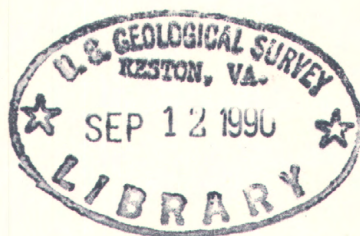
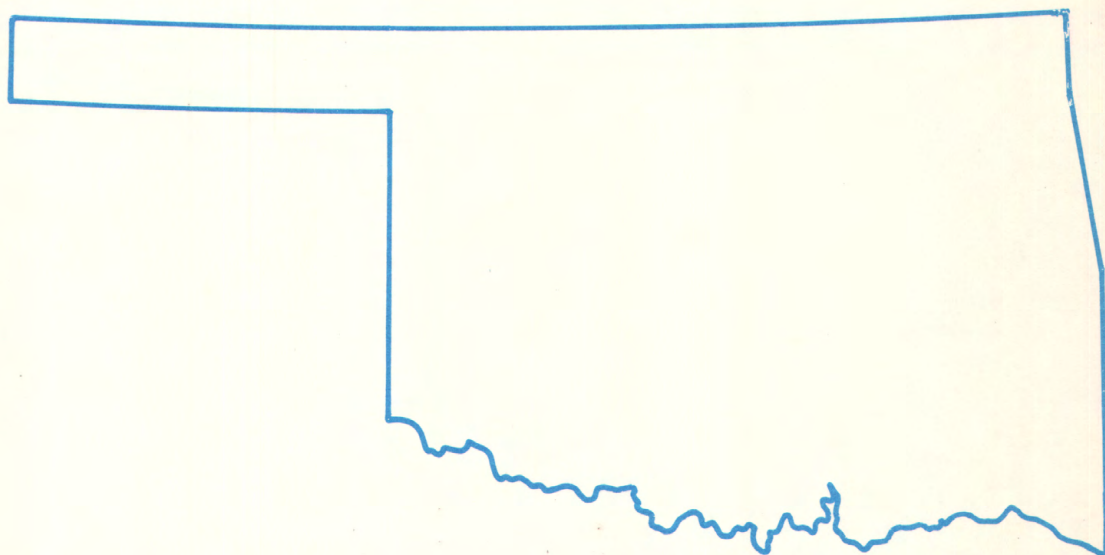


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# Water Resources Data Oklahoma Water Year 1988



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT OK-88-1  
Prepared in cooperation with the State of Oklahoma  
and with other agencies



# CALENDAR FOR WATER YEAR 1988

1987

## OCTOBER

S	M	T	W	T	F	S
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1988

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## SEPTEMBER

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# Water Resources Data Oklahoma Water Year 1988

by L.D. Hauth, D.M. Walters, T.E. Coffey, and D.K. White



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT OK-88-1  
Prepared in cooperation with the State of Oklahoma  
and with other agencies



DEPARTMENT OF THE INTERIOR

MANUEL LUJAN, JR., Secretary

U.S. GEOLOGICAL SURVEY

Dallas L. Peck, Director

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District Chief, Water Resources Division  
U.S. Geological Survey  
215 Dean A. McGee Avenue, Room 621  
Oklahoma City, Oklahoma 73102

1990



## PREFACE

This hydrologic-data report for Oklahoma is one of a series of annual reports that document hydrologic data gathered from the U.S. Geological Survey's surface-water data-collection network in each state, Puerto Rico, and the Trust Territories. These records of streamflow and water quality provide the hydrologic information needed by state, local, and federal agencies, and the private sector for developing and managing our Nation's land and water resources.

This report is the culmination of a concerted effort by dedicated personnel of the U.S. Geological Survey who collected, compiled, analyzed, verified, and organized the data, and who typed, edited, and assembled the report. The authors had primary responsibility for assuring that the information contained herein is accurate, complete, and adheres to Geological Survey policy and established guidelines.

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<b>16. Abstract (Limit: 200 words)</b>  Water resources data for the 1988 water year for Oklahoma consists of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes or reservoirs. This report contains discharge records for 126 gaging stations; stage and contents for 30 lakes or reservoirs; water quality for 39 gaging stations and 2 lakes. Also included are 23 partial-record stations. These data represent that part of the National Water Data System collected by the U.S. Geological Survey and cooperating State and Federal agencies in Oklahoma.			
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## WATER RESOURCES DATA - OKLAHOMA, 1988

### INTRODUCTION

The Water Resources Division of the U.S. Geological Survey, in cooperation with State agencies, obtains a large amount of data pertaining to the water resources of Oklahoma each water year (October 1 to September 30). These data, accumulated during many water years, constitute a valuable data base for developing an improved understanding of the water resources of the State. To make these data readily available to interested parties outside the Geological Survey, the data are published annually in this report series entitled "Water Resources Data - Oklahoma."

This report includes records on surface water in the State. Specifically, it contains: (1) Discharge records for 126 streamflow-gaging stations, and 23 partial-record or miscellaneous streamflow stations; (2) stage and content records for 30 lakes and reservoirs; and (3) water-quality records for 39 streamflow-gaging stations, and 2 lakes.

This series of annual reports for Oklahoma began with the 1961 water year with a report that contained only data relating to the quantities of surface water. For the 1964 water year, a similar report was introduced that contained only data relating to water quality. Beginning with the 1975 water year, the report format was changed to present, in one volume, data on quantity and quality of surface water.

Prior to introduction of this series and for several water years concurrent with it, water-resources data for Oklahoma were published in U.S. Geological Survey Water-Supply Papers. Data on stream discharge and stage and on lake or reservoir contents and stage, through September 1960, were published annually under the title "Surface Water Supply of the United States, Parts 7A and 7B." For the 1961 through 1970 water years, the data were published in two 5-year reports. Data on chemical quality, temperature, and suspended sediment for the 1941 through 1970 water years were published annually under the title "Quality of Surface Waters of the United States." The above mentioned Water-Supply Papers may be consulted in the libraries of the principal cities of the United States and may be purchased from Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, CO 80225.

Publications similar to this report are published annually by the Geological Survey for all States. These official Survey reports have an identification number consisting of the two-letter State abbreviation, the last two digits of the water year, and the volume number. For example, this volume is identified as "U.S. Geological Survey Water-Data Report OK-88-1." For archiving and general distribution, the reports for 1971-74 water years also are identified as water-data reports. These water-data reports are for sale in paper copy or in microfiche by the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161.

Additional information, including current prices, for ordering specific reports may be obtained from the District Chief at the address given on back of title page or by telephone (405) 231-4256.

### COOPERATION

The U.S. Geological Survey and organizations of the State of Oklahoma have had cooperative agreements for the systematic collection of streamflow records since 1935, and for water quality records since 1941. Organizations that assisted in collecting the data through cooperative agreement with the Survey are:

Oklahoma Water Resources Board, Gerald E. Borelli (to August 1988), Robert S. Kerr, Jr.,  
Chairman and James R. Barnett, Executive Director.  
Oklahoma Department of Transportation, Neal A. McCaleb, Chief Engineer.  
Oklahoma Geological Survey, Charles J. Mankin, Director.  
Oklahoma State Department of Health, Environmental Health Services, Mark S. Coleman,  
Deputy Commissioner.  
Oklahoma City Water Department, James D. Couch, Director of Water Services.

The following Federal agencies assisted in the data collection program by providing funds or services:

Corps of Engineers, U.S. Army  
Bureau of Reclamation, U.S. Department of Interior  
Bureau of Land Management, U.S. Department of Interior

Assistance in the form of funds or services was rendered by the following organizations through the Oklahoma Water Resources Board: Grand River Dam Authority; Central Oklahoma Master Conservancy District; Fort Cobb Reservoir Master Conservancy District; Lugert-Altus Irrigation District; Foss Reservoir Master Conservancy District; Mountain Park Master Conservancy District; Oklahoma Gas and Electric Company; the cities of Ada, Altus, Claremore, Lawton, Oklahoma City, Sapulpa, and Tulsa.

Organizations that supplied data are acknowledged in the station descriptions.



## WATER RESOURCES DATA - OKLAHOMA, 1988

## SUMMARY OF HYDROLOGIC CONDITIONS

Streamflow

Large variations in streamflow characterize hydrologic conditions in Oklahoma. In the extreme southeastern part of the State, mean annual precipitation exceeds 52 inches and mean annual runoff exceeds 20 inches. In the southeast, stream channels are deeply incised in mountainous terrain, and streamflow generally is perennial. In the extreme northwestern part of the Panhandle, mean annual precipitation is less than 16 inches and mean annual runoff is less than 0.1 inch. In northwestern Oklahoma, streams generally have shallow, ill-defined channels, and ephemeral flow.

Precipitation data from monthly reports of the National Weather Service, averaged over the State, indicate that monthly precipitation was greater than normal during November, December, January, March, April, July, and September of the water year. Precipitation was less than normal during February, May, June, and August.

A comparison of daily and monthly streamflow for the 1988 water year and the period of record at six selected stations (fig. 1-6) reflects the unusually wet winter and early spring, and very dry late spring and summer. These stations were selected at representative locations within Oklahoma. All locations, except the Washita River near Dickson, depict natural flow conditions.

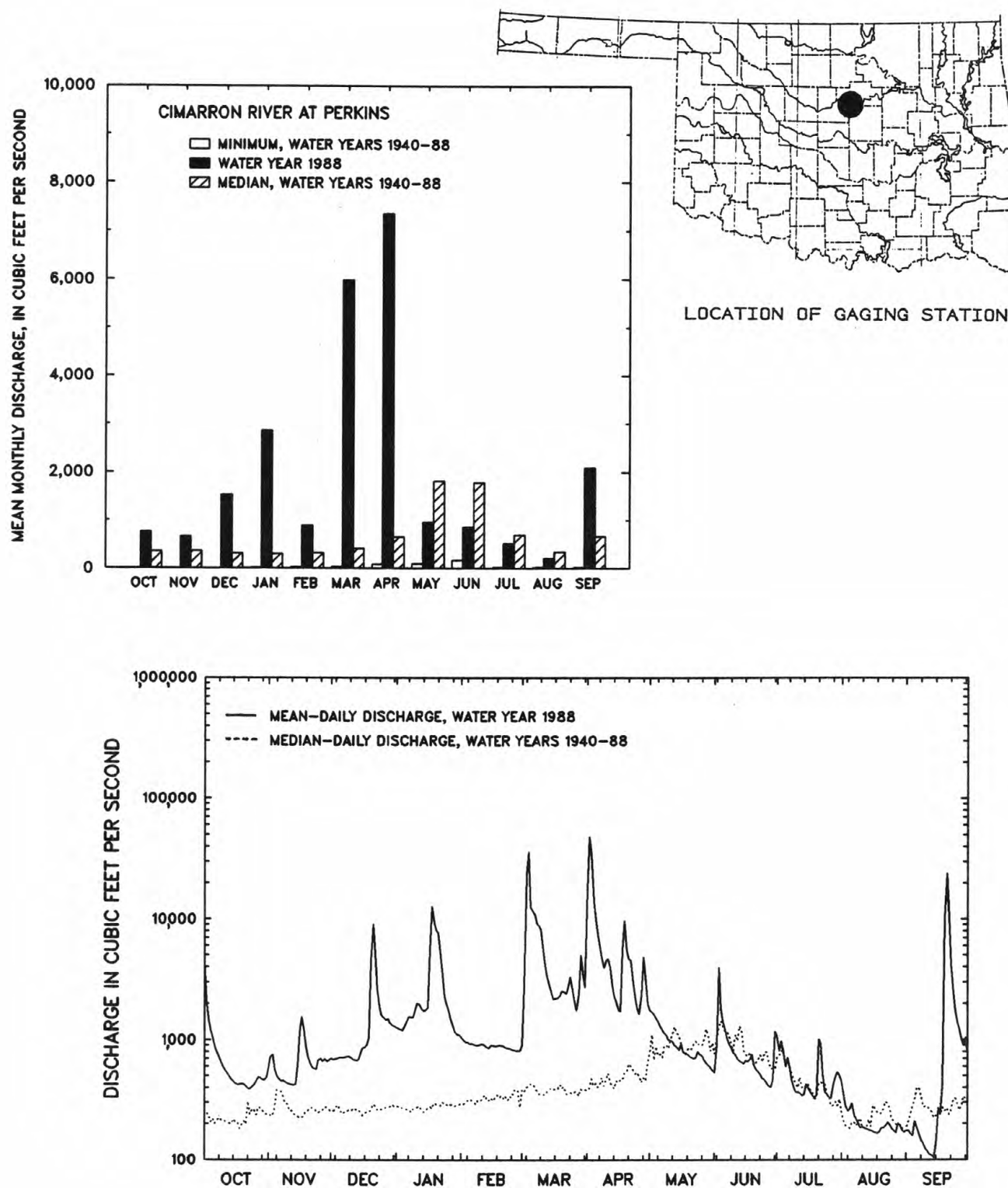
In spite of the greater-than-normal flow for the year, drought conditions existed during some months. Streamflow was much less than normal in all streams during May and June, except in south-central Oklahoma. Streamflow continued to be below normal during July and August with near normal flows in September in the north-central and northeast (fig. 1, 2); in the southwest September streamflow was much greater than normal (fig. 3). The lowest June mean-monthly discharge for the period of record was recorded at Big Cabin Creek near Big Cabin. In the southeast, streamflow was less than normal in July and September but greater than normal in August (fig. 4). The lowest June and July mean-monthly discharge for the period of record was recorded at Kiamichi River near Big Cedar. In the far southeast, streamflow was greater than normal in July and August, and less than normal in September (fig. 5). The lowest May mean-monthly discharge for the period of record was recorded at Glover Creek near Glover. Streamflow was less than normal only in June in south-central Oklahoma (fig. 6).

A comparison of streamflow for the 1988 water year with streamflow for the period of record at the six selected stations is presented in the following table:

STATION	IDENTIFICATION	Statistics of discharge during 1988 water year (cubic feet per second)			Statistics of discharge during period of record (cubic feet per second)		
		Maximum	Minimum	Average	Maximum	Minimum	Average
07161000	Cimarron River at Perkins	52,700	104	2,051	162,000	.8	1,300 (1940-88)
07191000	Big Cabin Creek near Big Cabin	21,200	.86	425	52,000	.10	327 (1948-88)
07301500	North Fork Red River near Carter	11,400	0	141	53,400	0	120 (1945-62, 1965-88)
07331000	Washita River near Dickson	34,100	188	2,525	105,000	0	1,573 (Prior to reg 1929-58) 1,442
07335700	Kiamichi River near Big Cedar	10,900	0	78.9	(Since reg by Ft Cobb 21,500	0	78.5 (1962-88)
07337900	Glover Creek near Glover	20,300	.83	480	98,600	0	453 (1966-88) (1962-88)

The average discharge streamflow statistic illustrates normal or slightly greater-than-normal flow in 1988 despite the drought, due to the unusually wet winter and early spring in Oklahoma.

Conservation storage in six selected reservoirs in the State, with a combined conservation storage capacity of 8,014,000 acre-feet, decreased from 95 percent at the start of the water year to 93 percent at the end of the water year.



**Figure 1.--Comparison of mean-daily discharges, median-daily discharges, minimum mean-monthly discharges, water year mean-monthly discharges, and median mean-monthly discharges for the Cimarron River at Perkins.**



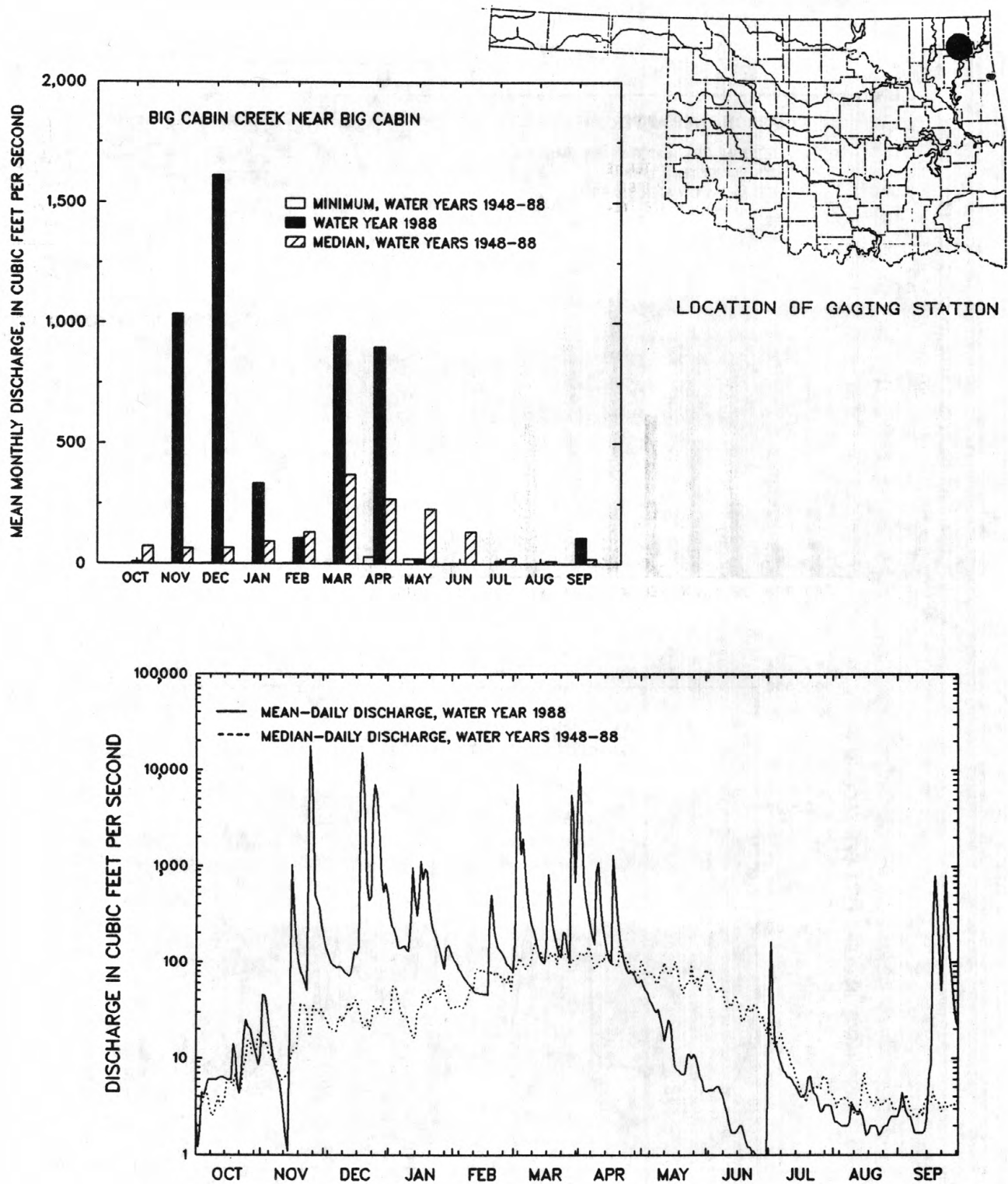
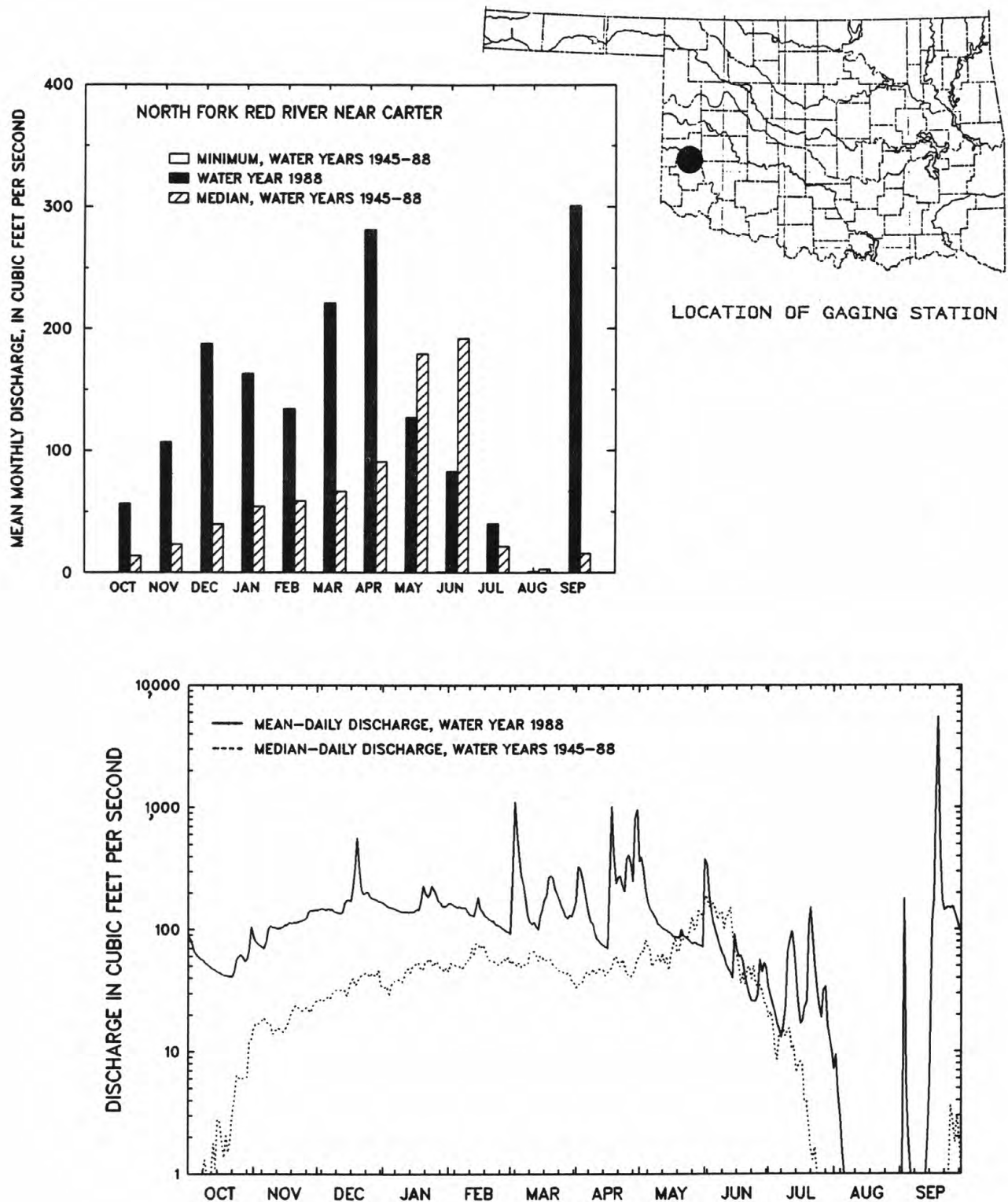


Figure 2.--Comparison of mean-daily discharges, median-daily discharges, minimum mean-monthly discharges, water year mean-monthly discharges, and median mean-monthly discharges for Big Cabin Creek near Big Cabin.



**Figure 3.--Comparison of mean-daily discharges, median-daily discharges, minimum mean-monthly discharges, water year mean-monthly discharges, and median mean-monthly discharges for North Fork Red River River near Carter.**

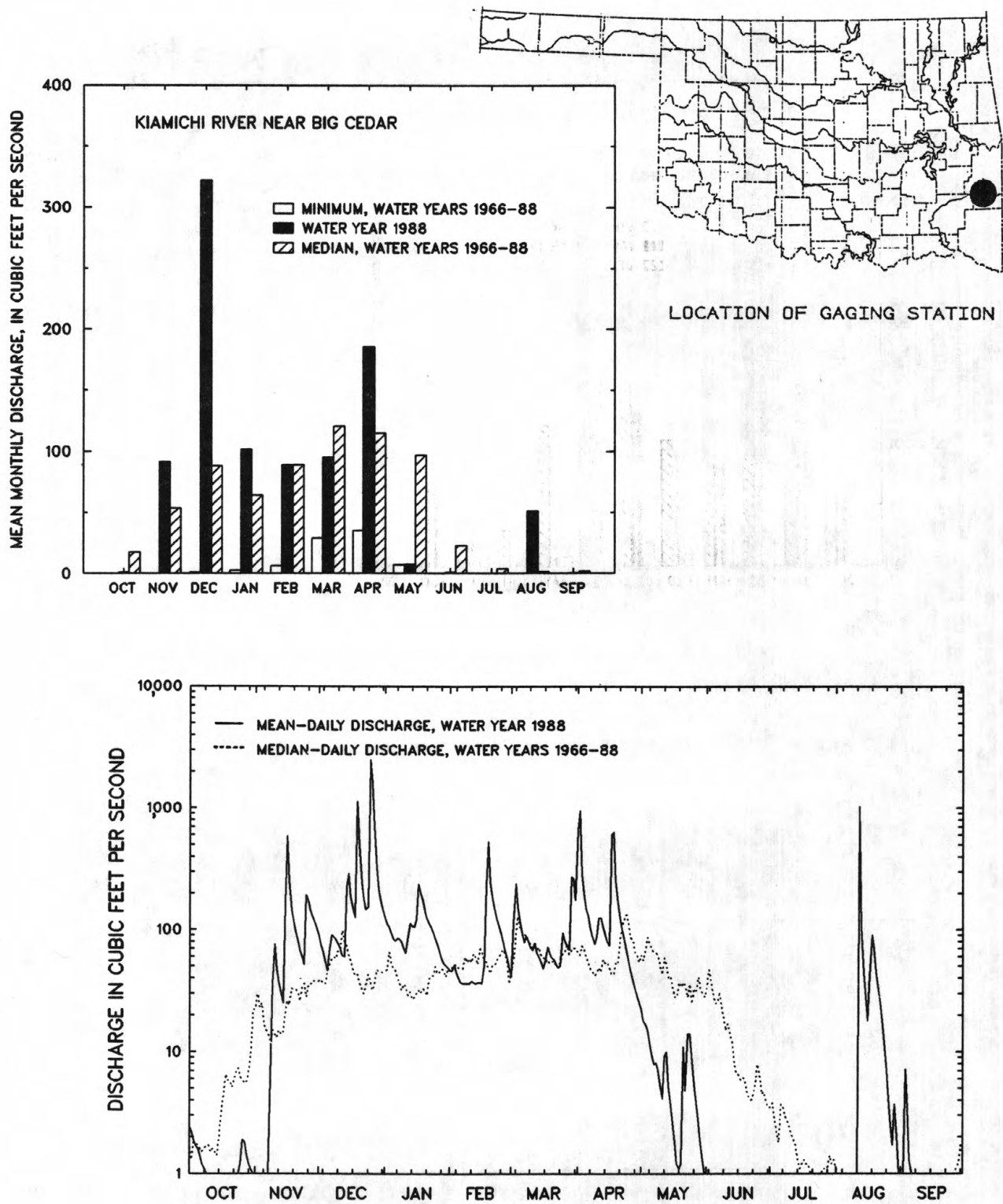


Figure 4.--Comparison of mean-daily discharges, median-daily discharges, minimum mean-monthly discharges, water year mean-monthly discharges, and median mean-monthly discharges for the Kiamichi River near Big Cedar.



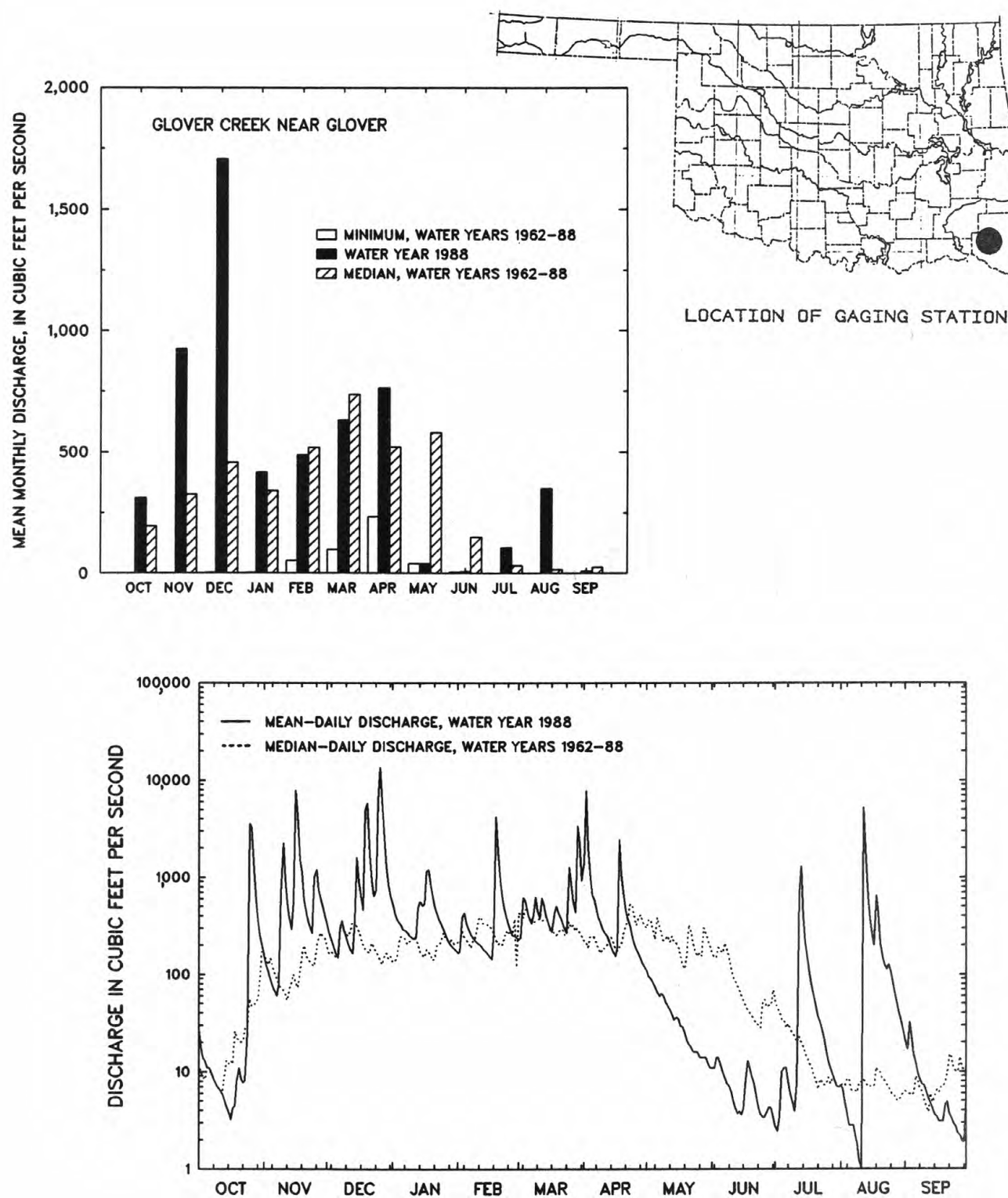


Figure 5.--Comparison of mean-daily discharges, median-daily discharges, minimum mean-monthly discharges, water year mean-monthly discharges, and median mean-monthly discharges for the Glover River near Glover.

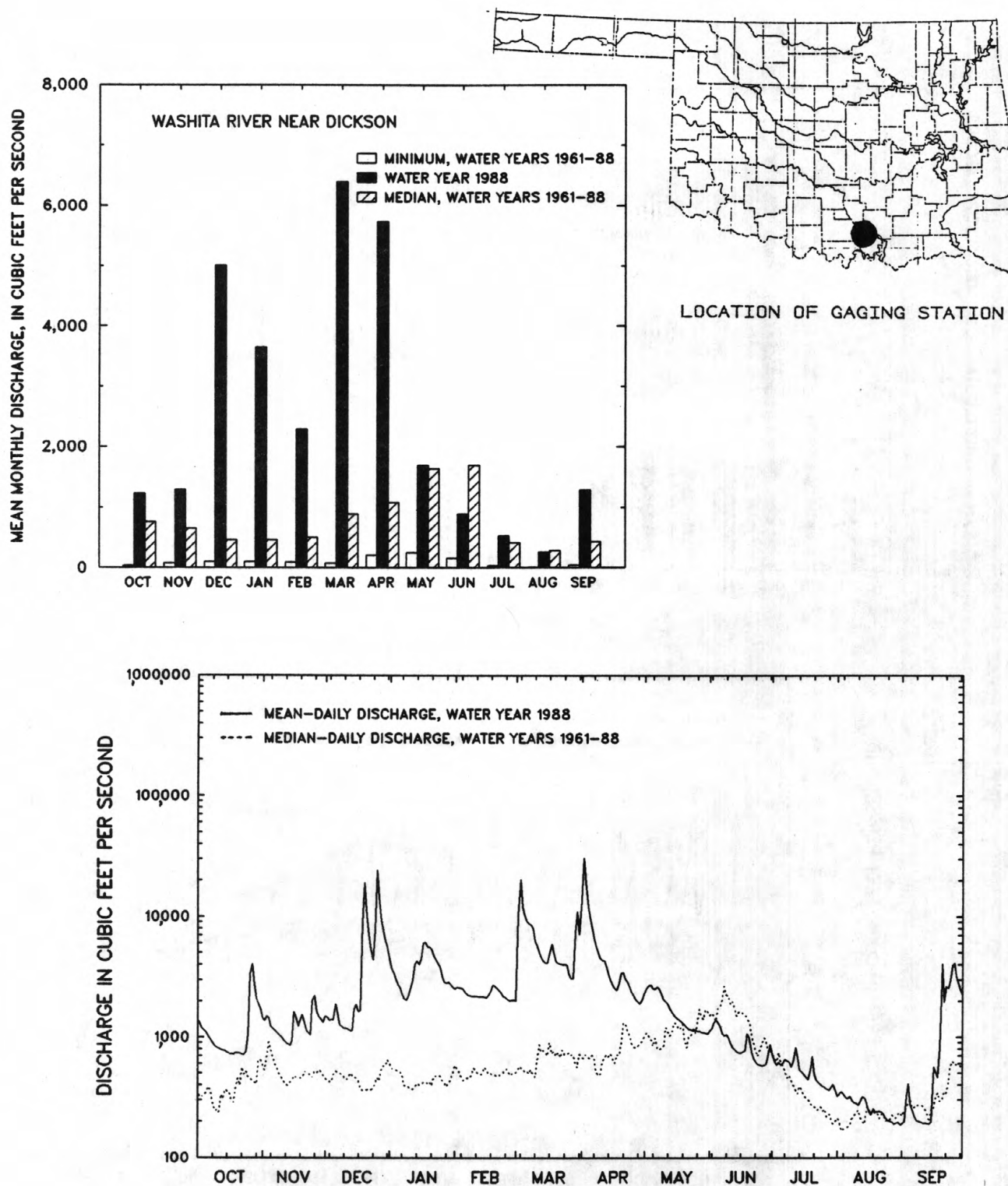


Figure 6.--Comparison of mean-daily discharges, median-daily discharges, minimum mean-monthly discharges, water year mean-monthly discharges, and median mean-monthly discharges for the Washita River near Dickson.

Chemical Quality of Streamflow

The concentrations of selected dissolved chemical constituents measured at surface-water sampling stations in the State during the 1988 water year generally were within the ranges measured during previous years. Concentrations of dissolved solids, chloride, sulfate, and suspended sediment are shown in the following tables for sampling sites on selected principal streams in the State. Maximum and minimum concentrations of these constituents for the 1988 water year are compared to maximum and minimum concentrations for water years 1970 through 1985.

The maximum dissolved-solids concentration measured in these streams in 1988 was 9,600 mg/L in the Cimarron River near Buffalo. This concentration is considered normal for the station. Dissolved-solids concentrations, in milligrams per liter, are listed in the following table:

Station identification	1988 water year		1970-85 water years	
	Maximum	Minimum	Maximum	Minimum
07152500 Arkansas River at Ralston	912	788	2,550	139
07157950 Cimarron River near Buffalo	9,600	4,080	49,200	601
07161000 Cimarron River at Perkins	5,400	2,880	15,700	338
07164500 Arkansas River at Tulsa	1,370	879	2,400	108
07193500 Neosho River below Fort Gibson near Fort Gibson	178	138	213	102
07231500 Canadian River near Calvin	1,010	319	1,880	85
07234000 Beaver River near Beaver	3,920	3,130	4,320	164
07237500 North Canadian River near Woodward	1,470	808	3,110	626
07242000 North Canadian River near Wetumka	869	156	1,650	119
07243500 Deep Fork near Beggs	628	301	1,720	86
07301110 Salt Fork Red River near Elmer	3,480	1,320	4,450	192
07305000 North Fork Red River near Headrick	4,470	1,980	17,100	208
07331000 Washita River near Dickson	1,210	554	1,460	139
07335700 Kiamichi River near Big Cedar	39	23	45	8

The maximum dissolved-chloride concentration measured at the selected stations in 1988 was 5,300 mg/L in the Cimarron River near Buffalo. Dissolved-chloride concentrations, in milligrams per liter, are listed in the following table:

Station identification	1988 water year		1970-85 water years	
	Maximum	Minimum	Maximum	Minimum
07152500 Arkansas River at Ralston	310	220	1,300	19
07157950 Cimarron River near Buffalo	5,300	2,300	29,000	180
07161000 Cimarron River at Perkins	2,700	860	8,600	110
07164500 Arkansas River at Tulsa	520	280	1,100	15
07193500 Neosho River below Fort Gibson near Fort Gibson	12	6.7	24	4.5
07231500 Canadian River near Calvin	250	49	750	18
07234000 Beaver River near Beaver	1,600	1,200	1,800	14
07237500 North Canadian River near Woodward	400	200	640	140
07242000 North Canadian River near Wetumka	220	110	640	17
07243500 Deep Fork near Beggs	240	56	800	7.3
07301110 Salt Fork Red River near Elmer	680	170	1,000	15
07305000 North Fork Red River near Headrick	1,700	540	8,000	40
07331000 Washita River near Dickson	120	38	250	6.0
07335700 Kiamichi River near Big Cedar	2.3	1.8	9.6	1.0



The maximum dissolved-sulfate concentration measured in 1988 was in the Salt Fork Red River near Elmer; however, this concentration is normal for the station. Dissolved-sulfate concentrations, in milligrams per liter, are listed in the following table:

Station identification	1988 water year		1970-85 water years	
	Maximum	Minimum	Maximum	Minimum
07152500 Arkansas River at Ralston	190	140	300	8.7
07157950 Cimarron River near Buffalo	1,200	450	2,400	7.1
07161000 Cimarron River at Perkins	550	410	690	12
07164500 Arkansas River at Tulsa	260	120	210	19
07193500 Neosho River below Fort Gibson near Fort Gibson	43	27	50	7.7
07231500 Canadian River near Calvin	280	68	380	7.0
07234000 Beaver River near Beaver	620	480	1,100	18
07237500 North Canadian River near Woodward	370	180	930	110
07242000 North Canadian River near Wetumka	210	28	280	6.2
07243500 Deep Fork near Beggs	40	21	170	2.4
07301110 Salt Fork Red River near Elmer	1,500	640	1,800	72
07305000 North Fork Red River near Headrick	910	570	2,000	24
07331000 Washita River near Dickson	640	210	760	9.6
07335700 Kiamichi River near Big Cedar	8.3	4.8	9.3	.8

The maximum suspended-sediment concentration measured in 1988 at the selected stations was in the North Fork Red River near Headrick. The concentration was within the historic concentration range for this station. Suspended-sediment concentrations, in milligrams per liter, are listed in the following table:

Station identification	1988 water year		1970-85 water years	
	Maximum	Minimum	Maximum	Minimum
07152500 Arkansas River at Ralston	122	18	13,500	10
07157950 Cimarron River near Buffalo	126	6	12,800	2
07161000 Cimarron River at Perkins	126	22	17,000	15
07164500 Arkansas River at Tulsa	26	7	5,280	3
07193500 Neosho River below Fort Gibson near Fort Gibson	165	6	496	1
07231500 Canadian River near Calvin	1,200	20	30,900	9
07234000 Beaver River near Beaver	26	14	14,900	7
07237500 North Canadian River near Woodward	929	10	3,770	6
07242000 North Canadian River near Wetumka	670	189	14,900	12
07243500 Deep Fork near Beggs	223	21	1,470	10
07301110 Salt Fork Red River near Elmer	2,420	41	12,100	7
07305000 North Fork Red River near Headrick	3,810	27	5,520	3
07331000 Washita River near Dickson	1,590	58	17,300	12
07335700 Kiamichi River near Big Cedar	--	--	154	1

#### SPECIAL NETWORKS AND PROGRAMS

Hydrologic Bench-Mark Network is a network of 57 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by the activities of man.

National Stream Quality Accounting Network (NASQAN) is a nationwide data-collection network designed by the U.S. Geological Survey to meet many of the information needs of government agencies and other groups involved in natural or regional water-quality planning and management. The 500 or so sites in NASQAN are generally located at the downstream ends of hydrologic accounting units designated by the U.S. Geological Survey Office of Water Data Coordination in consultation with the Water Resources Council. The objectives of NASQAN are (1) to obtain information on the quality and quantity of water moving within and from the United States through a systematic and uniform process of data collection, summarization, analysis, and reporting such that the data may be used for, (2) description of the areal variability of water quality in the Nation's rivers through analysis of data from this and other programs, (3) detection of changes or trends with time in the pattern of occurrence of water-quality characteristics, and (4) providing a nationally consistent data base useful for water-quality assessment and hydrologic research.

The National Trends Network (NTN) is a 150-station network for sampling atmospheric deposition in the United States. The purpose of the network is to determine the variability, both in location and in time, of the composition of atmospheric deposition, which includes snow, rain, dust particles, aerosols, and gases. The core from which the NTN was built was the already-existing deposition-monitoring network of the National Atmospheric Deposition Program (NADP).

#### EXPLANATION OF THE RECORDS

The surface-water and water-quality records published in this report are for the 1988 water year that began October 1, 1987, and ended September 30, 1988. A calendar of the water year is provided on the inside of the front cover. The records contain streamflow data, stage and content data for lakes and reservoirs, and water-quality data for surface water. The locations of the stations where the data were collected are shown in figures 7-9. The following sections of the introductory text are presented to provide users with a more detailed explanation of how the hydrologic data published in this report were collected, analyzed, computed, and arranged for presentation.

#### Station Identification Numbers

Each data station in this report is assigned a unique identification number. This number is unique in that it applies specifically to a given station and to no other. The number usually is assigned when a station is first established and is retained for that station indefinitely. The systems used by the U.S. Geological Survey to assign identification numbers for surface-waters stations are based on geographic location. The "downstream order" system is used for regular surface-water stations and the "latitude-longitude" system is used for surface-water stations where only miscellaneous measurements are made.

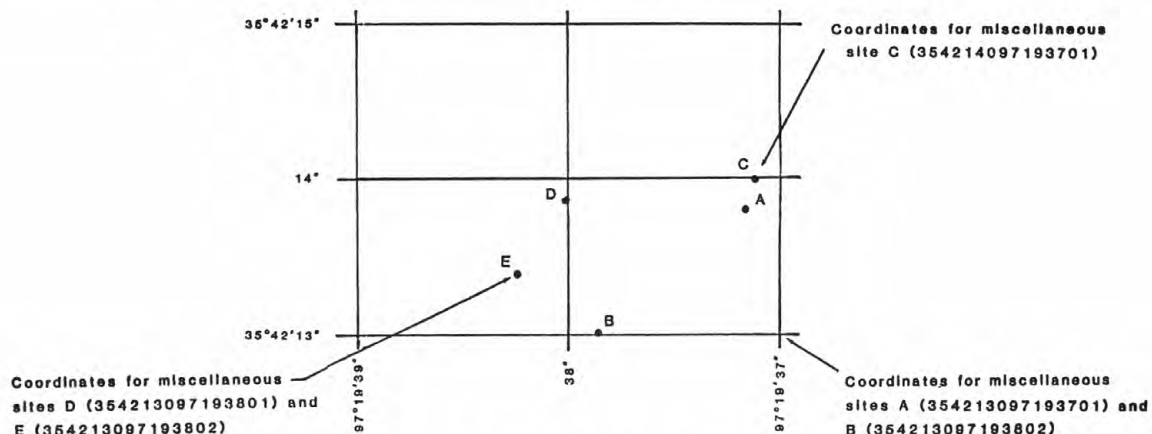
#### Downstream Order System

Since October 1, 1950, the order of listing hydrologic-station records in Survey reports is in a downstream direction along the main stream. All stations on a tributary entering upstream from a mainstream station are listed before that station. A station on a tributary that enters between two mainstream stations is listed between them. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. The rank of any tributary with respect to the stream to which it is immediately tributary is indicated by an indentation in the "List of Stations" in the front of this report. Each indentation represents one rank. This downstream order and system of indentation show which stations are on tributaries between any two stations and the rank of the tributary on which each station is situated.

The station-identification number is assigned according to downstream order. In assigning station numbers, no distinction is made between partial-record stations and other stations; therefore, the station number for a partial-record station indicates downstream-order position in a list made up of both types of stations. Gaps are left in the series of numbers to allow for new stations that may be established; hence, the numbers are not consecutive. The complete eight-digit number for each station, such as 07152500, which appears just to the left of the station name, includes the two-digit Part number "07" plus the six-digit downstream-order number "152500." The Part number designates the major river basin; for example, part "07" is the Lower Mississippi River basin.

#### Latitude-Longitude System

The identification numbers for miscellaneous surface-water sites are assigned according to the grid system of latitude and longitude. The number consists of 15 digits. The first six digits denote the degrees, minutes, and seconds of latitude, the next seven digits denote degrees, minutes, and seconds of longitude, and the last two digits (assigned sequentially) identify the sites within a 1-second grid. This site-identification number, once assigned, is a pure number, and has no locational significance. In the rare instance where the initial determination of latitude and longitude are found to be in error, the station will retain its initial identification number; however, its true latitude and longitude will be listed in the LOCATION paragraph of the station description. (See figure below.)



System for numbering miscellaneous sites (latitude and longitude)

### Records of Stage and Water Discharge

Records of stage and water discharge may be complete or partial. Complete records of discharge are those obtained using a continuous stage-recording device through which either instantaneous or mean daily discharge may be computed for any time, or any period of time, during the period of record. Complete records of lake or reservoir content, similarly, are those for which stage or content may be computed or estimated with reasonable accuracy for any time, or period of time. They may be obtained using a continuous stage-recording device, but need not be. Because daily mean discharges and end-of-day contents commonly are published for such stations, they are referred to as "daily stations."

By contrast, partial records are obtained through discrete measurements without using a continuous stage-recording device and pertain only to a few flow characteristics, or perhaps only one. The nature of the partial record is indicated by table titles such as "Crest-stage partial records," or "Low-flow partial records." Location of all complete-record, crest-stage partial-record, and low-flow partial-record stations for which data are given in this report are shown in figures 7-8.

### Data Collection and Computation

The data obtained at a complete-record gaging station on a stream or canal consist of a continuous record of stage, individual measurements of discharge throughout a range of stages, and notations regarding factors that may affect the relationships between stage and discharge. These data, together with supplemental information, such as weather records, are used to compute daily discharges. The data obtained at a complete-record gaging station on a lake or reservoir consist of a record of stage and of notations regarding factors that may affect the relationship between stage and lake content. These data are used with stage-area and stage-capacity curves or tables to compute water-surface areas and lake storage.

Continuous records of stage are obtained with analog recorders that trace continuous graphs of stage or with digital recorders that punch stage values on paper tapes at selected time intervals. Measurements of discharge are made with current meters using methods adapted by the Geological Survey as a result of experience accumulated since 1880. These methods are described in standard textbooks, in Water-Supply Paper 2175, and in U.S. Geological Survey Techniques of Water-Resources Investigations, Book 3, Chapter A6.

In computing discharge records, results of individual measurements are plotted against the corresponding stages, and stage-discharge relation curves are then constructed. From these curves, rating tables indicating the approximate discharge for any stage within the range of the measurements are prepared. It is necessary to define extremes of discharge outside the range of the current-meter measurements, the curves are extended using: (1) logarithmic plotting; (2) velocity-area studies; (3) results of indirect measurements of peak discharge, such as slope-area or contracted-opening measurements, and computations of flow-over-dams or weirs; or (4) step-backwater techniques.

Daily mean discharges are computed by applying the daily mean stages (gage heights) to the stage-discharge curves or tables. If the stage-discharge relation is subject to change because of frequent or continual change in the physical features that form the control, the daily mean discharge is determined by the shifting-control method, in which correction factors based on the individual discharge measurements and notes of the personnel making the measurements are applied to the gage heights before the discharges are determined from the curves or tables. This shifting-control method also is used if the stage-discharge relation is changed temporarily because of aquatic growth or debris on the control. For some stations, formation of ice in the winter may so obscure the stage-discharge relations that daily mean discharges must be estimated from other information such as temperature and precipitation records, notes of observations, and records for other stations in the same or nearby basins for comparable periods.

At some stream-gaging stations the stage-discharge relation is affected by the backwater from reservoirs, tributary streams, or other sources. This necessitates the use of the slope method in which the slope or fall in a reach of the stream is a factor in computing discharge. The slope or fall is obtained by means of an auxiliary gage set at some distance from the base gage. At some stations the stage-discharge relation is affected by changing stage; at these stations the rate of change in stage is used as a factor in computing discharge.

In computing records of lake or reservoir contents, it is necessary to have available from surveys, curves or tables defining the relationship of stage and content. The application of stage to the stage-content curves or tables gives the contents from which daily, monthly, or yearly changes then are determined. If the stage-content relationship changes because of deposition of sediment in a lake or reservoir, periodic resurveys may be necessary to redefine the relationship. Even when this is done, the contents computed may become increasingly in error as time since the last survey increases. Discharges over lake or reservoir spillways are computed from stage-discharge relationships much as other stream discharges are computed.

For some gaging stations there are periods when no gage-height record is obtained, or the recorded gage height is so faulty that it cannot be used to compute daily discharge or contents. This happens when the recorder stops or otherwise fails to operate properly, intakes are plugged, the float is frozen in the well, or for various other reasons. For such periods, the daily discharges are estimated from the recorded range in stage, previous or following record, discharge measurements, weather records, and comparison with other station records from the same or nearby basins. Likewise, daily contents may be estimated from operator's logs, previous or following record, inflow-outflow studies, and other information.



## Data Presentation

The records published for each gaging station consist of two parts, the manuscript or station description and data table for the current water year. The manuscript provides, under various headings, descriptive information, such as station location; period of record; average discharge; historical extremes; record accuracy; and other remarks pertinent to station operation and regulation. The following information, as appropriate, is provided with each continuous record of discharge or lake content. Comments to follow clarify information presented under the various headings of the station description.

**LOCATION.**--Information on locations is obtained from the most accurate maps available. The location of the gage with respect to the cultural and physical features in the vicinity and with respect to the reference place mentioned in the station name is given. River mileages, given for only a few stations, were determined by methods given in "River Mileage Measurement," Bulletin 14, Revision of October 1968, prepared by the Water Resources Council or were provided by the U.S. Army Corps of Engineers.

**DRAINAGE AREA.**--Drainage areas are measured using the most accurate maps available. Because the type of maps available varies from one drainage basin to another, the accuracy of drainage areas likewise varies. Drainage areas are updated as better maps become available.

**PERIOD OF RECORD.**--This indicates the period for which there are published records for the station or for an equivalent station. An equivalent station is one that was in operation at a time that the present station was not, and whose location was such that records from it can reasonably be considered equivalent with records from the present station.

**REVISED RECORDS.**--Published records, because of new information, occasionally are found to be incorrect, and revisions are printed in later reports. Listed under this heading are all the reports in which revisions have been published for the station and the water years to which the revisions apply. If a revision did not include daily, monthly, or annual figures of discharge, that fact is noted after the year dates as follows: "(M)" means that only the instantaneous maximum discharge was revised; "(m)" that only the instantaneous minimum was revised; and "(P)" that only peak discharges were revised. If the drainage area has been revised, the report in which the most recently revised figure was first published is given.

**GAGE.**--The type of gage in current use, the datum of the current gage referred to National Geodetic Vertical Datum of 1929 (see glossary), and a condensed history of the types, locations, and datums of previous gages are given under this heading.

**REMARKS.**--This paragraph is used to present information relative to the accuracy of the records, to special methods of computation, to conditions that affect natural flow at the station and, possibly, to other pertinent items. For reservoir stations, information is given on the dam forming the reservoir, the capacity, outlet works and spillway, and purpose and use of the reservoir.

**COOPERATION.**--Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

**AVERAGE DISCHARGE.**--The discharge value given is the arithmetic mean of the water-year mean discharges. It is computed only for stations having at least 5 water years of complete record, and only water years of complete record are included in the computation. It is not computed for stations where diversions, storage, or other water-use practices cause the value to be meaningless. If water developments significantly altering flow at a station are put into use after the station has been in operation for a period of years, a new average is computed as soon as 5 water years of record have accumulated following the development.

**EXTREMES FOR PERIOD OF RECORD.**--Extremes may include maximum and minimum stages and maximum and minimum discharges or content. Unless otherwise qualified, the maximum discharge or content is the instantaneous maximum corresponding to the highest stage that occurred. The highest stage may have been obtained from a graphic or digital recorder, a crest-stage gage, or by direct observation of a nonrecording gage. If the maximum stage did not occur on the same day as the maximum discharge or content, it is given separately. Similarly, the minimum is the instantaneous minimum discharge, unless otherwise qualified, and was determined and is reported in the same manner as the maximum.

**EXTREMES OUTSIDE PERIOD OF RECORD.**--Included here is information concerning major floods or unusually low flows that occurred outside the stated period of record. The information may or may not have been obtained by the U.S. Geological Survey.

**EXTREMES FOR CURRENT YEAR.**--Extremes given here are similar to those for the period of record, except the peak discharge listing may include secondary peaks. For stations meeting certain criteria, all peak discharges and stages occurring during the water year and greater than a selected base discharge are presented under this heading. The peaks greater than the base discharge, excluding the highest one, are referred to as secondary peaks. Peak discharges are not published for canals, ditches, drains, or streams for which the peaks are subject to substantial control by man. The time of occurrence for peaks is expressed in 24-hour local standard time. For example, 12:30 a.m. is 0030, and 1:30 p.m. is 1330. The minimum for the current water year appears below the table of peak data.

**REVISIONS.**--If a critical error in published records is discovered, a revision is included in the first report published following discovery of the error.

Although rare, occasionally the records of a discontinued gaging station may need revision. Because, for these stations, there would be no current or, possibly, future station manuscript published to document the revision in a "Revised Records" entry, users of data for these stations who obtained the record from previously published data reports may wish to contact the District office to determine if the published records were ever revised after the station was discontinued. Of course, if the data were obtained by computer retrieval, the data would be current and there would be no need to check because any published revision of data is always accompanied by revision of the corresponding data in computer storage.

Manuscript information for lake or reservoir stations differs from that for stream stations in the nature of the "Remarks" and in the inclusion of a skeleton stage-capacity table when daily contents are given.

The daily table for stream-gaging stations gives mean discharge for each day and is followed by monthly and yearly summaries. In the monthly summary below the daily table, the line headed "TOTAL" gives the sum of the daily figures. The line headed "MEAN" gives the average flow in cubic feet per second during the month. The lines headed "MAX" and "MIN" give the maximum and minimum daily discharges, respectively, for the month. Discharge for the month also is usually expressed in cubic feet per second per square mile (line headed "CFSM"), or in inches (line headed "IN."), or in acre-feet (line headed "AC-FI"). Figures for cubic feet per second per square mile and runoff in inches are omitted if there is extensive regulation or diversion or if the drainage area includes large noncontributing areas. In the yearly summary below the monthly summary, the figures shown are the appropriate discharges for the calendar and water years. At some stations monthly and (or) yearly observed discharges are adjusted for reservoir storage or diversions, or diversions or reservoir contents are given. These figures are identified by a symbol and corresponding footnote.

Data collected at partial-record stations follow the information for continuous-record sites. Data for partial-record discharge stations are presented in two tables. The first is a table of annual maximum stage and discharge at crest-stage stations, and the second is a table of discharge measurements at low-flow partial-record stations. The tables of partial-record stations are followed by a listing of discharge measurements made at sites other than continuous-record or partial-record stations. These measurements and others collected for some special reason are called measurements at miscellaneous sites.

#### Identifying Estimated Discharge

Estimated daily-discharge values published in the water-discharge tables of annual State data reports are identified by flagging individual daily values with the letter symbol "e" and printing a table footnote, "e Estimated."

#### Accuracy of the Records

The accuracy of streamflow records depends primarily on: (1) The stability of the stage-discharge relation or, if the control is unstable, the frequency of discharge measurements; and (2) the accuracy of measurements of stage, measurements of discharge, and interpretation of records.

The accuracy attributed to the records is indicated under "REMARKS." "Excellent" means that about 95 percent of the daily discharges are within 5 percent of the true; "good," within 10 percent; and "fair," within 15 percent. Records that do not meet the criteria mentioned, are rated "poor." Different accuracies may be attributed to different parts of a given record.

Daily mean discharges in this report are given to the nearest hundredth of a cubic foot per second for values less than 1 ft<sup>3</sup>/s; to the nearest tenth between 1.0 and 10 ft<sup>3</sup>/s; to whole numbers between 10 and 1,000 ft<sup>3</sup>/s; and to 3 significant figures for more than 1,000 ft<sup>3</sup>/s. The number of significant figures used is based solely on the magnitude of the discharge value. The same rounding rules apply to discharges listed for partial-record stations and miscellaneous sites.

Discharge at many stations, as indicated by the monthly mean, may not reflect natural runoff due to the effects of diversion, consumption, regulation by storage, increase or decrease in evaporation due to artificial causes, or to other factors. For such stations, figures of cubic feet per second per square mile and of runoff, in inches, are not published unless satisfactory adjustments can be made for diversions, for changes in contents of reservoirs, or for other changes incident to use and control. Evaporation from a reservoir is not included in the adjustments for changes in reservoir contents, unless it is so stated. Even at those stations where adjustments are made, large errors in computed runoff may occur if adjustments or losses are large in comparison with the observed discharge.

#### Other Records Available

Records of discharge, not published by the Geological Survey, are collected in Oklahoma at several sites by the U.S. Army Corps of Engineers. The National Water Data Exchange (NAWDEX), U.S. Geological Survey, Reston, VA 22092, maintains an index of these sites as well as an index of records of discharge collected by other agencies but not published by the Geological Survey. Information on records at specific sites can be obtained from that office upon request.

Information used in the preparation of the records in this publication, such as discharge-measurement notes, gage-height records, temperature measurements, and rating tables are on file in the Oklahoma District office. Also, most of the daily mean discharges are in computer-readable form.

#### Records of Surface-Water Quality

Records of surface-water quality ordinarily are obtained at or near stream-gaging stations because interpretation of records of surface-water quality nearly always requires corresponding discharge data. Records of surface-water quality in this report may involve a variety of types of data and measurement frequencies.

### Classification of records

Water-quality data for surface-water sites are grouped into one of three classifications. A continuing-record station is a site where data are collected on a regularly scheduled basis. Frequency may be once or more times daily, weekly, monthly, or quarterly. A partial-record station is a site where limited water-quality data are collected systematically over a period of years. Frequency of sampling is usually less than quarterly. A miscellaneous sampling site is a location other than a continuing or partial-record station, where random samples are collected to give better areal coverage to define water-quality conditions in the river basin.

A careful distinction needs to be made between "continuing records" as used in this report and "continuous recordings," which refers to a continuous graph or a series of discrete values punched at short intervals on a paper tape. Some records of water quality, such as temperature and specific conductance, may be obtained through continuous recordings; however, because of costs, most data are obtained only monthly or less frequently. Locations of stations for which records on the quality of surface water appear in this report are shown in figure 10.

### Arrangement of Records

Water-quality records collected at a surface-water daily record station are published immediately following that record, regardless of the frequency of sample collection. Station number and name are the same for both records. Where a surface-water daily record station is not available or where the water quality differs significantly from that at the nearby surface-water station, the continuing water-quality record is published with its own station number and name in the regular downstream-order sequence. Water-quality data for partial-record stations and for miscellaneous sampling sites appear in separate tables following the table of discharge measurements at miscellaneous sites.

### On-site Measurements and Sample Collection

In obtaining water-quality data, a major concern needs to be assuring that the data obtained represent the in situ quality of the water. To assure this, certain measurements, such as water temperature, pH, and dissolved oxygen, need to be made onsite when the samples are taken. To assure that measurements made in the laboratory also represent the in situ water, carefully prescribed procedures need to be followed in collecting the samples, in treating the samples to prevent changes in quality pending analysis, and in shipping the samples to the laboratory. Procedures for onsite measurements and for collecting, treating, and shipping samples are given in publications on "Techniques of Water-Resources Investigations," Book 1, Chap. D2; Book 3, Chap. C2; Book 5, Chap. A1, A3, and A4. All of these references are listed on p. 17 of this report. Also, detailed information on collecting, treating, and shipping samples may be obtained from the Geological Survey District Office.

One sample can define adequately the water quality at a given time if the mixture of solutes throughout the stream cross section is homogeneous. However, the concentration of solutes at different locations in the cross section may vary widely with different rates of water discharge, depending on the source of material and the turbulence and mixing of the stream. Some streams must be sampled through several vertical sections to obtain a representative sample needed for an accurate mean concentration and for use in calculating load. All samples obtained for the National Stream Quality Accounting Network (see definitions) are obtained from at least several verticals. Whether samples are obtained from the centroid of flow or from several verticals, depends on flow conditions and other factors which must be evaluated by the collector.

Chemical-quality data published in this report are considered to be the most representative values available for the stations listed. The values reported represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis. In the rare case where an apparent inconsistency exists between a reported pH value and the relative abundance of carbon dioxide species (carbonate and bicarbonate), the inconsistency is the result of a slight uptake of carbon dioxide from the air by the sample between measurement of pH in the field and determination of carbonate and bicarbonate in the laboratory.

For chemical-quality stations equipped with digital monitors, the records consist of daily maximum, minimum, and mean values for each constituent measured and are based upon hourly punches beginning at 0100 hours and ending at 2400 hours for the day of record. More detailed records (hourly values) may be obtained from the U.S. Geological Survey District Office whose address is given on the back of the title page of this report.

### Water temperature

Water temperatures are measured at most of the water-quality stations. In addition, water temperatures are taken at time of discharge measurements for water-discharge stations. For stations where water temperatures are taken manually once or twice daily, the water temperatures are taken at about the same time each day. Large streams have a small diurnal temperature change; shallow streams may have a daily range of several degrees and may follow closely the changes in air temperature. Some streams may be affected by waste-heat discharges.

### Sediment

Suspended-sediment concentrations are determined from samples collected by using depth-integrating samplers. Samples usually are obtained at several verticals in the cross section, or a single sample may be obtained at a fixed point and a coefficient applied to determine the mean concentration in the cross sections.

Suspended-sediment samples were collected periodically at many verticals in the stream cross section. Although data collected periodically may represent conditions only at the time of observations, such data are useful in establishing seasonal relations between quality and streamflow and in predicting long-term sediment-discharge characteristics of the stream.



In addition to the records of suspended-sediment discharge, records of the periodic measurements of the particle-size distribution of the suspended sediment and bed material are included for some stations.

#### Laboratory Measurements

Sediment samples, samples for biochemical-oxygen (BOD), samples for indicator bacteria, and daily samples for specific conductance are analyzed locally. All other samples are analyzed in the Geological Survey laboratories in Arvada, Colo. Methods used in analyzing sediment samples and computing sediment records are given in TWRI, Book 5, Chap. C1. Methods used by the Geological Survey laboratories are given in TWRI, Book 1, Chap. D2; Book 3, Chap. C2; Book 5, Chap. A1, A3, and A4.

In March 1989 the National Water-Quality Laboratory discovered a bias in the turbidimetric method for sulfate analysis, indicating that values below 75 mg/L have a median positive bias of 2 mg/L above the true value for the period between 1982 and 1989. Sulfate values in this report have not been corrected for this bias.

#### Data Presentation

For continuing-record stations, information pertinent to the history of station operation is provided in descriptive headings preceding the tabular data. These descriptive headings give details regarding location, drainage area, period of record, type of data available, instrumentation, general remarks, cooperation, and extremes for parameters currently measured daily. Tables of chemical, physical, biological, radiochemical data, and so forth, obtained at a frequency less than daily are presented first. Tables of "daily values" of specific conductance, and water temperature then follow in sequence.

LOCATION.--See Data Presentation under "Records of Stage and Water Discharge;" same comments apply.

DRAINAGE AREA.--See Data Presentation under "Records of Stage and Water Discharge;" same comments apply.

PERIOD OF RECORD.--This indicates the periods for which there are published water-quality records for the station. The periods are shown separately for records of parameters measured daily or continuously and those measured less than daily. For those measured daily or continuously, periods of record are given for the parameters individually.

INSTRUMENTATION.--Information on instrumentation is given only if a water-quality monitor temperature record, sediment pumping sampler, or other sampling device is in operation at a station.

REMARKS.--Remarks provide added information pertinent to the collection, analysis, or computation of the records.

COOPERATION.--Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

EXTREMES.--Maximums and minimums are given only for parameters measured daily or more frequently. None are given for parameters measured weekly or less frequently, because the true maximums or minimums may not have been sampled. Extremes, when given, are provided for both the period of record and for the current water year.

REVISIONS.--If errors in published water-quality records are discovered after publication, appropriate updates are made to the Water-Quality File in the U.S. Geological Survey's computerized data system, WATSTORE, and subsequently by monthly transfer of update transactions to the U.S. Environmental Protection Agency's STORET system. Because the usual volume of updates makes it impractical to document individual changes in the State data-report series or elsewhere, potential users of U.S. Geological Survey water-quality data are encouraged to obtain all required data from the appropriate computer file to insure the most recent updates.

The surface-water-quality records for partial-record stations and miscellaneous sampling sites are published in separate tables following the table of discharge measurements at miscellaneous sites. No descriptive statements are given for these records. Each station is published with its own station number and name in the regular downstream-order sequence.

#### Remark Codes

The following remark codes may appear with the water-quality data in this report:

<u>PRINTED OUTPUT</u>	<u>REMARK</u>
E	Estimated value
>	Actual value is known to be greater than the value shown
<	Actual value is known to be less than the value shown
K	Results based on colony count outside the acceptance range (non-ideal colony count)
L	Biological organism count less than 0.5 percent (organisms may be observed rather than counted)
D	Biological organism count equal to or greater than 15 percent (dominant)
&	Biological organism estimated as dominant

## DEFINITIONS OF TERMS

Terms related to streamflow, water-quality, and other hydrologic data, as used in this report, are defined below. See also table for converting English units to International System (SI) Units on the inside of the back cover.

Acre-foot (AC-FT, acre-ft) is the quantity of water required to cover 1 acre to a depth of 1 foot and is equal to 43,560 cubic feet or about 326,000 gallons or 1,233 cubic meters.

Algae are mostly aquatic single-celled, colonial, or multicelled plants, containing chlorophyll and lacking roots, stems, and leaves.

Aroclor is the registered trade mark for a group of polychlorinated biphenyls which were manufactured by the Monsanto Company prior to 1976. Aroclors are assigned specific four-digit reference numbers dependent upon molecular type and degree of substitution of the biphenyl ring hydrogen atoms by chlorine atoms. The first two digits of a numbered aroclor represent the molecular type and the last two digits represent the weight percent of the hydrogen substituted chlorine.

Bacteria are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, while others perform an essential role in nature in the recycling of materials; for example, by decomposing organic matter into a form available for reuse by plants.

Total coliform bacteria are a particular group of bacteria that are used as indicators of possible sewage pollution. They are characterized as aerobic or facultative anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria which ferment lactose with gas formation within 48 hours at 35 °C. In the laboratory these bacteria are defined as all the organisms that produce colonies with a golden-green metallic sheen within 24 hours when incubated at 35 °C  $\pm$  1.0 °C on M-Endo medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Fecal coliform bacteria are bacteria that are present in the intestine or feces of warm-blooded animals. They are often used as indicators of the sanitary quality of the water. In the laboratory they are defined as all organisms that produce blue colonies within 24 hours when incubated at 44.5 °C  $\pm$  0.2 °C on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Fecal streptococcal bacteria are bacteria found also in the intestine of warm-blooded animals. Their presence in water is considered to verify fecal pollution. They are characterized as Gram-positive, cocci bacteria which are capable of growth in brain-heart infusion broth. In the laboratory they are defined as all the organisms which produce red or pink colonies within 48 hours at 35 °C  $\pm$  1.0 °C on KF-streptococcus medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Bed material is the sediment mixture of which a streambed, lake, pond, reservoir, or estuary bottom is composed.

Biochemical oxygen demand (BOD) is a measure of the quantity of dissolved oxygen, in milligrams per liter, necessary for the decomposition of organic matter by microorganisms, such as bacteria.

Biomass is the amount of living matter present at any given time, expressed as the mass per unit area or volume of habitat.

Ash mass is the mass or amount of residue present after the residue from the dry mass determination has been ashed in a muffle furnace at a temperature of 500 °C for 1 hour. The ash mass values of zooplankton and phytoplankton are expressed in grams per cubic meter ( $\text{g}/\text{m}^3$ ), and periphyton and benthic organisms in grams per square meter ( $\text{g}/\text{m}^2$ ).

Dry mass refers to the mass of residue present after drying in an oven at 105 °C for zooplankton and periphyton, until the mass remains unchanged. This mass represents the total organic matter, ash and sediment, in the sample. Dry-mass values are expressed in the same units as ash mass.

Organic mass or volatile mass of the living substance is the difference between the dry mass and the ash mass and represents the actual mass of the living matter. The organic mass is expressed in the same units as for ash and dry mass.

Wet mass is the mass of living matter plus contained water.

Bottom material: See Bed material.

Cells/volume refers to the number of cells of any organism which is counted by using a microscope and grid or counting cell. Many planktonic organisms are multicelled and are counted according to the number of contained cells per sample, usually milliliters (mL) or liters (L).

Chemical oxygen demand (COD) is a measure of the chemically oxidizable material in the water, and furnishes an approximation of the amount of organic and reducing material present. The determined value may correlate with natural water color or with carbonaceous organic pollution from sewage or industrial wastes.

Chlorophyll refers to the green pigments of plants. Chlorophyll a and b are the two most common green pigments in plants.

Color unit is produced by one milligram per liter of platinum in the form of the chloro-platinate ion. Color is expressed in units of the platinum-cobalt scale.

Contents is the volume of water in a reservoir or lake. Unless otherwise indicated, volume is computed on the basis of a level pool and does not include bank storage.

Control designates a feature downstream from the gage that determines the stage-discharge relation at the gage. This feature may be a natural constriction of the channel, an artificial structure, or a uniform cross section over a long reach of the channel.

