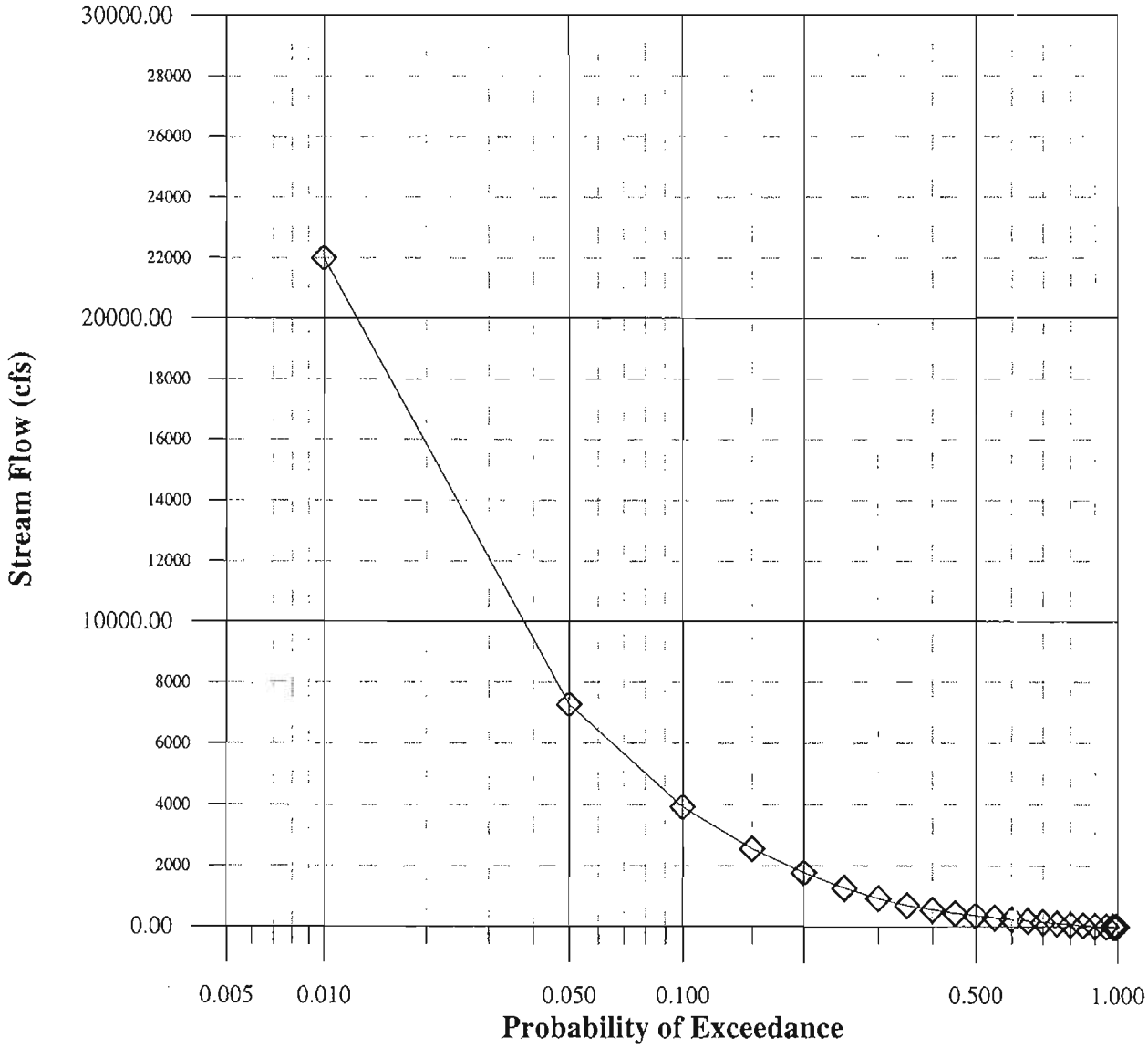
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Canadian River at Calvin, OK |
| Station number | 07231500 |
| latitude (degrees, minutes, and seconds) | 345840 |
| longitude (degrees, minutes, and seconds) | 0961436 |
| hydrologic unit code | 11090202 |
| drainage area (square miles) | 27952 |
| contributing drainage area (square miles) | 23151 |
| gauge datum (feet above NGVD) | 682.72 |
| period of record | October 1944 - September 1993 |

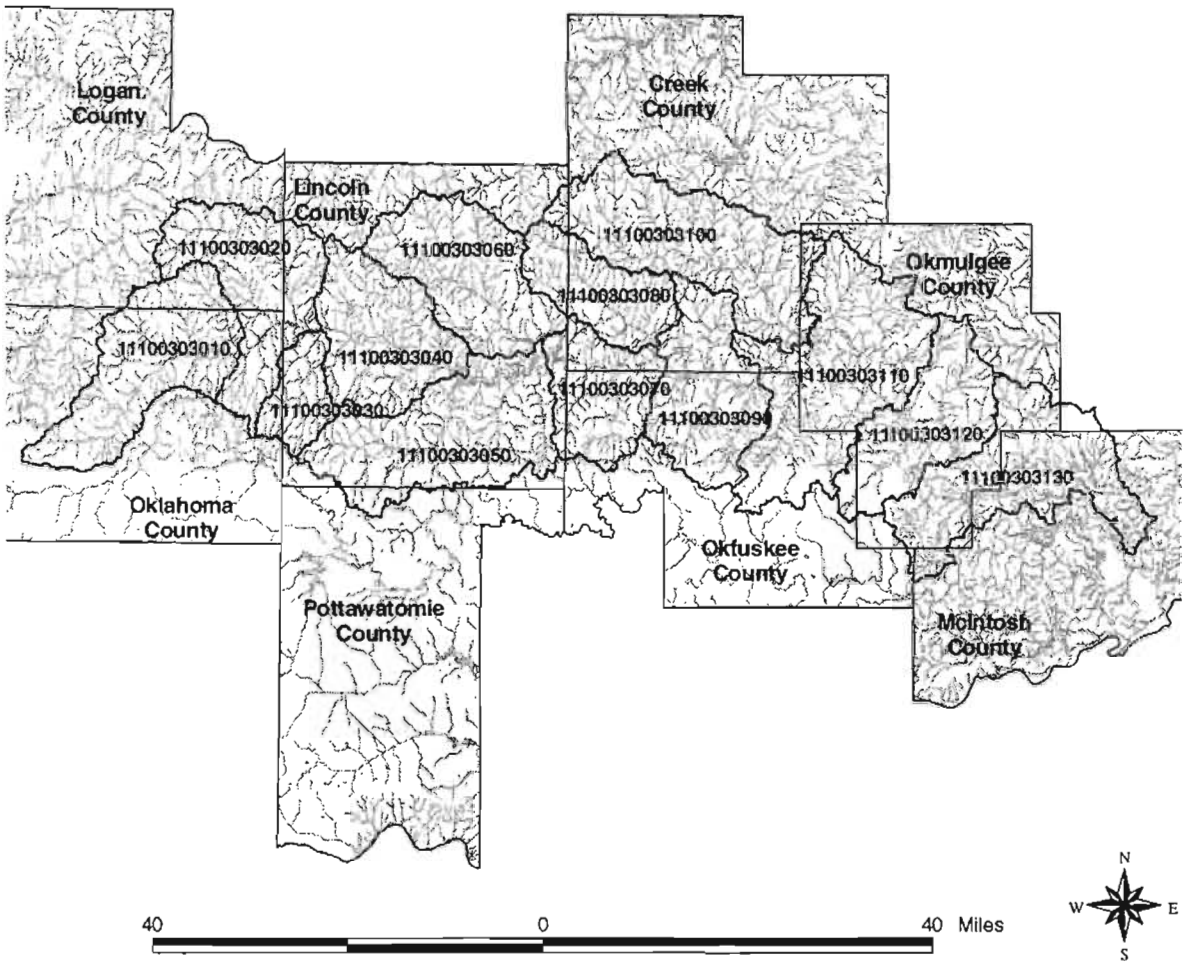
| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 22000.000 |
| 5 percent = | 7270.000 |
| 10 percent = | 3930.000 |
| 15 percent = | 2560.000 |
| 20 percent = | 1770.000 |
| 25 percent = | 1260.000 |
| 30 percent = | 914.000 |
| 35 percent = | 690.000 |
| 40 percent = | 544.000 |
| 45 percent = | 430.000 |
| 50 percent = | 349.000 |
| 55 percent = | 286.000 |
| 60 percent = | 234.000 |
| 65 percent = | 187.000 |
| 70 percent = | 142.000 |
| 75 percent = | 106.000 |
| 80 percent = | 70.000 |
| 85 percent = | 41.000 |
| 90 percent = | 23.000 |
| 95 percent = | 7.000 |
| 98 percent = | 0.840 |
| 99 percent = | 0.000 |
| 99.5 percent = | 0.000 |
| 99.9 percent = | 0.000 |

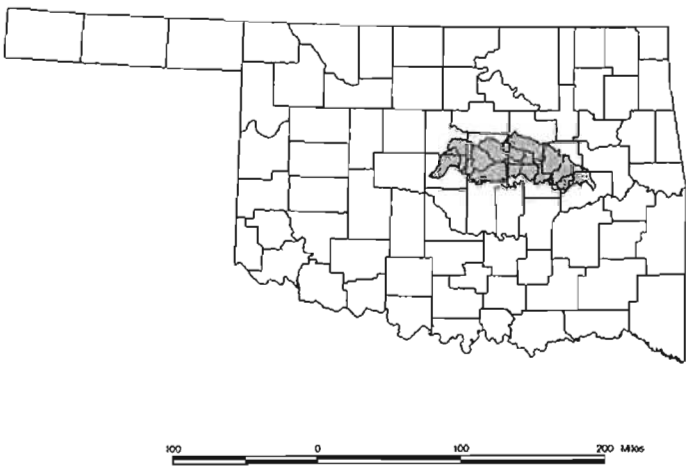
| | |
|---|---|
| Minimum flow: | 0.000 |
| Maximum flow: | 140,000.000 |
| Mean annual flow: | 1,697.505 |

# STREAM SUBSYSTEM 2-6-1, CANADIAN RIVER
## From the Mouth of North Canadian River to the Mouth of Walnut Creek



# STREAM SYSTEM 2-7: DEEP FORK RIVER



## STREAM SYSTEM 2-7: DEEP FORK RIVER

### General Information

Stream system area - 2,537 $mi^2$

| Watersheds - | Hydrologic Unit Code - 1110 0303 |
|---|---|
| 1110 0303 010 | 222 $mi^2$ |
| 1110 0303 020 | 200 $mi^2$ |
| 1110 0303 030 | 64 $mi^2$ |
| 1110 0303 040 | 181 $mi^2$ |
| 1110 0303 050 | 263 $mi^2$ |
| 1110 0303 060 | 193 $mi^2$ |
| 1110 0303 070 | 131 $mi^2$ |
| 1110 0303 080 | 117 $mi^2$ |
| 1110 0303 090 | 178 $mi^2$ |
| 1110 0303 100 | 261 $mi^2$ |
| 1110 0303 110 | 308 $mi^2$ |
| 1110 0303 120 | 172 $mi^2$ |
| 1110 0303 130 | 247 $mi^2$ |

Total drainage area - 2,537 $mi^2$

Major tributaries - Coon Creek, Bear Creek, Bellcow Creek, Quapaw Creek, Robinson Creek, Ranch Creek, Dry Creek, Salt Creek, Walnut Creek, Nuyaka Creek, Browns Creek, Little Deep Fork Creek, Montezuma Creek

Major reservoirs or lakes - Arcadia Lake, Chandler Lake, Bellcow Lake, Meeker Lake, Prague City Lake, Stroud Lake, Dripping Springs Lake, Eufaula Lake, Sparks Lake

Mean annual runoff based on adjusted gauge flow - 6.5 inches
Mean annual net lake evaporation for stream system - 14.3 inches
Estimated reservoir refill factor ($\alpha$) for stream system - 1.8

### Estimated Available Water

<u>USGS gauge 07243500 Deep Fork River near Beggs, OK.</u>

Gauge Location: NW SW Sec.20-T14N-R12EIM, Okmulgee County - 2,018 $mi^2$ drainage area
Water Years 1939 - 1995:

Mean annual gauge flow - 952 cfs; 689,400 acre-feet
Mean annual gauge flow adjusted for upstream water use - 697,693 acre-feet
Mean annual runoff for 502.6 $mi^2$ below USGS gauge - 173,780 acre-feet
Mean annual net lake evaporation for 2-7 arm of Eufaula Lake (27.4 $mi^2$) - 8,508 acre-feet

Mean annual flow adjusted for total drainage area of stream system 2-7 - 862,965 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07243500 (WY 1939-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 24,725 | April | 92,732 | July | 35,980 | October | 43,545 |
| February | 35,720 | May | 148,286 | August | 15,314 | November | 44,997 |
| March | 72,206 | June | 119,695 | September | 22,796 | December | 33,643 |

Reservoir's Storage/Dependable Yields Within Stream System and Subsystem

Total storage within stream system - 59,351 acre-feet (excludes portion of power supply pool storage allocated to water supply from Eufaula Reservoir)

Total dependable yield - 42,129 acre-feet/year

SCS storage within stream system - 46,114 acre-feet/year

**Total Estimated Available Water - 862,965 acre-feet/year**
**Total Estimated Storage/Dependable Yields - 88,243 acre-feet**
**Adjusted Total Estimated Available Water - 774,749 acre-feet/year**

| Watershed Code | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1110 0303 010 | 222 $mi^2$ | 62,600 acre-feet/year |
| 1110 0303 020 | 200 $mi^2$ | 65,089 acre-feet/year |
| 1110 0303 030 | 64 $mi^2$ | 21,770 acre-feet/year |
| 1110 0303 040 | 181 $mi^2$ | 55,096 acre-feet/year |
| 1110 0303 050 | 263 $mi^2$ | 84,088 acre-feet/year |
| 1110 0303 060 | 193 $mi^2$ | 65,649 acre-feet/year |
| 1110 0303 070 | 131 $mi^2$ | 43,839 acre-feet/year |
| 1110 0303 080 | 117 $mi^2$ | 38,340 acre-feet/year |
| 1110 0303 090 | 178 $mi^2$ | 59,384 acre-feet/year |
| 1110 0303 100 | 261 $mi^2$ | 73,606 acre-feet/year |
| 1110 0303 110 | 308 $mi^2$ | 79,118 acre-feet/year |
| 1110 0303 120 | 172 $mi^2$ | 58,113 acre-feet/year |
| 1110 0303 130 | 247 $mi^2$ | 68,057 acre-feet/year |

## ARCADIA LAKE

**Deep Fork River - System 2-7**

Hydrologic Unit Code - 1110 0303

Located on the Deep Fork River
Oklahoma County

Drainage area - 105 $mi^2$
Surface area, flood pool - 3,820 acres
Surface area, conservation pool - 1,820 acres
Surface area, inactive pool - 20 acres

Flood control storage - 64,430 acre-feet
Inactive pool - 190 acre-feet

Water supply storage - 27,380 acre-feet
Water supply dependable yield - 12,320 acre-feet

**OWRB Reservoir ID #4**

## CHANDLER LAKE

**Deep Fork River - Stream System 2-7**

Hydrologic Unit Code - 1110 0303

Located on Bellcalf Creek
Lincoln County

Drainage area - undetermined
Surface area, conservation pool - 129 acres

Water supply storage - 2,778 acre-feet
Water supply dependable yield - Unknown

**OWRB Reservoir ID #67**

## BELLCOW LAKE
## Kickapoo Nations Watershed Site #1M

**Deep Fork River - Stream System 2-7**

Hydrologic Unit Code - 1110 0303

Located on Bellcow Creek
Lincoln County

Drainage area - undetermined
Surface area, conservation pool - undetermined

Water supply storage - Unknown
Water supply dependable yield - 4,558 acre-feet/year

**OWRB Reservoir ID #70**

## MEEKER LAKE
## Quapaw Creek Watershed Site #15

**Deep Fork River - Stream System 2-7**

Hydrologic Unit Code - 1110 0303

Located on South Quapaw Creek
Lincoln County

Drainage area - undetermined
Surface area, conservation pool - 250 acres

Water supply storage - 1,818 acre-feet
Water supply dependable yield - 202 acre-feet/year

**OWRB Reservoir ID #87**

## PRAGUE CITY LAKE
## Robinson Creek Watershed Site #4M

**Deep Fork River - Stream System 2-7**

Hydrologic Unit Code - 1110 0303

Located on Sand Creek
Lincoln County

Drainage area - undetermined
Surface area, conservation pool - 225 acres

Water supply storage - 2,415 acre-feet
Water supply dependable yield - 549 acre-feet/year

**OWRB Reservoir ID #89**

## STROUD LAKE
### Salt-Camp Creek Watershed Site #12

**Deep Fork River - Stream System 2-7**

Hydrologic Unit Code - 1110 0303

Located on Camp Creek
Lincoln County

Drainage area - undetermined
Surface area, conservation pool - 600 acres

Water supply storage - 8,800 acre-feet
Water supply dependable yield - 1,299 acre-feet/year

**OWRB Reservoir ID #94**

## DRIPPING SPRINGS LAKE
## Okfuskee Tributaries Watershed Site #S-1

**Deep Fork River - Stream System 2-7**

Hydrologic Unit Code - 1110 0303

Located on Salt Creek
Okmulgee County

Drainage area - undetermined
Surface area, conservation pool - 1,150 acres

Water supply storage - 16,200 acre-feet
Water supply dependable yield - 7,214 acre-feet/year

**OWRB Reservoir ID # 75**

## EUFAULA LAKE

**Deep Fork River - Stream System 2-7**
**Lower North Canadian River - Stream Subsystem 2-5-1**
**Lower Canadian River - Stream Subsystem 2-6-1**
**Canadian River to the North Canadian River - Stream System 2-3**

Hydrologic Unit Code - 1110 0303
1110 0302
1109 0204

Located on the Canadian River
McIntosh and Haskell Counties

Drainage area - 47,522 $mi^2$
Surface area, flood pool - 143,000 acres
Surface area, conservation pool - 46,100 acres

Flood control storage - 1,510,800 acre-feet
Power storage - 1,463,000 acre-feet
Inactive storage - 851,600 acre-feet

Water supply dependable yield - 56,000 acre-feet/year (water supply yield to taken out of the 1,463,000 acre-feet of power supply storage)
Proportion of water supply yield within Stream System 2-7 -15,960 acre-feet/year (28.5% of total yield)

OWRB Reservoir ID #18

## SPARKS LAKE

**Deep Fork River - Stream System 2-7**

Hydrologic Unit Code - 1110 0303

Located on unnamed tributary to Quapaw Creek
Lincoln County

Drainage area - undetermined
Surface area, conservation pool - undetermined

Water supply storage - unknown acre-feet
Water supply dependable yield - 27 acre-feet/year

**OWRB Reservoir ID # 92**

**STREAM SYSTEM 2-7:** Deep Fork River

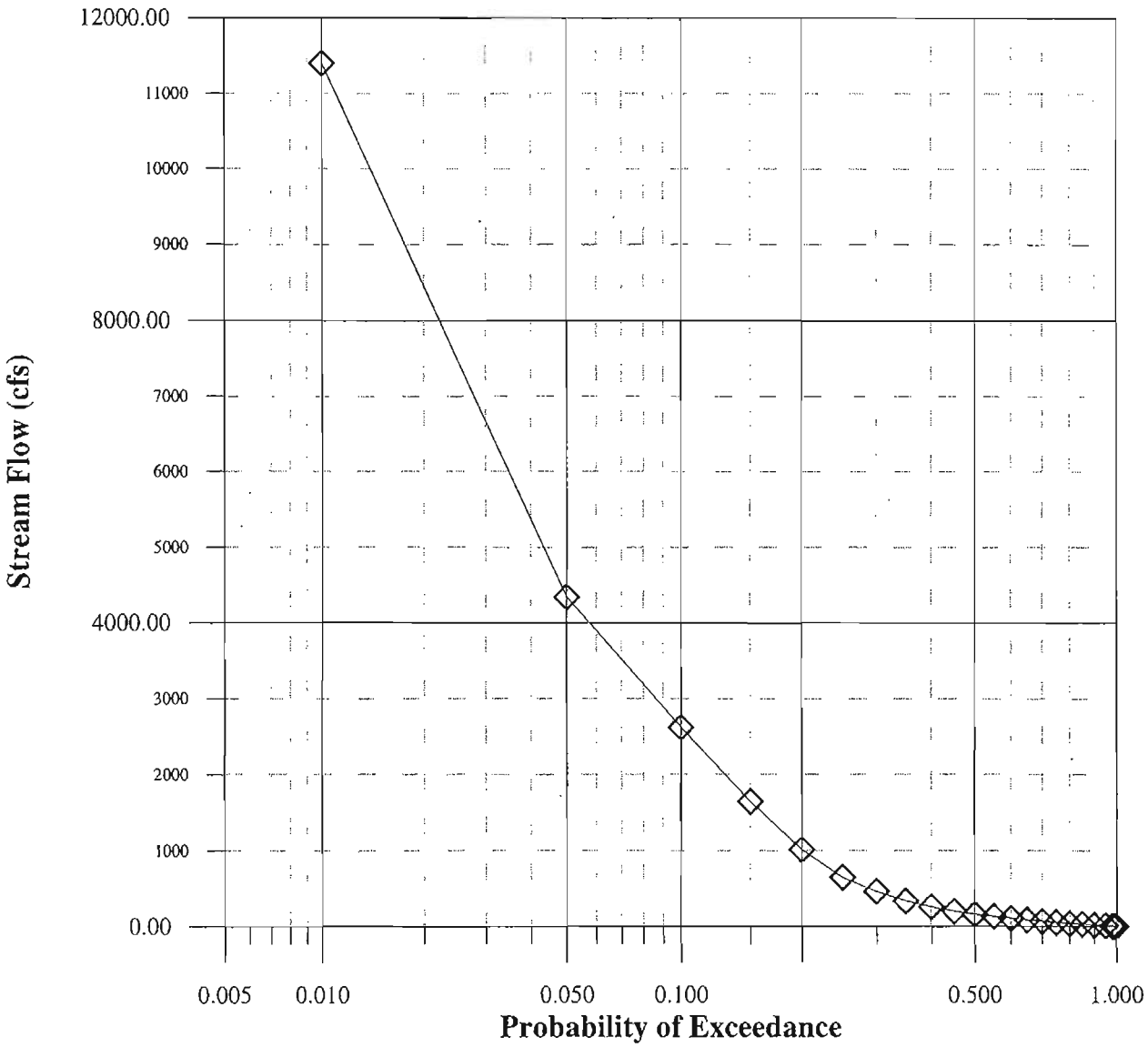
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Deep Fork near Beggs, OK |
| Station number | 07243500 |
| latitude (degrees, minutes, and seconds) | 354026 |
| longitude (degrees, minutes, and seconds) | 0960406 |
| hydrologic unit code | 11100303 |
| drainage area (square miles) | 2018 |
| contributing drainage area (square miles) | 2018 |
| gauge datum (feet above NGVD) | 632.55 |
| period of record | October 1938 - September 1993 |

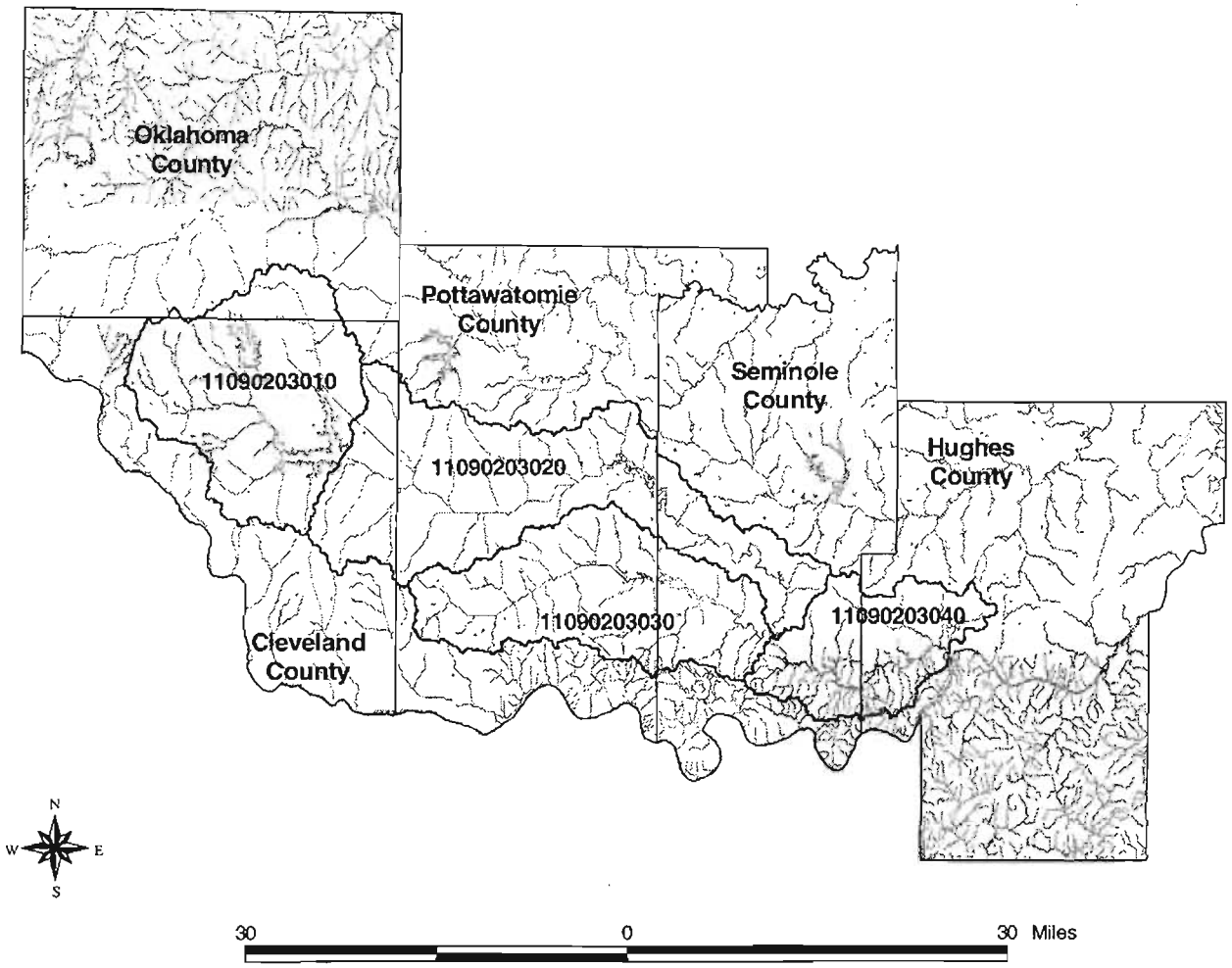
| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 11400.000 |
| 5 percent = | 4340.000 |
| 10 percent = | 2620.000 |
| 15 percent = | 1640.000 |
| 20 percent = | 1010.000 |
| 25 percent = | 648.000 |
| 30 percent = | 463.000 |
| 35 percent = | 338.000 |
| 40 percent = | 257.000 |
| 45 percent = | 200.000 |
| 50 percent = | 160.000 |
| 55 percent = | 130.000 |
| 60 percent = | 105.000 |
| 65 percent = | 84.000 |
| 70 percent = | 65.000 |
| 75 percent = | 51.000 |
| 80 percent = | 38.000 |
| 85 percent = | 27.000 |
| 90 percent = | 18.000 |
| 95 percent = | 9.500 |
| 98 percent = | 3.000 |
| 99 percent = | 0.100 |
| 99.5 percent = | 0.000 |
| 99.9 percent = | 0.000 |

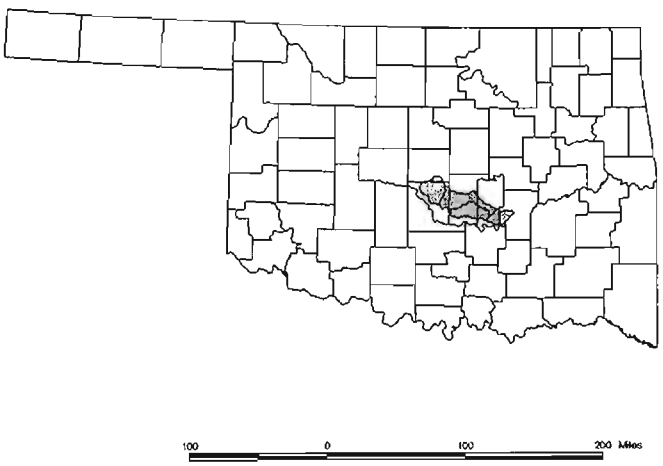
| | |
|---|---|
| Minimum flow: | 0.000 |
| Maximum flow: | 55,600.000 |
| Mean annual flow: | 934.926 |

# STREAM SYSTEM 2-7, DEEP FORK RIVER



# STREAM SYSTEM 2-8: LITTLE RIVER



## STREAM SYSTEM 2-8: LITTLE RIVER

### General Information

Stream system area - 980 $mi^2$ Hydrologic Unit Code for Watershed - 1109 0203

| | | |
|---|---|---|
| Watershed - | 1109 0203 010 | 259 $mi^2$ |
| | 1109 0203 020 | 345 $mi^2$ |
| | 1109 0203 030 | 238 $mi^2$ |
| | 1109 0203 040 | 138 $mi^2$ |

Total drainage area for Little River - 980 $mi^2$

Major tributaries - Spring Creek, Pecan Creek, Salt Creek, Bird Creek

Major reservoirs and lakes - Lake Thunderbird, Lake Stanley Draper (import), Holdenville Lakes

Mean annual runoff based on adjusted gauge flow - 6.2 inches
Mean annual net lake evaporation for stream system - 15.7 inches (at Lake Thunderbird)
Estimated reservoir refill factor ($\alpha$) for stream system - 1.7

### Estimated Available Water

USGS gauge 07231000 Little River near Sasakwa, OK.