Control structure as used in this report is a structure on a stream or canal that is used to regulate the flow or stage of the stream.

Cubic foot per second ( $\text{ft}^3/\text{s}$ )<sup>1</sup> is the rate of discharge representing a volume of 1 cubic foot passing a given point during 1 second and is equivalent to 7.48 gallons per second or 448.8 gallons per minute or 0.02832 cubic meters per second.

Cubic feet per second per square mile [ $(\text{ft}^3/\text{s})/\text{mi}^2$ ]<sup>1</sup> is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming that the runoff is distributed uniformly in time and area.

Discharge is the volume of water (or more broadly, volume of fluid plus suspended sediment) that passes a given point within a given period of time.

Mean discharge (MEAN) is the arithmetic mean of individual daily mean discharges during a specific period.

Instantaneous discharge is the discharge at a particular instant of time.

Dissolved refers to that material in a representative water sample which passes through a 0.45  $\mu\text{m}$  membrane filter. This is a convenient operational definition used by Federal agencies that collect water data. Determinations of "dissolved" constituents are made on subsamples of the filtrate.

Dissolved-solids concentration of water is determined either analytically by the "residue-on-evaporation" method, or mathematically by totaling the concentrations of individual constituents reported in a comprehensive chemical analysis. During the analytical determination of dissolved solids, the bicarbonate (generally a major dissolved component of water) is converted to carbonate. Therefore, in the mathematical calculation of dissolved-solids concentration, the bicarbonate value, in milligrams per liter, is multiplied by 0.492 to reflect the change.

Drainage area of a stream at a specified location is that area, measured in a horizontal plane, enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by gravity into the stream above the specified point. Figures of drainage area given herein include all closed basins, or noncontributing areas, within the area unless otherwise noted.

Drainage basin is a part of the surface of the earth that is occupied by a drainage system, which consists of a surface stream or a body of impounded surface water together with all tributary surface streams and bodies of impounded surface water.

Gage height (G.H.) is the water-surface elevation referred to some arbitrary gage datum. Gage height is often used interchangeably with the more general term "stage," although gage height is more appropriate when used with a reading on a gage.

Gaging station is a particular site on a stream, canal, lake, or reservoir where systematic observations of hydrologic data are obtained.

Hardness of water is a physical-chemical characteristic that is commonly recognized by the increased quantity of soap required to produce lather. It is computed as the sum of equivalents of polyvalent cations and is expressed as the equivalent concentration of calcium carbonate ( $\text{CaCO}_3$ ).

HWM is a high-water mark or flood mark.

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<sup>1</sup>Until appropriate changes can be made to the WATSTORE and Prime computer systems, the unit abbreviations "CFS" and "CFSM" will appear in some computer-generated table headings and summaries.



Hydrologic Bench-Mark Network is a network of 57 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by the activities of man.

Hydrologic unit is a geographic area representing part of all of a surface drainage basin or distinct hydrologic feature as delineated by the Office of Water Data Coordination on the State Hydrologic Unit Maps; each hydrologic unit is identified by an eight-digit number.

Micrograms per gram ( $\mu\text{g/g}$ ) is a unit expressing the concentration of a chemical constituent as the mass (micrograms) of the element per unit mass (gram) of material analyzed.

Micrograms per liter ( $\mu\text{g/L}$ ,  $\mu\text{g/L}$ ) is a unit expressing the concentration of chemical constituents in solution as mass (micrograms) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to one milligram per liter.

Milligrams per liter ( $\text{MG/L}$ ,  $\text{mg/L}$ ) is a unit for expressing the concentration of chemical constituents in solution. Milligrams per liter represents the mass of solute per unit volume (liter) of water. Concentrations of suspended sediment also is expressed in  $\text{mg/L}$  and is based on the mass of dry sediment per liter of water-sediment mixture.

National Geodetic Vertical Datum of 1929 (NGVD of 1929) is a geodetic datum derived from a general adjustment of the first order level nets of both the United States and Canada. It was formerly called "Sea Level Datum of 1929" or "mean sea level" in this series of reports. Although the datum was derived from the average sea level over a period of many years at 26 tide stations along the Atlantic, Gulf or Mexico, and Pacific Coasts, it does not necessarily represent local mean sea level at any particular place.

National Stream Quality Accounting Network (NASQAN) is a nationwide data-collection network designed by the U.S. Geological Survey to meet many of the information needs of government agencies and other groups involved in natural or regional water-quality planning and management. The 500 or so sites in NASQAN are generally located at the downstream ends of hydrologic accounting units designated by the U.S. Geological Survey Office of Water Data Coordination in consultation with the Water Resources Council. The objectives of NASQAN are (1) to obtain information on the quality and quantity of water moving within and from the United States through a systematic and uniform process of data collection, summarization, analysis, and reporting such that the data may be used for, (2) description of the areal variability of water quality in the Nation's rivers through analysis of data from this and other programs, (3) detection of changes or trends with time in the pattern of occurrence of water-quality characteristics, and (4) providing a nationally consistent data base useful for water-quality assessment and hydrologic research.

The National Trends Network (NTN) is a 150-station network for sampling atmospheric deposition in the United States. The purpose of the network is to determine the variability, both in location and in time, of the composition of atmospheric deposition, which includes snow, rain, dust particles, aerosols, and gases. The core from which the NTN was built was the already-existing deposition-monitoring network of the National Atmospheric Deposition Program (NADP).

Organism is any living entity.

Organism count/area refers to the number of organisms collected and enumerated in a sample and adjusted to the number per unit area habitat, usually square meter ( $\text{m}^2$ ), acre, or hectare. Periphyton, benthic organisms, and macrophytes are expressed in these terms.

Organism count/volume refers to the number of organisms collected and enumerated in a sample and adjusted to the number per sample volume, usually milliliter (mL) or liter (L). Numbers of planktonic organisms can be expressed in these terms.

Total organism count is the total number of organisms collected and enumerated in any particular sample.

Parameter Code is a 5-digit number used in the U.S. Geological Survey computerized data system, WATSTORE, to uniquely identify a specific constituent. The codes used in WATSTORE are the same as those used in the U.S. Environmental Protection Agency data system, STORET. The Environmental Protection Agency assigns and approves all requests for new codes.

Partial-record station is a particular site where limited streamflow and/or water-quality data are collected systematically over a period of years for use in hydrologic analyses.

Particle size is the diameter, in millimeters (mm), of a particle determined by either sieve or sedimentation methods. Sedimentation methods (pipet, bottom-withdrawal tube, visual-accumulation tube) determine fall diameter of particles in either distilled water (chemically dispersed) or in native water (the river water at the time and point of sampling).

Particle-size classification used in this report agrees with the recommendation made by the American Geophysical Union Subcommittee on Sediment Terminology. The classification is as follows:

<u>Classification</u>	<u>Size (mm)</u>	<u>Method of analysis</u>
Clay.....	0.00024 - 0.004	Sedimentation
Silt.....	.004 - .062	Sedimentation
Sand.....	.062 - 2.0	Sedimentation or sieve
Gravel.....	2.0 - 64.0	Sieve

The particle-size distribution given in this report are not necessarily representative of all particles in transport in the stream. Most of the organic matter is removed and the sample is subjected to mechanical and chemical dispersion before analysis in distilled water. Chemical dispersion is not used for native-water analysis.

Percent composition is a unit for expressing the ratio of a particular part of a sample or population to the total sample or population in terms of types, numbers, mass, or volume.

Periphyton is the assemblage of microorganisms attached to and living upon submerged solid surfaces. While primarily consisting of algae, they also include bacteria, fungi, protozoa, rotifers, and other small organisms.

Pesticides are chemical compounds used to control undesirable organisms. Major categories of pesticides include insecticides, miticides, fungicides, herbicides, and rodenticides.

Picocurie (PC, pCi) is one trillionth ( $1 \times 10^{-12}$ ) of the amount of radioactivity represented by a curie (Ci). A curie is the amount of radioactivity that yields  $3.7 \times 10^{10}$  radioactive disintegrations per second. A picocurie yields 2.22 dpm (disintegrations per minute).

Plankton is the community of suspended, floating, or weakly swimming organisms that live in the open water of lakes and rivers.

Phytoplankton is the plant part of the plankton. They are usually microscopic and their movement is subject to the water currents. Phytoplankton growth is dependent upon solar radiation and nutrient substances. Because they are able to incorporate as well as release materials to the surrounding water, the phytoplankton have a profound effect upon the quality of the water. They are the primary food producers in the aquatic environment, and are commonly known as algae.

Blue-green algae are a group of phytoplankton organisms having a blue pigment, in addition to the green pigment called chlorophyll. Blue-green algae often cause nuisance conditions in water.

Diatoms are the unicellular or colonial algae having a siliceous shell. Their concentrations are expressed as number of cells per milliliter (cells/mL) of sample.

Green algae have chlorophyll pigments similar in color to those of higher green plants. Some forms produce algae mats or floating "moss" in lakes. Their concentrations are expressed as number of cells per milliliter (cells/mL) of sample.

Zooplankton is the animal part of the plankton. Zooplankton are capable of extensive movements within the water column and are often large enough to be seen with the unaided eye. Zooplankton are secondary consumers feeding upon bacteria, phytoplankton, and detritus. Because they are the grazers in the aquatic environment, the zooplankton are a vital part of the aquatic food web. The zooplankton community is dominated by small crustaceans and rotifers.

Primary productivity is a measure of the rate at which new organic matter is formed and accumulated through photosynthetic and chemosynthetic activity of producer organisms (chiefly, green plants). The rate of primary production is estimated by measuring the amount of oxygen release (oxygen method) or the amount of carbon assimilated by the plants (carbon method).

Milligrams of carbon per area or volume per unit time [ $\text{mg C}/\text{m}^2 \cdot \text{time}$ ]] for periphyton and macrophytes and [ $\text{mg C}/(\text{m}^3 \cdot \text{time})$ ]] for phytoplankton are units for expressing primary productivity. They define the amount of carbon dioxide consumed as measured by radioactive carbon (carbon 14). The carbon 14 method is of greater sensitivity than the oxygen light and dark bottle method, and is preferred for use in unenriched waters. Unit time may be either the hour or day, depending on the incubation period.

Milligrams of oxygen per area or volume per unit time [ $\text{mg O}/(\text{m}^2 \cdot \text{time})$ ] for periphyton and macrophytes and [ $\text{mg O}/\text{m}^3 \cdot \text{time}$ ] for phytoplankton are the units for expressing primary productivity. They define production and respiration rates as estimated from changes in the measured dissolved-oxygen concentration. The oxygen light and dark bottle method is preferred if the rate of primary production is sufficient for accurate measurements to be made within 24 hours. Unit time may be either the hour or day, depending on the incubation period.

Recoverable from bottom material is the amount of a given constituent that is in solution after a representative sample of bottom material has been digested by a method (usually using an acid or mixture of acids) that results in dissolution of readily soluble substances. Complete dissolution of all bottom material is not achieved by the digestion treatment and thus the determination represents less than the total amount (that is, less than 95 percent) of the constituent in the sample. To achieve comparability of analytical data, equivalent digestion procedures are likely to produce different analytical results.

Return period is the average time interval between occurrences of a hydrological event of a given or greater magnitude, usually expressed in years. May also be called recurrence interval.

Runoff in inches (IN, in) shows the depth to which the drainage area would be covered if all the runoff for a given time period were uniformly distributed on it.

Sediment is solid material that originates mostly from disintegrated rocks and is transported by, suspended in, or deposited from water; it includes chemical and biochemical precipitates and decomposed organic material such as humus. The quantity, characteristics, and cause of the occurrence of sediment in streams are influenced by environmental factors. Some major factors are degree of slope, length of slope, soil characteristics, land usage, and quantity and intensity of precipitation.

Bed load is the sediment that is transported in a stream by rolling, sliding, or skipping along the bed and very close to it. In this report, bed load is considered to consist of particles in transit within 0.25 ft of the streambed.

Bed load discharge (tons per day) is the quantity of bed load measured by dry weight that moves past a section as bed load in a given time.

Suspended sediment is the sediment that at any given time is maintained in suspension by the upward components of turbulent currents or that exists in suspension as a colloid.

Suspended-sediment concentration is the velocity-weighted concentration of suspended sediment in the sampled zone (from the water surface to a point approximately 0.3 ft above the bed) expressed as milligrams of dry sediment per liter of water-sediment mixture (mg/L).

Mean concentration is the time-weighted concentration of suspended sediment passing a stream section during a 24-hour day.

Suspended-sediment discharge (tons/day) is the rate at which dry mass of sediment passes a section of a stream or is the quantity of sediment, as measured by dry mass or volume, that passes a section in a given time. It is calculated in units of tons per day as follows: concentration (mg/L)  $\times$  discharge ( $\text{ft}^3/\text{s}$ )  $\times$  0.0027.

Suspended-sediment load is a general term that refers to material in suspension. It is not synonymous with either discharge or concentration.

Total sediment discharge (tons/day) is the sum of the suspended-sediment discharge and the bed-load discharge. It is the total quantity of sediment, as measured by dry mass or volume, that passes a section during a given time.

Total-sediment load or total load is a term which refers to the total sediment (bed load plus suspended-sediment load) that is in transport. It is not synonymous with total-sediment discharge.

Sodium-adsorption-ratio (SAR) is the expression of relative activity of sodium ions in exchange reactions within soil and is an index of sodium or alkali hazard to the soil. Waters range in respect to sodium hazard from those which can be used for irrigation on almost all soils to those which are generally unsatisfactory for irrigation.

Solute is any substance that is dissolved in water.

Specific conductance is a measure of the ability of a water to conduct an electrical current. It is expressed in microsiemens per centimeter at 25 °C. Specific conductance is related to the type and concentration of ions in solution and can be used for approximating the dissolved-solids content of the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is about 65 percent of the specific conductance (in microsiemens). This relation is not constant from stream to stream, and it may vary in the same source with changes in the composition of the water.



Stage-discharge relation is the relation between gage height (stage) and the volume of water, per unit of time, flowing in a channel.

Streamflow is the discharge that occurs in a natural channel. Although the term "discharge" can be applied to the flow of a canal, the word "streamflow" uniquely describes the discharge in a surface stream course. The term "streamflow" is more general than "runoff" as streamflow may be applied to discharge whether or not it is affected by diversion or regulation.

Substrate is the physical surface upon which an organism lives.

Natural substrate refers to any naturally occurring or submersed solid surface, such as a rock or tree, upon which an organism lives.

Artificial substrate is a device which is purposely placed in a stream or lake for colonization of organisms. The artificial substrate simplifies the community structure by standardizing the substrate from which each sample is taken. Examples of artificial substrates are basket samplers (made of wire cages filled with clean streamside rocks) and multiplate samplers (made of hardboard) for benthic organism collection, and plexiglass strips for periphyton.

Surface area of a lake is that area outlined on the latest U.S. Geological Survey topographic map as the boundary of the lake and measured by a planimeter in acres. In localities not covered by topographic maps, the areas are computed from the best maps available at the time planimetered. All areas shown are those for the stage when the planimetered map was made.

Surficial bed material is the part (0.1 to 0.2 ft) of the bed material that is sampled using U.S. Series Bed-Material Samplers.

Suspended (as used in tables of chemical analyses) refers to the amount (concentration) of undissolved material in a water-sediment mixture. It is associated with the material retained on a 0.45-micrometer filter.

Suspended, recoverable is the amount of a given constituent that is in solution after the part of a representative water-suspended sediment sample that is retained on a 0.45  $\mu$ m membrane filter has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all the particulate matter is not achieved by the digestion treatment and thus the determination represents something less than the "total" amount (that is, less than 95 percent) of the constituent present in the sample. To achieve comparability of analytical data, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Determinations of "suspended, recoverable" constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total recoverable concentrations of the constituent.

Suspended, total is the total amount of a given constituent in the part of a representative water-suspended sediment sample that is retained on a 0.45  $\mu$ m membrane filter. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to determine when the results should be reported as "suspended, total."

Determinations of "suspended, total" constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total concentrations of the constituent.

Taxonomy is the division of biology concerned with the classification and naming of organisms. The classification of organisms is based upon a hierarchical scheme beginning with Kingdom and ending with Species at the base. The higher the classification level, the fewer features the organisms have in common. For example, the taxonomy of a particular mayfly, Hexagenia limbata, is the following:

Kingdom.....	Animal
Phylum.....	Arthropoda
Class.....	Insecta
Order.....	Ephemeroptera
Family.....	Ephemeridae
Genus.....	<u>Hexagenia</u>
Species.....	<u>hexagenia limbata</u>

Time-weighted average is computed by multiplying the number of days in the sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the total number of days. A time-weighted average represents the composition of water that would be contained in a vessel or reservoir that had received equal quantities of water from the stream each day for the year.



Tons per acre-foot indicates the dry mass of dissolved solids in 1 acre-foot of water. It is computed by multiplying the concentration of the constituent, in milligrams per liter, by 0.00136.

Tons per day (T/DAY) is the quantity of a substance in solution or suspension that passes a stream section during a 24-hour period.

Total is the total amount of a given constituent in a representative water-suspended sediment sample, regardless of the constituent's physical or chemical form. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent present in both the dissolved and suspended phases of the sample. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as "total." (Note that the word "total" does double duty here, indicating both that the sample consists of a water-suspended sediment mixture and that the analytical method determines all of the constituent in the sample.)

Total discharge is the total quantity of any individual constituent, as measured by dry mass or volume, that passes through a stream cross-section per unit of time. This term needs to be qualified, such as "total sediment discharge," "total chloride discharge," and so on.

Total, recoverable is the amount of a given constituent that is in solution after a representative water-suspended sediment sample has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily substances. Complete dissolution of all particulate matter is not achieved by the digestion treatment, and thus the determination represents something less than the "total" amount (that is, less than 95 percent) of the constituent present in the dissolved and suspended phases of the sample. To achieve comparability of analytical data, equivalent digestion procedures are required of all laboratories performing such analyses, because different digestion procedures are likely to produce different analytical results.

Water year in Geological Survey reports dealing with surface-water supply is the 12-month period, October 1 through September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ending September 30, 1986, is called the "1986 water year."

WDR is used as an abbreviation for "Water-Data Report" in the REVISED RECORDS paragraph to refer to State annual hydrologic-data reports (WRD was used as an abbreviation for "Water-Resources Data" in reports published prior to 1976).

Weighted average is used in this report to indicate discharge-weighted average. It is computed by multiplying the discharge for a sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the sum of the discharges. A discharge-weighted average approximates the composition of water that would be found in a reservoir containing all the water passing a given location during the water year after thorough mixing in the reservoir.

WSP is used as an abbreviation for "Water-Supply Paper" in references to previously published reports.

## PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

The U.S. Geological Survey publishes a series of manuals describing procedures for planning and conducting specialized work in water-resources investigations. The material is grouped under major subject headings called books and is further divided into sections and chapters. For example, Section A of Book 3 (Applications of Hydraulics) pertains to surface water. The chapter, the unit of publication, is limited to a narrow field of subject matter. This format permits flexibility in revision and publication as the need arises.

The reports listed below are for sale by the U.S. Geological Survey, Books and Open-File Reports Section, Federal Center, Box 25425, Denver, Colorado 80225 (authorized agent of the Superintendent of Documents, Government Printing Office). Prepayment is required. Remittance should be sent by check or money order payable to the U.S. Geological Survey. Prices are not included because they are subject to change. Current prices can be obtained by writing to the above address. When ordering or inquiring about prices for any of these publications, please give the title, book number, chapter number, and "U.S. Geological Survey Techniques of Water-Resources Investigations."

- 1-D1. Water temperature--influential factors, field measurement, and data presentation, by H. H. Stevens, Jr., J. F. Ficke, and G. F. Smoot: USGS--TWRI Book 1, Chapter D1. 1975. 65 pages.
- 1-D2. Guidelines for collection and field analysis of ground-water samples for selected unstable constituents, by W. W. Wood: USGS--TWRI Book 1, Chapter D2. 1976. 24 pages.
- 2-D1. Application of surface geophysics to ground-water investigations, by A. A. R. Zohdy, G. P. Eaton, and D. R. Mabey: USGS--TWRI Book 2, Chapter D1. 1974. 116 pages.
- 2-E1. Application of borehole geophysics to water-resources investigations, by W. S. Keys and L. M. MacCary: USGS--TWRI Book 2, Chapter E1. 1971. 126 pages.
- 3-A1. General field and office procedures for indirect discharge measurements, by M. A. Benson and Tate Dalrymple: USGS--TWRI Book 3, Chapter A1. 1967. 30 pages.
- 3-A2. Measurement of peak discharge by the slope-area method, by Tate Dalrymple and M. A. Benson: USGS--TWRI Book 3, Chapter A2. 1967. 12 pages.
- 3-A3. Measurement of peak discharge at culverts by indirect methods, by G. L. Bodhaine: USGS--TWRI Book 3, Chapter A3. 1968. 60 pages.
- 3-A4. Measurement of peak discharge at width contractions by indirect methods, by H. J. Matthai: USGS--TWRI Book 3, Chapter A4. 1967. 44 pages.
- 3-A5. Measurement of peak discharge at dams by indirect methods, by Harry Hulsing: USGS--TWRI Book 3, Chapter A5. 1967. 29 pages.
- 3-A6. General procedure for gaging streams, by R. W. Carter and Jacob Davidian: USGS--TWRI Book 3, Chapter A6. 1968. 13 pages.
- 3-A7. Stage measurements at gaging stations, by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3, Chapter A7. 1968. 28 pages.
- 3-A8. Discharge measurements at gaging stations, by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3, Chapter A8. 1969. 65 pages.
- 3-A9. Measurement of time of travel and dispersion in streams by dye tracing, by E. F. Hubbard, F. A. Kilpatrick, L. A. Martens, and J. F. Wilson, Jr.: USGS--TWRI Book 3, Chapter A9. 1982. 44 pages.
- 3-A10. Discharge ratings at gaging stations, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A10. 1984. 59 pages.
- 3-A11. Measurement of discharge by moving-boat method, by G. F. Smoot and C. E. Novak: USGS--TWRI Book 3, Chapter A11. 1969. 22 pages.
- 3-A12. Fluorometric procedures for dye tracing, by J. F. Wilson, Jr., E. D. Cobb, and F. A. Kilpatrick: USGS--TWRI Book 3, Chapter A12. 1986. 41 pages.
- 3-A13. Computation of continuous records of streamflow, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A13. 1983. 53 pages.
- 3-A14. Use of flumes in measuring discharge, by F. A. Kilpatrick and V. R. Schneider: USGS--TWRI Book 3, Chapter A14. 1983. 46 pages.
- 3-A15. Computation of water-surface profiles in open channels, by Jacob Davidian: USGS--TWRI Book 3, Chapter A15. 1984. 48 pages.
- 3-A16. Measurement of discharge using tracers, by F. A. Kilpatrick and E. D. Cobb: USGS--TWRI Book 3, Chapter A16. 1985. 52 pages.
- 3-A17. Acoustic velocity meter systems, by Antonius Laenen: USGS--TWRI Book 3, Chapter A17. 1985. 38 pages.
- 3-B1. Aquifer-test design, observation, and data analysis, by R. W. Stallman: USGS--TWRI Book 3, Chapter B1. 1971. 26 pages.

## PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS--Continued

- 3-B2. Introduction to ground-water hydraulics, a programed test for self-instruction, by G. D. Bennett: USGS--TWRI Book 3, Chapter B2. 1976. 172 pages.
- 3-B3. Type curves for selected problems of flow to wells in confined aquifers, by J. E. Reed: USGS--TWRI Book 3, Chapter B3. 1980. 106 pages.
- 3-B5. Definition of boundary and initial conditions in the analysis of saturated ground-water flow systems--An introduction, by O. L. Franke, T. E. Reilly, and G. D. Bennett: USGS--TWRI Book 3, Chapter B5. 1987. 15 pages.
- 3-B6. The principle of superposition and its application in ground-water hydraulics, by T. E. Reilly, O. L. Franke, and G. D. Bennett: USGS--TWRI Book 3, Chapter B6. 1987. 28 pages.
- 3-C1. Fluvial sediment concepts, by H. P. Guy: USGS--TWRI Book 3, Chapter C1. 1970. 55 pages.
- 3-C2. Field methods for measurement of fluvial sediment, by H. P. Guy and V. W. Norman: USGS--TWRI Book 3, Chapter C2. 1970. 59 pages.
- 3-C3. Computation of fluvial-sediment discharge, by George Porterfield: USGS--TWRI Book 3, Chapter C3. 1972. 66 pages.
- 4-A1. Some statistical tools in hydrology, by H. C. Riggs: USGS--TWRI Book 4, Chapter A1. 1968. 39 pages.
- 4-A2. Frequency curves, by H. C. Riggs: USGS--TWRI Book 4, Chapter A2. 1968. 15 pages.
- 4-B1. Low-flow investigations, by H. C. Riggs: USGS--TWRI Book 4, Chapter B1. 1972. 18 pages.
- 4-B2. Storage analyses for water supply, by H. C. Riggs and C. H. Hardison: USGS--TWRI Book 4, Chapter B2. 1973. 20 pages.
- 4-B3. Regional analyses of streamflow characteristics, by H. C. Riggs: USGS--TWRI Book 4, Chapter B3. 1973. 15 pages.
- 4-D1. Computation of rate and volume of stream depletion by wells, by C. T. Jenkins: USGS--TWRI Book 4, Chapter D1. 1970. 17 pages.
- 5-A1. Methods for determination of inorganic substances in water and fluvial sediments, by M. W. Skougstad and others, editors: USGS--TWRI Book 5, Chapter A1. 1979. 626 pages.
- 5-A2. Determination of minor elements in water by emission spectroscopy, by P. R. Barnett and E. C. Mallory, Jr.: USGS--TWRI Book 5, Chapter A2. 1971. 31 pages.
- 5-A3. Methods for analysis of organic substances in water, by D. F. Goerlitz and Eugene Brown: USGS--TWRI Book 5, Chapter A3. 1972. 40 pages.
- 5-A4. Methods for collection and analysis of aquatic biological and microbiological samples, edited by P. E. Greeson, T. A. Ehlke, G. A. Irwin, B. W. Lium, and K. V. Slack: USGS--TWRI Book 5, Chapter A4. 1977. 332 pages.
- 5-A5. Methods for determination of radioactive substances in water and fluvial sediments, by L. L. Thatcher, V. J. Janzer, and K. W. Edwards: USGS--TWRI Book 5, Chapter A5. 1977. 95 pages.
- 5-A6. Quality assurance practices for the chemical and biological analyses of water and fluvial sediments, by L. C. Friedman and D. E. Erdmann: USGS--TWRI Book 5, Chapter A6. 1982. 181 pages.
- 5-C1. Laboratory theory and methods for sediment analysis, by H. P. Guy: USGS--TWRI Book 5, Chapter C1. 1969. 58 pages.
- 6-A1. A modular three-dimensional finite-difference ground-water flow model, by M. G. McDonald and A. W. Harbaugh: USGS--TWRI Book 6, Chapter A1. 1988. 586 pages.
- 7-C1. Finite difference model for aquifer simulation in two dimensions with results of numerical experiments, by P. C. Trescott, G. F. Pinder, and S. P. Larson: USGS--TWRI Book 7, Chapter C1. 1976. 116 pages.
- 7-C2. Computer model of two-dimensional solute transport and dispersion in ground water, by L. F. Konikow and J. D. Bredehoeft: USGS--TWRI Book 7, Chapter C2. 1978. 90 pages.
- 7-C3. A model for simulation of flow in singular and interconnected channels, by R. W. Schaffranek, R. A. Baltzer, and D. E. Goldberg: USGS--TWRI Book 7, Chapter C3. 1981. 110 pages.
- 8-A1. Methods of measuring water levels in deep wells, by M. S. Garber and F. C. Koopman: USGS--TWRI Book 8, Chapter A1. 1968. 23 pages.
- 8-A2. Installation and service manual for U.S. Geological Survey manometers, by J. D. Craig: USGS--TWRI Book 8, Chapter A2. 1983. 57 pages.
- 8-B2. Calibration and maintenance of vertical-axis type current meters, by G. F. Smoot and C. E. Novak: USGS--TWRI Book 8, Chapter B2. 1968. 15 pages.



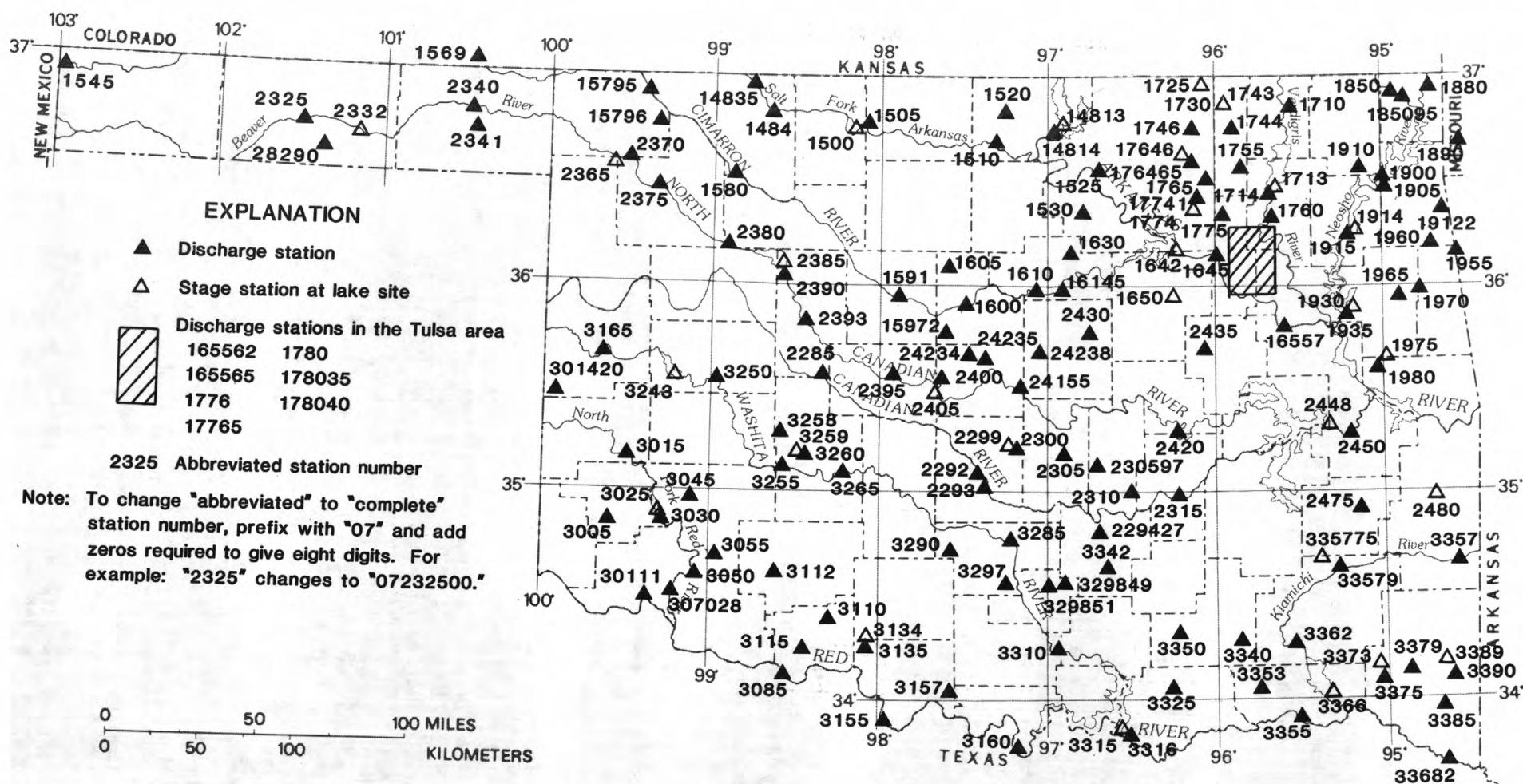


Figure 7.—Location of continuous-record surface-water stations, water year 1988.

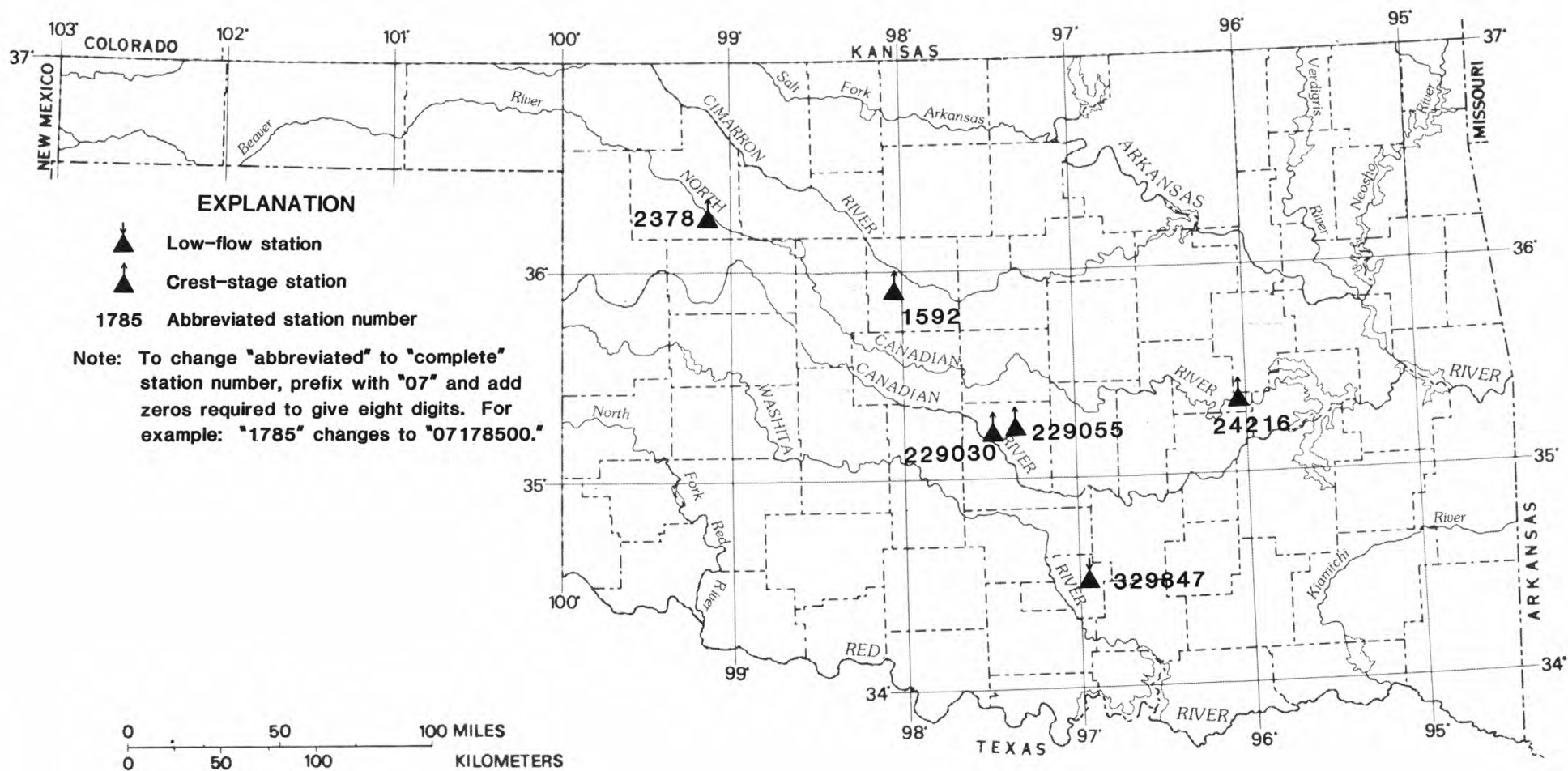


Figure 8.—Location of partial-record stations, water year 1988.

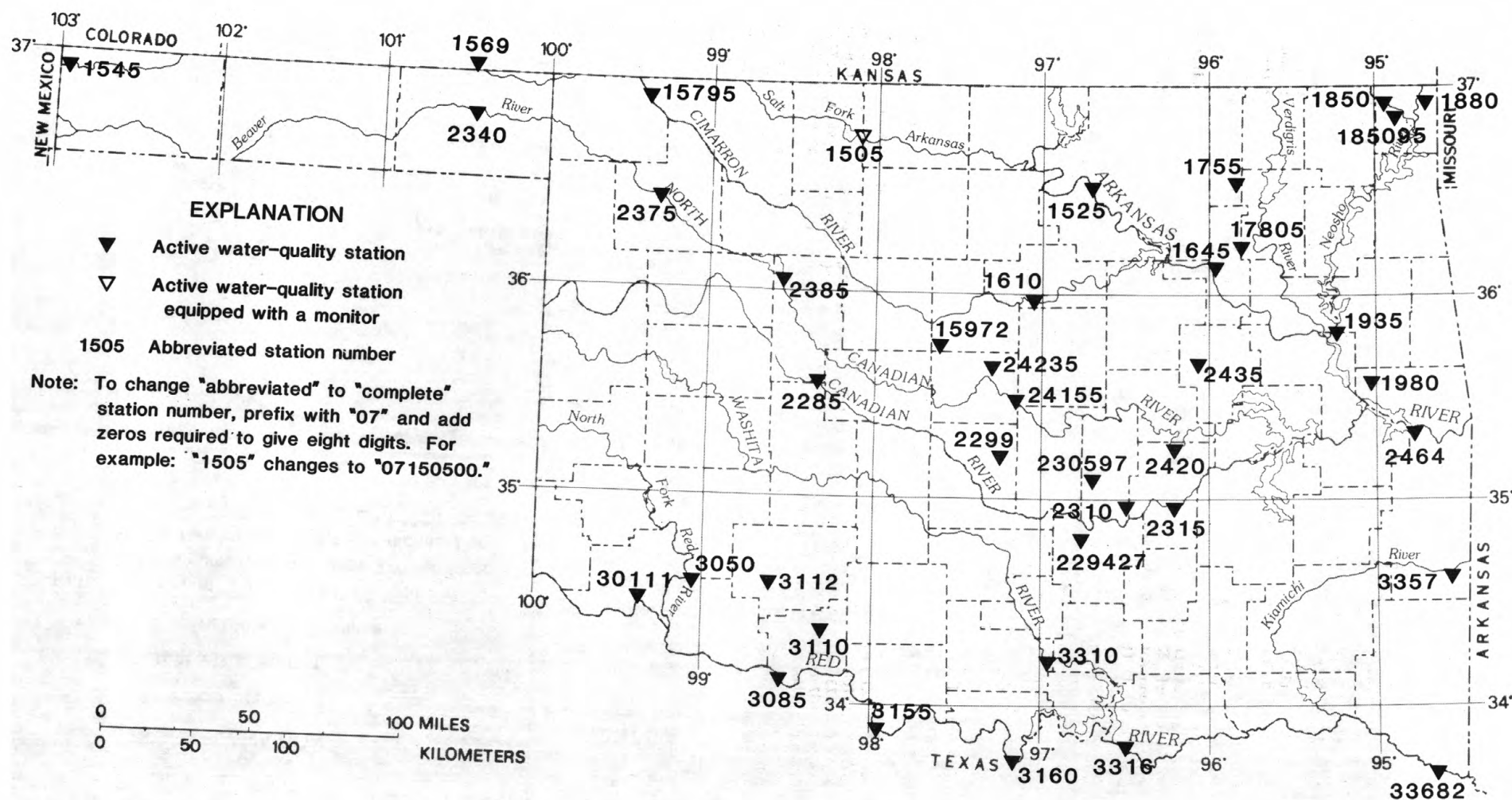


Figure 9.—Location of water-quality stations, water year 1988.



## 07148130 KAW LAKE NEAR PONCA CITY, OK

LOCATION (REVISED).--Lat 36°41'58", long 96°55'18", in NE 1/4 SE 1/4 sec.25, T.26 N., R.3 E., Osage County, Hydrologic Unit 11060001, 1,700 ft east of centerline of spillway on dam on Arkansas River, about 8 mi east of Ponca City, and at mile 653.7.

DRAINAGE AREA.--46,530 mi<sup>2</sup>, of which 7,607 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--April 1976 to current year.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929. Prior to July 8, 1976 nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by a rolled, earth dam. Spillway is concrete, gravity ogee-weir type controlled by eight 50-foot taintor gates. Outlet works consist of two sluice gates. Regulated storage began April 22, 1976; conservation pool first filled July 6, 1976. Capacity, 1,348,000 acre-ft, at elevation 1,044.5 ft, top of flood control pool, 428,600 acre-ft, at elevation 1,010.0 ft, top of conservation pool, and 250,700 acre-ft, at elevation 997.5 ft, crest of controlled spillway. Dead storage 85,100 acre-ft below elevation 978.0 ft. Figures given herein represent total contents. Reservoir is designed for flood control, water-quality control, recreation, fish and wildlife, and water supply.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 1,387,000 acre-ft, Oct. 6, 1986, elevation, 1,045.52 ft; minimum since conservation pool first filled, 223,100 acre-ft, Mar. 25, 1977, elevation, 995.06 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 706,300 acre-ft, Apr. 5, elevation, 1,023.57 ft; minimum, 385,200 acre-ft, Feb. 12, elevation, 1,007.35 ft.

## Capacity table (elevation, in feet, and contents, in acre-ft):

1,006	364,300	1,030	873,000
1,012	463,700	1,036	1,052,000
1,018	580,900	1,042	1,256,000
1,024	716,700	1,046	1,406,000

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	436000	429600	449600	567500	412500	389100	491600	490600	429100	430300	428300	427400
2	434600	428900	449400	570400	409700	393300	568800	484400	430300	430300	427900	428100
3	432700	429300	450700	573300	408400	411600	636900	475200	430100	431700	428100	428100
4	430500	429400	450700	575000	406100	428700	690000	463300	430000	432600	428400	427200
5	428600	427900	450300	574600	403300	442900	702800	452200	429600	432700	428800	427400
6	427400	427000	450300	571200	399000	455400	698700	444100	428900	432000	429100	426700
7	427600	426900	449900	565900	396000	469000	693600	441400	428800	431500	429300	426400
8	427900	428000	449600	559300	393500	477000	685300	439400	429600	430100	429500	427100
9	429500	426600	449100	549500	391300	483500	677400	437000	429500	429800	430100	427100
10	428400	425200	448000	540000	390100	488300	665600	435800	429100	429500	430500	427200
11	428100	425000	448200	529800	386700	487900	655200	432800	428800	429500	430500	427200
12	428300	425100	447800	517700	385700	480400	644300	430400	428400	429800	429800	427900
13	428400	425800	447700	505500	385600	471300	633200	427500	428300	429300	430000	427600
14	429800	426200	449400	493700	388800	462700	621000	424400	428800	428400	430000	427400
15	430500	428700	447300	482400	388700	454300	607700	421400	428900	427700	429600	426600
16	430800	431300	446300	476300	390000	445800	595100	418300	429300	428100	428900	431500
17	430800	432400	443100	474600	389700	439200	584700	416000	429500	429600	428900	431900
18	431900	432200	442800	471700	390100	430200	585200	416900	429600	431000	428900	437400
19	431200	433100	458100	470800	389500	423100	576700	419500	429600	437900	429500	439800
20	430500	433000	493000	470100	389000	417700	573000	424600	429600	444000	429300	440200
21	429500	432400	515100	471200	388600	413600	565400	428300	429500	446100	429100	438900
22	429600	432600	524100	467700	388900	411500	556200	432400	429500	446100	429800	437500
23	429500	432300	528400	462100	388600	409300	544500	437100	429500	444700	429500	435700
24	431200	444400	535600	454700	388800	411300	533900	436900	428900	442600	430100	432700
25	431500	447600	540200	446100	388900	411300	523800	436200	428900	440900	431000	430500
26	431700	449800	543000	437700	388900	411000	514000	434400	428900	438100	430000	429100
27	430800	449900	547300	428800	388900	409500	506200	434500	428600	435500	429800	429500
28	430500	449100	552300	420100	389600	411800	496700	433400	428300	432600	428300	430500
29	430300	449200	555400	414500	388800	410300	488500	432400	428900	430800	427700	429800
30	429100	449400	559300	413800	---	410200	487700	430800	431000	429800	427200	429500
31	429800	---	564000	413300	---	419200	---	431100	---	428800	427400	---
MAX	436000	449900	564000	575000	412500	488300	702800	490600	431000	446100	431000	440200
MIN	427400	425000	442800	413300	385600	389100	487700	416000	428300	427700	427200	426400
(+)	1010.07	1011.20	1017.19	1009.09	1007.58	1009.45	1013.31	1010.07	1010.14	1010.01	1009.92	1010.05
(++)	-6,400	+19,600	+114,600	-150,700	-24,500	+30,400	+68,500	-56,600	-100	-2,200	-1,400	+2,100
CAL YR 1987	MAX 791700	MIN 389300	(++)	+88,800								
WTR YR 1988	MAX 702800	MIN 385600	(++)	-6,700								

(+) ELEVATION, IN FEET, AT END OF MONTH

(++) CHANGE IN CONTENTS, IN ACRE-FEET

LOCATION (REVISED).--Lat 36°41'36", long 96°55'48", in NW 1/4 NE 1/4 sec.36, T.26 N., R.3 E., Kay County, Hydrologic Unit 11060001, 3,000 ft downstream from Kaw Lake, 8 mi east of Ponca City, and at mile 653.1.

PERIOD OF RECORD.--April 1976 to current year.

GAGE.--Water-stage recorder. Datum of gage is 923 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Oct. 1, 1987, gage at site 3,000 ft upstream at National Geodetic Vertical Datum of 1929.

REMARKS.--Flow completely regulated by Kaw Lake. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. U.S. Army Corps of Engineers' satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 39,300 ft<sup>3</sup>/s, Oct. 11, 1986; no flow May 13, 1979, Sept. 14-24, 1986, Oct. 1-4, 1986.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 10,800 ft<sup>3</sup>/s, Apr. 6, 7, gage height, 10.66 ft; minimum daily discharge, 129 ft<sup>3</sup>/s, Sept. 13.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1770	1110	1680	968	1920	1580	3010	8200	1710	283	773	168
2	2220	1110	1600	1130	507	1560	2750	8860	1720	279	516	160
3	2230	1110	1250	1770	720	1850	2920	9780	1730	276	514	158
4	2230	1100	1670	1000	1620	1390	3150	9520	1730	278	396	157
5	2220	1090	1690	351	452	1800	7380	9350	1730	419	280	157
6	1410	1110	1700	341	1390	1860	10700	6870	1710	784	278	154
7	831	1110	1700	612	2190	1930	10600	4270	1620	804	280	136
8	694	1100	1720	987	2510	1930	10600	4280	1360	808	281	136
9	469	1070	1710	1290	2910	1950	10400	3810	1070	813	279	135
10	789	943	1700	511	2090	1360	10300	3480	1070	815	275	134
11	800	809	1710	4190	625	4520	10200	3850	1070	813	276	134
12	815	682	1710	6390	1010	7310	10100	3430	1070	807	387	133
13	643	528	1700	3020	1560	4110	9970	3410	872	811	506	129
14	369	532	1540	4200	1560	4060	9730	3390	623	814	501	130
15	497	536	1020	4620	1380	4500	9590	3340	618	588	500	133
16	823	617	1110	7820	1790	5720	9490	3340	614	333	503	152
17	827	892	1400	7730	2000	6150	9380	2800	614	337	356	133
18	826	1070	2210	7030	2010	4070	9630	1180	610	334	225	171
19	933	719	2350	7700	2030	5290	8920	158	612	772	224	174
20	1070	1080	2350	5120	2000	6560	9250	185	609	1910	224	137
21	1090	1100	2750	3700	2010	5480	9190	151	606	2150	227	759
22	954	1120	5050	4050	1830	4240	9130	189	608	2160	230	1330
23	822	1090	4030	4910	1570	4220	8930	1280	606	2170	226	1340
24	819	1120	2350	6150	1470	2190	8760	2900	603	2170	225	1310
25	811	1120	1710	3360	1560	2530	8650	3410	601	2160	225	1310
26	942	1100	1430	3750	1580	2540	8550	3410	600	2140	374	1040
27	1090	1640	1640	4350	1580	2570	8420	2070	597	2140	499	185
28	1100	2190	1210	7120	1580	2570	8340	2110	428	2140	488	142
29	1100	2210	1300	5530	1570	2510	8180	2130	285	1610	380	144
30	1100	2030	1580	3490	---	2490	8150	2130	285	1070	274	139
31	1110	---	1230	3460	---	1700	---	1950	---	1060	234	---
TOTAL	33404	33038	57800	116650	47024	102540	254370	115233	27981	34048	10956	10620
MEAN	1078	1101	1865	3763	1622	3308	8479	3717	933	1098	353	354
MAX	2230	2210	5050	7820	2910	7310	10700	9780	1730	2170	773	1340
MIN	369	528	1020	341	452	1360	2750	151	285	276	224	129

## ARKANSAS RIVER BASIN

07148350 SALT FORK ARKANSAS RIVER NEAR WINCHESTER, OK

LOCATION.--Lat 36°57'42" (revised), long 98°46'55", in NE 1/4 SE 1/4 sec.26, T.29 N., R.15 W., Woods County, Hydrologic Unit 11060002, near left bank on downstream side of pier of county road bridge, 1.0 mi northeast of Winchester, 2.5 mi upstream from Greenleaf Creek (formerly Greenwood Creek), 4.9 mi downstream from Yellowstone Creek, 5.0 mi downstream from State line, 19.0 mi northwest of Alva, and at mile 156.2.

DRAINAGE AREA.--856 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1959 to current year. Monthly discharge only for some periods, published in WSP 1731.

REVISED RECORDS.--WSP 1731: Drainage area. WSP 1921: 1960.

GAGE.--Water-stage recorder. Datum of gage is 1,410.05 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except for periods of estimated record, which were affected by ice, and are poor. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office.

AVERAGE DISCHARGE.--29 years, 95.0 ft<sup>3</sup>/s, 68,830 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 52,000 ft<sup>3</sup>/s, Aug. 19, 1961, gage height, 13.95 ft, from rating curve extended above 17,400 ft<sup>3</sup>/s; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in May 1957 reached a stage of 15.4 ft, from information provided by county engineer, discharge not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Apr. 1	1945	*1,520	*7.68	No peak greater than base discharge.			
Minimum daily discharge, .55 ft <sup>3</sup> /s, Sept. 28.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	116	59	75	e49	98	72	609	173	212	332	4.1	.75
2	90	57	71	e52	82	98	997	165	166	97	3.1	1.1
3	69	52	70	e54	e70	267	481	159	113	61	2.5	.94
4	61	49	68	e58	e45	324	326	148	85	45	2.3	.69
5	57	46	68	e56	e30	317	275	137	71	28	2.1	.69
6	50	47	68	e52	e21	300	223	127	58	17	1.9	.66
7	50	49	67	e50	e24	332	200	120	52	13	1.6	.66
8	48	48	69	e52	e40	265	186	112	52	12	1.4	.71
9	46	43	67	e60	e60	193	169	105	47	12	1.5	.69
10	39	41	67	e70	e54	173	164	98	39	35	1.3	.63
11	38	46	67	e78	e60	158	156	96	32	40	1.2	.63
12	42	50	65	e80	e70	144	144	91	26	24	1.2	.71
13	44	51	e56	e90	e80	133	140	86	23	17	1.1	.71
14	45	52	e45	e98	e96	128	135	79	21	11	1.1	1.4
15	48	56	e40	e120	100	127	128	75	22	5.9	1.0	1.2
16	53	55	e45	e160	95	125	125	73	26	4.5	.97	1.5
17	52	51	e60	213	90	131	137	69	27	16	1.0	.90
18	52	50	e80	254	86	141	486	68	26	20	1.1	.86
19	47	49	157	253	86	154	491	64	21	78	1.1	.72
20	48	53	190	e120	82	196	325	60	18	140	.96	.72
21	50	56	152	e90	76	172	248	81	13	217	.83	.71
22	52	59	127	e84	74	153	204	70	10	116	.88	.68
23	53	58	115	e80	70	141	172	71	6.8	71	.99	.82
24	54	66	104	e82	70	129	158	73	4.7	52	.77	.86
25	58	61	e70	e80	71	120	252	68	5.3	41	.78	.70
26	61	60	e45	e90	73	113	253	60	14	28	.74	.65
27	55	71	e44	e100	74	109	192	53	87	18	1.0	.57
28	52	86	e42	111	74	108	166	57	95	14	.93	.55
29	50	87	e46	109	73	106	165	53	39	14	.73	.56
30	52	83	e50	109	---	109	187	50	38	9.2	.71	.69
31	58	---	e47	106	---	113	---	69	---	5.8	.64	---
TOTAL	1690	1691	2337	3060	2024	5151	7894	2810	1449.8	1594.4	41.53	23.66
MEAN	54.5	56.4	75.4	98.7	69.8	166	263	90.6	48.3	51.4	1.34	.79
MAX	116	87	190	254	100	332	997	173	212	332	4.1	1.5
MIN	38	41	40	49	21	72	125	50	4.7	4.5	.64	.55
AC-FT	3350	3350	4640	6070	4010	10220	15660	5570	2880	3160	82	47

CAL YR 1987 TOTAL 75658.8 MEAN 207 MAX 5560 MIN 2.6 AC-FT 150100  
WTR YR 1988 TOTAL 29766.39 MEAN 81.3 MAX 997 MIN .55 AC-FT 59040

e Estimated



## ARKANSAS RIVER BASIN

07148400 SALT FORK ARKANSAS RIVER NEAR ALVA, OK

LOCATION (REVISED).--Lat 36°48'54", long 98°38'52", in SW 1/4 SW 1/4 sec.18, T.27 N., R.13 W., Woods County, Hydrologic Unit 11060002, at bridge on U.S. Highway 281, 1.0 mi northeast of Alva, 23.0 mi upstream from Medicine Lodge River, and at mile 141.0.

DRAINAGE AREA.--1,009 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1904 to December 1905 (gage heights only), October 1937 to September 1951, monthly discharge only for some periods, published in WSP 1311, October 1979 to current year. Occasional low-flow measurements water years 1952-54, 1977-79.

GAGE.--Water stage recorder. Datum of gage is 1,292.04 ft above National Geodetic Vertical Datum of 1929. April 1904 to December 1905, chain gage at site 0.8 mi upstream at different datum, and February 1938 to September 1951, water stage recorder at present site and at datum 5.00 ft higher.

REMARKS.--Records fair except for period with ice effect, which are poor. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office.

AVERAGE DISCHARGE.--14 years (water years 1938-51), 109 ft<sup>3</sup>/s, 78,970 acre-ft/yr; 9 years (water years 1980-88), 134 ft<sup>3</sup>/s, 97,080 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 27,000 ft<sup>3</sup>/s, Oct. 23, 1941, from rating curve extended above 13,000 ft<sup>3</sup>/s. Maximum gage height, 15.24 ft, Oct. 10, 1985; no flow at times in several years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 8,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Apr. 1	2400	*1,820	*9.89	No peak greater than base discharge.			
Minimum daily discharge, .75 ft <sup>3</sup> /s, Sept. 12.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	194	82	106	e86	124	72	641	255	178	352	14	1.1
2	146	78	102	e80	104	107	1160	239	220	177	11	1.9
3	113	75	102	e70	101	403	694	233	169	98	9.8	2.7
4	97	76	98	e50	99	419	482	219	132	71	8.3	1.3
5	90	74	91	e31	e80	493	385	202	112	51	7.7	1.1
6	84	67	93	e24	e50	497	323	193	101	37	7.9	.97
7	79	65	93	e20	e52	469	286	187	95	27	5.9	.94
8	72	68	94	e25	112	410	260	177	90	21	4.0	.77
9	71	67	97	e40	128	299	236	164	83	26	4.3	.82
10	66	64	95	e70	120	254	215	153	74	23	7.2	.80
11	62	74	95	105	e50	237	211	144	66	41	4.9	.78
12	63	80	95	107	e56	218	205	137	61	36	3.8	.75
13	65	86	93	119	109	198	202	129	58	21	2.9	.83
14	67	88	94	117	125	189	198	122	57	14	2.3	5.7
15	69	90	87	101	108	183	189	115	56	9.0	2.4	14
16	69	89	e50	113	100	178	178	108	68	6.3	1.9	7.0
17	69	78	e46	147	98	173	186	100	56	15	1.8	3.9
18	69	75	103	203	90	192	741	90	50	21	1.9	5.5
19	66	77	152	275	88	214	632	86	43	32	2.5	4.7
20	59	77	243	273	88	322	502	89	39	118	2.5	2.4
21	56	74	212	204	90	283	369	94	34	159	1.6	1.7
22	56	74	177	167	91	239	321	117	29	182	1.1	1.5
23	59	76	163	170	88	218	278	111	25	102	1.3	3.6
24	73	82	150	e170	84	208	252	114	21	70	2.1	3.2
25	109	90	128	e150	83	195	325	110	20	51	1.4	3.0
26	84	87	e84	e140	82	181	371	99	21	38	1.0	2.3
27	84	94	e86	147	80	173	295	89	63	34	.98	2.0
28	79	105	e94	140	76	168	246	86	108	28	2.0	1.8
29	82	115	e90	131	73	161	232	85	87	25	1.9	1.4
30	81	112	e90	130	---	157	258	79	54	23	1.5	1.4
31	80	---	e94	134	---	163	---	83	---	19	1.1	---
TOTAL	2513	2439	3397	3739	2629	7673	10873	4209	2270	1927.3	122.98	79.86
MEAN	81.1	81.3	110	121	90.7	248	362	136	75.7	62.2	3.97	2.66
MAX	194	115	243	275	128	497	1160	255	220	352	14	14
MIN	56	64	46	20	50	72	178	79	20	6.3	.98	.75
AC-FT	4980	4840	6740	7420	5210	15220	21570	8350	4500	3820	244	158

CAL YR 1987 TOTAL 88141 MEAN 241 MAX 7880 MIN 13 AC-FT 174800  
WTR YR 1988 TOTAL 41872.14 MEAN 114 MAX 1160 MIN .75 AC-FT 83050

e Estimated

## ARKANSAS RIVER BASIN

## 07150000 GREAT SALT PLAINS LAKE NEAR JET, OK

LOCATION.--Lat 36°44'40", long 98°08'08", in NW 1/4 SE 1/4 sec.11, T.26 N., R.9 W., Alfalfa County, Hydrologic Unit 11060004, at right end of Great Salt Plains Dam on Salt Fork Arkansas River, 4.5 mi upstream from Wagon Creek, 5.5 mi northeast of Jet, and at mile 103.3.

DRAINAGE AREA.--3,200 mi<sup>2</sup>, of which 8 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--July 1941 to current year. Prior to October 1970, published as Great Salt Plains Reservoir near Jet.

REVISED RECORDS.--WSP 1117: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by earth dam. Outlet works consist of a 310-foot uncontrolled concrete spillway containing a series of three weirs to form a cascade. Storage began in June 1941; conservation pool was first filled Oct. 21, 1941. Capacity, 257,700 acre-ft at elevation 1,138.5 ft, crest of upper weir, and 31,420 acre-ft at elevation 1,125.0 ft, crest of intermediate weir and conservation pool. Reservoir is used for flood control and as a wildlife refuge. Figures given herein represent total contents. Revised capacity table, based on survey in 1971, used since Oct. 1, 1972. U.S. Corps of Engineers' satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 189,400 acre-ft, July 2, 1951, elevation, 1,134.38 ft; minimum, 17,180 acre-ft, Sept. 6, 1973, elevation, 1,123.16 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 69,460 acre-ft, Apr. 4, elevation 1,128.50 ft; minimum, 24,180 acre-ft, Sept. 23, elevation 1,124.11 ft affected by seiche.

Capacity table (elevation, in feet, and contents, in acre-ft):

1,124	23,280	1,127	51,180
1,125	31,420	1,128	62,940
1,126	40,070	1,129	75,970

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	55880	34480	35690	37170	37450	35320	46880	43530	40610	35130	33370	27760
2	51650	34480	35870	36900	37450	36900	58000	46780	40510	35500	33090	28080
3	49080	34850	35780	36900	37360	46780	68280	42800	40910	35870	32720	27590
4	47200	34110	35500	36520	36900	48460	68540	41640	40330	35690	31880	27430
5	44260	34480	35690	36150	36710	51180	64760	40800	39490	35320	32260	27020
6	42590	35870	35600	36150	36340	52000	60820	40240	38470	34760	32260	27460
7	40330	34580	35320	36060	36150	53880	56590	40140	37920	34580	32160	27110
8	39220	33000	35970	35500	35970	53300	53060	39680	36340	34300	31450	26830
9	37360	34480	36800	35220	36340	51770	50450	38750	36620	34300	32440	26590
10	37450	34300	35220	35040	36250	49080	48560	38190	36250	33740	31610	26370
11	37450	34300	35220	35040	36340	51530	46250	37820	35780	33740	31340	26070
12	36990	34950	34950	35410	36060	45840	44890	37820	35410	33460	31510	25800
13	36150	34480	34200	35410	36150	44260	43220	37080	34580	33650	31340	25570
14	35870	34110	37730	35600	36250	42690	42170	36150	35410	33370	30930	25610
15	36060	34670	36250	35780	36340	41430	41330	36150	34760	32900	30360	25880
16	35970	35690	35690	36150	36060	40330	40610	36150	34580	32260	30360	25800
17	35780	34020	35600	37360	36250	41540	42060	35970	34480	32260	30360	25800
18	35320	34850	35780	38470	36340	41540	44680	35780	34200	32160	30040	27190
19	35220	34670	38570	40050	36340	40700	45630	35780	34200	32160	29380	27110
20	35220	34390	38750	40420	36150	41010	45940	36430	34110	32630	29870	26780
21	35320	35040	39400	41120	36340	41330	46040	36620	33930	32720	29380	26780
22	34850	34480	39220	41750	36060	41010	44790	36900	33370	33370	29550	25400
23	34670	34300	39400	41750	36060	41010	43740	36990	33090	34110	29550	27350
24	34200	34950	38380	41640	36060	40240	42380	36800	32810	35040	29710	27110
25	34950	34390	37540	40610	36060	40420	47090	36520	33090	34480	29220	26780
26	34950	34850	39400	40510	35500	39400	48350	36430	32530	33740	28980	26700
27	35320	36800	38190	39860	35320	38940	47930	35870	33000	35410	28570	26540
28	34850	36340	37730	39310	34670	36620	46360	35410	34480	35320	28650	26210
29	34850	35870	37170	39310	35870	38290	46670	35220	32720	34850	28490	26290
30	35780	35870	37820	38380	---	37540	45630	35130	35690	34300	28450	26450
31	34670	---	37170	37540	---	36430	---	38840	---	34110	27680	---
MAX	55880	36800	39400	41750	37450	53880	68540	46780	40910	35870	33370	28080
MIN	34200	33000	34200	35040	34670	35320	40610	35130	32530	32160	27680	25400
(+)	1125.35	1125.48	1125.62	1125.66	1125.48	1125.54	1126.47	1125.80	1125.46	1125.29	1124.54	1124.39
(++)	-22,270	+1,200	+1,300	+370	-1,670	+560	+9,200	-6,790	-3,150	-1,580	-6,430	-1,230
CAL YR 1987	MAX 89060	MIN 29630	(++)	+920								
WTR YR 1988	MAX 68540	MIN 25400	(++)	-30,490								

(+) ELEVATION, IN FEET, AT END OF MONTH

(++) CHANGE IN CONTENTS, IN ACRE-FEET

## ARKANSAS RIVER BASIN

## 07150500 SALT FORK ARKANSAS RIVER NEAR JET, OK

LOCATION.--Lat 36°45'09", long 98°07'43", in NE 1/4 NE 1/4 sec.11, T.26 N., R.9 W., Alfalfa County, Hydrologic Unit 11060004, near center of span on downstream side of bridge on State Highway 38, 0.6 mi downstream from Great Salt Plains Dam, 4 mi upstream from Wagon Creek, 6.7 mi northeast of Jet, and at mile 102.7.

DRAINAGE AREA.--3,202 mi<sup>2</sup>, of which 8 mi<sup>2</sup> is probably noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1937 to current year.

REVISED RECORDS.--WSP 1117: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,092.20 ft above National Geodetic Vertical Datum of 1929. Prior to Mar. 17, 1938, nonrecording gage at site 2.5 mi upstream at datum 13.46 ft higher. Mar. 17, 1938 to Apr. 26, 1953, water-stage recorder at site 200 ft upstream, datum 5.00 ft higher prior to Oct. 1, 1950.

REMARKS.--No estimated daily discharges. Records good. Flow regulated since June 1941 by Great Salt Plains Lake (station 07150000). U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Since regulation by Great Salt Plains Lake, 47 years (water years 1942-88), 398 ft<sup>3</sup>/s, 288,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 25,900 ft<sup>3</sup>/s, May 19, 1938, gage height, 13.80 ft, present datum; no flow at times in 1939-41, 1944, and 1955-56.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,870 ft<sup>3</sup>/s, Apr. 4, gage height, 7.11 ft; minimum daily discharge, 3.5 ft<sup>3</sup>/s, Sept. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2740	251	312	456	528	324	782	1320	810	208	167	18
2	2370	249	305	440	533	282	2110	1220	856	265	112	18
3	2060	238	302	431	528	1200	3410	1290	812	310	85	18
4	1760	223	287	412	507	1570	3820	1060	793	329	62	18
5	1460	176	288	359	471	1830	3650	965	732	296	39	18
6	1250	220	306	373	451	2050	3270	847	645	256	38	17
7	1050	212	290	390	387	2210	2790	842	575	206	40	15
8	878	215	290	385	377	2260	2380	822	504	182	24	15
9	665	153	284	385	396	2140	2030	702	374	166	11	16
10	555	183	284	385	401	1950	1790	625	363	155	8.9	16
11	557	179	272	332	474	1890	1560	611	333	125	4.8	16
12	514	196	261	280	426	1630	1380	556	291	124	11	16
13	431	190	242	299	371	1330	1210	515	260	125	28	16
14	385	163	277	309	475	1180	1010	466	247	115	19	16
15	361	169	352	325	413	1020	955	370	218	117	18	17
16	374	272	287	365	397	893	904	372	183	59	18	17
17	349	222	293	475	358	960	926	353	188	45	18	16
18	308	181	293	564	389	987	1210	336	185	41	18	17
19	270	240	272	765	433	955	1340	294	174	47	19	16
20	286	222	633	882	399	939	1420	322	145	43	19	15
21	286	253	733	958	399	977	1460	365	126	49	18	8.6
22	265	211	748	1020	383	1010	1430	393	107	70	18	3.5
23	236	225	751	1040	345	952	1270	405	81	179	19	17
24	216	227	727	1040	332	983	1130	400	70	178	18	15
25	243	223	597	988	339	868	1390	394	63	194	18	16
26	262	150	618	919	341	769	1680	383	70	152	18	16
27	269	259	610	885	324	742	1690	374	70	267	20	16
28	274	398	551	808	305	631	1590	324	82	259	18	16
29	243	345	492	822	305	557	1450	282	98	265	18	16
30	221	316	478	797	---	535	1460	228	124	213	18	15
31	232	---	466	580	---	486	---	295	---	190	18	---
TOTAL	21370	6761	12901	18469	11787	36110	52497	17731	9579	5230	960.7	470.1
MEAN	689	225	416	596	406	1165	1750	572	319	169	31.0	15.7
MAX	2740	398	751	1040	533	2260	3820	1320	856	329	167	18
MIN	216	150	242	280	305	282	782	228	63	41	4.8	3.5
AC-FT	42390	13410	25590	36630	23380	71620	104100	35170	19000	10370	1910	932

CAL YR 1987 TOTAL 354541 MEAN 971 MAX 5560 MIN 24 AC-FT 703200  
WTR YR 1988 TOTAL 193865.8 MEAN 530 MAX 3820 MIN 3.5 AC-FT 384500

## ARKANSAS RIVER BASIN

07150500 SALT FORK ARKANSAS RIVER NEAR JET, OK--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1951-63, 1968 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1954 to September 1959, October 1961 to September 1963, July 1968 to current year.

WATER TEMPERATURE: October 1954 to September 1959, October 1961 to September 1963, July 1968 to current year.

CHLORIDES: October 1955 to September 1959.

INSTRUMENTATION.--Water-quality monitor since July 1968.

REMARKS.--In addition to water-quality monitor, samples were collected by a local observer on a daily basis.

Samples were collected quarterly and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 57,000 microsiemens, Jan. 28, 1977; minimum daily, 1,280 microsiemens, Nov. 4, 1980.

WATER TEMPERATURE: Maximum daily, 36.0 °C, Aug. 11, 1980, Aug. 22, 1986; minimum daily, 0.0 °C on many days during winter period.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 13,100 microsiemens, Sept. 26; minimum daily, 1,730 microsiemens, Oct. 1.