Gauge Location: NE Sec.22-T6N-R7EIM, Seminole County - 865 $mi^2$ drainage area
Water Years 1966 - 1995:

Mean annual gauge flow - 372 cfs; 269,388 acre-feet
Mean annual gauge flow adjusted for upstream water use - 286,225 acre-feet
Mean annual runoff for 108 $mi^2$ below USGS gauge adjusted for evaporation loss from Lake Holdenville - 34,967 acre-feet

Mean annual flow adjusted for total drainage area of stream system 2-8 - 321,192 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07231000 (WY 1966-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 13,223 | April | 36,010 | July | 7,996 | October | 16,668 |
| February | 18,777 | May | 54,800 | August | 4,391 | November | 19,404 |
| March | 32,413 | June | 39,878 | September | 7,916 | December | 17,652 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem

Total storage within stream system - 216,900 acre-feet
Total dependable yield within stream system - 21,700 acre-feet/year
SCS storage within stream system - 2,846 acre-feet/year

**Total Estimated Available Water - 321,192 acre-feet/year**
**Total Estimated Storage/Dependable Yields - 24,546 acre-feet/year**
**Adjusted Total Estimated Available Water - 296,646 acre-feet**

| Watershed Code | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1109 0203 010 | 259 $mi^2$ | 63,186 acre-feet/year |
| 1109 0203 020 | 345 $mi^2$ | 113,073 acre-feet/year |
| 1109 0203 030 | 238 $mi^2$ | 75,158 acre-feet/year |
| 1109 0203 040 | 138 $mi^2$ | 45,229 acre-feet/year |

## LAKE THUNDERBIRD

### Little River - Stream System 2-8

Hydrologic Unit Code - 1109 0203 010

Located on the Little River
Cleveland County

Drainage area - 256 $mi^2$
Surface area, flood pool - 8,800 acres
Surface area, conservation pool - 6,070 acres

Flood control storage - 76,600 acre-feet
Dead storage - 13,700 acre-feet

Water supply storage - 105,900 acre-feet
Water supply dependable yield - 21,700 acre-feet/year

### OWRB Reservoir ID #60

## LAKE STANLEY DRAPER
**(Import)**

**Little River - Stream System 2-8**

Hydrologic Unit Code - 1109 0203 010

Located on East Elm Creek
Cleveland County

Drainage area - 11.5 $mi^2$
Surface area, conservation pool - 2,900 acres

Water supply storage - 100,000 acre-feet
Water supply dependable yield - 0 acre-feet/year; Oklahoma City's import storage reservoir for water from Atoka Lake (Stream System 1-4)

**OWRB Reservoir ID #15**

## HOLDENVILLE LAKES

### Little River - Stream System 2-8

Hydrologic Unit Code - 1109 0203 040

Located on unnamed tributary to Little River
Hughes County

Drainage area - undetermined
Surface area, conservation pool - 550 acres

Water supply storage - 11,000 acre-feet (Holdenville Waterworks Lake storage - 200 acre-feet)
Water supply dependable yield - Unknown; these two lakes are interconnected and also serve as Holdenville's import storage reservoirs for water from the Little River

### OWRB Reservoir ID #29

**STREAM SYSTEM 2-8:** Little River

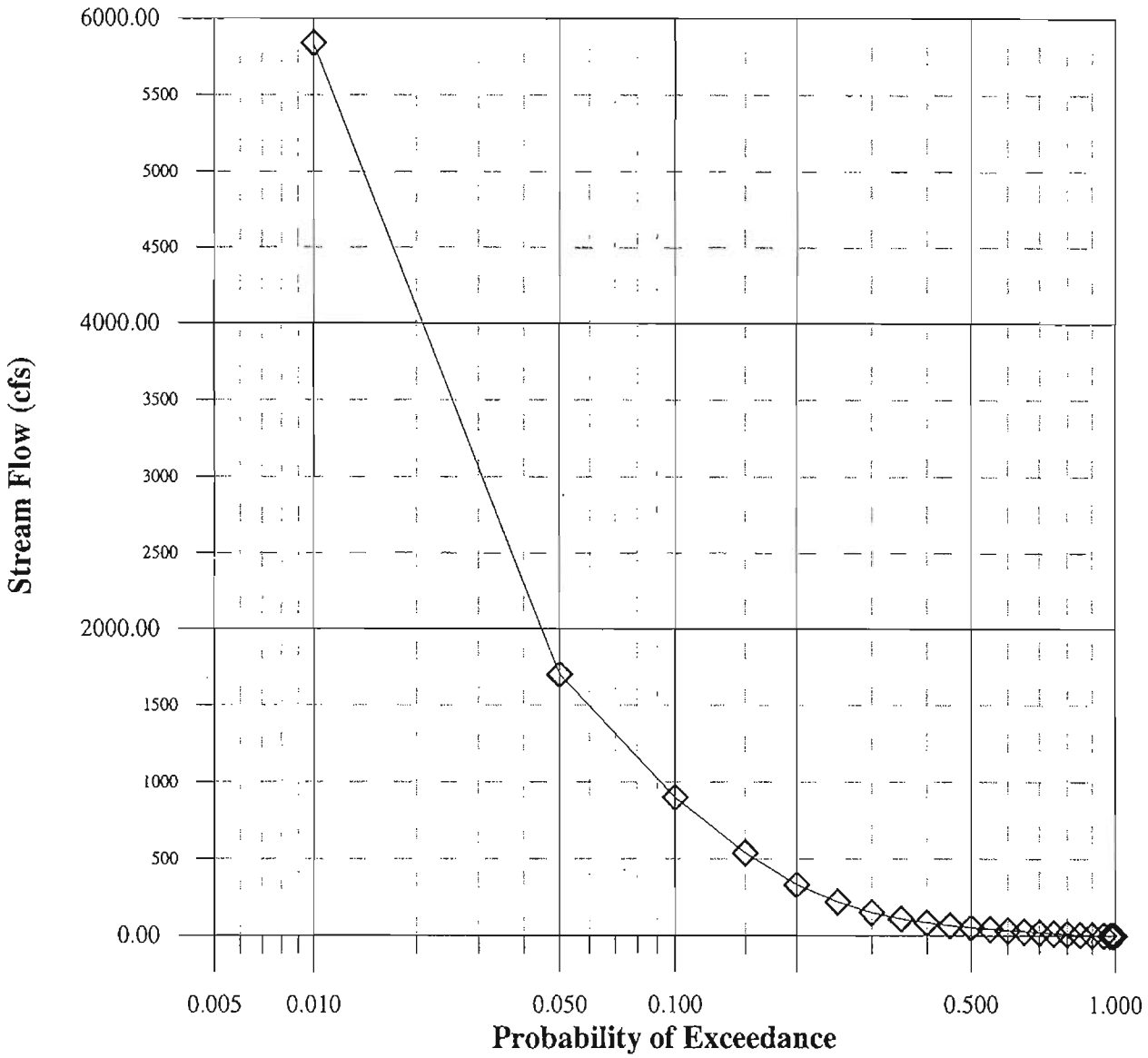
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Little River near Sasakwa, OK |
| Station number | 07231000 |
| latitude (degrees, minutes, and seconds) | 345902 |
| longitude (degrees, minutes, and seconds) | 0963301 |
| hydrologic unit code | 11090203 |
| drainage area (square miles) | 865 |
| contributing drainage area (square miles) | 865 |
| gauge datum (feet above NGVD) | 744.34 |
| period of record | October 1942 - September 1993 |

| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 5840.000 |
| 5 percent = | 1700.000 |
| 10 percent = | 900.000 |
| 15 percent = | 538.000 |
| 20 percent = | 331.000 |
| 25 percent = | 218.000 |
| 30 percent = | 148.000 |
| 35 percent = | 107.000 |
| 40 percent = | 82.000 |
| 45 percent = | 63.000 |
| 50 percent = | 50.000 |
| 55 percent = | 40.000 |
| 60 percent = | 32.000 |
| 65 percent = | 25.000 |
| 70 percent = | 19.000 |
| 75 percent = | 13.000 |
| 80 percent = | 8.600 |
| 85 percent = | 4.500 |
| 90 percent = | 1.800 |
| 95 percent = | 0.240 |
| 98 percent = | 0.000 |
| 99 percent = | 0.000 |
| 99.5 percent = | 0.000 |
| 99.9 percent = | 0.000 |

| | |
|---|---|
| Minimum flow: | 0.000 |
| Maximum flow: | 32,500.000 |
| Mean annual flow: | 382.018 |

# STREAM SYSTEM 2-8, LITTLE RIVER



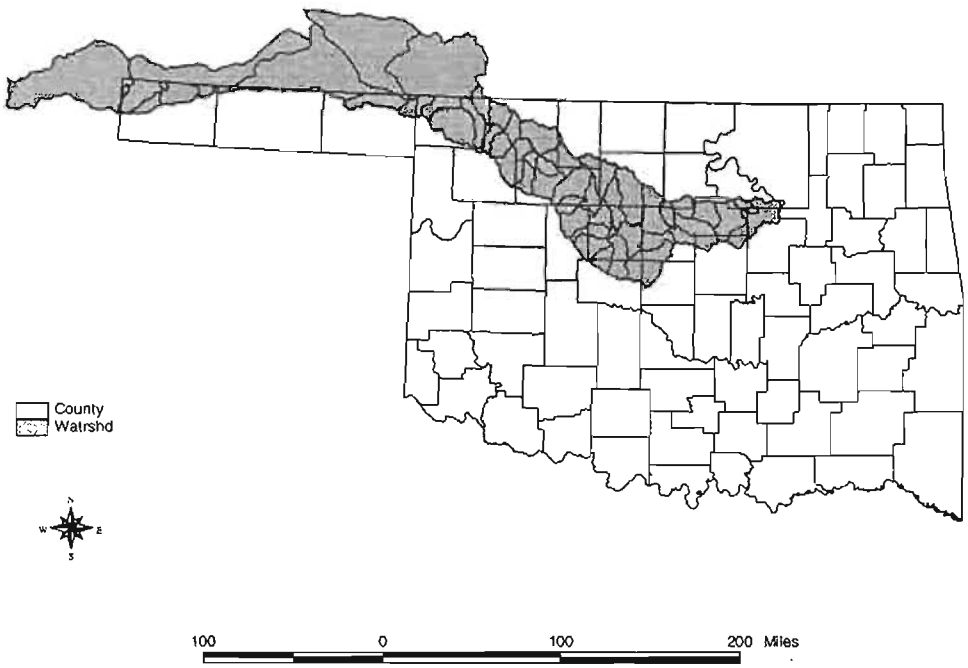
## STREAM SYSTEM 2-9: CIMARRON RIVER

### General Information

Stream system area - 8,350 $mi^2$

Total drainage area - 19,039 $mi^2$ (8,350 $mi^2$ in OK; 10,689 $mi^2$ in NM, CO, and KS)

Major reservoirs and lakes - Lake Hefner (import), Langston Lake, Lake Carl Blackwell, Lake McMurtry, Keystone Lake




Index map showing Stream System 2-9: Cimarron River.

### Estimated Available Water

Total Estimated Available Water:

| | |
|---|---|
| Stream Subsystem 2-9-4 | 27,298 acre-feet/year |
| Stream Subsystem 2-9-3 | 195,508 acre-feet/year |
| Stream Subsystem 2-9-2 | 566,065 acre-feet/year |
| Stream Subsystem 2-9-1 | 1,053,665 acre-feet/year |
| Stream System 2-9 | 1,842,536 acre-feet/year |

Adjusted Total Estimated Available Water:

| | |
|---|---|
| Stream Subsystem 2-9-4 | 27,298 acre-feet/year |
| Stream Subsystem 2-9-3 | 195,508 acre-feet/year |
| Stream Subsystem 2-9-2 | 557,456 acre-feet/year |
| Stream Subsystem 2-9-1 | 1,025,016 acre-feet/year |
| Stream System 2-9 | 1,805,278 acre-feet/year |

Total Estimated Dependable Yields Within Stream System - 16,632 acre-feet/year

Lake Hefner (import) water supply dependable yield - 0 acre-feet/year

Langston Lake water supply dependable yield - Unknown

Lake Carl Blackwell water supply dependable yield - 7,000 acre-feet/year

Lake McMurtry water supply dependable yield - 3,002 acre-feet/year

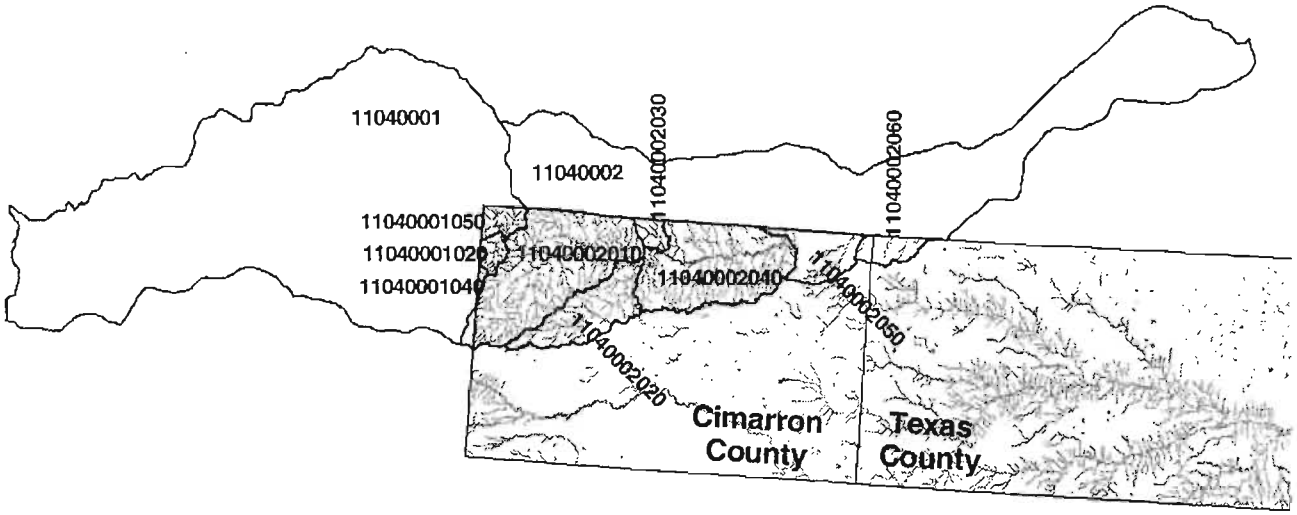
Keystone Lake water supply dependable yield - 6,630 acre-feet/year within Stream System 2-9 (total dependable yield is 22,400 acre-feet/year)

Total water supply storage - 161,712 acre-feet

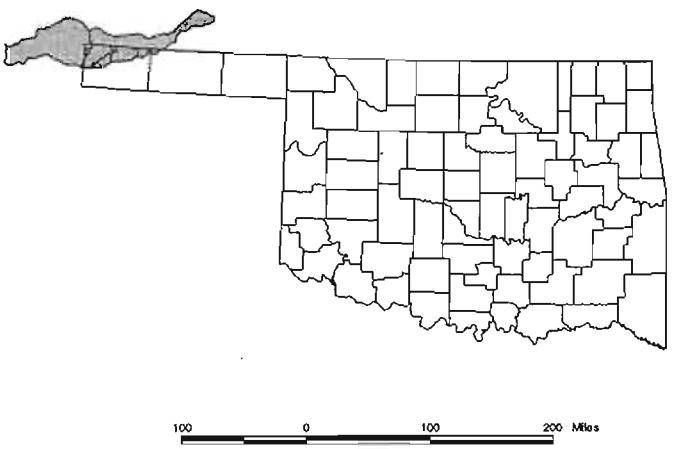
Total water supply dependble yields - 16,632 acre-feet/year

SCS sediment pool storage - 20,626 acre-feet/year

# STREAM SYSTEM 2-9-4: CIMARRON RIVER
## From Texas County, OK. - Kansas State Line to New Mexico State Line







## STREAM SUBSYSTEM 2-9-4: CIMARRON RIVER
## From Texas County, OK - Kansas State Line to New Mexico State Line

### Cimarron River Headwaters

### General Information

Stream subsystem area - 697 $mi^2$ — Hydrologic Unit Code - 1104 0001 and 1104 0002

| Watersheds - | | |
|---|---|---|
| | 1104 0001 020 | 15 $mi^2$ |
| | 1104 0001 040 | 4 $mi^2$ |
| | 1104 0001 050 | 22 $mi^2$ |
| | 1104 0002 010 | 248 $mi^2$ |
| | 1104 0002 020 | 97 $mi^2$ |
| | 1104 0002 030 | 16 $mi^2$ |
| | 1104 0002 040 | 206 $mi^2$ |
| | 1104 0002 050 | 60 $mi^2$ |
| | 1104 0002 060 | 29 $mi^2$ |

Total drainage area - 2,050 $mi^2$ (697 $mi^2$ in OK; 1,353 $mi^2$ in NM, CO, and KS)

Major tributaries - South Carrizo Creek, Cold Springs Creek

Major reservoirs or lakes - None

Mean annual runoff based on adjusted gauge flow - 0.2 inches
Mean annual net lake evaporation for stream subsystem - 46.0 inches
Estimated reservoir refill factor ($\alpha$) for stream subsystem - 0.5

### Estimated Available Water

USGS gauge 07154500 Cimarron River near Kenton, OK.

Gauge Location: SW Sec.4-T5N-R1ECM, Cimarron County - 1,106 $mi^2$ drainage area of which 68 $mi^2$ is probably noncontributing
Water Years 1951 - 1995:

Mean annual gauge flow - 17.6 cfs; 12,745 acre-feet
Mean annual gauge flow adjusted for upstream water use - 13,272 acre-feet
Mean annual runoff for 1,097 $mi^2$ below gauge - 14,026 acre-feet

Mean annual flow adjusted for total drainage area of stream subsystem 2-9-4 - 27,298 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07154500 (WY 1951-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 125 | April | 354 | July | 2,097 | October | 677 |
| February | 99 | May | 2,067 | August | 3,284 | November | 119 |
| March | 91 | June | 2,059 | September | 1,673 | December | 132 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem

SCS storage within stream subsystem - 0 acre-feet

**Total Estimated Available Water - 27,298 acre-feet/year**
**Total Storage/Dependable Yields - 0 acre-feet**
**Adjusted Total Estimated Available Water - 27,298 acre-feet/year**

| Watershed Code | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1104 0001 020 | 15 $mi^2$ | 587 acre-feet/year |
| 1104 0001 040 | 4 $mi^2$ | 157 acre-feet/year |
| 1104 0001 050 | 22 $mi^2$ | 862 acre-feet/year |
| 1104 0002 010 | 248 $mi^2$ | 9,713 acre-feet/year |
| 1104 0002 020 | 97 $mi^2$ | 3,799 acre-feet/year |
| 1104 0002 030 | 16 $mi^2$ | 627 acre-feet/year |
| 1104 0002 040 | 206 $mi^2$ | 8,068 acre-feet/year |
| 1104 0002 050 | 60 $mi^2$ | 2,350 acre-feet/year |
| 1104 0002 060 | 29 $mi^2$ | 1,136 acre-feet/year |

**STREAM SUBSYSTEM 2-9-4:** Cimarron River from Colorado State Line to New Mexico State Line - Cimarron River Headwaters.

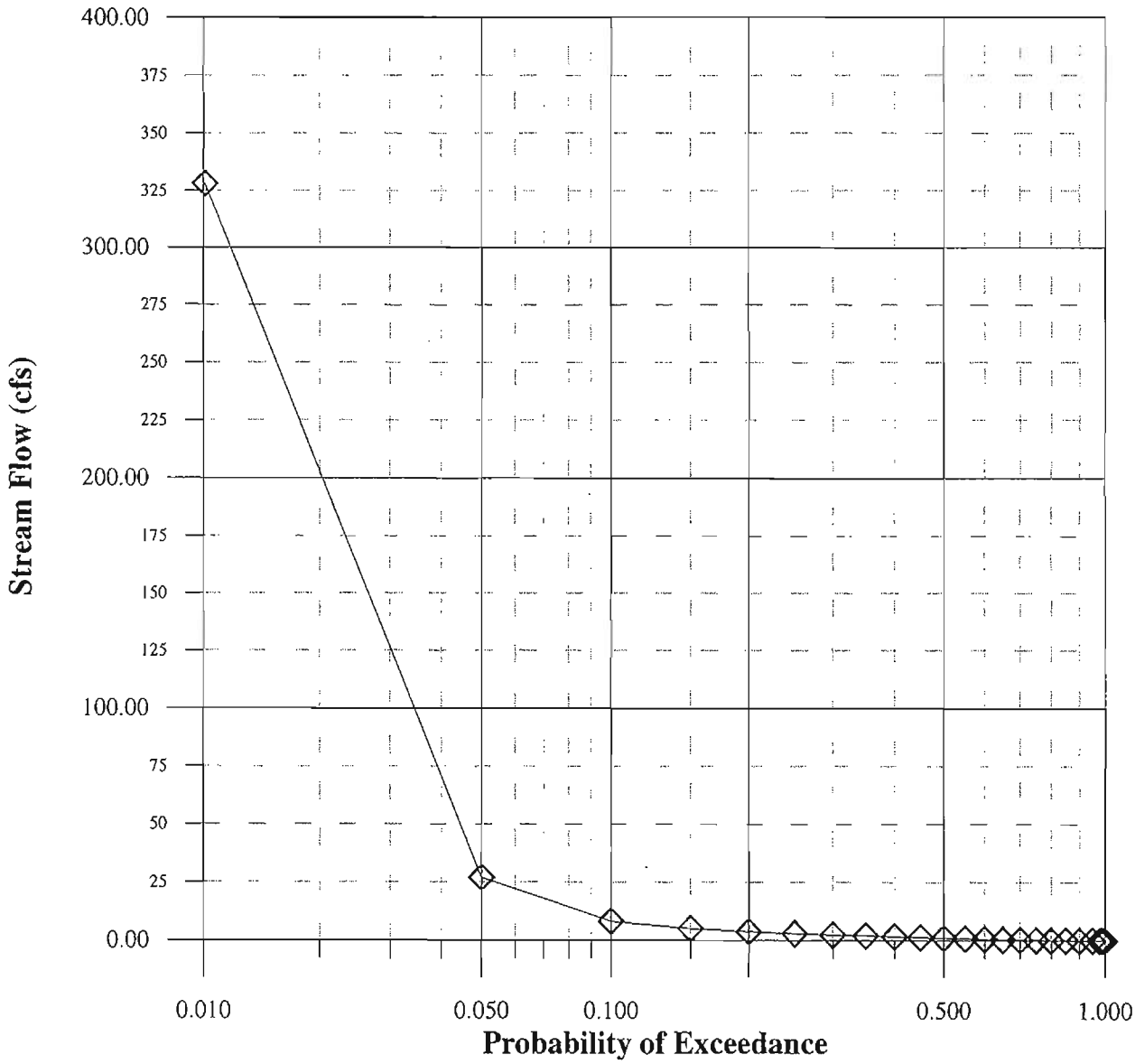
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Cimarron River near Kenton, OK |
| Station number | 07154500 |
| latitude (degrees, minutes, and seconds) | 365536 |
| longitude (degrees, minutes, and seconds) | 1025731 |
| hydrologic unit code | 11040001 |
| drainage area (square miles) | 1106 |
| contributing drainage area (square miles) | 10381 |
| gauge datum (feet above NGVD) | 4262.08 |
| period of record | October 1950 - September 1993 |

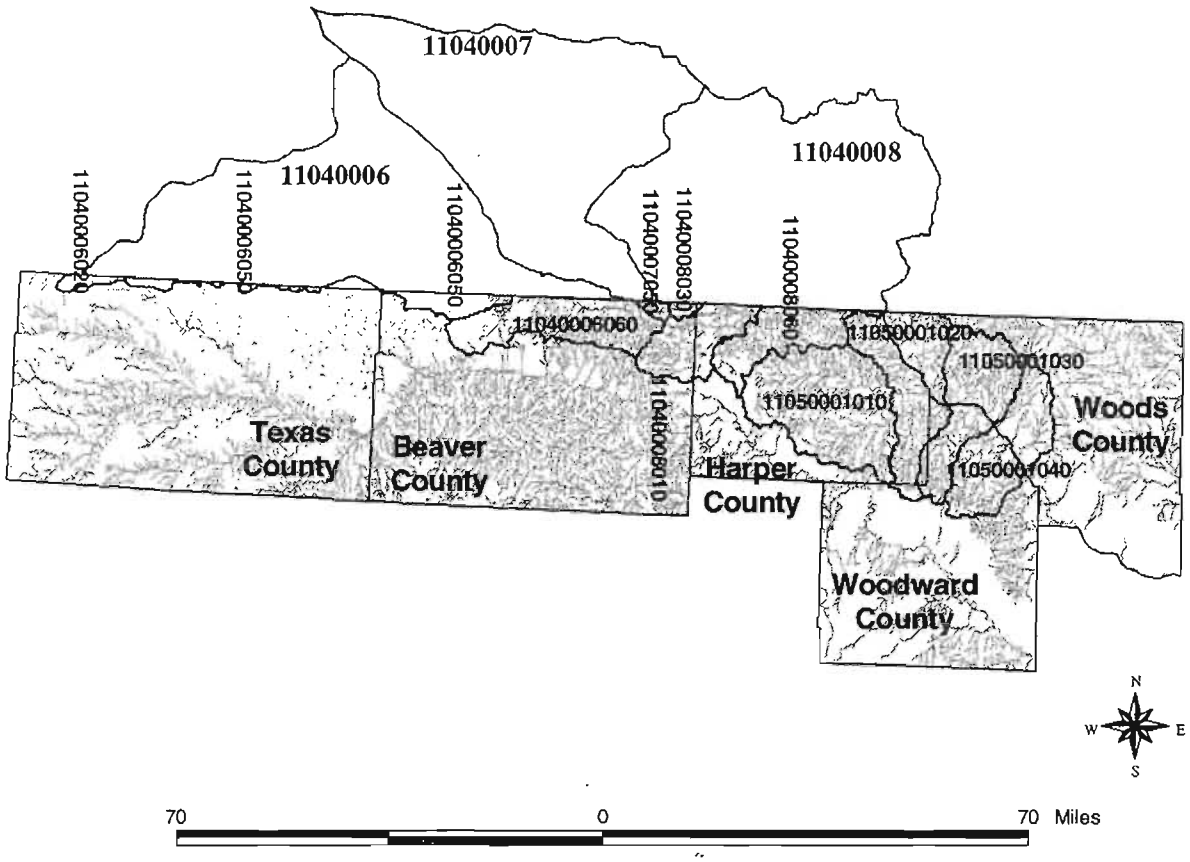
| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 328.000 |
| 5 percent = | 27.000 |
| 10 percent = | 8.200 |
| 15 percent = | 5.000 |
| 20 percent = | 3.700 |
| 25 percent = | 2.900 |
| 30 percent = | 2.300 |
| 35 percent = | 2.000 |
| 40 percent = | 1.600 |
| 45 percent = | 1.300 |
| 50 percent = | 1.000 |
| 55 percent = | 0.800 |
| 60 percent = | 0.530 |
| 65 percent = | 0.300 |
| 70 percent = | 0.170 |
| 75 percent = | 0.090 |
| 80 percent = | 0.010 |
| 85 percent = | 0.000 |
| 90 percent = | 0.000 |
| 95 percent = | 0.000 |
| 98 percent = | 0.000 |
| 99 percent = | 0.000 |
| 99.5 percent = | 0.000 |
| 99.9 percent = | 0.000 |

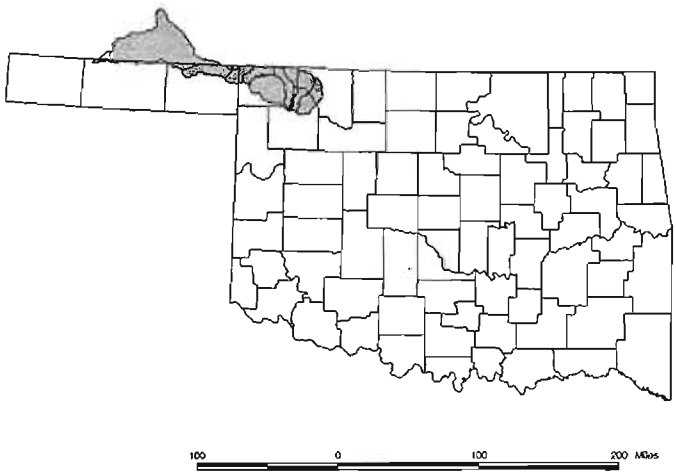
| | |
|---|---|
| Minimum flow: | 0.000 |
| Maximum flow: | 11,000.000 |
| Mean annual flow: | 18.271 |

# STREAM SUBSYSTEM 2-9-4, CIMARRON RIVER
## From Colorado State Line to New Mexico State Line



# STREAM SYSTEM 2-9-3: CIMARRON RIVER
## From Near Waynoka to Texas County, OK - Kansas State Line



## STREAM SUBSYSTEM 2-9-3: CIMARRON RIVER
## From Near Waynoka to Texas County, OK - Kansas State Line

### Upper Cimarron River

### General Information

Stream subsystem area - 1,795 $mi^2$

Hydrologic Unit Code - 1104 0006; 1104 0007; 1104 0008; and 1105 0001

| | | |
|---|---|---|
| Watersheds - | 1104 0006 020 | 17 $mi^2$ |
| | 1104 0006 050 | 78 $mi^2$ |
| | 1104 0006 060 | 227 $mi^2$ |
| | 1104 0007 050 | 11 $mi^2$ |
| | 1104 0008 010 | 146 $mi^2$ |
| | 1104 0008 030 | 11 $mi^2$ |
| | 1104 0008 060 | 156 $mi^2$ |
| | 1105 0001 010 | 392 $mi^2$ |
| | 1105 0001 020 | 283 $mi^2$ |
| | 1105 0001 030 | 237 $mi^2$ |
| | 1105 0001 040 | 237 $mi^2$ |

Total drainage area - 13,181 $mi^2$ (2,492 $mi^2$ in OK; 10,689 $mi^2$ in NM, CO, and KS)

Major tributaries - Redoubt Creek, Snake Creek, Keno Creek, Sand Creek (Harper Co.), Sleeping Bear Creek, Buffalo Creek, Sand Creek (Woods Co.), Traders Creek, Anderson Creek, Redhorse Creek, Long Creek, Whitehorse Creek, Chimney Creek, Sand Creek (Woodward Co.), Main Creek

Major reservoirs or lakes - None

Mean annual runoff based on adjusted gauge flow - 0.5 inches
Mean annual net lake evaporation for stream subsystem - 38.5 inches
Estimated reservoir refill factor ($\alpha$) for stream subsystem - 0.5

### Estimated Available Water

USGS gauge 07158000 Cimarron River near Waynoka, OK.

Gauge Location: NW NE Sec.35-T24N-R16WIM, Woods County - 13,334 $mi^2$ drainage area of which 4,830 $mi^2$ is probably noncontributing
Water Years 1938 - 1995:

Mean annual gauge flow - 298 cfs; 215,800 acre-feet
Mean annual gauge flow adjusted for upstream water use - 222,806 acre-feet (includes flow from stream subsystem 2-9-4)

Mean annual flow adjusted for total drainage area of stream subsystem 2-9-3 - 195,508 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07158000 (WY 1938-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 7,565 | April | 21,011 | July | 21,157 | October | 13,408 |
| February | 9,777 | May | 49,757 | August | 13,592 | November | 6,904 |
| March | 14,453 | June | 36,367 | September | 15,059 | December | 6,765 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem
SCS storage within stream subsystem - 0 acre-feet

**Total Estimated Available Water - 195,508 acre-feet/year**
**Total Storage/Dependable Yields - 0 acre-feet/year**
**Adjusted Total Estimated Available Water - 195, 508 acre-feet/year**

| Watershed Code | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1104 0006 020 | 17 $mi^2$ | 1,852 acre-feet/year |
| 1104 0006 050 | 78 $mi^2$ | 8,496 acre-feet/year |
| 1104 0006 060 | 227 $mi^2$ | 24,724 acre-feet/year |
| 1104 0007 050 | 11 $mi^2$ | 1,198 acre-feet/year |
| 1104 0008 010 | 146 $mi^2$ | 15,902 acre-feet/year |
| 1104 0008 030 | 11 $mi^2$ | 1,198 acre-feet/year |
| 1104 0008 060 | 156 $mi^2$ | 16,991 acre-feet/year |
| 1105 0001 010 | 392 $mi^2$ | 42,696 acre-feet/year |
| 1105 0001 020 | 283 $mi^2$ | 30,824 acre-feet/year |
| 1105 0001 030 | 237 $mi^2$ | 25,814 acre-feet/year |
| 1105 0001 040 | 237 $mi^2$ | 25,814 acre-feet/year |

**STREAM SUBSYSTEM 2-9-3:** Cimarron River from near Waynoka to Kansas State Line - Upper Cimarron River

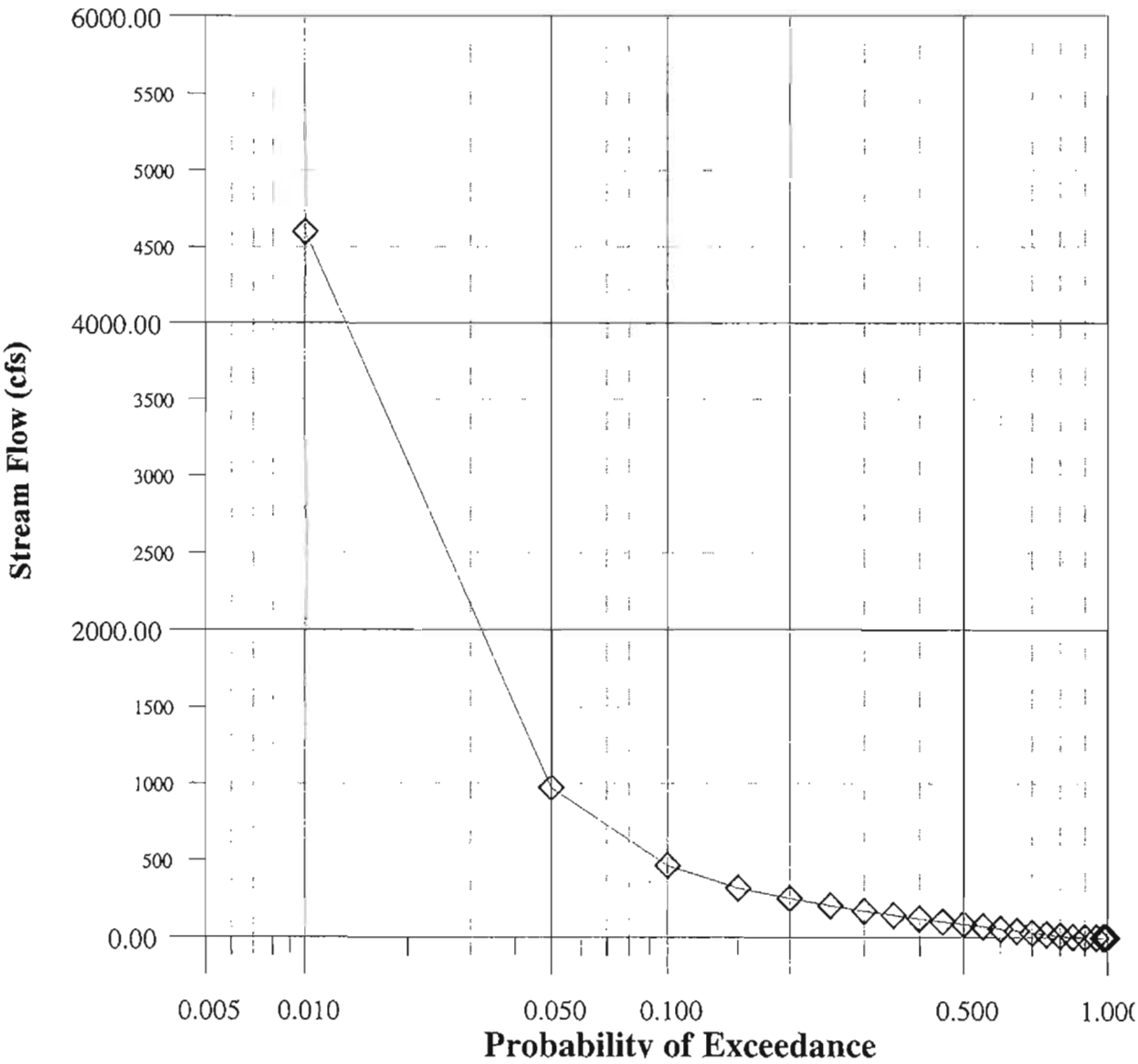
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Cimarron River near Waynoka, OK |
| Station number | 07158000 |
| latitude (degrees, minutes, and seconds) | 363102 |
| longitude (degrees, minutes, and seconds) | 0985245 |
| hydrologic unit code | 11050001 |
| drainage area (square miles) | 13334 |
| contributing drainage area (square miles) | 8504 |
| gauge datum (feet above NGVD) | 1367.35 |
| period of record | October 1937 - September 1993 |