WATER TEMPERATURE: Maximum daily, 35.0 °C, Aug. 12, 14, 20; minimum daily, 1.0 °C, Dec. 16, 26, Jan. 9, and Feb. 1, 10.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

		AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	STREAM- FLOW, INSTAN- TANEOUS (CFS)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	BARO- METRIC PRES- SURE (MM OF HG)
OCT										
06...	2000	1028	1028	5.10	1220	3050	8.20	21.0	17.5	--
DEC										
04...	1600	1028	80020	4.02	277	4100	8.00	15.0	8.0	732
FEB										
09...	1500	1028	80020	4.19	401	5160	8.90	9.0	4.5	734
APR										
15...	1300	1028	80020	4.81	936	3270	8.70	14.0	14.5	734
JUN										
01...	1650	1028	1028	4.78	856	4550	8.10	24.0	24.0	--
JUL										
28...	1545	1028	80020	3.90	249	6400	8.20	28.0	26.5	731
DATE	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	OXYGEN DEMAND, CHEM- ICAL (HIGH LEVEL) (MG/L)	HARD- NESS TOTAL (MG/L AS CAC03)	HARD- NESS NONCARB WH WAT TOT FLD MG/L AS CAC03	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD- SORP- TION RATIO
OCT										
06...	--	--	--	--	--	--	--	--	--	--
DEC										
04...	11.8	105	41	540	370	140	47	680	73	13
FEB										
09...	15.9	130	26	650	500	160	60	830	73	15
APR										
15...	11.4	117	27	600	440	140	60	480	63	9
JUN										
01...	--	--	--	--	--	--	--	--	--	--
JUL										
28...	8.8	117	62	690	580	160	70	1200	79	21
DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH IT FIELD MG/L AS HCO3	CAR- BONATE WATER WH IT FIELD MG/L AS CO3	ALKA- LITY WAT WH TOT IT FIELD MG/L AS CAC03	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)
OCT										
06...	--	--	--	--	--	--	--	--	--	--
DEC										
04...	5.9	200	0	164	430	920	2400	2320	3.26	1790
FEB										
09...	6.0	174	16	169	500	1300	3010	2940	4.09	3260
APR										
15...	6.4	170	11	157	440	610	1780	1630	2.42	4500
JUN										
01...	--	--	--	--	--	--	--	--	--	--
JUL										
28...	8.3	122	0	101	660	1600	3870	3760	5.26	2600



## 07150500 SALT FORK ARKANSAS RIVER NEAR JET, OK--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1730	3440	3730	4870	4850	4300	4330	3330	4740	4960	6470	9450
2	2260	3120	3450	5040	5160	4240	4110	3510	4330	4880	7320	9340
3	3280	3660	3440	5060	5340	4230	2020	4170	4290	5380	7830	9920
4	3020	3660	4090	4930	5340	4540	1910	3560	4620	7200	7990	9870
5	---	3770	4340	4990	5230	4400	3810	3560	4610	6640	8560	9650
6	2950	3610	4510	---	5280	2660	3380	3690	5000	5850	8380	10000
7	2950	3070	4410	---	5200	2630	2790	3520	4860	5350	8320	10800
8	3160	3370	4450	---	5210	3200	2430	3740	3650	5690	8370	10300
9	3660	3540	4030	5560	5120	3050	3230	3680	4000	5340	10000	10200
10	3730	3560	3680	5570	4860	2840	3550	4180	4420	5840	10400	10800
11	3740	3550	3560	5550	4990	2790	3830	3870	4470	5580	12000	10900
12	3610	3660	3670	5510	5040	3410	3630	3460	4480	5890	10500	10500
13	3440	3530	3810	5490	5070	3980	3220	3200	4520	6380	8770	10700
14	3640	3570	---	5450	4880	3730	3430	3470	4480	6230	8940	10500
15	3710	3740	---	5400	4690	3760	3140	4070	4530	5190	9560	10600
16	3670	---	3900	5320	4440	4190	3460	4180	4620	6410	9660	10800
17	3710	3680	3970	5200	4310	---	3470	4140	4650	6720	9410	11200
18	3680	3510	4160	5220	4450	3950	3440	4220	4700	6850	9410	9770
19	3670	3490	3880	5100	4450	2710	3560	4210	4710	6560	9150	10700
20	3770	3560	4040	4120	4340	3620	3530	4170	4160	6520	9600	10400
21	3740	3580	4060	4490	4260	3900	3300	3930	4710	6560	9920	11500
22	3320	3550	3860	4270	3620	4020	2540	4010	5210	7050	9800	12300
23	2920	3290	3710	4220	3700	3920	3280	4440	4910	7140	9430	10800
24	3440	3190	4070	3790	4080	3810	3940	5330	4970	7180	9300	11400
25	3710	3430	---	4290	4080	3520	3880	5880	5130	6490	9550	12600
26	3660	3600	5470	4900	4020	3610	3870	5680	4870	6040	9440	13100
27	3700	3740	5350	5280	4190	3460	3850	5060	5150	6570	9490	12600
28	3480	3740	5230	4650	4270	4460	3840	3880	5210	6460	9510	12300
29	3130	3550	4940	4820	4270	4420	3700	4190	5050	6510	9810	12600
30	3160	3550	4670	4350	---	4320	3840	4190	4620	6450	9570	12400
31	3240	---	4720	5230	---	4340	---	4430	---	5780	9950	---
MEAN	3360	3530	4190	4950	4650	3730	3410	4100	4660	6180	9240	10900
WTR YR 1988	MEAN	5270	MAX	13100	MIN	1730						

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	20.0	7.0	2.0	5.0	10.5	11.5	19.0	24.5	27.0	27.0	25.0
2	20.0	20.0	7.0	3.0	4.0	10.5	10.5	18.0	23.0	27.5	28.0	22.5
3	19.0	20.0	9.0	3.0	3.0	6.5	11.0	16.0	25.0	27.0	29.0	26.5
4	18.0	20.0	7.0	4.0	2.0	6.5	15.0	18.0	26.0	29.0	29.5	26.0
5	---	19.0	10.0	2.5	1.0	5.0	14.5	19.5	26.5	29.5	29.0	21.5
6	15.0	19.0	10.0	---	2.0	8.5	12.5	20.0	25.5	30.0	28.5	25.0
7	18.0	18.0	10.0	---	3.5	10.0	18.0	22.0	27.0	27.5	29.0	24.0
8	18.0	16.0	9.0	---	5.0	9.0	18.0	23.0	32.0	27.0	31.0	25.0
9	16.5	11.0	8.0	1.0	6.0	10.5	14.0	23.0	28.0	27.0	28.5	28.0
10	13.5	10.0	7.0	2.0	1.0	12.0	14.0	24.5	27.5	28.5	32.0	26.0
11	13.0	10.0	8.0	2.0	2.0	11.5	13.0	24.0	25.0	27.5	31.5	26.5
12	17.0	11.0	8.0	2.0	3.5	19.0	15.0	27.0	24.5	27.5	35.0	28.0
13	16.0	13.0	6.0	3.0	4.5	6.5	17.5	23.0	23.0	29.5	25.0	27.0
14	17.0	11.0	---	3.0	4.0	7.5	16.0	24.0	24.0	29.0	35.0	25.0
15	18.0	14.0	---	3.5	4.5	8.0	14.0	25.0	27.0	28.0	32.0	25.0
16	17.0	---	1.0	5.0	6.5	5.0	16.0	24.0	27.0	30.0	30.5	30.0
17	18.0	12.0	3.0	5.0	7.0	---	16.0	25.0	27.0	29.0	29.5	26.0
18	18.0	11.0	3.0	4.0	6.0	5.0	15.0	25.5	29.0	22.0	31.0	24.5
19	---	10.0	4.0	5.0	7.0	8.0	16.0	25.0	29.0	27.5	29.0	25.0
20	15.0	10.0	3.0	4.0	7.0	10.0	17.0	25.0	29.0	27.5	35.0	25.0
21	16.0	10.0	4.0	2.0	8.0	12.5	18.0	23.5	29.5	28.5	30.5	26.5
22	16.0	11.0	4.0	2.5	9.0	15.5	15.5	20.5	32.5	27.5	29.0	25.0
23	16.0	10.0	6.0	3.0	8.5	15.0	18.0	20.0	29.0	26.5	30.5	25.0
24	17.0	10.0	5.5	4.0	9.0	15.5	17.0	24.0	28.5	27.0	29.0	22.0
25	15.0	11.0	---	3.0	10.0	14.0	17.0	22.0	32.0	28.0	30.0	25.0
26	18.0	9.0	1.0	3.0	11.0	15.0	17.0	24.0	29.0	27.0	29.0	25.0
27	18.0	8.0	2.0	4.0	12.0	16.0	15.5	23.0	27.0	27.0	23.0	26.0
28	18.0	7.0	3.0	5.0	12.5	15.5	17.5	23.0	27.5	27.0	22.0	23.5
29	18.0	7.0	3.0	8.0	12.0	10.5	16.0	23.5	27.0	28.5	25.0	23.0
30	17.0	7.0	3.0	11.0	---	13.0	18.5	23.0	27.5	27.0	26.0	23.5
31	20.0	---	3.0	4.0	---	12.5	---	24.0	---	29.5	25.0	---
MEAN	17.0	12.5	5.5	3.5	6.0	11.0	15.5	22.5	27.5	28.0	29.0	25.0
WTR YR 1988	MEAN	17.0	MAX	35.0	MIN	1.0						

## 07151000 SALT FORK ARKANSAS RIVER AT TONKAWA, OK

LOCATION.--Lat 36°40'13", long 97°18'33", in NW 1/4 SE 1/4 sec.4, T.25 N., R.1 W., Kay County, Hydrologic Unit 11060004, on left bank near end of bridge on U.S. Highway 77 in Tonkawa, 4 mi downstream from Thompson Creek, 7.8 mi upstream from Chikaskia River, and at mile 33.8.

DRAINAGE AREA.--4,528 mi<sup>2</sup>, of which 8 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--September 1903 to October 1905 (gage heights only), October 1935 to current year. Monthly discharge only for some periods, published as Arkansas River (Salt Fork) near Tonkawa 1903-4 and as "near Tonkawa" 1905.

REVISED RECORDS.--WSP 1117: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 930.22 ft above National Geodetic Vertical Datum of 1929. September 1903 to October 1905, nonrecording gage near present site at different datum. Jan. 2, 1936 to Jan. 22, 1939, nonrecording gage, and Jan. 23, 1939 to June 20, 1960, water-stage recorder at site 100 ft upstream at same datum.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Some regulation since June 1941 by Great Salt Plains Lake, 69.5 mi upstream (station 07150000). U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Since regulation by Great Salt Plains Dam, 47 years (water years 1942-88), 809 ft<sup>3</sup>/s, 586,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 97,300 ft<sup>3</sup>/s, Oct. 11, 1973, gage height, 28.98 ft; no flow Aug. 31 to Oct. 12, and Oct. 14-16, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 10, 1923, reached a stage of 26.8 ft, from information by U.S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 11,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Mar. 4	0600	*16,600	*19.58	Apr. 2	1700	16,400	19.46

Minimum daily discharge, 50 ft<sup>3</sup>/s, Sept. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9500	e575	685	e950	1160	677	6640	2270	445	e175	e102	65
2	5090	566	668	e930	1010	727	14700	2060	2570	e250	e99	64
3	3610	565	648	e910	961	9120	15800	1760	2090	e417	e97	64
4	2920	565	634	e880	952	15900	10200	1760	1280	e410	e95	63
5	2470	542	630	e847	930	10900	6720	1530	1080	397	e92	61
6	2000	525	603	e840	925	8550	5060	1350	987	e420	e90	60
7	1780	487	603	e815	898	7180	4420	1240	890	e382	e87	60
8	1550	585	613	e803	847	5200	3860	1140	803	329	e85	58
9	1340	597	593	e797	809	3990	3410	e1020	728	325	e84	55
10	1190	515	678	e797	790	3400	2960	e920	645	348	e81	55
11	1010	462	606	e785	790	3020	2560	e855	551	304	e79	54
12	947	470	576	e798	785	2730	2250	e790	518	359	e77	53
13	927	468	561	e815	859	2500	1980	e735	485	e328	e77	50
14	871	479	579	e835	798	2010	1770	e715	442	e256	e76	52
15	800	708	585	e880	791	1800	1560	e675	411	e237	76	67
16	772	786	610	1050	840	1610	1400	e640	381	e220	82	95
17	751	514	697	2840	797	1500	1890	e610	352	e345	78	62
18	738	560	591	3890	773	1450	4770	e580	329	e640	76	163
19	707	520	2080	5030	758	1560	6250	e560	e300	e305	76	1880
20	664	484	5600	5830	768	2470	3280	e540	e250	e175	79	797
21	e625	507	3040	3730	788	2870	2430	e519	e225	145	86	286
22	e602	486	e2300	2650	761	2150	2160	e500	e214	e140	80	135
23	e590	489	e1760	1950	757	1800	2010	e490	e209	e137	78	98
24	e575	1030	e1560	1620	725	1610	1790	e670	e201	e132	77	89
25	e550	925	e1420	1520	708	1510	1810	e760	e193	e128	76	82
26	834	580	e1320	1460	698	1450	3720	e630	e188	e122	71	76
27	722	565	e1230	1350	696	1300	4380	e570	e182	e118	70	70
28	e660	627	e1180	1300	696	1220	3000	e530	e178	e113	71	e73
29	e620	705	e1090	1250	686	1200	2470	e495	e177	e110	70	75
30	e600	727	e1040	1220	---	1060	2160	e485	e176	e108	71	79
31	e582	---	e990	1250	---	1100	---	472	---	e104	68	---
TOTAL	46597	17614	35770	50622	23756	103564	127410	27871	17480	7979	2506	4941
MEAN	1503	587	1154	1633	819	3341	4247	899	583	257	80.8	165
MAX	9500	1030	5600	5830	1160	15900	15800	2270	2570	640	102	1880
MIN	550	462	561	785	686	677	1400	472	176	104	68	50
AC-FT	92430	34940	70950	100400	47120	205400	252700	55280	34670	15830	4970	9800

CAL YR 1987 TOTAL 908824 MEAN 2490 MAX 39600 MIN 167 AC-FT 1803000  
WTR YR 1988 TOTAL 466110 MEAN 1274 MAX 15900 MIN 50 AC-FT 924500

e Estimated

## 07152000 CHIKASKIA RIVER NEAR BLACKWELL, OK

LOCATION.--Lat 36°48'41", long 97°16'41", in NE 1/4 NW 1/4 sec.23, T.27 N., R.1 W., Kay County, Hydrologic Unit 11060005, near left bank on downstream side of State Highway 11 bridge at northeast edge of Blackwell, 0.1 mi downstream from Bitter Creek, and at mile 28.3 (revised).

DRAINAGE AREA.--1,859 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1935 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1117: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 967.41 ft above National Geodetic Vertical Datum of 1929. See WSP 1921 for history of changes prior to April, 1952.

REMARKS.--Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Some regulation at low flow by Lake Blackwell, capacity 3,600 acre-ft, 12.6 mi upstream from station. Small diversion made from reservoir for municipal supply of city of Blackwell. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--53 years, 523 ft<sup>3</sup>/s, 378,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 85,000 ft<sup>3</sup>/s, June 22, 1942, gage height, 33.3 ft, from floodmark present datum; maximum gage height, 34.28 ft, Oct. 3, 1986, no flow at times in 1954, and 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 10, 1923, reached a stage of about 34 ft, present site and datum, from information provided by local residents, discharge 100,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 8,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Dec. 20	1450	10,200	25.06	Mar. 4	0300	10,100	24.90
Jan. 20	1235	8,230	22.54	Apr. 2	1900	*20,000	*30.53

Minimum daily discharge, 15 ft<sup>3</sup>/s, Sept. 9-14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

JAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1290	156	312	e272	498	247	4550	641	309	227	100	e18
2	780	160	282	e257	427	277	17600	675	713	969	81	e18
3	569	176	267	e243	374	5630	11200	687	791	607	76	e17
4	451	179	246	e232	345	7860	2300	662	554	334	78	e17
5	380	177	242	e222	325	3320	1420	635	462	238	e67	e17
6	335	179	237	e213	e283	3890	1070	585	420	222	e58	e16
7	300	190	232	e209	261	2320	868	558	394	216	e51	e16
8	294	211	236	e200	e262	1520	738	542	377	157	e46	e16
9	270	187	228	e191	e268	1210	693	509	366	109	e42	e15
10	291	185	225	e188	e273	819	697	488	356	103	e39	e15
11	273	186	223	e184	e278	663	639	468	338	117	e36	e15
12	281	186	217	e178	e279	563	549	457	312	268	e33	e15
13	249	184	217	e174	278	494	514	438	283	190	e31	e15
14	205	186	e212	e170	307	447	483	423	269	130	e29	e15
15	238	532	e205	305	326	410	451	417	263	95	e28	25
16	112	933	e201	541	330	391	429	392	259	95	e26	47
17	128	356	e198	1770	301	398	473	391	253	86	e25	43
18	202	239	e193	2190	300	417	2450	380	260	84	e25	94
19	234	215	1930	4540	302	465	3720	382	258	71	e24	186
20	294	202	9070	7600	297	731	1350	383	256	73	e23	38
21	281	190	5000	3110	291	769	817	320	249	188	e23	e34
22	246	187	1130	1190	285	603	642	387	225	257	e22	29
23	222	182	710	875	278	503	545	400	209	218	e22	34
24	205	570	576	694	274	439	491	402	203	143	e22	32
25	203	394	523	617	272	397	778	404	192	140	e21	35
26	188	246	458	568	269	373	3550	415	220	145	e21	33
27	181	237	391	507	268	348	1410	407	215	135	e20	32
28	194	351	356	462	267	336	768	387	211	120	e20	39
29	190	396	e321	474	253	326	599	375	252	110	e19	38
30	214	352	e303	565	---	327	555	372	238	111	e19	31
31	222	---	e287	577	---	460	---	370	---	107	e19	---
TOTAL	9522	8124	25228	29518	8771	36953	62349	14352	9707	6065	1146	995
MEAN	307	271	814	952	302	1192	2078	463	324	196	37.0	33.2
MAX	1290	933	9070	7600	498	7860	17600	687	791	969	100	186
MIN	112	156	193	170	253	247	429	320	192	71	19	15
AC-FT	18890	16110	50040	58550	17400	73300	123700	28470	19250	12030	2270	1970

CAL YR 1987 TOTAL 509337 MEAN 1395 MAX 33800 MIN 76 AC-FT 1010000  
WTR YR 1988 TOTAL 212730 MEAN 581 MAX 17600 MIN 15 AC-FT 421900

e Estimated

## 07152500 ARKANSAS RIVER AT RALSTON, OK

LOCATION (REVISED).--Lat 36°30'15", long 96°43'41", in NE 1/4 NE 1/4 sec.2, T.23 N., R.5 E., Pawnee County, Hydrologic Unit 11060006, on right upstream abutment of bridge on State Highway 18 at Ralston, 2 mi downstream from Salt Creek, 2 mi upstream from Grayhorse Creek, and at mile 594.0. Prior to Feb. 10, 1988, gage was near left bank on downstream side of pier of bridge.

DRAINAGE AREA.--54,465 mi<sup>2</sup>, of which 7,615 mi<sup>2</sup> is probably noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1925 to current year. Monthly discharge only for some periods, published in WSP 1311. Gage-height records collected in this vicinity since 1922 are contained in reports of National Weather Service.

REVISED RECORDS.--WSP 1341: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 776.70 ft above National Geodetic Vertical Datum of 1929. Oct. 1, 1925 to Nov. 13, 1935, nonrecording gage at site of former highway bridge 1,200 ft downstream at same datum. Nov. 14, 1935 to Feb. 23, 1939, nonrecording gage near left bank on downstream side of bridge at same datum. Feb. 24, 1939 to Feb. 10, 1988, gage was near left bank on downstream side of pier of bridge at same datum.

REMARKS.--Records fair. Flow regulated since April 1976 by Kaw Lake (station 07148130) 59.7 mi upstream; some regulation by Great Salt Plains Lake (station 07150000) since 1941.

AVERAGE DISCHARGE.--Prior to regulation by Kaw Lake, 50 years (water years 1926-75), 4,826 ft<sup>3</sup>/s, 3,496,000 acre-ft/yr; since regulation by Kaw Lake, 12 years (water years 1977-88), 5,566 ft<sup>3</sup>/s, 4,033,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 211,000 ft<sup>3</sup>/s, Oct. 13, 1973, gage height, 22.98 ft; minimum discharge, 14 ft<sup>3</sup>/s, Oct. 12, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 11, 1923, reached a stage of 23.8 ft, referred to outside gage on basis of stages observed in 1923 and 1944 at site 1,200 ft downstream.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 42,000 ft<sup>3</sup>/s, Apr. 4, gage height, 12.06 ft, minimum daily discharge, 324 ft<sup>3</sup>/s, Sept. 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35800	2010	3500	4230	5620	3580	31100	11800	3310	e1020	1500	e510
2	19200	1960	3070	3930	5620	3610	31300	11800	3240	e1040	1450	e480
3	9880	1890	2870	3720	5390	9130	31300	12300	3260	e975	1260	e463
4	7480	1860	2680	3640	5170	18800	39700	12700	4440	e1020	1130	e445
5	6120	1930	2550	3600	5040	27500	23100	12300	3780	e1210	1080	e428
6	5300	1950	2690	3600	5090	23400	18300	12000	3200	1320	1030	e413
7	4520	1950	2670	3610	5140	19700	18000	9660	2950	1340	e955	e402
8	3530	1940	2660	3740	4750	16400	16800	6790	2720	1360	e880	e392
9	3130	1910	2600	4590	4720	11900	15500	6400	2550	1380	e860	e381
10	2640	1990	2580	5080	4710	9390	14700	6100	2320	1370	e840	e370
11	2500	1990	2550	5230	4550	7670	13300	5230	2240	1460	e805	e358
12	2440	1820	2570	5420	4790	8280	13400	5460	2190	1680	e795	e350
13	2300	1750	2510	6010	4040	9850	13200	4980	2160	1430	e775	e345
14	2160	1620	2580	8220	3810	9030	13400	4850	2130	1380	e770	e338
15	2010	1610	2680	10300	3790	8800	13100	4770	2100	1430	e740	e324
16	1680	1700	2660	11000	3750	8820	12700	4770	1990	1310	701	884
17	1900	2070	2640	14200	3760	9590	12600	4610	1670	1080	675	588
18	1910	2630	2960	17900	3950	9640	22100	4300	1640	1080	663	2920
19	1860	2300	5010	18400	3790	9910	24000	3360	1550	1590	603	3070
20	1860	2080	12800	17200	3830	10900	23200	2800	e1490	1580	e560	4690
21	2000	1850	23400	20100	3850	11000	17400	2800	e1440	1660	e480	5070
22	2040	1960	21900	17700	3750	10700	14400	2850	e1390	1950	e435	2900
23	2040	1950	13700	13200	3730	8580	13300	3730	e1370	1970	e405	1780
24	1870	3000	9290	11600	3580	7830	12700	3000	e1350	2050	e385	1590
25	1860	3260	6120	10700	3600	6230	12600	4110	e1350	2080	e367	1410
26	1830	4600	5320	10300	3620	5690	12700	4710	e1330	2020	e348	1300
27	1830	3320	5460	10000	3510	5610	14700	4670	e1320	1980	e337	1220
28	2130	2770	5840	9750	3530	5460	15900	3990	e1310	2020	410	852
29	2070	3330	4900	9520	3600	5310	13200	3430	e1300	2080	602	577
30	2010	3550	4200	8330	---	4900	12500	3490	e1090	2060	601	e510
31	2050	---	4460	5710	---	6190	---	3460	---	1610	566	---
TOTAL	139950	68550	171420	280530	124080	313400	540200	187220	64180	47535	23008	35360
MEAN	4515	2285	5530	9049	4279	10110	18010	6039	2139	1533	742	1179
MAX	35800	4600	23400	20100	5620	27500	39700	12700	4440	2080	1500	5070
MIN	1680	1610	2510	3600	3510	3580	12500	2800	1090	975	337	324
AC-FT	277600	136000	340000	556400	246100	621600	1071000	371400	127300	94290	45640	70140

CAL YR 1987 TOTAL 3797120 MEAN 10400 MAX 78900 MIN 1610 AC-FT 7532000  
WTR YR 1988 TOTAL 1995433 MEAN 5452 MAX 39700 MIN 324 AC-FT 3958000

e Estimated



07152500 ARKANSAS RIVER AT RALSTON, OK--Continued  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1950-63, 1965 to current year.

## PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: January 1950 to September 1963, July 1968 to current year.

WATER TEMPERATURE: January 1950 to September 1963, July 1968 to current year.

INSTRUMENTATION.--Water-quality monitor, July 1968 to September 1980.

REMARKS.--Samples were collected by a local observer on a daily basis. Additional samples were collected bimonthly and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 7,510 microsiemens, Sept. 14, 1955; minimum daily, 157 microsiemens, Nov. 21, 1979.

WATER TEMPERATURE: Maximum daily, 37.0 °C, July 28, 1956; minimum daily, -0.5 °C on many days during winter period.

## EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily (more than 20 percent missing record), 2,150 microsiemens, Aug. 7; minimum daily, 220 microsiemens, Sept. 19.

WATER TEMPERATURE: Maximum daily (more than 20 percent missing record), 29.0 °C, Aug. 27; minimum daily, 0.0 °C on several days during winter period.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL-LECTING	AGENCY ANA-LYZING	SAMPLE LOC-ATION, CROSS SECTION	GAGE HEIGHT (FEET)	DIS-CHARGE, INST. (CUBIC FEET PER SECOND)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE AIR (DEG C)	TEMPER-ATURE WATER (DEG C)	TUR-BID-ITY (NTU)	BARO-METRIC PRES-SURE (MM OF HG)
		SAMPLE (CODE NUMBER)	SAMPLE (CODE NUMBER)	(FT FM L BANK)								
NOV 03...	1100	1028	80020	--	3.45	1890	1430	8.50	29.0	20.0	35	760
DEC 02...	1230	1028	1028	--	4.15	3030	1200	8.10	18.0	9.0	--	--
FEB 10...	1300	1028	80020	--	4.84	4760	1440	8.00	5.0	5.5	8.3	743
MAR 23...	1200	1028	80020	--	5.99	8990	*1530	8.50	22.0	15.0	3.7	729
JUN 01...	1315	1028	80020	--	4.27	3500	1430	8.80	25.5	24.0	21	740
01...	1316	1028	1028	120	4.27	3500	1430	8.70	--	24.0	--	--
01...	1317	1028	1028	320	4.27	3500	1430	8.70	--	24.0	--	--
01...	1318	1028	1028	520	4.27	3500	1430	8.80	--	24.0	--	--
01...	1319	1028	1028	720	4.27	3500	1430	8.80	--	24.0	--	--
01...	1320	1028	1028	920	4.27	3500	1430	8.80	--	24.0	--	--
JUL 06...	1310	1028	80020	--	3.25	1410	1350	8.50	37.5	31.0	4.5	740
AUG 16...	1200	1028	80020	--	2.78	710	*1530	8.20	36.0	30.0	5.8	740
DATE	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CAC03)	HARD-NESS NONCARB WH WAT TOT FLD (MG/L AS CAC03)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
NOV 03...	14.2	157	37	K17	300	130	82	24	180	56	5	5.9
DEC 02...	--	--	--	--	--	--	--	--	--	--	--	--
FEB 10...	9.4	77	76	48	310	110	86	23	160	52	4	5.0
MAR 23...	9.5	99	280	250	360	170	91	33	190	53	4	4.6
JUN 01...	11.9	146	K34	88	290	120	73	25	170	56	5	4.1
01...	12.1	--	--	--	--	--	--	--	--	--	--	--
01...	12.2	--	--	--	--	--	--	--	--	--	--	--
01...	12.2	--	--	--	--	--	--	--	--	--	--	--
01...	12.3	--	--	--	--	--	--	--	--	--	--	--
01...	12.2	--	--	--	--	--	--	--	--	--	--	--
JUL 06...	8.1	113	100	K14	260	92	60	26	160	57	4	4.9
AUG 16...	6.6	91	K6	160	280	110	72	25	210	61	6	4.9

\* SPECIFIC CONDUCTANCE, LAB (US/CM)

07152500 ARKANSAS RIVER AT RALSTON, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	BICAR- BONATE WATER WH IT FIELD (MG/L AS HCO3)	CAR- BONATE WATER WH IT FIELD (MG/L AS CO3)	ALKA- LITY WAT WH TOT IT FIELD (MG/L AS CACO3)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SiO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N)
NOV 03...	205	9	184	150	290	0.20	4.2	851	842	1.16	4340	<0.010
DEC 02...	--	--	--	--	--	--	--	--	--	--	--	--
FEB 10...	--	--	--	140	220	0.30	9.5	814	767	1.11	10500	<0.010
MAR 23...	220	6	190	190	240	0.30	10	912	883	1.24	22100	<0.010
JUN 01...	180	15	172	150	270	0.40	5.3	826	804	1.12	7810	<0.010
01...	--	--	--	--	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	--	--	--	--
JUL 06...	195	10	176	140	240	0.30	8.2	788	738	1.07	3000	<0.010
AUG 16...	220	0	176	140	310	0.40	7.2	887	874	1.21	1700	<0.010

DATE	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS- PHOROUS TOTAL (MG/L AS P)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4)	PHOS- PHOROUS ORGANIC TOTAL (MG/L AS P)	PHOS- PHOROUS ORGANIC DIS- SOLVED (MG/L AS P)
NOV 03...	<0.100	0.040	0.020	0.03	1.3	1.3	0.070	0.060	0.040	0.12	0.07	0.02
DEC 02...	--	--	--	--	--	--	--	--	--	--	--	--
FEB 10...	1.10	0.090	0.130	0.17	0.41	0.50	0.190	0.140	0.140	0.43	0.19	0.0
MAR 23...	1.40	0.080	0.040	0.05	1.7	1.8	0.220	0.110	0.080	0.25	0.22	0.03
JUN 01...	1.50	0.040	0.090	0.12	0.26	0.30	0.050	0.030	0.020	0.06	0.05	0.01
01...	--	--	--	--	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	--	--	--	--
JUL 06...	<0.100	0.190	0.060	0.08	0.41	0.60	0.110	0.030	0.020	0.06	0.11	0.01
AUG 16...	<0.100	0.090	--	--	0.61	0.70	0.170	0.080	0.080	0.25	0.17	0.0

DATE	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)
NOV 03...	<10	3	140	<0.5	<1	2	<3	3	14	<5	20	4
DEC 02...	--	--	--	--	--	--	--	--	--	--	--	--
FEB 10...	--	--	--	--	--	--	--	--	--	--	--	--
MAR 23...	370	2	130	<0.5	1	1	<3	6	250	<5	20	26
JUN 01...	20	2	120	<0.5	<1	3	<3	3	5	<5	18	<1
01...	--	--	--	--	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	--	--	--	--
JUL 06...	--	--	--	--	--	--	--	--	--	--	--	--
AUG 16...	<10	5	150	<0.5	1	1	<3	4	18	<5	18	1200

07152500 ARKANSAS RIVER AT RALSTON, OK--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	MERCURY DIS- SOLVED (UG/L AS HG)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V)	ZINC, DIS- SOLVED (UG/L AS ZN)	SEDI- MENT, SUS- PENDE (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
NOV 03...	--	<10	1	<1	1.0	850	<6	8	79	403	70
DEC 02...	--	--	--	--	--	--	--	--	--	--	--
FEB 10...	--	--	--	--	--	--	--	--	--	--	--
MAR 23...	0.4	<10	5	1	1.0	870	<6	4	--	--	--
JUN 01...	0.6	<10	4	<1	<1.0	840	<6	<4	122	1150	34
01...	--	--	--	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	--	--	--
JUL 06...	--	--	--	--	--	--	--	--	18	69	62
AUG 16...	0.9	<10	2	<1	1.0	930	<6	49	20	38	55

## 07152500 ARKANSAS RIVER AT RALSTON, OK--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	352	1500	1030	---	1560	1460	295	914	---	---	2130	1490
2	640	1510	1120	1430	1590	1440	343	882	1250	1520	2140	---
3	1030	1500	1270	1470	1620	602	547	919	1190	---	2090	---
4	1380	1450	---	1470	1540	---	480	844	1800	---	---	---
5	1130	1440	1430	1140	1540	---	698	821	---	1810	---	---
6	1050	1420	1360	1150	1590	---	915	845	1450	---	2090	1660
7	1470	---	1380	1660	---	594	---	837	1590	1380	2150	1680
8	1700	---	1370	1350	1600	809	963	1200	1700	1500	2140	1700
9	1620	1460	1360	1140	1600	941	---	1170	1760	---	---	1690
10	1650	1470	1430	1230	---	1030	933	1170	1800	1820	2000	1680
11	---	1530	1500	1080	1550	---	839	1290	---	1920	---	250
12	1650	1460	1510	1090	1630	1520	845	1310	1880	1620	1910	1710
13	1610	1480	1580	1080	1650	1000	813	1250	1780	1430	---	1740
14	---	---	1520	1060	1740	996	---	1240	---	---	---	1740
15	---	1550	1380	1030	1780	1000	831	---	1500	1680	1720	1720
16	1660	1530	1350	---	1920	1030	736	1230	1620	1470	1670	---
17	1780	1490	1340	469	1820	1030	---	1200	1630	---	1650	---
18	1780	1350	1300	855	1820	---	---	1180	1640	1470	---	240
19	1660	1190	274	817	1760	879	692	---	1630	844	1600	220
20	1740	1250	271	792	---	960	693	1170	---	1500	1630	550
21	1770	---	516	890	1660	938	690	---	1580	1140	---	460
22	1630	---	560	---	1650	1010	714	---	1630	995	1680	---
23	1580	1450	765	910	---	1080	---	820	---	1050	1640	590
24	1520	---	905	934	1690	1130	774	1250	1530	1110	1760	1020
25	1570	702	---	963	---	1170	755	1240	1530	1130	---	1010
26	1560	---	---	1010	---	---	733	1120	---	1080	1770	1050
27	1590	815	852	1030	---	1480	753	1140	1440	1070	1780	1060
28	1640	1440	---	1020	---	1560	774	1150	1440	---	---	---
29	1560	---	935	1040	1620	1380	---	---	1410	1210	1670	---
30	1340	1040	1120	---	---	1310	---	1340	---	1380	1870	---
31	1410	---	---	1400	---	---	---	1400	---	---	1610	---

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19.0	18.0	9.0	---	9.0	10.0	12.0	15.0	---	26.0	25.0	25.0
2	19.0	18.0	5.5	.0	2.0	11.0	12.0	17.0	23.0	24.0	25.0	---
3	16.0	16.0	7.0	2.0	2.0	8.0	10.0	14.0	22.0	---	24.0	---
4	16.0	17.0	---	2.0	1.0	---	12.0	15.0	23.0	---	---	---
5	17.0	15.0	9.0	3.0	.0	---	14.0	16.0	---	27.0	---	---
6	15.0	13.0	11.0	3.0	.0	---	12.0	18.0	22.0	---	27.0	24.0
7	15.5	---	10.0	.0	---	6.0	---	14.0	24.0	26.0	27.0	26.0
8	15.0	---	10.0	.0	2.0	5.0	14.0	20.0	25.0	26.0	27.0	24.0
9	16.0	11.0	9.0	.0	3.0	8.0	---	20.0	25.0	---	---	24.0
10	14.0	6.0	9.0	.0	---	9.0	11.0	19.0	21.0	26.0	27.0	22.0
11	---	6.0	7.0	.0	.0	---	11.0	19.0	---	26.0	---	21.0
12	13.0	7.0	6.0	1.0	.0	9.0	12.0	20.0	21.0	25.0	27.0	24.0
13	12.0	8.0	7.0	.0	2.0	5.0	13.0	21.0	22.0	25.0	---	22.0
14	---	---	4.0	.0	6.0	3.0	---	21.0	---	---	---	23.0
15	---	11.0	.0	.0	3.0	5.0	13.0	---	24.0	27.0	27.0	23.0
16	16.0	10.0	1.0	---	4.0	5.0	12.0	22.0	25.0	26.0	27.0	---
17	14.0	9.0	.0	2.0	6.0	5.0	---	22.0	23.0	---	27.0	---
18	14.0	8.0	3.0	3.0	5.0	---	---	23.0	25.0	27.0	---	21.0
19	17.0	5.0	2.0	5.0	4.0	5.0	12.0	---	25.0	26.0	27.0	22.0
20	11.0	9.0	3.0	4.0	---	9.0	13.0	23.0	---	24.0	27.0	20.0
21	11.0	---	3.0	2.0	6.0	10.0	15.0	---	25.0	23.0	---	21.0
22	11.0	---	4.0	---	8.0	13.0	16.0	---	25.0	25.0	27.0	---
23	14.0	9.0	5.0	2.0	---	14.0	---	19.0	---	25.0	26.0	23.0
24	16.0	---	8.0	1.0	6.0	13.0	14.0	19.0	26.0	25.0	26.0	20.0
25	14.5	9.0	---	2.0	---	14.0	15.0	21.0	25.0	26.0	---	19.0
26	16.0	---	---	1.0	---	---	15.0	21.0	---	27.0	26.0	20.0
27	14.0	7.0	2.0	1.0	---	13.0	14.0	20.0	24.0	26.0	29.0	21.0
28	12.0	9.0	---	4.0	---	15.0	15.0	21.0	27.0	---	---	---
29	13.0	---	2.0	6.0	10.0	12.0	---	---	26.0	25.0	25.0	---
30	15.0	9.0	2.0	---	---	10.0	---	22.0	---	26.0	26.0	---
31	18.0	---	---	10.0	---	---	---	23.0	---	---	26.5	---



07153000 BLACK BEAR CREEK AT PAWNEE, OK

LOCATION.--Lat 36°20'37", long 96°47'57", on east line of SE 1/4 NE 1/4 sec.31, T.22 N., R.5 E., Pawnee County, Hydrologic Unit 11060006, on downstream side of left pier of bridge on State Highway 18 in north Pawnee, 300 ft downstream from Skedee Creek, and at mile 23.4.

DRAINAGE AREA.--576 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1944 to current year.

REVISED RECORDS.--WSP 1117: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 802.73 ft, National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Sept. 21, 1944, nonrecording gage at present site and datum except for Aug. 27, 1953 to Apr. 29, 1954, nonrecording gage at site 500 ft downstream at same datum.

REMARKS.--Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--44 years, 190 ft<sup>3</sup>/s, 137,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 30,200 ft<sup>3</sup>/s, Oct. 3, 1959, gage height, 31.43 ft; no flow at times in many years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 19, 1943, reached a stage of 28.19 ft, from floodmark, discharge 17,800 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Mar. 5	0230	4,650	12.27	Apr. 1	1900	*6,070	*14.78

Minimum daily discharge, 3.6 ft<sup>3</sup>/s, Sept. 6, 9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	495	14	48	346	86	42	5010	246	33	66	27	4.3
2	347	14	39	188	81	151	5240	248	34	34	20	4.0
3	248	16	33	147	71	2710	5270	175	37	42	16	4.0
4	180	17	30	120	67	3790	3170	149	36	e32	14	4.5
5	133	13	29	84	62	4490	1830	125	e33	e27	11	3.9
6	93	13	27	63	e50	3590	1460	109	e31	e25	11	3.6
7	70	13	27	e61	e45	2740	1100	99	e30	e23	8.5	3.9
8	55	14	26	e57	e43	1950	810	93	e29	e22	8.2	3.7
9	40	12	25	e53	e42	1150	622	88	e28	e21	9.7	3.6
10	25	12	24	e46	e41	806	1090	80	e27	e20	10	3.9
11	18	12	24	e43	e41	600	791	71	e27	e20	9.1	14
12	14	14	24	e40	e40	461	423	75	e26	e19	8.2	11
13	12	14	24	e38	e39	352	317	63	e25	82	7.1	7.1
14	11	14	28	e36	e38	282	250	56	e25	128	6.6	4.5
15	9.7	20	30	109	59	234	207	63	e24	115	5.7	4.7
16	8.9	31	31	485	55	199	167	102	e24	46	5.5	297
17	8.0	182	31	1340	51	210	170	64	e23	42	5.1	202
18	8.0	121	43	1290	50	450	1600	54	e23	56	5.1	1470
19	8.0	74	606	945	58	436	2840	45	e23	221	5.3	2390
20	7.1	50	2170	847	60	441	2040	91	e22	502	5.0	2290
21	6.8	38	2170	597	61	378	953	122	e22	348	5.2	1910
22	8.6	32	1050	394	57	328	637	187	e22	162	4.9	712
23	9.3	28	617	282	52	241	461	591	e21	99	5.4	553
24	9.6	46	436	218	48	197	346	327	e20	65	5.0	571
25	11	162	328	172	44	161	281	159	e20	42	4.4	380
26	11	129	282	132	43	139	368	86	e20	30	4.3	278
27	11	72	480	110	43	117	443	60	e19	24	4.9	192
28	12	68	699	101	43	105	300	45	e19	27	5.0	136
29	12	82	426	92	42	164	217	38	e18	68	4.4	144
30	11	65	301	85	---	227	178	34	75	97	4.0	106
31	14	---	411	83	---	432	---	33	---	43	4.0	---
TOTAL	1907.0	1392	10519	8604	1512	27573	38591	3778	816	2548	249.6	11711.7
MEAN	61.5	46.4	339	278	52.1	889	1286	122	27.2	82.2	8.05	390
MAX	495	182	2170	1340	86	4490	5270	591	75	502	27	2390
MIN	6.8	12	24	36	38	42	167	33	18	19	4.0	3.6
AC-FT	3780	2760	20860	17070	3000	54690	76550	7490	1620	5050	495	23230

CAL YR 1987 TOTAL 152449.6 MEAN 418 MAX 6880 MIN 6.8 AC-FT 302400  
WTR YR 1988 TOTAL 109201.3 MEAN 298 MAX 5270 MIN 3.6 AC-FT 216600

e Estimated

## 07154500 CIMARRON RIVER NEAR KENTON, OK

LOCATION.--Lat 36°55'36", long 102°57'31", in SW 1/4 sec.4, T.5 N., R.1 E., Cimarron County, Hydrologic Unit 11040001, near right bank on downstream side of pier of county road bridge, 1.5 mi upstream from North Carrizo Creek, 1.7 mi northeast of Kenton, 2.2 mi downstream from Carrizozo Creek, and at mile 594.0.

DRAINAGE AREA.--1,106 mi<sup>2</sup>, of which 68 mi<sup>2</sup> is probably noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1904 to July 1905 (gage heights only), October 1950 to current year.

REVISED RECORDS.--WSP 1711: 1956 (M).

GAGE.--Water-stage recorder. Datum of gage is 4,262.08 ft above National Geodetic Vertical Datum of 1929. April 1904 to July 1905 nonrecording gage at site 0.9 mi upstream at different datum. Oct. 1, 1950 to Sept. 19, 1967, water-stage recorder at same site and at datum 5.00 ft higher.

REMARKS.--Records fair, except for estimated periods which are poor. Extensive diversions for irrigation upstream from station.

AVERAGE DISCHARGE.--38 years (water years 1951-88), 20.1 ft<sup>3</sup>/s, 14,560 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 43,400 ft<sup>3</sup>/s, Oct. 17, 1965, gage height, 22.32 ft, present datum; from rating curve extended above 7,000 ft<sup>3</sup>/s, on basis of contracted-opening measurement of peak flow; no flow at times in most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
July 6	0500	*1,880	*12.11	No peak greater than base discharge.			

Minimum daily discharge, 0.01 ft<sup>3</sup>/s, June 29 and Aug. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.7	5.3	9.3	e2.6	6.7	6.7	4.2	.29	.56	324	.05	.14
2	5.2	4.2	9.3	e2.4	e3.5	7.3	7.9	.78	.54	18	.02	73
3	4.1	3.3	8.9	e2.5	e3.6	8.2	9.8	5.7	.51	5.2	.01	27
4	3.8	2.7	9.2	e2.4	e3.4	7.9	8.1	4.7	.46	3.8	.18	3.7
5	3.3	2.3	7.6	e2.5	e3.3	9.2	5.0	3.6	.45	4.7	.25	2.1
6	3.1	1.1	4.2	e2.2	e2.7	8.0	2.1	2.7	.48	444	.15	4.1
7	2.9	3.9	2.9	e2.0	e2.8	6.7	.92	1.9	.45	19	.11	2.5
8	2.3	3.2	2.3	e2.3	e3.5	6.2	.53	1.8	.41	8.4	34	1.3
9	1.5	1.2	2.0	e2.1	e3.4	6.0	.55	2.1	.36	36	7.8	.93
10	.97	.71	2.0	e2.2	e3.5	4.0	.34	1.6	.32	87	333	.53
11	1.2	2.1	2.2	e2.4	e2.5	.46	.29	1.4	.33	26	123	2.1
12	1.2	1.5	2.0	e2.2	e3.2	.30	.44	.65	.42	9.4	15	2.3
13	1.5	2.0	e1.9	e2.5	e5.2	.36	.83	.46	.42	e7.0	5.6	4.9
14	2.4	1.3	e2.0	e3.5	e6.4	1.8	.50	.47	75	e5.0	4.3	57
15	1.4	3.2	e1.8	e5.0	e3.5	.81	.52	.26	272	e3.8	6.1	103
16	1.1	5.0	e2.1	e7.0	e5.8	.62	.84	.19	30	e3.2	3.1	28
17	1.0	4.8	e2.7	e10	e5.6	.51	3.2	.14	5.6	e2.6	2.1	9.8
18	2.3	6.1	4.4	14	e3.7	e1.9	6.4	.08	1.2	e6.0	5.5	6.6
19	2.9	6.6	4.0	37	e4.0	e3.6	5.8	.08	.37	40	4.8	5.0
20	3.5	6.5	3.4	e4.5	e3.8	e2.2	2.0	.09	.26	2.3	4.4	4.5
21	3.7	8.4	2.4	e5.0	e4.2	.46	.54	.18	.27	2.7	3.0	4.2
22	4.1	7.0	3.0	11	e4.3	.30	.32	100	.16	.57	1.1	3.9
23	4.6	7.6	3.2	12	e3.6	.38	.25	120	.12	.24	.66	4.1
24	4.9	7.5	2.9	12	e6.0	.21	.21	21	.09	.19	.77	4.8
25	5.3	7.5	2.6	14	e7.4	.20	.25	5.4	.06	.18	1.0	4.6
26	5.0	8.3	2.6	13	8.2	1.3	.25	1.3	.04	.15	.51	4.2
27	5.1	9.6	e2.2	15	7.0	.43	.43	.47	.03	.13	.83	3.6
28	5.4	9.5	e2.4	18	7.0	.35	.27	.46	.02	.11	.84	2.6
29	5.7	9.4	e2.5	16	6.7	2.2	.35	.45	.01	.10	.78	2.9
30	5.7	8.6	e2.6	13	---	1.3	.31	.46	.65	.10	.43	3.6
31	6.1	---	e2.4	9.8	---	.90	---	.55	---	.07	.18	---
TOTAL	106.97	150.41	113.0	250.1	134.5	90.79	63.44	279.26	391.59	1059.94	559.57	377.00
MEAN	3.45	5.01	3.65	8.07	4.64	2.93	2.11	9.01	13.1	34.2	18.1	12.6
MAX	6.1	9.6	9.3	37	8.2	9.2	9.8	120	272	444	333	103
MIN	.97	.71	1.8	2.0	2.5	.20	.21	.08	.01	.07	.01	.14
AC-FT	212	298	224	496	267	180	126	554	777	2100	1110	748

CAL YR 1987 TOTAL 5778.25 MEAN 15.8 MAX 688 MIN .00 AC-FT 11460  
WTR YR 1988 TOTAL 3576.57 MEAN 9.77 MAX 444 MIN .01 AC-FT 7090

e Estimated

## ARKANSAS RIVER BASIN

07154500 CIMARRON RIVER NEAR KENTON, OK--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--October 1987 to September 1988.

REMARKS.--Samples were collected monthly. Specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)
OCT											
15...	1200	1028	80020	5.90	1.5	2070	8.20	16.5	13.0	648	9.2
NOV											
04...	0900	1028	80020	5.95	2.8	1980	8.10	7.0	9.0	653	8.6
DEC											
08...	0800	1028	80020	5.98	2.4	2020	8.00	3.0	5.0	647	10.8
JAN											
20...	1230	1028	80020	6.14	4.0	1960	8.40	-2.0	0.0	652	13.2
FEB											
11...	0900	1028	80020	6.15	1.7	2250	8.30	-15.0	0.0	654	12.3
MAR											
15...	1000	1028	80020	5.91	0.96	2620	8.40	1.5	4.0	648	12.1
APR											
12...	1630	1028	80020	5.89	0.54	2650	8.40	26.5	20.5	649	10.5
MAY											
17...	1100	1028	80020	5.71	0.17	2900	8.30	27.0	20.0	647	8.3
JUN											
16...	0800	1028	80020	6.76	34	214	8.20	16.0	17.0	653	6.4
JUL											
20...	1130	1028	80020	5.96	2.3	638	8.20	20.0	21.0	659	7.3
AUG											
16...	1330	1028	80020	5.97	2.8	840	9.00	31.0	26.5	652	6.7
SEP											
27...	1730	1028	80020	5.98	3.6	1450	8.60	28.5	21.0	647	8.1
DATE		OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	HARD- NESS TOTAL (MG/L AS CACO3)	HARD- NESS NONCARB WH WAT TOT FLD (MG/L AS CACO3)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH FET FIELD (MG/L AS HCO3)	CAR- BONATE WATER WH FET FIELD (MG/L AS CO3)
OCT											
15...	104	550	210	63	95	250	49	5	5.6	410	0
NOV											
04...	88	550	200	79	86	210	45	4	5.0	430	0
DEC											
08...	100	550	200	87	80	220	46	4	5.1	430	0
JAN											
20...	106	600	250	100	86	190	40	3	5.2	370	13
FEB											
11...	99	590	240	89	89	260	49	5	5.2	430	0
MAR											
15...	110	--	--	--	--	--	--	--	--	470	7
APR											
12...	139	780	390	98	130	370	51	6	5.7	450	15
MAY											
17...	109	620	230	68	110	460	61	8	6.6	480	0
JUN											
16...	78	78	9	20	6.7	10	21	0.5	3.3	84	0
JUL											
20...	95	180	53	37	22	58	40	2	4.5	160	0
AUG											
16...	98	240	86	48	30	81	41	2	5.8	130	29
SEP											
27...	108	430	160	65	64	160	45	3	5.4	300	10

## ARKANSAS RIVER BASIN

07154500 CIMARRON RIVER NEAR KENTON, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	ALKA- LITY WAT WH TOT FET FIELD (MG/L AS CAC03)	CARBON DIOXIDE DIS- SOLVED (MG/L AS C02)	SULFATE DIS- SOLVED (MG/L AS S04)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SI02)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N)
OCT 15...	336	4.1	770	42	0.50	3.0	1460	1430	1.99	5.99	<0.100
NOV 04...	352	5.4	680	37	0.60	3.1	1360	1310	1.85	10.2	<0.100
DEC 08...	352	6.8	680	37	0.50	12	1380	1330	1.88	9.09	0.400
JAN 20...	350	2.4	650	32	0.60	16	1330	1290	1.81	14.5	0.700
FEB 11...	352	3.4	800	58	0.40	11	1570	1520	2.14	7.04	0.100
MAR 15...	394	3.0	--	--	--	--	--	--	--	--	<0.100
APR 12...	394	2.9	1100	68	0.70	0.30	1970	2030	2.68	2.87	<0.100
MAY 17...	396	3.8	1200	76	0.70	7.2	2230	2170	3.03	1.02	<0.100
JUN 16...	69	0.8	29	2.3	0.30	7.0	122	120	0.17	11.3	0.300
JUL 20...	130	1.6	180	9.7	0.30	7.7	384	398	0.52	2.42	0.300
AUG 16...	158	0.2	250	12	0.30	11	498	563	0.68	3.79	<0.100
SEP 27...	264	1.2	490	26	0.40	10	963	988	1.31	9.49	<0.100

DATE	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO- GEN, TOTAL (MG/L AS N)	NITRO- GEN, TOTAL (MG/L AS NO3)	PHOS- PHOROUS TOTAL (MG/L AS P)	PHOS- PHOROUS ORGANIC TOTAL (MG/L AS P)	ARSENIC TOTAL (UG/L AS AS)	BORON, DIS- SOLVED (UG/L AS B)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR)
OCT 15...	0.020	0.58	0.60	--	--	0.110	0.11	2	260	<10	<10
NOV 04...	0.030	0.27	0.30	--	--	<0.010	--	2	250	<10	2
DEC 08...	<0.010	--	0.70	1.1	4.9	0.020	0.02	2	230	<10	3
JAN 20...	0.010	0.49	0.50	1.2	5.3	0.020	0.02	2	210	<10	2
FEB 11...	0.010	0.29	0.30	0.40	1.8	0.020	0.02	1	240	<10	2
MAR 15...	0.020	0.88	0.90	--	--	0.030	0.03	--	--	--	--
APR 12...	0.020	0.38	0.40	--	--	0.020	0.02	2	330	40	2
MAY 17...	0.010	0.49	0.50	--	--	0.030	0.03	4	410	<10	2
JUN 16...	0.050	0.45	0.50	0.80	3.5	0.090	0.09	4	30	<10	45
JUL 20...	<0.010	--	0.70	1.0	4.4	0.120	0.12	2	80	<10	3
AUG 16...	0.020	0.38	0.40	--	--	0.100	0.10	3	110	<10	1
SEP 27...	<0.010	--	0.40	--	--	0.040	0.04	4	190	<10	3



## ARKANSAS RIVER BASIN

07154500 CIMARRON RIVER NEAR KENTON, OK--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG)	SELE- NIUM, TOTAL (UG/L AS SE)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN)	SEDI- MENT, SUS- PENDED (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
OCT 15...	20	10	<100	<10	<0.10	4	40	43	0.18	92
NOV 04...	20	<3	<100	8	<0.10	4	<10	29	0.22	72
DEC 08...	30	<10	<100	30	<0.10	4	<10	8	0.05	55
JAN 20...	20	5	<100	42	<0.10	5	10	13	0.14	70
FEB 11...	30	20	<100	80	<0.10	5	20	--	--	--
MAR 15...	--	--	--	--	--	--	--	27	0.07	64
APR 12...	190	<10	200	30	<0.10	3	10	70	0.10	54
MAY 17...	10	10	<100	120	<0.10	2	20	19	0.01	61
JUN 16...	70	75	<100	<1	<0.10	<1	190	3080	286	99
JUL 20...	20	44	<100	10	<0.10	2	30	72	0.45	93
AUG 16...	<10	14	<100	5	<0.10	3	<10	200	1.5	31
SEP 27...	10	7	<100	4	0.10	4	10	59	0.58	97

## ARKANSAS RIVER BASIN

07156900 CIMARRON RIVER NEAR FORGAN, OK

LOCATION (REVISED).--Lat 37°00'40", long 100°29'29", in SE 1/4 SE 1/4 sec.8, T.35 S., R.29 W., Mead County, KS, Hydrologic Unit 11040006, near center of span on downstream side of pier of bridge on Kansas State Highway 23, 0.8 mi north of Oklahoma-Kansas State Line, 7.8 mi north of Forgan, and at mile 375.7.

DRAINAGE AREA.--8,536 mi<sup>2</sup>, of which 4,316 mi<sup>2</sup> is probably noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1965 to September 1986, October 1987 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,326.05 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair except for estimated winter periods which are poor. Natural flow affected by irrigational development.

AVERAGE DISCHARGE.--22 years (water years 1966-86, 88), 69.1 ft<sup>3</sup>/s, 50,060 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 21,200 ft<sup>3</sup>/s, Oct. 20, 1965, gage height, 8.10 ft; minimum discharge, 13 ft<sup>3</sup>/s, June 19, 20, 1988.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
July 19	2345	*132	*3.36	No peak greater than base discharge.			

Minimum daily discharge, 13 ft<sup>3</sup>/s, June 19, 20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	26	33	18	e41	34	47	80	46	47	36	21	25
2	22	31	21	e40	34	61	82	45	40	27	19	42
3	22	34	16	e41	34	e59	69	46	30	26	18	45
4	25	33	15	e43	e33	e61	63	43	28	26	20	37
5	27	30	18	e40	e29	e60	59	37	26	23	23	33
6	28	30	24	e35	e26	64	55	33	26	24	22	30
7	26	43	40	e23	e27	55	56	34	25	29	16	27
8	27	36	48	e21	e29	48	54	38	23	34	17	23
9	26	38	47	e24	e31	48	64	40	21	42	20	23
10	25	38	48	e29	e33	49	58	34	21	42	24	23
11	27	39	47	e45	e24	47	54	36	21	54	23	23
12	27	39	41	e50	e29	44	54	33	19	37	22	26
13	24	36	44	e30	e45	43	54	31	16	31	22	28
14	25	31	65	e32	55	45	53	26	19	29	18	35
15	42	29	e45	e45	51	41	52	28	23	26	16	33
16	33	26	e35	e50	53	46	52	28	25	28	16	34
17	29	29	e38	e56	54	e58	63	24	18	48	15	30
18	29	33	e47	e60	53	61	85	26	16	34	28	28
19	35	32	e52	e54	51	58	70	23	13	80	29	32
20	34	29	49	e40	48	60	64	22	13	77	24	31
21	32	28	46	e29	47	55	64	28	14	39	24	31
22	33	28	43	e31	50	52	58	36	17	32	24	30
23	35	27	45	e40	51	47	56	36	20	29	23	35
24	36	32	48	46	52	43	56	38	16	32	23	38
25	38	31	e40	41	50	50	67	33	19	33	20	32
26	35	32	e35	39	50	52	60	29	22	33	19	29
27	32	36	e32	36	48	48	52	29	24	34	21	28
28	32	33	e29	35	45	52	49	34	19	30	23	30
29	29	30	e35	37	46	58	53	28	22	25	23	31
30	28	23	e38	35	---	55	49	28	26	22	23	33
31	30	---	e50	35	---	58	---	47	---	22	20	---
TOTAL	919	969	1199	1203	1212	1625	1805	1039	669	1084	656	925
MEAN	29.6	32.3	38.7	38.8	41.8	52.4	60.2	33.5	22.3	35.0	21.2	30.8
MAX	42	43	65	60	55	64	85	47	47	80	29	45
MIN	22	23	15	21	24	41	49	22	13	22	15	23
AC-FT	1820	1920	2380	2390	2400	3220	3580	2060	1330	2150	1300	1830

WTR YR 1988 TOTAL 13305 MEAN 36.4 MAX 85 MIN 13 AC-FT 26390

e Estimated

## ARKANSAS RIVER BASIN

07156900 CIMARRON RIVER NEAR FORGAN, OK--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--May 1987 to current year.

REMARKS.--Samples were collected monthly. Specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)
MAY 14...	1600	1028	80020	3.02	34	3540	8.30	29.5	31.0	700	8.7
JUN 22...	1600	1028	80020	2.97	30	3650	8.30	30.0	35.5	694	8.0
JUL 21...	1730	1028	80020	2.92	14	3920	8.30	32.5	30.0	701	8.0
SEP 08...	1600	1028	80020	3.00	29	3660	8.30	22.0	26.0	700	7.8

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	HARD- NESS TOTAL (MG/L AS CAC03)	HARD- NESS NONCARB WH WAT TOT FLD (MG/L AS CAC03)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH FET FIELD (MG/L AS HC03)	CAR- BONATE WATER WH FET FIELD (MG/L AS C03)
MAY 14...	129	370	240	81	40	590	77	14	5.1	160	0
JUN 22...	130	320	210	70	36	520	77	13	5.3	140	0
JUL 21...	117	330	240	63	41	640	81	16	6.3	110	0
SEP 08...	106	340	190	75	38	590	79	14	5.5	190	0

DATE	ALKA- LINITY WAT WH TOT FET FIELD (MG/L AS CAC03)	CARBON DIOXIDE DIS- SOLVED (MG/L AS C02)	SULFATE DIS- SOLVED (MG/L AS S04)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SI02)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)
MAY 14...	130	1.3	160	950	0.80	11	1940	1920	2.64	177
JUN 22...	113	1.1	100	920	0.80	11	1910	1730	2.60	157
JUL 21...	88	0.9	190	1100	0.90	4.8	2140	2100	2.91	83.2
SEP 08...	153	1.5	170	900	0.90	14	1980	1890	2.69	158

## ARKANSAS RIVER BASIN

07156900 CIMARRON RIVER NEAR FORGAN, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987

DATE	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS- PHOROUS TOTAL (MG/L AS P)	PHOS- PHOROUS ORGANIC TOTAL (MG/L AS P)	ARSENIC TOTAL (UG/L AS AS)	BORON, DIS- SOLVED (UG/L AS B)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR)
MAY 14...	<0.100	0.040	0.46	0.50	0.020	0.02	2	170	<10	<10
JUN 22...	<0.100	0.030	0.77	0.80	0.060	0.06	2	180	<10	<10
JUL 21...	<0.100	0.020	0.48	0.50	0.030	0.03	1	190	<10	30
SEP 08...	<0.100	<0.010	--	0.50	0.020	0.02	1	160	<10	<10

DATE	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG)	SELE- NIUM, TOTAL (UG/L AS SE)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN)	SEDI- MENT, SUS- PENDE (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
MAY 14...	10	<10	<100	<10	<0.10	5	20	--	--	--
JUN 22...	10	4	100	4	0.10	4	20	141	12	49
JUL 21...	10	20	<100	10	0.20	3	<10	25	0.97	66
SEP 08...	110	20	<100	<10	<0.10	4	<10	60	4.8	35

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)
OCT 09...	1430	1028	80020	3.01	30	3710	8.30	18.0	19.5	702	9.7
NOV 03...	1400	1028	80020	3.07	36	3840	8.20	20.0	20.0	698	10.0
DEC 07...	1500	1028	80020	3.11	45	3600	8.20	20.0	14.5	692	10.0
JAN 21...	1100	1028	80020	3.25	30	4200	8.30	-3.0	0.0	700	12.6
FEB 12...	1000	1028	80020	3.37	38	3780	8.20	2.5	0.5	701	11.8
MAR 14...	1500	1028	80020	3.04	48	3740	8.40	11.0	14.0	699	9.1
APR 13...	0930	1028	80020	3.03	56	3690	8.30	12.5	9.5	697	11.5
MAY 18...	1000	1028	80020	3.00	31	3700	8.40	25.0	20.0	695	9.5
JUN 15...	1430	1028	80020	2.97	25	3640	8.50	29.0	29.0	705	10.0
JUL 19...	1545	1028	80020	3.19	80	3480	8.40	25.5	26.0	702	7.8
AUG 17...	1100	1028	80020	2.86	20	4060	8.50	30.0	26.0	701	9.0
SEP 27...	1100	1028	80020	2.98	32	3930	8.40	24.0	20.5	698	8.9



## ARKANSAS RIVER BASIN

07156900 CIMARRON RIVER NEAR FORGAN, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	HARD- NESS TOTAL (MG/L AS CACO3)	HARD- NESS NONCARB WH WAT (TOT FLD MG/L AS CACO3)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH FET FIELD (MG/L AS HCO3)	CAR- BONATE WATER WH FET FIELD (MG/L AS CO3)	
OCT 09...	116	390	210	92	39	600	67	15	10	220	0
NOV 03...	122	400	220	94	39	640	78	14	5.7	220	0
DEC 07...	110	440	230	110	39	570	74	12	5.8	250	0
JAN 21...	95	480	230	120	43	610	73	13	6.2	300	0
FEB 12...	90	410	190	110	34	550	74	12	5.8	270	0
MAR 14...	98	--	--	--	--	--	--	--	--	250	0
APR 13...	112	440	230	110	40	590	74	13	4.8	250	0
MAY 18...	116	400	220	96	40	630	77	14	4.4	210	10
JUN 15...	143	340	210	73	38	690	81	17	5.1	140	7
JUL 19...	106	310	150	74	31	590	80	15	5.9	190	5
AUG 17...	123	370	210	82	41	700	80	16	5.2	180	7
SEP 27...	110	400	220	90	42	600	76	13	4.5	220	2

DATE	ALKA- LINITY WAT WH TOT FET FIELD (MG/L AS CACO3)	CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SI02)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N)
OCT 09...	177	1.7	190	940	0.90	16	1960	2280	2.67	160	0.200
NOV 03...	177	2.2	200	970	0.90	19	2040	2070	2.77	200	0.300
DEC 07...	209	2.6	200	890	0.80	5.6	1990	1950	2.71	240	0.700
JAN 21...	245	2.4	230	920	9.0	27	2220	2110	3.02	182	1.20
FEB 12...	222	2.7	210	890	0.70	24	2000	1960	2.72	206	1.20
MAR 14...	202	1.6	--	--	--	--	--	--	--	--	0.900
APR 13...	209	2.0	200	890	0.90	7.6	1980	1970	2.69	300	0.400
MAY 18...	188	1.3	190	930	0.90	12	2060	2030	2.80	175	<0.100
JUN 15...	129	0.7	190	1000	0.80	11	2120	2090	2.88	142	<0.100
JUL 19...	163	1.2	140	980	0.70	15	1970	1940	2.68	426	0.400
AUG 17...	163	0.9	190	990	0.80	14	2220	2130	3.02	118	<0.100
SEP 27...	181	1.4	190	1000	0.80	17	2040	2050	2.77	174	0.100

## ARKANSAS RIVER BASIN

07156900 CIMARRON RIVER NEAR FORGAN, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO- GEN, TOTAL (MG/L AS N)	NITRO- GEN, TOTAL (MG/L AS NO3)	PHOS- PHOROUS TOTAL (MG/L AS P)	PHOS- PHOROUS ORGANIC TOTAL (MG/L AS P)	ARSENIC TOTAL (UG/L AS AS)	BORON, DIS- SOLVED (UG/L AS B)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR)
OCT 09...	0.020	0.38	0.40	0.60	2.7	0.020	0.02	1	160	<10	10
NOV 03...	0.050	0.65	0.70	1.0	4.4	0.010	0.01	2	170	<10	3
DEC 07...	0.010	0.69	0.70	1.4	6.2	0.030	0.03	2	160	<10	3
JAN 21...	0.090	0.51	0.60	1.8	8.0	0.030	0.03	1	160	<10	5
FEB 12...	0.040	0.36	0.40	1.6	7.1	0.020	0.02	1	150	<10	2
MAR 14...	0.020	0.38	0.40	1.3	5.8	0.010	0.01	--	--	--	--
APR 13...	0.030	0.27	0.30	0.70	3.1	0.020	0.02	2	160	30	1
MAY 18...	0.030	0.37	0.40	--	--	0.010	0.01	2	170	<10	<1
JUN 15...	0.040	0.36	0.40	--	--	0.020	0.02	2	170	<10	<1
JUL 19...	<0.010	--	1.2	1.6	7.1	0.040	0.04	1	160	<10	1
AUG 17...	<0.010	--	0.30	--	--	0.020	0.02	1	160	<10	<1
SEP 27...	<0.010	--	0.30	0.40	1.8	0.020	0.02	1	170	<10	2

DATE	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG)	SELE- NIUM, TOTAL (UG/L AS SE)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN)	SEDI- MENT, SUS- PENDE (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
OCT 09...	10	10	<100	<10	<0.10	4	10	221	18	22
NOV 03...	30	10	<100	<10	<0.10	4	20	144	14	30
DEC 07...	30	<10	<100	10	<0.10	4	10	134	16	41
JAN 21...	20	10	<100	20	<0.10	4	20	165	13	24
FEB 12...	20	20	<100	10	<0.10	5	10	37	3.8	28
MAR 14...	--	--	--	--	--	--	--	214	28	33
APR 13...	210	<10	100	20	<0.10	4	10	170	26	25
MAY 18...	<10	10	<100	<10	<0.10	3	30	132	11	28
JUN 15...	<10	10	<100	<10	0.10	4	20	106	7.1	20
JUL 19...	<10	20	<100	20	<0.10	3	10	136	29	72
AUG 17...	<10	10	<100	<10	0.10	3	10	68	3.6	30
SEP 27...	10	20	<100	<10	<0.10	3	<10	130	11	14

## ARKANSAS RIVER BASIN

07157950 CIMARRON RIVER NEAR BUFFALO, OK

LOCATION.--Lat 36°51'07", long 99°18'54", in SE 1/4 NE 1/4 sec.2, T.27 N., R.20 W., Harper County, Hydrologic Unit 11050001, near left bank on downstream side of pier of U.S. Highway 64, 0.5 mi downstream from Keno Creek, 17.0 mi northeast of Buffalo, and at mile 289.1.

DRAINAGE AREA.--12,004 mi<sup>2</sup>, of which 4,813 mi<sup>2</sup> is probably noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1960 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,599.67 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 1, 1979, at site 6.9 mi upstream at elevation 1,650 ft.

REMARKS.--Records fair except for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--28 years, 140 ft<sup>3</sup>/s, 101,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,400 ft<sup>3</sup>/s, Sept. 26, 1973, gage height, 5.57 ft, datum then in use; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Apr. 19	0330	*685	*5.68	No peak greater than base discharge.			

Minimum daily discharge, 0.02 ft<sup>3</sup>/s, Sept. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	73	56	73	e40	146	91	297	168	139	21	1.9	.26
2	53	62	69	e44	e90	143	426	173	149	9.1	1.4	.41
3	42	59	70	e42	e80	260	526	169	151	6.3	1.2	1.7
4	38	53	69	e39	e70	325	396	151	116	4.6	1.2	.33
5	34	51	72	e35	e60	329	323	147	81	3.2	2.6	.22
6	30	52	73	e27	e70	300	259	129	60	2.3	2.9	.18
7	29	55	68	e22	e90	297	243	121	52	2.8	1.0	.14
8	28	59	77	e20	e100	242	225	113	45	4.2	1.0	.12
9	28	63	68	e22	e96	212	221	100	36	5.2	1.0	.10
10	22	83	69	e27	e80	186	212	98	32	4.2	.90	.07
11	25	74	69	e50	e45	176	190	92	28	3.2	.75	.04
12	28	72	65	e45	e90	153	181	85	25	2.4	.67	.03
13	28	70	68	e40	140	135	175	81	22	1.6	.55	.02
14	28	66	e60	e50	190	128	161	74	20	1.0	.46	.07
15	42	70	e42	e80	154	123	149	67	20	.67	.37	8.3
16	51	66	e22	e170	128	118	135	57	18	1.6	.30	20
17	60	64	e26	229	116	140	194	53	17	50	.51	3.1
18	73	63	e40	274	110	164	557	51	14	23	.56	1.5
19	62	61	e94	337	111	223	636	47	10	193	.52	.97
20	55	61	229	302	107	248	490	55	9.1	79	.44	.53
21	51	66	202	229	104	229	350	47	6.8	44	.29	.47
22	50	68	149	184	100	199	283	51	5.3	47	1.2	.40
23	49	63	133	187	90	175	223	59	4.7	50	2.9	1.6
24	48	65	115	225	87	169	199	58	3.6	33	.31	3.3
25	48	64	e80	236	88	156	281	50	3.5	23	.19	1.4
26	55	66	e40	219	91	147	272	50	5.2	12	.14	.75
27	53	88	e35	213	93	128	238	42	15	8.6	.24	.59
28	53	86	e40	197	93	115	205	48	10	6.8	.20	.45
29	54	88	e43	176	90	103	173	51	7.3	5.4	.17	.42
30	52	82	e50	171	---	101	175	44	6.2	4.2	.15	.48
31	57	---	e45	159	---	132	---	100	---	3.1	.11	---
TOTAL	1399	1996	2355	4091	2909	5647	8395	2631	1111.7	655.47	26.13	47.95
MEAN	45.1	66.5	76.0	132	100	182	280	84.9	37.1	21.1	.84	1.60
MAX	73	88	229	337	190	329	636	173	151	193	2.9	20
MIN	22	51	22	20	45	91	135	42	3.5	.67	.11	.02
AC-FT	2770	3960	4670	8110	5770	11200	16650	5220	2210	1300	52	95

CAL YR 1987 TOTAL 85855.86 MEAN 235 MAX 7750 MIN .41 AC-FT 170300  
WTR YR 1988 TOTAL 31264.25 MEAN 85.4 MAX 636 MIN .02 AC-FT 62010

e Estimated

07157950 CIMARRON RIVER NEAR BUFFALO, OK--Continued  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1953, 1961-63, 1968 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 1968 to January 1982.

WATER TEMPERATURE: July 1968 to January 1982.

INSTRUMENTATION.--Water-quality monitor from March 1969 to September 1979.

REMARKS.--Samples were collected on an approximate six-week basis and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	STREAM- FLOW, INSTAN- TANEOUS (CFS)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	TUR- BID- ITY (FTU)	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)
OCT 08...	1630	1028	80020	3.99	29	14400	8.30	24.0	23.0	--	713	8.4
NOV 19...	1130	1028	80020	4.25	60	7230	8.20	9.0	5.5	1.8	726	12.4
JAN 15...	1400	1028	80020	4.75	118	16600	8.00	8.0	0.5	--	713	12.4
FEB 26...	1230	1028	80020	4.57	96	8460	8.30	23.0	12.0	6.3	717	10.8
APR 14...	1230	1028	80020	4.72	164	9080	8.30	17.0	16.5	--	718	9.6
MAY 12...	1000	1028	80020	4.55	89	*8890	8.30	22.0	18.5	0.80	720	8.8
JUL 27...	1330	1028	80020	4.06	8.7	15000	8.30	28.5	30.5	1.0	720	7.9
SEP 06...	1415	1028	80020	3.73	0.15	*14900	8.30	28.0	24.0	--	717	9.9

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD- NESS TOTAL (MG/L AS CAC03)	HARD- NESS NONCARB WH WAT TOT FLD MG/L AS CAC03	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH IT FIELD MG/L AS HCO3	
OCT 08...	110	--	--	990	830	260	81	2700	86	39	1.1	227
NOV 19...	106	250	160	700	510	170	66	1300	80	22	6.2	259
JAN 15...	98	--	--	750	510	--	73	2900	89	48	8.2	283
FEB 26...	110	K18	K8	680	470	160	68	1800	85	31	1.9	259
APR 14...	108	--	--	760	540	170	81	1600	82	26	7.3	261
MAY 12...	103	47	K19	750	550	170	77	1600	82	26	6.6	242
JUL 27...	117	580	120	900	770	230	78	2800	87	42	8.5	163
SEP 06...	132	--	--	1500	1400	450	89	2900	81	34	5.6	172

DATE	CAR- BONATE WATER WH IT FIELD MG/L AS CO3	ALKA- LINITY WAT WH TOT IT FIELD MG/L AS CAC03	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SI02)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N)
OCT . 08...	0	186	760	--	--	16	8520	--	11.6	660	--	0.010
NOV 19...	0	212	450	--	0.80	18	4080	3830	5.55	665	--	<0.010
JAN 15...	0	232	530	5000	--	20	9360	8860	12.7	2980	0.470	0.020
FEB 26...	0	212	470	2300	0.70	16	4950	4950	6.73	1280	--	<0.010
APR 14...	0	214	590	2400	--	14	5360	5000	7.29	2370	--	<0.010
MAY 12...	0	198	610	2400	0.70	14	5330	5000	7.25	1280	--	<0.010
JUL 27...	0	134	800	4900	0.60	16	9240	8920	12.6	217	--	<0.010
SEP 06...	0	141	1200	5300	--	22	9600	10100	13.1	3.89	--	<0.010

\* SPECIFIC CONDUCTANCE, LAB (US/CM)



## ARKANSAS RIVER BASIN

07157950 CIMARRON RIVER NEAR BUFFALO, OK--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS NO2)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS- PHOROUS TOTAL (MG/L AS P)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4)	PHOS- PHOROUS ORGANIC TOTAL (MG/L AS P)
OCT 08...	0.03	<0.100	--	0.050	0.06	--	--	--	--	0.040	0.12	--
NOV 19...	--	<0.100	0.040	0.040	0.05	--	<0.20	0.010	<0.010	<0.010	--	0.01
JAN 15...	0.07	0.490	--	0.130	0.17	--	--	--	--	<0.010	--	--
FEB 26...	--	<0.100	0.010	--	0.05	0.59	0.60	0.010	0.010	<0.010	--	0.01
APR 14...	--	<0.100	--	0.030	0.04	--	--	--	--	<0.010	--	--
MAY 12...	--	<0.100	0.060	0.030	0.04	--	<0.20	0.020	<0.010	<0.010	--	0.02
JUL 27...	--	<0.100	0.040	--	0.12	0.56	0.60	0.020	0.020	<0.010	--	0.02
SEP 06...	--	<0.100	--	0.150	0.19	--	--	--	--	<0.010	--	--

## ARKANSAS RIVER BASIN

57

07157960 BUFFALO CREEK NEAR LOVEDALE, OK

LOCATION.--Lat 36°46'14", long 99°22'00", in SW 1/4 SW 1/4 sec.33, T.27 N., R.20 W., Harper County, Hydrologic Unit 11050001, near center of channel on downstream side of pier of bridge on State Highway 34, 1.2 mi east of Lovedale, 1.3 mi upstream from Sleeping Bear Creek, and at mile 7.6.

DRAINAGE AREA.--408 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,602.56 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good, except for periods of estimated record, which were affected by ice, and are poor. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office.

AVERAGE DISCHARGE.--22 years, 12.3 ft<sup>3</sup>/s, 8,910 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,800 ft<sup>3</sup>/s, Aug. 9, 1967, gage height, 14.80 ft, from rating curve extended above 7,000 ft<sup>3</sup>/s on basis of slope-area determination of peak flow; maximum gage height, 16.17 ft, May 10, 1979; no flow most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Apr. 18	1615	*240	*5.62	No peak greater than base discharge.			

Minimum daily discharge, 5.9 ft<sup>3</sup>/s, Sept. 13, 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	17	21	e21	21	18	47	50	67	19	10	7.7
2	20	17	21	e20	21	22	130	50	49	22	10	8.9
3	18	17	21	e19	20	53	86	46	41	22	9.9	9.0
4	17	18	20	e18	e19	50	63	44	33	18	9.7	8.4
5	17	17	21	e17	e18	46	55	43	29	15	10	7.7
6	16	18	21	e15	e16	47	50	41	26	14	9.7	7.3
7	15	18	21	e13	e17	53	47	42	24	17	9.2	7.2
8	15	18	22	e11	e19	48	45	41	23	16	8.9	6.9
9	14	18	22	e10	e19	40	43	41	22	15	9.0	6.7
10	14	18	21	e10	e18	35	43	41	21	15	9.0	6.2
11	14	18	21	e10	e18	32	43	41	21	32	8.8	6.1
12	15	19	21	e11	e17	29	42	42	20	29	8.5	6.0
13	15	18	21	e11	20	27	41	42	19	20	8.2	5.9
14	15	19	e25	e12	20	26	41	41	19	16	7.9	6.0
15	16	19	e27	e25	20	26	40	39	19	14	7.5	7.3
16	17	19	e26	28	20	25	39	35	19	13	7.3	7.9
17	16	19	25	29	20	27	44	33	19	46	7.5	7.8
18	16	19	24	30	19	28	164	32	18	45	9.0	7.4
19	16	19	27	31	19	31	144	31	17	49	8.2	7.3
20	16	19	32	29	19	40	78	32	17	48	8.3	6.7
21	16	19	31	e25	19	45	62	31	16	26	8.1	6.4
22	16	19	28	e24	19	40	56	31	15	20	7.8	6.1
23	16	19	26	24	18	34	51	32	14	16	12	6.4
24	17	20	25	24	18	31	49	32	14	15	12	7.5
25	17	19	24	23	18	29	57	30	14	15	9.4	7.2
26	17	20	24	23	18	28	55	29	14	14	8.3	6.8
27	17	21	e23	23	18	27	50	27	15	13	7.8	6.4
28	17	21	e22	22	18	26	47	26	15	13	8.2	6.2
29	17	21	e22	22	18	26	46	25	19	12	7.9	5.9
30	17	21	e23	22	---	25	49	25	15	11	7.8	6.0
31	17	---	e23	22	---	26	---	35	---	11	7.4	---
TOTAL	509	564	731	624	544	1040	1807	1130	674	651	273.3	209.3
MEAN	16.4	18.8	23.6	20.1	18.8	33.5	60.2	36.5	22.5	21.0	8.82	6.98
MAX	23	21	32	31	21	53	164	50	67	49	12	9.0
MIN	14	17	20	10	16	18	39	25	14	11	7.3	5.9
AC-FT	1010	1120	1450	1240	1080	2060	3580	2240	1340	1290	542	415

CAL YR 1987 TOTAL 15309.5 MEAN 41.9 MAX 2860 MIN 6.1 AC-FT 30370  
WTR YR 1988 TOTAL 8756.6 MEAN 23.9 MAX 164 MIN 5.9 AC-FT 17370

e Estimated

## ARKANSAS RIVER BASIN

07158000 CIMARRON RIVER NEAR WAYNOKA, OK

LOCATION.--Lat 36°31'02", long 98°52'45", in NW 1/4 NE 1/4 sec.35, T.24 N., R.16 W., Woods County, Hydrologic Unit 11050001, near left bank on downstream side of bridge on U.S. Highway 281, 4.0 mi south of Waynoka, and at mile 247.0.

DRAINAGE AREA.--13,334 mi<sup>2</sup>, of which 4,830 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--September 1903 to December 1905 (gage heights and discharge measurements only), October 1937 to current year. Monthly discharge only for some periods, published in WSP 1311.

GAGE.--Water-stage recorder. Datum of gage is 1,367.35 ft above National Geodetic Vertical Datum of 1929.

September 1903 to December 1905, nonrecording gage at the Atchison, Topeka and Santa Fe Railway Co. bridge 5 mi upstream at different datum. Feb. 4 to Mar. 3, 1938, nonrecording gage and Mar. 4, 1938, to Oct. 24, 1956, water-stage recorder, on former highway bridge 50 ft downstream at present datum.

REMARKS.--Records good except for periods affected by ice, which are poor. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Extensive diversions for irrigation above station.

AVERAGE DISCHARGE.--51 years, (water years 1938-88), 317 ft<sup>3</sup>/s, 229,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 94,500 ft<sup>3</sup>/s, May 16, 1957, gage height, 15.10 ft, from rating curve extended above 45,000 ft<sup>3</sup>/s on basis of contracted-opening measurement of peak flow; no flow at times in most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--A stage of about 14 ft occurred probably in 1914.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 10,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Apr. 18	1415	*4,870	*7.96	No peak greater than base discharge.			

No flow several days in August and September.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	206	88	143	185	243	165	825	444	367	1010	17	2.0
2	170	87	141	160	232	259	1830	382	295	425	12	2.7
3	135	85	145	156	221	939	1160	346	213	158	8.7	7.2
4	114	90	145	160	224	849	1020	300	197	112	7.6	12
5	100	84	147	135	226	945	766	286	181	92	8.4	7.3
6	86	81	150	e124	e200	1090	602	270	165	77	9.7	3.3
7	73	81	148	e109	e194	1110	510	244	146	62	15	1.1
8	68	89	146	e72	198	971	448	224	133	64	8.4	.26
9	64	88	143	e80	228	643	415	210	122	113	15	.00
10	56	85	136	e82	225	558	396	196	114	91	8.4	.00
11	54	90	133	e94	e210	472	376	191	105	73	6.1	.00
12	55	104	128	e98	e213	388	371	180	99	60	3.7	.00
13	54	101	129	e90	e220	340	366	166	93	64	1.1	.00
14	56	104	171	e180	226	321	342	159	90	53	.00	.00
15	61	107	194	e270	256	299	327	153	89	38	.00	17
16	86	112	e135	300	256	277	318	150	94	67	.00	45
17	92	108	126	333	214	337	356	145	91	313	.00	46
18	80	108	133	346	200	359	2960	135	84	206	.00	40
19	81	114	208	427	198	457	2230	129	75	164	36	29
20	85	114	362	393	187	693	1350	126	66	376	22	17
21	78	113	313	335	183	739	928	130	56	220	8.9	11
22	75	114	286	298	177	584	691	171	48	122	3.2	7.8
23	77	115	233	274	167	490	528	164	41	95	2.2	12
24	89	116	219	285	167	450	455	160	35	85	71	11
25	91	131	206	300	178	414	771	146	33	80	27	14
26	94	127	187	316	187	367	733	128	36	67	15	14
27	93	136	170	289	180	341	531	119	50	55	7.9	10
28	88	157	171	272	168	329	464	112	59	48	9.9	27
29	87	149	161	268	165	300	444	107	48	38	23	12
30	85	146	169	271	---	304	510	102	43	32	12	8.8
31	87	---	189	251	---	299	---	118	---	26	5.1	---
TOTAL	2720	3224	5467	6953	5943	16089	23023	5893	3268	4486	364.30	357.46
MEAN	87.7	107	176	224	205	519	767	190	109	145	11.8	11.9
MAX	206	157	362	427	256	1110	2960	444	367	1010	71	46
MIN	54	81	126	72	165	165	318	102	33	26	.00	.00
AC-FT	5400	6390	10840	13790	11790	31910	45670	11690	6480	8900	723	709

CAL YR 1987 TOTAL 145370.6 MEAN 398 MAX 10100 MIN 3.9 AC-FT 288300  
WTR YR 1988 TOTAL 77787.76 MEAN 213 MAX 2960 MIN .00 AC-FT 154300

e Estimated

## ARKANSAS RIVER BASIN

07159100 CIMARRON RIVER NEAR DOVER, OK

LOCATION.--Lat 35°57'06", long 97°54'51", in SW 1/4 NE 1/4 sec.14, T.17 N., R.7 W., Kingfisher County, Hydrologic Unit 11050002, near right bank on downstream bridge on U.S. Highway 81, 1.0 mi downstream from Turkey Creek, 2.0 mi south of Dover, 2.5 mi upstream from Kingfisher Creek, and at mile 160.6.

DRAINAGE AREA.--15,713 mi<sup>2</sup>, of which 4,926 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--October 1973 to current year.

GAGE.--Water-stage recorder. Datum of gage is 999.19 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. U.S. Army Corps of Engineers' telemeter at station.

AVERAGE DISCHARGE.--15 years, 892 ft<sup>3</sup>/s, 646,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 123,000 ft<sup>3</sup>/s, Oct. 3, 1986, gage height, 26.10 ft from high-water mark (HWM); minimum daily, 4.3 ft<sup>3</sup>/s, Sept. 23, 1980.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 12,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Mar. 3	0800	16,800	17.56	Sept. 19	1830	17,100	17.61
Apr. 2	0945	*19,100	*17.93				

Minimum daily discharge, 30 ft<sup>3</sup>/s, Sept. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1490	267	333	690	734	433	6160	e2100	1000	864	105	47
2	881	264	333	e660	690	587	16500	e1950	e2500	660	71	46
3	648	256	333	e640	662	10200	13200	e1850	e1600	412	77	45
4	522	255	333	e610	642	11200	7620	e1700	e1200	809	111	40
5	446	255	333	587	612	9070	5020	e1600	e1000	401	102	38
6	394	249	323	e540	581	10100	4090	e1500	e820	365	97	37
7	355	250	322	e520	527	8230	3430	e1400	e710	284	92	35
8	330	250	317	e500	558	9070	3060	e1350	e640	248	88	34
9	312	246	313	e470	554	7860	2820	e1280	e580	219	82	33
10	293	239	310	e450	541	4550	2710	e1150	e490	192	79	34
11	278	238	308	e440	486	3470	2600	e1100	e450	182	72	33
12	276	238	308	e450	402	2990	2500	e1000	e420	251	70	32
13	278	238	306	e445	667	2700	2320	e970	e380	284	67	30
14	273	246	349	e500	572	2500	2230	e920	e360	244	64	31
15	259	296	375	e540	586	2340	2160	e890	e340	182	61	36
16	257	303	375	e600	609	2240	2080	e880	e330	154	58	293
17	255	283	374	e670	608	2260	2040	e830	320	163	55	234
18	255	277	446	e1500	603	2380	2210	e790	333	151	54	2340
19	251	274	515	e5000	583	2400	3570	e760	338	208	68	15000
20	255	272	2370	4420	545	2440	6670	e740	329	854	61	6560
21	253	274	2730	2740	521	2950	3990	e850	311	550	56	984
22	244	274	1790	1700	505	3830	3320	1100	296	376	54	336
23	249	272	1230	1310	479	3250	2770	893	281	468	47	181
24	250	269	1060	1130	463	2740	2430	826	272	339	42	134
25	255	268	972	1000	458	2460	2670	804	272	267	70	108
26	257	272	929	913	448	2270	5200	729	272	227	59	100
27	254	283	846	863	448	2140	5400	678	288	232	47	86
28	250	305	801	831	439	2040	3110	632	549	793	58	67
29	250	319	754	823	428	2050	e2400	580	625	625	67	58
30	252	324	720	790	---	1920	e2250	551	445	347	61	53
31	282	---	718	769	---	1880	---	525	---	153	53	---
TOTAL	11104	8056	21526	33101	15951	124550	126530	32928	17751	11504	2148	27085
MEAN	358	269	694	1068	550	4018	4218	1062	592	371	69.3	903
MAX	1490	324	2730	5000	734	11200	16500	2100	2500	864	111	15000
MIN	244	238	306	440	402	433	2040	525	272	151	42	30
AC-FT	22020	15980	42700	65660	31640	247000	251000	65310	35210	22820	4260	53720

CAL YR 1987 TOTAL 656132 MEAN 1798 MAX 34100 MIN 238 AC-FT 1301000  
WTR YR 1988 TOTAL 432234 MEAN 1181 MAX 16500 MIN 30 AC-FT 857300

e Estimated



## ARKANSAS RIVER BASIN

07159720 COTTONWOOD CREEK NEAR NAVINA, OK

LOCATION.--Lat 35°46'36", long 97°32'45", SW 1/4 NW 1/4 sec.17, T.15 N., R.4 W., Logan County, Hydrologic Unit 11050002 on downstream right bank, 0.5 mi downstream from Deer Creek, 1.7 mi southeast of Navina, 10.7 mi southwest of Guthrie, and at mile 25.0.

DRAINAGE AREA.--247 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1977 to September 1980, March 1982 to current year.

GAGE.--Water-stage recorder. Datum of gage is 962.10 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair. Low flow sustained in part by sewage effluent.

AVERAGE DISCHARGE.--9 years (water years 1978-80, 1983-88), 132 ft<sup>3</sup>/s, 95,630 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 32,500 ft<sup>3</sup>/s, May 28, 1987, gage height, 24.64 ft, from high-water mark (HWM), from slope-area measurement; minimum daily discharge, 8.0 ft<sup>3</sup>/s, Oct. 14, 15, 1977.

EXTREMES FOR CURRENT PERIOD.--Peak discharges greater than base discharge of 2,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Mar. 3	1400	*2,710	*20.53	Apr. 1	2400	2,470	20.32

Minimum daily discharge, 19 ft<sup>3</sup>/s, Aug. 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	44	e60	58	88	83	51	1450	107	87	47	25	25
2	40	e50	56	75	73	238	2010	91	72	53	23	22
3	35	48	44	78	70	2380	603	84	49	44	21	40
4	34	43	44	97	70	1140	436	80	47	37	22	43
5	34	38	43	87	70	577	376	73	45	34	23	30
6	34	35	49	63	61	554	334	76	43	30	49	28
7	32	36	47	74	69	361	254	77	39	27	32	25
8	31	49	45	94	74	249	187	77	36	26	30	24
9	32	43	43	88	69	195	145	66	36	25	26	24
10	31	42	43	76	70	171	636	59	33	26	97	22
11	30	40	43	77	64	147	382	55	32	25	44	21
12	31	35	43	80	63	118	225	53	31	25	31	22
13	32	32	43	105	69	103	172	51	31	24	26	21
14	e30	33	45	96	70	97	148	51	29	25	25	21
15	e27	47	59	93	68	97	130	53	29	25	24	27
16	e26	117	76	439	62	96	115	51	35	23	23	45
17	e26	82	81	814	59	107	152	64	31	22	20	43
18	e25	55	86	339	58	178	1050	52	30	35	21	143
19	e25	59	214	272	68	122	339	48	30	47	22	265
20	e25	67	713	218	73	107	222	46	27	35	31	82
21	e25	53	240	147	66	101	180	42	27	25	61	47
22	e27	51	133	116	61	98	153	42	26	22	40	40
23	e27	54	98	103	57	95	129	42	27	21	28	59
24	e26	47	92	99	50	92	113	46	26	21	24	160
25	e26	65	83	95	50	90	120	47	25	20	23	53
26	e25	86	95	91	49	81	125	47	25	20	22	42
27	e25	62	99	89	50	78	105	47	33	30	19	34
28	e24	64	111	86	51	76	95	46	44	48	22	29
29	e24	67	97	87	50	194	94	45	163	42	36	71
30	e28	56	89	88	---	123	101	42	62	38	29	48
31	e80	---	94	88	---	93	---	44	---	29	30	---
TOTAL	961	1616	3106	4442	1847	8209	10581	1804	1250	951	949	1556
MEAN	31.0	53.9	100	143	63.7	265	353	58.2	41.7	30.7	30.6	51.9
MAX	80	117	713	814	83	2380	2010	107	163	53	97	265
MIN	24	32	43	63	49	51	94	42	25	20	19	21
AC-FT	1910	3210	6160	8810	3660	16280	20990	3580	2480	1890	1880	3090

CAL YR 1987 TOTAL 71394 MEAN 196 MAX 6980 MIN 24 AC-FT 141600  
WTR YR 1988 TOTAL 37272 MEAN 102 MAX 2380 MIN 19 AC-FT 73930

e Estimated

## ARKANSAS RIVER BASIN

61

07159720 COTTONWOOD CREEK NEAR NAVINA, OK--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1978 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1977 to November 1980.

WATER TEMPERATURE: October 1977 to November 1980.

REMARKS.--Samples collected bimonthly. Specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	TUR- BID- ITY (NTU)
NOV										
03...	1130	1028	80020	6.34	47	1040	7.40	20.5	19.0	21
JAN										
27...	1300	1028	80020	7.20	90	1120	7.90	11.0	5.0	12
MAR										
21...	1500	1028	80020	7.71	100	1160	7.60	24.0	15.0	24
MAY										
25...	1700	1028	80020	6.62	46	1200	--	26.0	22.5	27
JUL										
26...	1600	1028	80020	5.63	22	1280	8.00	33.0	29.0	41
SEP										
28...	1100	1028	80020	5.90	30	1020	7.60	22.0	21.0	53
DATE	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	HARD- NESS TOTAL (MG/L AS CAC03)	HARD- NESS NONCARB WH WAT TOT FLD (MG/L AS CAC03)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD- SORP- TION RATIO
NOV										
03...	740	7.5	84	300	110	73	29	91	39	2
JAN										
27...	750	11.7	93	410	130	95	41	100	35	2
MAR										
21...	740	7.7	79	390	120	90	40	100	36	2
MAY										
25...	735	7.2	87	420	140	96	44	120	38	3
JUL										
26...	730	7.8	107	290	120	68	28	140	51	4
SEP										
28...	730	6.7	79	260	110	61	27	100	44	3
DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH IT FIELD (MG/L AS HC03)	CAR- BONATE WATER WH IT FIELD (MG/L AS C03)	ALKA- LINITY WAT WH TOT IT (MG/L AS CAC03)	SULFATE DIS- SOLVED (MG/L AS S04)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTITU- ENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)
NOV										
03...	6.5	237	0	194	170	93	628	581	0.85	80.5
JAN										
27...	4.8	320	0	262	160	110	739	674	1.01	179
MAR										
21...	4.2	293	0	240	190	100	734	688	1.0	198
MAY										
25...	5.8	--	--	280	220	120	733	775	1.0	91.0
JUL										
26...	10	--	--	--	200	150	763	694	1.04	44.7
SEP										
28...	6.9	181	0	148	160	110	598	560	0.81	47.8

## 07160000 CIMARRON RIVER NEAR GUTHRIE, OK

LOCATION.--Lat 35°55'07", long 97°25'34", near center of east line of sec.29, T.17 N., R.2 W, Logan County, Hydrologic Unit 11050002, on downstream side left bank of State Highway 77 bridge, 1.6 mi downstream from Cottonwood Creek, 2.5 mi north of Guthrie, 6.1 mi upstream from Skeleton Creek, and at mile 122.4.

DRAINAGE AREA.--16,892 mi<sup>2</sup>, of which 4,926 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--October 1937 to September 1976, October 1983 to current year. Monthly discharge only for some periods, published in WSP's 1311 and 1731.

REVISED RECORDS.--WSP 1341: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 896.50 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers' bench mark). Prior to Mar. 19, 1939, nonrecording gage at railway bridge 1,200 ft upstream at datum 4.00 ft higher. From Mar. 19, 1939 to Sept. 30, 1976, recording gage 125 ft upstream from railway bridge at datum 4.00 ft higher. From Sept. 14, 1967 to Sept. 30, 1976, supplementary water-stage recorder at present site and datum.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--44 years (water years 1938-76, 1984-88), 973 ft<sup>3</sup>/s, 704,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 158,000 ft<sup>3</sup>/s, May 17, 1957, gage height, 18.58 ft, site and datum then in use; minimum discharge, 0.1 ft<sup>3</sup>/s, Nov. 2, 1939.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 16,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Mar. 3	2230	*28,900	*11.84	Sept. 19	2200	27,100	11.56
Apr. 2	1500	28,200	11.73				

Minimum daily discharge, 88 ft<sup>3</sup>/s, Sept. 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2070	478	414	986	1000	840	9690	e2100	580	677	e280	134
2	1320	456	420	968	972	1670	26200	e1950	4070	748	e230	124
3	923	393	417	956	938	14900	14800	e1800	2470	759	e190	297
4	769	376	409	935	908	18300	9870	e1600	1620	602	e200	223
5	e670	367	402	e910	882	9570	5980	e1400	1280	838	e230	206
6	e600	365	403	e870	856	10100	4790	e1200	1030	e730	e200	157
7	e520	365	393	e840	833	9150	3850	e1090	880	e400	e180	134
8	e475	365	386	e760	814	7230	2970	e1000	783	e360	e160	117
9	e445	360	380	e850	e780	7670	2670	987	711	e320	e140	106
10	e425	357	375	e870	e760	5410	2880	942	663	e300	e150	100
11	e400	e350	373	e890	e750	3430	3050	881	578	e285	e140	96
12	e385	e348	372	e900	e740	e2800	2500	850	e500	e260	e130	93
13	e370	e342	373	e830	e730	e2500	2210	802	e470	e290	e125	89
14	e370	e340	405	e880	e720	e2400	2190	759	430	e310	e120	88
15	e380	399	424	934	e710	e2300	e2110	731	432	e280	e115	98
16	e370	519	431	1260	e700	e2300	e2060	715	409	e260	e112	249
17	e365	704	440	5370	e690	e2250	e2020	701	410	e235	e110	403
18	e360	478	466	8070	798	e2300	3660	691	427	e230	e109	1190
19	e358	425	691	4490	831	e2200	3470	690	413	e225	e108	18900
20	e357	409	3340	5660	824	e2180	3470	684	395	279	e120	18800
21	357	398	5490	3820	e790	1970	4510	655	376	626	e115	4710
22	347	378	2720	2900	e760	2040	2930	647	346	775	e110	2210
23	345	369	1760	2090	e750	2540	2650	881	e330	593	e108	1570
24	352	386	1360	1690	e730	2280	2400	807	e310	509	e104	1340
25	365	381	1220	1470	e710	1970	2350	726	e300	471	e100	1260
26	365	393	1150	1320	e700	1830	2670	709	e290	422	e120	943
27	357	419	1120	1200	e695	1680	4270	654	e280	524	e112	818
28	352	403	1070	1110	e690	1580	3420	604	327	610	e150	744
29	341	414	1040	1060	682	1980	2650	552	949	699	e160	674
30	342	423	1020	1050	---	1900	e2300	503	924	726	151	769
31	426	---	1010	1020	---	1780	---	482	---	676	146	---
TOTAL	15881	12160	30274	56959	22743	131050	140590	28793	22983	15019	4525	56642
MEAN	512	405	977	1837	784	4227	4686	929	766	484	146	1888
MAX	2070	704	5490	8070	1000	18300	26200	2100	4070	838	280	18900
MIN	341	340	372	760	682	840	2020	482	280	225	100	88
AC-FT	31500	24120	60050	113000	45110	259900	278900	57110	45590	29790	8980	112300

CAL YR 1987 TOTAL 894880 MEAN 2452 MAX 41000 MIN 340 AC-FT 1775000  
WTR YR 1988 TOTAL 537619 MEAN 1469 MAX 26200 MIN 88 AC-FT 1066000

e Estimated

## ARKANSAS RIVER BASIN

07160500 SKELETON CREEK NEAR LOVELL, OK

LOCATION.--Lat 36°03'36", long 97°35'05", in NW 1/4 SW 1/4 sec.1, T.18 N., R.4 W., Logan County, Hydrologic Unit 11050002, near right bank on downstream side of pier of bridge on State Highway 74, 2 mi upstream from Otter Creek, 2.8 mi east of Lovell, and at mile 14.6.

DRAINAGE AREA.--410 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1949 to current year.

GAGE.--Water-stage recorder. Datum of gage is 909.76 ft above National Geodetic Vertical Datum of 1929 (Oklahoma State Highway Department datum). Prior to Dec. 5, 1949, nonrecording gage at site 60 ft downstream at datum 4.70 ft higher. Prior to Oct. 1, 1979, gage at present site and datum 5.00 ft higher.

REMARKS.--Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office.

AVERAGE DISCHARGE.--39 years, 131 ft<sup>3</sup>/s, 94,910 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 75,200 ft<sup>3</sup>/s, May 16, 1957, gage height, 34.58 ft, at datum then in use; no flow at times in 1953-54, 1956.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,300 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Dec. 20	2015	3,060	20.66	Apr. 19	0215	2,420	18.21
Mar. 4	1300	3,850	23.14	Sept. 19	2030	*11,000	*32.19
Apr. 2	1230	8,280	30.76				

Minimum daily discharge, 9.2 ft<sup>3</sup>/s, Sept. 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	217	47	55	163	152	56	4820	326	e1000	42	e50	14
2	127	60	47	127	130	443	7670	233	e3000	364	e46	13
3	87	52	43	e110	118	1420	2500	208	e1000	142	e39	15
4	69	49	45	e104	117	1790	504	199	e180	82	e33	15
5	61	33	42	e110	112	1040	369	177	e60	71	e30	14
6	60	27	42	e118	92	1640	290	168	e45	67	e46	17
7	44	24	37	126	91	932	245	162	e40	66	e30	16
8	47	23	36	134	e89	490	223	158	e38	70	e26	e14
9	43	35	31	161	e86	350	223	144	e36	83	e26	e13
10	42	33	33	135	e84	293	273	131	e36	136	e25	e11
11	40	37	33	126	e80	259	213	122	e33	90	e26	e10
12	36	36	32	e112	e94	226	176	115	e30	76	e26	e9.8
13	33	34	30	e108	119	196	164	111	e26	144	e25	e9.4
14	36	32	32	e102	108	183	154	108	25	78	e20	e9.2
15	29	235	65	131	108	176	145	98	24	69	e19	e10
16	31	732	66	762	102	168	130	91	25	70	e18	12
17	30	232	64	1800	87	194	331	86	132	67	e17	153
18	31	105	79	1290	82	299	1850	80	103	65	e17	295
19	49	68	587	1170	89	426	1520	74	38	78	e18	5530
20	32	57	2520	877	88	390	411	72	21	894	e20	5610
21	30	58	828	354	82	331	310	65	18	554	e18	627
22	25	56	384	264	81	237	271	163	15	152	e16	164
23	30	51	267	234	74	199	241	87	14	107	e16	108
24	69	157	218	220	65	186	216	74	13	77	e15	98
25	61	89	212	209	62	165	362	62	12	74	e15	89
26	44	81	217	181	62	149	682	e56	11	74	14	75
27	37	57	193	161	68	139	330	e52	12	90	16	57
28	38	71	191	152	70	179	245	e51	13	550	19	52
29	40	106	174	155	62	311	231	e50	63	324	17	41
30	32	76	155	166	---	191	303	e48	17	e120	18	36
31	31	---	179	167	---	249	---	e46	---	e68	14	---
TOTAL	1581	2753	6937	10029	2654	13307	25402	3617	6080	4944	735	13137.4
MEAN	51.0	91.8	224	324	91.5	429	847	117	203	159	23.7	438
MAX	217	732	2520	1800	152	1790	7670	326	3000	894	50	5610
MIN	25	23	30	102	62	56	130	46	11	42	14	9.2
AC-FT	3140	5460	13760	19890	5260	26390	50380	7170	12060	9810	1460	26060

CAL YR 1987 TOTAL 92118 MEAN 252 MAX 6800 MIN 18 AC-FT 182700  
WTR YR 1988 TOTAL 91176.4 MEAN 249 MAX 7670 MIN 9.2 AC-FT 180800

e Estimated



## 07161000 CIMARRON RIVER AT PERKINS, OK

LOCATION.--Lat 35°57'32", long 97°01'49", in SW 1/4 SW 1/4 sec.7, T.17 N., R.3 E., Payne County, Hydrologic Unit 11050003, on right bank at downstream side of bridge on U.S. Highway 177, 1.0 mi south of Perkins, 1.5 mi upstream from Dugout Creek, 4.0 mi downstream from Wildhorse Creek, and at mile 87.3.  
DRAINAGE AREA.--17,852 mi<sup>2</sup> of which 4,962 mi<sup>2</sup> is probably noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1939 to current year. Monthly discharge only for some periods, published in WSP 1311.

Gage-height records collected at same site since 1927 are contained in reports of National Weather Service.

REVISED RECORDS.--WSP 1341: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 814.88 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to June 26, 1940 and Jan. 9 to Apr. 7, 1957, nonrecording gage at same site and datum 5.00 ft higher. Prior to Oct. 1, 1977, at same site and datum 5.00 ft higher.

REMARKS.--Records fair. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--49 years, 1,300 ft<sup>3</sup>/s, 941,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 162,000 ft<sup>3</sup>/s, Oct. 4, 1986, gage height, 26.75 ft, from floodmark; minimum discharge, 0.8 ft<sup>3</sup>/s, Dec. 8, 1954.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Oct. 4, 5, 1926, reached a stage of 17.0 ft from floodmarks,

information provided by U.S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 16,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Mar. 4	unknown	46,900	18.08	Sept. 20	1300	32,600	16.86
Apr. 2	unknown	*52,700	*18.50				

Minimum daily discharge, 104 ft<sup>3</sup>/s, Sept. 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4350	e580	e700	e1260	1050	e900	e17800	e1750	e530	1070	440	e176
2	2110	724	e685	e1230	e1000	e2710	e48100	e1680	e920	802	355	e175
3	1500	752	e690	e1210	e950	e23700	e34000	e1620	3950	968	284	e165
4	e1210	e560	e700	e1180	e950	e36000	e14100	e1500	1790	800	253	e159
5	e1030	e502	e710	e1300	e930	e12600	e9900	e1400	1420	595	264	e210
6	e880	e468	e708	e1420	e930	e11800	e7510	e1290	1210	710	295	e185
7	e800	e450	e715	1550	e910	e10900	e5970	e1190	1030	595	234	e165
8	e710	e458	e720	e1520	e900	e9100	e4790	e1120	923	465	218	e147
9	e645	e445	723	e1520	e900	e8870	e9330	e1080	842	396	203	e135
10	e595	e430	720	e1730	e920	e8240	e4470	e990	784	368	186	e124
11	e555	e425	e698	1990	e920	e5500	e4650	e980	743	366	188	e118
12	e520	e422	e678	1960	e910	e4100	e3910	e965	698	357	185	e111
13	e490	e420	e670	1820	e870	e3310	e2830	e895	662	344	181	e108
14	e465	e428	e685	1730	e850	e2810	e2290	e875	645	351	178	104
15	e447	612	759	1760	e900	e2420	e2080	e820	628	427	175	e135
16	e432	1150	852	1850	e890	e2170	e1750	e925	672	394	172	e270
17	e424	1550	865	5460	e880	e2190	e1720	e800	658	e368	169	e240
18	e427	1220	905	12700	e890	e2200	e5450	e770	684	e343	167	e415
19	e430	e882	1040	9330	e900	e2290	e9600	e750	752	e328	171	10300
20	e421	e718	4510	8090	e890	e2530	e5410	e725	e610	e350	185	24000
21	e408	e628	9030	7600	e880	e2470	e4640	e710	e558	1010	186	10400
22	e393	e583	5100	4870	e860	2390	e4520	e695	e535	914	191	4200
23	e390	e572	2620	3420	e850	e2720	e2930	e710	e510	518	204	2460
24	e409	e568	1860	e2260	e840	e3290	e2260	e795	e475	365	197	1720
25	e422	680	1580	e1950	e830	e2570	e1810	e750	e460	352	180	1390
26	e453	e698	1510	e1700	e820	e2070	e1630	e730	e433	329	174	1230
27	e488	e660	1460	e1450	e810	e1740	e2350	e680	e410	325	167	1000
28	e479	e689	1480	e1300	e810	e2390	e4810	e640	e405	422	201	892
29	e467	e660	1360	e1150	e810	e4980	e3280	e610	470	489	195	1040
30	e460	e680	1310	e1100	---	e3590	e1980	e585	1160	533	176	743
31	e485	---	e1290	e1100	---	e2720	---	e550	---	490	e170	---
TOTAL	23295	19614	47333	88510	25850	185270	220470	29580	25567	16144	6544	62517
MEAN	751	654	1527	2855	891	5976	7349	954	852	521	211	2084
MAX	4350	1550	9030	12700	1050	36000	48100	1750	3950	1070	440	24000
MIN	390	420	670	1100	810	900	1630	550	405	325	167	104
AC-FT	46210	38900	93880	175600	51270	367500	437300	58670	50710	32020	12980	124000

CAL YR 1987 TOTAL 1110027 MEAN 3041 MAX 60300 MIN 375 AC-FT 2202000  
WTR YR 1988 TOTAL 750694 MEAN 2051 MAX 48100 MIN 104 AC-FT 1489000

e Estimated

## ARKANSAS RIVER BASIN

65

07161000 CIMARRON RIVER AT PERKINS, OK--Continued  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1950, 1953-63, 1965 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1952 to September 1963, June 1965 to January 1982.

WATER TEMPERATURE: October 1962 to September 1963, June 1965 to January 1982.

INSTRUMENTATION.--Water-quality monitor from April 1969 to September 1980.

REMARKS.--Samples were collected bimonthly and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	TUR- BID- ITY (NTU)	BARO- METRIC PRES- SURE (MM OF HG)
DEC 09...	1300	1028	80020	8.33	726	9130	--	19.0	11.0	5.5	741
FEB 01...	1530	1028	80020	8.70	1010	6310	8.40	10.0	8.0	26	729
MAR 22...	1500	1028	80020	10.20	3350	*4700	8.30	20.0	14.0	65	729
JUN 03...	1400	1028	1028	11.77	3850	1550	8.00	31.0	25.5	--	--
JUL 12...	1200	1028	80020	8.69	374	5970	8.60	32.0	29.0	27	740
AUG 22...	1020	1028	80020	8.13	189	5420	8.20	34.5	29.0	50	740
DATE	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD- NESS TOTAL (MG/L AS CACO3)	HARD- NESS NONCARB WH WAT TOT FLD (MG/L AS CACO3)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD- SORP- TION RATIO
DEC 09...	9.1	88	--	--	--	--	--	--	--	--	--
FEB 01...	11.1	100	190	250	710	440	180	64	1200	78	20
MAR 22...	9.6	97	200	170	760	510	190	69	740	68	12
JUN 03...	--	--	--	--	--	--	--	--	--	--	--
JUL 12...	--	--	89	36	540	390	130	53	1000	80	19
AUG 22...	--	--	K6	160	470	320	100	54	990	82	20
DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH FET FIELD (MG/L AS HCO3)	CAR- BONATE WATER WH FET FIELD (MG/L AS CO3)	ALKA- LINITY WAT WH TOT FET FIELD (MG/L AS CACO3)	CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SI02)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTITU- ENTS, DIS- SOLVED (MG/L)
DEC 09...	6.5	--	--	--	--	500	2700	0.40	--	5400	--
FEB 01...	6.1	340	2	278	2.1	490	1800	0.40	14	4250	3930
MAR 22...	4.9	320	0	262	2.4	550	860	0.40	12	2880	2580
JUN 03...	--	--	--	--	--	--	--	--	--	--	--
JUL 12...	6.9	160	14	154	0.7	480	1400	0.30	12	3440	3200
AUG 22...	5.9	190	0	156	1.9	410	1400	0.40	5.5	3240	3060

\*SPECIFIC CONDUCTANCE, LAB (US/CM)

## 07161000 CIMARRON RIVER AT PERKINS, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS NO2)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N)
DEC 09...	--	--	--	--	--	--	0.040	--	--	0.36
FEB 01...	5.78	11600	1.75	0.050	0.16	1.80	0.130	0.170	0.22	0.37
MAR 22...	3.92	26000	1.09	0.010	0.03	1.10	0.040	<0.010	--	0.66
JUN 03...	--	--	--	--	--	--	--	--	--	--
JUL 12...	4.68	3470	--	<0.010	--	<0.100	0.100	0.070	0.09	0.80
AUG 22...	4.41	1650	--	0.020	0.07	<0.100	0.030	0.290	0.37	1.2
DATE	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS- PHOROUS TOTAL (MG/L AS P)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4)	PHOS- PHOROUS ORGANIC TOTAL (MG/L AS P)	PHOS- PHOROUS ORGANIC DIS- SOLVED (MG/L AS P)	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)
DEC 09...	0.40	0.270	--	--	--	0.27	--	<10	3	--
FEB 01...	0.50	0.190	0.180	0.160	0.49	0.19	0.02	--	--	--
MAR 22...	0.70	0.130	0.110	0.070	0.21	0.13	0.04	40	3	180
JUN 03...	--	--	--	--	--	--	--	--	--	--
JUL 12...	0.90	0.250	0.020	<0.010	--	0.25	0.02	--	--	--
AUG 22...	1.2	0.370	0.070	0.060	0.18	0.37	0.01	10	6	140
DATE	BERYL- LIUM, DIS- SOLVED (UG/L AS BE)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY DIS- SOLVED (UG/L AS HG)
DEC 09...	--	--	2	--	3	--	<5	--	--	0.1
FEB 01...	--	--	--	--	--	--	--	--	--	--
MAR 22...	<2	<3	2	<9	2	57	<5	50	11	0.2
JUN 03...	--	--	--	--	--	--	--	--	--	--
JUL 12...	--	--	--	--	--	--	--	--	--	--
AUG 22...	<0.5	2	2	<3	1	17	<5	35	29	<0.1
DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V)	ZINC, DIS- SOLVED (UG/L AS ZN)	SEDI- MENT, SUS- PENDED (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
DEC 09...	--	<1	2	<1.0	--	--	--	22	43	39
FEB 01...	--	--	--	--	--	--	--	126	344	74
MAR 22...	<30	2	2	<1.0	2100	<18	<9	--	--	--
JUN 03...	--	--	--	--	--	--	--	--	--	--
JUL 12...	--	--	--	--	--	--	--	68	69	95
AUG 22...	<10	3	1	1.0	1600	10	32	78	40	64

## ARKANSAS RIVER BASIN

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07161450 CIMARRON RIVER NEAR RIPLEY, OK

LOCATION.--Lat 35°59'09", long 96°54'43", in SE 1/4 SE 1/4 sec.31, T.18 N., R.4 E., Payne County, Hydrologic Unit 11050003, on right bank at downstream side of bridge on State Highway 33, 2.2 mi upstream from Stillwater Creek, 2.5 mi south of Ripley, 2.8 mi downstream from Sand Creek, 7.0 mi east of Perkins, and at mile 79.2.

DRAINAGE AREA.--17,979 mi<sup>2</sup> of which 4,962 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--October 1987 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 795.86 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. U.S. Army Corps of Engineers' satellite telemeter at station.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 52,000 ft<sup>3</sup>/s, Apr. 2, gage height, 20.42 ft; minimum daily discharge, 127 ft<sup>3</sup>/s, Sept. 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5910	702	738	1790	1120	867	17900	1810	585	1240	585	174
2	3170	739	714	1620	1080	2680	48400	1760	804	878	444	173
3	2100	756	717	1500	1050	23700	34400	1690	4700	1060	368	168
4	1510	610	721	1410	1040	36100	14500	1580	2410	1080	319	162
5	1220	534	701	1490	1020	12600	10000	1460	2140	732	285	221
6	1010	485	706	1800	1020	12000	7630	1350	1820	870	326	188
7	941	470	704	2820	1000	11900	6200	1270	1470	855	279	169
8	765	480	708	2830	978	9130	5080	1220	1280	662	258	151
9	699	457	701	2740	964	9000	4260	1160	1150	547	253	145
10	635	446	697	3050	979	8440	4560	1060	1060	479	253	142
11	587	449	693	3360	977	5690	4510	1070	988	451	228	137
12	556	447	681	3520	962	4170	3760	1010	918	432	235	132
13	521	442	664	3290	935	3350	2750	970	860	395	242	129
14	491	441	740	3120	911	2850	2180	925	810	369	209	127
15	474	481	805	2920	962	2470	1880	885	763	456	196	146
16	467	1060	866	3490	956	2210	1750	1020	792	422	184	289
17	446	1930	877	5730	946	2150	1770	844	733	378	176	245
18	435	1470	870	12200	954	2200	5430	809	729	349	168	421
19	442	938	1260	9400	962	2410	9580	779	813	334	170	10100
20	440	749	4730	7830	955	2600	5450	749	708	350	166	34700
21	433	656	10500	7730	947	2540	4700	730	663	1340	165	15800
22	408	629	7870	4930	926	2380	4570	710	627	1890	185	7380
23	413	593	4710	3480	901	2780	2980	757	602	1080	186	5020
24	427	588	3290	2480	894	3340	2300	847	569	687	183	3690
25	441	705	2690	2010	885	2630	1870	818	548	592	171	e2500
26	512	793	2520	1740	874	2130	1770	734	531	557	162	e1790
27	520	698	2480	1530	868	1800	3300	718	514	551	152	e1540
28	503	744	2580	1350	861	2440	4850	681	506	839	174	e1370
29	497	700	2200	1230	861	5020	3330	645	578	876	187	e1810
30	482	724	1940	1160	---	3620	2030	618	1110	956	175	e1050
31	633	---	1860	1160	---	2760	---	593	---	843	168	---
TOTAL	28088	20916	61933	104710	27788	187957	223690	31272	31781	22550	7252	90069
MEAN	906	697	1998	3378	958	6063	7456	1009	1059	727	234	3002
MAX	5910	1930	10500	12200	1120	36100	48400	1810	4700	1890	585	34700
MIN	408	441	664	1160	861	867	1750	593	506	334	152	127
AC-FT	55710	41490	122800	207700	55120	372800	443700	62030	63040	44730	14380	178700

WTR YR 1988 TOTAL 838006 MEAN 2290 MAX 48400 MIN 127 AC-FT 1662000

e Estimated



## 07163000 COUNCIL CREEK NEAR STILLWATER, OK

LOCATION.--Lat 36°06'58", Long 96°52'03", in NE 1/4 NW 1/4 sec.22, T.19 N., R.4 E., Payne County, Hydrologic Unit 11050003, on right bank downstream side of bridge on State Highway 51, 10.0 mi east of Stillwater, and at mile 10.0.

DRAINAGE AREA.--31 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1934 to current year.

REVISED RECORDS.--WSP 1211: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 828.28 ft above National Geodetic Vertical Datum of 1929.

Prior to May 4, 1934, nonrecording gage at same site and datum. Prior to Nov. 9, 1982, gage 200 ft upstream at 10.00 ft higher datum.

REMARKS.--Records poor. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office.

AVERAGE DISCHARGE.--54 years, 11.8 ft<sup>3</sup>/s, 5.17 in/yr, 8,549 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 25,000 ft<sup>3</sup>/s, Oct. 2, 1959, gage height, 28.9 ft, present datum, from floodmarks, from rating curve extended above 2,500 ft<sup>3</sup>/s on basis of slope-area measurements at gage heights 13.4 ft and 17.5 ft; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 27, 1912, reached a stage of 16.6 ft at gage, based on floodmarks set by local resident at site 900 ft downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Apr. 1	0345	*3,490	*18.99	No other peak greater than base discharge.			
No flow, Aug. 5-Sept. 15.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e1.7	e4.5	.37	e1.2	e.50	e1.9	1430	9.4	2.9	.50	.13	.00
2	e2.0	e3.4	e.36	e1.1	1.6	e9.6	113	9.2	10	.43	.09	.00
3	e2.0	e3.0	e.35	e.96	1.6	e44	39	8.6	12	.46	.06	.00
4	e1.8	e2.6	e.34	e.87	1.7	e76	27	8.4	rr 3.6	.46	.03	.00
5	e1.8	e2.3	e.33	e.80	1.5	e96	21	8.6	2.7	.43	.0	.00
6	e1.8	e2.0	e.32	e1.3	1.3	e61	16	8.4	2.4	.37	.00	.00
7	e1.8	e1.8	e.31	e1.9	1.4	e15	15	9.0	2.2	.27	.00	.00
8	e2.0	e1.7	e.42	e1.4	1.5	e28	14	10	2.2	.24	.00	.00
9	e2.0	e1.7	e.47	e1.2	1.7	e17	13	7.9	2.0	.25	.00	.00
10	e2.0	e1.5	.54	e1.0	1.7	e12	141	6.8	1.7	.29	.00	.00
11	e2.0	e1.3	.54	e.92	1.4	e9.6	30	6.5	1.7	.30	.00	.00
12	e2.0	e1.2	e.49	e.84	e1.3	e8.0	18	6.4	1.7	.23	.00	.00
13	e2.0	e1.1	e.44	e.81	e1.2	e6.4	14	6.3	1.6	.21	.00	.00
14	e2.0	e1.0	e.41	e1.3	e1.1	e5.6	13	6.4	1.6	.20	.00	.00
15	e2.2	e.96	e.60	e1.1	e1.2	e4.9	11	6.3	1.4	.18	.00	.00
16	e2.1	e.98	e.49	e.96	e1.1	e6.4	10	6.8	1.4	.15	.00	41
17	e2.0	e.99	e.42	e.92	e1.1	e7.9	157	6.5	1.4	.14	.00	1.5
18	e1.9	e.87	e.35	e.86	e1.2	e6.7	202	5.7	1.4	.12	.00	72
19	e2.0	e.80	e.33	e.81	e3.5	e5.6	34	5.1	1.3	.11	.00	188
20	e2.0	e.75	e3.0	e.77	e3.0	e4.6	22	6.7	1.2	.12	.00	4.2
21	e1.9	e.71	e2.4	e.73	e2.6	e3.7	18	13	1.1	.15	.00	1.4
22	e1.8	e.64	e2.0	e.69	e2.4	e3.4	15	5.6	1.0	.18	.00	1.1
23	e1.9	e.60	e1.5	e.66	e2.3	e3.0	12	9.3	.90	.15	.00	5.0
24	e1.9	e.63	e1.1	e.63	e2.2	2.6	11	24	.84	.12	.00	14
25	e1.9	.50	e3.1	e.62	e2.2	1.7	11	6.8	.76	.08	.00	1.6
26	e2.0	.40	e5.6	e.60	e2.1	1.4	10	4.3	.76	.06	.00	1.1
27	e2.0	.44	e8.4	e.57	e2.0	1.4	9.6	3.6	.68	.08	.00	1.0
28	e1.8	.57	e5.2	e.56	e2.0	1.8	9.3	3.3	.69	.18	.00	2.6
29	e1.7	.52	e2.4	e.54	e1.9	71	9.2	3.2	.72	.26	.00	24
30	e1.7	.45	e1.9	e.52	---	18	9.5	3.0	.59	.24	.00	1.6
31	e7.2	---	e1.5	e.51	---	108	---	2.9	---	.18	.00	---
TOTAL	64.9	39.91	45.98	27.65	50.30	642.2	2454.6	228.0	64.44	7.14	0.31	360.10
MEAN	2.09	1.33	1.48	.89	1.73	20.7	81.8	7.35	2.15	.23	.010	12.0
MAX	7.2	4.5	8.4	1.9	3.5	108	1430	24	12	.50	.13	188
MIN	1.7	.40	.31	.51	.50	1.4	9.2	2.9	.59	.06	.00	.00
AC-FT	129	79	91	55	100	1270	4870	452	128	14	.6	714

CAL YR 1987 TOTAL 7571.41 MEAN 20.7 MAX 930 MIN .13 AC-FT 15020  
WTR YR 1988 TOTAL 3985.53 MEAN 10.9 MAX 1430 MIN .00 AC-FT 7910

e Estimated

## ARKANSAS RIVER BASIN

## 07164200 KEYSTONE LAKE NEAR SAND SPRINGS, OK

LOCATION.--Lat 36°09'05", long 96°15'05", in SW 1/4 SE 1/4 sec.4, T.19 N., R.10 E., Tulsa County, Hydrologic Unit 11110101, in stair tower of intake structure near left end of Keystone Dam on Arkansas River, 8.5 mi west of Sand Springs, and at mile 538.8.

DRAINAGE AREA.--74,506 mi<sup>2</sup>, of which 12,541 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--September 1964 to current year. Prior to October 1970, published as Keystone Reservoir near Sand Springs.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929. Prior to Nov. 1, 1964, nonrecording gage nearby at same datum.

REMARKS.--Reservoir is formed by rolled-fill earth dam. Spillway is concrete ogee-type weir controlled by 18 40-foot taintor gates. Outlet works consist of nine sluices. Regulated storage began Sept. 11, 1964; power pool was first filled Nov. 20, 1964. Capacity, 1,738,000 acre-ft, at elevation 754.0 ft, top of flood control pool, 557,600 acre-ft, at elevation 723.0 ft, top of power pool, 260,900 acre-ft, at elevation 706.0 ft, minimum power pool. Figures given herein represent total contents. Reservoir is designed for flood control, power development, and conservation. Revised capacity table, based on survey in 1977, used since Oct. 1, 1983.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 1,886,000 acre-ft, Nov. 6, 1974, elevation, 754.86 ft; maximum elevation, 755.85 ft, Oct. 6, 1986; minimum since power pool was first filled, 297,800 acre-ft, Jan. 19, 1965, elevation, 705.07 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 1,058,000 acre-ft, Apr. 5, elevation 739.22 ft; minimum, 448,700 acre-ft, Sept. 15, elevation, 717.92 ft.

## Capacity table (elevation, in feet, and contents, in acre-ft):

717	431,200	740	1,088,000
720	490,500	750	1,530,000
730	745,900	760	2,086,000

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	588600	521600	596100	798300	671100	522300	763200	598400	576800	552200	514900	471800
2	604900	521600	598900	799300	661800	534900	897300	583200	570700	552000	508300	473400
3	592300	526300	598600	799300	652000	577800	997600	580200	558300	555300	502000	474600
4	571200	526300	600100	797700	640700	658700	1044000	576600	558800	557100	497100	471400
5	563300	525400	597300	790700	631100	738400	1043000	572400	531700	557800	500100	454500
6	565500	527400	597900	778000	628500	789800	1007000	569500	574100	555500	502700	454900
7	565900	531100	591300	761000	624300	807200	984300	571200	575600	552200	505300	452800
8	563800	535100	587600	742300	619800	792000	949900	566200	574600	550100	502600	453600
9	561200	537600	584400	727100	615900	761300	949200	557600	574400	554300	501200	452200
10	560900	535600	580700	713300	611800	724100	941100	555500	574900	558600	499700	453200
11	558800	536300	579000	704600	602100	698800	923700	548900	581200	556200	497300	453800
12	556400	534000	583200	700800	594100	676200	901000	541500	586900	553200	495600	452200
13	553400	530600	586600	697700	591600	660400	876600	536000	581200	548700	496700	450600
14	551300	531300	586100	698000	594600	649000	850000	533800	580700	543600	498200	449100
15	548000	535600	577300	698500	582700	642800	821300	532000	580500	538100	492800	450100
16	544800	536500	573900	712700	576600	648700	793300	528600	579700	537200	492800	451600
17	545000	539500	567400	725900	597600	627900	766600	520000	577800	543800	492800	456300
18	547800	545700	563600	753400	561900	622200	766600	518700	581400	537000	487600	464000
19	542900	551800	585200	785800	553900	629200	774500	522000	582900	534900	486300	482400
20	543800	557100	618000	782600	554300	610300	782900	529200	580000	532600	485700	527700
21	537900	552900	659300	772400	552000	604200	772400	535400	574900	527900	486800	574900
22	526500	558800	703100	765900	550600	599100	751300	543200	570500	524700	483000	579500
23	520900	558300	725900	749800	545200	590800	725000	553400	566200	529500	481600	575100
24	527200	558600	739900	726800	541100	584200	695700	560700	561400	537900	481600	567900
25	532600	558100	749200	703700	537900	579000	675600	560700	558100	534700	482600	577800
26	525400	562600	747700	691100	533500	573900	668100	562400	557400	531100	483200	569500
27	518300	574600	759500	686800	533100	568300	659000	563100	553600	528100	481800	560700
28	513400	581200	775200	685700	533300	571500	652800	571500	550600	532600	484300	556200
29	514700	584400	785800	683700	527200	590800	638500	577300	552000	529200	482600	546100
30	516300	593600	793600	682900	---	589600	619800	581900	551300	526500	478700	536300
31	519800	---	796100	678400	---	588100	---	580700	---	521800	475200	---
MAX	604900	593600	796100	799300	671100	807200	1044000	598400	586900	558600	514900	579500
MIN	513400	521600	563600	678400	527200	522300	619800	518700	531700	521800	475200	449100
(†)	721.35	724.48	731.63	727.68	721.68	724.26	725.51	723.96	722.78	721.50	719.26	722.08
(††)	-29,600	+73,800	+202,500	-117,700	-151,200	+60,900	+31,700	-39,100	-29,400	-29,500	-46,600	+61,100
CAL YR 1987	MAX 1162000	MIN 513400	(††) -196,300									
WTR YR 1988	MAX 1044000	MIN 449100	(††) -13,100									

(†) ELEVATION, IN FEET, AT END OF MONTH

(††) CHANGE IN CONTENTS, IN ACRE-FEET

07164500 ARKANSAS RIVER AT TULSA, OK

LOCATION (REVISED).--Lat 36°08'26", long 96°00'22", in NE 1/4 SW 1/4 sec.11, T.19 N., R.12 E., Tulsa County, Hydrologic Unit 11110101, at right abutment on downstream side of 11th Street bridge in Tulsa, 10.1 mi upstream from Polecat Creek, 15.1 mi downstream from Keystone Dam, and at mile 523.7.

DRAINAGE AREA.--74,615 mi<sup>2</sup>, of which 12,541 mi<sup>2</sup> is probably noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1925 to current year. Monthly discharge only for some periods, published in WSP 1311. Gage-height records collected in this vicinity since 1904 are published in reports of the National Weather Service.

REVISED RECORDS.--WSP 1341: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 615.23 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Feb. 2, 1939, nonrecording gage and Feb. 2, 1939 to Sept. 30, 1952, water-stage recorder at datum 3.00 ft higher.

REMARKS.--Records fair above 2,000 ft<sup>3</sup>/s and poor below. Except for 109 mi<sup>2</sup> intervening area, flow completely regulated by Keystone Lake (station 07164200) since September 1964. Prior to September 1964, minor regulation by John Martin Lake in Colorado and by Great Salt Plains Lake (station 07150000). U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Prior to regulation by Keystone Lake, 39 years (water years 1926-64), 6,554 ft<sup>3</sup>/s, 4,745,000 acre-ft/yr; since regulation by Keystone Lake, 24 years (water years 1965-88), 7,895 ft<sup>3</sup>/s, 5,720,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 307,000 ft<sup>3</sup>/s, Oct. 5, 1986, gage height, 25.21 ft; minimum, 27 ft<sup>3</sup>/s, Oct. 12, 13, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since 1904, 22.8 ft, June 13, 1923, present datum, from reports of National Weather Service.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 48,000 ft<sup>3</sup>/s, Apr. 6, gage height, 10.29 ft; minimum daily discharge, 75 ft<sup>3</sup>/s, Sept. 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	26900	1660	1960	4750	10600	5990	11000	24400	4840	1230	5180	1710
2	28200	2130	2290	5730	12100	6860	17800	22100	4020	1280	6340	1070
3	23000	2550	4320	5380	12200	13400	32400	15700	10800	1290	3840	276
4	22100	567	950	5640	12400	15100	38900	15500	6970	264	3470	125
5	16100	3270	4120	7100	12400	25300	43900	15500	3680	592	2030	7840
6	5480	1950	3030	9770	7770	26200	46000	14800	3590	2440	275	808
7	5840	1260	4500	10400	7560	29400	39300	11600	745	2920	150	254
8	5920	1020	6850	11600	8450	40200	31800	11400	6110	3070	1030	75
9	5850	684	3980	11900	8160	39400	31500	10900	2470	1810	3080	88
10	3920	2170	4710	11900	8350	38400	31600	9090	3940	285	1250	825
11	4140	1780	3940	12100	8380	34400	30700	7690	2020	1040	1840	220
12	4140	3250	2610	12200	8660	24300	30300	9240	377	3340	2530	203
13	4100	2740	1190	12200	7170	23700	29700	8710	3340	3600	1700	876
14	4100	1860	3470	12200	5060	22800	29200	6870	2500	3780	422	1130
15	3980	1610	5680	12300	7470	17200	29000	6550	2590	4240	1270	1100
16	3990	2740	5320	9880	8410	17000	28500	7090	2120	2520	2420	312
17	3850	1230	5480	11600	7680	17200	28000	9150	2900	1130	500	214
18	861	608	6720	12000	8040	17200	27400	6640	1750	1800	1500	352
19	4070	865	5930	14800	7420	17000	28400	4020	283	4280	e2000	951
20	2180	1620	4290	26800	5340	16900	31300	2730	2420	4110	e1500	3500
21	5080	2530	4240	34400	6310	17000	31400	1080	3080	4250	e900	9470
22	6050	2810	12300	33100	5340	17000	31000	850	3190	4160	400	11000
23	7030	703	12600	30000	6180	17100	30500	e150	3310	1970	949	11600
24	1620	5810	8420	29800	7540	16400	29800	394	3580	1430	1040	9320
25	448	5800	9460	28000	4800	12800	26900	2220	3250	2630	500	3850
26	3400	5050	12500	22000	4590	12400	18500	4670	2010	4240	160	4720
27	6200	732	9550	15900	4870	8920	18600	4000	2490	4340	114	7050
28	4840	477	778	12900	3440	10500	21800	3150	2640	5020	916	6460
29	3160	1300	4930	12900	4520	17000	25500	1490	1810	5440	367	5810
30	1920	1230	3620	12600	---	14300	25100	1620	1240	5470	2220	5620
31	714	---	5650	11200	---	13600	---	3760	---	6560	1730	---
TOTAL	219183	62006	165388	463050	221210	604970	875800	243064	94065	90531	51623	96829
MEAN	7070	2067	5335	14940	7628	19520	29190	7841	3135	2920	1665	3228
MAX	28200	5810	12600	34400	12400	40200	46000	24400	10800	6560	6340	11600
MIN	448	477	778	4750	3440	5990	11000	150	283	264	114	75
AC-FT	434700	123000	328000	918500	438800	1200000	1737000	482100	186600	179600	102400	192100

CAL YR 1987 TOTAL 5483073 MEAN 15020 MAX 61000 MIN 448 AC-FT 10880000  
WTR YR 1988 TOTAL 3187719 MEAN 8710 MAX 46000 MIN 75 AC-FT 6323000

e Estimated

## ARKANSAS RIVER BASIN

07164500 ARKANSAS RIVER AT TULSA, OK--Continued  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1960-61, 1977 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: March 1977 to July 1985, October 1987 to September 1988.

WATER TEMPERATURE: March 1977 to July 1985, October 1987 to September 1988

INSTRUMENTATION.--Water-quality monitor since March 1977.

REMARKS.--Interruptions in daily record were due to malfunctions of the recording instrument. Prior to September 1985, once-daily observer's readings were published. Water quality monitor records for these periods are available on request at the district office. Samples were collected bimonthly and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 7,820 microsiemens, Feb. 16, 1978; minimum daily, 518 microsiemens, July 27, 1977.