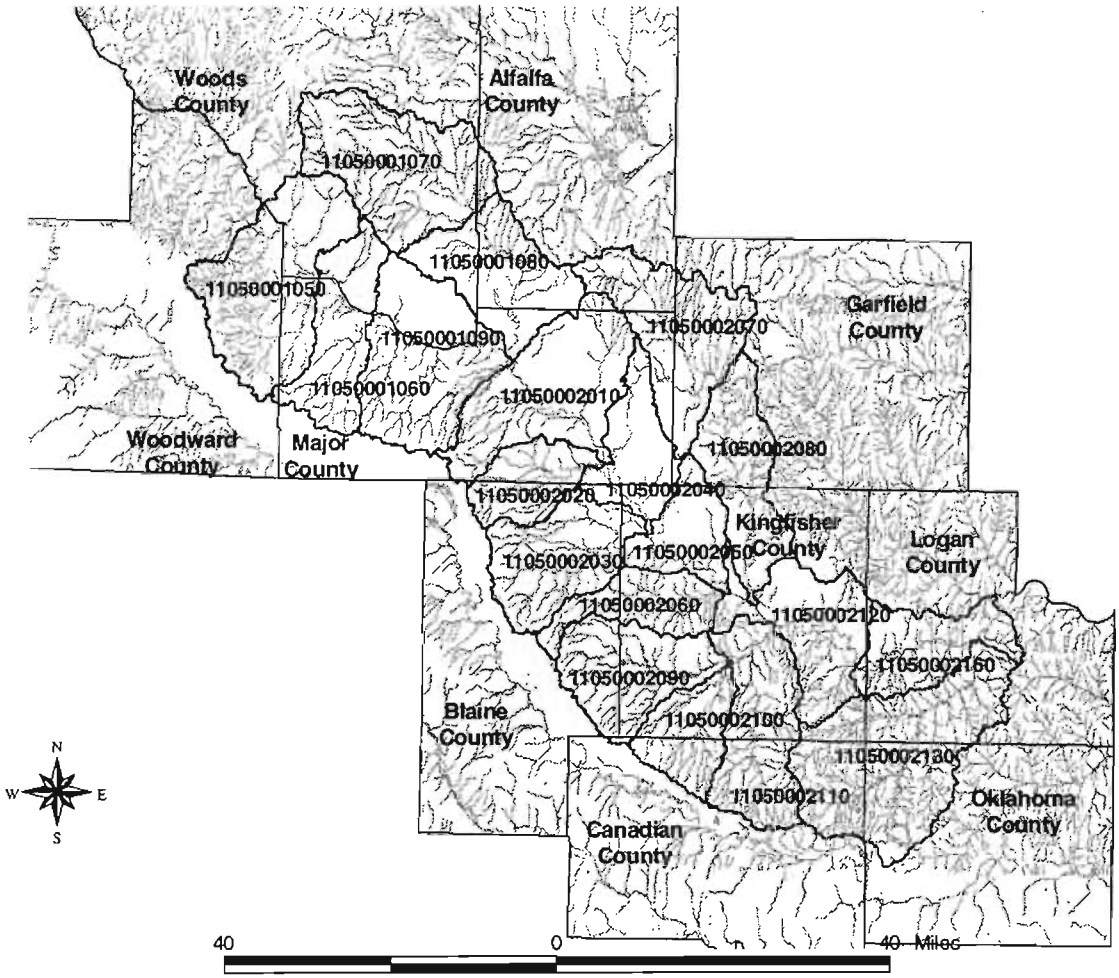
| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 4600.000 |
| 5 percent = | 971.000 |
| 10 percent = | 464.000 |
| 15 percent = | 317.000 |
| 20 percent = | 250.000 |
| 25 percent = | 203.000 |
| 30 percent = | 168.000 |
| 35 percent = | 142.000 |
| 40 percent = | 120.000 |
| 45 percent = | 100.000 |
| 50 percent = | 85.000 |
| 55 percent = | 70.000 |
| 60 percent = | 55.000 |
| 65 percent = | 42.000 |
| 70 percent = | 30.000 |
| 75 percent = | 20.000 |
| 80 percent = | 10.000 |
| 85 percent = | 3.000 |
| 90 percent = | 0.300 |
| 95 percent = | 0.000 |
| 98 percent = | 0.000 |
| 99 percent = | 0.000 |
| 99.5 percent = | 0.000 |
| 99.9 percent = | 0.000 |

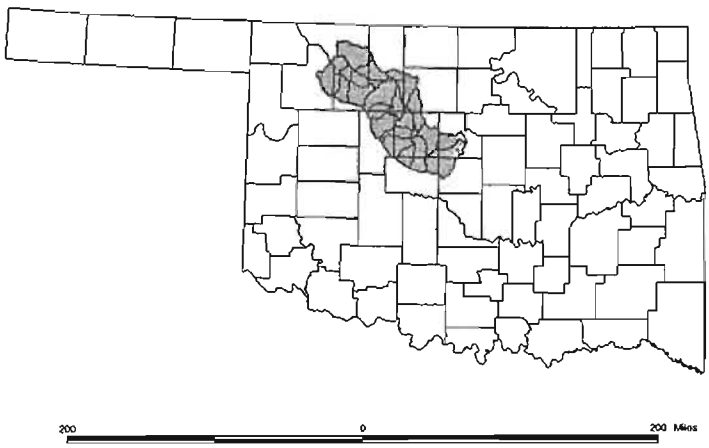
| | |
|---|---|
| Minimum flow: | 0.000 |
| Maximum flow: | 51,600.000 |
| Mean annual flow: | 304.739 |

# STREAM SUBSYSTEM 2-9-3, CIMARRON RIVER
## From Near Waynoka, OK to Kansas State Line



# STREAM SYSTEM 2-9-2: CIMARRON RIVER
## From Near Guthrie to Near Waynoka



## STREAM SUBSYSTEM 2-9-2: CIMARRON RIVER
## From Near Guthrie to Near Waynoka

### Middle Cimarron River

### General Information

Stream subsystem area - 3,837 $mi^2$ — Hydrologic Unit Code - 1105 0001 and 1105 0002

| Watersheds - | | |
|---|---|---|
| | 1105 0001 050 | 304 $mi^2$ |
| | 1105 0001 060 | 169 $mi^2$ |
| | 1105 0001 070 | 290 $mi^2$ |
| | 1105 0001 080 | 199 $mi^2$ |
| | 1105 0001 090 | 279 $mi^2$ |
| | 1105 0002 010 | 272 $mi^2$ |
| | 1105 0002 020 | 110 $mi^2$ |
| | 1105 0002 030 | 196 $mi^2$ |
| | 1105 0002 040 | 130 $mi^2$ |
| | 1105 0002 050 | 111 $mi^2$ |
| | 1105 0002 060 | 117 $mi^2$ |
| | 1105 0002 070 | 238 $mi^2$ |
| | 1105 0002 080 | 182 $mi^2$ |
| | 1105 0002 090 | 189 $mi^2$ |
| | 1105 0002 100 | 115 $mi^2$ |
| | 1105 0002 110 | 212 $mi^2$ |
| | 1105 0002 120 | 197 $mi^2$ |
| | 1105 0002 130 | 382 $mi^2$ |
| | 1105 0002 160 | 145 $mi^2$ |

Total drainage area - 17,018 $mi^2$ (6,329 $mi^2$ in OK; 10,689 $mi^2$ in NM, CO, and KS)

Major tributaries - Wildcat Creek, Griever Creek, Barney Creek, Cottonwood Creek (Major Co.), Little Eagle Chief Creek, Sand Creek (Woods Co.), Eagle Chief Creek, Sand Creek (Major Co.), Elm Creek, Deep Creek, Spring Creek, Salt Creek, Cooper Creek, Sand Creek (Garfield Co.), Buffalo Creek, Turkey Creek, Otter Creek, Dead Indian Creek, Uncle Johns Creek, Kingfisher Creek, Campbell Creek, Deer Creek, Cottonwood Creek (Canadian, Kingfisher, and Logan Cos.)

Major reservoirs or lakes - Lake Hefner (import)

Mean annual runoff based on adjusted gauge flow - 1.2 inches
Mean annual net lake evaporation for stream subsystem - 29.5 inches

Estimated reservoir refill factor ($\alpha$) for stream subsystem - 0.9

**Estimated Available Water**

USGS gauge 07160000 Cimarron River near Guthrie, OK.

Gauge Location: near center of east line of Sec.29-T17N-R2WIM, Logan County - 16,892 $mi^2$ drainage area of which 4,926 $mi^2$ is probably noncontributing
Water Years 1938 - 1995:

Mean annual gauge flow - 1,071 cfs; 775,575 acre-feet
Mean annual gauge flow adjusted for upstream water use - 788,871 acre-feet (includes flow from stream subsystems 2-9-4 and 2-9-3)

Mean annual flow adjusted for total drainage area of stream subsystem 2-9-2 - 566,065 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 0716000 (WY 1938-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 26,262 | April | 83,328 | July | 53,078 | October | 66,916 |
| February | 32,942 | May | 160,771 | August | 38,563 | November | 42,557 |
| March | 64,026 | June | 132,253 | September | 51,782 | December | 27,185 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem
Total storage within stream subsystem - 75,000 acre-feet
Total dependable yield within stream subsystem - 0 acre-feet/year
SCS storage within stream subsystem - 8,609 acre-feet

**Total Estimated Available Water - 566,065 acre-feet/year**
**Total Storage/Dependable Yields - 8,609 acre-feet/year**
**Adjusted Total Estimated Available Water - 557,456 acre-feet/year**

| Watershed Code | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1105 0001 050 | 304 $mi^2$ | 44,849 acre-feet/year |
| 1105 0001 060 | 169 $mi^2$ | 24,932 acre-feet/year |
| 1105 0001 070 | 290 $mi^2$ | 42,783 acre-feet/year |
| 1105 0001 080 | 199 $mi^2$ | 29,358 acre-feet/year |
| 1105 0001 090 | 279 $mi^2$ | 41,160 acre-feet/year |
| 1105 0002 010 | 272 $mi^2$ | 40,128 acre-feet/year |
| 1105 0002 020 | 110 $mi^2$ | 16,228 acre-feet/year |
| 1105 0002 030 | 196 $mi^2$ | 28,915 acre-feet/year |
| 1105 0002 040 | 130 $mi^2$ | 19,179 acre-feet/year |
| 1105 0002 050 | 111 $mi^2$ | 16,376 acre-feet/year |
| 1105 0002 060 | 117 $mi^2$ | 17,261 acre-feet/year |
| 1105 0002 070 | 238 $mi^2$ | 35,112 acre-feet/year |

| Watershed Code | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1105 0002 080 | 182 $mi^2$ | 26,850 acre-feet/year |
| 1105 0002 090 | 189 $mi^2$ | 27,883 acre-feet/year |
| 1105 0002 100 | 115 $mi^2$ | 16,966 acre-feet/year |
| 1105 0002 110 | 212 $mi^2$ | 28,245 acre-feet/year |
| 1105 0002 120 | 197 $mi^2$ | 29,063 acre-feet/year |
| 1105 0002 130 | 382 $mi^2$ | 53,518 acre-feet/year |
| 1105 0002 160 | 145 $mi^2$ | 18,652 acre-feet/year |

## LAKE HEFNER
## (Import)

**Middle Cimarron River - Stream Subsystem 2-9-2**

Hydrologic Unit Code - 1105 0002

Located on Bluff Creek
Oklahoma County

Drainage area - undetermined
Surface area, conservation pool - 2,500 acres

Water supply storage - 75,000 acre-feet
Water supply dependable yield - 0 acre-feet/year; Oklahoma City's import storage reservoir for water from Canton Lake (Stream Subsystem 2-5-3)

**OWRB Reservoir ID #27**

**STREAM SUBSYSTEM 2-9-2:** Cimarron River from near Guthrie to near Waynoka - Middle Cimarron River

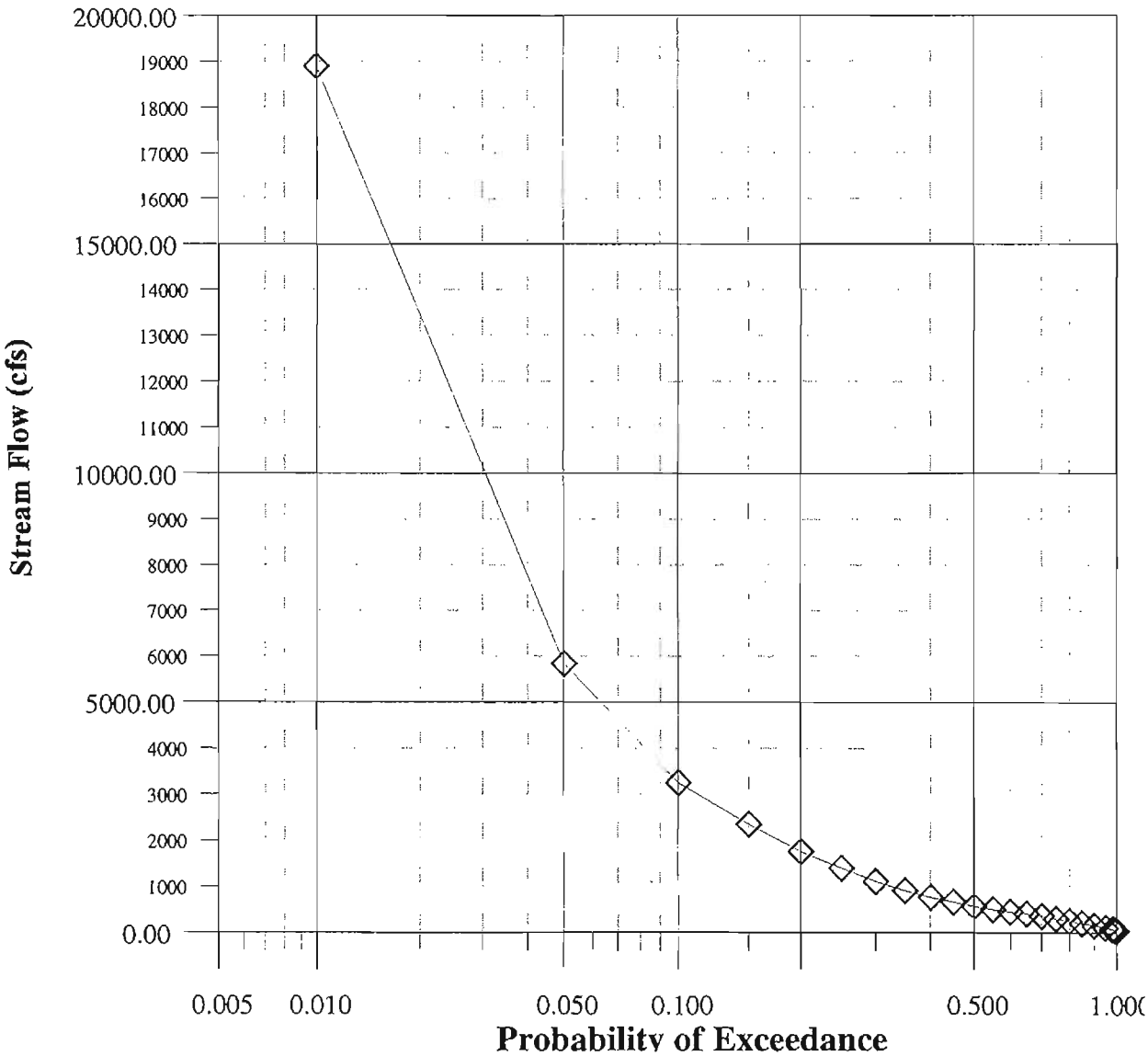
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Cimarron River near Guthrie, OK |
| Station number | 07160000 |
| latitude (degrees, minutes, and seconds) | 355514 |
| longitude (degrees, minutes, and seconds) | 0972532 |
| hydrologic unit code | 11050002 |
| drainage area (square miles) | 16892 |
| contributing drainage area (square miles) | 11966 |
| gauge datum (feet above NGVD) | 896.50 |
| period of record | February 1983 - September 1993 |

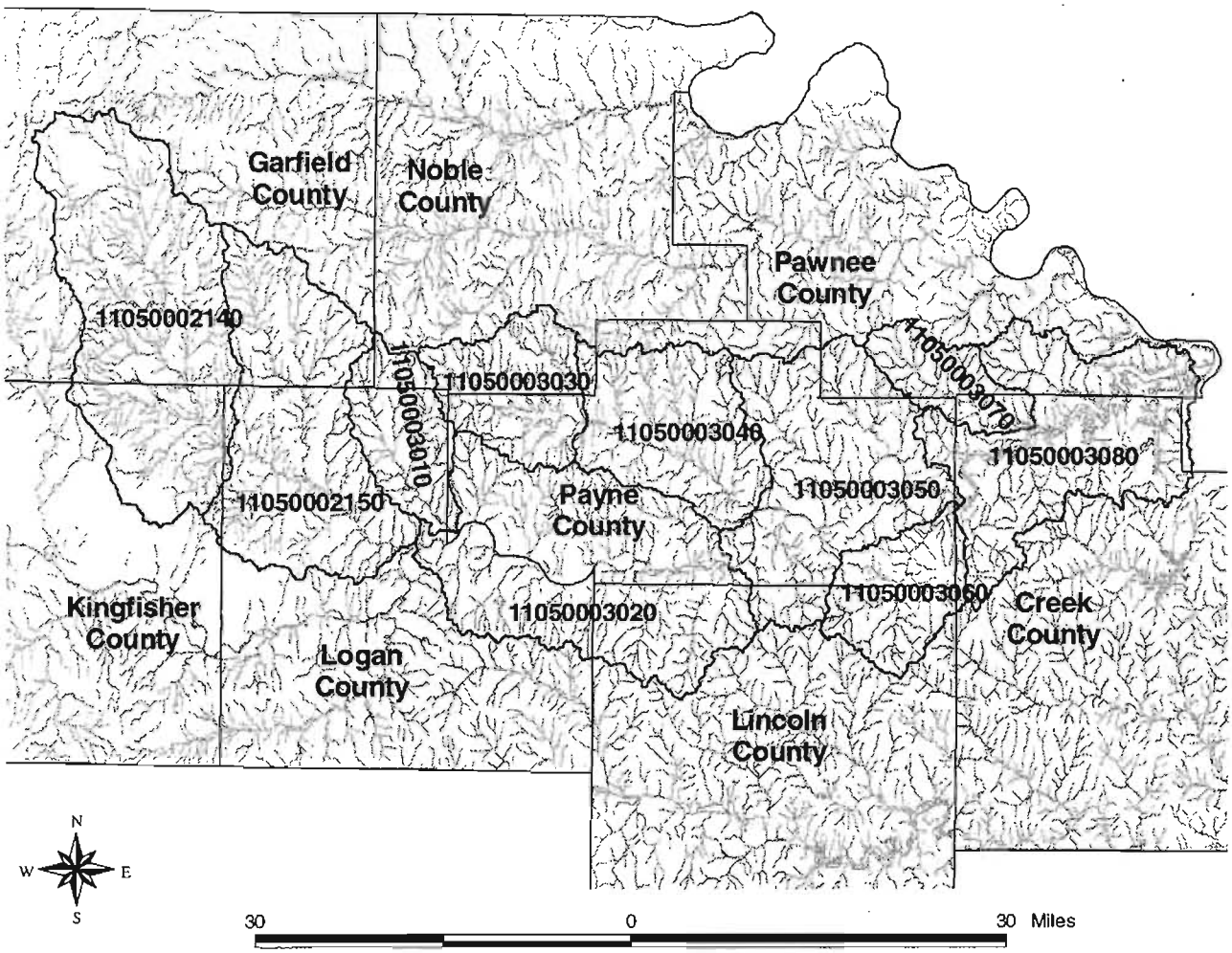
| Percent Exceedance | Calculated Flows (cfs) |
|---|---|
| 1 percent = | 18900.000 |
| 5 percent = | 5830.000 |
| 10 percent = | 3250.000 |
| 15 percent = | 2350.000 |
| 20 percent = | 1760.000 |
| 25 percent = | 1400.000 |
| 30 percent = | 1110.000 |
| 35 percent = | 912.000 |
| 40 percent = | 769.000 |
| 45 percent = | 669.000 |
| 50 percent = | 576.000 |
| 55 percent = | 503.000 |
| 60 percent = | 449.000 |
| 65 percent = | 409.000 |
| 70 percent = | 360.000 |
| 75 percent = | 300.000 |
| 80 percent = | 249.000 |
| 85 percent = | 202.000 |
| 90 percent = | 156.000 |
| 95 percent = | 105.000 |
| 98 percent = | 76.000 |
| 99 percent = | 59.000 |
| 99.5 percent = | 48.000 |
| 99.9 percent = | 37.000 |

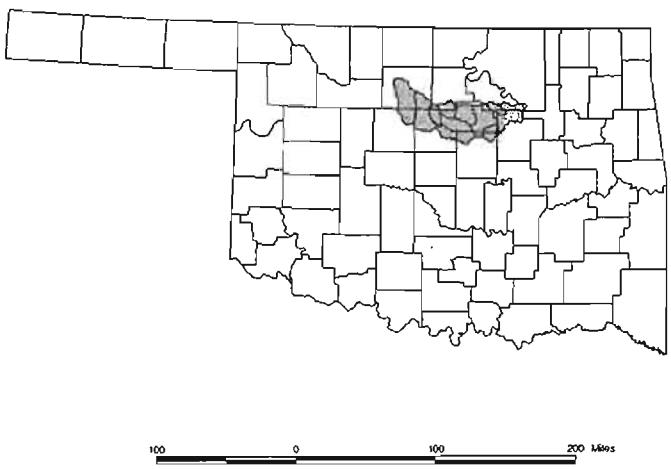
| | |
|---|---|
| Minimum flow: | 34.000 |
| Maximum flow: | 92,000.000 |
| Mean annual flow: | 1,647.294 |

# STREAM SUBSYSTEM 2-9-2, CIMARRON RIVER
## From Near Guthrie to Near Waynoka, OK



## STREAM SYSTEM 2-9-1: CIMARRON RIVER
### From Confluence With Arkansas River to Near Gutherie



## STREAM SUBSYSTEM 2-9-1: CIMARRON RIVER
## From Confluence With Arkansas River to Near Guthrie

### Lower Cimarron River

### General Information

Stream subsystem area - 2,021 $mi^2$ — Hydrologic Unit Code - 1105 0002 and 1105 0003

| Watersheds - | | |
|---|---|---|
| | 1105 0002 140 | 356 $mi^2$ |
| | 1105 0002 150 | 279 $mi^2$ |
| | 1105 0003 010 | 90 $mi^2$ |
| | 1105 0003 020 | 341 $mi^2$ |
| | 1105 0003 030 | 114 $mi^2$ |
| | 1105 0003 040 | 162 $mi^2$ |
| | 1105 0003 050 | 259 $mi^2$ |
| | 1105 0003 060 | 100 $mi^2$ |
| | 1105 0003 070 | 65 $mi^2$ |
| | 1105 0003 080 | 255 $mi^2$ |

Total drainage area - 19,039 $mi^2$ (8,350 $mi^2$ in OK; 10,689 $mi^2$ in NM, CO, and KS)

Major tributaries - Hackberry Creek, Crooked Creek, Otter Creek, Skeleton Creek, West Beaver Creek, East Beaver Creek, Beaver Creek, Clear Creek, Wild Horse Creek, Lost Creek, Dugout Creek, Brush Creek, Little Stillwater Creek, Stillwater Creek, Council Creek, Salt Creek, Euchee Creek, Lagoon Creek

Major reservoirs or lakes - Langston Lake, Lake Carl Blackwell, Lake McMurtry, Keystone Lake

Mean annual runoff based on adjusted gauge flow - 2.5 inches
Mean annual net lake evaporation for stream subsystem - 21.5 inches
Estimated reservoir refill factor ($\alpha$) for stream subsystem - 1.4

### Estimated Available Water

<u>USGS gauge 07161450 Cimarron River near Ripley, OK.</u>

Gauge Location: SE SE of Sec.31-T18N-R4EIM, Payne County - 17,979 $mi^2$ drainage area of which 4,926 $mi^2$ is probably noncontributing
Water Years 1988 - 1995:

Mean annual gauge flow - 2,369 cfs; 1,715,535 acre-feet
Mean annual gauge flow adjusted for upstream water use - 1,731,668 acre-feet (includes flow from stream subsystems 2-9-4, 2-9-3 and 2-9-2)
Mean annual runoff for 933.3 $mi^2$ below gauge - 123,816 acre-feet
Mean annual net lake evaporation for 2-9-1 arm of Keystone Lake (14.7 $mi^2$) - 12,948 acre-feet

Mean annual flow adjusted for total drainage area of stream subssytem 2-9-1 - 1,053,665 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07161450 (WY 1988-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 81,554 | April | 215,165 | July | 84,260 | October | 35,672 |
| February | 60,718 | May | 351,741 | August | 103,142 | November | 87,078 |
| March | 197,059 | June | 303,850 | September | 96,184 | December | 99,944 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem

Total storage within stream subsystem - 86,712 acre-feet
Total dependable yield within stream subsystem - 16,632 acre-feet/year
SCS storage within stream subsystem - 12,017 acre-feet

**Total Estimated Available Water - 1,053,665 acre-feet/year**
**Total Storage/Dependable Yields - 28,649 acre-feet/ year**
**Adjusted Total Estimated Available Water - 1,025,016 acre-feet/year**

| Watershed Code | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1105 0002 140 | 356 $mi^2$ | 184,779 acre-feet/year |
| 1105 0002 150 | 279 $mi^2$ | 148,459 acre-feet/year |
| 1105 0003 010 | 90 $mi^2$ | 46,922 acre-feet/year |
| 1105 0003 020 | 341 $mi^2$ | 171,414 acre-feet/year |
| 1105 0003 030 | 114 $mi^2$ | 48,798 acre-feet/year |
| 1105 0003 040 | 162 $mi^2$ | 80,382 acre-feet/year |
| 1105 0003 050 | 259 $mi^2$ | 135,032 acre-feet/year |
| 1105 0003 060 | 100 $mi^2$ | 52,026 acre-feet/year |
| 1105 0003 070 | 65 $mi^2$ | 33,888 acre-feet/year |
| 1105 0003 080 | 255 $mi^2$ | 126,316 acre-feet/year |

## LANGSTON LAKE
### Fitzgerald-Soldier Creek Watershed Site #3-M

**Cimarron River - Stream Subsystem 2-9-1**

Hydrologic Unit Code - 1105 0003

Located on an unnamed tributary of Fitzgerald Creek
Logan County

Drainage area - undetermined
Surface area, conservation pool - 304 acres

Water supply storage - 5,792 acre-feet
Water supply dependable yield - Unknown

**OWRB Reservoir ID #83**

## LAKE CARL BLACKWELL

**Cimarron River - Stream Subsystem 2-9-1**

Hydrologic Unit Code - 1105 0003

Located on Stillwater Creek
Payne County

Drainage area - undetermined
Surface area, conservation pool - 3,370 acres

Water supply storage - 61,500 acre-feet
Water supply dependable yield - 7,000 acre-feet/year

**OWRB Reservoir ID #11**

## LAKE MCMURTRY
## Stillwater Creek Watershed Site #40

**Cimarron River - Stream Subsystem 2-9-1**

Hydrologic Unit Code - 1105 0003

Located on North Stillwater Creek
Payne County

Drainage area - undetermined
Surface area, conservation pool - 1,155 acres

Water supply storage - 13,500 acre-feet
Water supply dependable yield - 3,002 acre-feet/year

**OWRB Reservoir ID #40**

## KEYSTONE LAKE

**Cimarron River - Stream Subsystem 2-9-1**
**Arkansas River to the Kansas State Line - Stream System 2-12**

Hydrologic Unit Code - 1105 0003
1106 0006

Located on the Arkansas River
Tulsa County

Drainage area - 74,506 $mi^2$ of which 52,155 $mi^2$ is noncontributing
Surface area, flood pool - 54,678 acres
Surface area, power pool - 22,420 acres
Surface area, conservation pool - 12,430 acres

Flood control storage - 1,167,232 acre-feet
Power storage - 287,122 acre-feet
Inactive pool - 227,259 acre-feet

Water supply storage - 20,000 acre-feet
Water supply dependable yield - 22,400 acre-feet/year
Proportion of water supply yield within Stream System 2-9 - 6,630 acre-feet/year (29.6% of total yield)

**OWRB Reservoir ID #34**

**STREAM SUBSYSTEM 2-9-1** Cimarron River from mouth to near Guthrie - Lower Cimarron River

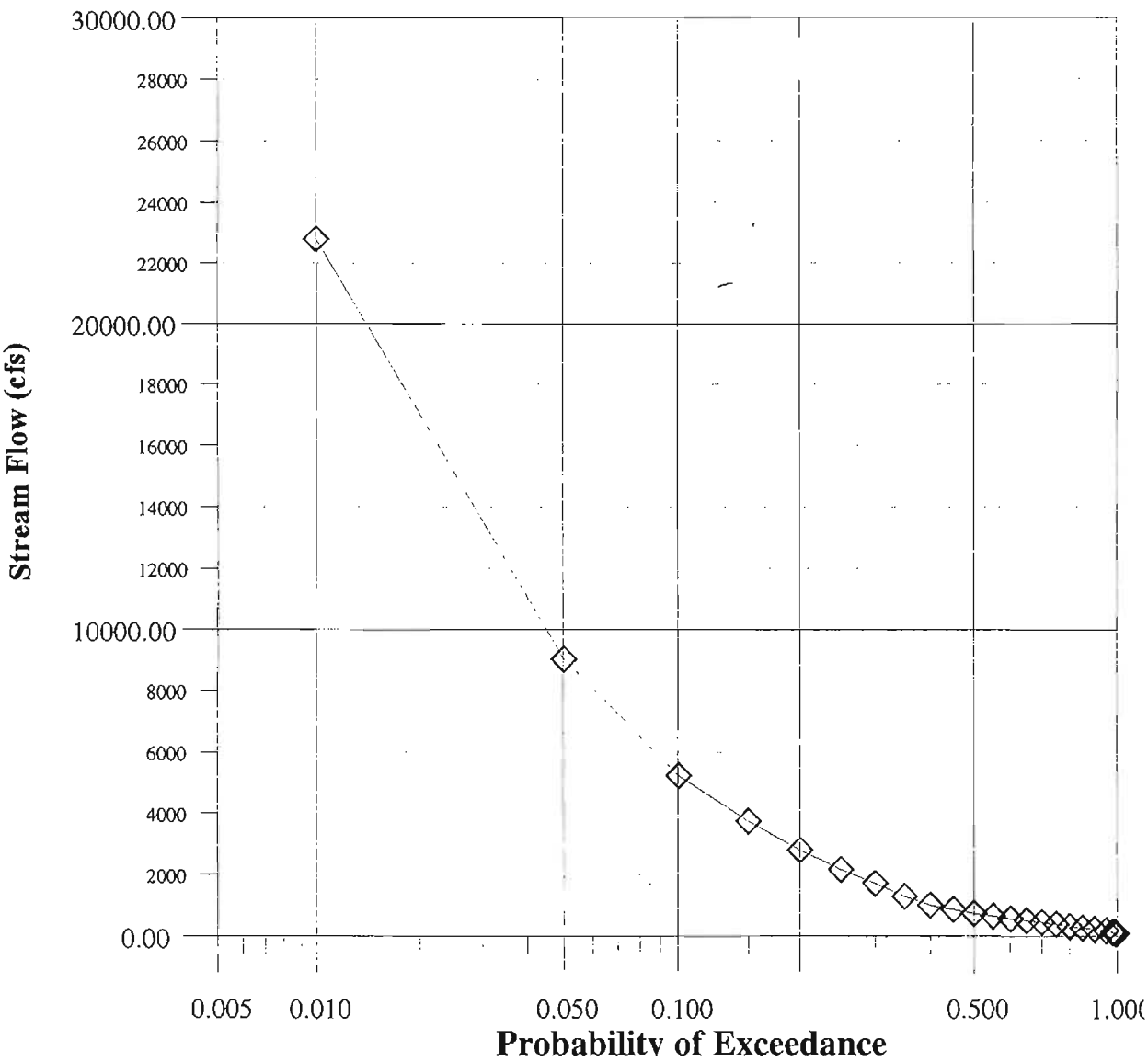
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Cimarron River near Ripley, OK |
| Station number | 07161450 |
| latitude (degrees, minutes, and seconds) | 355909 |
| longitude (degrees, minutes, and seconds) | 0965443 |
| hydrologic unit code | 11050003 |
| drainage area (square miles) | 17979 |
| contributing drainage area (square miles) | 13053 |
| gauge datum (feet above NGVD) | 1367.35 |
| period of record | October 1987 - September 1993 |