WATER TEMPERATURE: Maximum daily, 32.0 °C, July 3-6, 14, 1978; minimum daily, 0.0 °C on many days during winter periods.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL-LECTING	AGENCY ANA-LYZING	SAMPLE LOC-ATION, CROSS SECTION	GAGE HEIGHT (FEET)	DIS-CHARGE, INST. (CUBIC FEET PER SECOND)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE AIR (DEG C)	TEMPER-ATURE WATER (DEG C)	TUR-BID-ITY (NTU)
		SAMPLE (CODE NUMBER)	SAMPLE (CODE NUMBER)	(FT FM L BANK)							
NOV 04...	1430	1028	80020	--	1.60	402	2300	8.10	21.5	20.5	8.7
JAN 28...	1230	1028	1028	1200	--	--	1680	8.20	--	--	--
28...	1231	1028	1028	900	--	--	1670	8.20	--	--	--
28...	1232	1028	1028	600	--	--	1630	8.30	--	--	--
28...	1233	1028	1028	300	--	--	1630	8.20	--	--	--
28...	1530	1028	80020	--	5.17	12900	1660	8.20	21.5	4.0	8.7
MAR 30...	1430	1028	80020	--	5.22	14300	1500	8.20	13.0	15.0	14
MAY 31...	1545	1028	80020	--	2.29	896	2430	8.50	33.0	26.0	3.4
JUL 27...	1345	1028	80020	--	2.25	849	2160	8.30	27.0	24.0	2.7
AUG 31...	1605	1028	80020	--	2.18	816	2120	8.10	--	25.5	2.0
DATE	BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CAC03)	HARD-NESS NONCARB WH WAT TOT FLD (MG/L AS CAC03)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT
NOV 04...	740	10.6	122	K23	320	270	140	72	22	300	70
JAN 28...	--	12.3	--	--	--	--	--	--	--	--	--
28...	--	12.3	--	--	--	--	--	--	--	--	--
28...	--	12.3	--	--	--	--	--	--	--	--	--
28...	--	12.3	--	--	--	--	--	--	--	--	--
28...	750	12.3	96	55	48	220	87	59	18	230	69
MAR 30...	750	11.7	118	44	20	290	150	76	24	200	60
MAY 31...	740	11.0	141	21	K8	360	200	89	32	340	67
JUL 27...	750	7.4	90	95	230	340	180	84	31	330	67
AUG 31...	745	8.4	106	24	46	330	170	81	31	310	67



## ARKANSAS RIVER BASIN

07164500 ARKANSAS RIVER AT TULSA, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH FET FIELD (MG/L AS HCO3)	CAR- BONATE WATER WH FET FIELD (MG/L AS CO3)	ALKA- LINITY WAT WH TOT FET FIELD (MG/L AS CACO3)	CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SiO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)
NOV 04...	8	6.0	160	0	131	2.0	160	460	0.50	5.7	1120
JAN 28...	--	--	--	--	--	--	--	--	--	--	--
JAN 28...	--	--	--	--	--	--	--	--	--	--	--
JAN 28...	--	--	--	--	--	--	--	--	--	--	--
JAN 28...	--	--	--	--	--	--	--	--	--	--	--
MAR 30...	7	6.7	160	0	135	1.7	120	330	0.30	12	933
MAY 31...	5	3.6	180	0	144	1.8	150	280	0.30	8.2	879
JUL 27...	8	8.7	190	0	160	1.6	200	460	2.0	4.2	1240
AUG 31...	8	6.3	190	0	157	2.4	190	470	0.60	3.4	1190
DATE	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS NO2)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N)
NOV 04...	1110	1.52	1220	0.750	0.030	0.10	0.780	0.070	0.070	0.09	0.63
JAN 28...	--	--	--	--	--	--	--	--	--	--	--
JAN 28...	--	--	--	--	--	--	--	--	--	--	--
JAN 28...	--	--	--	--	--	--	--	--	--	--	--
JAN 28...	--	--	--	--	--	--	--	--	--	--	--
MAR 30...	862	1.27	32500	0.930	0.020	0.07	0.950	0.100	0.090	0.12	0.40
MAY 31...	834	1.20	33900	0.910	0.020	0.07	0.930	0.120	0.080	0.10	0.68
JUL 27...	1360	1.86	3310	0.390	0.030	0.10	0.420	0.030	0.020	0.03	14
AUG 31...	1220	1.69	2840	0.160	0.070	0.23	0.230	0.160	0.180	0.23	1.4
AUG 31...	1190	1.62	2620	0.120	0.010	0.03	0.130	0.070	0.080	0.10	0.13
DATE	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS- PHOROUS TOTAL (MG/L AS P)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4)	PHOS- PHOROUS ORGANIC TOTAL (MG/L AS P)	PHOS- PHOROUS ORGANIC DIS- SOLVED (MG/L AS P)	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	
NOV 04...	0.70	0.130	0.150	0.120	0.37	0.13	0.03	20	2	160	
JAN 28...	--	--	--	--	--	--	--	--	--	--	
JAN 28...	--	--	--	--	--	--	--	--	--	--	
JAN 28...	--	--	--	--	--	--	--	--	--	--	
JAN 28...	--	--	--	--	--	--	--	--	--	--	
MAR 30...	0.50	0.130	0.110	0.080	0.25	0.13	0.03	--	--	--	
MAY 31...	0.80	0.140	0.110	0.080	0.25	0.14	0.03	50	2	140	
JUL 27...	14	0.110	0.110	0.090	0.28	0.11	0.02	<10	3	200	
AUG 31...	1.6	0.150	0.120	0.100	0.31	0.15	0.02	--	--	--	
AUG 31...	0.20	0.200	0.190	0.130	0.40	0.20	0.06	<10	3	100	

## ARKANSAS RIVER BASIN

07164500 ARKANSAS RIVER AT TULSA, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	BERYL- LIUM, DIS- SOLVED (UG/L AS BE)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY DIS- SOLVED (UG/L AS HG)
NOV 04...	<0.5	<1	<1	1	4	6	<5	18	41	0.2
JAN 28...	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--
MAR 30...	<0.5	3	<1	<3	3	15	<5	20	4	<0.1
MAY 31...	<10	<1	<1	1	2	30	<5	20	80	<0.1
JUL 27...	--	--	--	--	--	--	--	--	--	--
AUG 31...	<10	2	<1	1	<1	20	<5	20	10	<0.1
DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V)	ZINC, DIS- SOLVED (UG/L AS ZN)	SEDI- MENT, SUS- PENDE (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
NOV 04...	2	<1	1	<1.0	700	7	4	--	--	--
JAN 28...	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	13	453	72
MAR 30...	<10	3	<1	<1.0	740	<6	4	26	1000	74
MAY 31...	2	5	1	<1.0	1100	9	<10	7	17	79
JUL 27...	--	--	--	--	--	--	--	15	34	58
AUG 31...	2	<1	<1	1.0	790	7	200	--	--	--

## 07164500 ARKANSAS RIVER AT TULSA, OK--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE. WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	1500	1420	1460	2720	2310	2630	2800	2680	2750	1950	1860	1910
2	1530	1430	1480	2780	2620	2690	2680	2610	2660	1950	1910	1930
3	1480	1420	1450	2790	2560	2690	2700	2620	2660	1970	1920	1940
4	1420	1340	1390	---	---	---	2660	2620	2630	1960	1880	1940
5	1500	1340	1380	2930	2530	2640	2820	2600	2760	2020	1910	1950
6	1620	1530	1570	2550	2410	2480	2900	2830	2870	2040	1970	2000
7	---	---	---	2590	2400	2540	2960	2830	2890	2030	1840	1960
8	---	---	---	2720	2160	2610	2920	2800	2870	1850	1790	1820
9	---	---	---	2980	2670	2860	2880	2620	2710	1810	1770	1790
10	---	---	---	2990	2570	2790	2700	2640	2670	1850	1800	1820
11	---	---	---	2640	2510	2580	2660	2600	2650	1870	1800	1840
12	---	---	---	2780	2660	2710	2690	2560	2630	1930	1720	1840
13	---	---	---	2820	2660	2740	2920	2700	2760	1770	1640	1720
14	---	---	---	2810	2670	2740	3020	2570	2840	1900	1760	1810
15	---	---	---	---	---	---	2560	2390	2460	1910	1850	1880
16	---	---	---	---	---	---	2830	2520	2660	1940	1910	1920
17	---	---	---	---	---	---	3040	2820	2950	1970	1920	1940
18	---	---	---	---	---	---	3090	2960	3030	2020	1970	1990
19	---	---	---	---	---	---	3080	1470	2270	2090	2020	2070
20	---	---	---	---	---	---	2570	1560	2040	1990	1700	1790
21	---	---	---	3390	2640	2970	2950	2570	2710	1700	1630	1660
22	---	---	---	3400	3100	3190	3070	2990	3040	1640	1600	1610
23	---	---	---	3350	2770	3060	3050	2940	2990	1610	1570	1590
24	---	---	---	3270	1980	2940	2990	2620	2790	1580	1570	1580
25	---	---	---	2890	2630	2720	2600	1930	2250	1590	1580	1580
26	---	---	---	2850	2640	2760	2050	1900	2000	1640	1590	1610
27	2370	2240	2320	2820	2780	2820	1890	1810	1850	1650	1630	1640
28	2430	2320	2370	2820	2780	2800	---	---	---	1740	1660	1700
29	2560	2430	2500	2830	2680	2780	1970	1860	1920	1800	1740	1770
30	2690	2360	2520	2760	2720	2740	2100	1950	2020	1870	1690	1770
31	2640	1920	2390	---	---	---	2120	1920	2050	1760	1630	1710
MONTH	---	---	---	---	---	---	---	---	---	2090	1570	1810
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	1710	1560	1630	2640	2380	2510	---	---	---	---	---	---
2	1640	1500	1580	2570	1120	2060	---	---	---	---	---	---
3	1910	1640	1730	1850	974	1370	---	---	---	---	---	---
4	2180	1930	2070	2030	1850	1950	---	---	---	---	---	---
5	2280	2160	2200	1870	1620	1690	---	---	---	---	---	---
6	2390	2140	2210	1780	1620	1680	---	---	---	---	---	---
7	2640	2370	2480	1870	1680	1750	---	---	---	---	---	---
8	2580	2460	2540	1860	1590	1680	---	---	---	---	---	---
9	2560	2450	2510	1600	1370	1500	---	---	---	---	---	---
10	2690	2510	2610	1370	1270	1320	---	---	---	---	---	---
11	2420	2030	2170	1360	1080	1190	---	---	---	---	---	---
12	2310	2150	2230	1090	1020	1050	---	---	---	---	---	---
13	2450	2230	2330	1120	1090	1100	---	---	---	---	---	---
14	2520	2320	2460	1110	1080	1100	---	---	---	---	---	---
15	2360	2220	2290	1100	1050	1070	---	---	---	---	---	---
16	2280	2160	2210	1260	1100	1160	---	---	---	---	---	---
17	2220	2130	2180	1260	1090	1170	---	---	---	---	---	---
18	---	---	---	1200	1090	1140	---	---	---	---	---	---
19	---	---	---	1240	1180	1220	---	---	---	---	---	---
20	2500	2060	2190	1240	1210	1230	---	---	---	---	---	---
21	2530	2220	2360	1250	1200	1240	---	---	---	---	---	---
22	2490	2270	2410	---	---	---	---	---	---	---	---	---
23	2420	2190	2310	---	---	---	---	---	---	---	---	---
24	2430	2290	2370	---	---	---	---	---	---	---	---	---
25	2560	2410	2450	---	---	---	---	---	---	---	---	---
26	2730	2460	2620	---	---	---	---	---	---	---	---	---
27	2580	2360	2460	---	---	---	---	---	---	---	---	---
28	2620	2430	2560	---	---	---	---	---	---	---	---	---
29	2600	2430	2490	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	1990	1630	1810	---	---	---	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

## 07164500 ARKANSAS RIVER AT TULSA, OK--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	2320	2060	2250	2470	2440	2460	2240	2050	2160	2250	1900	2070
2	---	---	---	2500	2420	2440	2070	1900	1970	2230	1710	2130
3	1980	1900	1940	2540	2460	2490	---	---	---	---	---	---
4	2090	1930	2020	2610	2360	2550	2110	2070	2100	---	---	---
5	2140	1990	2040	2400	2270	2330	2100	2020	2070	2140	2050	2080
6	2160	2110	2130	2440	2350	2410	2130	1930	2050	2070	2030	2050
7	---	---	---	2340	2310	2320	2070	1950	2000	2080	1950	2060
8	2300	2150	2210	2400	2310	2360	2090	1530	1960	---	---	---
9	2260	2070	2200	2440	2380	2400	2230	2070	2130	---	---	---
10	2110	1970	2020	2470	2430	2450	2430	2230	2320	2210	2180	2200
11	2130	2040	2080	2460	2310	2440	3390	2460	2750	2190	2160	2180
12	2250	2080	2160	2470	2390	2440	4010	2820	3370	2150	2080	2130
13	2310	2160	2230	2450	2390	2410	4320	2860	3330	2180	2110	2150
14	2290	2200	2250	2460	2380	2410	3260	2830	3100	2190	2150	2170
15	2260	2130	2210	2480	2420	2440	3960	2930	3060	2200	2100	2170
16	2290	2090	2130	2470	2410	2440	---	---	---	---	---	---
17	2430	2050	2290	2490	2430	2460	---	---	---	---	---	---
18	2610	2230	2360	---	---	---	3090	2470	2920	2070	1250	1840
19	2910	2350	2660	2310	1810	2170	2430	2220	2300	---	---	---
20	2850	2350	2640	2270	2180	2230	2360	2230	2290	2130	2020	2060
21	---	---	---	2290	2250	2260	2380	2210	2320	2130	2050	2090
22	---	---	---	2370	2280	2310	2220	2180	2200	2100	2010	2060
23	2380	2270	2300	2390	2340	2370	2190	2100	2130	2070	1870	1960
24	2320	2290	2310	2480	2380	2430	2130	2030	2050	1950	1890	1930
25	2420	2290	2310	2530	2470	2490	2050	2020	2030	1940	1910	1920
26	2460	2400	2420	2500	2460	2480	2060	2010	2040	1920	1870	1910
27	2460	2360	2430	2450	2360	2400	2070	2020	2040	1900	1850	1890
28	2540	2370	2430	2370	2230	2330	2040	2020	2030	1870	1850	1860
29	2490	2370	2450	2460	2390	2420	2030	1900	1990	1840	1790	1820
30	2500	2440	2460	2480	2290	2410	1960	1910	1930	1800	1770	1780
31	---	---	---	2350	1980	2220	1950	1910	1940	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	---	---	---	19.4	17.2	18.5	10.4	8.1	9.3	5.1	3.3	4.2
2	---	---	---	18.8	16.8	17.9	11.2	8.5	9.8	5.5	3.5	4.4
3	---	---	---	18.6	15.9	17.3	11.8	10.1	11.0	6.3	4.8	5.4
4	---	---	---	21.0	17.5	19.0	11.3	9.7	10.5	4.9	3.8	4.4
5	---	---	---	17.1	15.0	16.1	11.8	9.7	10.6	3.8	1.3	2.7
6	---	---	---	15.6	14.3	15.0	12.1	11.1	11.6	2.7	1.1	2.2
7	---	---	---	14.6	14.0	14.3	11.4	10.8	11.2	3.5	1.8	2.6
8	---	---	---	15.8	14.0	15.0	12.1	10.0	11.2	3.4	1.6	2.4
9	---	---	---	15.0	10.5	13.3	10.7	8.7	9.7	3.6	2.2	2.7
10	---	---	---	13.7	9.7	11.5	10.7	8.6	9.6	2.8	1.5	2.2
11	---	---	---	13.4	11.4	12.4	11.1	9.2	10.1	3.9	1.9	2.8
12	---	---	---	15.2	12.1	13.5	10.1	8.8	9.5	4.4	2.1	3.5
13	---	---	---	14.9	12.5	13.7	9.5	7.7	8.6	3.6	1.2	2.3
14	---	---	---	14.6	13.2	14.0	7.8	2.3	5.4	3.9	1.9	2.7
15	---	---	---	15.1	12.7	14.2	7.6	5.3	6.2	4.4	2.0	3.0
16	---	---	---	14.3	13.0	13.9	7.8	5.9	6.8	5.1	2.9	4.1
17	---	---	---	---	---	---	8.1	6.3	7.1	4.8	3.4	4.0
18	---	---	---	---	---	---	7.8	7.2	7.6	4.8	2.6	3.6
19	---	---	---	---	---	---	7.7	6.8	7.3	4.5	3.2	3.8
20	---	---	---	---	---	---	8.4	6.9	7.6	3.3	2.7	2.9
21	---	---	---	---	---	---	8.5	6.8	7.6	3.5	2.2	2.7
22	---	---	---	13.4	11.8	12.6	8.3	6.7	7.5	3.4	2.1	2.6
23	---	---	---	15.0	12.3	13.6	8.4	6.5	7.5	3.4	2.0	2.7
24	---	---	---	15.9	12.6	13.7	8.5	6.7	8.0	3.8	2.4	3.0
25	---	---	---	12.4	10.8	11.6	6.6	3.9	5.2	3.2	1.9	2.6
26	---	---	---	11.5	10.5	11.1	5.9	4.7	5.2	3.9	2.2	2.9
27	16.9	14.9	15.9	10.6	9.6	10.2	6.6	5.1	5.8	4.6	2.3	3.3
28	17.3	14.1	15.6	9.5	7.5	8.7	5.8	2.0	4.3	6.0	3.2	4.3
29	18.2	15.1	16.7	9.3	6.7	8.4	5.3	4.1	4.8	6.1	4.1	5.0
30	20.4	17.2	18.5	10.5	9.0	9.7	5.6	4.6	5.1	7.8	5.1	6.2
31	20.4	18.6	19.4	---	---	---	5.7	4.7	5.2	6.4	5.0	6.1
MONTH	---	---	---	---	---	---	12.1	2.0	8.0	7.8	1.1	3.5



DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	4.9	3.3	4.2	8.9	5.8	7.2	12.6	11.1	11.8	19.2	16.4	17.5
2	3.5	2.9	3.2	9.7	8.1	8.7	12.3	10.8	11.5	17.7	16.5	17.1
3	4.0	3.5	3.8	8.3	5.5	7.0	13.4	10.9	12.0	18.5	16.3	17.2
4	5.3	3.6	4.3	8.7	5.3	6.6	14.2	11.6	12.7	19.7	16.2	17.7
5	4.2	3.0	3.6	6.8	5.8	6.3	14.5	12.6	13.4	20.7	16.9	18.6
6	4.9	2.1	3.3	8.3	6.2	7.1	14.0	12.2	13.0	19.2	16.9	18.1
7	5.0	2.9	3.8	9.6	7.0	8.0	14.5	12.4	13.3	18.7	17.0	17.9
8	5.0	3.9	4.4	8.7	7.5	8.0	15.0	12.4	13.5	21.0	17.8	19.3
9	6.4	4.5	5.3	8.8	7.2	7.9	14.0	12.6	13.2	21.2	17.2	19.0
10	4.8	2.4	4.0	8.7	6.8	7.7	13.6	12.0	12.7	22.1	17.5	19.7
11	3.6	.3	2.0	9.0	7.1	7.9	14.2	12.2	13.0	22.2	17.9	20.0
12	5.0	1.8	3.1	8.4	6.5	7.4	15.0	12.5	13.6	22.4	18.3	20.3
13	6.4	2.9	4.6	7.3	6.1	6.7	---	---	---	23.4	18.9	21.0
14	6.8	4.3	5.5	8.1	5.8	6.8	---	---	---	23.6	19.3	21.4
15	5.5	2.6	3.9	8.8	5.8	7.1	---	---	---	23.0	19.2	21.1
16	6.3	3.2	4.5	8.0	6.0	7.0	---	---	---	24.2	19.9	21.9
17	4.5	3.9	4.2	7.0	6.6	6.8	---	---	---	24.1	19.5	21.6
18	---	---	---	8.8	6.2	7.3	---	---	---	25.9	20.1	22.3
19	---	---	---	9.8	6.2	7.8	---	---	---	25.6	20.5	22.6
20	5.9	3.6	4.7	10.8	7.2	8.8	---	---	---	22.7	20.8	21.8
21	8.0	4.0	5.7	11.0	7.6	9.1	---	---	---	23.7	20.6	22.4
22	9.8	5.0	6.9	11.4	7.4	9.3	---	---	---	22.8	17.8	21.4
23	7.6	4.5	5.8	10.6	8.5	9.4	---	---	---	22.7	17.2	19.5
24	6.9	4.0	5.3	---	---	---	---	---	---	24.9	16.9	21.2
25	7.6	4.3	6.0	---	---	---	16.8	15.6	16.1	---	---	---
26	8.7	4.8	6.8	---	---	---	17.7	15.6	16.5	25.0	20.2	22.3
27	10.1	5.8	7.7	---	---	---	18.6	15.2	16.7	25.6	20.1	22.4
28	9.5	5.6	7.6	---	---	---	18.5	15.5	16.8	24.9	20.7	22.7
29	8.6	6.0	7.4	---	---	---	17.0	16.0	16.5	24.6	21.4	23.1
30	---	---	---	---	---	---	19.0	16.3	17.4	25.3	21.7	23.5
31	---	---	---	11.5	10.2	10.8	---	---	---	27.0	22.1	24.0
MONTH	---	---	---	---	---	---	---	---	---	---	---	---
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	25.4	21.8	23.5	29.6	26.8	28.3	31.8	27.1	28.9	27.6	24.0	25.7
2	---	---	---	28.9	25.9	27.1	31.7	26.6	28.6	27.1	24.8	26.0
3	26.1	22.0	23.9	29.3	25.0	27.3	---	---	---	27.5	24.0	26.0
4	25.9	22.2	24.0	32.3	27.9	30.0	32.0	27.0	29.1	25.4	21.8	23.8
5	27.4	21.5	23.8	31.3	28.9	30.2	30.7</					

## 07165000 HEYBURN LAKE NEAR HEYBURN, OK

LOCATION (REVISED).--Lat 35°56'49", long 96°17'54", in SE 1/4 SE 1/4 sec.13, T.17 N., R.9 E., Creek County, Hydrologic Unit 11110101, at intake structure at right abutment of Heyburn Dam on Polecat Creek, 2.5 mi northwest of Heyburn, 3.5 mi upstream from bridge on U.S. Highway 66, 11.0 mi southwest of Sapulpa, and at mile 48.6.

DRAINAGE AREA.--123 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1950 to current year. Prior to October 1970, published as Heyburn Reservoir near Heyburn.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by an earth dam. Outlet works consist of an 8-foot, 3-inch diameter concrete conduit extending from an uncontrolled concrete drop inlet at the upstream side of dam at a concrete stilling basin near downstream toe of dam and three, 36-inch gated lowflow pipes which drain into the conduit below the drop inlet. Spillway is 200-foot channel in a natural saddle about 1,000 ft west of right abutment. Storage began Sept. 29, 1950; conservation pool was first filled Mar. 10, 1951. Capacity, 147,600 acre-ft, at elevation 802.0 ft maximum pool, 55,400 acre-ft, at elevation 784.0 ft, spillway crest and top of flood control pool, and 7,105 acre-ft, at elevation 761.5, conservation pool. Dead storage, 293 acre-ft, below elevation 740.0 ft, invert of lowflow sluices. Reservoir was designed for flood control and conservation. Figures given herein represent total contents. Revised capacity table, based on survey in 1978, used since Oct. 1, 1984.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 32,210 acre-ft, Nov. 4, 1974, elevation, 776.85 ft; minimum since conservation pool was first filled, 4,070 acre-ft, May 8, 9, 1981, elevation 757.95 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 16,760 acre-ft, Apr. 2, elevation, 769.34 ft; minimum, 6,130 acre-ft, July 26, elevation 760.32 ft.

Capacity table (elevation, in feet, and contents, in acre-ft):

760	5,880	770	17,820
765	10,770	775	27,970

RESERVOIR STORAGE (ACRE-Feet), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6780	6500	7400	7960	7380	7380	16510	7350	7170	6640	7330	6690
2	6760	6490	7360	7820	7380	9380	14940	7350	7160	6610	7310	6730
3	6740	6490	7340	7730	7370	13240	12130	7350	7150	6580	7440	6770
4	6720	6490	7310	7660	7360	11360	10120	7340	7140	6560	7190	6750
5	6700	6470	7280	7590	7330	10380	9090	7330	7120	6540	7170	6740
6	6680	6450	7290	7570	7320	9790	8500	7320	7100	6510	7150	6710
7	6670	6460	7280	7550	7320	9040	8170	7320	7100	6490	7130	6670
8	6630	6500	7270	7530	7320	8540	7980	7310	7090	6480	7100	6660
9	6630	6490	7260	7530	7320	8210	7860	7300	7060	6450	7080	6650
10	6610	6480	7250	7530	7330	8010	8260	7280	7040	6450	7050	6630
11	6590	6460	7230	7530	7300	7870	8150	7270	7000	6420	7030	6620
12	6580	6450	7220	7530	7290	7760	7990	7250	6980	6400	7010	6590
13	6570	6450	7210	7680	7290	7680	7880	7260	6980	6380	6990	6580
14	6540	6440	7330	7680	7310	7600	7780	7240	6970	6390	6990	6560
15	6540	6670	7320	7680	7300	7560	7700	7230	6960	6360	6970	6550
16	6540	6710	7320	8120	7290	7520	7650	7220	6950	6340	6970	6520
17	6530	6730	7310	8130	7300	7890	7650	7210	6930	6320	6940	6530
18	6510	6730	7460	8010	7350	8020	7710	7190	6920	6300	6920	6630
19	6510	6740	11290	7990	7770	7910	7690	7180	6890	6320	6910	6660
20	6490	6740	10270	7870	7790	7820	7640	7180	6860	6300	6900	6660
21	6480	6740	9150	7760	7710	7740	7600	7190	6830	6270	6860	6630
22	6460	6740	8500	7670	7630	7670	7550	7210	6800	6250	6850	6620
23	6470	6730	8150	7590	7570	7630	7520	7300	6790	6210	6850	7370
24	6490	7460	7920	7540	7510	7600	7460	7320	6760	6200	6830	7470
25	6490	7920	9220	7510	7460	7540	7440	7290	6740	6170	6800	7420
26	6490	7750	9310	7470	7430	7510	7430	7270	6730	6160	6780	7370
27	6490	7670	9490	7440	7410	7460	7410	7230	6710	6190	6750	7320
28	6470	7600	9010	7420	7400	9480	7390	7210	6700	6790	6790	7320
29	6460	7520	8500	7380	7350	12690	7380	7190	6670	7570	6760	7340
30	6480	7440	8230	7380	---	10630	7370	7180	6650	7470	6740	7320
31	6500	---	8240	7380	---	9420	---	7170	---	7380	6720	---
MAX	6780	7920	11290	8130	7790	13240	16510	7350	7170	7690	7440	7470
MIN	6460	6440	7210	7380	7290	7380	7370	7170	6650	6160	6720	6520
(+)	760.79	761.88	762.72	761.81	761.78	763.85	761.80	761.57	760.97	761.81	761.05	761.74
(++)	-280	+940	+800	-860	-30	+2,070	-2,050	-200	-520	+730	-660	+600

CAL YR 1987 MAX 17190 MIN 6440 (++) +930  
WTR YR 1988 MAX 16510 MIN 6160 (++) +540

(+) ELEVATION, IN FEET, AT END OF MONTH  
(++) CHANGE IN CONTENTS, IN ACRE-Feet

## ARKANSAS RIVER BASIN

07165562 HAIKEY CREEK AT 101ST STREET SOUTH AT TULSA, OK.

LOCATION.--Lat 36°01'01", long 95°50'55", in NW 1/4 NW 1/4 sec.29, T.18 N., R.14 E., Tulsa County, Hydrologic Unit 11110101, near right downstream abutment of 101st Street South bridge, 1.0 mi downstream from right bank unnamed tributary, 2.0 mi upstream from Little Haikey Creek, and at mile 6.4.

DRAINAGE AREA.--17.8 mi<sup>2</sup>.

PERIOD OF RECORD.--January 1988 to September 1988

GAGE.--Water-stage recorder. Datum of gage is 617.82 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records poor.

EXTREMES FOR CURRENT PERIOD.--January to September 1988: Maximum discharge, 1,900 ft<sup>3</sup>/s, Mar. 29, gage height, 14.83 ft; no flow at times.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	2.7	24	465	2.2	4.9	.00	.00	.00
2	---	---	---	---	2.6	663	44	2.5	5.3	.00	.00	89
3	---	---	---	---	2.5	491	6.7	3.2	5.6	.00	.00	27
4	---	---	---	---	3.3	42	4.0	3.2	2.5	.00	.00	1.3
5	---	---	---	---	e3.0	68	3.1	3.1	3.7	.00	.00	1.0
6	---	---	---	---	2.5	65	2.2	2.9	4.2	.00	.00	.80
7	---	---	---	---	2.1	14	1.8	3.0	4.4	.00	.00	.60
8	---	---	---	---	2.1	13	1.8	3.1	2.1	.00	.00	.40
9	---	---	---	---	2.2	7.2	1.6	3.2	.33	.00	.00	.20
10	---	---	---	---	2.3	5.9	50	2.9	e.30	.00	.00	.00
11	---	---	---	---	2.6	5.3	4.8	.00	e.20	.00	.00	.00
12	---	---	---	---	2.0	5.0	2.2	1.1	e.10	.00	.00	.00
13	---	---	---	---	2.0	4.5	1.8	1.1	e.00	.00	.00	.00
14	---	---	---	---	2.1	4.3	1.5	.00	e.00	.00	.00	.00
15	---	---	---	---	2.2	4.3	1.3	.00	e.00	.00	.00	.00
16	---	---	---	---	2.2	4.2	1.1	.00	e7.0	.00	.00	.00
17	---	---	---	---	2.1	109	5.1	.00	e4.9	.00	.00	.00
18	---	---	---	---	5.7	56	5.5	.00	e3.6	.00	.00	58
19	---	---	---	---	e5.3	7.8	1.5	.00	e1.4	17	1.5	202
20	---	---	---	.00	e4.9	5.5	.55	.45	e.68	15	13	1.3
21	---	---	---	4.0	e4.5	5.0	.29	.20	e.45	4.9	1.4	1.0
22	---	---	---	3.6	e4.1	4.8	.84	129	.21	3.9	.00	.80
23	---	---	---	3.4	e3.7	4.7	.23	140	.00	2.7	.00	6.1
24	---	---	---	3.3	e3.3	74	.00	32	.00	3.7	.00	17
25	---	---	---	3.1	e2.7	29	.68	8.3	.00	21	.00	.30
26	---	---	---	2.9	2.1	5.1	1.5	4.8	.00	5.2	.00	.20
27	---	---	---	2.7	2.0	4.1	1.1	3.0	.00	10	.00	.20
28	---	---	---	2.6	2.0	68	1.1	1.7	.00	235	7.3	.10
29	---	---	---	2.6	2.0	657	1.4	1.7	.00	14	5.0	123
30	---	---	---	2.6	---	18	1.7	3.8	.00	3.5	.12	2.5
31	---	---	---	2.7	---	7.8	---	4.4	---	.16	.00	---
MEAN	---	---	---	---	2.86	79.9	20.5	11.6	1.73	10.8	.91	17.8
MAX	---	---	---	---	5.7	663	465	140	7.0	235	13	202
MIN	---	---	---	---	2.0	4.1	.00	.00	.00	.00	.00	.00
MED	---	---	---	---	2.5	7.8	1.6	2.9	.31	.00	.00	.50

e Estimated

## ARKANSAS RIVER BASIN

07165565 LITTLE HAIKEY CREEK AT 101ST STREET SOUTH AT TULSA, OK.

LOCATION.--Lat 36°01'03", long 95°51'38", in SE 1/4 SW 1/4 sec.19, T.18 N., R.14 E., Tulsa County, Hydrologic Unit 11110101, near right downstream abutment of 101st Street South bridge, 2.0 mi upstream from Haikey Creek, and at mile 2.0.

DRAINAGE AREA.--5.45 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1987 to September 1988

GAGE.--Water-stage recorder. Datum of gage is 626.21 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records poor.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 680 ft<sup>3</sup>/s, Mar. 29, gage height, 13.51 ft; no flow at times.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e.02	.83	.79	2.4	.95	15	117	.57	.29	.07	.09	.00
2	.02	.47	.67	2.4	.89	185	13	.54	.46	.07	.06	19
3	e.02	.36	.88	2.0	.93	110	4.5	.60	.85	.07	.03	e10
4	e.02	.21	.96	1.7	1.8	29	2.6	.51	.22	.08	.05	e.50
5	e.02	.26	.96	1.4	1.2	37	2.0	.51	.15	.08	.05	e.00
6	e.02	.18	.96	1.5	.78	23	1.5	.52	.14	.08	.05	e.00
7	e.02	.08	.96	1.9	.77	12	1.3	.54	.14	.08	.05	e.00
8	e.02	1.2	1.1	1.7	.77	10	1.3	.57	.14	.08	.05	e.00
9	e.03	1.1	1.1	1.4	.76	3.1	1.2	.55	.14	.10	.05	e.00
10	e.03	.43	.87	1.3	.82	2.3	19	.48	.12	.10	.01	e.00
11	e.03	.24	.77	1.4	.90	2.2	2.2	.40	.12	1.5	.01	e.00
12	e.03	.23	.88	30	.72	2.1	1.4	.40	.10	.18	.00	e.00
13	e.03	.21	.96	4.2	.72	1.9	1.1	.40	.10	.00	.02	e.00
14	.03	.18	16	.65	.72	1.8	.99	.33	.10	.00	.03	e.10
15	.02	53	11	.69	.72	1.7	.83	.45	.10	.00	.05	e.00
16	.00	9.9	4.1	2.2	.72	1.6	.73	.30	.10	.09	.05	e.50
17	.00	3.5	2.3	29	.72	31	3.8	.23	.11	.08	.03	e.10
18	.00	1.1	31	2.0	24	12	1.7	.18	.12	.07	.03	e25
19	.08	2.2	197	16	23	3.6	.76	.12	.12	26	.04	e50
20	.45	.63	23	1.6	2.7	2.5	.64	2.3	.12	1.0	.04	e5.0
21	.43	.54	5.4	1.5	1.5	2.5	.54	.20	.09	.14	.04	e1.0
22	.15	.55	3.0	1.5	1.2	2.1	.49	63	.09	.06	.03	e.50
23	2.7	.61	1.9	1.6	.89	1.8	.57	16	.07	.03	.02	e2.0
24	11	84	12	1.3	.79	22	.53	1.5	.07	6.6	.01	e20
25	.79	16	155	1.1	.77	6.6	.91	.54	.07	1.4	.00	e2.0
26	1.5	1.7	e80	1.0	1.1	2.4	.69	.35	.07	.09	.00	e1.0
27	.30	3.0	e20	.96	.75	1.9	.55	.25	.06	6.6	.00	e.50
28	.13	2.3	e8.0	.96	.72	56	.52	.19	.05	81	6.7	e.00
29	.12	1.1	3.6	.96	.68	128	.62	.19	.06	1.5	.32	e25
30	.12	.83	3.1	.96	---	8.0	.58	.19	.07	.27	.05	e2.0
31	1.5	---	2.5	.96	---	5.4	---	.21	---	.16	.02	---
MEAN	.63	6.23	19.1	3.81	2.52	23.3	6.12	3.00	.15	4.12	.26	5.47
MAX	11	84	197	30	24	185	117	63	.85	81	6.7	50
MIN	.00	.08	.67	.65	.68	1.6	.49	.12	.05	.00	.00	.00
MED	.03	.73	2.5	1.5	.79	5.4	1.0	.45	.10	.09	.04	.50

WTR YR 1988 MEAN 6.26 MAX 197 MIN .00 MED .72

e Estimated



## ARKANSAS RIVER BASIN

07165570 ARKANSAS RIVER NEAR HASKELL, OK

LOCATION.--Lat 35°49'23", long 95°38'39", in NE 1/4 sec.31, T.16 N., R.16 E., Muskogee County, Hydrologic Unit 11110101, near left (revised) bank on downstream side of bridge on State Highway 104, 2.0 mi east of Haskell, 23.5 mi upstream from Verdigris River, and at mile 483.7.

DRAINAGE AREA.--75,473 mi<sup>2</sup>, of which 12,541 mi<sup>2</sup> probably is noncontributing.

PERIOD OF RECORD.--June 1972 to current year.

GAGE.--Water-stage recorder. Datum of gage is 530.00 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Flow regulated by Keystone Lake (station 07164200) 55.1 mi upstream. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--16 years, 10,060 ft<sup>3</sup>/s, 7,288,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 259,000 ft<sup>3</sup>/s, Oct. 5, 1986, gage height, 22.82 ft; minimum daily, 87 ft<sup>3</sup>/s, Sept. 13, 1988.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 52,800 ft<sup>3</sup>/s, Apr. 6, gage height, 13.99 ft; minimum daily discharge, 87 ft<sup>3</sup>/s, Sept. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18100	1630	2160	e10000	13700	8740	19800	28000	5710	1750	5720	2110
2	28500	2210	2420	11300	13700	13600	24000	27100	7790	2160	5890	1750
3	24400	2960	3490	9320	14400	25700	32400	22000	7840	1840	5940	1970
4	22400	3220	5000	9000	14400	22400	43000	18600	14300	2270	5260	587
5	21500	1610	3180	9340	14400	23800	46900	18500	10900	673	4380	158
6	13300	3470	5170	11000	13900	28500	49800	18600	7520	622	2750	7800
7	7310	2850	4570	13300	11300	27700	46700	17100	5760	2510	849	1730
8	7120	1890	6280	13500	11500	36700	40300	15600	3410	3560	414	483
9	7060	1620	7980	14600	12800	41100	35400	15100	7600	3660	696	1010
10	6810	1110	6180	14500	11300	39800	35700	14700	4710	2920	2250	179
11	5130	2390	6120	14600	11900	38700	35000	11500	5270	805	1690	614
12	5320	2560	5390	14700	11400	29900	34900	12400	3850	903	1970	226
13	5290	3770	3660	15600	e11600	24600	33700	12900	1670	3870	1990	87
14	5440	3680	2370	15400	e10000	24100	32900	12400	4530	4540	1560	553
15	5100	3310	6090	15100	e9000	21200	32000	11100	4130	4900	476	869
16	4930	3690	7750	14900	13300	18400	32400	11300	e3700	5210	724	1080
17	5120	4320	6500	15000	11900	18500	31400	12100	e3500	3400	2390	372
18	4410	2350	7860	16500	11200	19600	30900	13800	e4000	2060	1170	1090
19	1860	1260	12300	15900	13500	19100	30800	11400	e2500	2040	1540	1230
20	4580	1450	19500	19800	14000	18500	33300	7590	e1380	5820	2180	1490
21	3320	2070	13300	29600	9600	18300	34900	4820	3440	5440	1530	4320
22	5500	3250	11600	31800	11900	18300	34800	3470	5100	5320	1000	12300
23	7230	3590	16100	29500	9500	18200	34200	4380	5030	4960	612	14100
24	7290	1420	15500	28000	10000	18200	33800	2780	4790	2590	1530	15100
25	2890	9430	15300	27800	11000	17600	33100	2620	4960	1760	1120	11700
26	1040	12300	23900	24600	9260	15700	26200	5640	4540	2360	546	4420
27	3510	12400	23900	20100	9290	14100	21700	7320	3330	4880	209	5670
28	7520	3260	14800	16900	8490	13600	22400	6810	4260	6760	116	8780
29	5860	1410	8670	15300	6930	23900	26600	5060	3890	9700	928	8490
30	3980	2070	9350	15000	---	23600	28600	3420	2810	6960	333	7610
31	2880	---	8180	14500	---	18000	---	3420	---	5330	1660	---
TOTAL	254700	102550	284570	526460	335170	700140	997600	361530	152220	111573	59423	117878
MEAN	8216	3418	9180	16980	11560	22590	33250	11660	5074	3599	1917	3929
MAX	28500	12400	23900	31800	14400	41100	49800	28000	14300	9700	5940	15100
MIN	1040	1110	2160	9000	6930	8740	19800	2620	1380	622	116	87
AC-FT	505200	203400	564400	1044000	664800	1389000	1979000	717100	301900	221300	117900	233800

CAL YR 1987 TOTAL 6354920 MEAN 17410 MAX 60500 MIN 1040 AC-FT 12600000  
WTR YR 1988 TOTAL 4003814 MEAN 10940 MAX 49800 MIN 87 AC-FT 7942000

e Estimated

## ARKANSAS RIVER BASIN

## 07171000 VERDIGRIS RIVER NEAR LENAPAH, OK

LOCATION.--Lat 36°51'05", long 95°35'06", at center of sec.3, T.27 N., R.16 E., Nowata County, Hydrologic Unit 11070103, on right bank on downstream side of county road bridge, 2.8 mi east of Lenapah, 4.5 mi upstream from Cedar Creek, and at mile 144.6.

DRAINAGE AREA.--3,639 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1938 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 977: 1942 (M). WSP 1117: drainage area.

GAGE.--Water-stage recorder. Datum of gage is 644.89 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Some regulation since April 1949 by Fall River Reservoir in Kansas. Flow regulated since 1960 by Toronto Lake in Kansas. Flow has been further regulated since 1966 by Elk Reservoir in Kansas. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Prior to regulation, 11 years (water years 1939-49), 2,599 ft<sup>3</sup>/s, 1,833,000 acre-ft/yr; since regulation, 22 years (water years 1967-88), 2,780 ft<sup>3</sup>/s, 2,014,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 137,000 ft<sup>3</sup>/s, May 20, 1943, gage height, 40.44 ft, from floodmarks; no flow at times in 1939-40, and 1956.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 39,100 ft<sup>3</sup>/s, Apr. 2, gage height, 34.06 ft; minimum daily discharge, 8.2 ft<sup>3</sup>/s, Sept. 12

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	72	45	1710	9900	1090	521	31700	2170	500	15	163	11
2	72	52	1890	7290	1000	690	38400	1590	349	79	155	11
3	144	57	2040	5860	980	11900	37300	1460	318	741	146	10
4	210	51	1750	5620	1130	16100	34400	1570	219	292	131	9.7
5	207	45	1590	6150	1140	13800	30600	1690	152	152	92	9.2
6	160	45	1420	4610	1070	12900	12100	1550	131	98	61	9.8
7	106	42	902	3260	838	12800	13700	1450	122	68	42	11
8	82	38	767	2580	838	11300	15600	1190	114	50	31	11
9	74	33	746	1630	865	9770	16000	920	106	42	26	10
10	72	33	703	1480	781	9100	18300	757	95	34	42	9.2
11	73	99	508	1500	623	8720	18000	625	86	29	45	8.3
12	69	107	428	1310	549	7940	14500	596	79	82	30	8.2
13	66	103	413	1400	522	6910	14100	505	67	259	155	21
14	62	102	396	1510	584	6490	14000	424	54	136	78	28
15	59	212	400	1810	688	5160	13700	400	43	82	60	29
16	58	391	418	2050	786	3500	13500	574	39	56	73	93
17	57	386	412	2940	817	2780	13200	796	57	59	44	156
18	50	608	366	2530	884	3010	17200	442	56	126	32	168
19	67	913	4630	3870	1360	2670	18800	307	73	508	28	4160
20	111	1000	20700	7290	1870	2460	17300	233	63	1170	28	3780
21	103	927	16900	6990	1720	3010	12600	238	50	1010	27	1190
22	75	882	11700	6250	1390	3640	12300	222	40	869	26	893
23	59	723	7760	4880	1220	e5000	12400	283	33	805	40	835
24	47	7450	9430	3810	1250	3880	12000	373	26	754	97	560
25	39	11300	10500	3190	1200	3030	11700	455	20	725	69	244
26	42	3930	10900	3030	942	2490	9500	598	16	1120	48	151
27	64	1780	14600	2240	650	1910	7460	710	13	799	34	119
28	60	1740	15000	1890	564	1710	3240	758	10	343	25	97
29	57	1740	13200	1650	543	6350	2240	732	8.3	203	19	82
30	56	1670	11000	1410	---	8530	3100	678	8.3	183	15	73
31	49	---	11100	1320	---	8910	---	620	---	173	13	---
TOTAL	2522	36504	174279	111250	27894	196981	488940	24916	2947.6	11062	1875	12797.4
MEAN	81.4	1217	5622	3589	962	6354	16300	804	98.3	357	60.5	427
MAX	210	11300	20700	9900	1870	16100	38400	2170	500	1170	163	4160
MIN	39	33	366	1310	522	521	2240	222	8.3	15	13	8.2
AC-FT	5000	72410	345700	220700	55330	390700	969800	49420	5850	21940	3720	25380

CAL YR 1987 TOTAL 1202402 MEAN 3294 MAX 27900 MIN 32 AC-FT 2385000  
WTR YR 1988 TOTAL 1091968.0 MEAN 2984 MAX 38400 MIN 8.2 AC-FT 2166000

e Estimated

## 07171300 OOLOGAH LAKE NEAR OOLOGAH, OK

LOCATION.--Lat 36°25'19", long 95°40'43", in NE 1/4 NW 1/4 sec.2, T.22 N., R.15 E., Rogers County, Hydrologic Unit 11070103, in gage tower 1,000 ft from left end of dam on Verdigris River, 2.0 mi southeast of Oologah, and at mile 90.3.

DRAINAGE AREA.--4,339 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1963 to current year. Prior to October 1970, published as Oologah Reservoir near Oologah.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by earth dam. Spillway is concrete ogee-type weir controlled by 7 taintor gates.

Storage began May 15, 1963, conservation pool was first filled Apr. 4, 1964. Capacity 1,519,000 acre-ft at elevation 661.0 ft, top of flood control pool, 553,400 acre-ft at elevation 638.0 ft, conservation pool. Dead storage 9,260 acre-ft below elevation 592.0 ft. Figures given herein represent total contents. Reservoir is used for flood control and conservation.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 1,751,000 acre-ft, Oct. 9, 1986, elevation, 664.90 ft; minimum since conservation pool first filled 33,750 acre-ft, Aug. 28, and Oct. 27, 1969, elevation, 602.87 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 950,000 acre-ft, Apr. 6, elevation, 649.34 ft; minimum, 454,200 acre-ft, Sept. 15, elevation, 634.43 ft.

Capacity table (elevation, in feet, and contents, in acre-ft):

635	469,400	655	1,203,000
640	614,100	660	1,462,000
645	782,400	665	1,757,000
650	978,000		

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	540200	541000	642400	835700	660600	553400	695000	604000	499800	479600	480700	464800
2	549900	542200	641400	827200	652800	565400	779400	592100	500600	478800	481000	465400
3	548200	541600	641300	817500	650500	600900	855500	591100	500600	478000	480700	465100
4	551100	541900	641100	802000	646900	633900	910100	588100	499000	476700	480200	461900
5	548200	540500	637800	782400	641100	657700	946600	585900	498500	477800	480400	462400
6	547100	536400	637800	768900	630600	677600	938600	581900	497400	477500	480200	461100
7	547100	536700	634600	756000	628700	698400	924800	577000	495800	476700	479100	457300
8	543600	544800	632900	740700	624600	710200	912500	574900	497700	475600	477800	458700
9	548800	539600	621800	743200	619300	719200	906100	570000	495000	475600	480200	458900
10	547600	537000	596000	706700	621200	726500	900200	560000	492800	474000	477200	458700
11	545100	534700	580400	690000	608300	728600	896600	547600	490900	473500	476400	457600
12	543000	534100	571200	685100	600300	729600	882400	535000	490100	472900	476100	456800
13	541600	534400	563500	676000	584100	723700	867300	525500	489100	471600	474800	456800
14	541000	534100	560900	666500	597300	715400	850500	519800	488200	470800	475900	456800
15	539600	539000	555400	659000	566600	701800	832000	514600	487700	470000	475300	458400
16	540500	541300	553700	661000	561400	686100	810900	509200	487700	468100	475300	460300
17	540500	542500	551700	663600	560000	673400	794200	503100	487400	470800	475600	461100
18	541300	543600	553100	662300	558600	650500	786100	499300	486100	470800	474500	463800
19	541900	544500	594200	664600	559100	627100	778700	499000	485800	473700	473200	469700
20	540800	545600	654500	673400	560600	602500	770300	499000	485000	473500	473200	476700
21	538200	542800	688700	678300	558000	585600	750800	497900	484500	475100	470800	479900
22	537600	547600	710200	680900	558800	578300	732100	499000	484200	476100	468100	480400
23	540500	548200	716400	682200	556800	574300	712300	499500	483700	475600	471300	485600
24	544500	586500	742800	682800	554800	573000	691300	499000	483700	477200	469700	487700
25	543300	642400	772000	680500	554500	571500	678900	499500	481500	477800	469700	487700
26	543900	652500	778700	677600	554500	566000	671400	498700	479900	480400	468900	488200
27	542500	651800	797900	672700	554800	556300	660600	498200	481000	481000	468600	488200
28	541900	649200	823800	669500	556000	562600	649200	498200	480700	483700	468300	488000
29	541300	646900	834900	663600	554000	581600	633900	498200	478000	482100	466700	488200
30	540800	644000	837200	662900	---	597300	621200	499000	477200	482300	466200	488000
31	541300	---	840500	662300	---	609500	---	499000	---	482100	465700	---
MAX	551100	652500	840500	835700	660600	729600	946600	604000	500600	483700	481000	488200
MIN	537600	534100	551700	659000	554000	553400	621200	497900	477200	468100	465700	456800
(+)	637.58	640.94	646.57	641.50	638.02	639.85	640.23	636.10	635.29	635.47	634.86	635.69
(++)	-7,800	+102,700	+196,500	-178,200	-108,300	+55,500	+621,200	-122,200	-21,800	+4,900	-16,400	+22,300
CAL YR 1987	MAX 895500	MIN 522400	(++) +245,000									
WTR YR 1988	MAX 946600	MIN 456800	(++) -61,100									

(+) ELEVATION, IN FEET, AT END OF MONTH  
(++) CHANGE IN CONTENTS, IN ACRE-FEET

## ARKANSAS RIVER BASIN

07171400 VERDIGRIS RIVER NEAR OOLOGAH, OK

LOCATION (REVISED).--Lat 36°25'14", Long 95°41'03", in NW 1/4 NW 1/4 sec.2, T.22 N., R.15 E., Rogers County, Hydrologic Unit 11070105, on right bank 0.2 mi downstream from Oologah Dam, 1.2 mi upstream from Fourmile Creek, 2 mi southeast of Oologah, and at mile 90.0.

DRAINAGE AREA.--4,339 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1961 to current year.

GAGE.--Water-stage recorder. Datum of gage is 552.00 ft above National Geodetic Vertical Datum of 1929. The datum published in WSP 1921 was in error; the datum is unchanged for period of record.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Some regulation by several dams in Kansas prior to May 1963, and completely regulated thereafter by Oologah Lake (station 07171300). U.S. Army Corps of Engineers' satellite telemeter is connected to station.

AVERAGE DISCHARGE.--Since regulation by Oologah Lake, 24 years (water years 1965-88), 3,058 ft<sup>3</sup>/s, 2,216,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 53,700 ft<sup>3</sup>/s, Oct. 14, 1986, maximum gage height, 38.23 ft, Oct. 8, 1986, backwater from Caney River; no flow at time in several years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in May 1943 reached a stage of 65.2 ft, from floodmarks. Flood of May 9, 1961, reached a stage of 52.8 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 23,800 ft<sup>3</sup>/s, Apr. 14, gage height, 31.90 ft; minimum daily discharge, 5.2 ft<sup>3</sup>/s, Sept. 17.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	123	107	2280	11200	3200	733	4510	10200	193	13	13	9.3
2	123	108	2280	11200	3180	867	3620	6460	159	13	13	8.8
3	120	109	2260	11100	3180	1510	3500	2870	197	13	14	7.5
4	117	109	2260	14300	3160	2170	8590	2860	198	14	14	7.6
5	115	109	2260	15700	3150	4500	17100	2860	197	15	13	7.7
6	115	109	2250	12200	3150	4510	19800	2860	198	15	14	7.3
7	113	109	2250	9890	3150	4440	20100	2860	201	15	15	7.8
8	112	107	2250	9860	3150	4420	21100	2860	202	14	18	7.8
9	112	107	7990	9830	3140	4420	22100	3550	198	14	18	6.8
10	112	107	14600	9790	3140	4430	22100	5750	197	13	19	6.4
11	111	107	6580	9750	3140	6220	22200	6770	201	14	14	6.4
12	110	106	5070	8020	4620	8160	22100	6740	202	14	11	6.5
13	112	104	5050	6240	6080	8160	21800	5010	203	14	8.6	6.1
14	112	106	2910	6210	6060	9480	22900	2840	132	15	8.4	6.7
15	111	137	2200	5320	6060	11700	23600	2830	40	15	12	7.3
16	107	105	894	4300	4500	11600	23500	3140	44	14	15	7.3
17	107	102	633	4270	2230	11600	23400	3390	28	14	13	5.2
18	107	102	727	4210	2220	13500	23300	1800	16	13	12	5.6
19	107	102	2270	4290	2300	15100	23400	216	16	14	11	8.3
20	105	104	875	4210	2270	15000	23400	214	15	13	9.4	5.9
21	104	105	693	4190	2240	11900	23100	213	20	13	9.0	6.3
22	103	104	2070	4190	2220	6620	23000	210	18	13	8.9	6.3
23	107	105	4000	4180	2220	4960	22900	209	13	13	12	15
24	101	1100	4450	4180	2220	4950	22700	203	13	13	11	25
25	99	130	4650	4170	1390	4970	19100	201	13	13	9.8	5.6
26	104	429	4940	4170	752	4990	14000	203	13	13	9.3	5.9
27	104	3530	4800	4150	738	4980	12100	201	13	13	9.1	6.7
28	104	3510	4520	4150	736	2800	10300	198	13	14	9.1	7.1
29	104	3480	6940	3750	733	1560	10200	196	13	14	9.0	7.2
30	105	2460	10400	3220	---	2260	10200	194	13	13	9.1	7.2
31	107	---	11200	3210	---	3300	---	193	---	13	9.4	---
TOTAL	3393	17109	126552	215450	84329	195810	539720	78301	2979	424	371.1	234.6
MEAN	109	570	4082	6950	2908	6316	17990	2526	99.3	13.7	12.0	7.82
MAX	123	3530	14600	15700	6080	15100	23600	10200	203	15	19	25
MIN	99	102	633	3210	733	733	3500	193	13	13	8.4	5.2
AC-FT	6730	33940	251000	427300	167300	388400	1071000	155300	5910	841	736	465
CAL YR 1987	TOTAL	1230307	MEAN	3371	MAX	14900	MIN	96	AC-FT	2440000		
WTR YR 1988	TOTAL	1264672.7	MEAN	3455	MAX	23600	MIN	5.2	AC-FT	2508000		



## ARKANSAS RIVER BASIN

07172500 HULAH LAKE NEAR HULAH, OK

LOCATION (REVISED).--Lat 36°55'39", long 96°05'18", in SW 1/4 SE 1/4 sec.2, T.28 N., R.11 E., Osage County, Hydrologic Unit 11070106, in stair tower at right end of Hulah Dam on Caney River, 0.5 mi downstream from Hickory Creek, 2.0 mi west of Hulah, 15.7 mi upstream from Little Caney River, and at mile 96.2.

DRAINAGE AREA.--732 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1950 to current year. Prior to October 1970, published as Hulah Reservoir near Hulah.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929. Prior to Feb. 15, 1951, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by an earth dam. Spillway is 472-foot concrete ogee-type weir controlled by 10 taintor gates. Outlet works consist of nine rectangular sluices, two 24-inch gated pipes, and one 10-inch water-supply pipe. Closure for diversion made Feb. 6, 1950; regulated storage began Oct. 25, 1950; conservation pool was first filled Sept. 24, 1951. Capacity, 289,000 acre-ft, at elevation 765.0 ft, top of taintor gates, 61,360 acre-ft, at elevation 740.0 ft, crest of spillway, and 31,120 acre-ft, at elevation 733.0 ft, conservation pool. Figures given herein represent total contents. Reservoir is used for flood control, conservation, and municipal water supply. Revised capacity table, based on survey in 1973, used since Oct. 1, 1977.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 350,100 acre-ft, Oct. 3, 1986, elevation, 769.41 ft; minimum since conservation pool was first filled, 11,250 acre-ft, Mar. 20, 1957, elevation, 723.22 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 154,400 acre-ft, Apr. 5, elevation 752.92 ft; minimum, 25,560 acre-ft, Sept. 15, elevation 731.36 ft.

Capacity table (elevation, in feet, and contents, in acre-ft):

725	9,940	745	90,970
730	21,400	750	128,700
735	36,680	755	174,200
740	61,360	760	227,400

RESERVOIR STORAGE (ACRE-Feet), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	30200	30170	37180	61410	31590	31160	120900	49030	31880	29500	29430	26740
2	30310	30170	33970	58380	30730	33670	140200	48760	31880	29540	29290	26670
3	30280	30170	31630	55480	30560	56750	149200	48760	31840	29260	29220	26600
4	30200	30060	31260	52530	30660	62820	153400	46590	31700	29120	29090	26470
5	30310	29960	31230	49530	30840	64400	153400	45240	31590	29020	29020	26340
6	30200	29890	31260	46500	31160	66880	150300	43830	31370	29020	28950	26170
7	30170	29820	31230	43490	31410	68930	146500	42310	31230	28990	28820	26010
8	30060	29960	31230	40990	31630	67490	142000	40820	31230	28920	28750	25840
9	29960	29820	31480	39530	32100	64670	137800	37180	31230	28920	28770	25850
10	29890	29750	31450	38130	32460	31360	139000	34420	31190	28920	28840	25790
11	29890	29710	31260	36590	32310	58380	135100	33820	31010	29020	28770	25760
12	29820	29640	31260	34910	32210	54660	129600	32020	30940	28950	28820	25690
13	29710	29610	31520	33340	31950	50950	123300	30980	30940	29360	28610	25660
14	29640	29570	32210	31660	32100	47380	117600	30800	30940	29360	28540	25600
15	29640	30240	32170	30910	31520	43910	111800	30660	30910	29360	28440	25560
16	29610	30660	32210	34720	31410	40620	106100	30630	30870	29360	28340	26770
17	29570	30700	32390	40050	31410	37300	102300	30420	30870	29360	28240	26640
18	29570	30940	32530	42560	31660	36020	104900	30420	30730	29330	28170	32860
19	29570	31080	43410	49990	31660	36100	101400	30560	30590	29260	28100	38680
20	29570	31230	62770	50670	31660	37100	97450	30800	30520	29260	27970	39200
21	29710	31260	66940	49530	31810	36950	90770	31080	30490	29260	27730	37850
22	29680	31340	65850	47960	31920	36170	84400	31450	30450	30270	27630	35370
23	29680	31590	62250	46110	31630	35170	78600	31880	30240	30200	27630	34050
24	29890	45720	60340	44300	31410	34230	72670	32130	30170	30130	27560	33080
25	30310	47740	59180	41820	31300	33340	67380	32350	30130	30060	27300	32170
26	30280	46980	58570	39690	31230	33040	61830	32460	30060	29990	27130	31370
27	30240	45940	64240	36790	31160	32500	56300	32390	29820	29920	27070	30940
28	30240	45020	68540	34420	31050	33970	50630	32280	29710	29850	26900	31050
29	30240	43910	67550	32790	30980	36670	48410	32130	29640	29750	27000	31160
30	30100	41030	65750	32280	---	37460	49990	32020	29470	29640	26930	31080
31	30110	---	64080	31810	---	43070	---	31880	---	29570	26800	---
MAX	30310	47740	68540	61410	32460	68930	153400	49030	31880	30270	29430	39200
MIN	29570	29570	31230	30910	30560	31160	48410	30420	29470	28920	26800	25560
(+)	732.73	735.58	740.52	733.19	732.96	736.07	737.65	733.21	732.53	732.56	731.74	732.99
(++)	-580	+10,920	+23,050	-32,270	-830	+12,090	+6,920	-18,110	-2,410	+100	-2,770	+4,280

CAL YR 1987 MAX 136500 MIN 29570 (++) +10,220  
WTR YR 1988 MAX 153400 MIN 25560 (++) +390

(+) ELEVATION, IN FEET, AT END OF MONTH  
(++) CHANGE IN CONTENTS, IN ACRE-Feet

## 07173000 CANEY RIVER NEAR HULAH, OK

LOCATION (REVISED).--Lat 36°55'39", long 96°05'18", in SW 1/4 SE 1/4 sec.2, T.28 N., R.11 E., Osage County, Hydrologic Unit 11070106, on left bank 1,200 ft downstream from Hulah Dam, 2.1 mi upstream from Opossum Creek, 2.5 mi west of Hulah, and at mile 95.9.

DRAINAGE AREA.--733 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1937 to current year.

REVISED RECORDS.--WSP 1117: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 699.00 ft above National Geodetic Vertical Datum of 1929. Prior to Feb. 18, 1939, nonrecording gage. Feb. 18, 1939 to Sept. 30, 1948, waterstage recorder at county road bridge, 0.2 mi upstream at datum 14.04 ft lower. Oct. 1, 1948 to Sept. 30, 1972, at site 0.6 mi downstream at datum 17.04 ft lower.

REMARKS.--No estimated daily discharges. Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Flow completely regulated since February 1950 by Hulah Lake (station 07172500). About 5 to 9 ft<sup>3</sup>/s is diverted from gage pool for municipal water supply by the city of Bartlesville.

AVERAGE DISCHARGE.--Prior to regulation by Hulah Lake, 13 years (water years 1938-50), 413 ft<sup>3</sup>/s, 299,200 acre-ft/yr; since regulation by Hulah Lake, 38 years (water years 1951-88), 393 ft<sup>3</sup>/s, 284,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 58,000 ft<sup>3</sup>/s, from rating curve extended above 7,000 ft<sup>3</sup>/s, on basis of relating stage to release records at maximum and lower stages, Oct. 3, 1986, gage height, 26.80 ft; no flow at times in several years.

EXTREMES OUTSIDE PERIOD OF RECORD.--A stage of 40.2 ft occurred at original site and datum, date unknown, from floodmark, information provided by U.S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,580 ft<sup>3</sup>/s, Apr. 6, gage height, 6.47 ft; minimum daily discharge, 1.0 ft<sup>3</sup>/s, June 9-12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.0	3.1	2090	2100	560	28	86	1530	68	4.9	4.6	3.0
2	3.8	3.1	2040	2080	580	37	82	1520	71	5.1	4.6	3.0
3	4.0	3.1	1380	2080	294	49	81	1260	68	5.1	4.6	2.9
4	4.0	3.1	380	2060	156	1080	1500	948	66	5.7	4.6	2.8
5	3.2	3.1	142	2050	112	2020	3300	948	66	8.4	4.6	2.8
6	1.8	3.1	142	2040	82	2030	3580	948	66	5.3	5.0	2.8
7	1.7	3.1	142	2000	82	2050	3530	946	32	5.2	6.0	2.8
8	1.7	3.1	137	1510	82	2370	3500	928	2.4	5.2	6.2	2.8
9	3.1	3.1	133	1070	82	2490	3360	920	1.0	5.2	8.1	2.8
10	3.4	3.1	133	1070	131	2460	1940	906	1.0	5.2	5.2	2.8
11	3.0	3.1	96	1060	204	2460	2740	899	1.0	7.9	4.7	2.8
12	2.8	3.1	71	1050	207	2430	3420	899	1.0	5.4	5.1	2.8
13	2.7	3.1	71	1050	211	2400	3380	552	6.8	6.6	5.0	2.8
14	2.7	10	71	1050	211	2240	3340	142	14	5.1	4.9	2.8
15	2.7	12	71	462	211	2080	3310	142	6.6	5.2	4.9	3.0
16	2.7	7.0	108	226	175	2050	3280	142	6.6	5.2	4.8	15
17	2.7	3.1	128	226	148	2030	3140	142	4.9	6.8	4.5	15
18	2.8	1.3	128	228	146	1340	1820	66	4.9	4.3	4.4	17
19	2.8	4.0	134	689	142	978	2710	5.4	4.7	5.1	5.7	17
20	2.8	4.9	141	1380	142	978	3550	4.7	4.9	4.6	6.2	4.5
21	2.8	4.7	1390	1570	142	978	3520	3.8	6.0	4.6	7.3	619
22	2.8	4.7	3070	1580	178	978	3480	3.8	7.0	4.6	2.5	1060
23	2.9	4.7	3150	1570	208	978	3410	3.8	6.5	4.6	1.2	595
24	3.0	11	1790	1560	170	970	3360	2.4	4.7	4.6	1.2	291
25	3.0	292	1630	1540	136	694	3310	2.9	4.6	4.6	4.3	291
26	3.0	1120	960	1540	136	474	3270	40	4.6	4.6	6.0	291
27	3.0	1120	8.2	1530	136	474	3200	65	4.6	4.6	5.9	108
28	3.0	1120	481	1520	136	474	3150	65	4.6	4.6	5.8	11
29	3.0	1120	1940	1000	70	474	2320	66	4.6	4.6	5.8	13
30	3.1	1460	2130	553	---	771	1520	66	4.6	4.6	4.5	9.5
31	3.1	---	2130	546	---	615	---	67	---	4.6	3.0	---
TOTAL	91.1	6339.7	26417.2	39990	5270	41480	82189	14233.8	548.6	162.1	151.2	3399.7
MEAN	2.94	211	852	1290	182	1338	2740	459	18.3	5.23	4.88	113
MAX	4.0	1460	3150	2100	580	2490	3580	1530	71	8.4	8.1	1060
MIN	1.7	1.3	8.2	226	70	28	81	2.4	1.0	4.3	1.2	2.8
AC-FT	181	12570	52400	79320	10450	82280	163000	28230	1090	322	300	6740

CAL YR 1987 TOTAL 264787.5 MEAN 725 MAX 4800 MIN 1.3 AC-FT 525200  
WTR YR 1988 TOTAL 220272.4 MEAN 602 MAX 3580 MIN 1.0 AC-FT 436900

## ARKANSAS RIVER BASIN

07174300 COPAN LAKE NEAR COPAN, OK

LOCATION.--Lat 36°53'13", long 95°57'10", in NW 1/4, NW 1/4 sec.29, T.28 N., R.13 E., Washington County, Hydrologic Unit 11070106, 600 ft northwest of project office, 1.5 mi southwest of Copan and at mile 7.4.

DRAINAGE AREA.--505 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1983 to current year.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by earth dam. Spillway is concrete ogee-type weir controlled by 4 taintor gates. A 36-inch diameter low-flow pipe and a 12-inch diameter future water-supply pipe extend through the spillway.

Storage began Apr. 1, 1983, conservation pool was first filled Apr. 23, 1983. Capacity 227,700 acre-feet at elevation 732.0 ft, top of flood control pool; 43,400 acre-ft at elevation, 710.0 ft, top of conservation pool. Dead storage 600 acre-ft below elevation 687.5 ft. Figures given herein represent total contents. Reservoir is used for flood control, water conservation, and future water supply.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 278,700 acre-ft, Oct. 4, 1986, elevation, 735.35 ft; minimum since conservation pool first filled, 30,830 acre-ft, Oct. 14, 1983, elevation, 707.17 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 137,100 acre-ft, Apr. 6, elevation, 723.77 ft; minimum, 35,370 acre-ft, Sept. 15, elevation, 708.25 ft.

Capacity table (elevation, in feet, and contents, in acre-ft):

705	22,830	725	148,400
710	43,400	730	203,200
715	71,170	735	273,200
720	105,900	740	359,600

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	41750	40010	51030	70860	43900	43700	83010	72760	41750	40530	40060	36970
2	41660	40010	48920	68240	43750	45450	108400	70990	42220	40290	40010	36880
3	41520	39960	47290	65310	43750	53670	124200	68420	42410	40240	39870	36790
4	41370	39910	45890	62560	43700	61390	132000	64600	42600	40100	39870	36610
5	41280	39910	45250	59060	43500	66590	135800	60870	42650	39960	39820	36520
6	41190	39730	44650	56230	43310	70620	137100	57560	42600	39870	39630	36350
7	41090	39490	44100	53190	43160	74040	136300	54230	42600	39770	39490	36040
8	40900	39440	43750	51140	43070	75320	134300	52090	42830	39680	39410	36040
9	41140	39730	43550	49870	43070	73280	132200	49760	42510	39580	39490	36080
10	40900	39490	43310	49130	43160	69830	135500	47670	42410	39580	39350	35910
11	40900	39300	43350	47890	43120	66290	133900	45250	42270	39580	39210	35820
12	40720	39210	43310	46790	43120	62270	130000	42980	42130	39910	39110	35770
13	40480	39160	43400	45650	43070	58900	125700	41750	42030	39960	39020	35680
14	40570	39160	44000	44050	43020	55230	121600	41040	41990	39960	39070	35610
15	40480	39020	43900	43900	42980	52720	117300	40430	41920	39770	38880	35550
16	40390	39630	43750	44900	43120	50770	113500	40290	41850	39820	38780	36970
17	40390	40100	43700	47390	43120	49340	110600	40430	41800	40010	38690	36970
18	40290	40430	43750	49760	43650	48190	111100	40570	41660	40200	38560	40720
19	40240	40670	46640	52560	43800	47740	109300	40620	41560	40720	38560	44900
20	40340	40670	54230	54340	43900	47440	106500	40720	41470	41040	38420	46390
21	40100	40570	61920	54060	43900	47240	103000	41000	41420	41140	38380	46390
22	39960	40860	64780	53510	44150	46540	99420	41140	41330	41140	38290	45990
23	39870	40860	65250	52190	44050	45700	95260	41370	41280	40950	38160	45450
24	39730	43400	66290	50870	44100	45100	91360	41520	41190	40950	37980	44650
25	40010	48440	67020	49230	44050	44650	87670	41700	41090	40860	37940	44000
26	40200	51400	67200	47490	44100	44400	83540	41700	41000	40810	37760	43650
27	40240	52720	72130	45990	44050	44150	78480	41750	40900	40570	37670	43650
28	40100	53300	76150	44400	44200	44650	73210	41800	40720	40530	37500	43650
29	40060	53460	76720	43160	44000	48090	71170	41750	40530	40430	37320	43550
30	40010	52980	75060	43450	---	50550	73340	41750	40720	40340	37140	43400
31	39960	---	73280	44000	---	55890	---	41850	---	40240	37100	---
MAX	41750	53460	76720	70860	44200	75320	137100	72760	42830	41140	40060	46390
MIN	39730	39020	43310	43160	42980	43700	71170	40290	40530	39580	37100	35550
(+)	709.27	711.87	715.33	710.12	710.12	712.40	715.34	709.68	709.39	709.34	708.63	710.00
(++)	-1,900	+13,020	+20,300	-29,280	0	+11,890	+17,450	-31,490	-1,130	-480	-3,140	+6,300
CAL YR 1987	MAX 104000	MIN 39020	(++) +28,810									
WTR YR 1988	MAX 137100	MIN 35550	(++) +1,540									

(+) ELEVATION, IN FEET AT END OF MONTH

(++) CHANGE IN CONTENTS, IN ACRE-FEET

## ARKANSAS RIVER BASIN

## 07174400 CANEY RIVER ABOVE COON CREEK AT BARTLESVILLE, OK

LOCATION.--Lat 36°45'20", long 95°58'19" (revised), in NE 1/4 NE 1/4 sec.12, T.26 N, R.12 E, Washington County, Hydrologic Unit 11070103, at right bank in city of Bartlesville water intake tower, 0.2 mi upstream from State Highway 123 bridge and low-water dam, 0.5 mi downstream from Atchison, Topeka, and Santa Fe railroad bridge, 1.0 mi upstream from confluence with Coon Creek, 2.7 mi downstream from confluence with Butler Creek, 5.0 mi upstream from confluence with Sand Creek, and at mile 69.2.

DRAINAGE AREA.--1,392 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1985 to current year.

GAGE.--Water-stage recorder. Datum of gage is 653.33 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Considerable regulation by Hulah Lake (station 07172500) 27.0 mi upstream, and Copan Lake (station 07174300) 12.0 mi upstream. Diversion at gage for municipal water supply by the city of Bartlesville. U.S. Army Corps of Engineers' satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 94,500 ft<sup>3</sup>/s, Oct. 4, 1986, gage height, 27.70 ft; minimum daily discharge, 6.6 ft<sup>3</sup>/s, Oct. 5-10, 1987.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 8,490 ft<sup>3</sup>/s, Apr. 1, gage height, 14.56 ft (from measurement on peak and during backwater); minimum daily discharge, 6.6 ft<sup>3</sup>/s, Oct. 5-10.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15	16	2470	4380	871	155	e8000	3520	101	18	22	20
2	13	16	3070	4300	869	148	e4000	3390	112	19	22	20
3	10	16	3060	4230	866	3070	1080	3350	140	20	20	20
4	7.1	16	2290	4190	464	1570	816	3320	160	20	26	20
5	6.6	16	923	4140	349	3630	3610	3250	153	20	26	20
6	6.6	16	602	4110	275	4490	5340	3140	139	20	24	20
7	6.6	16	597	4060	237	4130	5940	2750	126	20	22	20
8	6.6	16	435	4090	237	3940	5990	2670	78	20	22	20
9	6.6	16	340	2760	236	4910	5920	2580	32	20	27	20
10	6.6	16	334	2220	179	5350	5910	2290	25	20	27	18
11	7.4	16	270	2200	222	5390	4270	2240	24	23	26	18
12	7.8	16	173	2190	334	5330	5350	2210	24	30	34	18
13	7.8	16	92	2190	393	5270	5800	2110	22	24	26	18
14	8.3	14	90	2150	365	5130	5780	965	22	24	23	18
15	10	62	90	1790	364	4220	5700	630	25	23	22	19
16	11	42	90	1030	363	3940	5600	600	28	22	22	186
17	11	30	142	1230	251	3970	5540	423	25	22	21	90
18	11	19	228	788	207	4030	5540	275	24	22	20	517
19	20	16	699	1110	236	2730	4710	123	24	42	20	1020
20	17	16	1610	1990	290	2340	5410	40	24	118	20	515
21	16	12	631	2910	304	2270	5750	37	24	84	20	305
22	16	11	2400	3010	292	2230	5750	33	21	45	20	1350
23	16	12	4730	3000	334	2200	5660	34	18	30	22	1630
24	19	489	4630	2980	364	2180	5590	41	18	26	22	1010
25	22	275	3120	2960	305	2120	5540	41	18	26	20	795
26	23	862	2910	2940	259	1190	5480	36	18	26	20	760
27	24	1600	2280	2910	259	941	5730	56	18	26	20	502
28	22	1620	830	2870	251	922	5790	94	18	26	20	165
29	22	1620	1820	2770	251	1090	5650	95	18	26	20	38
30	18	1620	4130	1350	---	1310	4300	99	18	26	20	29
31	16	---	4440	907	---	2770	---	100	---	24	20	---
TOTAL	410.0	8528	49526	83755	10227	92966	155546	40542	1497	912	696	9201
MEAN	13.2	284	1598	2702	353	2999	5185	1308	49.9	29.4	22.5	307
MAX	24	1620	4730	4380	871	5390	8000	3520	160	118	34	1630
MIN	6.6	11	90	788	179	148	816	33	18	18	20	18
AC-FT	813	16920	98230	166100	20290	184400	308500	80420	2970	1810	1380	18250

CAL YR 1987 TOTAL 478146.3 MEAN 1310 MAX 7920 MIN 6.6 AC-FT 948400  
WTR YR 1988 TOTAL 453806.0 MEAN 1240 MAX 8000 MIN 6.6 AC-FT 900100

e Estimated



## 07174600 SAND CREEK AT OKESA, OK

LOCATION (REVISED).--Lat 36°43'08", Long 96°07'55", in SW 1/4 NW 1/4 sec.21, T.26 N., R.11 E., Osage County, Hydrologic Unit 11070106, on downstream side of left abutment of county road bridge, 0.5 mi northeast of Okesa, 9 mi southwest of Bartlesville, and at mile 17.2.

DRAINAGE AREA.--139 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1959 to current year.

GAGE.--Water-stage recorder. Datum of gage is 689.20 ft above National Geodetic Vertical Datum of 1929. Prior to May 25, 1960, nonrecording gage at same site and datum.

REMARKS.--Records poor. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office.

AVERAGE DISCHARGE.--29 years, 81.7 ft<sup>3</sup>/s, 59,190 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,500 ft<sup>3</sup>/s, Mar. 10, 1974, gage height, 28.6 ft; from floodmarks; no flow at times in most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Mar. 3	0900	3,720	12.37	Sept. 18	1415	4,900	14.13
Apr. 1	1200	*12,400	*22.53				

No flow Aug. 27-Sept. 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.3	1.7	25	e31	e20	14	8230	73	9.8	.76	1.9	.00
2	1.1	1.5	17	e28	e21	56	1560	54	9.7	.64	1.8	.00
3	1.3	1.4	13	e26	e20	2340	363	42	11	.58	1.4	.00
4	1.2	1.3	13	e24	e19	573	229	36	9.9	.58	1.0	.00
5	.87	1.0	12	e67	e18	665	164	34	8.2	.58	.72	.00
6	.67	1.1	11	e200	e19	625	115	31	7.9	.58	.58	.00
7	.58	1.2	10	e70	e20	669	94	29	7.1	.58	.54	.00
8	.56	1.1	9.6	e80	e22	280	79	30	6.5	.58	.50	.00
9	.50	.83	8.5	e70	24	170	68	28	6.2	.50	.45	.00
10	.47	.78	7.8	e50	23	121	1080	23	5.3	.50	.43	.00
11	.43	.78	7.1	e37	23	93	314	19	4.6	.51	.40	.00
12	.40	.78	7.1	e31	21	71	161	17	4.2	.47	.45	.00
13	.40	1.1	7.1	e26	19	56	115	16	3.7	1.3	.43	.00
14	.34	1.4	e8.6	e20	18	45	90	16	3.3	2.7	.30	.00
15	.30	2.9	e11	e15	18	40	73	16	3.2	2.3	.26	.00
16	.32	4.3	e190	e12	19	37	59	16	2.8	2.0	.24	175
17	.36	6.2	e1100	e12	21	85	57	11	2.7	2.0	.20	75
18	.35	4.9	e350	e11	19	252	1320	11	2.7	2.4	.19	2000
19	.58	4.2	e200	e11	30	265	298	11	2.5	2.3	.15	1270
20	.68	3.8	e3500	e11	38	171	162	13	2.1	11	.14	194
21	.68	3.2	e1100	e28	36	129	118	14	1.9	18	.08	76
22	.59	2.6	e350	e24	31	84	93	17	1.8	12	.04	41
23	.54	2.3	e270	e20	26	64	72	18	1.2	7.3	.08	47
24	.95	407	e205	e17	21	52	55	17	.82	5.1	.10	45
25	1.0	203	e155	e16	19	44	58	27	.77	4.1	.10	29
26	1.3	66	e110	e15	17	41	93	25	.89	3.5	.05	20
27	1.7	37	e94	e14	16	36	76	18	1.2	2.7	.0	17
28	1.6	32	e68	e15	14	33	54	15	1.1	2.5	.00	15
29	1.5	35	e52	e16	14	243	46	13	.93	2.7	.00	13
30	1.4	31	e40	e17	---	292	59	12	.93	2.6	.00	16
31	1.8	---	e35	e18	---	1160	---	11	---	2.2	.00	---
TOTAL	25.77	861.37	7986.8	1032	626	8806	15355	713	124.94	95.56	12.53	4033.00
MEAN	.83	28.7	258	33.3	21.6	284	512	23.0	4.16	3.08	.40	134
MAX	1.8	407	3500	200	38	2340	8230	73	11	18	1.9	2000
MIN	.30	.78	7.1	11	14	14	46	11	.77	.47	.00	.00
AC-FT	51	1710	15840	2050	1240	17470	30460	1410	248	190	25	8000

CAL YR 1987 TOTAL 48111.26 MEAN 132 MAX 3980 MIN .30 AC-FT 95430  
WTR YR 1988 TOTAL 39671.97 MEAN 108 MAX 8230 MIN .00 AC-FT 78690

e Estimated

## 07175500 CANEY RIVER NEAR RAMONA, OK

LOCATION.--Lat 36°30'33", long 95°50'32" (revised), in NE 1/4 NW 1/4 sec.5, T.23 N., R.14 E., Washington County, Hydrologic Unit 11070106, on left bank near downstream abutment of county road bridge, 1 mi upstream from Buck Creek, 2.2 mi downstream from Double Creek, 4.5 mi southeast of Ramona, and at mile 32.0.

DRAINAGE AREA.--1,955 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1945 to current year. Monthly discharge only for some periods, published in WSP 1311. Previous reports have included Caney River near Collinsville from Oct. 1935 to Feb. 1939; this record has been separated from Ramona.

REVISED RECORDS.--WSP 1117: Drainage area. WSP 1241: 1939.

GAGE.--Water-stage recorder. Datum of gage is 586.43 ft above National Geodetic Vertical Datum of 1929. Sept. 1, 1945 to Feb. 15, 1946, nonrecording gage at present site and datum.

REMARKS.--Records good. Flow regulated since February 1950 by Hulah Lake (station 07172500), and since April 1983 by Copan Lake (station 07174300). U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Since regulation by Hulah Lake, 32 years (water years 1951-82), 925 ft<sup>3</sup>/s, 670,200 acre-ft/yr; since regulation by Copan Lake, 5 years (water years 1984-88), 2,325 ft<sup>3</sup>/s, 1,684,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 85,600 ft<sup>3</sup>/s, Oct. 5, 1986, gage height, 31.16 ft; no flow Sept. 11 to Nov. 3, 1956.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 20,500 ft<sup>3</sup>/s, Apr. 3, gage height, 28.33 ft; minimum daily discharge, 26 ft<sup>3</sup>/s, Sept. 7, 13-15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	138	39	1930	4940	989	368	9920	4260	126	37	47	32
2	88	40	2750	4020	945	471	15900	3470	134	37	43	32
3	57	38	3200	4130	961	6110	18800	3280	143	38	42	33
4	49	37	3030	4000	909	8910	10400	3230	151	37	39	32
5	44	37	2150	3100	560	6170	4930	3140	156	37	37	30
6	38	37	976	2930	471	6650	4830	3050	145	36	45	27
7	35	36	709	2720	408	6320	5840	2880	137	35	43	26
8	32	35	681	1870	376	5000	6250	2600	129	33	39	27
9	32	34	513	3420	380	4270	6210	2530	112	34	38	27
10	32	34	431	1310	375	4680	7030	2410	68	33	92	29
11	32	33	417	2340	347	4930	8230	2200	52	39	53	30
12	31	33	356	2230	390	4850	6260	2150	44	89	46	28
13	31	33	268	2150	459	4710	5870	2100	42	73	160	26
14	31	33	209	2140	496	4600	6030	1840	43	41	106	26
15	31	103	236	2070	474	4330	5940	906	43	44	e60	26
16	31	592	259	2340	465	3630	5810	678	41	42	45	60
17	31	404	262	3530	457	3440	5690	612	47	43	36	714
18	31	219	335	2690	378	4230	6190	428	47	49	39	456
19	31	149	1650	2070	728	4070	7320	294	43	135	37	3250
20	31	116	6710	2870	852	2870	5960	178	41	346	37	3230
21	31	90	8650	2770	726	2390	5700	113	39	215	35	1040
22	31	76	3540	2980	601	2250	5840	94	38	153	35	539
23	35	69	3650	2930	517	2150	5750	89	37	115	35	2040
24	42	3200	4890	2850	513	2100	5610	97	36	87	39	2190
25	36	7900	4950	2780	511	2050	5510	101	34	69	41	1240
26	37	3780	4930	2720	445	1850	5510	92	35	61	37	907
27	37	2030	5900	2670	397	1170	5490	86	37	55	33	789
28	37	2170	5780	2640	385	1010	5660	92	36	56	32	495
29	36	2040	2810	2610	378	1640	5690	133	34	57	30	219
30	33	1940	3030	2340	---	2410	5490	135	34	56	30	98
31	37	---	4650	1270	---	2380	---	131	---	51	31	---
TOTAL	1248	25377	79852	85430	15893	112009	209660	43399	2104	2233	1462	17698
MEAN	40.3	846	2576	2756	548	3613	6989	1400	70.1	72.0	47.2	590
MAX	138	7900	8650	4940	989	8910	18800	4260	156	346	160	3250
MIN	31	33	209	1270	347	368	4830	86	34	33	30	26
AC-FT	2480	50340	158400	169500	31520	222200	415900	86080	4170	4430	2900	35100

CAL YR 1987 TOTAL 687418 MEAN 1883 MAX 13800 MIN 31 AC-FT 1363000  
WTR YR 1988 TOTAL 596365 MEAN 1629 MAX 18800 MIN 26 AC-FT 1183000

e Estimated

## ARKANSAS RIVER BASIN

07175500 CANEY RIVER NEAR RAMONA, OK--Continued  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1952-53, 1955-62, 1965 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1966 to April 1982.

WATER TEMPERATURE: October 1966 to April 1982.

REMARKS.--Samples were collected on an approximate six-week basis and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL-LECTING SAMPLE (CODE NUMBER)	AGENCY ANA-LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE AIR (DEG C)	TEMPER-ATURE WATER (DEG C)	TUR-BID-ITY (FTU)	BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)	
NOV 03...	1330	1028	80020	2.65	35	800	8.70	26.0	19.0	2.9	740	12.9	
DEC 10...	1215	1028	80020	4.36	428	*421	8.30	15.5	8.0	--	730	8.6	
JAN 27...	1250	1028	80020	11.02	2660	342	8.30	12.0	3.5	46	760	--	
FEB 24...	1100	1028	80020	4.60	508	613	8.40	6.0	6.5	18	750	--	
APR 28...	1250	1028	80020	18.09	5840	*269	8.20	28.0	16.5	--	750	--	
JUN 15...	1145	1028	80020	2.81	44	673	7.60	35.0	27.0	1.9	750	12.8	
JUL 19...	1025	1028	80020	2.80	40	852	8.00	35.5	29.0	--	740	11.4	
AUG 25...	1140	1028	80020	2.80	42	725	8.20	33.5	30.0	8.6	740	5.8	
DATE		OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CAC03)	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CAC03	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	BICAR-BONATE WATER WH IT FIELD MG/L AS HC03	
NOV 03...	144		49	64	260	76	83	12	60	33	2	5.0	205
DEC 10...	76	--	--	--	150	23	47	7.2	23	25	0.9	3.0	--
JAN 27...	--		56	160	140	17	44	6.5	14	18	0.5	2.0	146
FEB 24...	--		63	49	200	61	63	11	43	31	1	2.6	177
APR 28...	--		--	--	110	13	36	5.3	11	17	0.5	2.6	--
JUN 15...	164		K40	580	230	49	74	12	45	29	1	2.8	232
JUL 19...	154	--	--	--	240	84	76	13	68	37	2	3.8	200
AUG 25...	79		42	K700	220	59	70	12	58	36	2	4.0	200
DATE		CAR-BONATE WATER WH IT FIELD MG/L AS C03	ALKA-LITY WAT WH TOT IT FIELD MG/L AS CAC03	SULFATE DIS-SOLVED (MG/L AS S04)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SiO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N)
NOV 03...	10		184	27	140	0.40	4.7	472	444	0.64	44.3	0.450	0.010
DEC 10...	--	--	--	22	35	--	2.7	211	217	0.29	244	0.250	0.010
JAN 27...	0		120	23	21	0.20	7.1	200	192	0.27	1440	0.270	0.010
FEB 24...	0		145	41	78	0.20	7.3	374	335	0.51	513	0.330	0.010
APR 28...	--	--	--	17	13	--	7.1	161	153	0.22	2540	0.170	0.020
JUN 15...	0		190	31	88	0.30	2.3	394	368	0.54	47.0	--	<0.010
JUL 19...	0		164	34	160	--	5.9	518	458	0.70	56.2	--	<0.010
AUG 25...	0		164	26	120	0.40	7.1	426	398	0.58	48.0	--	<0.010

\* SPECIFIC CONDUCTANCE, LAB (US/CM)

## ARKANSAS RIVER BASIN

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07175500 CANEY RIVER NEAR RAMONA, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS NO2)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS- PHOROUS TOTAL (MG/L AS P)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4)	PHOS- PHOROUS ORGANIC TOTAL (MG/L AS P)
NOV 03...	0.03	0.460	0.030	0.020	0.03	1.3	1.3	0.090	0.040	0.020	0.06	0.09
DEC 10...	0.03	0.260	--	0.030	0.04	--	--	--	--	0.050	0.15	--
JAN 27...	0.03	0.280	0.070	0.030	0.04	0.63	0.70	0.090	<0.010	<0.010	--	0.09
FEB 24...	0.03	0.340	0.020	0.040	0.05	0.48	0.50	0.100	0.050	0.020	0.06	0.10
APR 28...	0.07	0.190	--	0.050	0.06	--	--	--	--	0.010	0.03	--
JUN 15...	--	<0.100	0.020	--	0.06	2.0	2.0	0.060	0.020	0.020	0.06	0.06
JUL 19...	--	<0.100	--	<0.010	--	--	--	--	--	0.020	0.06	--
AUG 25...	--	<0.100	0.020	0.030	0.04	0.48	0.50	0.030	0.030	0.020	0.06	0.03
DATE	PHOS- PHOROUS ORGANIC DIS- SOLVED (UG/L AS P)	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)
NOV 03...	0.02	<10	1	120	<0.5	<1	<1	<3	1	7	<5	9
DEC 10...	--	--	1	82	<0.5	<1	<5	<3	<10	16	<10	<4
JAN 27...	--	--	2	54	<0.5	<1	<5	<3	<10	130	<10	<4
FEB 24...	0.03	20	<1	90	<0.5	<1	<1	<3	2	28	<5	10
APR 28...	--	--	1	57	<0.5	2	<5	<3	<10	90	10	8
JUN 15...	0.0	--	<1	120	<0.5	<1	<5	<3	<10	13	<10	10
JUL 19...	--	--	2	140	<0.5	<1	10	<3	<10	130	<10	10
AUG 25...	0.01	20	2	130	<0.5	<1	2	<3	2	31	<5	10
DATE	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY DIS- SOLVED (UG/L AS HG)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V)	ZINC, DIS- SOLVED (UG/L AS ZN)	SEDI- MENT, SUS- PENDE (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
NOV 03...	34	0.5	<10	3	<1	<1.0	640	<6	4	40	3.8	86
DEC 10...	55	0.2	<10	<10	--	<1.0	370	<6	10	--	--	--
JAN 27...	34	0.2	<10	<10	--	<1.0	300	<6	20	56	402	91
FEB 24...	98	0.4	<10	<1	<1	<1.0	560	<6	640	43	59	93
APR 28...	7	0.5	<10	<10	--	<1.0	240	<6	74	240	3780	84
JUN 15...	28	0.2	<10	<10	--	<1.0	590	<6	9	44	5.3	87
JUL 19...	66	0.1	<10	<10	--	<1.0	640	<6	120	35	3.8	75
AUG 25...	70	<0.1	<10	4	<1	<1.0	590	<6	<3	--	--	--



## 07176000 VERDIGRIS RIVER NEAR CLAREMORE, OK

LOCATION.--Lat 36°18'26", Long 95°41'52", SE 1/4 SW 1/4 sec.10, T.21 N., R.15 E., Rogers County, Hydrologic Unit 11070105, on left bank on downstream side of bridge on State Highway 20, 2.3 mi downstream from Caney River, 4.5 mi west of Claremore, 12.4 mi upstream from Bird Creek, and at mile 76.0.

DRAINAGE AREA.--6,534 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1935 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1117: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 538.62 ft above National Geodetic Vertical Datum of 1929. Prior to Feb. 24, 1939, and May 17 to Aug. 24, 1967, nonrecording gage at same site and datum.

REMARKS.--No estimated daily discharges. Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Some regulation since 1949 by dams in Kansas, and since February 1950 by Hulah Lake (station 07172500). Flow regulated since May 1963 by Oologah Lake (station 07171300), 14.3 mi upstream from station, and since April 1983 by Copan Lake (station 07174300). U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Prior to regulation by Oologah Lake, 27 years (water years 1936-62), 3,723 ft<sup>3</sup>/s, 2,695,000 acre-ft/yr; since regulation by Oologah Lake, 24 years (water years 1965-88), 4,471 ft<sup>3</sup>/s, 3,239,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 182,000 ft<sup>3</sup>/s, May 21, 1943, gage height, 55.05 ft; no flow at times in 1936, 1939-40, 1956.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 30,300 ft<sup>3</sup>/s, Apr. 20; gage height, 26.43 ft; minimum daily discharge, 29 ft<sup>3</sup>/s, June 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	436	241	4200	17000	4470	1210	12700	16000	361	33	62	54
2	305	229	4540	16800	4320	1390	17100	12200	438	35	54	55
3	229	173	5340	16200	4290	8390	17300	6650	434	33	50	68
4	188	152	5680	17600	4290	10400	23000	6490	386	39	47	56
5	172	148	5120	20400	4170	13700	28900	6440	382	42	47	51
6	160	138	3970	18300	3910	12000	25400	6330	391	41	42	55
7	156	138	3120	14300	3830	11900	25600	6230	382	46	41	57
8	160	150	2950	13800	3780	10800	26700	5940	370	47	52	53
9	166	141	4530	14100	3780	9250	28200	5990	359	49	53	53
10	119	145	12700	13300	3790	8940	28500	8100	336	50	59	57
11	121	139	12200	12400	3770	10500	29700	9290	291	53	100	60
12	125	139	5540	11500	4550	13600	29600	9100	270	49	83	61
13	127	132	5410	8560	6410	13400	27900	8170	255	88	65	64
14	135	122	4340	8370	6470	14000	28400	5180	244	109	142	64
15	134	169	2510	7830	6450	16800	29400	4550	96	71	145	60
16	132	1590	1930	6960	5700	16300	29200	4060	68	57	99	107
17	136	1030	1020	7980	2780	15700	29000	4300	73	103	78	243
18	148	569	1100	7980	2790	17100	29000	3190	60	52	69	982
19	154	395	7200	6980	3180	20200	29800	688	51	51	59	1610
20	136	308	14000	7110	3460	19200	30000	578	45	186	53	4250
21	125	266	11600	7190	3180	16200	28900	472	64	338	49	2610
22	136	236	8630	7150	3040	10000	28800	401	65	224	44	1100
23	161	205	7110	7250	2900	7200	28600	385	66	166	46	1520
24	187	1010	8940	7190	2850	7130	28400	362	53	131	51	3570
25	200	10500	12200	7100	2360	7170	26500	355	55	110	57	2500
26	178	8430	13100	7030	1350	7070	20500	354	35	74	59	1670
27	151	4020	13900	6970	1280	6650	19100	349	31	66	60	1530
28	152	5800	12900	6930	1240	4920	16600	329	30	75	72	1530
29	163	5800	10800	6680	1220	5820	16700	323	30	74	67	1230
30	155	5300	12000	5980	---	5390	16600	366	29	67	59	880
31	163	---	15900	5310	---	6040	---	366	---	65	56	---
TOTAL	5210	47815	234480	322250	105610	328370	756100	133538	5750	2624	2020	26200
MEAN	168	1594	7564	10400	3642	10590	25200	4308	192	84.6	65.2	873
MAX	436	10500	15900	20400	6470	20200	30000	16000	438	338	145	4250
MIN	119	122	1020	5310	1220	1210	12700	323	29	33	41	51
AC-FT	10330	94840	465100	639200	209500	651300	1500000	264900	11410	5200	4010	51970

CAL YR 1987 TOTAL 2029584 MEAN 5561 MAX 22800 MIN 119 AC-FT 4026000  
WTR YR 1988 TOTAL 1969967 MEAN 5382 MAX 30000 MIN 29 AC-FT 3907000

## ARKANSAS RIVER BASIN

## 07176460 BIRCH LAKE NEAR BARNSDALL, OK

LOCATION (REVISED).--Lat 36°32'00", long 96°09'43", in NW 1/4 NE 1/4 sec.30, T.24 N., R.11 E., Osage County, Hydrologic Unit 11070107, 450 ft north of dam on Birch Creek, 1.5 mi south of Barnsdall and at mile 0.8.

DRAINAGE AREA.--66.0 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1977 to current year.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929. Prior to May 31, 1977 nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by earth dam with uncontrolled concrete spillway. Storage began Mar. 18, 1977; conservation pool was first filled Mar. 23, 1978. The outlet work is a gated intake structure. Capacity, 58,180 acre-ft at elevation 774.0 ft, crest of uncontrolled spillway and 19,180 acre-ft at elevation 750.5 ft, top of conservation pool. Dead storage, 3,360 acre-ft below elevation 730.0 ft. Figures given herein represent total contents. Reservoir is used for flood control, water supply, water quality, recreation, and fish and wildlife.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 47,400 acre-ft, Oct. 6, 1986, elevation, 769.04 ft; minimum since conservation pool was first filled, 13,080 acre-ft, Oct. 26-29, 1977, elevation, 744.68 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 28,720 acre-ft, Apr. 4, elevation, 758.05 ft; minimum, 17,320 acre-ft, Sept. 15, elevation, 748.82 ft.

Capacity table (elevation, in feet, and contents, in acre-ft):

735	5,714	755	24,620
740	9,040	760	31,550
745	13,390	765	39,740
750	18,620	770	49,360

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23540	18830	19600	20190	19150	19140	27910	19280	18910	17650	19440	17850
2	22840	18820	19460	19940	19160	20530	28510	19240	19190	18140	19390	17820
3	22120	18800	19330	19700	19170	21960	28650	19210	19180	18070	19340	17760
4	21410	18780	19230	19520	19170	21960	28150	19170	19170	18000	19270	17700
5	20740	18740	19210	19490	19160	22580	26970	19140	19140	17950	19240	17650
6	20030	18700	19210	19490	19160	22390	25720	19120	19110	17890	19180	17600
7	19520	18680	19210	19460	19160	21880	24260	19120	19090	17840	19140	17540
8	19310	18650	19200	19430	19160	21320	23340	19120	19050	17770	19090	17510
9	19270	18610	19180	19420	19160	20720	22160	19100	18990	17720	19030	17480
10	19200	18580	19170	19420	19160	20110	22110	19070	18960	17670	18990	17450
11	19170	18560	19160	19430	19160	19590	21040	19070	18930	18240	18930	17410
12	19140	18540	19140	19500	19160	19230	20160	19060	18890	18860	18890	17380
13	19090	18530	19110	19560	19170	18860	19680	19050	18860	18870	18820	16810
14	19070	18510	19230	19600	19170	18690	19320	19020	18820	18820	18790	17340
15	19050	18690	19250	19690	19160	18690	19110	19010	18790	18780	18730	17320
16	19050	18770	19240	20330	19170	18690	19110	19010	18770	18770	18700	18150
17	19000	18790	19250	20400	19200	18990	19190	18990	18730	18770	18640	18160
18	18980	18790	19350	20330	19310	19250	20140	18970	18710	18710	18560	18910
19	18960	18790	22530	20320	19480	19330	20100	18960	18650	19500	18540	19270
20	18940	18790	24030	20060	19500	19400	19810	18980	18620	19520	18500	19260
21	18910	18790	24050	19770	19500	19410	19500	18980	18560	19490	18450	19260
22	18880	18780	23480	19530	19460	19400	19270	18980	18530	19440	18380	19250
23	18920	18770	22800	19360	19430	19370	19250	19020	18500	19390	18330	19560
24	18910	19830	22110	19210	19410	19360	19200	19050	18450	19340	18300	19620
25	18900	20040	21660	19110	19390	19330	19330	19050	18420	19290	17670	19640
26	18890	20070	21390	19100	19340	19290	19360	19030	18400	19240	18170	19610
27	18880	20070	21940	19110	19290	19240	19350	19010	18360	19180	18130	19600
28	18860	19980	21570	19120	19240	19210	19340	18990	18330	19540	18060	19580
29	18840	19880	20980	19140	19190	19880	19320	18980	17730	19580	18000	19560
30	18820	19750	20620	19170	---	19970	19310	18930	17700	19540	17960	19510
31	18840	---	20400	19180	---	20580	---	18930	---	19500	17910	---
MAX	23540	20070	24050	20400	19500	22580	28650	19280	19190	19580	19440	19640
MIN	18820	18510	19110	19100	19150	18690	19110	18930	17700	17650	17670	16810
(+)	750.20	751.00	751.56	750.50	750.51	751.71	750.61	750.28	749.17	750.78	749.36	750.79
(++)	-5,400	+910	+650	-1,220	+10	+1,390	-1,270	-380	-1,230	+1,800	-1,590	+1,600
CAL YR 1987	MAX 27290	MIN 18270	(++)	+830								
WTR YR 1988	MAX 28650	MIN 16810	(++)	-4,730								

(+) ELEVATION, IN FEET, AT END OF MONTH  
(++) CHANGE, IN CONTENTS, IN ACRE-FEET

## 07176465 BIRCH CREEK BELOW BIRCH LAKE NEAR BARNSDALL, OK

LOCATION (REVISED).--Lat 36°32'00", long 96°09'43", NW 1/4 NE 1/4 sec.30, T.24 N., R.11 E., Osage County, Hydrologic Unit 11070107, on right bank 300 ft downstream from Birch Dam, 1.5 mi south of Barnsdall, and at mile 0.7.

DRAINAGE AREA.--66.0 mi<sup>2</sup>.

PERIOD OF RECORD.--February 1977 to current year.

REVISED RECORDS.--WDR OK-86-1: 1984-85.

GAGE.--Water-stage recorder. Datum of gage is 690.00 ft, National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Flow completely regulated since March 1977 by Birch Lake (station 07176460).

AVERAGE DISCHARGE.--11 years, 46.2 ft<sup>3</sup>/s, 33,470 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,070 ft<sup>3</sup>/s, Oct. 7, 1986, gage height, 13.37 ft; maximum gage height, 26.40 ft, June 10, 1985 (backwater from Bird Creek); no flow at times in several years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,030 ft<sup>3</sup>/s, Apr. 1, gage height, 12.73 ft; minimum daily discharge, 2.3 ft<sup>3</sup>/s, May 20-26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	368	5.4	58	113	4.3	11	1430	12	2.7	12	17	15
2	363	5.4	58	113	4.3	6.1	151	12	6.2	19	17	15
3	366	5.4	58	113	4.3	14	9.8	12	8.4	19	15	15
4	363	5.4	29	85	4.3	171	350	12	9.4	19	15	15
5	353	5.7	8.9	27	4.3	298	590	12	9.4	19	15	15
6	337	5.8	8.7	27	4.3	298	578	9.8	9.4	17	15	14
7	223	5.5	8.0	27	4.3	294	571	9.1	9.4	16	15	12
8	78	5.4	6.4	22	4.3	294	565	8.9	9.4	16	15	12
9	9.5	5.4	6.2	13	4.3	292	559	8.5	9.4	16	15	12
10	9.4	5.1	6.2	13	4.3	292	555	6.5	9.4	16	15	12
11	9.4	4.6	5.9	13	4.3	241	552	4.6	9.4	17	15	12
12	9.4	4.4	5.4	12	4.3	149	401	4.4	9.4	17	15	12
13	9.4	4.3	5.4	12	4.4	151	202	4.3	9.4	16	15	12
14	7.1	4.2	5.4	12	4.6	61	151	4.1	9.4	16	15	12
15	4.3	4.3	5.4	42	4.6	6.2	58	4.1	9.4	16	15	12
16	4.3	4.2	5.3	65	4.6	2.9	10	4.1	9.4	16	15	13
17	4.3	4.1	5.1	65	4.6	2.9	10	3.4	9.4	16	15	13
18	4.3	4.1	5.1	65	4.6	2.9	13	2.9	9.4	16	15	15
19	4.3	4.1	62	88	12	2.9	83	2.4	9.4	17	15	13
20	4.4	4.1	81	126	19	2.9	140	2.3	9.4	17	15	12
21	4.6	4.1	124	127	19	8.8	140	2.3	9.4	17	15	12
22	4.8	3.6	343	102	19	17	81	2.3	9.4	17	15	12
23	5.2	3.2	340	69	19	17	12	2.3	9.4	17	15	13
24	5.4	16	338	69	19	17	12	2.3	9.4	17	15	13
25	5.4	4.0	338	36	19	17	12	2.3	9.4	17	15	13
26	5.4	3.8	337	7.5	19	17	12	2.3	9.4	17	15	13
27	5.4	33	336	4.6	19	17	12	2.4	9.4	17	15	13
28	5.4	58	336	4.6	19	17	12	2.5	9.4	17	15	13
29	5.4	58	331	4.4	19	18	12	2.5	9.4	17	15	12
30	5.4	58	328	4.3	---	18	12	2.6	9.4	17	15	12
31	5.4	---	209	4.3	---	42	---	2.7	---	17	15	---
TOTAL	2588.9	338.6	3793.4	1485.7	281.0	2798.6	7295.8	165.9	271.1	520	469	389
MEAN	83.5	11.3	122	47.9	9.69	90.3	243	5.35	9.04	16.8	15.1	13.0
MAX	368	58	343	127	19	298	1430	12	9.4	19	17	15
MIN	4.3	3.2	5.1	4.3	4.3	2.9	9.8	2.3	2.7	12	15	12
AC-FT	5140	672	7520	2950	557	5550	14470	329	538	1030	930	772

CAL YR 1987 TOTAL 19627.1 MEAN 53.8 MAX 433 MIN 1.7 AC-FT 38930  
WTR YR 1988 TOTAL 20397.0 MEAN 55.7 MAX 1430 MIN 2.3 AC-FT 40460

## ARKANSAS RIVER BASIN

95

07176500 BIRD CREEK NEAR AVANT, OK

LOCATION.--Lat 36°29'12", long 96°03'50", in SW 1/4 NW 1/4 sec.7 (revised), T.23 N., R.12 E., Osage County, Hydrologic Unit 11070107, 150 ft upstream from county road bridge at Avant, 1.5 mi upstream from Candy Creek, and at mile 54.2.

DRAINAGE AREA.--364 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1945 to current year.

GAGE.--Water-stage recorder. Datum of gage is 651.28 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Flow slightly regulated since 1958 by Bluestem Lake. Some regulation since March 1977 by Birch Lake (station 07176460), located on Birch Creek, 12.1 mi upstream. Small diversions upstream for municipal water supply for the cities of Pawhuska and Barnsdall.

AVERAGE DISCHARGE.--43 years, 221 ft<sup>3</sup>/s, 160,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 32,400 ft<sup>3</sup>/s, Oct. 2, 1959, gage height, 31.40 ft; maximum gage height, 32.03 ft, Mar. 11, 1974; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Nov. 24	1615	8,270	11.25	Mar. 3	1215	6,390	8.77
Dec. 19	2115	9,820	13.65	Apr. 1	2045	*16,200	*23.47

Minimum daily discharge, 3.1 ft<sup>3</sup>/s, Oct. 17, 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	416	14	157	457	101	69	13200	146	12	8.8	36	16
2	332	13	131	341	101	522	7040	144	142	9.6	30	17
3	303	12	115	297	120	4680	922	137	52	20	27	20
4	285	12	92	257	81	1460	633	133	55	22	21	17
5	277	12	45	163	118	1860	813	129	46	24	20	16
6	268	10	40	138	107	1890	711	125	26	24	16	16
7	234	10	36	132	105	1520	662	120	23	22	16	14
8	132	10	29	120	106	898	629	120	21	18	16	11
9	21	10	26	81	114	638	608	120	19	16	16	9.8
10	7.0	10	23	120	116	534	2180	108	17	16	16	9.6
11	6.3	10	20	120	111	478	1090	91	16	22	16	9.6
12	6.2	9.8	15	120	104	349	645	54	16	112	15	9.6
13	5.8	9.6	14	142	102	322	404	35	16	62	15	9.6
14	5.6	9.6	20	165	62	268	311	28	16	34	15	9.6
15	4.8	80	30	165	43	156	252	22	16	26	15	9.6
16	3.8	93	47	923	41	137	152	21	15	22	15	146
17	3.1	94	52	1540	41	170	145	23	12	34	15	208
18	3.1	51	141	519	42	555	2570	24	11	26	15	1410
19	3.3	36	5400	1020	175	405	831	24	11	234	15	1540
20	3.6	26	4770	785	212	333	484	24	11	158	15	450
21	4.1	16	943	397	147	272	383	24	11	50	15	219
22	4.7	10	778	344	117	232	317	24	11	41	15	160
23	8.5	8.2	595	253	96	209	186	29	11	31	15	327
24	9.6	3370	525	221	80	196	157	33	11	27	15	268
25	8.3	1450	876	191	73	188	200	59	11	26	16	168
26	7.6	336	1110	129	70	175	220	41	11	24	16	108
27	7.4	207	2160	91	69	170	200	29	10	22	16	80
28	8.4	227	1540	120	69	166	166	20	10	27	16	66
29	9.6	240	758	120	69	553	151	18	10	277	16	61
30	9.6	200	752	146	---	528	146	17	9.6	123	16	54
31	13	---	938	120	---	1170	---	15	---	56	16	---
TOTAL	2411.4	6596.2	22178	9737	2792	21103	36408	1937	658.6	1614.4	537	5459.4
MEAN	77.8	220	715	314	96.3	681	1214	62.5	22.0	52.1	17.3	182
MAX	416	3370	5400	1540	212	4680	13200	146	142	277	36	1540
MIN	3.1	8.2	14	81	41	69	145	15	9.6	8.8	15	9.6
AC-FT	4780	13080	43990	19310	5540	41860	72220	3840	1310	3200	1070	10830

CAL YR 1987 TOTAL 123598.2 MEAN 339 MAX 7340 MIN 3.1 AC-FT 245200  
WTR YR 1988 TOTAL 111432.0 MEAN 304 MAX 13200 MIN 3.1 AC-FT 221000



## ARKANSAS RIVER BASIN

07177400 SKIATOOK LAKE NEAR SKIATOOK, OK

LOCATION (REVISED).--Lat 36°21'02", long 96°05'18", in NE 1/4 SE 1/4 sec.26, T.22 N., R.11 E., Osage County, Hydrologic Unit 11070107, near right end of dam, 5.0 mi west of Skiatook and at mile 14.3.

DRAINAGE AREA.--354 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1984 to current year.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by rolled earthfill dam. Spillway is a concrete uncontrolled structure in right abutment. Outlet works consists of a controlled intake structure with a 10-foot, 6-inch diameter tunnel, a 2-foot, 6-inch by 5-foot low-flow sluice and a 36-inch water-supply pipe. Regulated storage began Oct. 31, 1984. Capacity, 893,000 acre-ft, at elevation 750.8 ft, maximum pool; 513,500 acre-ft at elevation 729.0 ft, top of flood control pool; 331,200 acre-ft, at elevation 714.0 ft, top of conservation pool; 11,800 acre-ft, at elevation 657.0 ft, top of inactive pool. Figures given herein represent total contents. Reservoir is designed for flood control, water supply, water quality, recreation and conservation.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 302,000 acre-ft, Apr. 4, 1988, elevation 711.96 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 302,000 acre-ft, Apr. 4, elevation 711.96 ft; minimum, 186,800 acre-ft, Nov. 14, elevation 698.55 ft.

Capacity table (elevation, in feet, and contents, in acre-ft):

695	162,100	710	282,800
700	197,600	715	333,000
705	237,800	720	387,600

RESERVOIR STORAGE (ACRE-Feet), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	202900	188700	195300	234400	246400	247700	288600	247600	242100	231900	231700	219500
2	201100	188700	194400	234700	246300	251900	299900	246800	242400	231200	231300	219200
3	199600	188600	194100	235000	246300	263400	301400	246800	242200	231100	230800	218800
4	198400	188600	193500	235000	246000	265800	301600	246400	242100	230700	230700	218500
5	196800	188500	192500	235000	245700	267700	298400	246400	242000	230400	230300	218200
6	195100	188000	192100	235300	245700	269100	294900	246300	241700	229800	229900	217700
7	193500	188000	191300	235700	246000	269200	291000	246400	241500	229400	229600	217500
8	192200	188000	191200	235700	246000	267700	287700	246900	241400	229100	229200	217100
9	191900	187500	190900	236000	246100	265800	283400	246500	240900	228700	228700	216900
10	190600	187400	190600	236000	246400	263600	284600	246700	240400	228400	228500	216400
11	189700	187400	190600	236600	245800	262200	282000	246700	239800	227800	228000	216100
12	189300	187400	190300	237400	246000	259900	278800	246600	239700	227900	227500	215800
13	189200	187100	189700	237600	246800	257400	279800	246500	239200	227700	227300	215500
14	189200	187100	190400	238500	246900	255300	271300	246400	238800	227300	226800	215000
15	189200	187600	190400	239400	246400	253200	267900	246300	238200	227000	226600	214800
16	189200	188000	190400	242400	246700	251000	265100	246200	237800	226500	226300	216700
17	189200	188000	190400	243800	246500	249800	262700	246000	237700	22800	225500	216600
18	189200	188000	190800	244800	247000	249300	265600	237900	237300	227700	224800	219900
19	189200	188000	206600	246400	248500	249100	264100	245500	236700	228300	225000	221600
20	188300	188000	214800	246400	248500	248400	261900	245100	236500	228200	224900	221800
21	188200	188000	215800	246700	248600	247800	259500	245100	236100	227900	224500	221900
22	188200	188400	216300	247000	248800	246600	257100	244900	235700	227500	224100	221800
23	188200	188400	216800	247500	247800	246300	254900	245100	235400	227200	223900	223800
24	188200	193600	217200	247800	247100	246300	252700	245100	235000	226900	223600	223500
25	188200	196700	220000	247800	246500	246000	251500	245000	234500	226600	223100	224100
26	188400	197200	223200	247100	246700	245900	250200	244300	234100	226200	222600	224000
27	188400	197500	228200	247100	246900	245700	249400	244100	233700	225400	221700	223700
28	188200	196900	230600	247100	247100	246300	248800	243800	233300	232000	221000	224100
29	188200	196500	231300	247100	247100	249300	248200	243400	232800	232600	220800	223200
30	188200	195800	232500	247300	---	250500	247900	243000	232500	232400	220200	222700
31	188700	---	233900	246900	---	251600	---	242600	---	232100	220100	---
MAX	202900	197500	233900	247800	248800	269200	301600	247600	242400	232600	231700	224100
MIN	188200	187100	189700	234400	245700	245700	247900	237900	232500	22800	220100	214800
(+)	698.80	699.76	704.53	706.05	706.07	706.59	706.17	705.56	704.37	704.31	702.83	703.19
(++)	-20,600	+7,100	+38,100	+13,000	+200	+4,500	-3,700	-5,300	-10,100	-400	-12,000	+2,600

CAL YR 1987 MAX 238700 MIN 139800 (++) +94,100

WTR YR 1988 MAX 301600 MIN 22800 (++) +13,400

(+) ELEVATION, IN FEET, AT END OF MONTH

(++) CHANGE IN CONTENTS, IN ACRE-Feet

ARKANSAS RIVER BASIN

97

07177410 HOMINY CREEK BELOW SKIATOOK LAKE NEAR SKIATOOK, OK

LOCATION (REVISED).--Lat 36°21'09", long 96°05'18", in NE 1/4 SE 1/4 sec.26, T.22 N., R.11 E., Osage County, Hydrologic Unit 11070107, located 300 ft downstream from Skiatook Lake stilling basin on the left bank of outlet channel, about 5.0 mi west of Skiatook, and at mile 14.0 on Hominy Creek.

DRAINAGE AREA.--354 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1984 to current year. Published as Hominy Creek near Skiatook, October 1984 to September 1986.

GAGE.--Water-stage recorder. Datum of gage is 610.00 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records poor. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Flow regulated by Skiatook Lake (07177400).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,330 ft<sup>3</sup>/s, Oct. 29, 1986, gage height 22.80 ft; maximum gage height, 25.44 ft, Apr. 30, 1985 (from backwater); minimum daily discharge, 0.03 ft<sup>3</sup>/s, Nov. 10-14, 1984, and Feb. 22-24, 1986.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,960 ft<sup>3</sup>/s, Apr. 10, gage height, 16.03 ft; maximum gage height, 16.75 ft, Apr. 1 (from backwater); minimum daily discharge, 0.58 ft<sup>3</sup>/s, Feb. 7-10.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e650	e20	e350	.74	105	1.1	e50	240	179	139	125	132
2	e650	e10	350	.74	39	78	32	240	159	138	124	132
3	e645	e40	347	.74	.63	317	2.1	170	120	138	124	132
4	e645	e40	346	1.5	.63	463	670	106	124	138	124	132
5	e643	e40	345	1.4	e.60	1080	1620	74	124	137	126	132
6	e643	e40	345	1.4	e.59	1050	1870	2.9	125	137	126	133
7	e640	e40	230	1.4	.58	1010	1870	2.9	147	137	126	131
8	e430	e50	138	1.4	.58	1000	1860	2.9	157	137	124	130
9	e250	e45	138	1.4	.58	994	1860	2.7	157	137	124	131
10	e250	e40	138	1.2	.58	989	1910	2.7	157	137	125	132
11	e250	e40	104	1.0	e.60	990	1870	2.7	155	138	125	132
12	e250	e40	46	.98	e1.0	984	1870	2.7	152	138	125	132
13	e120	e40	46	1.0	1.3	982	1860	31	152	102	125	132
14	e1.2	e40	46	.97	1.2	980	1860	74	153	97	125	131
15	e.80	e40	45	.96	1.2	980	1670	74	156	116	129	130
16	e.78	e50	46	1.7	1.2	978	1340	53	155	124	134	132
17	e.77	e50	46	1.0	1.3	981	1340	40	153	125	133	132
18	e.76	e45	46	.90	1.4	722	1340	114	151	125	134	132
19	e.74	e30	449	.90	96	483	1340	154	150	125	134	49
20	e.78	e10	144	.76	180	483	1340	154	150	125	136	1.7
21	.77	e5.0	32	.79	179	481	1340	154	150	125	138	1.7
22	e.75	e2.0	.73	.78	270	480	1190	154	150	123	136	65
23	e20	e1.5	.74	.74	375	281	965	138	150	124	132	109
24	e10	e2.0	.75	.73	375	133	965	121	150	124	132	111
25	e20	e50	20	73	153	105	964	121	150	124	132	111
26	e10	e2.0	7.3	179	1.2	105	656	121	150	125	132	111
27	e2.0	e200	46	178	1.1	106	353	137	150	125	133	111
28	e1.5	e350	.77	178	1.0	105	353	180	141	125	133	111
29	e1.2	e350	.69	150	1.0	115	286	179	141	125	132	122
30	e1.0	e350	.82	105	---	1.8	240	179	141	124	132	130
31	e30	---	.82	105	---	172	---	179	---	126	132	---
TOTAL	6169.05	2062.5	3855.62	993.13	1790.27	17629.9	34886.1	3206.5	4449	3960	4012	3403.4
MEAN	199	68.7	124	32.0	61.7	569	1163	103	148	128	129	113
MAX	650	350	449	179	375	1080	1910	240	179	139	138	133
MIN	.74	1.5	.69	.73	.58	1.1	2.1	2.7	120	97	124	1.7
AC-FT	12240	4090	7650	1970	3550	34970	69200	6360	8820	7850	7960	6750

CAL YR 1987 TOTAL 66504.18 MEAN 182 MAX 1490 MIN .40 AC-FT 131900  
WTR YR 1988 TOTAL 86417.47 MEAN 236 MAX 1910 MIN .58 AC-FT 171400

e Estimated

## 07177500 BIRD CREEK NEAR SPERRY, OK

LOCATION.--Lat 36°16'42", long 95°57'14", in NW 1/4 NW 1/4 sec.29, T.21 N., R.13 E., Tulsa County, Hydrologic Unit 11070107, near downstream side of right abutment of county road bridge, 1.5 mi upstream from Delaware Creek, 2.4 mi downstream from Hominy Creek, 2.5 mi southeast of Sperry, and at mile 25.0.

DRAINAGE AREA.--905 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1938 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1117: Drainage area. WSP 1921: 1943.

GAGE.--Water-stage recorder. Datum of gage is 579.43 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Flow slightly regulated since March 1977 by Birch Lake (station 07176460). Flow regulated to some extent since October 1984 by Skiatook Lake (station 07177400). U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Prior to regulation by Skiatook Lake, 46 years (water years 1939-84), 484 ft<sup>3</sup>/s, 350,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 90,000 ft<sup>3</sup>/s Oct. 3, 1959, gage height, 32.60 ft, from rating curve extended above 49,000 ft<sup>3</sup>/s; no flow at times in 1939, 1954-57, 1964-66, 1970.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1915 reached a stage similar to flood of Oct. 31, 1941, 30.14 ft, from information provided by local residents.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 18,800 ft<sup>3</sup>/s, Apr. 2, gage height, 28.17; minimum daily discharge, 16 ft<sup>3</sup>/s, Oct. 23, 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1260	65	712	1170	255	86	8750	438	198	155	197	152
2	1250	38	648	681	238	624	16300	432	261	149	179	154
3	1170	44	612	525	159	8570	11500	401	308	149	171	158
4	1140	56	586	472	147	6390	2340	259	186	153	169	158
5	1120	56	540	377	142	4480	3350	244	174	159	162	152
6	1100	56	488	256	135	5160	3760	185	171	161	161	147
7	1090	56	437	264	129	3710	3600	157	156	161	161	148
8	1050	56	243	324	129	3110	3510	153	169	162	159	147
9	579	55	230	277	129	2400	3450	158	169	159	190	145
10	363	54	225	283	129	2090	4500	161	167	158	206	142
11	317	52	219	213	129	1930	5470	154	162	158	162	140
12	311	52	133	239	125	1730	3830	137	161	184	157	142
13	309	52	115	478	124	1570	3290	98	161	278	149	141
14	138	52	121	385	113	1530	2980	118	159	146	149	140
15	36	532	149	334	78	1390	2810	130	158	145	149	142
16	30	905	168	1280	64	1320	2010	123	158	143	155	201
17	28	371	190	3110	62	1330	1880	80	158	150	158	343
18	22	220	287	1280	66	1750	3060	82	158	178	158	341
19	19	153	5040	1050	492	1230	4840	169	156	162	161	2730
20	17	126	11300	1740	642	1150	2820	179	155	750	158	1250
21	17	96	6670	840	464	997	2470	182	155	268	155	352
22	17	76	1450	574	382	907	2240	177	153	199	154	187
23	16	63	1070	425	544	753	1570	176	152	185	153	604
24	16	2190	879	341	524	407	1400	153	152	173	151	921
25	33	8960	2060	306	441	331	1380	148	152	167	151	390
26	34	2100	3450	363	116	304	1350	172	152	162	150	248
27	24	657	4850	324	94	286	752	163	152	161	149	194
28	23	887	3980	319	89	316	679	196	148	173	152	168
29	22	898	1840	331	87	4520	594	204	149	220	149	161
30	22	814	1170	276	---	1940	448	202	149	405	149	170
31	36	---	1720	264	---	872	---	200	---	248	150	---
TOTAL	11609	19792	51582	19101	6228	63183	106933	5831	5059	6221	4974	10468
MEAN	374	660	1664	616	215	2038	3564	188	169	201	160	349
MAX	1260	8960	11300	3110	642	8570	16300	438	308	750	206	2730
MIN	16	38	115	213	62	86	448	80	148	143	149	140
AC-FT	23030	39260	102300	37890	12350	125300	212100	11570	10030	12340	9870	20760

CAL YR 1987 TOTAL 293448 MEAN 804 MAX 11300 MIN 15 AC-FT 582100  
WTR YR 1988 TOTAL 310981 MEAN 850 MAX 16300 MIN 16 AC-FT 616800

## ARKANSAS RIVER BASIN

07177600 BIRD CREEK AT 66TH STREET NEAR TULSA, OK.

LOCATION.--Lat 36°14'57", long 95°56'35", in NE 1/4 NE 1/4 sec.5, T.20 N., R.13 E., Tulsa County, Hydrologic Unit 11070107, on downstream side at right abutment of county bridge, 1.6 mi downstream from Delaware Creek, 1.4 mi upstream from Flatrock Creek, 2.0 mi northeast of Turley, and at mile 21.8.

DRAINAGE AREA.--967 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1987 to current year.

GAGE.--Water-stage recorder. Datum of gage is 567.62 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,600 ft<sup>3</sup>/s, Apr. 3, 1988, gage height 32.99 ft; minimum daily discharge, 12 ft<sup>3</sup>/s, Sept. 27, 1987

EXTREMES FOR CURRENT PERIOD.--June to September 1987: Maximum discharge, 7,470 ft<sup>3</sup>/s, Sept. 29, gage height, 23.54 ft; minimum daily discharge, 12 ft<sup>3</sup>/s, Sept. 27.

Water year 1988: Maximum discharge, 19,600 ft<sup>3</sup>/s, Apr. 3, gage height, 32.99 ft; minimum daily discharge, 23 ft<sup>3</sup>/s, Oct. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	---	---	131	24	38
2	---	---	---	---	---	---	---	---	---	456	23	37
3	---	---	---	---	---	---	---	---	---	345	22	35
4	---	---	---	---	---	---	---	---	---	1410	21	34
5	---	---	---	---	---	---	---	---	---	2100	21	33
6	---	---	---	---	---	---	---	---	---	e400	22	33
7	---	---	---	---	---	---	---	---	---	e600	23	33
8	---	---	---	---	---	---	---	---	---	e450	22	33
9	---	---	---	---	---	---	---	---	---	e400	21	32
10	---	---	---	---	---	---	---	---	---	e210	21	26
11	---	---	---	---	---	---	---	---	---	e180	21	22
12	---	---	---	---	---	---	---	---	---	e175	21	25
13	---	---	---	---	---	---	---	---	---	e1720	92	30
14	---	---	---	---	---	---	---	---	---	e900	201	30
15	---	---	---	---	---	---	---	---	---	e600	92	49
16	---	---	---	---	---	---	---	---	---	e450	41	237
17	---	---	---	---	---	---	---	---	165	409	34	53
18	---	---	---	---	---	---	---	---	77	254	30	52
19	---	---	---	---	---	---	---	---	50	235	78	54
20	---	---	---	---	---	---	---	---	50	228	112	37
21	---	---	---	---	---	---	---	---	81	236	58	32
22	---	---	---	---	---	---	---	---	86	239	69	26
23	---	---	---	---	---	---	---	---	76	233	56	21
24	---	---	---	---	---	---	---	---	59	230	39	18
25	---	---	---	---	---	---	---	---	73	227	37	16
26	---	---	---	---	---	---	---	---	54	234	40	14
27	---	---	---	---	---	---	---	---	45	222	280	12
28	---	---	---	---	---	---	---	---	40	219	233	4000
29	---	---	---	---	---	---	---	---	38	210	84	6000
30	---	---	---	---	---	---	---	---	38	54	54	1090
31	---	---	---	---	---	---	---	---	---	28	43	---
TOTAL	---	---	---	---	---	---	---	---	---	13785	1935	12152
MEAN	---	---	---	---	---	---	---	---	---	445	62.4	405
MAX	---	---	---	---	---	---	---	---	---	2100	280	6000
MIN	---	---	---	---	---	---	---	---	---	28	21	12
AC-FT	---	---	---	---	---	---	---	---	---	27340	3840	24100

e Estimated



## ARKANSAS RIVER BASIN

07177600 BIRD CREEK AT 66TH STREET NEAR TULSA, OK.--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1370	116	712	1340	280	138	8510	462	214	162	197	153
2	1340	66	647	716	269	698	16100	454	265	159	174	153
3	1250	60	606	545	193	9220	14600	434	358	157	163	159
4	1200	80	579	486	169	6930	2870	300	221	167	162	156
5	1250	80	543	417	160	4200	2980	285	199	173	153	158
6	1260	80	494	301	154	4900	3480	221	194	168	154	154
7	1240	80	465	279	147	3510	3360	180	185	173	148	152
8	1100	81	276	413	145	2950	3280	173	197	176	146	e150
9	569	81	254	299	145	2280	3210	177	187	173	170	e148
10	426	84	246	312	145	2010	4020	169	181	168	219	e146
11	403	86	238	245	145	1870	5420	156	177	162	158	e146
12	392	85	159	256	142	1710	3620	137	177	187	153	e144
13	345	81	124	512	136	1530	3080	96	175	303	153	e144
14	79	81	136	471	128	1490	2760	111	172	166	153	e150
15	38	383	169	366	92	1370	2620	133	172	160	153	e150
16	36	1140	196	1030	71	1260	2000	128	172	161	166	268
17	31	445	217	2870	68	1280	1840	85	170	174	162	384
18	26	282	339	1560	75	1680	2520	76	172	215	162	417
19	25	194	5150	947	602	1280	4740	179	169	204	164	2410
20	25	161	12800	1740	805	1120	2640	197	168	738	165	1380
21	26	127	7540	884	600	935	2290	201	165	293	161	399
22	23	101	1610	591	484	850	2120	198	161	208	160	211
23	24	81	1090	455	612	740	1600	204	163	188	160	544
24	48	1450	864	371	600	416	1410	175	161	172	157	1000
25	66	9750	2090	335	549	361	1410	165	164	164	158	427
26	46	2750	3600	378	212	325	1430	195	164	161	155	269
27	38	696	4730	349	163	311	775	179	166	153	154	206
28	35	902	3980	339	155	345	692	212	167	180	165	178
29	34	921	2030	352	147	5090	623	220	166	227	156	166
30	38	826	1220	306	---	2440	480	217	166	431	154	177
31	46	---	1620	287	---	959	---	220	---	259	152	---
TOTAL	12829	21350	54724	19752	7593	64198	106480	6339	5568	6582	5007	10699
MEAN	414	712	1765	637	262	2071	3549	204	186	212	162	357
MAX	1370	9750	12800	2870	805	9220	16100	462	358	738	219	2410
MIN	23	60	124	245	68	138	480	76	161	153	146	144
AC-FT	25450	42350	108500	39180	15060	127300	211200	12570	11040	13060	9930	21220

WTR YR 1988 TOTAL 321121 MEAN 877 MAX 16100 MIN 23 AC-FT 636900

e Estimated

## ARKANSAS RIVER BASIN

07177650 FLAT ROCK CREEK AT CINCINNATI AVENUE AT TULSA, OK.

LOCATION.--Lat 36°12'55", long 95°59'42", in SE 1/4 NE 1/4 sec.14, T.20 N., R.12 E., Tulsa County, Hydrologic Unit 11070107, near right upstream abutment of Cincinnati Avenue bridge, 0.5 mi north of Cincinnati Avenue-36th Street North intersection, 2.0 mi south of Turley, and at mile 5.6.

DRAINAGE AREA.--8.2 mi<sup>2</sup>.

PERIOD OF RECORD.--December 1987 to September 1988.

GAGE.--Water-stage recorder. Datum of gage is 615.56 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair.

EXTREMES FOR CURRENT PERIOD.--Maximum discharge, 1,960 ft<sup>3</sup>/s, Mar. 28, gage height, 9.99 ft; no flow at times.DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	e.60	e4.5	e1.1	e5.0	303	.57	.01	.00	.00	.36
2	---	---	e.40	e4.2	e1.2	e35	25	.45	.00	.00	.00	.61
3	---	---	.55	e4.0	e5.0	575	7.0	.41	.00	.00	.00	.40
4	---	---	.41	e3.8	e3.0	243	4.7	.37	.00	.00	.00	.02
5	---	---	.27	e3.6	e2.0	55	3.5	.36	.00	.00	.00	.00
6	---	---	.24	e3.4	e1.5	26	2.9	.36	.00	.00	.65	.00
7	---	---	.07	e3.2	e1.2	8.8	2.6	.33	.00	.00	.53	.00
8	---	---	.00	e3.0	e1.1	5.5	2.2	.32	.00	.00	.00	.00
9	---	---	.00	e2.8	e1.1	e5.0	1.9	.26	.00	.00	.00	.00
10	---	---	.00	e2.5	e1.0	e4.5	16	.19	.00	.00	.00	.00
11	---	---	.00	e2.3	e1.0	e4.0	4.1	.13	.00	e.00	.00	.00
12	---	---	.20	e40	e.95	e3.5	2.8	.06	.00	.00	.00	.00
13	---	---	28	e8.0	e.90	e2.5	2.3	.00	.00	.00	.00	.00
14	---	---	35	e7.0	e.85	2.0	2.0	.00	.00	.00	.00	.00
15	---	---	e20	6.3	e.80	1.9	1.7	.00	.00	.00	.00	.00
16	---	---	e15	19	e.75	1.9	1.6	.00	.00	.00	.00	.70
17	---	---	e8.0	9.5	e.70	5.7	2.2	.00	.00	.09	.00	.03
18	---	---	e30	4.7	e40	9.1	3.8	.00	.00	.00	.00	1.6
19	---	---	e200	3.4	e30	4.2	2.6	.00	.00	.00	.00	4.8
20	---	---	e30	2.2	e10	3.3	2.0	.85	.00	.00	e.00	.33
21	---	---	e10	1.7	e5.0	2.7	1.8	.68	.00	.00	e.00	.02
22	---	---	e5.0	1.7	e2.0	2.4	1.5	.60	.00	.00	.00	.00
23	---	---	e2.0	1.6	e1.5	2.2	1.2	.17	.00	.00	.00	8.0
24	---	---	e10	1.4	e1.2	2.8	1.1	.00	.00	.00	.00	4.1
25	---	---	e160	1.3	e1.0	2.7	1.2	.00	.00	2.0	.00	.68
26	---	---	e90	e1.3	e3.0	2.1	1.1	.00	.00	.23	.00	.26
27	---	---	e30	e1.2	e1.5	2.0	.94	.00	.00	.00	.00	.16
28	---	---	e15	e1.2	e1.0	199	.84	.00	.00	.00	.64	.04
29	---	---	e10	e1.2	e.95	239	.76	.00	.00	.00	.00	.38
30	---	---	7.7	e1.1	---	16	.75	.0	.00	.00	.00	.11
31	---	---	e5.0	e1.1	---	11	---	.33	---	.00	.00	---
MEAN	---	---	23.0	4.91	4.18	47.8	13.5	.21	.000	.075	.059	.75
MAX	---	---	200	40	40	575	303	.85	.01	2.0	.65	8.0
MIN	---	---	.00	1.1	.70	1.9	.75	.00	.00	.00	.00	.00
AC-FT	---	---	1420	302	241	2940	803	13	.02	4.6	3.6	45

e Estimated

## ARKANSAS RIVER BASIN

07178000 BIRD CREEK NEAR OWASSO, OK.

LOCATION.--Lat 36°14'55", long 95°52'06", in NW 1/4 NW 1/4 sec.6, T.20 N., R.24 E., Tulsa County, Hydrologic Unit 11070107, at bridge on Mingo Road 2 mi southwest of Owasso, 1.5 mi downstream from Coal Creek, 1.4 mi upstream from Mingo Creek, and at mile 14.1.

DRAINAGE AREA.--1022 mi<sup>2</sup>.

PERIOD OF RECORD.--1936 to October 1939, April 1987 to current year.

GAGE.--Water-stage recorder. Datum of gage is 560.17 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,200 ft<sup>3</sup>/s, Apr. 3, 1988, gage height 22.14 ft; minimum daily discharge, 18 ft<sup>3</sup>/s, Sept. 27, 1987

EXTREMES FOR CURRENT PERIOD.--April to September 1987: Maximum daily discharge, 7,140 ft<sup>3</sup>/s, Sept. 29; minimum daily discharge, 18 ft<sup>3</sup>/s, Sept. 27.

Water Year 1988: Maximum discharge, 15,200 ft<sup>3</sup>/s, Apr. 3, gage height, 22.14 ft; minimum daily discharge, 55 ft<sup>3</sup>/s, Oct. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	147	e500	137	25	e50
2	---	---	---	---	---	---	---	118	e450	518	23	e45
3	---	---	---	---	---	---	---	82	e1100	544	22	e42
4	---	---	---	---	---	---	---	106	e2200	1380	21	e40
5	---	---	---	---	---	---	---	127	e1500	2220	20	e39
6	---	---	---	---	---	---	---	193	e1400	550	21	e38
7	---	---	---	---	---	---	---	168	e1200	700	25	e38
8	---	---	---	---	---	---	---	125	e1120	581	23	e37
9	---	---	---	---	---	---	---	107	e1100	476	22	e36
10	---	---	---	---	---	---	---	119	e1020	305	20	e30
11	---	---	---	---	---	---	---	102	e900	225	19	e28
12	---	---	---	---	---	---	---	84	e260	211	19	e30
13	---	---	---	---	---	---	---	69	e250	1720	109	e35
14	---	---	---	---	---	---	---	67	e230	1090	167	e34
15	---	---	---	---	---	---	---	64	e200	701	101	e60
16	---	---	---	---	---	---	---	52	e180	506	39	e300
17	---	---	---	---	---	---	---	48	e170	434	25	e70
18	---	---	---	---	---	---	---	46	e80	401	19	e60
19	---	---	---	---	---	---	---	43	e50	279	82	e65
20	---	---	---	---	---	---	---	41	e49	255	83	e45
21	---	---	---	---	---	---	---	42	e80	238	81	e40
22	---	---	---	---	---	---	---	96	e85	227	e80	e35
23	---	---	---	---	---	---	---	132	e80	220	e60	e30
24	---	---	---	---	---	---	---	126	e60	206	e50	e22
25	---	---	---	---	---	---	205	566	e70	191	e45	e21
26	---	---	---	---	---	---	184	444	e76	201	e50	e19
27	---	---	---	---	---	---	169	477	e55	191	e320	e18
28	---	---	---	---	---	---	206	5500	e50	186	e260	e4000
29	---	---	---	---	---	---	229	e7000	e45	185	e100	e7140
30	---	---	---	---	---	---	199	e2000	e40	84	e70	e1160
31	---	---	---	---	---	---	---	e700	---	30	e60	---
TOTAL	---	---	---	---	---	---	---	18991	14600	15192	2061	13607
MEAN	---	---	---	---	---	---	---	613	487	490	66.5	454
MAX	---	---	---	---	---	---	---	7000	2200	2220	320	7140
MIN	---	---	---	---	---	---	---	41	40	30	19	18
AC-FT	---	---	---	---	---	---	---	37670	28960	30130	4090	26990

e Estimated

## ARKANSAS RIVER BASIN

07178000 BIRD CREEK NEAR OWASSO, OK.--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1540	173	809	1440	301	154	8250	488	194	148	200	153
2	1460	130	777	829	289	793	14000	480	228	144	180	156
3	1180	111	808	628	222	10000	14400	464	354	146	170	177
4	1240	148	766	550	190	7000	5370	327	199	149	161	163
5	1320	142	737	475	183	5000	3500	292	169	155	163	157
6	1300	139	669	335	175	5200	4000	248	169	157	158	152
7	1280	137	645	314	170	4000	3700	194	154	157	149	148
8	1190	174	411	359	166	3200	3500	194	164	156	146	149
9	728	152	356	340	168	2600	4200	200	163	155	205	150
10	505	143	346	322	170	2200	5000	199	159	154	181	148
11	459	136	342	275	163	2000	5800	188	155	155	152	146
12	453	137	266	350	159	1900	4500	171	155	247	146	146
13	448	136	202	606	153	1700	4000	125	155	300	146	146
14	182	154	231	573	150	1600	3200	107	154	200	143	146
15	81	569	300	442	112	1500	2800	132	153	170	143	149
16	73	1540	330	1500	91	1400	2200	123	151	170	153	256
17	67	692	300	3200	85	1600	2000	93	153	180	153	308
18	59	446	473	1680	115	1800	2080	75	153	220	152	482
19	79	325	4000	1070	761	1500	4800	145	153	500	156	1970
20	69	272	13000	1740	734	1260	3500	187	151	800	161	1460
21	55	232	3120	1050	619	1130	2500	191	150	450	156	482
22	57	201	1670	714	527	1030	1980	181	148	300	159	229
23	73	178	1210	553	630	936	1600	231	147	200	159	568
24	123	1030	1020	436	602	567	1410	176	146	180	157	1160
25	143	10000	1750	387	593	488	1390	153	148	170	156	509
26	126	5000	3000	417	262	424	1430	171	148	160	153	291
27	110	3000	5000	397	175	392	829	168	149	180	153	212
28	99	1000	2200	378	165	425	720	182	149	200	230	179
29	89	1200	1900	400	159	5400	660	199	149	250	178	205
30	85	1070	1320	354	---	2500	508	198	148	450	159	185
31	123	---	1620	314	---	1230	---	194	---	350	154	---
TOTAL	14796	28767	49578	22428	8289	70929	113827	6476	4968	7353	5032	10782
MEAN	477	959	1599	723	286	2288	3794	209	166	237	162	359
MAX	1540	10000	13000	3200	761	10000	14400	488	354	800	230	1970
MIN	55	111	202	275	85	154	508	75	146	144	143	146
AC-FT	29350	57060	98340	44490	16440	140700	225800	12850	9850	14580	9980	21390

WTR YR 1988 TOTAL 343225 MEAN 938 MAX 14400 MIN 55 AC-FT 680800



## ARKANSAS RIVER BASIN

07178035 MINGO CREEK AT 36TH STREET NORTH AT TULSA, OK.

LOCATION.--Lat 36°12'22", long 95°51'32", in SW 1/4 SE 1/4 sec.18, T.20 N., R.14 E., Tulsa County, Hydrologic Unit 11070107, near left downstream abutment of 36th Street North bridge, 0.3 mi downstream from small unnamed tributary on the right, and at mile 3.3.

DRAINAGE AREA.--56.0 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1987 to current year.

GAGE.--Water-stage recorder. Datum of gage is 577.82 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair.

EXTREMES FOR CURRENT PERIOD.--September 1987: Maximum discharge, 756 ft<sup>3</sup>/s, Sept. 28, gage height, 7.56 ft; minimum daily discharge, 2.5 ft<sup>3</sup>/s, Sept. 26, 27.  
 Water year 1988: Maximum discharge, 6,360 ft<sup>3</sup>/s, Mar. 3, gage height, 15.42 ft; minimum daily discharge, 1.1 ft<sup>3</sup>/s, Aug. 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987  
 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	---	---	---	---	---
2	---	---	---	---	---	---	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---
5	---	---	---	---	---	---	---	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---	---	---	---
7	---	---	---	---	---	---	---	---	---	---	---	---
8	---	---	---	---	---	---	---	---	---	---	---	---
9	---	---	---	---	---	---	---	---	---	---	---	---
10	---	---	---	---	---	---	---	---	---	---	---	---
11	---	---	---	---	---	---	---	---	---	---	---	---
12	---	---	---	---	---	---	---	---	---	---	---	---
13	---	---	---	---	---	---	---	---	---	---	---	---
14	---	---	---	---	---	---	---	---	---	---	---	6.0
15	---	---	---	---	---	---	---	---	---	---	---	e4.0
16	---	---	---	---	---	---	---	---	---	---	---	80
17	---	---	---	---	---	---	---	---	---	---	---	6.7
18	---	---	---	---	---	---	---	---	---	---	---	265
19	---	---	---	---	---	---	---	---	---	---	---	21
20	---	---	---	---	---	---	---	---	---	---	---	16
21	---	---	---	---	---	---	---	---	---	---	---	12
22	---	---	---	---	---	---	---	---	---	---	---	4.5
23	---	---	---	---	---	---	---	---	---	---	---	3.6
24	---	---	---	---	---	---	---	---	---	---	---	3.1
25	---	---	---	---	---	---	---	---	---	---	---	2.7
26	---	---	---	---	---	---	---	---	---	---	---	2.5
27	---	---	---	---	---	---	---	---	---	---	---	2.5
28	---	---	---	---	---	---	---	---	---	---	---	243
29	---	---	---	---	---	---	---	---	---	---	---	17
30	---	---	---	---	---	---	---	---	---	---	---	5.8
31	---	---	---	---	---	---	---	---	---	---	---	---
MEAN	---	---	---	---	---	---	---	---	---	---	---	---
MAX	---	---	---	---	---	---	---	---	---	---	---	---
MIN	---	---	---	---	---	---	---	---	---	---	---	---
AC-FT	---	---	---	---	---	---	---	---	---	---	---	---

e Estimated

## ARKANSAS RIVER BASIN

07178035 MINGO CREEK AT 36TH STREET NORTH AT TULSA, OK.--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.9	11	16	39	15	77	1690	3.8	e3.0	2.3	3.9	1.8
2	3.4	6.5	15	31	14	1560	257	3.2	e40	2.0	3.6	205
3	2.3	12	15	31	15	1980	85	3.3	e23	2.2	2.2	109
4	2.6	21	16	27	27	313	55	3.2	e5.5	1.8	1.7	5.5
5	2.6	22	13	20	21	349	42	3.2	e5.0	2.2	100	2.5
6	2.6	22	12	17	12	225	30	3.5	e4.0	2.5	64	1.8
7	2.8	27	12	23	13	102	25	3.7	e3.0	2.4	4.5	1.9
8	3.5	121	14	26	14	82	23	4.8	e5.0	5.6	2.6	1.7
9	4.1	9.1	12	26	15	56	19	3.4	e6.0	11	2.1	1.8
10	3.6	4.5	11	21	14	44	319	3.3	e5.0	2.4	1.8	1.4
11	4.3	4.0	10	22	14	40	46	3.8	e5.0	17	1.7	1.2
12	5.9	3.7	8.6	356	11	31	27	4.0	e3.0	8.3	2.2	1.7
13	5.8	6.2	8.5	137	13	26	22	4.0	e3.0	3.1	3.7	1.5
14	5.6	8.8	150	55	12	25	18	3.9	e6.0	2.3	2.1	1.3
15	5.7	604	157	51	10	24	16	3.2	e3.0	2.3	1.6	51
16	7.1	155	79	103	10	23	15	3.0	e3.0	5.3	1.7	72
17	7.7	74	49	366	9.8	253	79	2.9	e6.0	94	1.6	5.8
18	13	16	368	81	207	124	61	2.8	e3.0	6.3	1.8	400
19	41	35	2250	332	357	44	22	3.4	e2.5	375	192	978
20	24	11	612	67	50	35	15	70	e2.0	47	175	26
21	4.9	9.0	92	42	29	30	13	e15	e4.0	5.3	72	8.3
22	3.4	8.4	54	32	23	29	11	e310	e3.0	3.2	22	4.7
23	16	9.2	40	30	18	27	8.2	e350	e3.0	2.7	17	513
24	270	1000	143	27	16	145	7.8	e60	3.2	219	6.5	333
25	21	420	1670	21	16	82	15	e10	4.1	198	2.1	22
26	12	43	972	21	16	29	10	e6.0	2.5	7.3	1.4	11
27	6.4	52	999	20	15	22	5.6	e4.0	5.7	12	1.1	8.4
28	4.3	59	210	20	14	304	4.7	e4.0	4.7	782	230	5.2
29	8.3	27	90	19	13	2070	4.3	e3.0	3.0	45	21	414
30	13	19	72	18	---	172	4.3	e4.0	3.4	9.4	4.4	27
31	83	---	61	17	---	137	---	e3.5	---	4.8	2.5	---
MEAN	19.2	94.0	266	67.7	35.0	273	98.3	29.2	5.75	60.8	30.6	107
MAX	270	1000	2250	366	357	2070	1690	350	40	782	230	978
MIN	2.3	3.7	8.5	17	9.8	22	4.3	2.8	2.0	1.8	1.1	1.2
AC-FT	1180	5590	16330	4160	2010	16780	5850	1800	342	3740	1880	6380

WTR YR 1988 MEAN 91.0 MAX 2250 MIN 1.1 AC-FT 66040

e Estimated

## ARKANSAS RIVER BASIN

07178040 MINGO CREEK AT 46TH STREET NORTH AT TULSA, OK.

LOCATION.--Lat 36°13'14", long 95°51'30", in SW 1/4 SE 1/4 sec.7, T.20 N., R.14 E., Tulsa County, Hydrologic Unit 11070107, near left downstream abutment of 46th Street North bridge, 0.1 mi downstream from small left bank tributary, 0.2 mi upstream from small right bank tributary, 9.0 mi northeast of downtown Tulsa post office, and at mile 1.9.