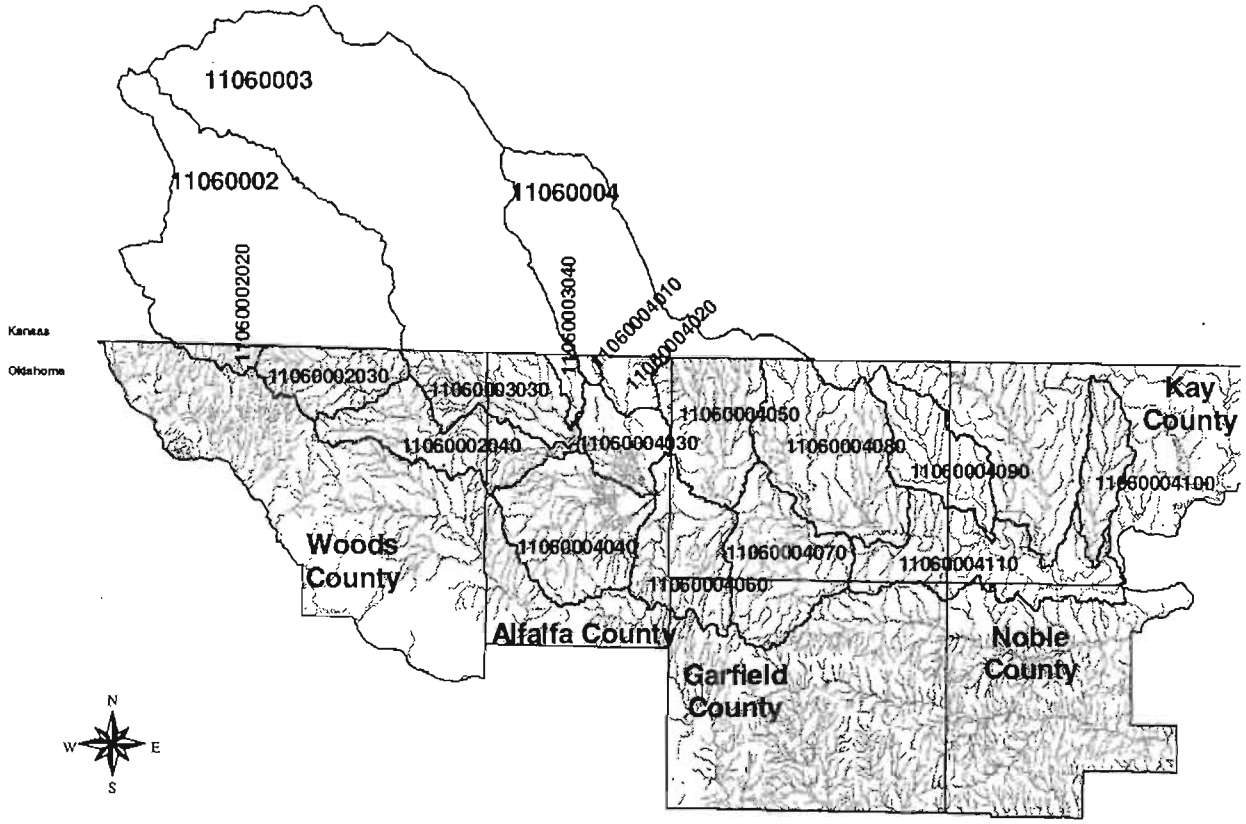
| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 22800.000 |
| 5 percent = | 9030.000 |
| 10 percent = | 5230.000 |
| 15 percent = | 3740.000 |
| 20 percent = | 2800.000 |
| 25 percent = | 2160.000 |
| 30 percent = | 1710.000 |
| 35 percent = | 1280.000 |
| 40 percent = | 999.000 |
| 45 percent = | 867.000 |
| 50 percent = | 734.000 |
| 55 percent = | 645.000 |
| 60 percent = | 552.000 |
| 65 percent = | 494.000 |
| 70 percent = | 441.000 |
| 75 percent = | 380.000 |
| 80 percent = | 310.000 |
| 85 percent = | 260.000 |
| 90 percent = | 225.000 |
| 95 percent = | 175.000 |
| 98 percent = | 129.000 |
| 99 percent = | 107.000 |
| 99.5 percent = | 93.000 |
| 99.9 percent = | 84.000 |

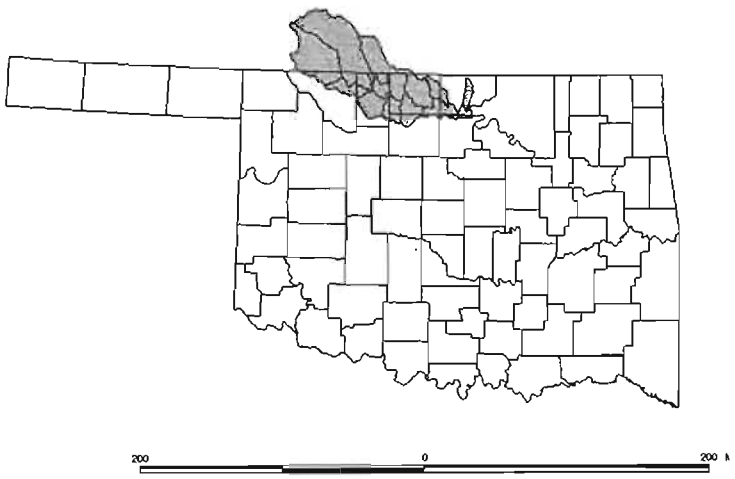
| | |
|---|---|
| Minimum flow: | 84.000 |
| Maximum flow: | 137,000.000 |
| Mean annual flow: | 2,363.073 |

# STREAM SUBSYSTEM 2-9-1, CIMARRON RIVER
## From Confluence With Arkansas River to Near Guthrie



# STREAM SYSTEM 2-10: SALT FORK OF THE ARKANSAS RIVER



## STREAM SYSTEM 2-10: SALT FORK OF THE ARKANSAS RIVER

### General Information

Stream system area - 2,413 $mi^2$

Hydrologic Unit Code - 1106 0002, 1106 0003 and 1106 0004

| | | |
|---|---|---|
| Watersheds - | 1106 0002 020 | 26 $mi^2$ |
| | 1106 0002 030 | 129 $mi^2$ |
| | 1106 0002 040 | 198 $mi^2$ |
| | 1106 0003 030 | 176 $mi^2$ |
| | 1106 0003 040 | 23 $mi^2$ |
| | 1106 0004 010 | 9 $mi^2$ |
| | 1106 0004 020 | 48 $mi^2$ |
| | 1106 0004 030 | 108 $mi^2$ |
| | 1106 0004 040 | 198 $mi^2$ |
| | 1106 0004 050 | 203 $mi^2$ |
| | 1106 0004 060 | 195 $mi^2$ |
| | 1106 0004 070 | 234 $mi^2$ |
| | 1106 0004 080 | 326 $mi^2$ |
| | 1106 0004 090 | 157 $mi^2$ |
| | 1106 0004 100 | 99 $mi^2$ |
| | 1106 0004 110 | 284 $mi^2$ |

Total drainage area - 6,246 $mi^2$ (2,413 $mi^2$ in OK; 3,833 $mi^2$ in KS)

Major tributaries - Yellowstone Creek, Greenleaf Creek, Turkey Creek, Driftwood Creek, Medicine Lodge River, Little Sandy Creek, Sandy Creek, Cottonwood Creek, West Clay Creek, East Clay Creek, Wagon Creek, Crooked Creek, Sand Creek (Grant Co.), Coldwater Creek, Sand Creek (Garfield and Grant Cos.), Wild Horse Creek, Osage Creek, Polecat Creek, Pond Creek, Deer Creek, Bois d'Arc Creek

Major reservoirs or lakes - Great Salt Plains Lake

Mean annual runoff based on adjusted gauge flow - 2.6 inches
Mean annual net lake evaporation for stream system - 28.3 inches
Estimated reservoir refill factor ($\alpha$) for stream system - 0.7

### Estimated Available Water

<u>USGS gauge 07151000 Salt Fork of the Arkansas River at Tonkawa, OK.</u>

Gauge Location: NW SE Sec.4-T25N-R1WIM, Kay County - 4,528 $mi^2$ drainage area of which 8 $mi^2$ is probably noncontributing

Water Years 1942 - 1995:

Mean annual gauge flow - 849 cfs; 614,812 acre-feet
Mean annual gauge flow adjusted for upstream water use - 617,260 acre-feet
Mean annual runoff for 227 $mi^2$ below USGS gauge - 31,000 acre-feet

Mean annual flow adjusted for total drainage area of stream system 2-10 - 648,260 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07151000 (WY 1942-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 21,588 | April | 69,817 | July | 54,616 | October | 52,709 |
| February | 29,554 | May | 105,172 | August | 38,440 | November | 38,390 |
| March | 57,014 | June | 91,542 | September | 34,819 | December | 21,465 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem
Total storage within stream system - 31,420 acre-feet
Total dependable yield within stream system - 0 acre-feet/year
SCS storage within stream system - 292 acre-feet

**Total Estimated Available Water - 648,260 acre-feet/year**
**Total Estimated Storage/Dependable Yields - 292 acre-feet/year**
**Adjusted Total Estimated Available Water - 647,968 acre-feet/year**

| Watershed Code | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1106 0002 020 | 26 $mi^2$ | 6,985 acre-feet/year |
| 1106 0002 030 | 129 $mi^2$ | 34,656 acre-feet/year |
| 1106 0002 040 | 198 $mi^2$ | 53,193 acre-feet/year |
| 1106 0003 030 | 176 $mi^2$ | 47,283 acre-feet/year |
| 1106 0003 040 | 23 $mi^2$ | 6,179 acre-feet/year |
| 1106 0004 010 | 9 $mi^2$ | 2,418 acre-feet/year |
| 1106 0004 020 | 48 $mi^2$ | 12,895 acre-feet/year |
| 1106 0004 030 | 108 $mi^2$ | 29,015 acre-feet/year |
| 1106 0004 040 | 198 $mi^2$ | 52,994 acre-feet/year |
| 1106 0004 050 | 203 $mi^2$ | 54,537 acre-feet/year |
| 1106 0004 060 | 195 $mi^2$ | 52,387 acre-feet/year |

| Watershed Code | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1106 0004 070 | 234 $mi^2$ | 62,772 acre-feet/year |
| 1106 0004 080 | 326 $mi^2$ | 87,581 acre-feet/year |
| 1106 0004 090 | 157 $mi^2$ | 42,179 acre-feet/year |
| 1106 0004 100 | 99 $mi^2$ | 26,597 acre-feet/year |
| 1106 0004 110 | 284 $mi^2$ | 76,297 acre-feet/year |

## GREAT SALT PLAINS LAKE

**Salt Fork of the Arkansas River - Stream System 2-10**

Hydrologic Unit Code - 1106 0004

Located on the Salt Fork of the Arkansas River
Alfalfa County

Drainage area - 3,200 $mi^2$
Surface area, flood pool - 27,730 acres
Surface area, conservation pool - 8,690 acres

Flood control storage - 239,980 acre-feet

Water supply storage - 31,420 acre-feet
Water supply dependable yield - 0 acre-feet/year

**OWRB Reservoir ID #25**

**STREAM SYSTEM 2-10:** Salt Fork of the Arkansas River

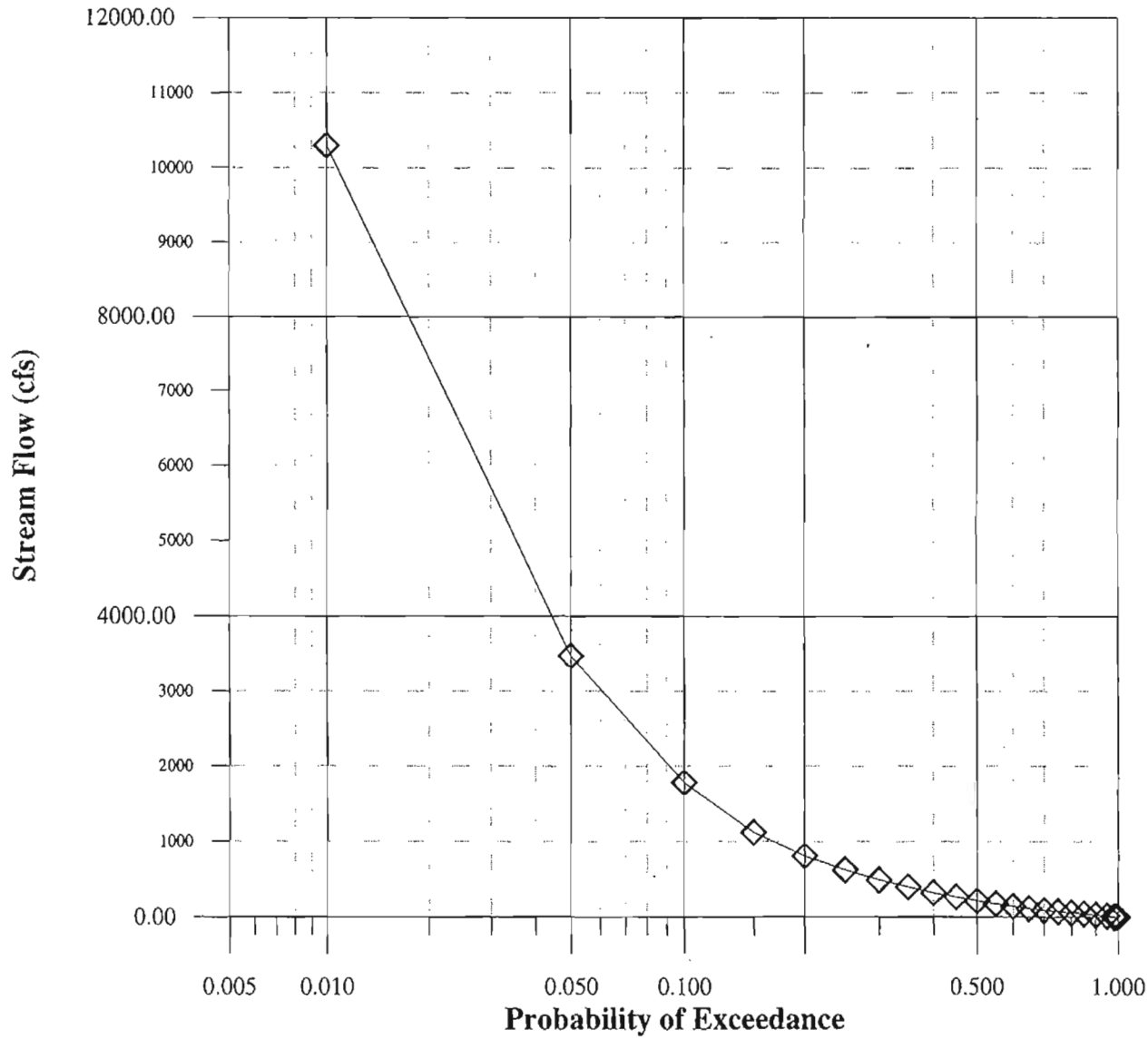
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Salt Fork of the Arkansas River at Tonkawa, OK |
| Station number | 07151000 |
| latitude (degrees, minutes, and seconds) | 364019 |
| longitude (degrees, minutes, and seconds) | 0971833 |
| hydrologic unit code | 11060004 |
| drainage area (square miles) | 4528 |
| contributing drainage area (square miles) | 4520 |
| gauge datum (feet above NGVD) | 930.22 |
| period of record | October 1935 - September 1993 |

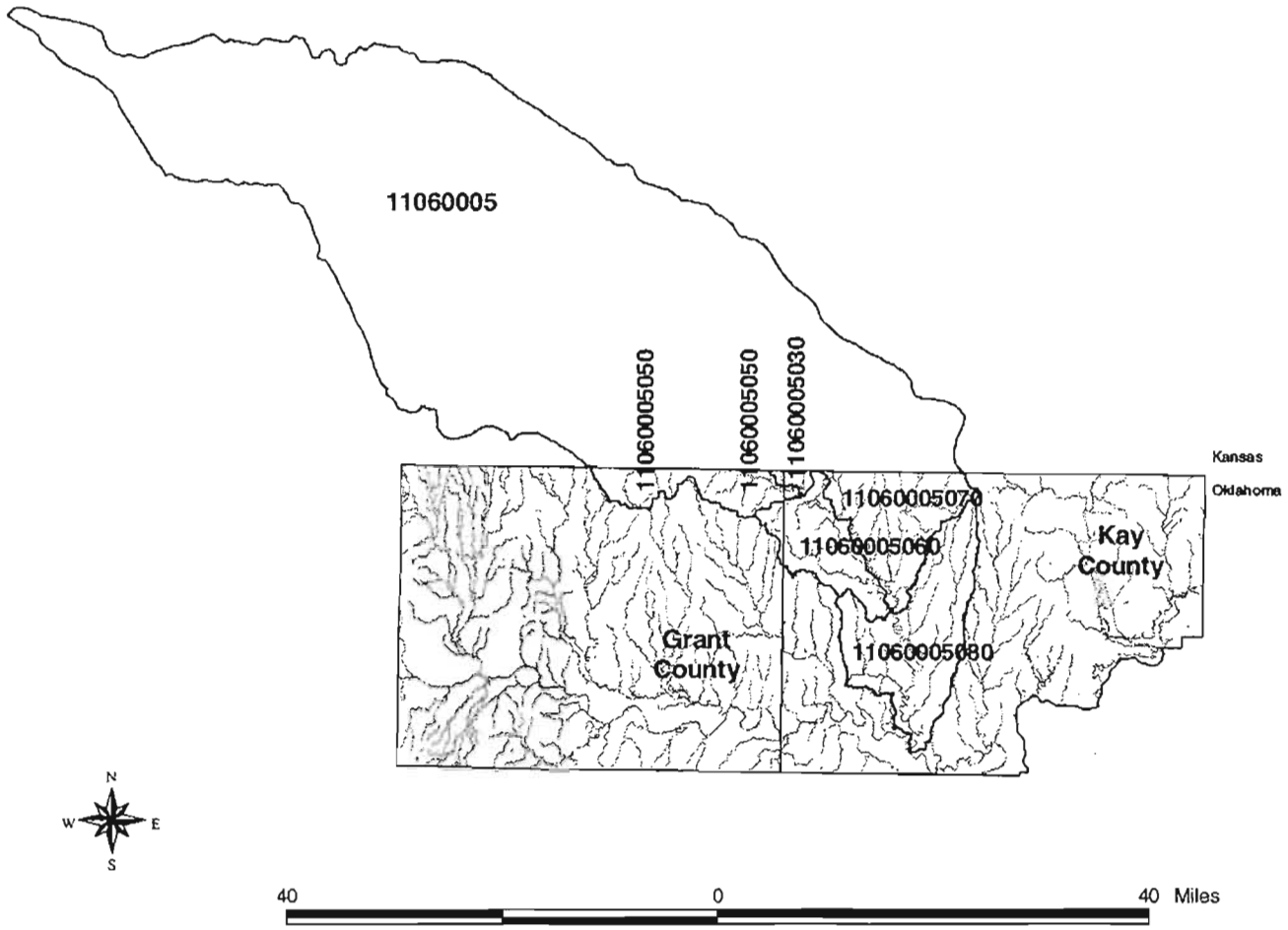
| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 10300.000 |
| 5 percent = | 3470.000 |
| 10 percent = | 1780.000 |
| 15 percent = | 1120.000 |
| 20 percent = | 810.000 |
| 25 percent = | 625.000 |
| 30 percent = | 490.000 |
| 35 percent = | 399.000 |
| 40 percent = | 321.000 |
| 45 percent = | 265.000 |
| 50 percent = | 214.000 |
| 55 percent = | 175.000 |
| 60 percent = | 140.000 |
| 65 percent = | 110.000 |
| 70 percent = | 86.000 |
| 75 percent = | 70.000 |
| 80 percent = | 53.000 |
| 85 percent = | 41.000 |
| 90 percent = | 28.000 |
| 95 percent = | 15.000 |
| 98 percent = | 5.900 |
| 99 percent = | 3.000 |
| 99.5 percent = | 1.400 |
| 99.9 percent = | 0.000 |

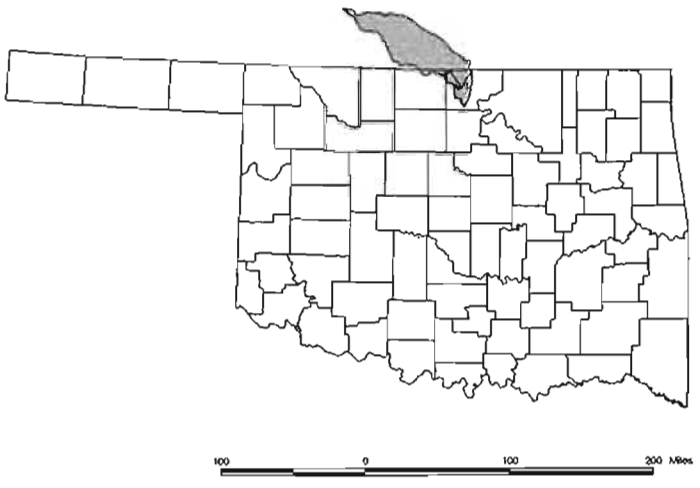
| | |
|---|---|
| Minimum flow: | 0.000 |
| Maximum flow: | 57,800.000 |
| Mean annual flow: | 806.735 |

# STREAM SYSTEM 2-10, SALT FORK OF THE ARKANSAS RIVER



# STREAM SYSTEM 2-11: CHIKASKIA RIVER



## STREAM SYSTEM 2-11: CHIKASKIA RIVER

### General Information

Stream system area - 375 $mi^2$ — Hydrologic Unit Code - 1106 0005

| Watersheds - | | |
|---|---|---|
| | 1106 0005 030 | 6 $mi^2$ |
| | 1106 0005 050 | 53 $mi^2$ |
| | 1106 0005 060 | 69 $mi^2$ |
| | 1106 0005 070 | 100 $mi^2$ |
| | 1106 0005 080 | 147 $mi^2$ |

Total drainage area - 2,002 $mi^2$ (375 $mi^2$ in OK; 1,627 $mi^2$ in KS)

Major tributaries - Doe Creek, Bitter Creek, Duck Creek

Major reservoirs or lakes - None

Mean annual runoff based on adjusted gauge flow - 4.0 inches
Mean annual net lake evaporation for stream system - 23.4 inches
Estimated reservoir refill factor ($\alpha$) for stream system - 0.8

### Estimated Available Water

USGS gauge 07152000 Chikaskia River near Blackwell, OK.

Gauge Location: NE NW Sec. 23-T27N-R1WIM, Kay County - 1,859 $mi^2$ drainage area
Water Years 1936 - 1995:

Mean annual gauge flow - 545 cfs; 394,667 acre-feet
Mean annual gauge flow adjusted for upstream water use - 397,279 acre-feet
Mean annual runoff for 150 $mi^2$ below USGS gauge - 32,056 acre-feet

Mean annual flow adjusted for total drainage area of stream system 2-11 - 429,335 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07152000 (WY 1936-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 14,207 | April | 44,759 | July | 29,091 | October | 32,536 |
| February | 19,332 | May | 67,101 | August | 20,727 | November | 24,701 |
| March | 37,825 | June | 60,472 | September | 26,427 | December | 14,146 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem

Total storage within stream system - 0 acre-feet

Total dependable yields within stream system - 0 acre-feet/year

SCS storage within stream system - 567 acre-feet/year

**Total Estimated Available Water - 429,335 acre-feet/year**
**Total Estimated Storage/Dependable Yields - 567 acre-feet/year**
**Adjusted Total Estimated Available Water - 428,768 acre-feet/year**

| Watershed Code | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1106 0005 030 | 6 $mi^2$ | 6,869 acre-feet/year |
| 1106 0005 050 | 53 $mi^2$ | 60,679 acre-feet/year |
| 1106 0005 060 | 69 $mi^2$ | 78,998 acre-feet/year |
| 1106 0005 070 | 100 $mi^2$ | 114,316 acre-feet/year |
| 1106 0005 080 | 147 $mi^2$ | 167,905 acre-feet/year |

**STREAM SYSTEM 2-11:** Chikaskia River

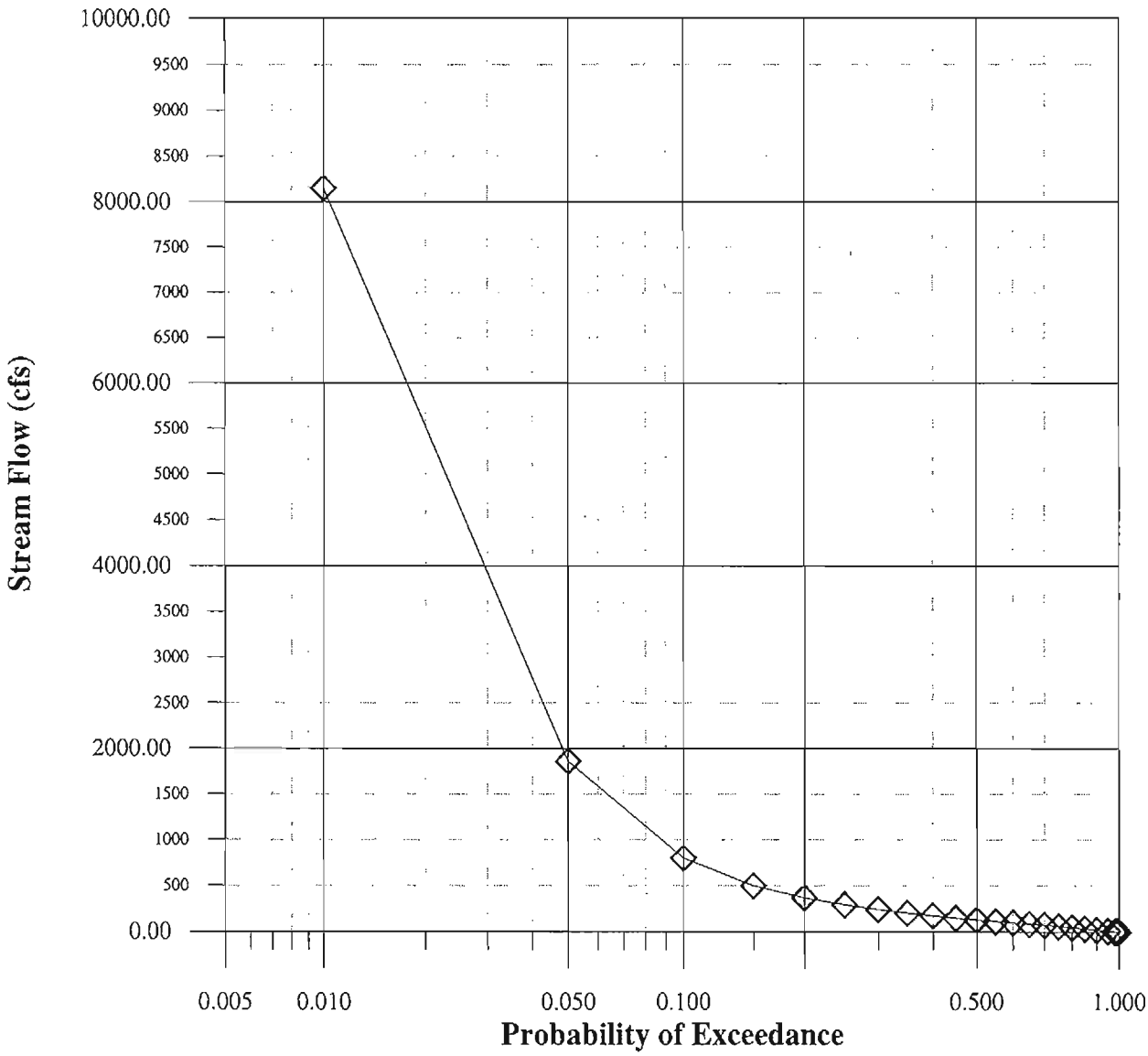
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Chikaskia River near Blackwell, OK |
| Station number | 07152000 |
| latitude (degrees, minutes, and seconds) | 364841 |
| longitude (degrees, minutes, and seconds) | 0971637 |
| hydrologic unit code | 11060005 |
| drainage area (square miles) | 1859 |
| contributing drainage area (square miles) | 1859 |
| gauge datum (feet above NGVD) | 967.41 |
| period of record | October 1936 - September 1993 |

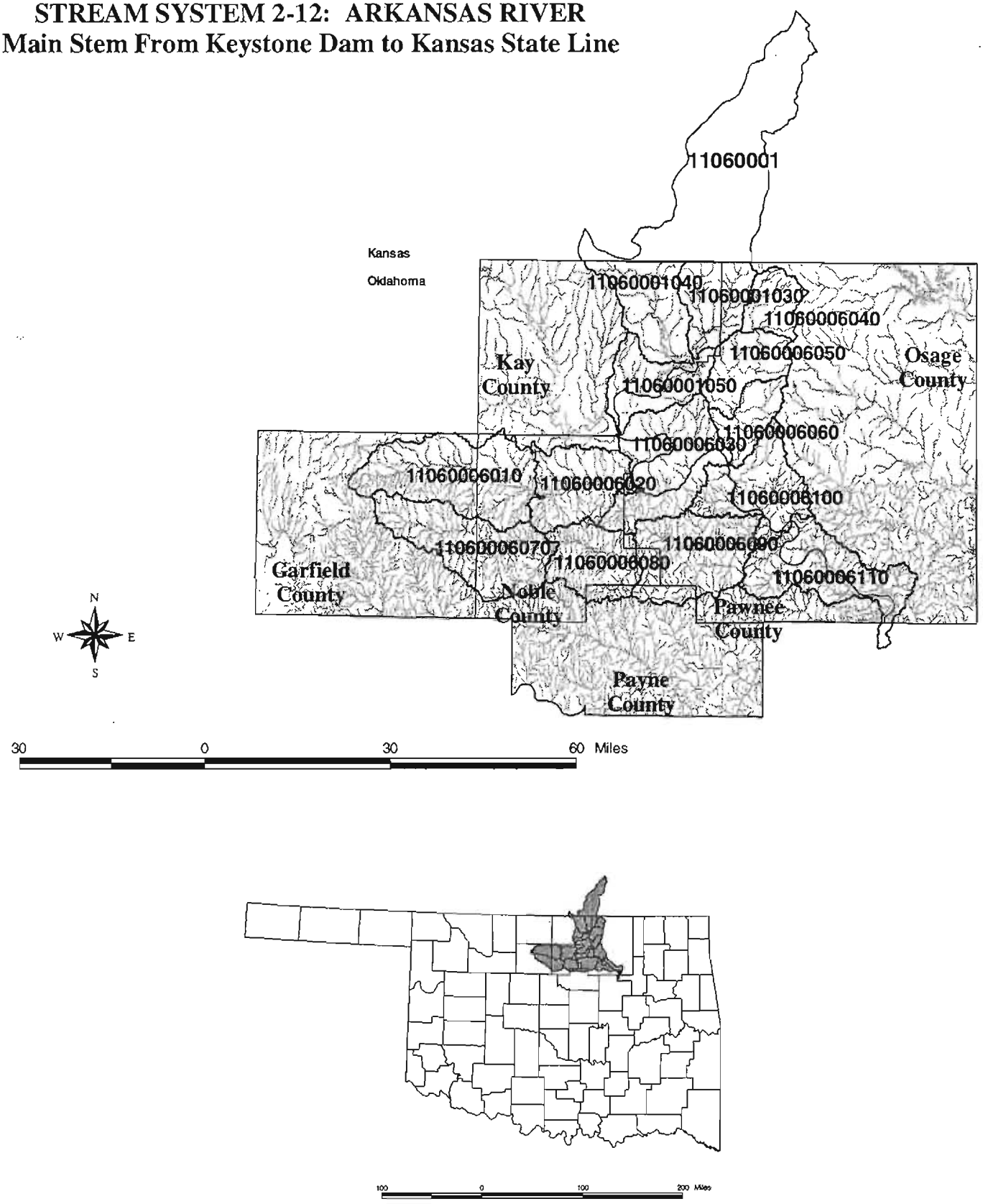
| Percent Exceedance | Calculated Flows (cfs) |
|---|---|
| 1 percent = | 8150.000 |
| 5 percent = | 1860.000 |
| 10 percent = | 800.000 |
| 15 percent = | 498.000 |
| 20 percent = | 367.000 |
| 25 percent = | 292.000 |
| 30 percent = | 241.000 |
| 35 percent = | 202.000 |
| 40 percent = | 173.000 |
| 45 percent = | 148.000 |
| 50 percent = | 128.000 |
| 55 percent = | 111.000 |
| 60 percent = | 97.000 |
| 65 percent = | 84.000 |
| 70 percent = | 72.000 |
| 75 percent = | 58.000 |
| 80 percent = | 45.000 |
| 85 percent = | 33.000 |
| 90 percent = | 19.000 |
| 95 percent = | 6.400 |
| 98 percent = | 1.500 |
| 99 percent = | 0.900 |
| 99.5 percent = | 0.500 |
| 99.9 percent = | 0.000 |

| | |
|---|---|
| Minimum flow: | 124.000 |
| Maximum flow: | 69,500.000 |
| Mean annual flow: | 533.529 |