DRAINAGE AREA.--59.9 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1987 to current year.

GAGE.--Water-stage recorder. Datum of gage is 562.60 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers bench mark).

REMARKS.--Records fair.

EXTREMES FOR CURRENT PERIOD.--April to September 1987: Maximum discharge, 3,290 ft<sup>3</sup>/s, July 18, maximum gage height, 13.67 ft, May 29 (backwater from Bird Creek); minimum daily discharge, 1.8 ft<sup>3</sup>/s, Aug. 5. Water year 1988: Maximum discharge, 6,720 ft<sup>3</sup>/s, Mar. 3, gage height, 17.46 ft; minimum daily discharge, 1.7 ft<sup>3</sup>/s, Sept. 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	9.7	172	19	3.4	2.7
2	---	---	---	---	---	---	---	3.2	62	335	2.4	2.6
3	---	---	---	---	---	---	---	2.7	162	27	2.4	2.4
4	---	---	---	---	---	---	---	e3.0	33	670	2.4	2.1
5	---	---	---	---	---	---	---	12	22	62	1.8	2.1
6	---	---	---	---	---	---	---	22	16	17	2.0	1.9
7	---	---	---	---	---	---	---	40	14	9.3	2.6	1.9
8	---	---	---	---	---	---	---	11	12	6.3	2.2	3.8
9	---	---	---	---	---	---	---	5.1	11	5.2	5.8	3.6
10	---	---	---	---	---	---	---	3.6	46	4.6	3.9	32
11	---	---	---	---	---	---	---	3.6	147	3.7	2.9	8.9
12	---	---	---	---	---	---	---	3.9	31	5.8	2.4	223
13	---	---	---	---	---	---	---	3.6	14	324	193	60
14	---	---	---	---	---	---	---	5.7	9.9	15	66	7.5
15	---	---	---	---	---	---	---	4.5	7.7	7.3	7.3	5.3
16	---	---	---	---	---	---	---	4.1	6.2	5.0	6.4	87
17	---	---	---	---	---	---	---	2.9	4.7	56	2.6	8.7
18	---	---	---	---	---	---	---	2.5	4.2	1140	2.1	275
19	---	---	---	---	---	---	---	2.4	40	48	57	27
20	---	---	---	---	---	---	---	11	39	14	11	17
21	---	---	---	---	---	---	---	5.5	9.5	9.4	3.9	15
22	---	---	---	---	---	---	---	140	6.1	6.4	2.8	5.9
23	---	---	---	---	---	---	---	97	5.4	5.0	2.7	4.4
24	---	---	---	---	---	---	---	7.20	209	4.7	2.4	3.2
25	---	---	---	---	---	---	---	5.9	539	103	2.1	2.7
26	---	---	---	---	---	---	---	4.7	27	11	4.2	2.3
27	---	---	---	---	---	---	---	4.4	55	4.7	2.9	526
28	---	---	---	---	---	---	---	4.4	e1000	3.2	2.8	22
29	---	---	---	---	---	---	---	4.1	e300	2.6	2.6	7.4
30	---	---	---	---	---	---	---	3.9	112	83	2.4	4.1
31	---	---	---	---	---	---	---	404	---	2.9	3.2	---
MEAN	---	---	---	---	---	---	---	98.2	36.2	91.0	32.2	37.0
MAX	---	---	---	---	---	---	---	1000	172	1140	526	275
MIN	---	---	---	---	---	---	---	2.4	2.6	2.4	1.8	1.9
AC-FT	---	---	---	---	---	---	---	6040	2160	5600	1980	2200

e Estimated

## ARKANSAS RIVER BASIN

07178040 MINGO CREEK AT 46TH STREET NORTH AT TULSA, OK.--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.7	13	17	45	17	70	e1750	5.8	3.4	2.7	6.9	2.5
2	3.6	6.8	14	37	17	1570	e280	4.9	49	2.6	3.7	210
3	2.6	5.7	14	34	22	e2040	e90	5.2	25	2.6	2.7	99
4	2.5	5.2	14	33	33	e340	e60	5.1	5.9	2.5	2.3	7.7
5	2.5	4.7	12	32	31	374	47	4.9	5.5	2.5	e100	3.4
6	2.3	4.1	10	23	20	247	37	5.3	3.8	2.9	73	2.4
7	2.6	4.1	9.9	26	21	103	30	5.1	3.4	2.6	4.6	2.3
8	2.5	122	11	35	23	83	26	6.3	5.4	3.7	2.6	2.3
9	2.5	12	11	35	23	54	20	4.7	6.3	11	2.3	2.2
10	2.1	6.4	9.1	30	21	43	321	4.3	5.4	2.8	2.1	1.9
11	2.6	4.4	8.8	26	21	34	53	4.6	5.0	17	2.1	1.8
12	3.2	3.6	8.1	376	20	26	29	4.4	3.4	9.7	2.2	1.8
13	3.0	3.8	7.7	e137	19	20	24	4.5	2.9	3.5	3.0	2.0
14	2.6	4.4	151	e65	16	19	19	4.6	6.1	2.7	2.2	1.7
15	1.9	623	262	60	13	17	15	3.7	3.2	2.6	1.9	60
16	1.9	163	90	108	13	16	13	3.6	3.1	9.7	1.9	65
17	1.9	80	55	376	13	250	77	3.7	5.9	103	2.0	8.2
18	6.3	18	385	88	205	124	74	3.6	3.5	8.1	1.9	e410
19	44	38	2900	349	382	37	28	4.7	2.7	e400	145	e1000
20	27	13	e620	75	59	26	18	63	2.6	50	206	29
21	6.3	9.5	e100	47	34	23	14	15	3.8	6.7	66	10
22	3.2	7.4	e64	37	27	21	12	345	2.9	3.9	32	5.8
23	12	7.3	50	34	22	18	9.3	404	2.7	3.0	17	e520
24	274	1030	160	30	19	138	8.4	61	2.6	189	9.2	e350
25	26	e450	1890	24	18	81	17	12	3.8	221	2.9	25
26	13	e50	e1000	24	18	23	12	6.4	2.6	8.1	2.3	12
27	8.3	57	e1010	24	17	15	8.1	4.8	4.7	5.8	1.8	9.0
28	4.8	71	e220	23	15	268	7.6	4.2	5.0	830	248	5.8
29	3.6	32	e100	20	15	2480	7.4	3.3	3.3	50	29	e430
30	e14	20	80	20	---	201	6.7	3.8	3.9	10	6.1	30
31	80	---	65	19	---	154	---	3.5	---	5.3	3.2	---
MEAN	18.3	95.6	302	73.9	40.5	288	104	32.7	6.23	63.7	31.8	110
MAX	274	1030	2900	376	382	2480	1750	404	49	830	248	1000
MIN	1.9	3.6	7.7	19	13	15	6.7	3.3	2.6	2.5	1.8	1.7
AC-FT	1130	5690	18540	4550	2330	17680	6180	2010	371	3920	1960	6570

WTR YR 1988 MEAN 97.7 MAX 2900 MIN 1.7 AC-FT 70920

e Estimated



LOCATION.--Lat 36°14'21", long 95°50'52", in NW 1/4 SW 1/4 sec.5, T.20 N., R.14 E., Tulsa County, Hydrologic Unit 11070107, at bridge on U.S. Highway 75, approximately 5.5 mi northwest of Catoosa.

PERIOD OF RECORD.--Water years 1965 to current year.

REMARKS.--Samples were collected periodically and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COLLECTING SAMPLE (CODE NUMBER)	AGENCY ANALYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	SPECIFIC CONDUCTANCE (US/CM)	PH (STANDARD UNITS)	TEMPERATURE AIR (DEG C)	TEMPERATURE WATER (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (NTU)	BAROMETRIC PRESSURE (MM OF HG)	OXYGEN, DISSOLVED (MG/L)
NOV 18...	1215	1028	80020	5.21	420	7.80	6.0	11.5	--	47	760	10.6
JAN 15...	1610	1028	80020	6.18	639	8.20	5.0	3.0	--	22	750	14.2
APR 05...	1345	1028	80020	12.25	320	7.70	24.0	14.5	--	120	740	11.3
MAY 20...	1500	1028	80020	5.23	634	8.00	24.0	25.0	--	10	740	6.6
20...	1501	1028	84042	--	--	--	--	--	40	67	--	--
JUN 14...	1000	1028	84042	4.43	459	7.80	27.0	25.0	50	19	750	--
15...	1000	1028	84042	4.43	460	7.70	29.5	25.0	--	--	760	8.8
28...	1030	1028	84042	4.84	446	7.70	32.0	28.0	--	--	745	5.6
29...	1100	1028	80020	4.87	445	7.90	32.0	29.0	--	13	745	5.8
AUG 09...	0845	1028	84042	4.89	426	7.70	28.5	29.0	50	25	750	5.4
SEP 20...	1130	1028	80020	9.67	245	7.80	23.5	23.0	--	340	750	7.4
20...	1131	1028	84042	--	--	--	--	--	>70	240	--	--

[illegible]

## ARKANSAS RIVER BASIN

07178050 BIRD CREEK NEAR CATOOSA, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, TOTAL (MG/L AS F)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	RESIDUE AT 105 DEG. C, DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDE (MG/L)	NITRO- GEN, NITRATE TOTAL (MG/L AS N)	NITRO- GEN, NITRITE TOTAL (MG/L AS N)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N)
NOV												
18...	5.5	34	47	--	240	--	213	0.33	--	--	--	--
JAN												
15...	3.1	49	64	--	320	--	289	0.44	--	--	--	--
APR												
05...	1.8	22	29	--	179	--	150	0.24	--	--	--	--
MAY												
20...	2.8	43	97	--	376	--	341	0.51	--	--	--	--
20...	--	--	--	0.2	--	357	--	--	18	<0.500	<0.500	<0.500
JUN												
14...	--	--	--	0.3	--	271	--	--	42	2.20	0.500	2.70
15...	--	36	57	--	--	--	--	--	--	--	--	--
28...	--	<20	56	--	--	--	--	--	--	--	--	--
29...	3.8	34	57	--	368	--	226	0.50	--	--	--	--
AUG												
09...	--	24	57	0.3	--	254	--	--	59	2.30	<0.500	2.30
SEP												
20...	3.2	16	24	--	149	--	133	0.20	--	--	--	--
20...	--	--	--	0.2	--	150	--	--	568	<0.500	<0.500	<0.500

DATE	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS NH4)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO- GEN, TOTAL (MG/L AS N)	NITRO- GEN, TOTAL (MG/L AS NO3)	PHOS- PHOROUS TOTAL (MG/L AS P)	PHOS- PHATE, TOTAL (MG/L AS PO4)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P)	ARSENIC TOTAL (UG/L AS AS)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, TOTAL RECOV- ERABLE (UG/L AS BA)
NOV												
18...	--	--	--	--	--	--	--	--	--	--	--	--
JAN												
15...	--	--	--	--	--	--	--	--	--	--	--	--
APR												
05...	--	--	--	--	--	--	--	--	--	--	--	--
MAY												
20...	--	--	--	--	--	--	--	--	--	--	--	--
20...	<0.100	--	0.55	0.55	--	--	0.030	--	<0.005	--	--	--
JUN												
14...	<0.100	--	1.0	1.0	3.7	16	1.29	3.50	1.14	--	--	--
15...	--	--	--	--	--	--	--	--	--	<60	<60	90
28...	--	--	--	--	--	--	--	--	--	<60	<60	90
29...	--	--	--	--	--	--	--	--	--	--	--	--
AUG												
09...	<0.100	--	0.89	0.89	3.2	14	1.40	3.77	1.23	<60	<60	100
SEP												
20...	--	--	--	--	--	--	--	--	--	--	--	--
20...	0.114	0.15	1.5	1.6	--	--	0.580	0.43	0.140	--	--	--

07178050 BIRD CREEK NEAR CATOOSA, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

[illegible]

07178050 BIRD CREEK NEAR CATOOSA, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

[illegible][illegible]



07178050 BIRD CREEK NEAR CATOOSA, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

[illegible]

07178050 BIRD CREEK NEAR CATOOSA, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

[illegible][illegible]

07178050 BIRD CREEK NEAR CATOOSA, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

[illegible]

07178050 BIRD CREEK NEAR CATOOSA, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

[illegible]



## ARKANSAS RIVER BASIN

07185000 NEOSHO RIVER NEAR COMMERCE, OK

LOCATION.--Lat 36°55'43", long 94°57'26", in SW 1/4 SE 1/4 sec.5, T.28 N., R.22 E., Ottawa County, Hydrologic Unit 11070206, on downstream side of right pier of county road bridge, 1.3 mi upstream from Mud Creek, 2.2 mi downstream from Four Mile Creek, 4.5 mi west of Commerce, and at mile 153.4.  
DRAINAGE AREA.--5,876 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1939 to current year.

REVISED RECORDS.--WSP 1117: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 748.97 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers' datum).

REMARKS.--Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Flow regulated to some extent since 1963 by John Redmond Reservoir in Kansas, 190 mi upstream. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--49 years, 3,684 ft<sup>3</sup>/s, 2,669,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 267,000 ft<sup>3</sup>/s, July 15, 1951, computed by flood-routing methods from hydrograph defined at Miami, mile 144.2, by several discharge measurements, gage-height record, and by comparison with computed inflow into Lake O' The Cherokees; maximum gage height, 34.03 ft, July 16, 1951, from floodmark; no flow at times in 1953-54, and 1956.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 20,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Nov. 25	0200	27,100	17.54	Apr. 4	0300	*45,100	*20.49
Dec. 21	1600	30,000	18.39	Apr. 20	2200	25,200	16.79
Mar. 5	0500	23,600	16.07				

Minimum daily discharge, 58 ft<sup>3</sup>/s, June 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1860	114	2330	10700	1560	882	19100	1340	966	1680	296	76
2	863	111	1860	8500	1330	982	36000	1200	959	1990	241	76
3	566	104	1990	4510	1260	10600	42600	1120	956	1580	182	76
4	684	102	2160	4190	1230	21200	44300	1070	888	1620	140	69
5	777	94	2070	e3800	1200	22800	40100	1170	719	907	125	64
6	761	80	1950	e3600	1100	16400	37500	1330	577	537	129	64
7	731	72	1470	e3400	805	9990	33000	1290	510	351	129	62
8	653	71	1090	e3200	853	6920	11400	1250	490	253	142	59
9	486	70	1000	e3100	1090	e5500	8470	1200	474	196	163	61
10	331	64	965	e3000	1110	4220	12800	1170	453	163	144	60
11	264	61	907	e2900	1100	3450	14900	1130	435	144	113	61
12	238	60	710	4290	977	3010	9910	1090	353	131	136	67
13	238	66	613	5000	914	2760	7840	993	260	559	241	72
14	234	73	622	5530	949	2580	11000	830	214	1150	213	80
15	229	203	662	2700	1100	2420	12400	666	201	847	151	91
16	226	969	657	1260	1320	2310	12200	614	218	750	118	216
17	221	1190	656	2380	1300	2240	10900	590	223	707	107	629
18	218	2960	651	2700	1230	2060	11900	578	216	878	108	649
19	217	2170	5940	3930	1430	1900	21600	563	253	979	102	1890
20	227	1430	24500	6420	3020	2040	24600	533	340	4270	105	5710
21	232	880	29300	7670	4620	2260	18300	446	246	2710	112	2540
22	227	761	29300	4940	3440	2730	6280	372	175	1430	107	940
23	e180	720	27700	3480	2300	2230	5130	433	130	994	110	676
24	e160	10500	13400	2910	1700	1780	4560	484	102	741	125	1080
25	e150	23600	6420	2680	1450	1590	3860	551	83	609	127	1050
26	e140	16700	11200	2500	1160	1400	3540	762	75	699	109	543
27	e130	8850	16000	2340	1060	1260	3640	750	68	644	99	322
28	118	3630	17500	2210	989	1200	3470	1000	58	500	96	225
29	112	2330	16300	1900	935	4860	2620	1030	70	453	89	194
30	110	2370	13000	1780	---	11500	1810	1010	638	399	85	167
31	115	---	11000	1790	---	7010	---	986	---	333	80	---
TOTAL	11698	80405	243923	119310	42532	162084	475730	27551	11350	29204	4224	17869
MEAN	377	2680	7868	3849	1467	5229	15860	889	378	942	136	596
MAX	1860	23600	29300	10700	4620	22800	44300	1340	966	4270	296	5710
MIN	110	60	613	1260	805	882	1810	372	58	131	80	59
AC-FT	23200	159500	483800	236700	84360	321500	943600	54650	22510	57930	8380	35440

CAL YR 1987 TOTAL 1851426 MEAN 5072 MAX 35700 MIN 60 AC-FT 3672000  
WTR YR 1988 TOTAL 1225880 MEAN 3349 MAX 44300 MIN 58 AC-FT 2432000

e Estimated

## ARKANSAS RIVER BASIN

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07185000 NEOSHO RIVER NEAR COMMERCE, OK--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1948-54, 1960-73, June to September 1988.

REMARKS.--Samples were collected on a monthly basis from June to September and specific conductance, air, and water temperature, and pH were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL-LECTING SAMPLE (CODE NUMBER)	AGENCY ANA-LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE AIR (DEG C)	TEMPER-ATURE WATER (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (FTU)	
OCT 28...	1435	1028	1028	2.44	118	376	8.00	16.0	14.0	--	--	
JUN 02...	1230	1028	80020	3.47	962	534	8.20	32.0	25.5	--	--	
JUL 20...	1040	1028	80020	5.96	593	280	8.50	24.0	27.0	75	110	
AUG 29...	1330	1028	80020	2.23	--	364	8.50	27.5	24.5	42	27	
DATE		BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, (PER-CENT SATUR-ATION)	HARD-NESS TOTAL (MG/L AS CAC03)	HARD-NESS NONCARB WH WAT TOT FLD (MG/L AS CAC03)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
OCT 28...	--	--	--	--	--	0	--	--	--	--	--	--
JUN 02...	--	--	--	--	250	44	73	16	18	13	0.5	3.2
JUL 20...	750	7.6	97	120	18	35	8.2	10	15	0.4	3.0	
AUG 29...	--	--	--	150	26	45	9.6	15	17	0.6	3.5	
DATE		SULFATE DIS-SOLVED (MG/L AS S04)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SI02)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL)	ALUM-INUM, DIS-SOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)
OCT 28...	--	--	--	--	--	--	--	--	--	--	--	--
JUN 02...	60	13	0.40	4.0	313	311	0.43	813	1300	<10		2
JUL 20...	43	7.4	0.20	6.2	179	175	0.24	287	7300	<10	--	
AUG 29...	44	13	0.20	6.4	228	212	0.31	0.0	2200	<10	--	
DATE		ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	BORON, DIS-SOLVED (UG/L AS B)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COBALT, TOTAL RECOV-ERABLE (UG/L AS CO)	COBALT, DIS-SOLVED (UG/L AS CO)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU)	COPPER, DIS-SOLVED (UG/L AS CU)
OCT 28...	--	--	--	--	--	--	--	--	--	--	--	--
JUN 02...	2	120	40	1	<1	3	3	3	2	7	2	
JUL 20...	2	60	30	4	<1	9	1	3	2	22	4	
AUG 29...	1	89	40	<1	<1	2	<1	<1	2	6	4	

## ARKANSAS RIVER BASIN

07185000 NEOSHO RIVER NEAR COMMERCE, OK--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	IRON, TOTAL RECOV- ERABLE (UG/L AS FE)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB)	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG)	MERCURY DIS- SOLVED (UG/L AS HG)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI)
OCT 28...	--	--	--	--	--	--	--	--	--	--
JUN 02...	1200	5	<5	<5	11	220	2	<0.10	<0.1	9
JUL 20...	7300	19	25	<5	5	450	3	3.3	<0.1	11
AUG 29...	2000	12	<5	<5	6	190	8	<0.10	<0.1	4

DATE	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, TOTAL (UG/L AS SE)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG)	SILVER, DIS- SOLVED (UG/L AS AG)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN)	ZINC, DIS- SOLVED (UG/L AS ZN)	SEDI- MENT, SUS- PENDE (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
OCT 28...	--	--	--	--	--	--	--	--	--	--
JUN 02...	6	<1	<1	1	<1.0	<10	<3	--	--	--
JUL 20...	4	--	<1	--	<1.0	50	20	--	--	--
AUG 29...	3	--	<1	--	<1.0	90	26	47	0.0	92





## ARKANSAS RIVER BASIN

07185095 TAR CREEK AT 22ND STREET BRIDGE AT MIAMI, OK--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD---June to September 1988.

REMARKS---Samples were collected from June to September and specific conductance, air and water temperatures, dissolved oxygen, and pH were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	COLOR (PLAT- INUM- COBALT UNITS)	TUR- BID- ITY (NTU)
FEB											
04...	1535	1028	1028	3.65	10	--	6.60	0.5	2.5	--	--
MAR											
16...	1255	1028	1028	3.65	4.3	1220	6.80	8.5	6.5	--	--
JUN											
03...	1030	1028	80020	3.42	3.0	2710	3.10	31.0	23.0	--	--
JUL											
11...	1430	1028	1028	3.44	3.2	2310	3.90	36.0	27.0	--	--
19...	1415	1028	80020	3.42	2.8	2710	3.70	27.5	28.5	3	6.3
AUG											
24...	1020	1028	1028	3.40	1.8	2710	3.80	--	--	--	--
30...	0830	1028	80020	3.33	1.4	2590	3.90	16.0	20.0	1	8.0

DATE	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	HARD- NESS TOTAL (MG/L AS CACO3)	HARD- NESS NONCARB WH WAT TOT FLD MG/L AS CACO3	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)
FEB										
04...	--	--	--	--	--	--	--	--	--	--
MAR										
16...	--	--	--	--	--	--	--	--	--	--
JUN										
03...	--	--	--	1600	1600	470	99	58	7	0.7 7.0
JUL										
11...	--	--	--	--	--	--	--	--	--	--
19...	740	7.4	99	1800	1800	520	110	61	7	0.7 7.8
AUG										
24...	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	1500	1500	420	100	80	11	0.9 11

DATE	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SiO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTITU- ENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL)	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)
FEB											
04...	--	--	--	--	--	--	--	--	--	--	--
MAR											
16...	--	--	--	--	--	--	--	--	--	--	--
JUN											
03...	1800	18	1.3	19	2600	2510	3.54	21.3	410	420	<1
JUL											
11...	--	--	--	--	--	--	--	--	--	--	--
19...	1800	22	0.90	18	2660	2570	3.62	20.1	330	350	--
AUG											
24...	--	--	--	--	--	--	--	--	--	--	--
30...	1700	35	1.1	13	2480	2380	3.37	9.37	230	130	--

## ARKANSAS RIVER BASIN

07185095 TAR CREEK AT 22ND STREET BRIDGE AT MIAMI, OK--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	BORON, DIS- SOLVED (UG/L AS B)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, TOTAL RECOV- ERABLE (UG/L AS CO)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU)	COPPER, DIS- SOLVED (UG/L AS CU)
FEB 04...	--	--	--	--	--	--	--	--	--	--	--
MAR 16...	--	--	--	--	--	--	--	--	--	--	--
JUN 03...	<1	100	260	2	1	3	1	130	120	5	2
JUL 11...	--	--	--	--	--	--	--	--	--	--	--
19...	<1	<100	270	<1	2	3	4	110	120	4	2
AUG 24...	--	--	--	--	--	--	--	--	--	--	--
30...	<1	100	340	1	3	2	2	70	80	5	3

DATE	IRON, TOTAL RECOV- ERABLE (UG/L AS FE)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB)	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG)	MERCURY DIS- SOLVED (UG/L AS HG)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI)	NICKEL, DIS- SOLVED (UG/L AS NI)
FEB 04...	--	--	--	--	--	--	--	--	--	--	--
MAR 16...	--	--	--	--	--	--	--	--	--	--	--
JUN 03...	4700	3900	<5	7	100	3300	3500	<0.10	<0.1	700	800
JUL 11...	--	--	--	--	--	--	--	--	--	--	--
19...	1900	440	11	13	100	2400	2300	<0.10	<0.1	700	700
AUG 24...	--	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	120	2000	2100	<0.10	<0.1	--	500

DATE	NICKEL, RECOV. FM BOT- TOM MA- TERIAL (UG/G AS NI)	SELE- NIUM, TOTAL (UG/L AS SE)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG)	SILVER, DIS- SOLVED (UG/L AS AG)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN)	ZINC, DIS- SOLVED (UG/L AS ZN)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
FEB 04...	--	--	--	--	--	--	--	--	--	--
MAR 16...	--	--	--	--	--	--	--	--	--	--
JUN 03...	--	<1	<1	<1	<1.0	30000	30000	9	0.07	21
JUL 11...	--	--	--	--	--	--	--	--	--	--
19...	--	--	<1	--	<1.0	25000	22000	10	0.08	72
AUG 24...	--	--	--	--	--	--	--	--	--	--
30...	460	--	<1	--	1.0	13000	13000	8	0.03	64

## ARKANSAS RIVER BASIN

07188000 SPRING RIVER NEAR QUAPAW, OK

LOCATION (REVISED).--Lat 36°56'03", long 94°44'48", in NE 1/4 SW 1/4 sec.5, T.28 N., R.24 E., Ottawa County, Hydrologic Unit 11070207, near downstream right abutment of county road bridge, 0.1 mi upstream from Rock Creek, 3.0 mi southeast of Quapaw, and at mile 13.9. Records include flow of Rock Creek.

DRAINAGE AREA.--2,510 mi<sup>2</sup>, includes that of Rock Creek.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1939 to current year.

REVISED RECORDS.--WSP 1117: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 746.25 ft above National Geodetic Vertical Datum of 1929.

Nonrecording gage on right bank at same datum used May 20 to Nov. 16, 1943.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Occasional releases from floodgates at old Riverton Hydroelectric plant, 15 mi upstream. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--49 years, 2,054 ft<sup>3</sup>/s, 11.11 in/yr, 1,488,000 acre-ft/yr.EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 190,000 ft<sup>3</sup>/s, May 19, 1943, gage height, 43.4 ft, from floodmark, from rating curve extended above 54,000 ft<sup>3</sup>/s, on basis of slope-area measurement of peak flow; minimum daily discharge, 5.8 ft<sup>3</sup>/s, July 8, 1954.EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge 18,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Nov. 25	0400	*43,100	*23.08	Dec. 28	0600	26,600	18.57
Dec. 21	0800	34,500	20.86	Apr. 2	1000	28,500	19.16

Minimum daily discharge, 149 ft<sup>3</sup>/s, Oct. 18.DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	247	e271	3500	6240	1600	1910	11400	1610	742	6260	399	405
2	192	e263	3070	4860	1580	1970	27100	1560	731	5510	386	375
3	188	e255	2580	4050	1560	8450	25400	1510	812	2840	370	355
4	207	e247	2360	3580	1520	15000	18500	1330	1000	1210	e280	338
5	199	e243	2260	3370	1460	10600	8290	1390	907	730	e260	317
6	184	e241	2140	2970	1380	7700	5910	1390	768	688	310	e290
7	171	e241	2020	2640	1330	5640	5020	1350	704	599	342	e270
8	168	e240	2010	2720	1310	4160	4460	1320	672	520	337	e255
9	162	e232	2080	2600	1300	3690	3790	1290	636	508	318	e240
10	198	e230	1930	2480	1280	3360	4030	1250	606	505	e300	e230
11	208	e225	1740	2390	1280	3110	4290	1120	590	542	420	e220
12	203	223	1400	2310	1250	2850	3890	1020	579	414	553	e210
13	186	e212	1560	2340	1230	2640	3470	1110	570	668	608	e200
14	173	e205	1450	2310	1250	2400	3170	1080	538	521	453	e190
15	162	e210	1270	2050	1270	2160	2660	1050	434	387	392	e180
16	158	e230	1340	1600	1390	2160	2740	1060	556	337	344	612
17	154	1100	1290	2030	1420	2220	2650	1030	664	333	322	906
18	149	1020	1240	2180	1360	2250	2730	984	618	382	314	2710
19	282	e900	8020	2270	2200	2240	5410	959	577	365	311	4800
20	290	801	31300	2600	7000	2210	3480	932	541	3910	339	3810
21	295	569	32600	2780	6240	2100	2700	919	514	2950	575	2030
22	287	461	21500	2350	4300	1880	2430	945	489	1590	484	1270
23	276	406	9930	2110	3150	1900	2190	1080	469	922	908	1280
24	e281	16200	5350	2010	2770	1850	2050	1070	452	715	3150	3500
25	e310	36900	8080	1910	2530	1930	1880	1080	442	488	2770	1860
26	e400	e25000	16400	1840	2250	1820	1910	996	430	947	1730	1470
27	e500	15000	23800	1770	2130	1740	1850	912	423	726	883	866
28	e420	10100	24600	1730	2100	1900	1780	865	413	758	637	861
29	e370	5900	14900	1690	2000	12400	1720	827	469	653	544	1050
30	e330	4230	9460	1680	---	15700	1660	796	1850	536	484	1220
31	e298	---	7070	1650	---	10500	---	767	---	478	447	---
TOTAL	7648	122355	248250	79110	61440	140440	168560	34602	19196	37992	19970	32320
MEAN	247	4078	8008	2552	2119	4530	5619	1116	640	1226	644	1077
MAX	500	36900	32600	6240	7000	15700	27100	1610	1850	6260	3150	4800
MIN	149	205	1240	1600	1230	1740	1660	767	413	333	260	180
AC-FT	15170	242700	492400	156900	121900	278600	334300	68630	38080	75360	39610	64110

CAL YR 1987 TOTAL 1019778 MEAN 2794 MAX 36900 MIN 137 AC-FT 2023000 CFSM 1.11 IN. 15.11

WTR YR 1988 TOTAL 971883 MEAN 2655 MAX 36900 MIN 149 AC-FT 1928000 CFSM 1.06 IN. 14.40

e Estimated

## ARKANSAS RIVER BASIN

07188000 SPRING RIVER NEAR QUAPAW, OK--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--June to September 1988.

REMARKS.--Samples were collected on a monthly basis from June to September and specific conductance, air and water temperature, and pH were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	COLOR (PLAT- INUM- COBALT UNITS)	TUR- BID- ITY (NTU)
JUN 01...	1730	1028	80020	5.77	724	386	8.10	25.5	25.5	--	--
JUL 19...	1045	1028	80020	5.50	48	362	--	29.0	27.0	4	3.8
AUG 30...	1430	1028	80020	5.45	477	207	7.90	32.0	26.0	40	20
SEP 29...	1630	1028	80020	6.50	1230	327	8.10	24.0	22.5	--	--
29...	2215	1028	80020	6.76	1480	327	8.10	15.5	19.5	--	--
30...	0015	1028	80020	6.71	1430	327	8.10	15.0	19.5	--	--
30...	0215	1028	80020	6.65	1370	327	8.10	14.0	19.0	--	--

DATE	BARO- METRIC PRES- SURE (MM OF HG)	HARD- NESS TOTAL (MG/L AS CAC03)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)
JUN 01...	--	180	61	5.5	11	12	0.4	2.7	39	12
JUL 19...	745	150	52	5.8	12	14	0.4	3.0	44	12
AUG 30...	--	95	33	3.1	7.0	13	0.3	5.0	23	8.4
SEP 29...	--	140	49	5.1	9.7	12	0.4	4.0	50	11
29...	--	130	46	4.7	9.2	13	0.3	3.6	49	11
30...	--	140	49	5.1	9.7	12	0.4	4.0	50	10
30...	--	150	51	5.2	10	12	0.4	3.8	50	10

DATE	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SiO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL)	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)	ARSENIC DIS- SOLVED (UG/L AS AS)
JUN 01...	0.40	9.0	232	220	0.32	454	520	10	1	1
JUL 19...	0.10	9.5	224	208	0.30	29.0	350	20	1	<1
AUG 30...	0.10	9.0	146	133	0.20	188	1600	100	--	1
SEP 29...	0.20	10	207	196	0.28	687	970	<10	1	1
29...	0.20	9.9	209	192	0.28	835	1200	20	1	1
30...	0.20	10	211	196	0.29	815	630	40	1	1
30...	0.20	11	204	200	0.28	755	1100	80	1	1



## ARKANSAS RIVER BASIN

07188000 SPRING RIVER NEAR QUAPAW, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	BARIUM, DIS- SOLVED (UG/L AS BA)	BORON, DIS- SOLVED (UG/L AS B)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, TOTAL RECOV- ERABLE (UG/L AS CO)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, TOTAL RECOV- ERABLE (UG/L AS CU)	COPPER, DIS- SOLVED (UG/L AS CU)
JUN 01...	63	20	2	<1	2	1	3	3	7	2
JUL 19...	58	30	1	<1	2	2	<1	3	5	3
AUG 30...	50	20	1	<1	3	<1	<1	<1	7	7
SEP 29...	58	30	1	2	2	<1	<1	<1	34	16
29...	55	30	1	3	2	3	<1	<1	22	15
30...	59	30	1	4	2	3	1	<1	18	24
30...	59	30	1	3	1	2	<1	<1	18	20

DATE	IRON, TOTAL RECOV- ERABLE (UG/L AS FE)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB)	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG)	MERCURY DIS- SOLVED (UG/L AS HG)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI)
JUN 01...	600	5	<5	<5	9	130	15	<0.10	<0.1	7
JUL 19...	410	13	7	<5	5	120	30	<0.10	<0.1	6
AUG 30...	90	120	<5	<5	<4	110	37	<0.10	0.1	6
SEP 29...	1000	47	17	<5	7	150	88	0.10	<0.1	6
29...	1200	140	13	<5	7	170	84	0.10	<0.1	7
30...	840	60	8	5	7	160	100	0.10	<0.1	10
30...	1100	62	8	6	7	150	99	0.10	<0.1	8

DATE	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, TOTAL (UG/L AS SE)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG)	SILVER, DIS- SOLVED (UG/L AS AG)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN)	ZINC, DIS- SOLVED (UG/L AS ZN)	SEDI- MENT, SUS- PENDED (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
JUN 01...	5	<1	<1	<1	<1.0	140	19	--	--	--
JUL 19...	4	<1	<1	--	<1.0	70	24	--	--	--
AUG 30...	4	--	<1	--	<1.0	170	100	--	--	--
SEP 29...	5	<1	<1	<1	<1.0	300	230	36	120	92
29...	12	<1	<1	<1	<1.0	320	190	38	152	92
30...	12	<1	<1	<1	<1.0	330	320	42	162	92
30...	11	<1	<1	<1	<1.0	320	290	47	174	80

## 07189000 ELK RIVER NEAR TIFF CITY, MO

LOCATION.--Lat 36°37'50", long 94°35'12", in NE 1/4 sec.22, T.22 N., R.34 W., McDonald County, Hydrologic Unit 11070208, on downstream side of second pier from right bank of bridge on State Highway 43, 0.8 mi downstream from Blackfoot Branch, 2.8 mi upstream from Buffalo Creek, 3.0 mi southeast of Tiff City, and at mile 15.8.

DRAINAGE AREA.--872 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1939 to current year.

REVISED RECORDS.--WSP 927: 1940. WSP 1117: Drainage area.

GAGE.--Water stage recorder. Datum of gage is 750.61 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Sept. 6, 1960 to Aug. 25, 1961, at site 100 ft downstream.

REMARKS.--Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--49 years, 804 ft<sup>3</sup>/s, 12.52 in/yr, 582,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 137,000 ft<sup>3</sup>/s, Apr. 19, 1941, gage height, 28.4 ft, from floodmark, from rating curve extended above 60,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; minimum daily discharge, 5.1 ft<sup>3</sup>/s, Sept. 5-6, 1954.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 9,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Dec. 20	1130	*27,100	*19.21	Mar. 30	0710	21,100	17.34
Dec. 26	1006	20,800	17.25	Apr. 2	2312	10,700	12.21

Minimum daily discharge, 58 ft<sup>3</sup>/s, Sept. 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	96	255	927	2400	652	942	4040	692	249	143	83	74
2	90	231	830	2000	649	920	7190	655	246	167	80	69
3	85	212	747	1770	632	1420	7100	630	246	170	79	78
4	81	198	669	1590	625	2850	4160	616	239	158	78	e88
5	78	186	601	1390	616	2650	3170	589	228	147	76	e97
6	75	176	549	1300	597	2360	2610	555	218	134	75	115
7	74	166	499	1230	588	2120	2170	536	210	127	100	100
8	72	161	460	1130	580	1940	1830	522	201	118	97	88
9	71	160	420	1030	576	1770	1650	503	192	114	90	82
10	72	154	387	953	571	1620	1520	475	193	114	109	77
11	75	149	358	890	571	1510	1520	454	188	127	101	72
12	78	144	333	850	561	1440	1500	435	179	132	91	68
13	79	138	313	856	554	1390	1450	417	171	129	88	63
14	80	135	326	850	554	1320	1360	400	167	125	84	60
15	78	151	475	828	552	1240	1270	386	160	115	76	58
16	75	389	715	813	544	1180	1180	375	158	108	68	69
17	73	1040	736	827	540	1150	1110	358	165	106	63	80
18	74	1010	711	858	566	1260	1220	341	167	115	61	105
19	104	856	4090	914	1340	1400	2000	326	159	126	71	209
20	134	707	20900	1060	3370	1550	1910	315	152	135	95	378
21	169	593	8020	1170	2640	1600	1600	320	143	176	112	345
22	167	508	4040	1130	2130	1560	1390	351	137	172	99	245
23	160	445	2770	1080	1790	1460	1240	390	133	155	104	228
24	223	451	2100	1030	1540	1360	1120	409	119	140	97	323
25	361	3090	4490	962	1370	1310	1020	387	108	126	87	381
26	473	3280	16400	895	1250	1230	948	348	106	117	77	351
27	543	1910	12000	833	1150	1160	882	318	109	109	70	294
28	495	1450	9500	780	1070	1110	819	303	105	110	77	251
29	395	1220	5260	741	999	5430	766	288	106	104	80	227
30	331	1070	3750	707	---	16000	728	275	133	96	78	210
31	289	---	2960	679	---	6250	---	260	---	88	79	---
TOTAL	5250	20635	106336	33546	29177	70502	60473	13229	5087	4003	2625	4885
MEAN	169	688	3430	1082	1006	2274	2016	427	170	129	84.7	163
MAX	543	3280	20900	2400	3370	16000	7190	692	249	176	112	381
MIN	71	135	313	679	540	920	728	260	105	88	61	58
AC-FT	10410	40930	210900	66540	57870	139800	119900	26240	10090	7940	5210	9690
CFSM	.19	.79	3.93	1.24	1.15	2.61	2.31	.49	.19	.15	.10	.19
IN.	.22	.88	4.54	1.43	1.24	3.01	2.58	.56	.22	.17	.11	.21

CAL YR 1987 TOTAL 361036 MEAN 989 MAX 20900 MIN 71 AC-FT 716100 CFSM 1.13 IN. 15.40  
WTR YR 1988 TOTAL 355748 MEAN 972 MAX 20900 MIN 58 AC-FT 705600 CFSM 1.11 IN. 15.18

e Estimated

## ARKANSAS RIVER BASIN

07190000 LAKE 0' THE CHEROKEES AT LANGLEY, OK

LOCATION.--Lat 36°28'07", long 95°02'28", in SW 1/4 SW 1/4 sec.14, T.23 N., R.21 E., Mayes County, Hydrologic Unit 11070209, on upstream side of pier at intake structure near right end of Pensacola Dam on Neosho River at Langley, 9.9 mi upstream from Big Cabin Creek, and at mile 77.0.

DRAINAGE AREA.--10,298 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1940 to current year. Prior to October 1940, published as Grand Lake at Langley.

REVISED RECORDS.--WSP 1117: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1.10 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers' bench mark). Prior to Nov. 14, 1941, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by multiple-arch concrete dam, with top of taintor-type spillway gates at gage height 755.0 ft. Storage began Mar. 21, 1940; power-pool was first filled Apr. 19, 1941. Capacity between gage heights 682.0 ft, sill of powerhouse penstock, and 745.0 ft, maximum power pool is 1,492,000 acre-ft. Capacity between gage heights 745.0 ft and 755.0 ft is 525,000 acre-ft, and is reserved for flood control. Dead storage below gage height 682.0 ft is 180,200 acre-ft. Figures given herein represent total contents. Reservoir is utilized for power development and flood control.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 2,213,000 acre-ft, May 25, 1957, gage height, 755.27 ft, minimum since power-pool was first filled, 642,900 acre-ft, Sept. 28, 1954, gage height, 713.41 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 1,961,000 acre-ft, Dec. 29, gage height, 750.84 ft; minimum, 1,441,000 acre-ft, Nov. 14, gage height, 739.72 ft.

Capacity table (elevation, in feet, and contents, in acre-ft):

740	1,452,000	750	1,917,000
745	1,672,000	755	2,198,000

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1462000	1452000	1719000	1865000	1522000	1473000	1748000	1610000	1571000	1574000	1557000	1511000
2	1459000	1448000	1707000	1843000	1510000	1480000	1813000	1608000	1565000	1576000	1553000	1511000
3	1454000	1446000	1696000	1831000	1501000	1512000	1860000	1592000	1558000	1574000	1548000	1512000
4	1452000	1445000	1683000	1772000	1500000	1578000	1885000	1579000	1559000	1568000	1546000	1511000
5	1450000	1445000	1669000	1740000	1497000	1635000	1896000	1572000	1559000	1567000	1546000	1513000
6	1449000	1445000	1656000	1722000	1497000	1677000	1896000	1566000	1560000	1568000	1545000	1511000
7	1449000	1445000	1640000	1685000	1497000	1700000	1894000	1562000	1558000	1566000	1543000	1509000
8	1449000	1449000	1622000	1702000	1496000	1712000	1880000	1558000	1560000	1560000	1542000	1509000
9	1451000	1450000	1609000	1694000	1498000	1716000	1855000	1561000	1560000	1566000	1538000	1508000
10	1451000	1448000	1593000	1681000	1499000	1719000	1842000	1563000	1558000	1566000	1538000	1508000
11	1448000	1447000	1587000	1666000	1493000	1716000	1830000	1563000	1558000	1568000	1538000	1506000
12	1449000	1446000	1584000	1656000	1493000	1714000	1815000	1561000	1559000	1568000	1538000	1504000
13	1450000	1447000	1581000	1648000	1487000	1707000	1793000	1563000	1558000	1564000	1537000	1504000
14	1450000	1444000	1576000	1637000	1482000	1701000	1779000	1565000	1556000	1563000	1537000	1502000
15	1450000	1452000	1572000	1636000	1481000	1694000	1767000	1564000	1559000	1563000	1537000	1496000
16	1450000	1454000	1566000	1629000	1480000	1688000	1756000	1564000	1560000	1562000	1537000	1497000
17	1450000	1456000	1559000	1624000	1479000	1680000	1745000	1562000	1560000	1563000	1530000	1497000
18	1451000	1459000	1555000	1618000	1481000	1668000	1736000	1559000	1559000	1563000	1531000	1503000
19	1459000	1461000	1610000	1613000	1484000	1660000	1742000	1557000	1558000	1570000	1530000	1521000
20	1457000	1453000	1731000	1617000	1499000	1659000	1741000	1557000	1557000	1568000	1531000	1534000
21	1455000	1450000	1819000	1620000	1513000	1655000	1733000	1564000	1557000	1571000	1530000	1537000
22	1456000	1455000	1854000	1616000	1522000	1648000	1717000	1564000	1557000	1567000	1526000	1537000
23	1455000	1460000	1852000	1610000	1519000	1639000	1710000	1569000	1555000	1566000	1529000	1535000
24	1456000	1534000	1833000	1600000	1516000	1630000	1703000	1571000	1552000	1564000	1533000	1564000
25	1453000	1694000	1844000	1592000	1512000	1621000	1692000	1570000	1552000	1564000	1538000	1568000
26	1451000	1786000	1928000	1582000	1506000	1607000	1680000	1565000	1550000	1565000	1537000	1570000
27	1452000	1800000	1916000	1572000	1499000	1592000	1668000	1565000	1549000	1563000	1522000	1564000
28	1454000	1783000	1961000	1563000	1492000	1584000	1657000	1569000	1545000	1563000	1520000	1556000
29	1457000	1764000	1949000	1550000	1482000	1622000	1643000	1570000	1548000	1562000	1514000	1561000
30	1451000	1740000	1912000	1541000	---	1690000	1627000	1571000	1552000	1561000	1510000	1560000
31	1454000	---	1886000	1530000	---	1708000	---	1570000	---	1560000	1511000	---
MAX	1462000	1800000	1961000	1865000	1522000	1719000	1896000	1610000	1571000	1576000	1557000	1570000
MIN	1448000	1444000	1555000	1530000	1479000	1473000	1627000	1557000	1545000	1560000	1510000	1496000
(+)	740.95	746.44	749.39	741.84	740.72	745.77	744.02	742.75	742.33	742.53	741.40	742.52
(++)	-12,000	+286,000	+146,000	-356,000	-48,000	+226,000	-81,000	-57,000	-18,000	+8,000	-49,000	+49,000
CAL YR 1987	MAX 1961000	MIN 1444000	(++) +383,000									
WTR YR 1988	MAX 1961000	MIN 1444000	(++) +94,000									

(+) ELEVATION, IN FEET, AT END OF MONTH  
(++) CHANGE IN CONTENTS, IN ACRE-FEET

## ARKANSAS RIVER BASIN

07190500 NEOSHO RIVER NEAR LANGLEY, OK

LOCATION.--Lat 36°26'15", long 95°02'44", in SE 1/4 sec.27, T.23 N., R.21 E., Mayes County, Hydrologic Unit 11070209, in concrete stilling well on left bank, 0.5 mi upstream from bridge on State Highway 82, 1.5 mi south of Langley, 3.6 mi downstream from Pensacola Dam, 6.3 mi upstream from Big Cabin Creek, and at mile 73.4.

DRAINAGE AREA.--10,335 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1939 to current year.

REVISED RECORDS.--WSP 1117: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 607.65 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Feb. 16, 1940, nonrecording gage at site 0.1 mi upstream at same datum. Feb. 10, 1954 to Sept. 30, 1963, water-stage recorder at site 0.5 mi downstream at same datum. Auxiliary water-stage recorders at sites 2.0 and 3.0 mi upstream at same datum.

REMARKS.--Records poor. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Low flow values of 25 ft<sup>3</sup>/s consist of estimated base flow (since July 1964). Flow regulated since 1940 by Lake O' The Cherokees (station 0719000).

AVERAGE DISCHARGE.--49 years, 7,243 ft<sup>3</sup>/s, 5,248,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 300,000 ft<sup>3</sup>/s, May 20, 1943, gage height, 45.5 ft, from floodmarks, from computation of outflow from Lake O' The Cherokees; minimum daily, 9 ft<sup>3</sup>/s, Mar. 25, 1940 (caused by closure of Pensacola Dam).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 63,700 ft<sup>3</sup>/s, Apr. 5, gage height, 24.06 ft; minimum daily discharge, 25 ft<sup>3</sup>/s, at times.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3170	2290	e18500	29700	9400	8010	e27300	e12700	e1030	e1490	2170	25
2	3310	2610	12500	22200	9580	6670	e46900	e4910	e4250	e5530	2090	66
3	2460	1710	11800	28900	9540	10000	e58700	e11900	e7380	e5850	3210	154
4	1020	1530	12300	28200	4610	10400	e62800	e10500	e472	e5600	627	25
5	1940	71	12300	27100	4560	10800	e59700	e7420	e1500	e2680	749	25
6	949	368	12200	20800	2300	10800	e53100	e5060	e714	e1720	831	25
7	1080	25	12200	e13500	3750	10400	e49700	e5510	e1950	e1950	920	25
8	521	25	12200	12400	3950	10200	e35700	e5040	e1820	e840	647	25
9	25	25	12200	12400	2600	10200	e27800	e1850	e556	e861	2140	715
10	25	25	11400	12400	4160	10200	e26600	e2400	e787	e336	94	181
11	1280	1030	6720	12300	6050	10300	e26200	e2640	e451	e126	63	1130
12	25	216	5390	12300	3500	10300	e25800	e2480	e26	e966	423	547
13	25	25	5610	11200	5400	10300	e24800	e1850	e1170	e2580	509	386
14	25	2540	5730	10700	5660	10300	e23900	e1290	e1200	e1910	415	2950
15	27	930	5040	5870	4600	10300	e22600	e2270	e252	e1040	556	3400
16	396	1410	6260	9770	4960	9820	e22000	e2600	e126	1630	1050	1520
17	493	3240	6810	10200	4360	10600	e21800	e3210	e556	376	3330	1570
18	99	4330	7580	10000	4680	11700	e21700	e2870	e945	2070	172	1950
19	81	3430	9340	9120	5170	10500	e25000	e1980	e1180	1460	49	2370
20	686	7460	e20500	10100	7170	7000	e30800	e2390	e1060	6270	299	1730
21	1020	3300	33300	11400	8360	9000	e30400	e26	e745	6240	732	1560
22	82	46	44300	11600	9000	9060	e21200	e672	e651	5130	1300	4500
23	1520	25	45400	11400	9400	9070	e12800	e1660	e997	2260	684	1370
24	2340	5850	40500	11200	9240	9170	e12900	e745	e1350	1570	527	25
25	2730	10700	38700	11000	8880	9620	e12900	e2660	e1140	1270	417	25
26	2560	24000	31800	10300	8330	11000	e12900	e3650	e955	1150	1170	1060
27	396	33400	29500	10600	9000	11400	e12200	e1970	e1630	2250	6950	6300
28	56	28200	37000	10400	9620	11300	e12800	e26	e220	1140	3630	3670
29	25	23000	45000	10700	9660	11900	e12700	e1230	e388	862	2490	1590
30	4040	22600	43500	10800	---	13600	e12700	e1300	e451	1300	1850	2030
31	25	---	36100	10600	---	15800	---	e2400	---	923	25	---
TOTAL	32431	184411	631680	429160	187490	319720	846400	107209	35952	69380	40119	40949
MEAN	1046	6147	20380	13840	6465	10310	28210	3458	1198	2238	1294	1365
MAX	4040	33400	45400	29700	9660	15800	62800	12700	7380	6270	6950	6300
MIN	25	25	5040	5870	2300	6670	12200	26	26	126	25	25
AC-FT	64330	365800	1253000	851200	371900	634200	1679000	212600	71310	137600	79580	81220

CAL YR 1987 TOTAL 3505242 MEAN 9603 MAX 64300 MIN 25 AC-FT 6953000  
WTR YR 1988 TOTAL 2924901 MEAN 7992 MAX 62800 MIN 25 AC-FT 5802000

e Estimated



## 07191000 BIG CABIN CREEK NEAR BIG CABIN, OK

LOCATION.--Lat 36°34'06", long 95°09'07" (revised), in NE 1/4 NE 1/4 sec.15, T.24 N., R.20 E., Craig County, Hydrologic Unit 11070209, near downstream side of right bank end of county road bridge, 4.9 mi northeast of Big Cabin, 0.9 mi downstream from White Oak Creek, 6.8 mi upstream from Mustang Creek, and at mile 13.0.

DRAINAGE AREA.--450 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1947 to current year.

GAGE.--Water-stage recorder. Datum of gage is 622.00 ft, National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Sept. 30, 1972, water-stage recorder at site 4.5 mi downstream at same datum.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Low flow sustained in part by sewage from city of Vinita. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--41 years, 327 ft<sup>3</sup>/s, 9.53 in/yr, 236,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 52,000 ft<sup>3</sup>/s, Oct. 3, 1959, gage height, 34.55 ft, at former site; maximum gage height, 46.65 ft, Feb. 23, 1985; minimum discharge, 0.10 ft<sup>3</sup>/s, Oct. 4, 5, 1954, Sept. 12-17, 26-28, Oct. 4-9, 1956, and Oct. 5-7, 1963.

EXTREMES FOR OUTSIDE PERIOD OF RECORD.--Flood of May 18, 1943, reached a stage of 34.96 ft at former site; discharge, 63,000 ft<sup>3</sup>/s, by slope-area measurement of peak flow.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 9,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Nov. 25	1700	*21,200	*38.81	Dec. 26	0300	9,190	31.15
Dec. 20	1400	16,900	36.96	Apr. 2	1350	12,500	34.13

Minimum daily discharge, 0.86 ft<sup>3</sup>/s, June 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.3	11	190	506	e115	80.0	4340	65	4.5	19	2.6	2.5
2	1.2	45	146	295	e104	166	11600	57	4.7	161	2.2	3.1
3	1.8	44	123	236	e96	7160	2840	51	4.7	40	2.2	4.4
4	4.4	33	106	221	e84	3160	662	47	4.7	15	2.1	3.5
5	4.2	22	95	180	e80	1330	431	40	4.8	12	2.0	2.8
6	5.0	15	91	139	e72	1940	330	37	5.1	9.8	2.0	2.5
7	6.0	9.9	88	140	e66	857	243	32	5.1	8.7	2.0	2.5
8	6.0	8.0	89	145	e62	475	191	30	4.5	7.5	2.0	2.1
9	6.0	6.9	89	147	e58	320	152	32	3.9	7.0	2.2	1.7
10	6.0	5.6	85	133	e55	247	880	26	3.2	6.4	3.3	1.7
11	6.0	3.9	78	130	e51	205	1090	20	2.7	6.4	3.1	1.7
12	6.3	2.6	75	275	e48	166	364	15	2.1	5.9	2.8	1.7
13	6.4	1.6	71	974	e48	134	223	19	1.7	5.4	2.8	1.7
14	6.4	1.1	74	494	e47	110	166	25	1.7	5.1	2.8	1.8
15	6.2	60	95	305	e47	101	127	22	1.7	4.6	2.6	2.4
16	6.0	1030	128	490	e46	96	103	12	1.8	4.0	2.1	6.8
17	6.0	342	120	1130	e46	143	96	8.2	2.0	4.0	1.6	8.8
18	6.0	149	143	735	e45	827	1310	7.6	2.0	4.0	1.7	298
19	14	101	5130	941	e280	471	688	7.3	1.7	4.5	2.0	796
20	11	80	15300	862	e500	251	280	6.8	1.4	6.4	2.0	349
21	5.4	69	5200	375	e220	181	180	6.8	1.2	6.5	2.0	134
22	4.3	59	675	242	e170	145	131	6.9	1.2	4.9	1.9	50
23	6.5	50	440	203	e140	120	97	11	1.1	4.3	1.6	227
24	17	2210	491	183	e130	112	83	11	1.1	4.1	1.7	806
25	25	17700	3830	154	e120	205	76	10	1.0	3.4	1.9	282
26	21	7440	7070	126	e110	200	79	11	.96	2.8	2.0	113
27	20	497	5590	103	95.0	132	79	10	.90	2.8	2.0	66
28	16	433	2400	e84	91.0	102	71	8.3	.88	3.3	2.3	37
29	13	372	804	e140	84.0	5550	61	6.5	.86	3.3	2.5	24
30	11	240	539	e150	---	3640	61	5.8	.86	3.3	2.5	21
31	8.4	---	666	e131	---	686	---	4.6	---	3.2	2.5	---
TOTAL	264.8	31041.6	50021	10369	3110.0	29312.0	27034	651.8	74.06	378.6	69.0	3254.7
MEAN	8.54	1035	1614	334	107	946	901	21.0	2.47	12.2	2.23	108
MAX	25	17700	15300	1130	500	7160	11600	65	5.1	161	3.3	806
MIN	1.2	1.1	71	84	45	80	61	4.6	.86	2.8	1.6	1.7
AC-FT	525	61570	99220	20570	6170	58140	53620	1290	147	751	137	6460
CFSM	.02	2.30	3.59	.74	.24	2.10	2.00	.05	.01	.03	.00	.24
IN.	.02	2.57	4.14	.86	.26	2.42	2.23	.05	.01	.03	.01	.27

CAL YR 1987 TOTAL 161701.41 MEAN 443 MAX 17700 MIN .60 AC-FT 320700 CFSM .98 IN. 13.37  
WTR YR 1988 TOTAL 155580.56 MEAN 425 MAX 17700 MIN .86 AC-FT 308600 CFSM .94 IN. 12.86

e Estimated

## 07191220 SPAVINAW CREEK NEAR SYCAMORE, OK

LOCATION.--Lat 36°20'07", long 94°38'27"(revised), in NE 1/4 NW 1/4 sec.4, T.21 N., R.25 E., Delaware County, Hydrologic Unit 11070209, on right bank 1.8 mi upstream from Cherokee Creek, 4.8 mi northeast of Row, 6.5 mi southeast of Sycamore, and at mile 35.0.

DRAINAGE AREA.--133 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1961 to current year.

REVISED RECORDS.--WSP 2121: 1965 (M).

GAGE.--Water-stage recorder. Elevation of gage is 875 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--No estimated daily discharges. Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office.

AVERAGE DISCHARGE.--27 years, 109 ft<sup>3</sup>/s, 11.13 in/yr, 78,970 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 39,800 ft<sup>3</sup>/s, July 27, 1975, gage height, 22.07 ft; minimum, 1.2 ft<sup>3</sup>/s, Aug. 9, 1964.

EXTREMES OUTSIDE PERIOD OF RECORD.--According to local residents, a flood of approximately the same magnitude as the July 27, 1975 flood occurred in the early 1880's.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Dec. 19	1900	*4,190	*11.07	Mar. 29	1700	2,560	9.62
Dec. 25	2030	2,980	10.04				

Minimum daily discharge, 10 ft<sup>3</sup>/s, Sept. 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	52	107	214	117	113	542	120	50	29	15	13
2	26	46	94	194	114	125	773	116	47	32	15	13
3	27	43	85	179	110	330	574	112	45	33	13	13
4	26	40	76	167	107	336	449	109	42	33	12	12
5	24	36	69	157	104	258	378	105	40	33	12	12
6	23	34	64	152	100	228	326	102	38	32	12	11
7	21	32	59	146	97	210	287	99	36	31	12	12
8	19	31	56	140	93	194	260	96	35	29	12	13
9	19	30	52	135	88	181	238	92	33	27	17	13
10	18	29	50	130	84	172	227	87	32	25	20	12
11	18	28	47	127	82	165	222	83	31	23	24	12
12	18	26	45	125	80	160	214	80	30	23	26	12
13	17	25	43	128	80	157	205	76	29	22	25	11
14	17	25	46	128	81	154	197	73	28	23	23	11
15	17	30	74	127	82	150	188	71	27	22	21	11
16	17	62	161	126	82	146	180	68	26	22	20	10
17	17	149	148	128	83	151	175	68	25	21	18	11
18	17	150	134	130	87	168	189	76	25	20	17	11
19	19	121	1810	137	118	192	224	73	25	18	17	14
20	23	100	1950	147	157	211	217	70	25	19	19	15
21	27	85	585	150	155	209	204	69	25	21	19	18
22	31	74	333	144	147	199	190	83	25	24	18	21
23	36	66	237	137	139	190	177	85	25	27	17	23
24	42	67	203	131	131	184	166	81	24	27	16	24
25	54	225	1330	124	126	180	157	76	22	26	14	24
26	68	260	1600	118	121	175	149	71	24	24	13	24
27	71	196	1290	112	118	171	141	66	29	22	13	24
28	69	160	742	109	116	170	134	63	28	20	13	24
29	65	139	444	108	114	1650	129	60	27	18	13	23
30	61	123	320	120	---	1250	124	56	26	17	14	22
31	56	---	249	119	---	685	---	53	---	16	13	---
TOTAL	988	2484	12503	4289	3113	8864	7636	2539	924	759	513	469
MEAN	31.9	82.8	403	138	107	286	255	81.9	30.8	24.5	16.5	15.6
MAX	71	260	1950	214	157	1650	773	120	50	33	26	24
MIN	17	25	43	108	80	113	124	53	22	16	12	10
AC-FT	1960	4930	24800	8510	6170	17580	15150	5040	1830	1510	1020	930
CFSM	.24	.62	3.03	1.04	.81	2.15	1.91	.62	.23	.18	.12	.12
IN.	.28	.69	3.50	1.20	.87	2.48	2.14	.71	.26	.21	.14	.13

CAL YR 1987	TOTAL 46779	MEAN 128	MAX 1950	MIN 17	AC-FT 92790	CFSM .96	IN. 13.08
WTR YR 1988	TOTAL 45081	MEAN 123	MAX 1950	MIN 10	AC-FT 89420	CFSM .93	IN. 12.61

## ARKANSAS RIVER BASIN

07191400 LAKE HUDSON NEAR LOCUST GROVE, OK

LOCATION.--Lat 36°13'54", long 95°11'36", in SE 1/4 NW 1/4 sec.9, T.20 N., R. 20 E., Mayes County, Hydrologic Unit 11070209, at left side of Robert S. Kerr dam on Neosho River, 2.0 mi northwest of Locust Grove, 3.5 mi downstream from Saline Creek, and at mile 47.3.

DRAINAGE AREA.--11,534 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1964 to current year.

GAGE.--Remote-controlled indicator and non-recording gage. Datum of gage is National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by earth dam and concrete spillway controlled by seventeen 22-foot taintor gates. Storage began Nov. 12, 1963; power pool first filled June 12, 1964. Capacity, 444,500 acre-ft at elevation 636.0 ft, top of taintor gates, 200,300 acre-ft at elevation 619.0 ft, power pool, and 48,630 acre-ft at elevation 599.0 ft, top of spillway crest. Figures given herein represent total contents. Reservoir was designed for flood control and power development.

COOPERATION.--Records provided by Grand River Dam Authority.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 443,600 acre-ft, Oct. 4, 1986, elevation, 635.95 ft; minimum since power pool first filled, 153,200 acre-ft, Mar. 24, 1988, elevation, 614.31 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 303,400 acre-ft, Dec. 27, elevation, 627.32 ft; minimum, 153,200 acre-ft, Mar. 24, elevation, 614.31 ft.

## MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	619.12	201,600	-
Oct. 31.....	619.47	205,500	+3,900
Nov. 30.....	619.82	209,400	+3,900
Dec. 31.....	626.03	285,600	+76,200
CAL YR 87.....	-	-	+85,200
Jan. 31.....	618.93	199,600	-86,000
Feb. 29.....	619.63	207,300	+7,700
Mar. 31.....	621.08	223,700	+16,400
Apr. 30.....	619.14	201,800	-21,900
May 31.....	619.41	204,800	+3,000
June 30.....	619.51	205,900	+1,100
July 31.....	619.71	208,100	+2,200
Aug. 31.....	619.49	205,700	-2,400
Sept. 30.....	619.17	202,200	-3,500
WTR YR 88.....	-	-	+600

## 07191500 NEOSHO RIVER NEAR CHOUTEAU, OK

LOCATION.--Lat 36°13'45", long 95°10'59", in SE 1/4 NW 1/4 sec.9, T.20 N., R.20 E., Mayes County, Hydrologic Unit 11070209, on left bank, 300 ft downstream from Robert S. Kerr Dam, 2.2 mi northwest of Locust Grove, 10.0 mi northeast of Chouteau, and at mile 47.2.

DRAINAGE AREA.--11,534 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1937 to September 1950, October 1963 to current year.

REVISED RECORDS.--WSP 1117: Drainage area. WDR OK-86-1: 1979.

GAGE.--Water-stage recorder. Datum of gage is 554.00 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Apr. 3, 1941, nonrecording gage at bridge on State Highway 33, 8.2 mi downstream, at datum 17.63 ft lower. Apr. 3, 1941 to Sept. 30, 1950, and Oct. 1963 to Apr. 6, 1964, at site 2.5 mi downstream, at datum 2.17 ft lower. Supplemental water-stage recorder Oct. 4, 1963, to July 10, 1973, at site 8.2 mi downstream.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Some regulation since 1940 by Lake O' The Cherokees (station 07190000), and completely regulated since 1963 by Lake Hudson (station 07191400).

AVERAGE DISCHARGE.--Since regulation by Lake Hudson, 25 years (water years 1964-88), 8,484 ft<sup>3</sup>/s, 6,147,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 400,000 ft<sup>3</sup>/s, May 20, 1943, gage height, 45.00 ft, site and datum then in use, from rating curve extended above 140,000 ft<sup>3</sup>/s, on basis of slope-area measurement of peak flow; minimum daily discharge, 12 ft<sup>3</sup>/s, Nov. 13, 1963 (caused by closure of Robert S. Kerr Dam).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 69,700 ft<sup>3</sup>/s, Apr. 5, gage height, 23.25 ft; minimum daily discharge, 160 ft<sup>3</sup>/s, Sept. 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1300	2740	18600	e36400	9160	9090	29600	13200	1720	674	3030	196
2	4500	5410	16400	e36700	8370	8640	47700	6830	5500	4790	1780	1220
3	4610	1030	e13900	e35400	8840	19600	62700	12000	8720	7390	3400	1490
4	1100	4170	e12000	e33100	10100	19700	66000	12600	2420	6320	1370	216
5	2270	1290	e13500	e28000	5470	18900	64200	8050	2030	4980	2360	195
6	1640	202	e10500	e22800	1560	15700	57600	7220	341	765	869	191
7	1350	196	e13500	e16300	3490	13500	55600	7140	2510	2500	482	189
8	1200	196	e12800	e11800	4480	12500	44900	6600	864	919	1670	187
9	210	189	e11300	e13600	4910	12500	37200	2490	1940	1450	1880	186
10	210	189	e12000	e13200	6020	12200	35500	2590	271	529	958	184
11	1320	189	e8200	e16500	3210	16500	36000	3450	358	492	379	182
12	200	245	e5400	e11700	1960	13800	33800	3760	241	487	581	483
13	198	212	e5900	e12400	6020	11000	29900	3170	1930	3730	239	237
14	198	205	e6700	e4550	7690	11300	27400	2090	1200	1990	738	1540
15	199	1110	e4900	e8100	5070	9750	26900	2790	1390	1730	903	228
16	199	3120	e5300	e18900	7150	11300	27900	3610	937	1250	1180	1990
17	199	6810	e6600	e11900	4820	11300	26200	4250	1920	818	3080	5040
18	199	5670	e8600	e8300	5960	13600	26300	3210	801	4480	238	1640
19	199	3940	e15000	e12200	6170	17600	28200	3750	1490	479	904	9770
20	199	4810	e32100	e14600	8320	14600	32000	2820	529	7620	871	1030
21	199	6830	e42400	e8200	9270	16500	34400	259	235	8360	1120	3320
22	199	746	e42900	e10800	13300	11100	26500	526	302	4430	1600	4470
23	1010	215	e43200	e11600	10900	13100	18200	287	1610	1980	813	3000
24	2440	6970	e41900	e11200	11000	11600	16600	4630	1520	326	1160	e160
25	4960	25000	e42600	e13000	10600	397	13500	2200	715	1820	431	e165
26	1290	29500	e46000	e9800	7350	2640	13700	3010	1780	588	239	e430
27	2050	33700	e49200	11000	10100	9720	13200	2640	3540	3860	5070	e5500
28	1080	33700	e46900	10200	10600	12400	13500	1980	274	2710	4850	e3400
29	729	29700	e46400	11400	9420	19900	14400	2280	1070	1530	5460	e3700
30	1280	20800	e48500	10400	---	23400	12700	971	696	1260	2640	e1300
31	204	---	e41900	13200	---	26900	---	2700	---	2100	224	---
TOTAL	36941	229084	725100	487250	211310	420737	972300	133103	48854	82357	50519	51839
MEAN	1192	7636	23390	15720	7287	13570	32410	4294	1628	2657	1630	1728
MAX	4960	33700	49200	36700	13300	26900	66000	13200	8720	8360	5460	9770
MIN	198	189	4900	4550	1560	397	12700	259	235	326	224	160
AC-FT	73270	454400	1438000	966500	419100	834500	1929000	264000	96900	163400	100200	102800

CAL YR 1987 TOTAL 4019908 MEAN 11010 MAX 61500 MIN 189 AC-FT 7973000  
WTR YR 1988 TOTAL 3449394 MEAN 9425 MAX 66000 MIN 160 AC-FT 6842000

e Estimated



## 07193000 FORT GIBSON LAKE NEAR FORT GIBSON, OK

LOCATION (REVISED).--Lat 35°52'12", long 95°13'38", in NE 1/4 NW 1/4 sec.18, T.16 N., R.20 E., Cherokee County, Hydrologic Unit 11070209, in control tower near left end of Fort Gibson Dam on Neosho River, 4.0 mi north of Fort Gibson, and at mile 7.7.

DRAINAGE AREA.--12,492 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1949 to current year. Prior to October 1970, published as Fort Gibson Reservoir near Fort Gibson.

REVISED RECORDS.--WSP 1731: 1950 (M).

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929. Prior to Jan. 13, 1950, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by concrete-gravity and earth-fill dam. Spillway is concrete ogee-type weir controlled by thirty 40-foot taintor gates; outlet works consists of ten, 5-foot, 8-inch by 7-foot sluice gates. Regulated storage began Sept. 5, 1949; power pool was first maintained in 1953. Capacity, 1,284,000 acre-ft at elevation 582.0 ft, flood control pool, 365,200 acre-ft at elevation 554.0 ft (maximum power pool), and 311,300 acre-ft at elevation 551.0 ft (minimum power pool). Figures given herein represent total contents. Reservoir was designed for flood control and power development. U.S. Army Corps of Engineers' satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 1,286,000 acre-ft, Oct. 5, 1986, elevation, 582.04 ft; minimum since first use of power pool, 303,800 acre-ft, May 26, 1955, elevation, 550.56 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 854,800 acre-ft, Dec. 28, elevation, 572.19 ft; minimum, 350,200 acre-ft, May 3, elevation 553.20.