# STREAM SYSTEM 2-11, CHICKASKIA RIVER



# STREAM SYSTEM 2-12: ARKANSAS RIVER
## Main Stem From Keystone Dam to Kansas State Line



## STREAM SYSTEM 2-12: ARKANSAS RIVER
## Main Stem From Keystone Dam to the Kansas State Line

### General Information

Stream system area - 2,588 $mi^2$ — Hydrologic Unit Code - 1106 0001 and 1106 0006

| Watersheds - | | |
|---|---|---|
| | 1106 0001 030 | 137 $mi^2$ |
| | 1106 0001 040 | 170 $mi^2$ |
| | 1106 0001 050 | 145 $mi^2$ |
| | 1106 0006 010 | 309 $mi^2$ |
| | 1106 0006 020 | 176 $mi^2$ |
| | 1106 0006 030 | 264 $mi^2$ |
| | 1106 0006 040 | 82 $mi^2$ |
| | 1106 0006 050 | 122 $mi^2$ |
| | 1106 0006 060 | 88 $mi^2$ |
| | 1106 0006 070 | 265 $mi^2$ |
| | 1106 0006 080 | 153 $mi^2$ |
| | 1106 0006 090 | 243 $mi^2$ |
| | 1106 0006 100 | 191 $mi^2$ |
| | 1106 0006 110 | 243 $mi^2$ |

Total drainage area - 55,579 $mi^2$ (5,566 $mi^2$ in OK; 50,013 $mi^2$ in NM, CO, and KS)

Major tributaries - Little Beaver Creek, Beaver Creek, Skinny Creek, Red Rock Creek, Greasy Creek, Doga Creek, Little Chief Creek, Salt Creek, Gray Horse Creek, Coal Creek, Sycamore Creek, Cow Creek, Long Branch, Turkey Creek, Camp Creek, Black Bear Creek, Bug Creek

Major reservoirs or lakes - Kaw Lake, Lake Ponca, Sooner Reservoir, Perry Lake, Lone Chimney Lake, Keystone Lake

Mean annual runoff based on adjusted gauge flow - 1.7 inches
Mean annual net lake evaporation for stream system - 20.5 inches
Estimated reservoir refill factor ($\alpha$) for stream system - 1.2

### Estimated Available Water

<u>USGS gauge 07152500 Arkansas River at Ralston, OK.</u>

Gauge Location: NE NE Sec.2-T23N-R5EIM, Pawnee County - 54,465 $mi^2$ drainage area of which 7,615 $mi^2$ is probably noncontributing
Water Years 1977 - 1995:

Mean annual gauge flow - 5,892 cfs; 4,266,751 acre-feet
Mean annual gauge flow adjusted for upstream water use - 4,305,338 acre-feet (includes flow from stream systems 2-10, 2-11 and 2-12)
Mean annual runoff for 1,093.7 $mi^2$ below USGS gauge - 100,507 acre-feet

Mean annual net lake evaporation for 2-12 arm of Keystone Lake (20.3 $mi^2$) - 17,880 acre-feet

Mean annual flow adjusted for total drainage area of stream system 2-12 - 3,310,370 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07152500 (WY 1977-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 205,239 | April | 491,040 | July | 407,649 | October | 283,779 |
| February | 219,430 | May | 631,646 | August | 272,647 | November | 244,270 |
| March | 464,601 | June | 657,696 | September | 210,284 | December | 179,407 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem

Total storage within stream system - 176,532 acre-feet (excludes portion of power supply pool storage allocated to water supply from Kaw Reservoir)

Total dependable yields within stream system - 195,608 acre-feet/year

SCS storage within stream system - 26,414 acre-feet

**Total Estimated Available Water - 3,310,370 acre-feet/year**
**Total Estimated Storage/Dependable Yields - 222,022 acre-feet/year**
**Adjusted Total Estimated Available Water - 3,088,348 acre-feet/year**

| Watershed Code | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1106 0001 030 | 137 $mi^2$ | 175,240 acre-feet/year |
| 1106 0001 040 | 170 $mi^2$ | 46,251 acre-feet/year |
| 1106 0001 050 | 145 $mi^2$ | 182,238 acre-feet/year |
| 1106 0006 010 | 309 $mi^2$ | 389,498 acre-feet/year |
| 1106 0006 020 | 176 $mi^2$ | 224,487 acre-feet/year |
| 1106 0006 030 | 264 $mi^2$ | 334,006 acre-feet/year |
| 1106 0006 040 | 82 $mi^2$ | 104,888 acre-feet/year |
| 1106 0006 050 | 122 $mi^2$ | 156,053 acre-feet/year |
| 1106 0006 060 | 88 $mi^2$ | 112,563 acre-feet/year |
| 1106 0006 070 | 265 $mi^2$ | 325,869 acre-feet/year |
| 1106 0006 080 | 153 $mi^2$ | 192,826 acre-feet/year |
| 1106 0006 090 | 243 $mi^2$ | 310,641 acre-feet/year |
| 1106 0006 100 | 191 $mi^2$ | 238,732 acre-feet/year |
| 1106 0006 110 | 243 $mi^2$ | 295,057 acre-feet/year |

## KAW LAKE

**Arkansas River to the Kansas State Line - Stream System 2-12**

Hydrologic Unit Code - 1106 0001

Located on the Arkansas River
Kay County

Drainage area - 46,530 $mi^2$ of which 39,878 $mi^2$ is noncontributing
Surface area, flood pool - 36,690 acres
Surface area, power pool - 18,775 acres
Surface area, conservation pool - 16,750 acres
Surface area, inactive pool - 4,240 acres

Flood control storage - 867,310 acre-feet
Power and conservation storage - 383,480 acre-feet
- Water supply storage - 171,200 acre-feet
- Water quality control storage - 31,800 acre-feet
- Power - 140,500 acre-feet

Inactive pool - 76,360 acre-feet

Water supply dependable yield - 171,200 acre-feet (yield is from power supply pool)
Water quality control dependable yield - 43,680 acre-feet; no permits subject to reallocation have been issued on this yield (yield is from power supply pool)

**OWRB Reservoir ID #33**

## LAKE PONCA

**Arkansas River to the Kansas State Line - Stream System 2-12**

Hydrologic Unit Code - 1106 0001

Located on Turkey Creek
Kay County

Drainage area - undetermined
Surface area, conservation pool - 805 acres

Water supply storage - 14,440 acre-feet
Water supply dependable yield - 2,529 acre-feet

**OWRB Reservoir ID #47**

## SOONER RESERVOIR

**Arkansas River to the Kansas State Line - Stream System 2-12**

Hydrologic Unit Code - 1106 0006

Located on Greasy Creek
Pawnee and Noble Counties

Drainage area - undetermined
Surface area, conservation pool - undetermined

Water supply storage- 149,000 acre-feet
Water supply dependable yield - 3,600 acre-feet; constructed for OG&E cooling water

**OWRB Reservoir ID #56**

## PERRY LAKE
## Upper Black Bear Creek Watershed Site #62

**Arkansas River to the Kansas State Line - Stream System 2-12**

Hydrologic Unit Code - 1106 0006

Located on Cow Creek
Noble County

Drainage area - undetermined
Surface area, conservation pool - 614 acres

Water supply storage- 6,892 acre-feet
Water supply dependable yield - Unknown

**OWRB Reservoir ID #88**

## LONE CHIMNEY LAKE
## Lower Black Bear Creek Watershed Site #19-M

**Arkansas River to the Kansas State Line - Stream System 2-12**

Hydrologic Unit Code - 1106 0006

Located on Camp Creek
Pawnee County

Drainage area - undetermined
Surface area, conservation pool - 550 acres

Water supply storage - 6,200 acre-feet
Water supply dependable yield - 2,509 acre-feet

**OWRB Reservoir ID #85**

## KEYSTONE LAKE

**Arkansas River to the Kansas State Line - Stream System 2-12**
**Cimarron River - Stream Subsystem 2-9-1**

Hydrologic Unit Code - 1106 0006
1105 0003

Located on the Arkansas River
Tulsa County

Drainage area - 74,506 $mi^2$ of which 52,155 $mi^2$ is noncontributing
Surface area, flood pool - 54,678 acres
Surface area, power pool - 22,420 acres
Surface area, conservation pool - 12,430 acres

Flood control storage - 1,167,232 acre-feet
Power storage - 287,122 acre-feet
Inactive pool - 227,259 acre-feet

Water supply storage - 20,000 acre-feet
Water supply dependable yield - 22,400 acre-feet/year
Proportion of water supply yield within Stream System 2-12 - 15,770 acre-feet/year (70.4% of total yield)

**OWRB Reservoir ID #34**

**STREAM SYSTEM 2-12**: Arkansas River main stem from Keystone Dam to the Kansas State Line

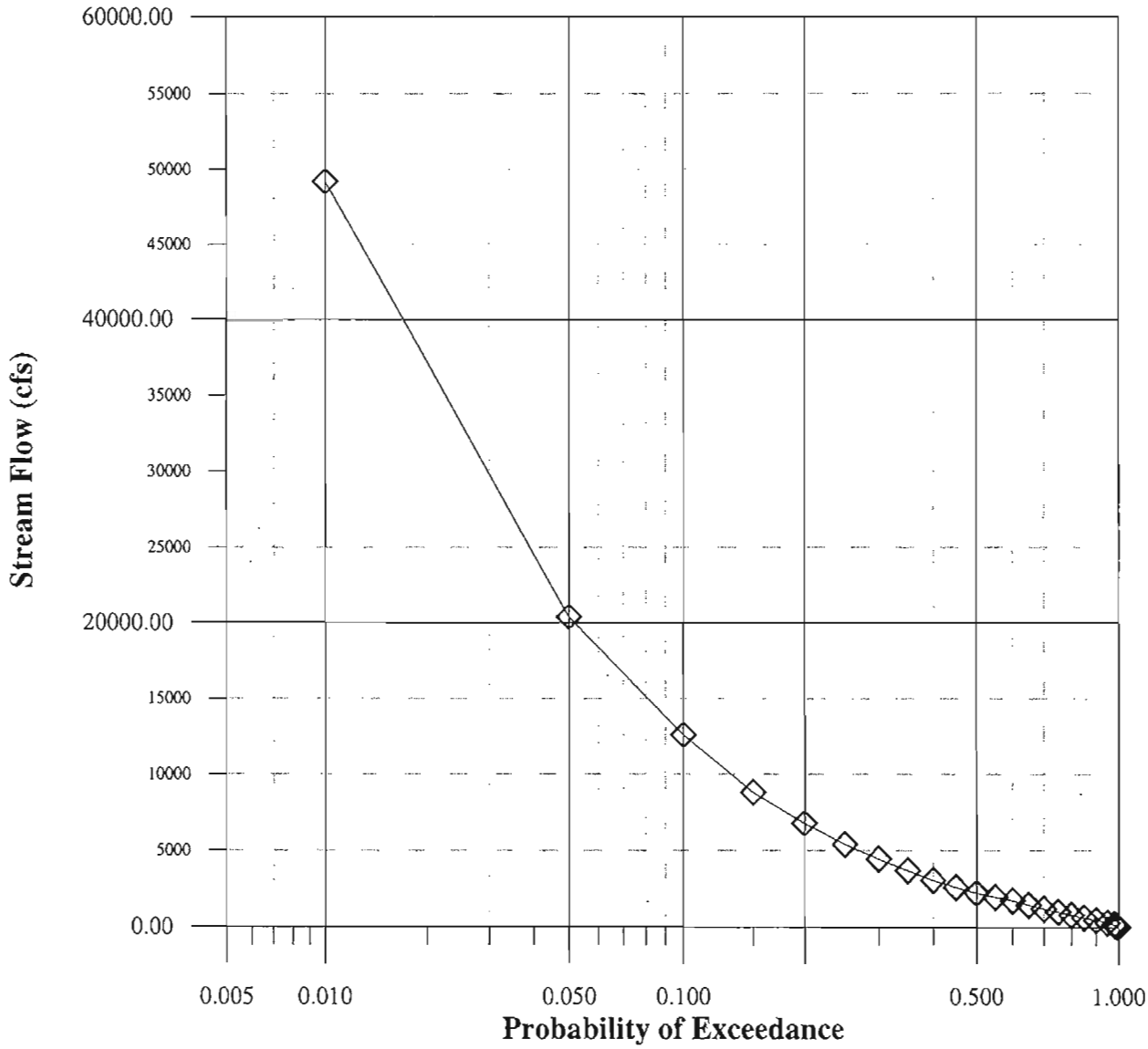
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Arkansas River at Ralston, OK |
| Station number | 07152500 |
| latitude (degrees, minutes, and seconds) | 363015 |
| longitude (degrees, minutes, and seconds) | 0964341 |
| hydrologic unit code | 11060006 |
| drainage area (square miles) | 54465 |
| contributing drainage area (square miles) | 46850 |
| gauge datum (feet above NGVD) | 776.70 |
| period of record | October 1925 - September 1993 |

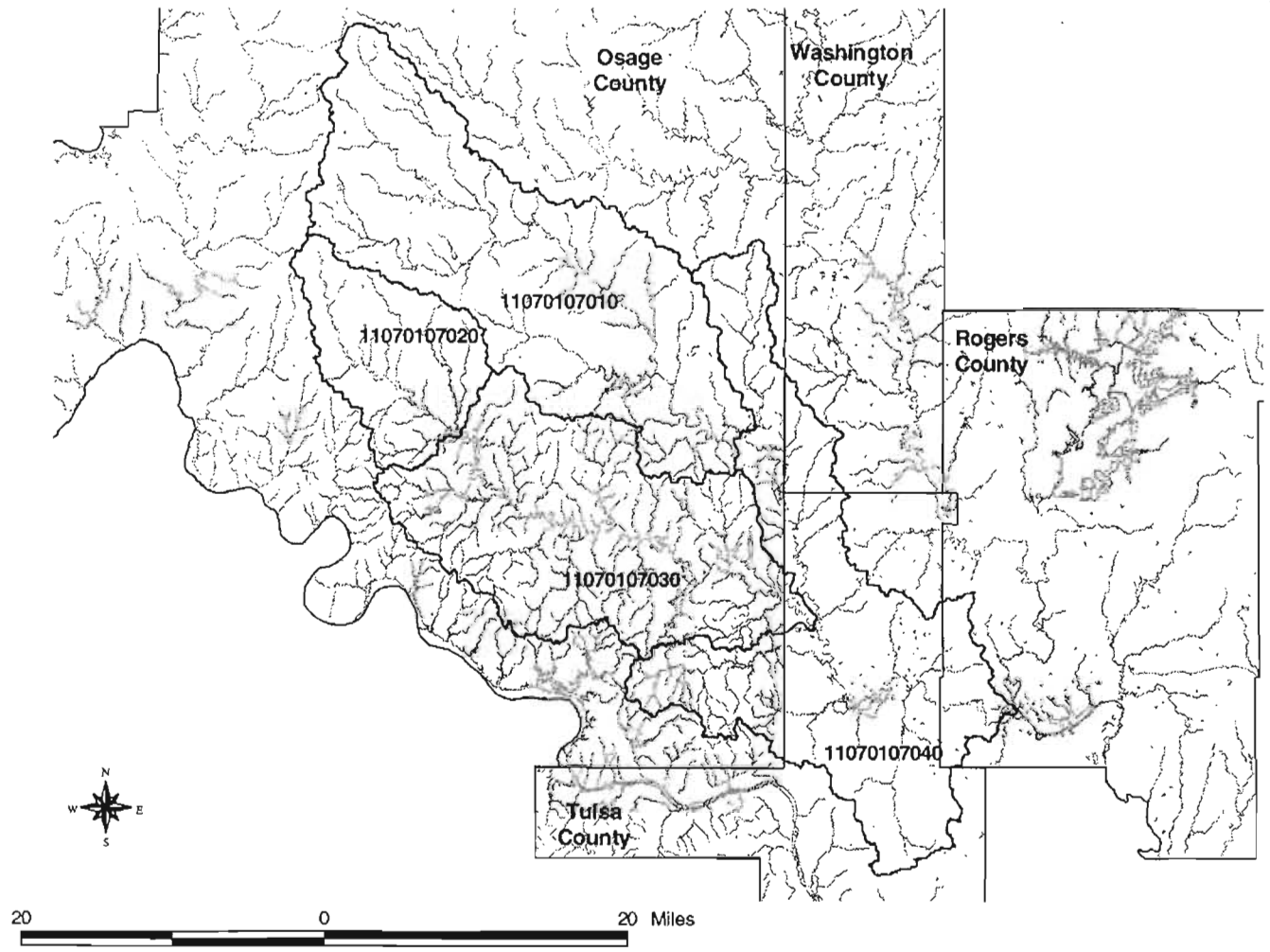
| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 39100.000 |
| 5 percent = | 22000.000 |
| 10 percent = | 14300.000 |
| 15 percent = | 11200.000 |
| 20 percent = | 8820.000 |
| 25 percent = | 7310.000 |
| 30 percent = | 6040.000 |
| 35 percent = | 5030.000 |
| 40 percent = | 4050.000 |
| 45 percent = | 3370.000 |
| 50 percent = | 2750.000 |
| 55 percent = | 2290.000 |
| 60 percent = | 1940.000 |
| 65 percent = | 1520.000 |
| 70 percent = | 1280.000 |
| 75 percent = | 1000.000 |
| 80 percent = | 740.000 |
| 85 percent = | 560.000 |
| 90 percent = | 419.000 |
| 95 percent = | 307.000 |
| 98 percent = | 202.000 |
| 99 percent = | 169.000 |
| 99.5 percent = | 130.000 |
| 99.9 percent = | 105.000 |

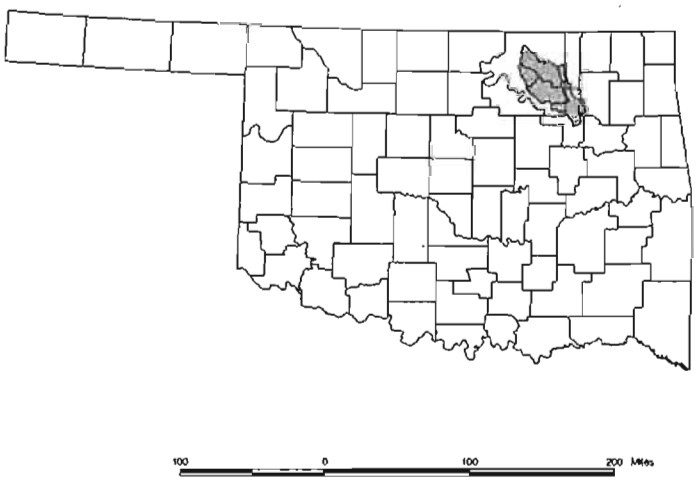
| | |
|---|---|
| Minimum flow: | 52.000 |
| Maximum flow: | 170,000.000 |
| Mean annual flow: | 5,860.549 |

# STREAM SYSTEM 2-12, ARKANSAS RIVER
## Main Stem From Keystone Dam to Kansas State Line



# STREAM SYSTEM 2-13: BIRD CREEK



## STREAM SYSTEM 2-13: BIRD CREEK

### General Information

Stream system area - 1,136 $mi^2$

| | | |
|---|---|---|
| Watershed - | 1107 0107 010 | 370 $mi^2$ |
| | 1107 0107 020 | 114 $mi^2$ |
| | 1107 0107 030 | 301 $mi^2$ |
| | 1107 0107 040 | 351 $mi^2$ |

Hydrologic Unit Code - 1107 0107

Total drainage area - 1,136 $mi^2$

Major tributaries - Birch Creek, Clear Creek, Candy Creek, Little Hominy Creek, Boar Creek, Hominy Creek, Delaware Creek

Major reservoirs or lakes - Birch Lake, Skiatook Lake

Mean annual runoff based on adjusted gauge flow - 14.7 inches
Mean annual net lake evaporation for stream system - 16.2 inches
Estimated reservoir refill factor ($\alpha$) for stream system - 1.7

### Estimated Available Water

USGS gauge 07178200 Bird Creek at State Highway 266 near Catoosa, OK.

Gauge Location: SE SE Sec.9-T20N-R14EIM, Tulsa County - 1,103 $mi^2$ drainage area
Water Years 1990 - 1995:

Mean annual gauge flow - 1,193 cfs; 863,923 acre-feet
Mean annual gauge flow adjusted for upstream water use - 867,542 acre-feet
Mean annual runoff for 34 $mi^2$ below USGS gauge - 26,742 acre-feet

Mean annual flow adjusted for total drainage area of stream system 2-13 - 894,284 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07178200 (WY 1990-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 41,146 | April | 134,515 | July | 66,486 | October | 19,374 |
| February | 42,886 | May | 161,202 | August | 22,080 | November | 49,997 |
| March | 111,753 | June | 143,800 | September | 24,522 | December | 46,128 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem

Total storage within stream system - 70,500 acre-feet
Total dependable yields within stream system - 19,040 acre-feet/year
SCS storage within stream system - 0 acre-feet

**Total Estimated Available Water - 894,284 acre-feet/year**
**Total Storage/Dependable Yields - 19,040 acre-feet/year**
**Adjusted Total Estimated Available Water - 875,244 acre-feet/year**

| Watershed Code | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1107 0107 010 | 370 $mi^2$ | 287,912 acre-feet/year |
| 1107 0107 020 | 114 $mi^2$ | 89,743 acre-feet/year |
| 1107 0107 030 | 301 $mi^2$ | 221,274 acre-feet/year |
| 1107 0107 040 | 351 $mi^2$ | 276,315 acre-feet/year |

## BIRCH LAKE

**Bird Creek - Stream System 2-13**

Hydrologic Unit Code - 1107 0107

Located on Birch Creek
Osage County

Drainage area - 66 $mi^2$
Surface area, flood pool - 2,395 acres
Surface area, conservation pool - 1,145 acres
Surface area, inactive pool - 414 acres

Flood control storage - 39,805 acre-feet
Conservation storage - 15,805 acre-feet:
- Water supply storage - 7,600 acre-feet
- Water quality control storage - 7,600 acre-feet
- Sediment storage - 640 acre-feet

Note: Sum of the above does not equal 15,805 acre-feet (COE data)

Inactive storage - 3,420 acre-feet

Water supply dependable yield - 3,360 acre-feet/year
Water quality control dependable yield - 3,360 acre-feet/year; no permits subject to reallocation have been issued on this yield

**OWRB Reservoir ID #06**

## SKIATOOK LAKE

### Bird Creek - Stream System 2-13

Hydrologic Unit Code - 1107 0107

Located on Hominy Creek
Osage County

Drainage area - 354 $mi^2$
Surface area, flood pool - 13,690 acres
Surface area, conservation pool - 10,190 acres
Surface area, inactive pool - 1,430 acres

Flood control storage - 178,000 acre-feet
Conservation storage - 311,600 acre-feet:
- Water supply storage - 62,900 acre-feet
- Water quality control storage - 233,000 acre-feet
- Sediment storage - 15,700 acre-feet

Inactive storage - 11,100 acre-feet

Water supply dependable yield - 15,680 acre-feet/year
Water quality control dependable yield - 69,440 acre-feet/year; permits subject to reallocation have been issued on this yield

**OWRB Reservoir ID #55**

**STREAM SYSTEM 2-13:** Bird Creek

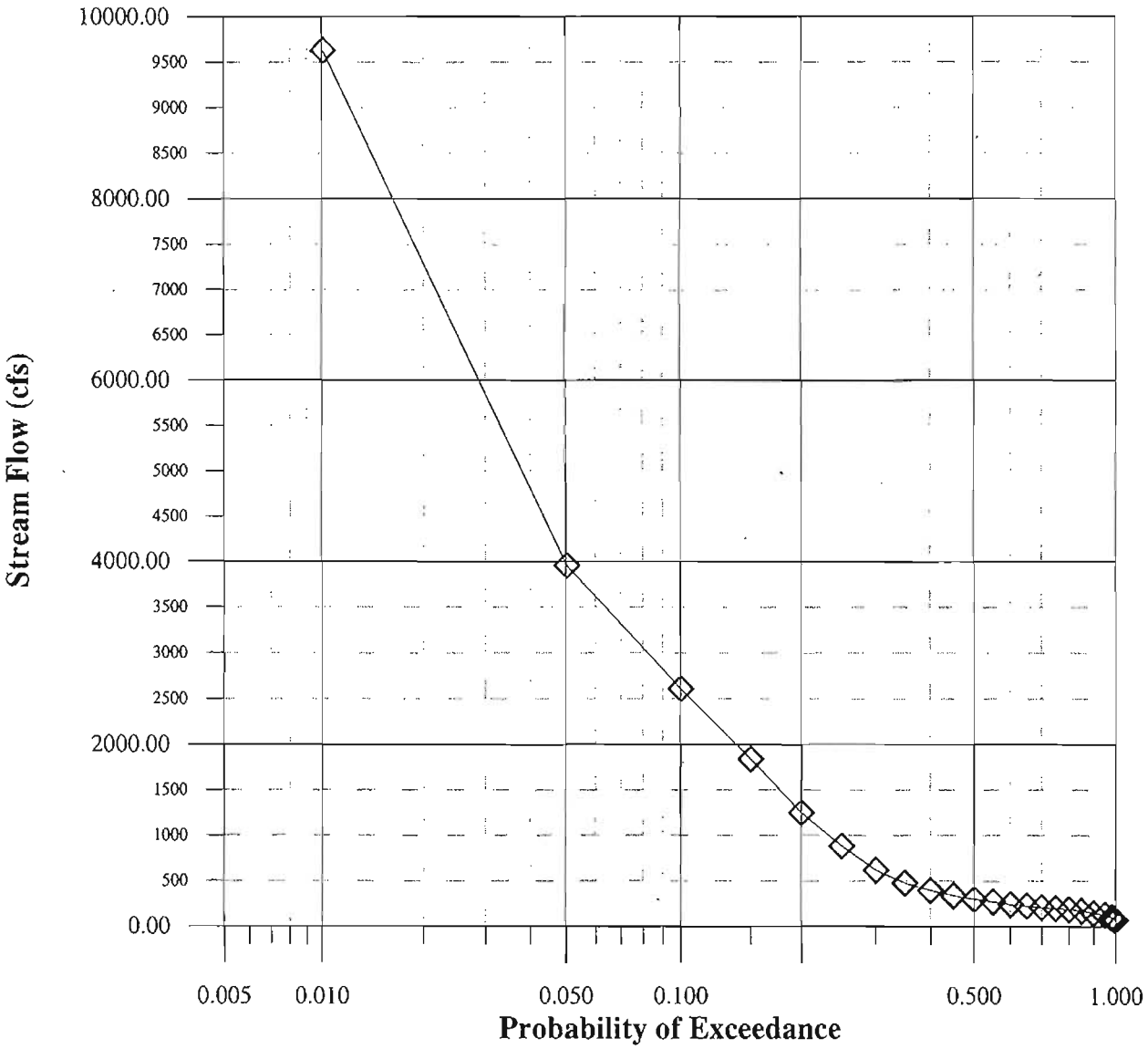
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Bird Creek at State Highway 266 near Catoosa, OK |
| Station number | 07178200 |
| latitude (degrees, minutes, and seconds) | 361323 |
| longitude (degrees, minutes, and seconds) | 0954909 |
| hydrologic unit code | 11070107 |
| drainage area (square miles) | 1103 |
| contributing drainage area (square miles) | 1103 |
| gauge datum (feet above NGVD) | 545.00 |
| period of record | August 1983 - September 1993 |

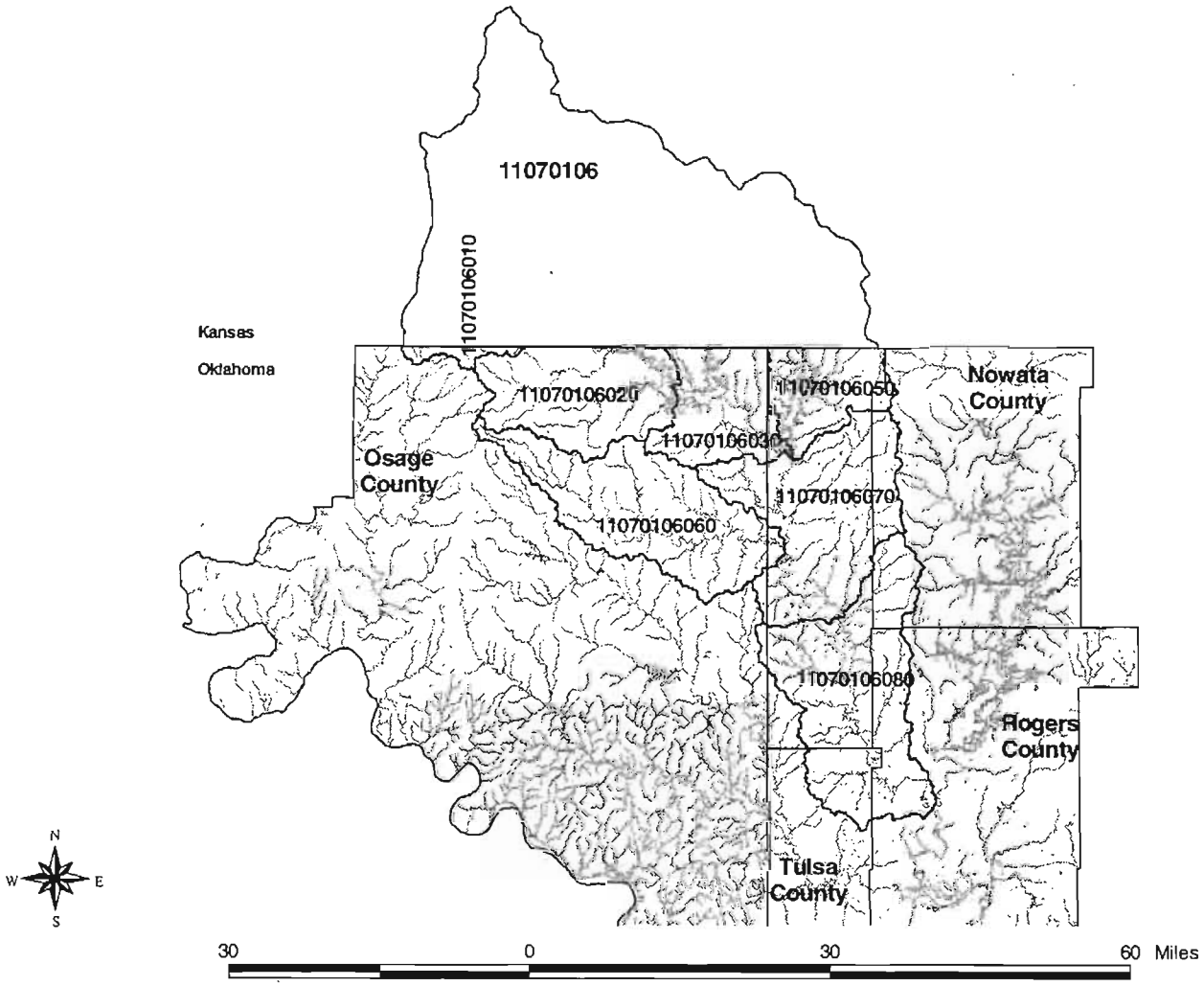
| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 9630.000 |
| 5 percent = | 3960.000 |
| 10 percent = | 2610.000 |
| 15 percent = | 1840.000 |
| 20 percent = | 1250.000 |
| 25 percent = | 883.000 |
| 30 percent = | 618.000 |
| 35 percent = | 477.000 |
| 40 percent = | 395.000 |
| 45 percent = | 338.000 |
| 50 percent = | 300.000 |
| 55 percent = | 272.000 |
| 60 percent = | 244.000 |
| 65 percent = | 227.000 |
| 70 percent = | 211.000 |
| 75 percent = | 199.000 |
| 80 percent = | 188.000 |
| 85 percent = | 173.000 |
| 90 percent = | 148.000 |
| 95 percent = | 129.000 |
| 98 percent = | 99.000 |
| 99 percent = | 93.000 |
| 99.5 percent = | 80.000 |
| 99.9 percent = | 70.000 |

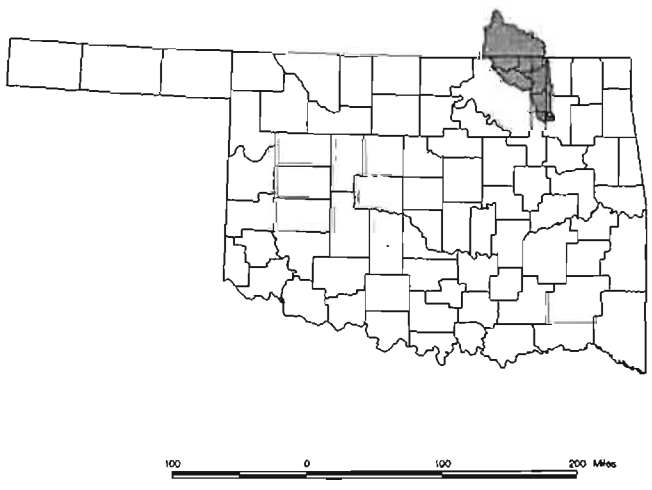
| | |
|---|---|
| Minimum flow: | 70.000 |
| Maximum flow: | 25,900.000 |
| Mean annual flow: | 995.528 |

# STREAM SYSTEM 2-13, BIRD CREEK



# STREAM SYSTEM 2-14: CANEY RIVER



## STREAM SYSTEM 2-14: CANEY RIVER

### General Information

Stream system area - 1,177 $mi^2$ — Hydrologic Unit Code - 1107 0106

| Watersheds - | | |
|---|---|---|
| | 1107 0106 010 | 14 $mi^2$ |
| | 1107 0106 020 | 172 $mi^2$ |
| | 1107 0106 030 | 120 $mi^2$ |
| | 1107 0106 050 | 97 $mi^2$ |
| | 1107 0106 060 | 241 $mi^2$ |
| | 1107 0106 070 | 247 $mi^2$ |
| | 1107 0106 080 | 286 $mi^2$ |

Total drainage area - 2,124 $mi^2$ (1,177 $mi^2$ in OK; 947 $mi^2$ in KS)

Major tributaries - Buck Creek, Pond Creek, Cotton Creek, Little Caney River, Butler Creek, Coon Creek, Rock Creek, Buck Creek, Sand Creek, Hogshooter Creek, Rabb Creek

Major reservoirs and lakes - Hulah Lake, Copan Lake, Sand Lake (not built)

Mean annual runoff based on adjusted gauge flow - 6.5 inches (WY 1951 - 1982); 13.4 inches (WY 1984 - 1995)
Mean annual net lake evaporation for stream system - 15.9 inches
Estimated reservoir refill factor ($\alpha$) for stream system - 1.6

### Estimated Available Water

USGS gauge 07175500 Caney River near Ramona, OK.

Gauge Location: NE NW Sec.5-T23N-R14EIM, Washington County - 1,955 $mi^2$ drainage area
Water Years 1951 - 1995:

Mean annual gauge flow - 925 cfs; 669,848 acre-feet (WY 1951 - 1982); 1,917 cfs; 1,388,215 acre-feet (WY 1984 - 1995)
Mean annual gauge flow adjusted for upstream water use - 681,028 acre-feet (WY 1951 - 1982); 1,399,699 acre-feet (WY 1984 - 1995)
Mean annual runoff for 156 $mi^2$ below USGS gauge - 54,343 acre-feet (WY 1951 - 1982); 111,690 acre-feet (WY 1984 - 1995)

Mean annual flow adjusted for total drainage area of stream system 2-14 - 947,012 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07175500 (WY 1984 - 1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 72,882 | April | 188,440 | July | 98,529 | October | 134,878 |
| February | 70,773 | May | 196,690 | August | 22,449 | November | 90,708 |
| March | 183,159 | June | 198,380 | September | 41,724 | December | 89,673 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem

Total storage within stream system - 27,300 acre-feet/year
Total dependable yield within stream system - 17,248 acre-feet/year
SCS storage within stream system - 3,058 acre-feet

**Total Estimated Available Water - 947,012 acre-feet/year**
**Total Storage/Dependable Yields - 20,306 acre-feet/year**
**Adjusted Total Estimated Available Water - 926,706 acre-feet/year**

| Watershed Code | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1107 0106 010 | 14 mi | 11,131 acre-feet/year |
| 1107 0106 020 | 172 $mi^2$ | 138,391 acre-feet/year |
| 1107 0106 030 | 120 $mi^2$ | 81,239 acre-feet/year |
| 1107 0106 050 | 97 $mi^2$ | 74,613 acre-feet/year |
| 1107 0106 060 | 241 $mi^2$ | 193,908 acre-feet/year |
| 1107 0106 070 | 247 $mi^2$ | 198,294 acre-feet/year |
| 1107 0106 080 | 286 $mi^2$ | 229,130 acre-feet/year |

## HULAH LAKE

**Caney River - Stream System 2-14**

Hydrologic Unit Code - 1107 0106

Located on the Caney River
Osage County

Drainage area - 732 $mi^2$
Surface area, flood pool - 13,000 acres
Surface area, conservation pool - 3,570 acres
Surface area, inactive pool - 0 acres

Flood control storage - 257,900 acre-feet
Conservation storage - 31,160 acre-feet
- Water supply storage - 19,800 acre-feet
- Water quality control storage - 7,100 acre-feet
- Sediment reserve - 4,200 acre-feet
  - Note: Sum of the above does not equal 31,160 acre-feet (COE data)

Water supply dependable yield - 13,888 acre-feet/year
Water quality control dependable yield - 5,040 acre-feet/year; no permits subject to reallocation have been issued on this yield

**OWRB Reservoir ID #32**

## COPAN LAKE

### Caney River - Stream System 2-14

Hydrologic Unit Code - 1107 0106

Located on the Little Caney River
Washington County

Drainage area - 505 $mi^2$
Surface area, flood pool - 13,380 acres
Surface area, conservation pool - 4,850 acres
Surface area, inactive pool - 11,014 acres

Flood control storage - 184,300 acre-feet
Conservation storage - 42,800 acre-feet:
- Water supply storage - 7,500 acre-feet
- Water quality control storage - 26,100 acre-feet
- Sediment storage - 9,200 acre-feet

Inactive storage - 600 acre-feet

Water supply dependable yield - 3,360 acre-feet/year
Water quality control dependable yield - 17,920 acre-feet/year; permits subject to reallocation have been issued on this yield

**OWRB Reservoir ID #13**

**STREAM SYSTEM 2-14:** Caney River

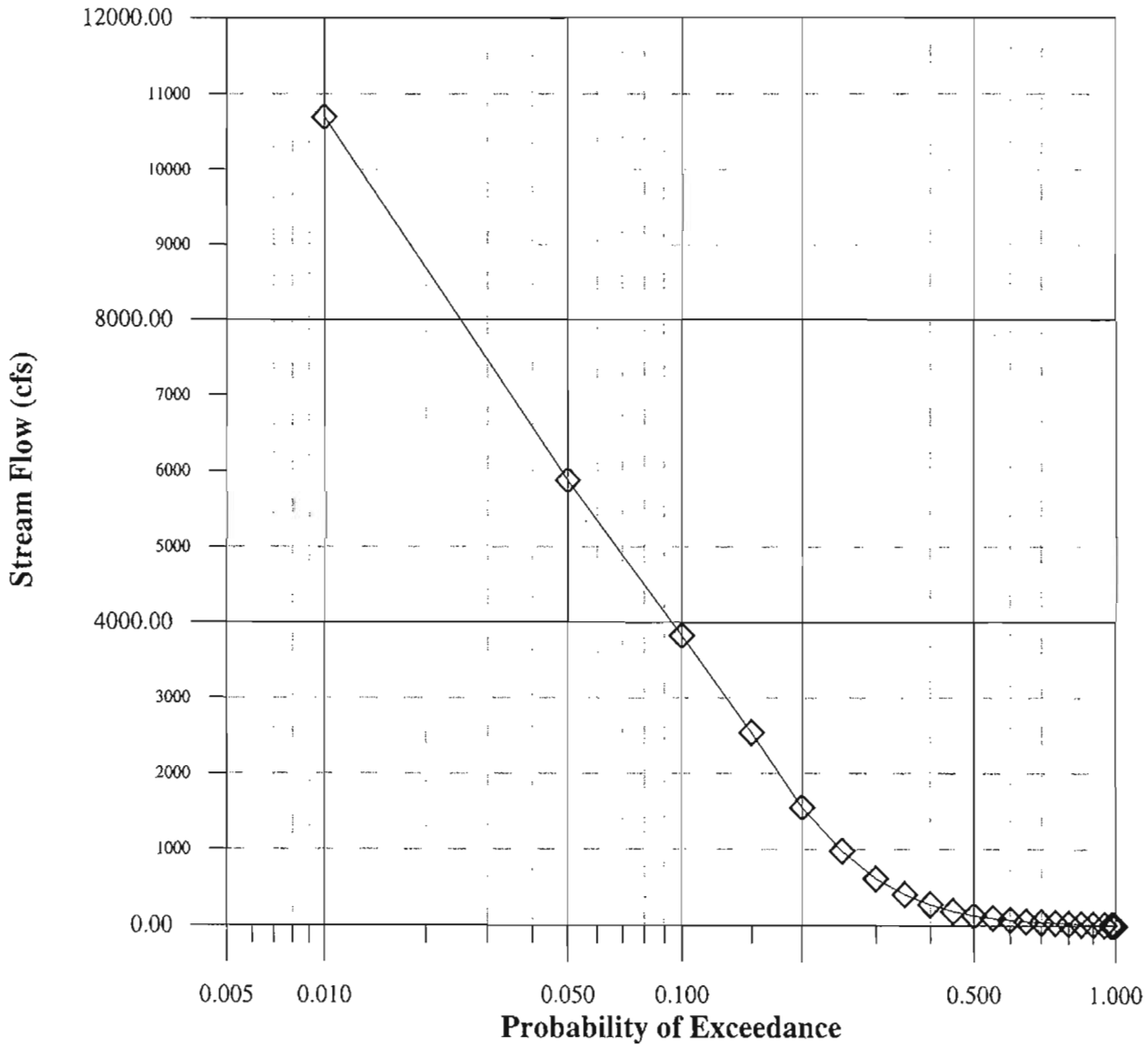
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Caney River near Ramona, OK |
| Station number | 07175500 |
| latitude (degrees, minutes, and seconds) | 363032 |
| longitude (degrees, minutes, and seconds) | 0955030 |
| hydrologic unit code | 11070106 |
| drainage area (square miles) | 1955 |
| contributing drainage area (square miles) | 1955 |
| gauge datum (feet above NGVD) | 586.43 |
| period of record | October 1945 - September 1993 |

| Percent Exceedance | Calculated Flows (cfs) |
|---|---|
| 1 percent = | 10700.000 |
| 5 percent = | 5880.000 |
| 10 percent = | 3820.000 |
| 15 percent = | 2540.000 |
| 20 percent = | 1550.000 |
| 25 percent = | 975.000 |
| 30 percent = | 613.000 |
| 35 percent = | 406.000 |
| 40 percent = | 275.000 |
| 45 percent = | 187.000 |
| 50 percent = | 129.000 |
| 55 percent = | 97.000 |
| 60 percent = | 73.000 |
| 65 percent = | 55.000 |
| 70 percent = | 44.000 |
| 75 percent = | 34.000 |
| 80 percent = | 27.000 |
| 85 percent = | 20.000 |
| 90 percent = | 15.000 |
| 95 percent = | 9.600 |
| 98 percent = | 5.200 |
| 99 percent = | 3.500 |
| 99.5 percent = | 1.200 |
| 99.9 percent = | 0.000 |

| | |
|---|---|
| Minimum flow: | 0.000 |
| Maximum flow: | 71,700.000 |
| Mean annual flow: | 1,148.661 |

# STREAM SYSTEM 2-14, CANEY RIVER



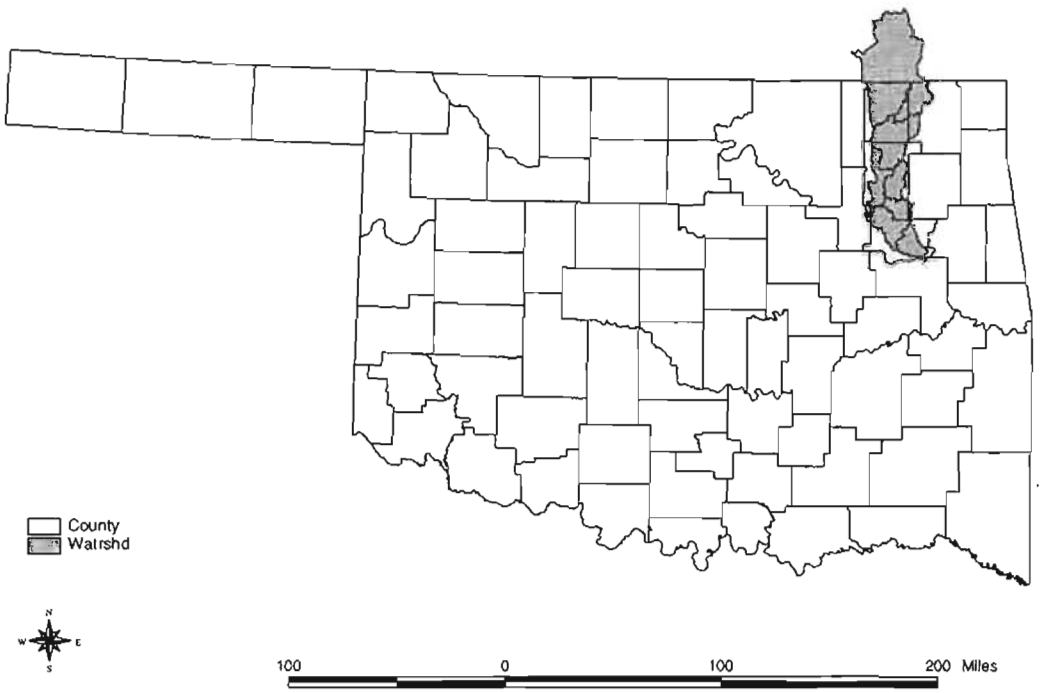
## STREAM SYSTEM 2-15: VERDIGRIS RIVER

### General Information

Stream system area - 1,539 $mi^2$

Total drainage area - 5,992 $mi^2$ (1,539 $mi^2$ in OK; 4,453 $mi^2$ in KS)

Major reservoirs and lakes - Oologah Lake




Index map showing Stream System 2-15: Verdrigis River.

### Estimated Available Water

Total Estimated Available Water:

| | |
|---|---|
| Stream Subsystem 2-15-2 | 2,391,316 acre-feet/year |
| Stream Subsystem 2-15-1 | 378,532 acre-feet/year |
| Stream System 2-15 | 2,769,848 acre-feet/year |

Adjusted Total Estimated Available Water:

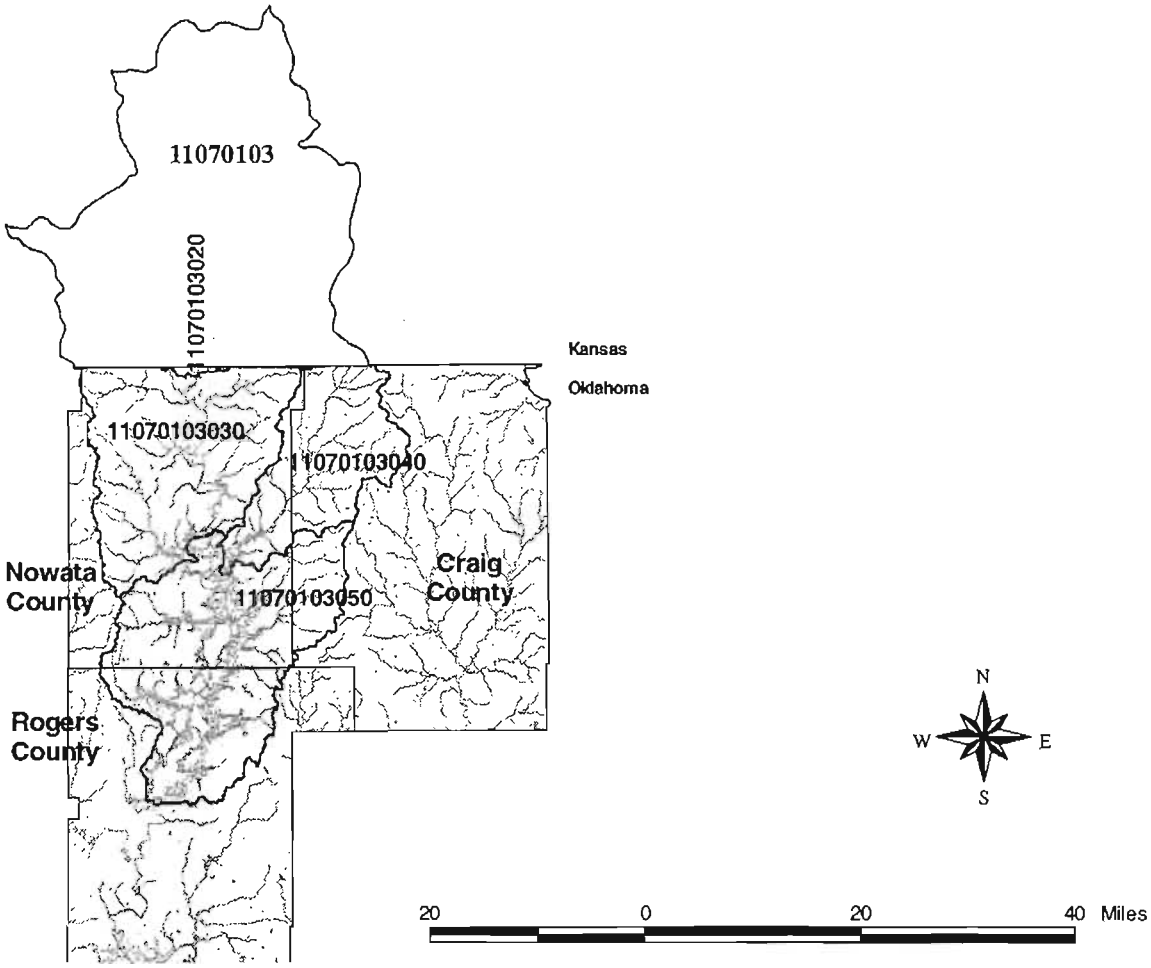
| | |
|---|---|
| Stream Subsystem 2-15-2 | 2,218,836 acre-feet/year |
| Stream Subsystem 2-15-1 | 378,532 acre-feet/year |
| Stream System 2-15 | 2,597,368 acre-feet/year |

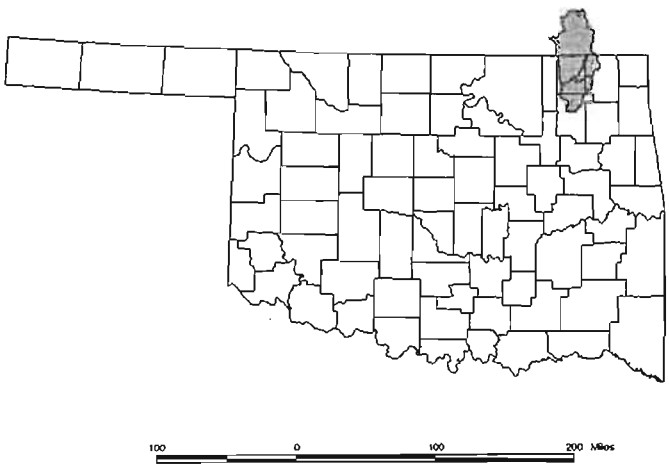
Total Dependable Yields Within Stream System:

Oologah Lake water supply dependable yield - 172,480 acre-feet/year

Total water supply storage - 342,600 acre-feet
Total water supply dependable yields - 172,480 acre-feet/year
SCS sediment pool storage - 0 acre-feet/year

# STREAM SUBSYSTEM 2-15-2: VERDIGRIS RIVER
## From Oologah Dam to Kansas State Line



## STREAM SUBSYSTEM 2-15-2: VERDIGRIS RIVER
### From Oologah Dam to Kansas State Line

### Verdigris River Above Oologah Dam

### General Information

Stream subsystem area - 833 $mi^2$

| Watersheds - | Hydrologic Unit Code - 1107 0103 |
|---|---|
| 1107 0103 020 | 3 $mi^2$ |
| 1107 0103 030 | 292 $mi^2$ |
| 1107 0103 040 | 171 $mi^2$ |
| 1107 0103 050 | 357 $mi^2$ |

Total drainage area - 4,329 $mi^2$ (823 $mi^2$ in OK; 3,506 $mi^2$ in KS)

Major tributaries - Opossum Creek, Cedar Creek, Mormon Creek, California Creek, East Fork, Brush Creek, Clear Creek, Big Creek, Salt Creek, Madden Creek

Major reservoirs or lakes - Oologah Lake

Mean annual runoff based on adjusted gauge flow - 10.6 inches
Mean annual net lake evaporation for stream subsystem - 12.0 inches
Estimated reservoir refill factor ($\alpha$) for stream subsystem - 1.9

### Available Estimated Water

USGS gauge 07171000 Verdigris River near Lenapah, OK.

Gauge Location: NE SW Sec.3-T27N-R16EIM, Nowata County - 3,639 $mi^2$ drainage area
Water Years 1967 - 1995:

Mean annual gauge flow - 2,837 cfs; 2,054,442 acre-feet
Mean annual gauge flow adjusted for upstream water use - 2,054,528 acre-feet
Mean annual runoff for 651.5 $mi^2$ below USGS gauge - 367,828 acre-feet
Mean annual net lake evaporation for Oologah Lake (48.5 $mi^2$) - 31,040 acre-feet

Mean annual flow adjusted for total drainage area of stream subsystem 2-15-2 - 2,391,316 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07171000 (WY 1967-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 107,078 | April | 252,662 | July | 146,441 | October | 144,903 |
| February | 123,048 | May | 271,848 | August | 58,244 | November | 176,120 |
| March | 267,235 | June | 313,908 | September | 69,579 | December | 123,992 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem

Total storage within stream subsystem - 342,600 acre-feet
Total dependable yields within stream subsystem - 172,480 acre-feet/year
SCS storage within stream sub-system - 0 acre-feet

**Total Estimated Available Water - 2,391,316 acre-feet/year**
**Total Estimated Storage/Dependable Yields - 172,480 acre-feet/year**
**Adjusted Total Estimated Available Water - 2,218,836 acre-feet/year**

| Watershed Codes | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1107 0103 020 | 3 $mi^2$ | 8,717 acre-feet/year |
| 1107 0103 030 | 292 $mi^2$ | 848,438 acre-feet/year |
| 1107 0103 040 | 171 $mi^2$ | 496,859 acre-feet/year |
| 1107 0103 050 | 357 $mi^2$ | 864,822 acre-feet/year |

## OOLOGAH LAKE

### Verdigris River Above Oologah Dam - Stream Subsystem 2-15-2

Hydrologic Unit Code - 1107 0103

Located on the Verdigris River
Nowata County

Drainage area - 4,339 $mi^2$
Surface area, flood pool - 67,120 acres
Surface area, conservation pool - 31,040 acres
Surface area, inactive pool - 880 acres

Flood control storage - 1,007,060 acre-feet
Conservation storage - 545,270 acre-feet
Water supply storage - 342,600 acre-feet
Navigation storage - 168,000 acre-feet
Sediment storage - 33,500 acre-feet
Note: Sum of the above does not equal 545,270 acre-feet (COE data)
Permanent storage - 6,940 acre-feet

Water supply dependable yield - 172,480 acre-feet/year
Navigation dependable yield - 91,224 acre-feet/year

**OWRB Reservoir ID #42**

**STREAM SUBSYSTEM 2-15-2:** Verdigris River from Oologah Dam to Kansas State Line

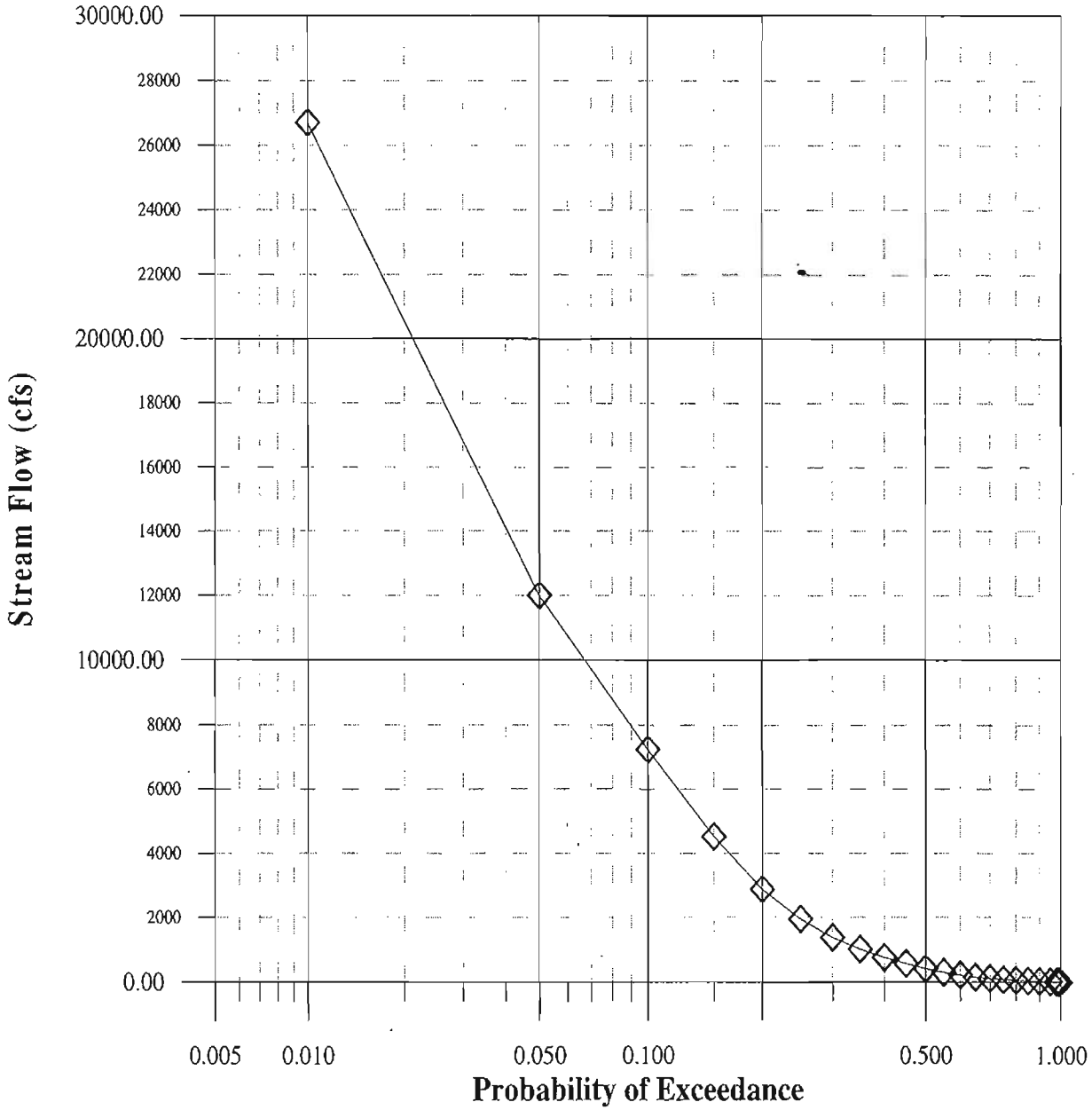
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Verdigris River near Lenapah, OK |
| Station number | 07171000 |
| latitude (degrees, minutes, and seconds) | 365104 |
| longitude (degrees, minutes, and seconds) | 0953509 |
| hydrologic unit code | 11070103 |
| drainage area (square miles) | 3639 |
| contributing drainage area (square miles) | 3639 |
| gauge datum (feet above NGVD) | 644.90 |
| period of record | October 1938 - September 1993 |

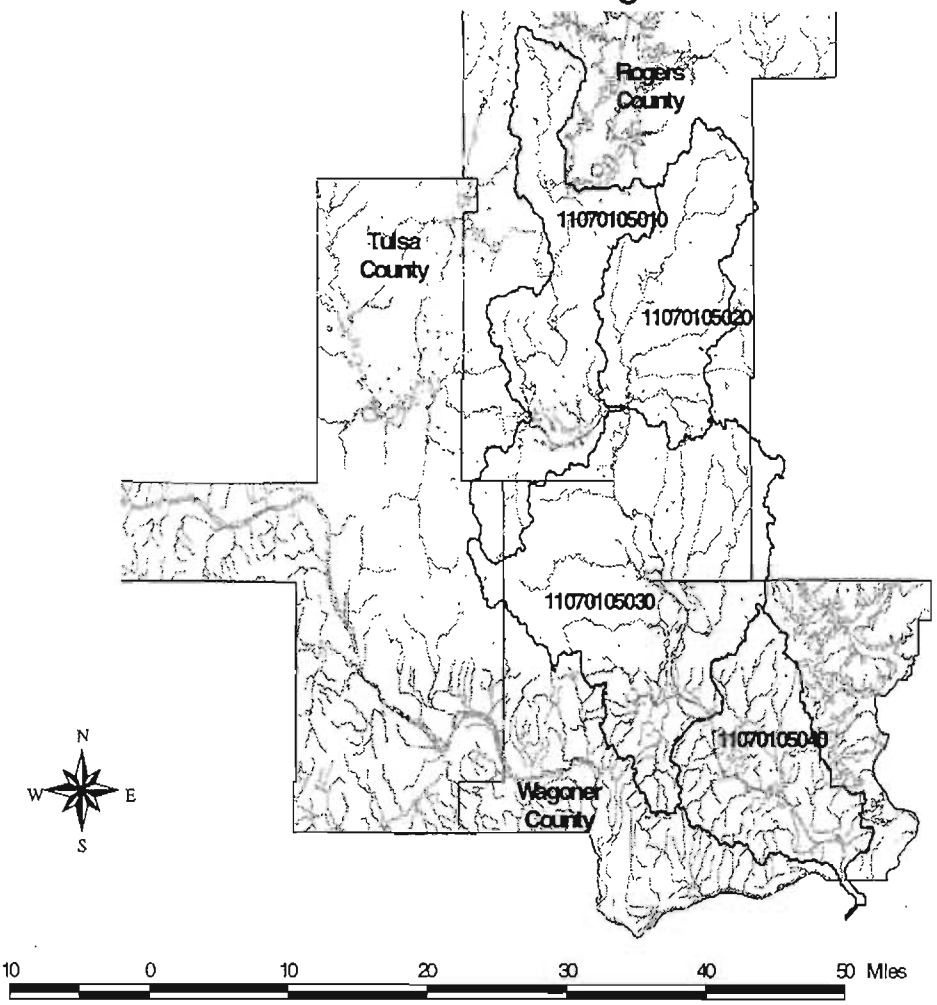
| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 26700.000 |
| 5 percent = | 12000.000 |
| 10 percent = | 7240.000 |
| 15 percent = | 4520.000 |
| 20 percent = | 2880.000 |
| 25 percent = | 1950.000 |
| 30 percent = | 1370.000 |
| 35 percent = | 1010.000 |
| 40 percent = | 755.000 |
| 45 percent = | 569.000 |
| 50 percent = | 411.000 |
| 55 percent = | 296.000 |
| 60 percent = | 212.000 |
| 65 percent = | 150.000 |
| 70 percent = | 104.000 |
| 75 percent = | 72.000 |
| 80 percent = | 50.000 |
| 85 percent = | 33.000 |
| 90 percent = | 20.000 |
| 95 percent = | 9.600 |
| 98 percent = | 3.900 |
| 99 percent = | 0.900 |
| 99.5 percent = | 0.000 |
| 99.9 percent = | 0.000 |

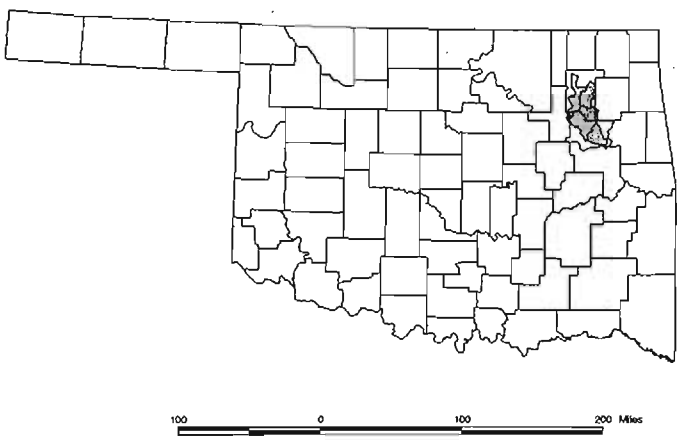
| | |
|---|---|
| Minimum flow: | 0.000 |
| Maximum flow: | 134,000.000 |
| Mean annual flow: | 2,414.833 |

# STREAM SUBSYSTEM 2-15-2, VERDIGRIS RIVER
## From Oologah Dam to Kansas State Line



# STREAM SUBSYSTEM 2-15-1: VERDIGRIS RIVER
## From Mouth to Oologah Dam



## STREAM SUBSYSTEM 2-15-1: VERDIGRIS RIVER
## From Mouth to Oologah Dam

### Mouth of Verdigris River to Oologah Dam

### General Information

Stream subsystem area - 716 $mi^2$ — Hydrologic Unit Code - 1107 0105

| Watersheds - | | |
|---|---|---|
| | 1107 0106 010 | 171 $mi^2$ |
| | 1107 0106 020 | 131 $mi^2$ |
| | 1107 0106 030 | 289 $mi^2$ |
| | 1107 0106 040 | 125 $mi^2$ |

Total drainage area - 8,303 $mi^2$ (3,850 $mi^2$ in OK; 4,453 $mi^2$ in KS)

Major tributaries - Dog Creek, Adams Creek, Bull Creek, Coal Creek

Major reservoirs or lakes - None

Mean annual runoff based on adjusted gauge flow - 9.7 inches
Mean annual net lake evaporation for stream subsystem - 10.3 inches
Estimated reservoir refill factor ($\alpha$) for stream subsystem - 2.0

### Estimated Available Water

USGS gauge 07176000 Verdigris River near Claremore, OK.

Gauge Location: NE NW Sec.15-T21N-R15EIM, Rogers County - 6,534 $mi^2$ drainage area
Water Years 1965 - 1995:

Mean annual gauge flow - 4,626 cfs; 3,349,964 acre-feet
Mean annual gauge flow adjusted for upstream water use - 3,389,054 acre-feet (includes flows from stream subsystem 2-15-2)
Mean annual runoff for 632 $mi^2$ below USGS gauge - 327,806 acre-feet

Mean annual flow adjusted for total drainage area of stream subsystem 2-15-1 - 378,532 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07176000 (WY 1965-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 210,836 | April | 479,672 | July | 276,583 | October | 210,159 |
| February | 181,155 | May | 441,168 | August | 82,477 | November | 268,495 |
| March | 406,849 | June | 478,184 | September | 86,483 | December | 228,180 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem

Total storage within stream subsystem - 0 acre-feet

Total dependable yields within stream subsystem - 0 acre-feet/year

SCS storage within stream sub-system - 0 acre-feet

**Total Estimated Available Water - 378,532 acre-feet/year**
**Total Estimated Storage/Dependable Yields - 0 acre-feet/year**
**Adjusted Total Estimated Available Water - 378,532 acre-feet/year**

| Watershed Codes | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1107 0106 010 | 171 $mi^2$ | 90,404 acre-feet/year |
| 1107 0106 020 | 131 $mi^2$ | 69,257 acre-feet/year |
| 1107 0106 030 | 289 $mi^2$ | 152,787 acre-feet/year |
| 1107 0106 040 | 125 $mi^2$ | 66,084 acre-feet/year |

**STREAM SUBSYSTEM 2-15-1:** Mouth of Verdigris River to Oologah Dam

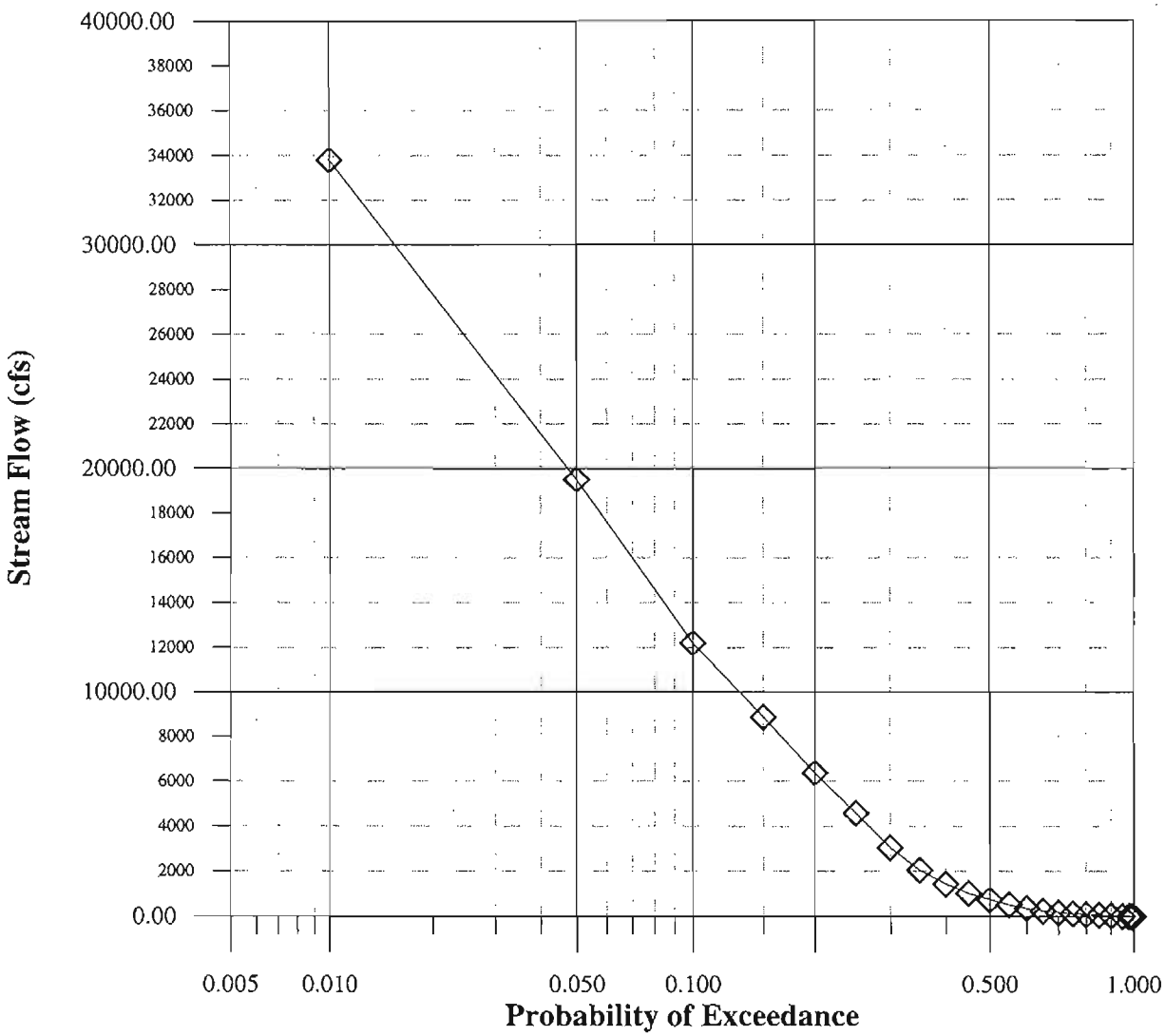
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Verdigris River near Claremore, OK |
| Station number | 07176000 |
| latitude (degrees, minutes, and seconds) | 361826 |
| longitude (degrees, minutes, and seconds) | 0954152 |
| hydrologic unit code | 11070105 |
| drainage area (square miles) | 6534 |
| contributing drainage area (square miles) | 6534 |
| gauge datum (feet above NGVD) | 538.62 |
| period of record | October 1935 - September 1993 |

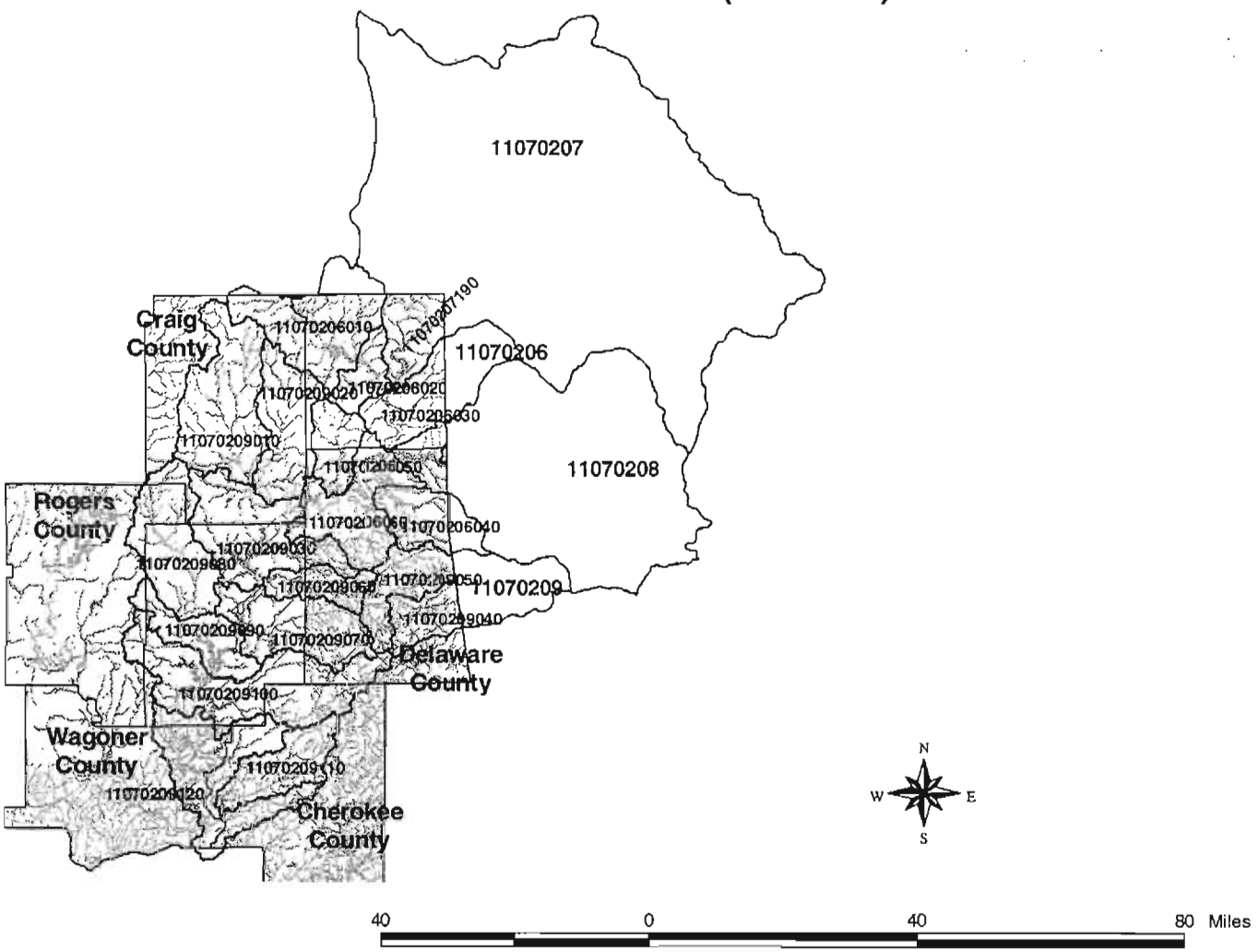
| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 34000.000 |
| 5 percent = | 19500.000 |
| 10 percent = | 12300.000 |
| 15 percent = | 8940.000 |
| 20 percent = | 6470.000 |
| 25 percent = | 4640.000 |
| 30 percent = | 3130.000 |
| 35 percent = | 2080.000 |
| 40 percent = | 1440.000 |
| 45 percent = | 1020.000 |
| 50 percent = | 737.000 |
| 55 percent = | 508.000 |
| 60 percent = | 347.000 |
| 65 percent = | 232.000 |
| 70 percent = | 163.000 |
| 75 percent = | 118.000 |
| 80 percent = | 80.000 |
| 85 percent = | 56.000 |
| 90 percent = | 35.000 |
| 95 percent = | 16.000 |
| 98 percent = | 5.800 |
| 99 percent = | 0.000 |
| 99.5 percent = | 0.000 |
| 99.9 percent = | 0.000 |

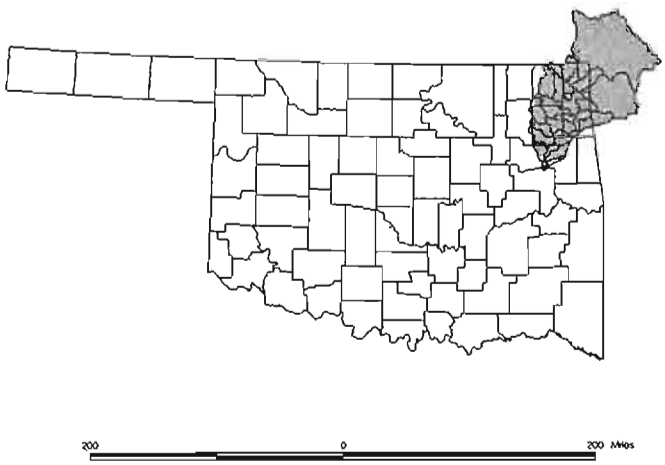
| | |
|---|---|
| Minimum flow: | 0.000 |
| Maximum flow: | 18,100.000 |
| Mean annual flow: | 4,080.022 |

# STREAM SUBSYSTEM 2-15-1, VERDIGRIS RIVER
## From Mouth to Oologah Dam



# STREAM SYSTEM 2-16: GRAND (NEOSHO) RIVER



## STREAM SYSTEM 2-16: GRAND (NEOSHO) RIVER FROM CONFLUENCE WITH ARKANSAS RIVER TO FT. GIBSON DAM

### General Information

Stream system area - 53 $mi^2$
Watershed - 1107 0209 120

Hydrologic Unit Code - portion of 1107 0209 120
243 $mi^2$ (53 $mi^2$ within this watershed)

Total drainage area - 12,547 $mi^2$ (2,952 $mi^2$ in OK including 2,899 $mi^2$ under Grand River Dam Authority (GRDA) jurisdiction; 9,595 $mi^2$ in KS, MO, and AR)

Major tributaries - None

Major reservoirs or lakes - None

Mean annual runoff based on gauge flow - 9.1 inches
Mean annual net lake evaporation for stream system - 3.5 inches
Estimated reservoir refill factor ($\alpha$) for stream system - 2.0

### Estimated Available Water

USGS gauge 07193500 Neosho River below Fort Gibson Lake near Fort Gibson, OK.

Gauge Location: NW NW Sec.19-T16N-R20EIM, Cherokee County - 12,495 $mi^2$ drainage area
Water Years 1963 - 1989:

Mean annual gauge flow - 8,403 cfs; 6,085,116 acre-feet
Mean annual gauge flow adjusted for upstream water use - No adjustment required
Mean annual runoff for 52 $mi^2$ below USGS gauge - 25,324 acre-feet

Monthly mean flow data for stream gauge 07193500 is unavailable.

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem
Total dependable yields within stream system - 84,000 acre-feet/year
SCS storage within stream system - 324 acre-feet/year

Estimated Available Water Within 2,952 $mi^2$ Drainage Basin Within Oklahoma
Total Estimated Available Water - 6,110,440 acre-feet/year
Total Storage/Dependable Yields - 84,324 acre-feet/year
Adjusted Total Estimated Available Water - 6,026,116 acre-feet/year

**Estimated Available Water Within 53 $mi^2$ Drainage Basin Under OWRB Jurisdication**
**Total Estimated Available Water -25,324 acre-feet/year**
**Total Storage/Dependable Yields - 324 acre-feet/year**
**Adjusted Total Estimated Available Water - 25,000 acre-feet/year***

* Note: The Adjusted Total Estimated Available Water does not take into account those stream water vested rights in the upper portions of the stream system. The vested rights are permits issued prior to the creation of the GRDA.

**STREAM SYSTEM 2-16**: Grand (Neosho) River from confluence with Arkansas River to Ft. Gibson Dam

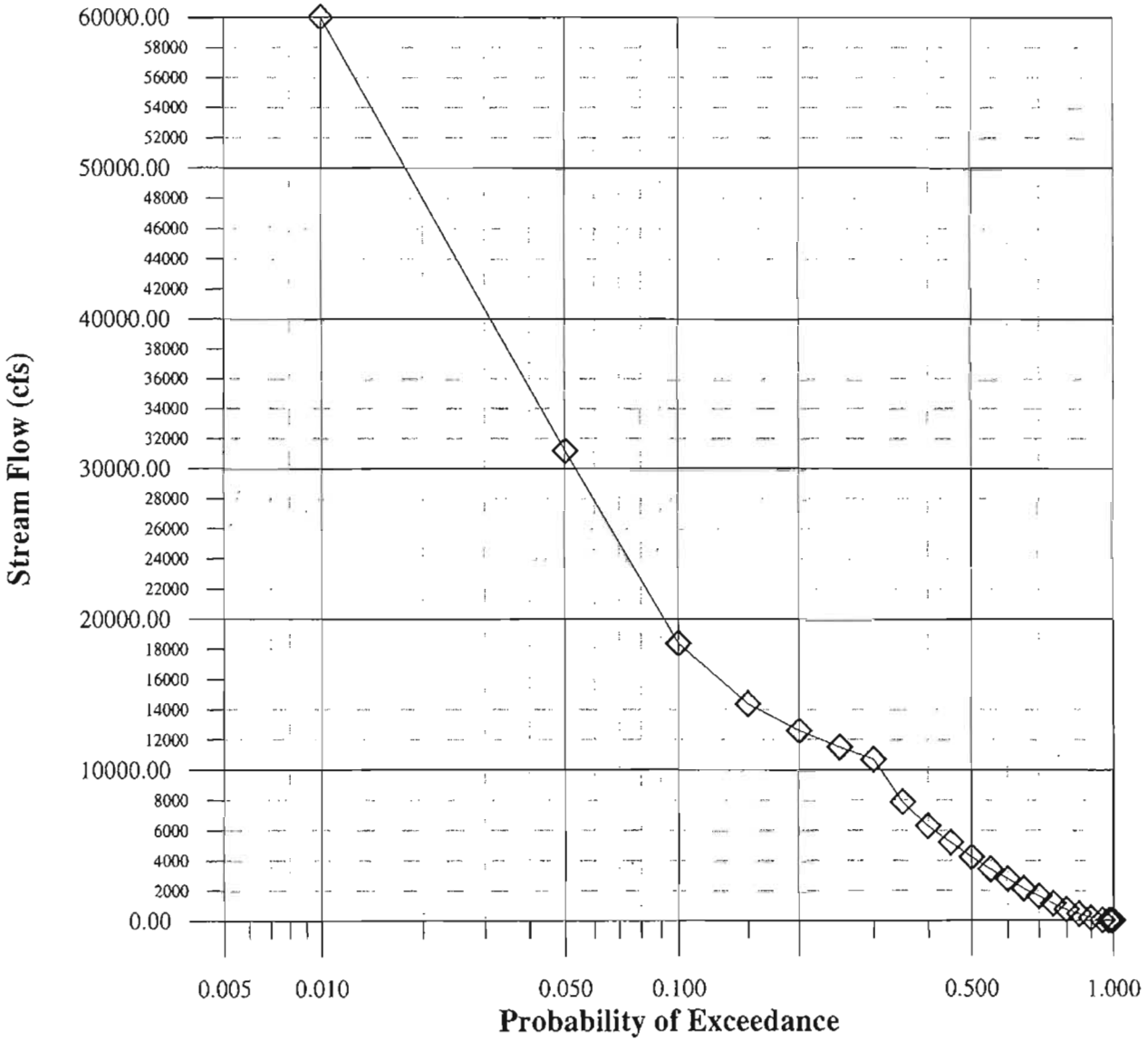
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Neosho River below Ft. Gibson Lake near Ft. Gibson, OK |
| Station number | 07193500 |
| latitude (degrees, minutes, and seconds) | 355110 |
| longitude (degrees, minutes, and seconds) | 0951344 |
| hydrologic unit code | 11070209 |
| drainage area (square miles) | 12495 |
| contributing drainage area (square miles) | 12495 |
| gauge datum (feet above NGVD) | 483.75 |
| period of record | October 1950 - September 1989 |

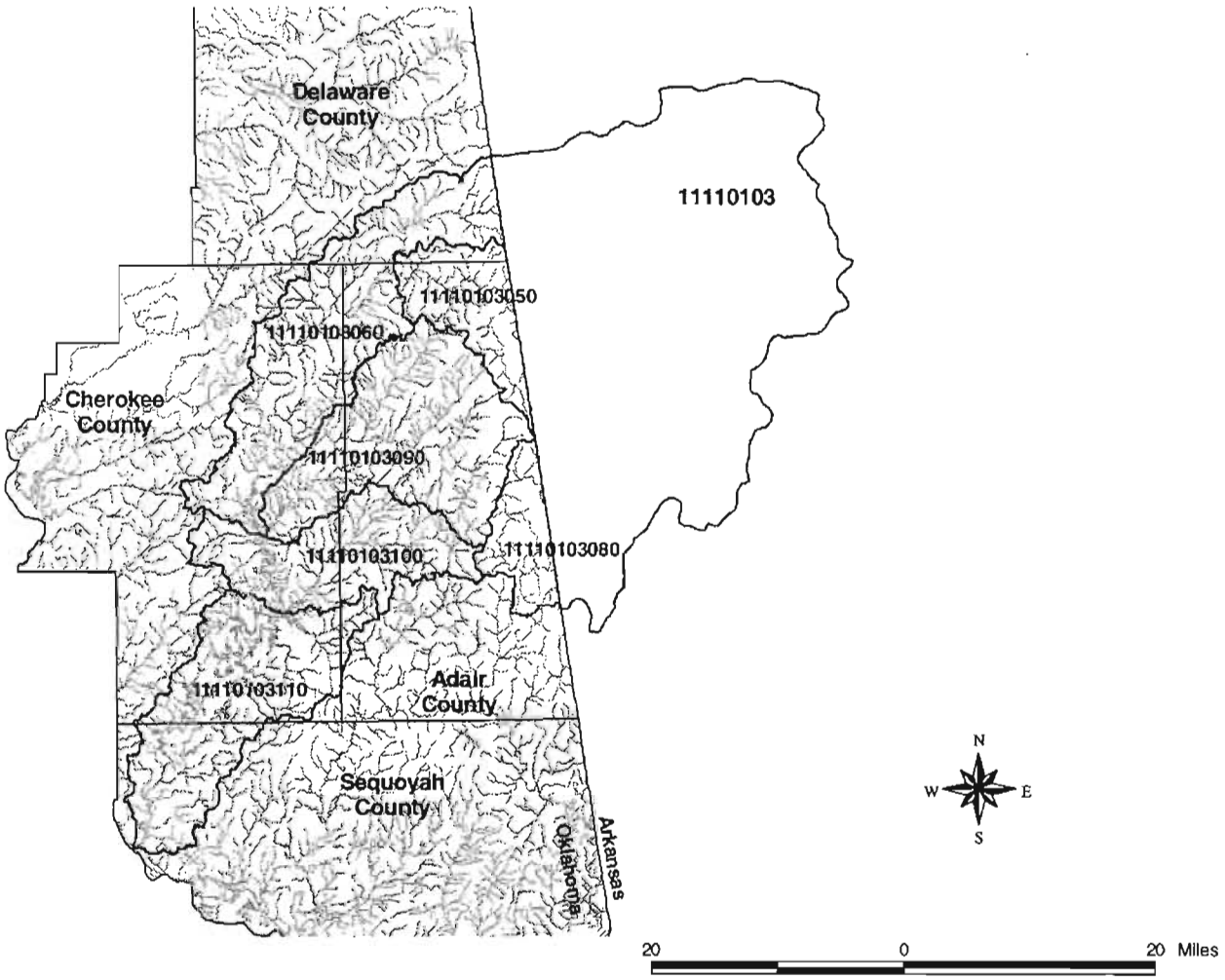
| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 60000.000 |
| 5 percent = | 31200.000 |
| 10 percent = | 18400.000 |
| 15 percent = | 14400.000 |
| 20 percent = | 12600.000 |
| 25 percent = | 11500.000 |
| 30 percent = | 10700.000 |
| 35 percent = | 7880.000 |
| 40 percent = | 6290.000 |
| 45 percent = | 5200.000 |
| 50 percent = | 4240.000 |
| 55 percent = | 3440.000 |
| 60 percent = | 2790.000 |
| 65 percent = | 2140.000 |
| 70 percent = | 1640.000 |
| 75 percent = | 1130.000 |
| 80 percent = | 740.000 |
| 85 percent = | 454.000 |
| 90 percent = | 187.000 |
| 95 percent = | 34.000 |
| 98 percent = | 15.000 |
| 99 percent = | 15.000 |
| 99.5 percent = | 15.000 |
| 99.9 percent = | 15.000 |

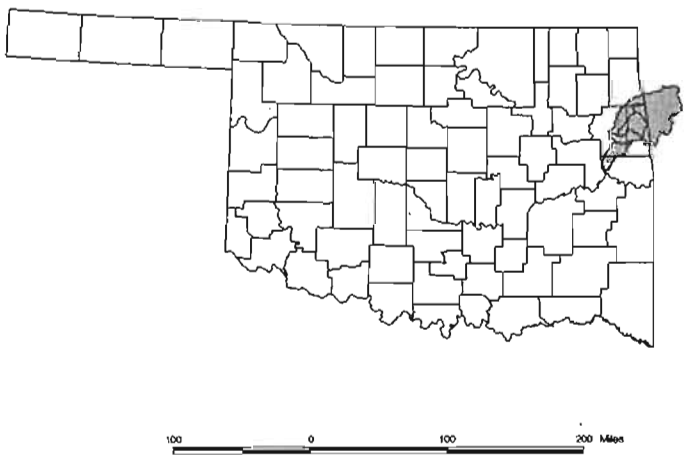
| | |
|---|---|
| Minimum flow: | 15.000 |
| Maximum flow: | 220,000.000 |
| Mean annual flow: | 8,401.239 |

# STREAM SYSTEM 2-16, GRAND (NEOSHO) RIVER
## From Confluence With Arkansas River to Ft. Gibson Dam



# STREAM SYSTEM 2-17: ILLINOIS RIVER



## STREAM SYSTEM 2-17: ILLINOIS RIVER

### General Information

Stream system area - 895 $mi^2$ Hydrologic Unit Code for Watershed - 1111 0103

| | | |
|---|---|---|
| Watershed - | 1111 0103 050 | 76 $mi^2$ |
| | 1111 0103 060 | 231 $mi^2$ |
| | 1111 0103 080 | 52 $mi^2$ |
| | 1111 0103 090 | 208 $mi^2$ |
| | 1111 0103 100 | 132 $mi^2$ |
| | 1111 0103 110 | 196 $mi^2$ |

Total drainage area for Illinois River - 1,643 $mi^2$ (895 $mi^2$ in OK; 748 $mi^2$ in AR)

Major tributaries - Ballard Creek, Flint Creek, Tyner Creek, Baron Fork, Caney Creek
Major reservoirs or lakes - Lake Frances (breached), Tenkiller Ferry Lake, Robert S. Kerr Reservoir

Mean annual runoff based on adjusted gauge flow - 13.3 inches
Mean annual net lake evaporation for stream system - 1.2 inches
Estimated reservoir refill factor ($\alpha$) for stream system - 2.0

### Estimated Available Water

USGS gauge 07198000 Illinois River near Gore, OK.

Gauge Location: NE SW Sec.27-T13N-R21EIM, Sequoyah County - 1,626 $mi^2$ drainage area
Water Years 1954 - 1995:

Mean annual gauge flow - 1,567 cfs; 1,134,759 acre-feet
Mean annual gauge flow adjusted for upstream water use - 1,149,806 acre-feet
Mean annual runoff for 33 $mi^2$ below USGS gauge - 23,316 acre-feet
Mean annual net lake evaporation for 2-17 arm of Robert S. Kerr Reservoir (1.0 $mi^2$) - 105 acre-feet

Mean annual flow adjusted for total drainage area of stream system 2-17 - 1,173,017 acre-feet/year

**Table of monthly mean flows (acre-feet) from USGS gauge 07198000 (WY 1954-1995)**

| Month | Acre-feet | Month | Acre-feet | Month | Acre-feet | Month | Acre-feet |
|---|---|---|---|---|---|---|---|
| January | 101,359 | April | 160,466 | July | 80,263 | October | 50,126 |
| February | 92,161 | May | 145,887 | August | 53,139 | November | 75,531 |
| March | 123,131 | June | 107,791 | September | 39,819 | December | 105,295 |

Reservoir's Storage/Dependable Yields Within Stream System or Subsystem
Total storage within stream system - 25,400 acre-feet
Total dependable yields within stream system - 29,792 acre-feet/year

SCS storage within stream system - 258 acre-feet/year

**Total Estimated Available Water - 1,173,017 acre-feet/year**
**Total Estimated Storage/Dependable Yields - 30,050 acre-feet/year**
**Adjusted Total Estimated Available Water - 1,142,967 acre-feet**

| Watershed Code | Area | Adjusted Total Estimated Available Water |
|---|---|---|
| 1111 0103 050 | 76 $mi^2$ | 99,608 acre-feet/year |
| 1111 0103 060 | 231 $mi^2$ | 302,756 acre-feet/year |
| 1111 0103 080 | 52 $mi^2$ | 68,153 acre-feet/year |
| 1111 0103 090 | 208 $mi^2$ | 272,354 acre-feet/year |
| 1111 0103 100 | 132 $mi^2$ | 173,004 acre-feet/year |
| 1111 0103 110 | 196 $mi^2$ | 227,092 acre-feet/year |

## LAKE FRANCES
## (Breached)

**Illinois River - Stream System 2-17**

Hydrologic Unit Code - 1111 0103 050

Located on the Illinois River
Adair County

Drainage area - undetermined
Surface area, conservation pool - 562 acres

Water supply storage - 0 acre-feet
Water supply dependable yield - 0 acre-feet/year

**OWRB Reservoir ID #66**

## TENKILLER FERRY LAKE

**Illinois River - Stream System 2-17**

Hydrologic Unit Code - 1111 0103 110

Located on the Illinois River
Sequoyah County

Drainage area - 1,610 $mi^2$
Surface area, flood pool - 20,800 acres
Surface area, conservation pool - 12,900 acres
Surface area, inactive pool - undetermined

Flood control storage - 576,700 acre-feet
Conservation storage - 371,000 acre-feet:
    Water supply storage - 25,400 acre-feet
    Power drawdown storage - 345,600 acre-feet
Inactive storage - 283,100 acre-feet

Water supply dependable yield - 29,792 acre-feet/year
Hydropower dependable yield - 151,200 acre-feet/year

**OWRB Reservoir ID #58**

## ROBERT S. KERR RESERVOIR/LOCK AND DAM

**Illinois River - Stream System 2-17**
**Canadian River to the North Canadian River - Stream System 2-3**
**Middle Arkansas River - Stream System 2-4**
**Lower Arkansas River - Stream System 2-2**

Hydrologic Unit Code - 1111 0103
1109 0204
1111 0102
1111 0104

Located on the Arkansas River
Sequoyah and LeFlore Counties

Drainage area - 147,756 $mi^2$ of which 22,241 $mi^2$ is noncontributing
Surface area, power pool - 32,800 acres

Top of power pool - 525,700 acre-feet
Power pondage - 84,700 acre-feet

Water supply storage - 0 acre-feet
Water supply dependable yield - 0 acre-feet/year

**OWRB Reservoir ID #49**

## STREAM SYSTEM 2-17: ILLINOIS RIVER

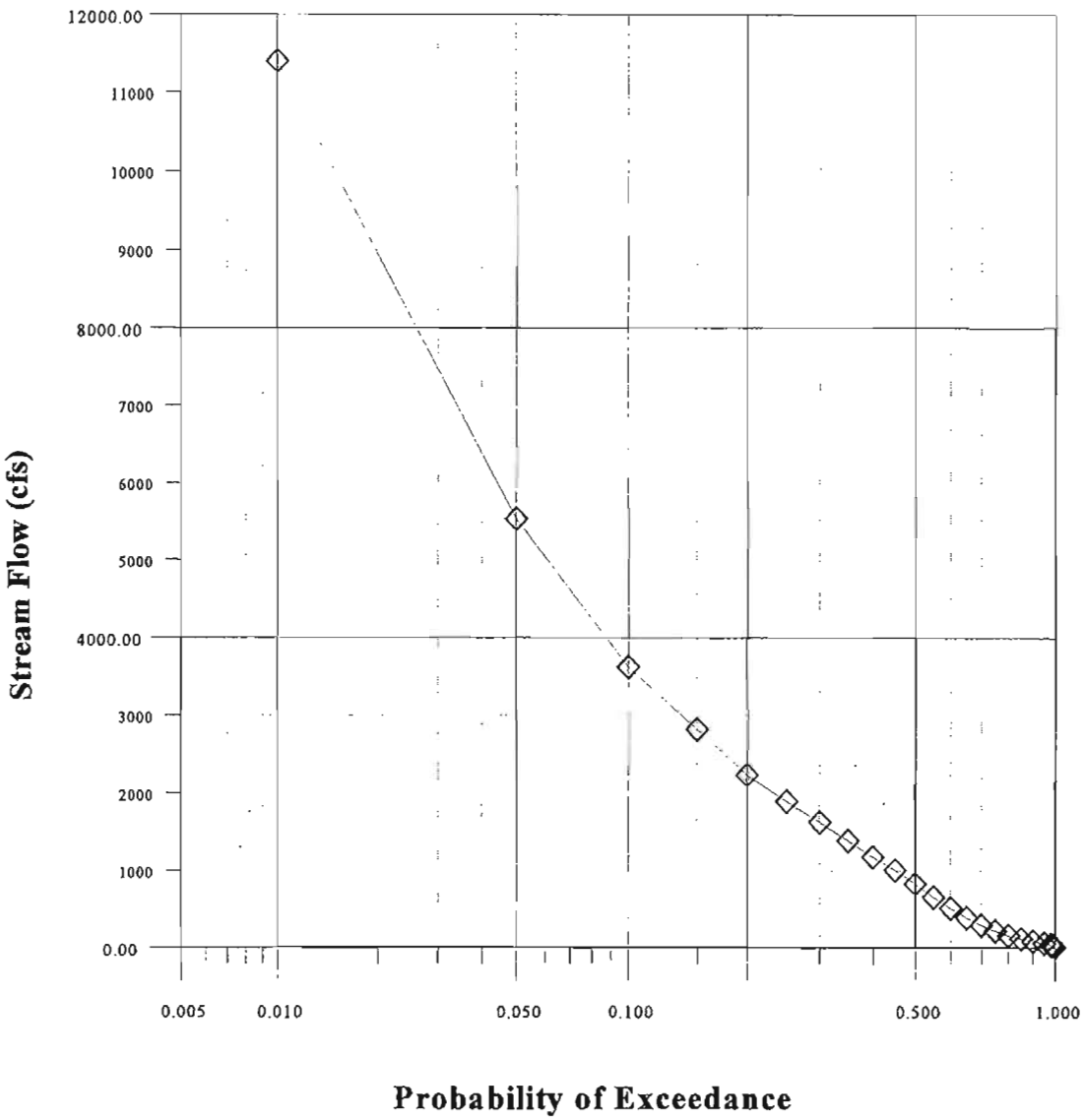
US Geological Survey Daily Mean Discharge Data

| | |
|---|---|
| Station name | Illinois River near Gore, OK |
| Station number | 07198000 |
| latitude (degrees, minutes, and seconds) | 353423 |
| longitude (degrees, minutes, and seconds) | 0950407 |
| hydrologic unit code | 11110103 |
| drainage area (square miles) | 1626 |
| contributing drainage area (square miles) | 1626 |
| gauge datum (feet above NGVD) | 468.00 |
| period of record | April 1939 - September 1993 |

| **Percent Exceedance** | **Calculated Flows (cfs)** |
|---|---|
| 1 percent = | 11400.000 |
| 5 percent = | 5530.000 |
| 10 percent = | 3620.000 |
| 15 percent = | 2820.000 |
| 20 percent = | 2240.000 |
| 25 percent = | 1900.000 |
| 30 percent = | 1630.000 |
| 35 percent = | 1390.000 |
| 40 percent = | 1180.000 |
| 45 percent = | 1010.000 |
| 50 percent = | 831.000 |
| 55 percent = | 655.000 |
| 60 percent = | 513.000 |
| 65 percent = | 389.000 |
| 70 percent = | 292.000 |
| 75 percent = | 217.000 |
| 80 percent = | 157.000 |
| 85 percent = | 115.000 |
| 90 percent = | 84.000 |
| 95 percent = | 56.000 |
| 98 percent = | 37.000 |
| 99 percent = | 28.000 |
| 99.5 percent = | 19.000 |
| 99.9 percent = | 5.200 |

| | |
|---|---|
| Minimum flow: | 2.100 |
| Maximum flow: | 147,000.000 |
| Mean annual flow: | 1,589.273 |

# STREAM SYSTEM 2-17, ILLINOIS RIVER



# APPENDIX B

## SUMMARY OF HYDROLOGIC DATA OF AVAILABLE WATER WITHIN THE ARKANSAS RIVER BASIN

# TOTAL ESTIMATED AVAILABLE WATER BY STREAM SYSTEM
# ARKANSAS RIVER BASIN

| STREAM SYSTEM<br><br>(available water based on mean annual flow) | Drainage Area of Stream System, Subsystem or Watershed<br><br>($mi^2$) | Total Estimated Available Water From Stream System and Generated in the Subsystem<br><br>(acre-feet) | Total Dependable Yields from Reservoirs within each Stream System or Subsystem<br><br>(acre-feet) | Total Sediment Pool for SCS Structures within each Stream System or Subsystem<br><br>(acre-feet) | Adjusted Total Estimated Available Water within the Streams of each Stream System or Subsystem<br><br>(acre-feet) |
|---|---|---|---|---|---|
| ARKANSAS RIVER SYSTEM | 42,168 | 22,140,865 | 626,961 | 158,322 | 21,355,582 |
| 2-1 Poteau River | 1,345 | 2,412,968 | 32,887 | 8,327 | 2,371,754 |
| 1111 0105 020 | 54 | 96,878 | 0 | 0 | 96,878 |
| 1111 0105 030 | 129 | 231,430 | 0 | 0 | 231,430 |
| 1111 0105 040 | 189 | 339,071 | 0 | 6,885 | 332,186 |
| 1111 0105 050 | 199 | 357,012 | 1,523 | 481 | 355,008 |
| 1111 0105 060 | 92 | 165,051 | 31,364 | 0 | 133,687 |
| 1111 0105 070 | 137 | 245,782 | 0 | 666 | 245,116 |
| 1111 0105 080 | 171 | 306,779 | 0 | 0 | 306,779 |
| 1111 0105 090 | 231 | 414,421 | 0 | 295 | 414,126 |
| 1111 0105 100 | 52 | 93,289 | 0 | 0 | 93,289 |
| 1111 0105 110 | 90 | 161,463 | 0 | 0 | 161,463 |
| 1111 0105 120 | 1 | 1,794 | 0 | 0 | 1,794 |
| 2-2 Main stem of the Arkansas River | 1,448 | 1,028,272 | 0 | 9,653 | 1,018,619 |
| 1111 0104 010 | 345 | 244,996 | 0 | 0 | 244,996 |
| 1111 0104 020 | 180 | 127,824 | 0 | 0 | 127,824 |
| 1111 0104 030 | 290 | 205,938 | 0 | 9,653 | 196,285 |
| 1111 0104 040 | 243 | 172,562 | 0 | 0 | 172,562 |
| 1111 0104 050 | 170 | 120,723 | 0 | 0 | 120,723 |
| 1111 0104 070 | 190 | 134,925 | 0 | 0 | 134,925 |
| 1111 0104 080 | 30 | 21,304 | 0 | 0 | 21,304 |
| 2-3 Canadian River [5] | 410 | 2,174,741 | 336 | 0 | 2,174,405 |
| 1109 0204 070 | 226 | 1,198,760 | 336 | 0 | 1,198,424 |

| STREAM SYSTEM<br><br>(available water based on mean annual flow) | Drainage Area of Stream System, Subsystem or Watershed<br><br>($mi^2$) | Total Estimated Available Water From Stream System and Generated in the Subsystem<br><br>(acre-feet) | Total Dependable Yields from Reservoirs within each Stream System or Subsystem<br><br>(acre-feet) | Total Sediment Pool for SCS Structures within each Stream System or Subsystem<br><br>(acre-feet) | Adjusted Total Estimated Available Water within the Streams of each Stream System or Subsystem<br><br>(acre-feet) |
|---|---|---|---|---|---|
| 1109 0204 080 | 184 | 975,981 | 0 | 0 | 975,981 |
| 2-4 Main stem of the Arkansas River | 2,161 | 1,485,317 | 1,904 | 2,551 | 1,480,862 |
| 1111 0101 010 | 371 | 254,999 | 1,904 | 0 | 253,095 |
| 1111 0101 020 | 208 | 142,964 | 0 | 0 | 142,964 |
| 1111 0101 030 | 181 | 124,406 | 0 | 0 | 124,406 |
| 1111 0101 040 | 249 | 171,145 | 0 | 272 | 170,873 |
| 1111 0101 050 | 159 | 109,285 | 0 | 2,279 | 107,006 |
| 1111 0101 060 | 208 | 142,964 | 0 | 0 | 142,964 |
| 1111 0102 010 | 173 | 118,908 | 0 | 0 | 118,908 |
| 1111 0102 020 | 99 | 68,046 | 0 | 0 | 68,046 |
| 1111 0102 030 | 89 | 61,172 | 0 | 0 | 61,172 |
| 1111 0102 040 | 108 | 74,231 | 0 | 0 | 74,231 |
| 1111 0102 050 | 109 | 74,919 | 0 | 0 | 74,919 |
| 1111 0102 060 | 99 | 68,046 | 0 | 0 | 68,046 |
| 1111 0102 070 | 108 | 74,231 | 0 | 0 | 74,231 |
| 2-5 North Canadian River | 9,363 | 716,171 | 41,656 | 33,503 | 641,012 |
| Subsystem 2-5-4 | 3,660 | 8,839 | 0 | 0 | 8,839 |
| 1110 0101 020 | 41 | 99 | 0 | 0 | 99 |
| 1110 0101 030 | 19 | 46 | 0 | 0 | 46 |
| 1110 0101 040 | 450 | 1,087 | 0 | 0 | 1,087 |
| 1110 0101 050 | 258 | 623 | 0 | 0 | 623 |
| 1110 0101 060 | 200 | 483 | 0 | 0 | 483 |
| 1110 0101 070 | 183 | 442 | 0 | 0 | 442 |
| 1110 0101 080 | 185 | 447 | 0 | 0 | 447 |
| 1110 0101 090 | 175 | 423 | 0 | 0 | 423 |
| 1110 0101 100 | 305 | 737 | 0 | 0 | 737 |

| STREAM SYSTEM<br><br>(available water based on mean annual flow) | Drainage Area of Stream System, Subsystem or Watershed<br><br>($mi^2$) | Total Estimated Available Water From Stream System and Generated in the Subsystem<br><br>(acre-feet) | Total Dependable Yields from Reservoirs within each Stream System or Subsystem<br><br>(acre-feet) | Total Sediment Pool for SCS Structures within each Stream System or Subsystem<br><br>(acre-feet) | Adjusted Total Estimated Available Water within the Streams of each Stream System or Subsystem<br><br>(acre-feet) |
|---|---|---|---|---|---|
| 1110 0102 010 | 234 | 565 | 0 | 0 | 565 |
| 1110 0102 020 | 166 | 401 | 0 | 0 | 401 |
| 1110 0102 030 | 108 | 261 | 0 | 0 | 261 |
| 1110 0102 040 | 293 | 708 | 0 | 0 | 708 |
| 1110 0102 050 | 235 | 568 | 0 | 0 | 568 |
| 1110 0102 060 | 257 | 621 | 0 | 0 | 621 |
| 1110 0103 010 | 13 | 31 | 0 | 0 | 31 |
| 1110 0103 020 | 109 | 263 | 0 | 0 | 263 |
| 1110 0103 040 | 27 | 65 | 0 | 0 | 65 |
| 1110 0103 050 | 207 | 500 | 0 | 0 | 500 |
| 1110 0104 050 | 25 | 60 | 0 | 0 | 60 |
| 1110 0104 060 | 55 | 133 | 0 | 0 | 133 |
| 1110 0104 070 | 66 | 159 | 0 | 0 | 159 |
| 1110 0104 080 | 49 | 118 | 0 | 0 | 118 |
| **Subsystem 2-5-3** | **3,080** | **114,257** | **18,928** | **202** | **95,127** |
| 1110 0201 010 | 218 | 8,087 | 0 | 0 | 8,087 |
| 1110 0201 020 | 86 | 3,190 | 0 | 0 | 3,190 |
| 1110 0201 030 | 242 | 8,977 | 224 | 0 | 8,753 |
| 1110 0201 040 | 24 | 890 | 0 | 0 | 890 |
| 1110 0201 050 | 163 | 6,047 | 0 | 0 | 6,047 |
| 1110 0201 060 | 107 | 3,969 | 0 | 0 | 3,969 |
| 1110 0201 070 | 219 | 8,124 | 0 | 202 | 7,922 |
| 1110 0201 080 | 110 | 4,081 | 0 | 0 | 4,081 |
| 1110 0201 090 | 160 | 5,935 | 0 | 0 | 5,935 |
| 1110 0203 010 | 1 | 37 | 0 | 0 | 37 |
| 1110 0203 020 | 387 | 14,356 | 0 | 0 | 14,356 |
| 1110 0203 030 | 272 | 10,090 | 0 | 0 | 10,090 |

| STREAM SYSTEM<br><br>(available water based on mean annual flow) | Drainage Area of Stream System, Subsystem or Watershed<br><br>($mi^2$) | Total Estimated Available Water From Stream System and Generated in the Subsystem<br><br>(acre-feet) | Total Dependable Yields from Reservoirs within each Stream System or Subsystem<br><br>(acre-feet) | Total Sediment Pool for SCS Structures within each Stream System or Subsystem<br><br>(acre-feet) | Adjusted Total Estimated Available Water within the Streams of each Stream System or Subsystem<br><br>(acre-feet) |
|---|---|---|---|---|---|
| 1110 0301 010 | 344 | 12,761 | 0 | 0 | 12,761 |
| 1110 0301 020 | 172 | 6,381 | 0 | 0 | 6,381 |
| 1110 0301 030 | 131 | 4,860 | 0 | 0 | 4,860 |
| 1110 0301 040 | 157 | 5,824 | 0 | 0 | 5,824 |
| 1110 0301 050 | 287 | 10,647 | 18,704 | 0 | (8,057) |
| Subsystem 2-5-2 | 758 | 55,529 | 5,000 | 709 | 49,820 |
| 1110 0301 060 | 326 | 23,882 | 0 | 0 | 23,882 |
| 1110 0301 070 | 163 | 11,941 | 0 | 0 | 11,941 |
| 1110 0301 080 | 269 | 19,706 | 5,000 | 709 | 13,997 |
| Subsystem 2-5-1 | 1,865 | 537,546 | 17,728 | 32,592 | 487,226 |
| 1110 0302 010 | 124 | 35,740 | 0 | 0 | 35,740 |
| 1110 0302 020 | 270 | 77,822 | 4,400 | 14,065 | 59,357 |
| 1110 0302 030 | 271 | 78,110 | 0 | 0 | 78,110 |
| 1110 0302 040 | 249 | 71,769 | 0 | 0 | 71,769 |
| 1110 0302 050 | 263 | 75,804 | 0 | 13,801 | 62,003 |
| 1110 0302 060 | 207 | 59,663 | 0 | 4,726 | 54,937 |
| 1110 0302 070 | 91 | 26,229 | 0 | 0 | 26,229 |
| 1110 0302 080 | 190 | 54,763 | 0 | 0 | 54,763 |
| 1110 0302 090 | 200 | 57,646 | 13,328 | 0 | 44,318 |
| 2-6 Canadian River [5] | 5,398 | 1,099,253 | 35,576 | 3,789 | 1,059,888 |
| Subsystem 2-6-3 | 1,994 | 214,851 | 0 | 1,117 | 213,734 |
| 1109 0201 010 | 322 | 34,695 | 0 | 0 | 34,695 |
| 1109 0201 020 | 307 | 33,079 | 0 | 0 | 33,079 |
| 1109 0201 030 | 287 | 30,924 | 0 | 0 | 30,924 |
| 1109 0201 040 | 241 | 25,967 | 0 | 0 | 25,967 |
| 1109 0201 050 | 271 | 29,200 | 0 | 0 | 29,200 |
| 1109 0201 060 | 340 | 36,635 | 0 | 312 | 36,323 |

| STREAM SYSTEM<br><br>(available water based on mean annual flow) | Drainage Area of Stream System, Subsystem or Watershed<br><br>($mi^2$) | Total Estimated Available Water From Stream System and Generated in the Subsystem<br><br>(acre-feet) | Total Dependable Yields from Reservoirs within each Stream System or Subsystem<br><br>(acre-feet) | Total Sediment Pool for SCS Structures within each Stream System or Subsystem<br><br>(acre-feet) | Adjusted Total Estimated Available Water within the Streams of each Stream System or Subsystem<br><br>(acre-feet) |
|---|---|---|---|---|---|
| 1109 0201 070 | 226 | 24,351 | 0 | 805 | 23,546 |
| Subsystem 2-6-2 | 948 | 367,792 | 0 | 121 | 367,671 |
| 1109 0202 010 | 268 | 103,975 | 0 | 121 | 103,854 |
| 1109 0202 020 | 96 | 156,230 | 0 | 0 | 156,230 |
| 1109 0202 030 | 203 | 78,757 | 0 | 0 | 78,757 |
| 1109 0202 040 | 381 | 147,815 | 0 | 0 | 147,815 |
| Subsystem 2-6-1 | 2,456 | 516,610 | 35,576 | 2,551 | 478,483 |
| 1109 0204 010 | 335 | 70,466 | 0 | 887 | 69,579 |
| 1109 0204 020 | 223 | 46,907 | 0 | 222 | 46,685 |
| 1109 0204 030 | 227 | 47,749 | 9,200 | 0 | 38,549 |
| 1109 0204 040 | 330 | 69,414 | 0 | 0 | 69,414 |
| 1109 0204 050 | 217 | 45,645 | 0 | 0 | 45,645 |
| 1109 0204 060 | 240 | 50,483 | 26,376 | 0 | 24,107 |
| 1109 0202 050 | 110 | 23,138 | 0 | 0 | 23,138 |
| 1109 0202 060 | 279 | 58,687 | 0 | 0 | 58,687 |
| 1109 0202 070 | 226 | 47,538 | 0 | 1,442 | 46,096 |
| 1109 0202 080 | 269 | 56,583 | 0 | 0 | 56,583 |
| 2-7 Deep Fork River [5] | 2,537 | 862,965 | 42,102 | 46,114 | 774,749 |
| 1110 030 010 | 222 | 75,514 | 12,320 | 594 | 62,600 |
| 1110 030 020 | 200 | 68,030 | 0 | 2,941 | 65,089 |
| 1110 030 030 | 64 | 21,770 | 0 | 0 | 21,770 |
| 1110 030 040 | 181 | 61,567 | 4,558 | 1,913 | 55,096 |
| 1110 030 050 | 263 | 89,460 | 751 | 4,621 | 84,088 |
| 1110 030 060 | 193 | 65,649 | 0 | 0 | 65,649 |
| 1110 030 070 | 131 | 44,560 | 0 | 721 | 43,839 |
| 1110 030 080 | 117 | 39,798 | 1,299 | 159 | 38,340 |
| 1110 030 090 | 178 | 60,547 | 0 | 1,163 | 59,384 |

| STREAM SYSTEM<br><br>(available water based on mean annual flow) | Drainage Area of Stream System, Subsystem or Watershed<br><br>($mi^2$) | Total Estimated Available Water From Stream System and Generated in the Subsystem<br><br>(acre-feet) | Total Dependable Yields from Reservoirs within each Stream System or Subsystem<br><br>(acre-feet) | Total Sediment Pool for SCS Structures within each Stream System or Subsystem<br><br>(acre-feet) | Adjusted Total Estimated Available Water within the Streams of each Stream System or Subsystem<br><br>(acre-feet) |
|---|---|---|---|---|---|
| 1110 030 100 | 261 | 88,780 | 0 | 15,174 | 73,606 |
| 1110 030 110 | 308 | 104,767 | 7,214 | 18,435 | 79,118 |
| 1110 030 120 | 172 | 58,506 | 0 | 393 | 58,113 |
| 1110 030 130 | 247 | 84,017 | 15,960 | 0 | 68,057 |
| 2-8 Little River | 980 | 321,192 | 21,700 | 2,846 | 296,646 |
| 1109 0203 010 | 259 | 84,886 | 21,700 | 0 | 63,186 |
| 1109 0203 020 | 345 | 113,073 | 0 | 0 | 113,073 |
| 1109 0203 030 | 238 | 78,004 | 0 | 2,846 | 75,158 |
| 1109 0203 040 | 138 | 45,229 | 0 | 0 | 45,229 |
| 2-9 Cimarron River | 8,350 | 1,842,536 | 16,632 | 20,626 | 1,805,278 |
| Subsystem 2-9-4 | 697 | 27,298 | 0 | 0 | 27,298 |
| 1104 0001 020 | 15 | 587 | 0 | 0 | 587 |
| 1104 0001 040 | 4 | 157 | 0 | 0 | 157 |
| 1104 0001 050 | 22 | 862 | 0 | 0 | 862 |
| 1104 0002 010 | 248 | 9,713 | 0 | 0 | 9,713 |
| 1104 0002 020 | 97 | 3,799 | 0 | 0 | 3,799 |
| 1104 0002 030 | 16 | 627 | 0 | 0 | 627 |
| 1104 0002 040 | 206 | 8,068 | 0 | 0 | 8,068 |
| 1104 0002 050 | 60 | 2,350 | 0 | 0 | 2,350 |
| 1104 0002 060 | 29 | 1,136 | 0 | 0 | 1,136 |
| Subsystem 2-9-3 | 1,795 | 195,508 | 0 | 0 | 195,508 |
| 1104 0006 020 | 17 | 1,852 | 0 | 0 | 1,852 |
| 1104 0006 050 | 78 | 8,496 | 0 | 0 | 8,496 |
| 1104 0006 060 | 227 | 24,724 | 0 | 0 | 24,724 |
| 1104 0007 050 | 11 | 1,198 | 0 | 0 | 1,198 |
| 1104 0008 010 | 146 | 15,902 | 0 | 0 | 15,902 |
| 1104 0008 030 | 11 | 1,198 | 0 | 0 | 1,198 |

| STREAM SYSTEM<br><br>(available water based on mean annual flow) | Drainage Area of Stream System, Subsystem or Watershed<br><br>($mi^2$) | Total Estimated Available Water From Stream System and Generated in the Subsystem<br><br>(acre-feet) | Total Dependable Yields from Reservoirs within each Stream System or Subsystem<br><br>(acre-feet) | Total Sediment Pool for SCS Structures within each Stream System or Subsystem<br><br>(acre-feet) | Adjusted Total Estimated Available Water within the Streams of each Stream System or Subsystem<br><br>(acre-feet) |
|---|---|---|---|---|---|
| 1104 0008 060 | 156 | 16,991 | 0 | 0 | 16,991 |
| 1105 0001 010 | 392 | 42,696 | 0 | 0 | 42,696 |
| 1105 0001 020 | 283 | 30,824 | 0 | 0 | 30,824 |
| 1105 0001 030 | 237 | 25,814 | 0 | 0 | 25,814 |
| 1105 0001 040 | 237 | 25,814 | 0 | 0 | 25,814 |
| **Subsystem 2-9-2** | **3,837** | **566,065** | **0** | **8,609** | **557,456** |
| 1105 0001 050 | 304 | 44,849 | 0 | 0 | 44,849 |
| 1105 0001 060 | 169 | 24,932 | 0 | 0 | 24,932 |
| 1105 0001 070 | 290 | 42,783 | 0 | 0 | 42,783 |
| 1105 0001 080 | 199 | 29,358 | 0 | 0 | 29,358 |
| 1105 0001 090 | 279 | 41,160 | 0 | 0 | 41,160 |
| 1105 0002 010 | 272 | 40,128 | 0 | 0 | 40,128 |
| 1105 0002 020 | 110 | 16,228 | 0 | 0 | 16,228 |
| 1105 0002 030 | 196 | 28,915 | 0 | 0 | 28,915 |
| 1105 0002 040 | 130 | 19,179 | 0 | 0 | 19,179 |
| 1105 0002 050 | 111 | 16,376 | 0 | 0 | 16,376 |
| 1105 0002 060 | 117 | 17,261 | 0 | 0 | 17,261 |
| 1105 0002 070 | 238 | 35,112 | 0 | 0 | 35,112 |
| 1105 0002 080 | 182 | 26,850 | 0 | 0 | 26,850 |
| 1105 0002 090 | 189 | 27,883 | 0 | 0 | 27,883 |
| 1105 0002 100 | 115 | 16,966 | 0 | 0 | 16,966 |
| 1105 0002 110 | 212 | 31,276 | 0 | 3,031 | 28,245 |
| 1105 0002 120 | 197 | 29,063 | 0 | 0 | 29,063 |
| 1105 0002 130 | 382 | 56,356 | 0 | 2,838 | 53,518 |
| 1105 0002 160 | 145 | 21,392 | 0 | 2,740 | 18,652 |
| **Subsystem 2-9-1** | **2,021** | **1,053,665** | **16,632** | **12,017** | **1,025,016** |
| 1105 0002 140 | 356 | 185,604 | 0 | 825 | 184,779 |

| STREAM SYSTEM<br><br>(available water based on mean annual flow) | Drainage Area of Stream System, Subsystem or Watershed<br><br>($mi^2$) | Total Estimated Available Water From Stream System and Generated in the Subsystem<br><br>(acre-feet) | Total Dependable Yields from Reservoirs within each Stream System or Subsystem<br><br>(acre-feet) | Total Sediment Pool for SCS Structures within each Stream System or Subsystem<br><br>(acre-feet) | Adjusted Total Estimated Available Water within the Streams of each Stream System or Subsystem<br><br>(acre-feet) |
|---|---|---|---|---|---|
| 1105 0002 150 | 279 | 145,459 | 0 | 0 | 145,459 |
| 1105 0003 010 | 90 | 46,922 | 0 | 0 | 46,922 |
| 1105 0003 020 | 341 | 177,783 | 0 | 6,369 | 171,414 |
| 1105 0003 030 | 114 | 59,435 | 10,002 | 635 | 48,798 |
| 1105 0003 040 | 162 | 84,460 | 0 | 4,078 | 80,382 |
| 1105 0003 050 | 259 | 135,032 | 0 | 0 | 135,032 |
| 1105 0003 060 | 100 | 52,136 | 0 | 110 | 52,026 |
| 1105 0003 070 | 65 | 33,888 | 0 | 0 | 33,888 |
| 1105 0003 080 | 255 | 132,946 | 6,630 | 0 | 126,316 |
| 2-10 Salt Fork of Arkansas River | 2,413 | 648,260 | 0 | 292 | 647,968 |
| 1106 0002 020 | 26 | 6,985 | 0 | 0 | 6,985 |
| 1106 0002 030 | 129 | 34,656 | 0 | 0 | 34,656 |
| 1106 0002 040 | 198 | 53,193 | 0 | 0 | 53,193 |
| 1106 0003 030 | 176 | 47,283 | 0 | 0 | 47,283 |
| 1106 0003 040 | 23 | 6,179 | 0 | 0 | 6,179 |
| 1106 0004 010 | 9 | 2,418 | 0 | 0 | 2,418 |
| 1106 0004 020 | 48 | 12,895 | 0 | 0 | 12,895 |
| 1106 0004 030 | 108 | 29,015 | 0 | 0 | 29,015 |
| 1106 0004 040 | 198 | 53,193 | 0 | 199 | 52,994 |
| 1106 0004 050 | 203 | 54,537 | 0 | 0 | 54,537 |
| 1106 0004 060 | 195 | 52,387 | 0 | 0 | 52,387 |
| 1106 0004 070 | 234 | 62,865 | 0 | 93 | 62,772 |
| 1106 0004 080 | 326 | 87,581 | 0 | 0 | 87,581 |
| 1106 0004 090 | 157 | 42,179 | 0 | 0 | 42,179 |
| 1106 0004 100 | 99 | 26,597 | 0 | 0 | 26,597 |
| 1106 0004 110 | 284 | 76,297 | 0 | 0 | 76,297 |
| 2-11 Chikaskia River | 375 | 429,335 | 0 | 567 | 428,768 |

| STREAM SYSTEM<br><br>(available water based on mean annual flow) | Drainage Area of Stream System, Subsystem or Watershed<br><br>($mi^2$) | Total Estimated Available Water From Stream System and Generated in the Subsystem<br><br>(acre-feet) | Total Dependable Yields from Reservoirs within each Stream System or Subsystem<br><br>(acre-feet) | Total Sediment Pool for SCS Structures within each Stream System or Subsystem<br><br>(acre-feet) | Adjusted Total Estimated Available Water within the Streams of each Stream System or Subsystem<br><br>(acre-feet) |
|---|---|---|---|---|---|
| 1106 0005 030 | 6 | 6,869 | 0 | 0 | 6,869 |
| 1106 0005 050 | 53 | 60,679 | 0 | 0 | 60,679 |
| 1106 0005 060 | 69 | 78,998 | 0 | 0 | 78,998 |
| 1106 0005 070 | 100 | 114,489 | 0 | 173 | 114,316 |
| 1106 0005 080 | 147 | 168,299 | 0 | 394 | 167,905 |
| **2-12 Main stem of Arkansas River from Keystone Dam to Kansas State Line** | **2,588** | **3,310,370** | **195,608** | **26,414** | **3,088,348** |
| 1106 0001 030 | 137 | 175,240 | 0 | 0 | 175,240 |
| 1106 0001 040 | 170 | 217,451 | 171,200 | 0 | 46,251 |
| 1106 0001 050 | 145 | 185,473 | 2,529 | 706 | 182,238 |
| 1106 0006 010 | 309 | 395,249 | 0 | 5,751 | 389,498 |
| 1106 0006 020 | 176 | 225,126 | 0 | 639 | 224,487 |
| 1106 0006 030 | 264 | 337,688 | 3,600 | 82 | 334,006 |
| 1106 0006 040 | 82 | 104,888 | 0 | 0 | 104,888 |
| 1106 0006 050 | 122 | 156,053 | 0 | 0 | 156,053 |
| 1106 0006 060 | 88 | 112,563 | 0 | 0 | 112,563 |
| 1106 0006 070 | 265 | 338,968 | 0 | 13,099 | 325,869 |
| 1106 0006 080 | 153 | 195,706 | 0 | 2,880 | 192,826 |
| 1106 0006 090 | 243 | 310,827 | 0 | 186 | 310,641 |
| 1106 0006 100 | 191 | 244,312 | 2,509 | 3,071 | 238,732 |
| 1106 0006 110 | 243 | 310,827 | 15,770 | | 295,057 |
| **2-13 Bird Creek** | **1,136** | **894,284** | **19,040** | **0** | **875,244** |
| 1107 0107 010 | 370 | 291,272 | 3,360 | 0 | 287,912 |
| 1107 0107 020 | 114 | 89,743 | 0 | 0 | 89,743 |
| 1107 0107 030 | 301 | 236,954 | 15,680 | 0 | 221,274 |
| 1107 0107 040 | 351 | 276,315 | 0 | 0 | 276,315 |
| **2-14 Caney River** | **1,177** | **947,012** | **17,248** | **3,058** | **926,706** |

| STREAM SYSTEM<br><br>(available water based on mean annual flow) | Drainage Area of Stream System, Subsystem or Watershed<br><br>($mi^2$) | Total Estimated Available Water From Stream System and Generated in the Subsystem<br><br>(acre-feet) | Total Dependable Yields from Reservoirs within each Stream System or Subsystem<br><br>(acre-feet) | Total Sediment Pool for SCS Structures within each Stream System or Subsystem<br><br>(acre-feet) | Adjusted Total Estimated Available Water within the Streams of each Stream System or Subsystem<br><br>(acre-feet) |
|---|---|---|---|---|---|
| 1107 0106 010 | 14 | 11,264 | 0 | 133 | 11,131 |
| 1107 0106 020 | 172 | 138,391 | 0 | 0 | 138,391 |
| 1107 0106 030 | 120 | 96,552 | 13,888 | 1,425 | 81,239 |
| 1107 0106 050 | 97 | 78,046 | 3,360 | 73 | 74,613 |
| 1107 0106 060 | 241 | 193,908 | 0 | 0 | 193,908 |
| 1107 0106 070 | 247 | 198,736 | 0 | 442 | 198,294 |
| 1107 0106 080 | 286 | 230,115 | 0 | 985 | 229,130 |
| 2-15 Verdigris River [4] | 1,539 | 2,769,848 | 172,480 | 0 | 2,597,368 |
| Subsystem 2-15-2 | 823 | 2,391,316 | 172,480 | 0 | 2,218,836 |
| 1107 0103 020 | 3 | 8,717 | 0 | 0 | 8,717 |
| 1107 0103 030 | 292 | 848,438 | 0 | 0 | 848,438 |
| 1107 0103 040 | 171 | 496,859 | 0 | 0 | 496,859 |
| 1107 0103 050 | 357 | 1,037,302 | 172,480 | 0 | 864,822 |
| Subsystem 2-15-1 | 716 | 378,532 | 0 | 0 | 378,532 |
| 1107 0106 010 | 171 | 90,404 | 0 | 0 | 90,404 |
| 1107 0106 020 | 131 | 69,257 | 0 | 0 | 69,257 |
| 1107 0106 030 | 289 | 152,787 | 0 | 0 | 152,787 |
| 1107 0106 040 | 125 | 66,084 | 0 | 0 | 66,084 |
| 2-16 Grand (Neosho) River | 53 | 25,324 | 0 | 324 | 25,000 |
| 2-17 Illinois River [3] | 895 | 1,173,017 | 29,792 | 258 | 1,142,967 |
| 1111 0103 050 | 76 | 99,608 | 0 | 0 | 99,608 |
| 1111 0103 060 | 231 | 302,756 | 0 | 0 | 302,756 |
| 1111 0103 080 | 52 | 68,153 | 0 | 0 | 68,153 |
| 1111 0103 090 | 208 | 272,612 | 0 | 258 | 272,354 |
| 1111 0103 100 | 132 | 173,004 | 0 | 0 | 173,004 |
| 1111 0103 110 | 196 | 256,884 | 29,792 | 0 | 227,092 |

1 Water allocated to Shawnee Lake exceeds dependable yield by 3,600 acre feet. The excess amount is deducted from the run-of-the-river.

2 Water allocated to Fort Supply Lake exceeds dependable yield by 6,747 acre feet. The excess amount is deducted from the run-of-the-river.

3 Water allocated to Tenkiller Ferry Reservoir exceeds dependable yield by 113 acre feet. The excess amount is deducted from the run-of-the-river.

4 Water allocated to Copan Lake exceeds dependable yield by 8,040 acre feet. The excess amount is deducted from the run-of-the-river. Water quality dependable yield is 16,688 acre-feet.

5 Forty-seven percent of the dependable yield from Eufaula Reservoir is contributed by the Canadian River System (2-6), twenty-four percent is contributed by the North Canadian River System (2-5), twenty-eight percent of the dependable yield is contributed by the Deep Fork River (2-7) and six-tenths of a percent of the dependable yield is contributed by the Main Stem of the Canadian River (2-3).

6 Thirty percent of the dependable yield of Keystone Reservoir is contributed by the Cimarron River System (2-9) and seventy percent is contributed by the Arkansas River System (2-12)