Capacity table (elevation, in feet, and contents, in acre-ft):

550	294,600	565	622,100
555	384,500	570	777,000
560	492,600	575	964,000

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	366900	372400	452100	751500	399500	399700	473300	364600	366300	368800	372000	371100
2	368800	374700	445200	718100	392700	409100	574400	353300	374500	370700	370300	367300
3	374900	365800	434300	687300	389500	456900	666000	356600	380400	370300	375300	369000
4	363900	367500	418000	637000	386500	472400	714900	362300	380200	373700	369000	368400
5	362900	367900	407800	574700	376700	457800	729300	357600	380000	377600	369800	368200
6	366700	367300	390700	534100	361400	435400	733800	356100	373900	371500	370700	366900
7	367500	367500	381200	490700	368000	409300	734400	358400	372200	374100	370700	365400
8	367500	369000	376100	457800	365000	385900	720600	359900	370900	372400	369700	365400
9	362700	367100	377200	446100	365800	376700	701800	358500	368400	373600	372200	364200
10	362900	367100	379000	432400	370100	371500	684600	359100	366700	373700	368800	364200
11	362200	365400	373600	427700	365200	377200	671100	362000	366300	374900	367100	363900
12	361400	365400	363500	412000	359500	385300	653700	362000	366300	372600	368000	363700
13	358200	366000	370300	404700	363700	388300	628400	359900	368000	377400	367700	362200
14	356600	366500	377400	377800	373600	388700	598400	357200	369200	375300	367900	363000
15	355500	376300	366300	367300	372400	386700	563100	355500	370600	371100	369200	363700
16	353900	369000	369000	398300	375500	384300	540100	357000	372200	372200	366500	366300
17	353900	370700	372200	406000	370500	386300	524400	355700	373200	372000	367100	373600
18	355100	373200	382300	403700	370500	386100	502900	353500	372200	380000	367300	371700
19	355100	370900	457100	409300	368600	391300	482100	354000	373900	373900	368400	380400
20	354800	370700	533300	420400	369400	388300	466400	361800	370500	382900	368400	377600
21	354400	373400	581600	418900	372000	391700	455800	362900	371500	378600	370100	376700
22	354400	369600	602900	419100	382900	386700	444400	363300	368000	370900	367100	380600
23	357000	364100	602900	420100	384900	386900	419100	365800	365800	372400	368000	376300
24	371300	380000	603100	422900	391300	389300	404700	367700	364100	372400	369200	369400
25	372600	415500	656100	424300	396700	389500	390500	371500	364200	363000	369200	369900
26	366900	414500	742400	414900	391300	359900	381600	372200	366000	365600	366900	365400
27	363500	466200	818500	410700	393900	368600	377200	372800	370900	364400	372200	374100
28	365000	475800	854800	422500	399700	379600	371300	373700	367900	371100	379200	372200
29	364600	474500	837200	398100	396700	431300	370700	375500	367700	365200	381200	373000
30	367300	460300	814900	397700	---	456700	367300	374700	367900	366500	377800	368600
31	368400	---	787800	402500	---	456500	---	369800	---	369200	376500	---
MAX	374900	475800	854800	751500	399700	472400	734400	375500	380400	382900	381200	380600
MIN	353900	364100	363500	367300	359500	359900	367300	353300	364100	364400	366500	362200
(+)	554.17	558.60	570.30	555.90	555.61	558.43	554.11	554.12	554.11	554.10	554.56	554.18
(++)	-4,600	+91,900	+327,500	-385,300	-5,800	+59,800	-89,200	+2,500	-1,900	+1,300	+7,300	-7,900

CAL YR 1987 MAX 854800 MIN 342500 (++) +418,800  
WTR YR 1988 MAX 854800 MIN 353300 (++) -4,400

(+) ELEVATION, IN FEET, AT END OF MONTH  
(++) CHANGE IN CONTENTS, IN ACRE-FEET

## 07193500 NEOSHO RIVER BELOW FORT GIBSON LAKE NEAR FORT GIBSON, OK

LOCATION.--Lat 35°51'15", long 95°13'45", in SE 1/4 NW 1/4 sec.19, T.16 N., R.20 E., Cherokee County, Hydrologic Unit 11070209, on left bank 1.1 mi downstream from Fort Gibson Dam, 3.5 mi north of Fort Gibson, and at mile 6.6.

DRAINAGE AREA.--12,495 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1950 to current year. Prior to October 1970, published as Neosho River below Fort Gibson Reservoir near Fort Gibson.

GAGE.--Water-stage recorder. Datum of gage is 483.75 ft above National Geodetic Vertical Datum of 1929. May 11, 1950 to Aug. 20, 1951, nonrecording gage and Aug. 21, 1951 to June 11, 1952, water-stage recorder, at site 4.4 mi downstream at datum 7.94 ft lower and used as auxiliary gage since June 10, 1971.

REMARKS.--Records good. Flow completely regulated by Fort Gibson Lake (station 07193000). U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--38 years, 8,425 ft<sup>3</sup>/s, 6,104,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 223,000 ft<sup>3</sup>/s, May 26, 1957, gage height, 37.60 ft, minimum 12 ft<sup>3</sup>/s, Oct. 10, 1957, Aug. 23, 1964.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in May 1943 reached a stage of 43.0 ft, from high-water profile by U.S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Maximum discharge 65,700 ft<sup>3</sup>/s, Jan. 4, maximum gage height, 19.21 ft, Jan. 4; minimum daily discharge, 15 ft<sup>3</sup>/s, at times.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3420	68	25100	57600	12400	9670	35800	14200	3220	15	135	3600
2	1830	4330	21900	56500	12200	13700	12800	13000	728	1790	2350	3670
3	2070	6530	21700	55200	12300	12300	20600	9920	5330	7410	87	15
4	6530	3530	21500	60900	12300	19400	39500	8840	1470	4180	4460	246
5	2700	1030	21400	63000	11600	30700	54200	10900	1500	1980	1780	164
6	1900	436	21100	48800	9300	29900	51700	6920	3690	3920	15	1330
7	15	38	20800	39400	180	28900	49200	4690	2750	141	59	630
8	1380	15	16700	29900	6890	26100	46000	5340	2050	1360	1600	29
9	3600	1320	13600	20900	5590	18600	39700	3300	2340	46	79	1130
10	15	15	12600	20500	5290	14900	39200	1450	1070	49	1940	15
11	15	858	11900	20700	8060	12400	38900	1240	15	1050	1460	15
12	1680	16	11800	20400	4950	11100	38700	2860	15	1390	15	15
13	1950	18	3060	20200	2750	10600	38100	3850	151	30	15	1190
14	1080	132	7000	20000	3060	10700	38700	3180	329	2800	15	15
15	697	448	12300	14200	5210	11000	38700	3610	52	3830	15	15
16	1430	12500	6250	8050	5500	13200	37900	2220	15	37	2450	15
17	15	8650	6390	12000	7580	12800	37100	3600	953	15	2950	106
18	23	6140	5910	12000	7930	14300	36300	3650	838	99	15	2900
19	1420	6350	5020	12100	9450	16400	38800	2700	15	5150	24	6620
20	15	6260	13500	12000	8910	16500	41000	15	1640	2040	15	3580
21	15	5920	28600	11800	8550	16500	40400	15	15	9770	18	3510
22	31	3910	39000	11900	9650	14900	35000	15	1910	8260	2460	4080
23	44	3700	46800	12000	9430	13100	29700	15	2540	29	15	6910
24	62	4320	46900	11800	9570	12500	24400	1600	1890	15	15	5400
25	2020	17400	38600	13200	9670	12100	20500	1630	15	4400	15	15
26	5990	23100	20000	15400	9870	8440	17800	1730	15	1470	1160	3090
27	3370	28500	28900	15500	9720	4190	15500	1600	297	4000	1120	607
28	1330	32700	39200	15700	9480	11000	15500	817	3180	58	1090	6340
29	978	32700	59500	14300	10500	11200	14700	973	58	4370	3160	3700
30	20	30400	64400	12300	---	17500	14100	779	128	28	5150	3810
31	34	---	61300	12200	---	29400	---	5560	---	15	284	---
TOTAL	45679	241334	752730	750450	237890	484000	1000500	120219	38219	69747	33966	62762
MEAN	1474	8044	24280	24210	8203	15610	33350	3878	1274	2250	1096	2092
MAX	6530	32700	64400	63000	12400	30700	54200	14200	5330	9770	5150	6910
MIN	15	15	3060	8050	180	4190	12800	15	15	15	15	15
AC-FT	90600	478700	1493000	1489000	471900	960000	1984000	238500	75810	138300	67370	124500

CAL YR 1987 TOTAL 4149984.0 MEAN 11370 MAX 64400 MIN 15 AC-FT 8231000  
WTR YR 1988 TOTAL 3837496 MEAN 10480 MAX 64400 MIN 15 AC-FT 7612000

## ARKANSAS RIVER BASIN

07193500 NEOSHO RIVER BELOW FORT GIBSON LAKE NEAR FORT GIBSON, OK--Continued  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1952 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1951 to September 1963, October 1973 to January 1982.

WATER TEMPERATURE: October 1951 to September 1963, October 1973 to January 1982.

REMARKS: Samples were collected bimonthly and specific conductance, pH, water temperature, dissolved oxygen, and alkalinity were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	TUR- BID- ITY (NTU)	BARO- METRIC PRES- SURE (MM OF HG)
OCT												
06...	1030	1028	1028	511	--	--	293	7.90	--	19.5	--	--
06...	1031	1028	1028	450	--	--	298	7.90	--	19.5	--	--
06...	1032	1028	1028	400	--	--	293	7.90	--	19.0	--	--
06...	1033	1028	1028	350	--	--	293	7.90	--	19.0	--	--
06...	1034	1028	1028	300	--	--	293	7.90	--	18.5	--	--
06...	1035	1028	1028	250	--	--	285	7.90	--	19.0	--	--
06...	1036	1028	1028	200	--	--	290	7.90	--	19.0	--	--
06...	1037	1028	1028	150	--	--	290	7.90	--	19.0	--	--
06...	1038	1028	1028	100	--	--	291	7.90	--	19.0	--	--
06...	1039	1028	1028	60.0	--	--	292	7.90	--	20.0	--	--
06...	1045	1028	80020	--	6.98	259	293	7.90	21.5	19.0	2.2	750
NOV												
18...	1320	1028	1028	--	8.40	6670	281	7.70	3.5	11.0	--	--
JAN												
11...	1420	1028	80020	--	11.76	20700	--	8.20	4.0	8.5	18	740
FEB												
09...	1100	1028	80020	--	7.98	5360	--	8.00	8.5	7.5	19	750
MAR												
22...	1115	1028	1028	--	10.92	13600	245	8.00	23.5	12.5	--	--
APR												
19...	1115	1028	80020	--	16.95	44200	--	7.90	14.5	16.0	8.2	740
JUN												
08...	1530	1028	80020	--	7.88	6810	240	7.60	30.0	23.0	7.7	740
SEP												
08...	1630	1028	80020	--	5.29	41	255	8.20	31.0	24.5	1.6	745

DATE	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD- NESS TOTAL (MG/L AS CAC03)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH FET FIELD (MG/L AS HC03)
OCT											
06...	7.8	--	--	--	--	--	--	--	--	--	--
06...	7.8	--	--	--	--	--	--	--	--	--	--
06...	7.6	--	--	--	--	--	--	--	--	--	--
06...	7.4	--	--	--	--	--	--	--	--	--	--
06...	7.5	--	--	--	--	--	--	--	--	--	--
06...	7.5	--	--	--	--	--	--	--	--	--	--
06...	7.5	--	--	--	--	--	--	--	--	--	--
06...	7.6	--	--	--	--	--	--	--	--	--	--
06...	7.6	--	--	--	--	--	--	--	--	--	--
06...	7.4	--	--	--	--	--	--	--	--	--	--
06...	7.6	83	K7	K13	130	40	7.2	10	14	0.4	120
NOV											
18...	--	--	--	--	--	--	--	--	--	--	--
JAN											
11...	12.7	--	K16	K18	100	32	5.0	6.5	12	0.3	83
FEB											
09...	12.1	--	K7	K8	94	30	4.6	6.4	13	0.3	85
MAR											
22...	--	--	--	--	--	--	--	--	--	--	--
APR											
19...	9.3	--	K6	K16	120	40	5.5	7.9	12	0.3	100
JUN											
08...	5.0	60	K10	K3	110	36	4.8	7.2	12	0.3	96
SEP											
08...	9.1	112	K17	52	110	34	5.4	8.7	15	0.4	100

## ARKANSAS RIVER BASIN

07193500 NEOSHO RIVER BELOW FORT GIBSON LAKE NEAR FORT GIBSON, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	CAR- BONATE WATER WH FET FIELD (MG/L AS CO3)	ALKA- LINITY WAT WH TOT FET FIELD (MG/L AS CACO3)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SiO2)	SOLIDS, RESIDUE AT 180 DEG. C SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS NO3)
OCT												
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	0	96	38	11	0.30	2.0	178	170	0.24	124	--	--
NOV												
18...	--	--	--	--	--	--	--	--	--	--	--	--
JAN												
11...	0	68	31	6.7	0.20	5.5	138	131	0.19	7710	--	--
FEB												
09...	0	70	27	9.1	0.20	11	143	137	0.19	2070	0.760	3.4
MAR												
22...	--	--	--	--	--	--	--	--	--	--	--	--
APR												
19...	0	86	43	7.8	0.20	6.0	167	165	0.23	19900	--	--
JUN												
08...	0	79	34	10	0.30	3.7	147	148	0.20	2700	--	--
SEP												
08...	0	85	30	12	0.10	4.1	159	149	0.22	17.6	0.080	0.35
DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS NO2)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS NH4)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS- PHOROUS TOTAL (MG/L AS P)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P)
OCT												
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	0.020	--	0.03	--	0.58	0.60	0.070	0.030	--
NOV												
18...	--	--	--	--	--	--	--	--	--	--	--	--
JAN												
11...	--	--	--	0.090	--	0.12	--	0.41	0.50	0.090	0.060	--
FEB												
09...	0.040	0.13	0.800	0.070	0.070	0.09	0.09	0.33	0.40	0.090	0.060	0.030
MAR												
22...	--	--	--	--	--	--	--	--	--	--	--	--
APR												
19...	<0.010	--	<0.100	0.080	0.010	0.10	0.01	0.52	0.60	0.070	0.050	<0.010
JUN												
08...	<0.010	--	0.470	0.060	0.100	0.08	0.13	0.94	1.0	0.050	0.010	<0.010
SEP												
08...	0.020	0.07	0.100	0.070	0.070	0.09	0.09	0.53	0.60	0.070	0.030	0.030



## ARKANSAS RIVER BASIN

07193500 NEOSHO RIVER BELOW FORT GIBSON LAKE NEAR FORT GIBSON, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS P04)	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)
OCT												
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	<10	1	63	<0.5	<1	<1	<3	1	19	10	9
NOV												
18...	--	--	--	--	--	--	--	--	--	--	--	--
JAN												
11...	--	20	<1	46	<0.5	<1	<1	<3	3	24	<5	<4
FEB												
09...	0.09	--	--	--	--	--	--	--	--	--	--	--
MAR												
22...	--	--	--	--	--	--	--	--	--	--	--	--
APR												
19...	--	<10	<1	49	<0.5	<1	<1	<3	1	6	<5	9
JUN												
08...	--	--	--	--	--	--	--	--	--	--	--	--
SEP												
08...	0.09	<10	1	50	<0.5	3	2	<3	3	21	<5	6

DATE	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY DIS- SOLVED (UG/L AS HG)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V)	ZINC, DIS- SOLVED (UG/L AS ZN)	SEDI- MENT, SUS- PENDE (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
OCT												
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--	--
06...	1	<0.1	<10	<1	<1	<1.0	240	<6	22	165	115	4
NOV												
18...	--	--	--	--	--	--	--	--	--	--	--	--
JAN												
11...	14	<0.1	<10	5	<1	<1.0	140	<6	18	12	671	92
FEB												
09...	--	--	--	--	--	--	--	--	--	67	970	54
MAR												
22...	--	--	--	--	--	--	--	--	--	--	--	--
APR												
19...	5	0.5	<10	2	<1	<1.0	160	<6	6	22	2630	52
JUN												
08...	--	--	--	--	--	--	--	--	--	6	110	56
SEP												
08...	1	<0.1	<10	<1	<1	1.0	160	<6	29	--	--	--

07195500 ILLINOIS RIVER NEAR WATTS, OK

LOCATION.--Lat 36°07'48", long 94°34'12", in NE 1/4 sec.18, T.19 N., R.26 E., Adair County, Hydrologic Unit 11110103, near right bank on downstream side of pier of bridge on U.S. Highway 59, 1.5 mi north of Watts, 4.5 mi downstream from Cincinnati Creek, and at mile 106.2.

DRAINAGE AREA.--635 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1955 to current year.

GAGE.--Water-stage recorder. Datum of gage is 893.78 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Some regulation at low flow by Lake Frances Dam, 0.8 mile upstream from station. Since July 2, 1957, small diversion for municipal water supply for the city of Siloam Springs, Ark., upstream from station. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--33 years, 591 ft<sup>3</sup>/s, 12.65 in/yr, 428,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 68,000 ft<sup>3</sup>/s, July 25, 1960, gage height, 25.96 ft, from rating curve extended above 51,000 ft<sup>3</sup>/s; minimum, 8.6 ft<sup>3</sup>/s, Oct. 26, 1955, Sept. 19, Oct. 14, 1956.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Dec. 20	0715	17,400	18.47	Mar. 3	1530	8,910	12.75
Dec. 26	0215	*27,000	*21.83	Mar. 29	2400	16,400	18.00

Minimum discharge, 85 ft<sup>3</sup>/s, Aug. 26, Sept. 13-15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	195	243	828	1610	562	486	2690	502	218	148	124	133
2	172	227	725	1390	552	1610	4250	472	227	163	96	129
3	164	213	643	1260	546	6770	2980	455	322	172	99	125
4	160	208	586	1150	537	3520	2120	440	345	166	100	137
5	151	200	536	1040	526	2210	1750	426	266	159	102	144
6	144	200	491	991	504	1730	1710	405	234	165	112	136
7	140	193	471	955	479	1460	1440	403	219	169	120	126
8	151	187	447	906	467	1260	1280	384	203	156	121	120
9	139	186	417	837	464	1100	1150	362	212	153	122	109
10	137	186	394	795	458	996	1130	357	211	151	120	101
11	135	191	371	751	470	913	1400	351	201	307	118	101
12	135	192	356	747	469	1010	1280	340	190	312	117	92
13	136	180	337	1190	451	949	1110	330	180	281	116	85
14	139	184	488	974	422	814	1020	324	179	247	116	85
15	138	217	1860	877	428	754	939	308	178	219	112	85
16	139	2010	1420	854	415	705	893	299	176	193	106	87
17	137	1990	1110	998	408	720	878	296	181	176	104	88
18	141	1330	967	1120	448	935	1300	291	198	159	109	89
19	176	939	4060	1190	849	1580	1190	286	182	149	142	95
20	473	748	11900	1380	1080	1590	964	281	170	175	156	112
21	419	630	3760	1130	899	1380	869	293	163	198	153	150
22	315	535	2340	992	795	1140	795	289	159	199	136	158
23	279	470	1750	906	733	986	718	320	156	189	118	150
24	300	459	1490	848	660	893	670	348	152	177	114	143
25	316	2730	8410	772	602	1010	630	316	149	162	107	139
26	313	2260	17400	723	568	944	603	288	147	149	85	136
27	408	1420	9610	682	543	813	584	274	145	143	86	130
28	358	1290	5520	646	517	740	554	264	147	168	88	122
29	317	1150	3340	617	485	11200	532	257	146	166	106	118
30	292	949	2430	594	---	10400	522	241	147	152	129	118
31	272	---	1920	566	---	3780	---	231	---	118	135	---
TOTAL	6891	21917	86377	29491	16337	64398	37951	10433	5803	5641	3569	3543
MEAN	222	731	2786	951	563	2077	1265	337	193	182	115	118
MAX	473	2730	17400	1610	1080	11200	4250	502	345	312	156	158
MIN	135	180	337	566	408	486	522	231	145	118	85	85
AC-FT	13670	43470	171300	58500	32400	127700	75280	20690	11510	11190	7080	7030
CFSM	.35	1.15	4.39	1.50	.89	3.27	1.99	.53	.30	.29	.18	.19
IN.	.40	1.28	5.06	1.73	.96	3.77	2.22	.61	.34	.33	.21	.21

CAL YR 1987 TOTAL 297517 MEAN 815 MAX 17400 MIN 135 AC-FT 590100 CFSM 1.28 IN. 17.43  
WTR YR 1988 TOTAL 292351 MEAN 799 MAX 17400 MIN 85 AC-FT 579900 CFSM 1.26 IN. 17.13

## ARKANSAS RIVER BASIN

07196000 FLINT CREEK NEAR KANSAS, OK

LOCATION (REVISED).--Lat 36°11'11", long 94°42'24", in SW 1/4 NW 1/4 sec.25, T.20 N., R.24 E., Delaware County, Hydrologic Unit 11110103, at bridge on State Highway 33, 6.0 mi southeast of Kansas, 6.0 mi downstream from Sager Creek, and at mile 2.2.

DRAINAGE AREA.--110 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1955 to September 1976, April 1979 to current year.

GAGE.--Water-stage recorder. Datum of gage is 854.59 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Small diversion above station for irrigation.

AVERAGE DISCHARGE.--30 years, (water years 1956-76, 80-88), 118 ft<sup>3</sup>/s 14.56 in/yr, 85,490 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 44,400 ft<sup>3</sup>/s, June 8, 1974, gage height, 19.42 ft; minimum daily discharge, 0.6 ft<sup>3</sup>/s, Oct. 11-13, 1956.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Dec. 19	1715	*4,600	*9.70	Mar. 29	1345	3,350	9.09
Dec. 25	1745	3,440	9.14				

Minimum daily discharge, 18 ft<sup>3</sup>/s, multiple days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	46	48	150	e560	106	101	514	82	37	23	19	22
2	38	45	131	e480	104	300	740	79	43	25	20	23
3	35	44	122	e420	102	1080	541	77	50	25	20	22
4	31	42	113	e370	100	579	441	75	40	23	19	21
5	29	41	104	e320	95	419	381	72	35	23	20	20
6	29	39	97	e290	90	344	335	69	33	23	21	19
7	28	36	93	e260	85	292	293	66	32	29	22	19
8	27	34	88	e330	85	251	262	65	31	25	18	19
9	27	34	82	e210	83	220	234	64	30	24	22	19
10	26	35	78	e195	83	197	234	61	30	22	26	19
11	26	34	75	e185	82	181	226	58	28	23	23	19
12	26	33	71	e175	79	202	204	56	27	29	22	18
13	26	33	68	170	78	169	189	54	26	30	22	18
14	26	32	150	164	75	154	177	52	26	27	21	18
15	26	48	407	158	74	143	166	50	26	29	20	19
16	25	320	305	157	73	134	157	49	26	27	19	19
17	27	272	243	175	73	151	151	48	27	24	28	19
18	28	200	215	184	88	201	161	47	29	22	33	20
19	57	159	1740	250	146	287	150	45	28	24	30	35
20	92	131	1680	258	169	253	141	44	27	28	24	34
21	68	112	735	227	166	223	137	48	26	26	21	25
22	54	99	516	202	154	198	131	60	25	23	19	22
23	50	91	412	185	141	178	125	64	22	23	20	22
24	66	98	357	168	134	166	108	64	23	24	20	27
25	77	424	1670	154	125	158	103	57	22	22	19	24
26	77	339	e1600	144	120	142	101	51	21	22	18	22
27	82	252	e1400	135	112	132	97	48	20	21	18	21
28	74	223	e1100	123	105	130	92	45	21	23	25	21
29	64	191	e900	116	101	2040	89	42	24	23	31	21
30	57	169	e740	112	---	1110	87	39	27	22	26	22
31	52	---	e620	109	---	642	---	38	---	20	23	---
TOTAL	1396	3658	16062	6986	3028	10777	6767	1769	862	754	689	649
MEAN	45.0	122	518	225	104	348	226	57.1	28.7	24.3	22.2	21.6
MAX	92	424	1740	560	169	2040	740	82	50	30	33	35
MIN	25	32	68	109	73	101	87	38	20	20	18	18
AC-FT	2770	7260	31860	13860	6010	21380	13420	3510	1710	1500	1370	1290
CFSM	.41	1.11	4.71	2.05	.95	3.16	2.05	.52	.26	.22	.20	.20
IN.	.47	1.24	5.43	2.36	1.02	3.64	2.29	.60	.29	.25	.23	.22

CAL YR 1987 TOTAL 51647 MEAN 141 MAX 1750 MIN 20 AC-FT 102400 CFSM 1.29 IN. 17.47  
WTR YR 1988 TOTAL 53397 MEAN 146 MAX 2040 MIN 18 AC-FT 105900 CFSM 1.33 IN. 18.06

e Estimated

## 07196500 ILLINOIS RIVER NEAR TAHLEQUAH, OK

LOCATION (REVISED).--Lat 35°55'22", long 94°55'24", in SE 1/4 NE 1/4 sec.26, T.17 N., R.22 E., Cherokee County, Hydrologic Unit 11110103, near center of channel on downstream side of pier of bridge, 0.2 mi downstream from U.S. Highway 62, 2.2 mi northeast of Tahlequah, 6.5 mi upstream from Baron Fork, and at mile 55.8.

DRAINAGE AREA.--959 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1935 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1117: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 664.14 ft, U.S. Army Corps of Engineers datum. Prior to Feb. 23, 1939, nonrecording gage.

REMARKS.--No estimated daily discharges. Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--53 years, 901 ft<sup>3</sup>/s, 12.76 in/yr, 652,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 150,000 ft<sup>3</sup>/s, May 10, 1950, gage height, 27.94 ft, from rating curve extended above 77,000 ft<sup>3</sup>/s, on basis of slope-area measurement of peak flow; minimum daily, 0.1 ft<sup>3</sup>/s, Oct. 10-14, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of January 1916 reached a stage of about 26 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 9,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Dec. 21	0900	16,800	14.77	Mar. 4	1330	9,750	11.67
Dec. 27	0300	*28,300	*17.60	Mar. 30	2100	20,700	15.93

Minimum discharge, 115 ft<sup>3</sup>/s, Sept. 15, 17.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	310	352	1420	2990	944	827	5160	812	367	202	186	145
2	293	330	1240	2580	916	1540	4470	782	358	202	175	163
3	274	309	1090	2270	899	5450	6160	760	348	202	169	156
4	257	294	976	2040	873	8850	4170	732	349	213	156	149
5	245	281	894	1850	846	5030	3260	704	399	222	154	145
6	236	271	849	1720	828	3490	2810	682	366	217	151	145
7	226	265	799	1640	802	2840	2590	660	332	212	151	146
8	220	266	753	1530	768	2430	2270	649	311	209	157	141
9	216	258	720	1430	749	2100	2030	634	294	210	163	139
10	216	252	683	1340	736	1850	1870	608	281	206	159	137
11	210	249	657	1270	723	1680	1830	587	274	207	161	132
12	208	247	632	1240	719	1560	1990	570	272	213	175	125
13	206	246	612	1280	719	1580	1870	554	265	261	178	122
14	203	244	691	1630	702	1500	1690	542	258	284	167	119
15	202	281	1130	1520	682	1330	1560	534	254	275	162	117
16	201	977	2400	1410	669	1220	1460	521	253	259	157	118
17	203	2800	2090	1440	658	1190	1400	501	251	242	159	117
18	202	2870	1750	1600	670	1280	1380	488	248	242	160	119
19	217	2090	3180	1770	782	1580	1690	473	242	250	157	149
20	252	1590	11300	1940	1130	2290	1650	463	245	234	158	149
21	325	1290	14100	2080	1520	2330	1440	467	242	213	165	147
22	404	1090	5560	1840	1410	2080	1320	546	234	212	169	146
23	386	941	3690	1660	1280	1800	1210	545	227	217	165	156
24	376	881	2920	1520	1180	1600	1110	513	223	216	160	168
25	455	1690	3720	1400	1090	1470	1050	512	219	212	153	172
26	466	3730	14300	1290	1000	1470	986	494	217	205	147	168
27	446	3180	20900	1210	938	1410	938	463	223	199	142	164
28	452	2230	11800	1130	888	1270	899	433	211	211	136	161
29	447	1900	6930	1080	843	3920	863	415	212	202	136	163
30	409	1670	4680	1030	---	16300	838	398	203	200	137	162
31	376	---	3610	992	---	12200	---	381	---	194	138	---
TOTAL	9139	33074	126076	49722	25964	95467	61964	17423	8178	6843	4903	4340
MEAN	295	1102	4067	1604	895	3080	2065	562	273	221	158	145
MAX	466	3730	20900	2990	1520	16300	6160	812	399	284	186	172
MIN	201	244	612	992	658	827	838	381	203	194	136	117
AC-FT	18130	65600	250100	98620	51500	189400	122900	34560	16220	13570	9730	8610
CFSM	.31	1.15	4.24	1.67	.93	3.21	2.15	.59	.28	.23	.16	.15
IN.	.35	1.28	4.89	1.93	1.01	3.70	2.40	.68	.32	.27	.19	.17

CAL YR 1987 TOTAL 444498 MEAN 1218 MAX 20900 MIN 196 AC-FT 881700 CFSM 1.27 IN. 17.24  
WTR YR 1988 TOTAL 443093 MEAN 1211 MAX 20900 MIN 117 AC-FT 878900 CFSM 1.26 IN. 17.19



## ARKANSAS RIVER BASIN

07197000 BARON FORK AT ELDON, OK

LOCATION.--Lat 35°55'16", long 94°50'18", in SE 1/4 sec.27, T.17 N., R.23 E., Cherokee County, Hydrologic Unit 11110103, on downstream side of second pier from left bank of bridge on State Highway 51, 0.4 mi southeast of Eldon, 6.0 mi downstream from Tyner Creek, and at mile 8.8.

DRAINAGE AREA.--307 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1948 to current year. Prior to October 1970 published as Barren Fork at Eldon.

GAGE.--Water-stage recorder. Datum of gage is 701.14 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Dec. 14, 1948, nonrecording gage at same site and datum.

REMARKS.--Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--40 years, 303 ft<sup>3</sup>/s, 13.39 in/yr, 219,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 55,500 ft<sup>3</sup>/s, Oct. 1, 1986, gage height, 25.78 ft; minimum, 1.7 ft<sup>3</sup>/s, Oct. 25, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 15, 1945, reached a stage of 23.8 ft, from information provided by local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Dec. 20	0400	11,200	14.90	Mar. 3	1015	8,300	13.15
Dec. 25	2245	*16,900	*17.75	Mar. 29	1400	10,100	14.29

Minimum daily discharge, 13 ft<sup>3</sup>/s, Sept. 14, 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	73	99	564	1080	270	207	1760	243	84	35	31	21
2	71	92	469	875	255	1140	2730	231	81	34	29	22
3	67	87	401	744	245	5650	1880	223	81	36	27	24
4	65	83	348	643	238	2960	1380	215	78	35	25	21
5	62	78	308	551	234	1800	1110	206	76	34	23	20
6	58	75	280	501	223	1300	1000	197	73	34	23	19
7	56	72	257	469	212	1030	862	188	70	35	22	18
8	54	73	236	425	205	845	744	181	69	35	20	17
9	52	72	217	388	199	711	652	173	67	34	20	16
10	50	68	200	359	195	612	592	167	66	34	19	16
11	49	66	185	336	191	534	628	161	62	36	19	15
12	48	65	176	327	187	502	609	156	59	39	24	15
13	47	63	165	408	180	480	544	151	56	43	26	14
14	45	63	188	417	178	410	489	145	54	52	25	13
15	44	83	675	391	174	367	449	138	52	49	24	13
16	43	1060	744	381	168	329	476	134	52	44	23	14
17	43	1810	633	435	163	321	482	128	54	40	26	14
18	42	1280	556	549	169	398	897	123	51	39	43	16
19	47	870	2240	613	252	732	792	120	49	39	52	31
20	56	633	6660	789	423	838	608	118	47	41	45	57
21	74	491	2750	690	373	762	517	119	46	40	39	57
22	87	404	1800	606	340	624	459	120	44	37	34	49
23	92	340	1290	544	312	527	411	125	42	36	31	43
24	102	309	1030	496	290	467	373	125	41	33	29	41
25	115	1890	5250	445	270	449	344	124	39	31	27	40
26	120	1980	8570	401	252	432	320	117	39	29	25	37
27	116	1270	6750	365	238	378	299	110	42	27	23	35
28	116	1010	3850	335	226	341	280	103	39	35	23	33
29	115	857	2480	316	213	5770	264	98	38	35	24	33
30	111	691	1790	299	---	4930	254	93	37	32	23	34
31	105	---	1380	283	---	2510	---	88	---	31	22	---
TOTAL	2225	16034	52442	15461	6875	38356	22205	4620	1688	1134	846	798
MEAN	71.8	534	1692	499	237	1237	740	149	56.3	36.6	27.3	26.6
MAX	120	1980	8570	1080	423	5770	2730	243	84	52	52	57
MIN	42	63	165	283	163	207	254	88	37	27	19	13
AC-FT	4410	31800	104000	30670	13640	76080	44040	9160	3350	2250	1680	1580
CFSM	.23	1.74	5.51	1.62	.77	4.03	2.41	.49	.18	.12	.09	.09
IN.	.27	1.94	6.35	1.87	.83	4.65	2.69	.56	.20	.14	.10	.10

CAL YR 1987 TOTAL 179061 MEAN 491 MAX 8570 MIN 29 AC-FT 355200 CFSM 1.60 IN. 21.70  
WTR YR 1988 TOTAL 162684 MEAN 444 MAX 8570 MIN 13 AC-FT 322700 CFSM 1.45 IN. 19.71

## 07197500 TENKILLER FERRY LAKE NEAR GORE, OK

LOCATION.--Lat 35°35'43", long 95°02'57", in SE 1/4 SW 1/4 sec.14, T.13 N., R.21 E., Sequoyah County, Hydrologic Unit 11110103, at gage tower on right bank, 0.6 mi upstream from Tenkiller Ferry Dam on Illinois River, 6.0 mi northeast of Gore, and at mile 12.8.

DRAINAGE AREA.--1,610 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1952 to current year. Prior to October 1970, published as Tenkiller Ferry Reservoir near Gore.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929. Prior to Apr. 5, 1953, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by earth dam. Spillway consists of 590 ft concrete modified ogee-type weir in right abutment controlled by ten taintor gates. Outlet works consist of a 19-foot diameter tunnel in right abutment controlled by two vertical lift gates. A similar tunnel conducts water to two hydroelectric turbines. Closure was made for diversion in July 1950 and regulated storage began in July 1952; conservation pool was first filled Apr. 9, 1953. Capacity, 1,231,000 acre-ft at elevation 667.0 ft, flood-control pool, 791,900 acre-ft at elevation, 642.0 ft, spillway crest, 628,700 acre-ft at elevation 630.0 ft, maximum power pool, and 283,100 acre-ft at elevation 594.5 ft, conservation and minimum power pool. Figures given herein represent total contents. Reservoir is used for flood control and for power development.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 1,218,000 acre-ft, June 5, 1957, elevation, 666.36 ft; minimum since conservation pool was first filled, 305,700 acre-ft, Oct. 21, 1954, elevation, 597.50 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 931,100 acre-ft, Dec. 30, elevation 650.83 ft; minimum, 614,000 acre-ft, Sept. 14, elevation 628.81 ft.

Capacity table (elevation, in feet, and contents, in acre-ft):

630	628,700	642	791,900
634	680,300	646	852,000
638	734,700	650	915,600

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	641700	627800	675100	908000	679000	648200	751400	677400	629900	634200	643800	615500
2	641900	627500	674100	890300	676100	660000	757600	671800	632000	634300	643900	615700
3	642000	626900	675100	874400	673500	681000	769100	665900	632400	634400	643900	616200
4	642300	627200	677400	857500	670100	699300	774800	662000	632600	634300	643800	616000
5	642600	627500	677400	839900	667900	709000	778700	661200	633100	634900	643800	615900
6	642000	628000	676500	821700	667900	713000	779800	658600	633700	635000	643800	615700
7	641700	629200	676600	805900	667900	715200	780100	658000	634100	635000	643600	615300
8	641400	628000	676100	792600	664600	715200	779700	658000	634700	635000	643600	615200
9	641700	626900	675100	782300	663500	712500	778500	654600	634700	635200	641400	615300
10	641700	625000	672400	764600	661300	709000	777200	651700	634900	635200	638300	615200
11	639800	623000	668500	761100	657600	705500	775100	648200	635000	637400	635200	615200
12	638800	622300	670200	753200	654500	702500	773400	643600	635200	637500	633600	614700
13	637300	621800	671900	739800	653400	699300	771200	637900	635400	637800	633600	614200
14	636300	623200	673800	732600	654800	694700	768400	634100	635700	638000	633700	614200
15	634600	629600	672000	725700	652500	692700	763200	630400	635900	638300	632100	614200
16	634800	634000	678500	719800	650700	688700	755800	626500	636500	638500	630500	614200
17	635300	643200	678100	707300	649500	686200	749700	623000	636800	638800	629600	614400
18	635800	650800	677700	709700	650000	683600	743700	620700	637000	640300	628300	614900
19	633600	653700	677700	704800	647600	685500	740000	619100	637300	640600	627800	616000
20	631500	654600	694100	702300	646100	686600	737500	620300	636800	640800	627700	616000
21	628000	656100	723600	700600	646000	688200	733900	621100	635700	640900	627800	616200
22	627200	657800	752800	699300	647600	682900	730500	622400	634400	640900	625400	616400
23	629300	656500	756400	698200	646900	686100	725700	624300	634200	640900	623600	616900
24	630700	655300	756100	696700	646400	684200	719700	625100	633500	640800	622200	617500
25	629100	660000	757600	694200	645600	681900	714100	626100	633700	641100	620000	617600
26	626000	663700	783800	691400	644900	682300	707700	626400	633800	641100	618300	617500
27	626900	671800	862200	690800	645500	684200	702000	627000	634200	642100	618100	617400
28	626700	676800	894200	687100	646100	686800	696200	627700	634300	643600	618000	617400
29	626900	678100	925600	684900	645600	692100	690100	628300	634400	643600	617600	617800
30	627000	676800	929400	684200	---	726400	683800	628800	634300	643800	617500	617900
31	627000	---	920600	683100	---	750700	---	629200	---	643900	617100	---
MAX	642600	678100	929400	908000	679000	750700	780100	677400	637300	643900	643900	617900
MIN	626000	621800	668500	683100	644900	648200	683800	619100	629900	634200	617100	614200
(+)	629.87	633.73	650.30	634.21	631.35	639.15	634.27	630.04	630.46	631.22	629.06	629.12
(++)	-14,400	+49,800	+243,800	-237,500	-37,500	+105,100	-66,900	-54,600	+5,100	+9,600	-26,800	+800
CAL YR 1987	MAX 929400	MIN 621800	(++)	+253,800								
WTR YR 1988	MAX 929400	MIN 614200	(++)	-23,500								

(+) ELEVATION, IN FEET, AT END OF MONTH  
(++) CHANGE IN CONTENTS, IN ACRE-FEET

## ARKANSAS RIVER BASIN

07198000 ILLINOIS RIVER NEAR GORE, OK

LOCATION.--Lat 35°34'23", long 95°04'07", in NE 1/4 SW 1/4 sec.27, T.13 N., R.21 E., Sequoyah County, Hydrologic Unit 11110104, on right bank 4.5 mi downstream from Tenkiller Ferry Dam, 4.5 mi northeast of Gore, and at mile 8.5.

DRAINAGE AREA.--1,626 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1924 to April 1926, April 1939 to current year. Monthly discharge only for some periods, published in WSP 1311.

GAGE.--Water-stage recorder. Datum of gage is 473.00 ft above National Geodetic Vertical Datum of 1929. See WSP 1921 for history of changes prior to Feb. 19, 1952.

REMARKS.--Records poor. Except for 16 mi<sup>2</sup> intervening area, flow completely regulated since July 1952 by Tenkiller Ferry Lake (station 07197500). U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--50 years (water years 1925, 1940-88), 1,533 ft<sup>3</sup>/s, 1,111,000 acre-ft/yr adjusted for storage.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 180,000 ft<sup>3</sup>/s May 11, 1950, gage height, 29.6 ft, from floodmark, present site and datum, from rating curve extended above 42,000 ft<sup>3</sup>/s by velocity-area studies; minimum discharge, 2.0 ft<sup>3</sup>/s, Sept. 16, 1959.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 12,300 ft<sup>3</sup>/s, Dec. 30, gage height, 11.89 ft; minimum daily discharge, 55 ft<sup>3</sup>/s, Oct. 25, Dec. 12, 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	116	416	989	12000	e2900	1350	10000	4690	84	84	83	819
2	199	255	1670	12000	e2850	1840	5740	4100	87	84	96	919
3	122	105	2650	12000	e2550	2980	3550	3620	87	81	83	88
4	120	894	3160	11900	e2550	3610	3550	2040	81	84	120	95
5	126	290	1790	11900	e2130	3570	3540	2000	144	81	86	88
6	119	56	1920	12000	e1020	3560	3550	2030	87	80	83	92
7	334	230	2570	9440	e1050	3230	3530	1030	94	81	91	91
8	206	82	2640	7060	e1960	4330	3450	917	154	81	80	89
9	384	746	2690	7040	e2120	4990	3440	2110	98	81	1050	82
10	122	622	2760	7030	e2340	4970	3430	2140	87	84	1520	88
11	125	1040	108	6990	e2470	4510	3450	2430	91	84	1560	85
12	1000	1320	55	6260	e2450	4120	3440	2650	94	84	1430	76
13	555	877	55	5470	e1100	4120	3710	3430	84	77	87	253
14	770	87	495	5540	e635	4120	4040	3130	87	84	81	325
15	788	245	847	5050	e1800	3950	5020	3060	91	87	862	127
16	1120	430	1740	4810	e1770	3600	5540	1820	88	89	906	89
17	85	90	3690	4720	e1430	3630	5750	1560	80	86	831	85
18	83	84	3740	4740	e1280	3560	5520	1580	98	87	734	79
19	912	1340	4380	4050	e2550	1740	4640	1210	94	97	515	89
20	948	1770	4590	3340	e2320	2840	4010	88	384	83	81	134
21	1590	894	5960	3320	e2010	2590	4220	125	763	90	84	90
22	2280	526	6640	3300	e1310	3080	3960	117	789	97	1260	98
23	904	2110	5910	2690	e1870	3440	4540	88	298	86	1060	90
24	56	2330	4000	2660	1860	3530	4530	130	437	90	765	94
25	55	2310	4200	2720	1860	3610	4530	101	84	90	1150	85
26	1500	2220	3970	2760	1390	3370	4820	134	82	83	897	91
27	2220	2130	3700	e2500	1160	3000	4680	134	87	83	91	220
28	266	1020	4780	e2450	1070	3090	4610	89	83	86	88	209
29	821	385	8610	e2400	1280	4250	4690	58	87	83	119	207
30	562	2320	11700	e1700	---	6360	4680	81	84	83	100	193
31	544	---	12100	e2100	---	8470	---	134	---	83	85	---
TOTAL	19032	27224	114109	181940	53085	115410	134160	46826	4988	2633	16078	5170
MEAN	614	907	3681	5869	1831	3723	4472	1511	166	84.9	519	172
MAX	2280	2330	12100	12000	2900	8470	10000	4690	789	97	1560	919
MIN	55	56	55	1700	635	1350	3430	58	80	77	80	76
AC-FT	37750	54000	226300	360900	105300	228900	266100	92880	9890	5220	31890	10250

CAL YR 1987 TOTAL 616236 MEAN 1688 MAX 12100 MIN 55 AC-FT 1222000  
WTR YR 1988 TOTAL 720655 MEAN 1969 MAX 12100 MIN 55 AC-FT 1429000

e Estimated

## ARKANSAS RIVER BASIN

07198000 ILLINOIS RIVER NEAR GORE, OK--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1948, 1952, 1954 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1947 to September 1948, October 1953 to September 1963.

WATER TEMPERATURE: October 1947 to September 1948, October 1953 to September 1963.

REMARKS.--Samples were collected every six weeks and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	TUR- BID- ITY (NTU)	BARO- METRIC PRES- SURE (MM OF HG)
OCT 29...	1345	1028	80020	2.70	97	242	--	22.0	16.0	--	728
DEC 10...	1300	1028	80020	7.08	3870	*202	--	18.0	12.0	0.80	728
JAN 22...	1400	1028	80020	7.00	3310	162	7.50	13.0	10.0	3.8	728
MAR 08...	1200	1028	80020	7.60	4450	172	7.80	20.0	13.0	8.3	735
APR 11...	1500	1028	80020	6.92	4320	*174	7.20	16.0	12.0	4.5	729
JUN 15...	1400	1028	80020	1.50	32	*247	--	34.0	18.0	2.5	734
JUL 19...	1100	1028	80020	1.55	27	--	--	27.0	18.0	1.3	751
AUG 16...	1000	1028	80020	1.83	48	249	7.10	36.0	20.0	1.2	752
SEP 27...	1000	1028	80020	2.40	28	250	--	26.0	15.5	2.3	755

DATE	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	OXYGEN DEMAND, CHEM- ICAL (HIGH LEVEL) (MG/L)	HARD- NESS TOTAL (MG/L AS CAC03)	HARD- NESS NONCARB WH WAT TOT FLD (MG/L AS CAC03)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD- SORP- TION RATIO
OCT 29...	9.2	98	49	97	14	35	2.3	12	21	0.6
DEC 10...	--	--	--	88	12	32	1.9	5.1	11	0.2
JAN 22...	--	--	--	79	9	29	1.7	4.1	10	0.2
MAR 08...	10.3	101	--	66	4	24	1.5	5.4	15	0.3
APR 11...	10.3	100	--	85	23	29	3.1	--	--	--
JUN 15...	8.2	90	--	88	20	31	2.6	14	25	0.7
JUL 19...	8.8	94	--	86	19	31	2.0	12	23	0.6
AUG 16...	8.4	94	--	87	16	31	2.4	--	--	--
SEP 27...	9.0	86	--	84	12	29	2.7	--	--	--

\* SPECIFIC CONDUCTANCE, LAB (US/CM)



## ARKANSAS RIVER BASIN

07198000 ILLINOIS RIVER NEAR GORE, OK--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH IT FIELD (MG/L AS HC03)	CAR- BONATE WATER WH IT FIELD (MG/L AS C03)	ALKA- LINITY WAT WH TOT IT FIELD (MG/L AS CAC03)	SULFATE DIS- SOLVED (MG/L AS S04)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)
OCT 29...	2.3	127	0	104	14	29	161	144	0.22	42.2
DEC 10...	2.8	83	0	68	11	8.8	114	107	0.16	1190
JAN 22...	2.5	107	0	88	14	--	134	--	--	--
MAR 08...	2.3	71	0	58	11	11	105	92	0.14	1260
APR 11...	2.5	73	0	60	11	8.5	122	--	--	--
JUN 15...	2.1	--	--	--	9.5	24	144	124	0.20	12.6
JUL 19...	2.2	82	0	68	9.1	22	139	118	0.19	9.98
AUG 16...	2.1	83	0	68	9.2	26	143	--	--	--
SEP 27...	3.4	83	0	68	8.6	23	136	--	--	--

## 07228500 CANADIAN RIVER AT BRIDGEPORT, OK

LOCATION.--Lat 35°32'37", long 98°19'03", SE 1/4 NW 1/4 sec.1, T.12 N., R.11 W., Caddo County, Hydrologic Unit 11090202, on downstream side of pier near center of bridge on U.S. Highway 281, 3.3 mi east of Bridgeport, 1.6 mi downstream from Lumpmouth Creek, and at mile 263.3.

DRAINAGE AREA.--25,276 mi<sup>2</sup>, of which 4,801 mi<sup>2</sup> is probably noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1944 to September 1964; October 1969 to current year.

REVISED RECORDS.--WSP 1341: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,360.00 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Oct. 1, 1947, at site 3.8 mi upstream at datum 24.25 ft higher. Oct. 1, 1947 to Sept. 30, 1948, nonrecording gage and Oct. 1, 1948 to September 1964, Oct. 1, 1969 to Dec. 17, 1980 at site 4.0 mi upstream and at datum 24.25 ft higher.

REMARKS.--Records poor. Flow regulated since October 1964 by Lake Meredith (station 07227900) located in Texas.

AVERAGE DISCHARGE.--Prior to regulation by Lake Meredith in Texas, 20 years (water years 1945-64), 469 ft<sup>3</sup>/s, 339,800 acre-ft/yr; since regulation by Lake Meredith, 19 years (water years 1970-88), 294 ft<sup>3</sup>/s, 213,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 150,000 ft<sup>3</sup>/s, June 23, 1948, gage height, 14.60 ft, at former site and datum, from floodmarks, from rating curve extended above 50,000 ft<sup>3</sup>/s; no flow at times in 1946, 1951-56, 1964, 1970, 1984, and 1985.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in May 1914 reached a stage of about 19.4 ft, a higher stage probably occurred during flood in October 1904.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 13,400 ft<sup>3</sup>/s, Sept. 19, gage height, 14.85 ft; minimum daily discharge, 2.6 ft<sup>3</sup>/s, Aug. 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	118	161	324	e750	e400	361	3550	845	e96	27	8.7	4.0
2	125	148	321	e840	e390	1470	3270	e680	297	31	7.1	3.8
3	133	124	311	e785	e380	5430	1700	e580	1080	23	6.1	61
4	132	107	302	e700	e370	3060	1010	e500	976	14	5.6	15
5	133	104	316	e650	e365	2740	821	e430	e700	8.7	5.6	6.0
6	129	109	333	e620	e360	2860	681	e410	524	7.6	5.3	5.4
7	132	122	326	e600	e350	2940	507	e350	440	6.9	5.9	4.9
8	130	142	344	e560	e345	2840	443	e300	297	6.3	4.8	4.3
9	124	141	341	e540	523	2500	418	e280	132	54	4.5	4.3
10	121	142	323	e560	659	2050	510	e250	112	31	4.1	4.2
11	117	139	330	e590	e485	1490	412	e230	84	7.9	4.4	4.0
12	120	146	305	e630	e400	894	345	e210	46	6.9	4.4	3.8
13	119	153	314	e700	e380	697	344	e190	16	14	4.1	3.7
14	113	151	415	e900	423	670	332	e185	9.2	16	3.8	4.6
15	108	168	e380	e1500	659	820	312	e175	8.9	8.0	3.4	7.8
16	106	179	e350	1930	419	763	298	e165	35	416	3.1	439
17	109	178	e400	3870	338	1060	355	e155	221	414	3.1	451
18	108	200	515	3840	346	1170	694	e150	61	232	3.1	1950
19	108	220	1220	6450	371	878	902	e145	18	190	4.6	9610
20	103	206	2480	2800	339	909	1380	e140	91	90	6.1	3390
21	101	210	1880	1240	338	951	1270	e138	28	61	6.2	1490
22	98	213	1310	855	316	1060	920	e135	8.5	23	3.8	990
23	100	230	1000	e600	320	1230	669	e132	6.5	8.6	3.1	822
24	116	248	e900	e500	315	968	557	130	5.2	6.6	2.9	846
25	130	242	e870	e470	272	847	1160	e125	4.4	162	3.2	610
26	134	240	e800	e440	238	863	1010	e120	272	210	2.8	539
27	133	263	e760	e430	282	704	983	e112	256	218	2.6	475
28	127	298	e700	e420	312	557	791	e110	115	253	3.1	425
29	120	314	e680	e440	317	686	808	e102	135	303	5.4	396
30	118	321	e660	e415	---	550	1120	e100	34	131	5.2	371
31	177	---	e680	e405	---	636	---	e98	---	31	4.4	---
TOTAL	3742	5619	20190	36030	11012	44654	27572	7672	6108.7	3011.5	140.5	22940.8
MEAN	121	187	651	1162	380	1440	919	247	204	97.1	4.53	765
MAX	177	321	2480	6450	659	5430	3550	845	1080	416	8.7	9610
MIN	98	104	302	405	238	361	298	98	4.4	6.3	2.6	3.7
AC-FT	7420	11150	40050	71470	21840	88570	54690	15220	12120	5970	279	45500

CAL YR 1987 TOTAL 292392 MEAN 801 MAX 42100 MIN 44 AC-FT 580000  
WTR YR 1988 TOTAL 188692.5 MEAN 516 MAX 9610 MIN 2.6 AC-FT 374300

e Estimated

## ARKANSAS RIVER BASIN

07228500 CANADIAN RIVER AT BRIDGEPORT, OK--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1949-61, 1964, 1970 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1948 to September 1960, October 1969 to April 1982.

WATER TEMPERATURE: October 1948 to September 1960, October 1969 to April 1982.

REMARKS: Samples were collected bimonthly and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)
NOV												
05...	1230	1028	80020	9.79	111	2120	8.20	20.0	18.5	740	7.1	79
FEB												
09...	1315	1028	80020	10.94	343	1960	8.00	6.0	4.0	730	15.2	122
APR												
15...	1200	1028	80020	11.31	317	2360	8.20	15.0	13.0	730	8.5	85
MAY												
24...	1200	1028	80020	11.08	130	2200	8.20	26.0	21.0	730	9.2	109
JUL												
22...	1600	1028	80020	10.89	18	1940	8.00	34.0	28.0	728	7.4	100
SEP												
23...	1330	1028	80020	11.13	800	1040	7.80	22.0	23.0	730	7.7	94

DATE	HARD- NESS TOTAL (MG/L AS CAC03)	HARD- NESS NONCARB WH WAT TOT FLD (MG/L AS CAC03)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH IT FIELD (MG/L AS HC03)	CAR- BONATE WATER WH IT FIELD (MG/L AS C03)	ALKA- LITY WAT WH TOT IT FIELD (MG/L AS CAC03)	SULFATE DIS- SOLVED (MG/L AS S04)
NOV												
05...	760	580	200	63	180	34	3	5.4	207	0	170	580
FEB												
09...	790	530	210	65	170	32	3	4.9	300	0	240	580
APR												
15...	770	580	190	71	200	36	3	5.2	202	0	166	630
MAY												
24...	840	660	220	69	140	27	2	4.2	181	0	148	710
JUL												
22...	210	80	69	9.3	25	20	0.8	8.9	152	0	125	340
SEP												
23...	440	280	130	28	50	20	1	5.4	189	0	155	300

DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	SILICA, DIS- SOLVED (MG/L AS SI02)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	NITRO- GEN, NITRATE TOTAL (MG/L AS N)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE TOTAL (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N02)	NITRO- GEN, N02+N03 TOTAL (MG/L AS N)
NOV												
05...	230	17	1480	1390	2.01	444	--	--	<0.010	<0.010	--	0.300
FEB												
09...	230	19	1510	1450	2.05	1400	0.970	0.960	0.030	0.030	0.10	1.00
APR												
15...	290	15	1590	1520	2.16	1360	--	0.230	--	0.020	0.07	--
MAY												
24...	210	16	1550	1480	2.11	544	0.380	--	0.020	--	--	0.400
JUL												
22...	240	10	--	782	1.06	37.2	--	--	<0.010	<0.010	--	<0.100
SEP												
23...	57	14	703	682	0.96	1520	0.370	--	0.030	--	--	0.400

07228500 CANADIAN RIVER AT BRIDGEPORT, OK--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4)	ARSENIC TOTAL (UG/L AS AS)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE)
NOV 05...	0.270	0.040	0.030	0.04	0.060	0.040	0.12	4	4	180	<1
FEB 09...	0.990	0.290	0.190	0.24	0.080	0.050	0.15	3	2	150	<0.5
APR 15...	0.250	--	0.090	0.12	--	<0.010	--	4	3	160	<0.5
MAY 24...	--	0.080	--	--	0.030	--	--	4	4	150	<0.5
JUL 22...	<0.100	0.030	0.020	0.03	0.030	<0.010	--	6	6	3	<0.5
SEP 23...	--	0.060	--	--	0.060	--	--	6	5	230	<0.5

DATE	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, TOTAL RECOV- ERABLE (UG/L AS CR)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB)	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)
NOV 05...	<1	<2	3	<5	<6	<20	13	<5	<20	56	10
FEB 09...	1	<1	7	<5	<3	<10	17	<5	<10	62	49
APR 15...	2	2	1	<5	<3	<10	5	<5	<10	63	35
MAY 24...	<1	1	2	<5	<3	<10	6	<5	<10	61	26
JUL 22...	<1	<1	2	<5	<3	<10	<3	<5	<10	10	<1
SEP 23...	<1	<1	6	<5	<3	<10	7	18	<10	21	8

DATE	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG)	MERCURY DIS- SOLVED (UG/L AS HG)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	SILVER, DIS- SOLVED (UG/L AS AG)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V)	ZINC, DIS- SOLVED (UG/L AS ZN)	PCB, DIS- SOLVED (UG/L)	PCB, TOTAL (UG/L)	PCN DISSOLV (UG/L)
NOV 05...	--	0.2	<20	<10	<1.0	2300	<12	6	<0.1	<0.1	<0.10
FEB 09...	1.4	<0.1	<10	<10	<1.0	2400	<6	6	--	--	--
APR 15...	<0.10	<0.1	<10	<10	<1.0	2400	7	<3	--	--	--
MAY 24...	<0.10	<0.1	<10	<10	1.0	2500	10	6	--	--	--
JUL 22...	<0.10	<0.1	30	<10	1.0	530	<6	<3	--	--	--
SEP 23...	<0.10	<0.1	<10	<10	<1.0	1000	10	19	<0.1	<0.1	<0.10

DATE	NAPH- THA- LENES, POLY- CHLOR. TOTAL (UG/L)	ALDRIN, DIS- SOLVED (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR- DANE, DIS- SOLVED (UG/L)	CHLOR- DANE, TOTAL (UG/L)	DDD, DIS- SOLVED (UG/L)	DDD, TOTAL (UG/L)	DDE, DIS- SOLVED (UG/L)	DDE, TOTAL (UG/L)	DDT, DIS- SOLVED (UG/L)	DDT, TOTAL (UG/L)
NOV 05...	<0.10	<0.01	<0.010	<0.1	<0.1	<0.01	<0.010	<0.01	<0.010	<0.01	<0.010
FEB 09...	--	--	--	--	--	--	--	--	--	--	--
APR 15...	--	--	--	--	--	--	--	--	--	--	--
MAY 24...	--	--	--	--	--	--	--	--	--	--	--
JUL 22...	--	--	--	--	--	--	--	--	--	--	--
SEP 23...	<0.10	<0.01	<0.010	<0.1	<0.1	<0.01	<0.010	<0.01	<0.010	<0.01	<0.010



WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

[illegible]

## 07229200 CANADIAN RIVER AT PURCELL, OK

LOCATION.--Lat 35°00'50", long 97°20'50", in NW 1/4 sec.7, T.6 N., R.1 W., Cleveland County, Hydrologic Unit 11090202, near left bank on downstream side of pier of U.S. Highway 77, 0.5 mi east of Purcell, 1.0 mi upstream from Walnut Creek, and at mile 184.9.

DRAINAGE AREA.--25,939 mi<sup>2</sup>, of which 4,801 mi<sup>2</sup> probably is noncontributing.

PERIOD OF RECORD.--October 1959 to June 1961, October 1979 to September 1983, October 1985 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,017.14 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records poor. Flow regulated since October 1964 by Lake Meredith (station 07227900) located in Texas. U.S. Army Corps of Engineers' satellite telemeter located at site. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office.

AVERAGE DISCHARGE.--Since regulation by Lake Meredith, 7 years (water years 1980-83, 1986-88), 787 ft<sup>3</sup>/s, 570,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 102,000 ft<sup>3</sup>/s, May 29, 1987, gage height, 14.75 ft (from HWM), no flow at times in 1980.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1904 reached a stage of 14.18 ft and flood in 1914 reached a stage of 12.98 ft, from information by the Atchison, Topeka, and Santa Fe Railway Co.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 13,000 ft<sup>3</sup>/s, Mar. 3; minimum daily discharge, 21 ft<sup>3</sup>/s, Sept. 10, 12-14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	382	e145	e440	e860	e600	e800	e4500	e1300	452	e400	e150	e27
2	e300	e215	e400	e840	e580	e2600	e5900	e1100	e540	e310	e120	e26
3	e240	e185	e390	e800	e540	e13000	e5300	e900	e740	e270	e100	e28
4	e210	e163	e389	e740	e510	e10000	e3400	e780	e700	e240	e90	e33
5	e198	e161	e390	e720	e485	e5300	e2500	e700	e600	e220	e82	e29
6	e184	e152	e395	e710	e490	e3600	e1800	e660	e640	e200	e70	e26
7	e179	e150	e399	e700	e470	e3700	e1300	e580	e800	192	e67	e23
8	e171	e150	e389	e680	e460	e3300	e1150	e560	e500	e185	e58	e22
9	e168	e170	e390	e690	e500	e2800	e1100	e520	e350	e200	e50	e22
10	e165	e171	e375	e700	695	e2400	e1400	e470	e290	e230	e110	e21
11	e160	e160	e385	e710	e720	1800	e1200	e420	e240	e220	e130	e22
12	e159	e153	e400	e760	e600	e1600	e1000	e404	e220	e185	e100	e21
13	e150	e160	e460	e950	e500	e1300	e900	e397	e210	e170	e90	e21
14	e150	e162	e451	e1400	e700	e1100	e820	e376	183	e150	e76	e21
15	e149	e180	e600	e1900	e800	e970	e860	e370	e175	e130	e71	e27
16	e148	e890	e875	e3000	e610	e940	e1100	e420	e160	e120	e64	e37
17	e146	e600	e800	e4400	e515	e1250	e1700	452	e150	e140	e58	e70
18	e150	e450	e680	e5000	e485	e1700	e2600	e385	e140	e235	e54	e350
19	e150	e470	e1000	e4600	e460	e1400	e2100	e335	e135	e290	e51	e2000
20	149	e540	e7000	e4000	e450	e1300	e1900	e312	e130	e225	e49	8890
21	145	e450	e4500	e2700	e430	e1150	e1650	e280	e120	183	e46	5200
22	e143	e460	e3000	e2100	e420	e1200	e1400	e290	e115	e150	e43	e3500
23	e150	e400	e1700	e1400	e410	e1400	e1200	e330	e105	e130	e42	e2100
24	e165	e380	e2000	e1100	e410	e1250	e1100	e340	e100	e120	41	e1500
25	e170	e640	e3000	e930	416	1150	e1100	e330	e96	e110	e38	e1100
26	e171	e740	e4500	e840	e415	e1200	e1150	e330	e96	e94	e36	e1500
27	e166	e560	e6700	e780	e410	e1150	e1300	e370	e95	e100	e34	e1000
28	e150	e520	e3500	e730	e500	e980	e1150	e300	e200	e150	e33	e640
29	e151	e450	e1500	e685	e500	e1000	e1050	e310	e510	e185	e32	e520
30	e145	e430	e1200	e660	---	e1500	e1100	e280	e490	e140	e30	e1000
31	e146	---	e960	e600	---	e1800	---	e400	---	e120	e28	---
TOTAL	5410	10457	49168	46685	15081	74640	54730	15001	9282	5794	2043	29776
MEAN	175	349	1586	1506	520	2408	1824	484	309	187	65.9	993
MAX	382	890	7000	5000	800	13000	5900	1300	800	400	150	8890
MIN	143	145	375	600	410	800	820	280	95	94	28	21
AC-FT	10730	20740	97520	92600	29910	148000	108600	29750	18410	11490	4050	59060

CAL YR 1987 TOTAL 565992 MEAN 1551 MAX 71000 MIN 112 AC-FT 1123000  
WTR YR 1988 TOTAL 318067 MEAN 869 MAX 13000 MIN 21 AC-FT 630900

e Estimated

## 07229300 WALNUT CREEK AT PURCELL, OK

LOCATION.--Lat 34°59'56", long 97°22'00", NW 1/4 NW 1/4 sec.13, T.6 N., R.2 W., McClain County, Hydrologic Unit 11090202, on downstream side of right bank pier of bridge on U.S. Highway 77, at south edge of Purcell, and at mile 1.0.

DRAINAGE AREA.--202 mi<sup>2</sup>.

PERIOD OF RECORD.--Water years 1951-55, 1958-65 (occasional low-flow measurements). October 1965 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,014.57 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 1, 1984, datum 3.00 ft higher.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office.

AVERAGE DISCHARGE.--23 years (water years 1966-88), 71.3 ft<sup>3</sup>/s, 51,660 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 67,700 ft<sup>3</sup>/s, Oct. 20, 1983, gage height, 21.40 ft (datum then in use), from rating curve extended above 20,000 ft, on basis of multiple contracted opening measurement at peak; no flow at times in 1966-67, and 1984.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Apr. 1	0515	*11,900	*16.97	No other peak above base discharge.			

Minimum daily discharge, 1.5 ft<sup>3</sup>/s, Aug. 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17	34	e20	e33	e40	41	6450	88	63	27	6.3	e2.6
2	15	21	e20	e31	e40	938	984	78	54	23	4.9	e2.5
3	14	18	e20	e29	e41	478	383	e72	77	e21	4.1	e50
4	e13	17	e19	e28	e43	e310	260	e67	50	e19	e4.0	e27
5	e15	e16	e19	e27	e40	e170	204	e63	43	e17	7.3	e16
6	e14	e16	e19	e26	e40	e80	158	e60	e37	e15	6.9	e8.0
7	e13	16	e19	e25	e40	e50	e140	e57	e33	e13	6.7	e4.7
8	e13	17	e19	e24	e42	e47	e130	e66	e30	e12	7.2	e3.7
9	e12	18	e18	e23	e43	e44	118	e58	e28	19	22	e3.3
10	e12	17	e18	e23	e43	e42	161	e53	e26	e18	75	e3.1
11	14	18	e19	e24	e41	e42	125	e48	e24	e16	27	e2.8
12	15	20	e19	e25	e40	e39	108	e46	e22	20	17	e2.7
13	16	e19	20	e28	e39	e38	e102	e44	e22	e18	e11	e2.6
14	17	e19	e19	e37	e39	e37	e98	e43	e21	e16	e6.6	e2.5
15	e16	26	e18	48	e40	e38	93	e42	e25	15	e4.1	e60
16	e16	45	e23	166	e41	e45	88	61	28	13	e2.1	e36
17	17	29	30	128	e43	e300	146	e45	32	12	e17	e17
18	16	e19	34	84	e46	e200	214	e43	33	11	e18	136
19	16	e21	371	75	50	e130	140	e40	29	12	e9.3	408
20	17	e18	184	70	e49	e96	114	e45	27	13	e7.0	415
21	16	e17	67	59	e43	e87	105	48	25	12	e5.8	e80
22	15	e16	51	52	e41	e81	100	47	23	11	4.4	e74
23	15	20	44	49	e39	e77	90	49	e22	10	e3.2	e502
24	53	38	42	e49	e38	e72	84	53	e21	8.7	e2.7	493
25	34	56	294	e47	e38	e68	e82	49	24	7.8	e2.2	34
26	22	26	e109	e45	e37	63	e78	46	31	7.5	e1.8	24
27	e18	23	e60	e44	e37	61	e74	e44	55	24	e1.6	23
28	e16	23	e50	e43	e37	64	e73	e42	39	24	e1.5	23
29	e14	e21	e43	e41	40	659	e72	e41	40	28	e4.0	178
30	e14	e21	e38	e42	---	139	101	e40	34	16	e3.1	34
31	30	---	e35	e43	---	570	---	e43	---	9.1	e2.8	---
TOTAL	545	685	1761	1468	1190	5106	11075	1621	1018	488.1	296.6	2668.5
MEAN	17.6	22.8	56.8	47.4	41.0	165	369	52.3	33.9	15.7	9.57	88.9
MAX	53	56	371	166	50	938	6450	88	77	28	75	502
MIN	12	16	18	23	37	37	72	40	21	7.5	1.5	2.5
AC-FT	1080	1360	3490	2910	2360	10130	21970	3220	2020	968	588	5290

CAL YR 1987 TOTAL 69483 MEAN 190 MAX 7160 MIN 12 AC-FT 137800  
WTR YR 1988 TOTAL 27922.2 MEAN 76.3 MAX 6450 MIN 1.5 AC-FT 55380

e Estimated

## ARKANSAS RIVER BASIN

151

07229427 CANADIAN SANDY CREEK NEAR ADA, OK

LOCATION.--Lat 34°47'04", long 96°42'49", SW 1/4 SE 1/4 sec.30, T.4 N., R.6 E., Pontotoc County, Hydrologic Unit 11090202, located 1.0 mi west of Ada on Sandy Creek Road, and 0.2 mi downstream from J.A. Richardson Expressway (loop).

DRAINAGE AREA.--198 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1986 to September 1988 (discontinued).

REVISED RECORDS.--WSP 1341: Drainage area. WSP 1731: 1951(M).

GAGE.--Water-stage recorder. Datum of gage is 861.67 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,900 ft<sup>3</sup>/s, May 28, 1987, gage height, 27.50 ft; minimum daily discharge, 0.09 ft<sup>3</sup>/s, Sept. 15, 16, 1988.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,460 ft<sup>3</sup>/s, Mar. 2, gage height, 22.41 ft; minimum daily discharge, 0.09 ft<sup>3</sup>/s, Sept. 15, 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.3	1.9	38	375	87	47	950	43	14	4.0	e.44	.68
2	1.2	1.9	38	349	79	2680	1410	40	14	1.7	e.42	.75
3	.72	2.0	35	331	76	2460	552	38	9.9	.94	e.40	.79
4	.37	1.6	31	305	73	798	379	36	7.5	1.0	.53	.58
5	.64	1.7	28	279	69	698	305	33	5.5	1.5	.76	.57
6	.44	1.7	27	251	60	629	248	31	4.1	1.1	e.56	.59
7	.43	1.4	27	253	62	504	223	31	3.6	.72	e.50	.64
8	.55	3.1	25	238	63	411	204	30	3.2	.53	e.44	.61
9	.58	2.9	23	231	63	372	179	28	2.8	.71	e.39	.49
10	.58	2.6	23	210	61	336	175	25	2.5	e.62	e.35	e.47
11	.53	2.5	23	192	55	290	157	23	2.2	.53	e.32	.53
12	.49	2.3	22	402	56	249	130	23	2.2	1.2	e.28	.49
13	.45	2.3	21	644	59	227	115	21	1.9	.79	e.26	e.29
14	.45	2.2	96	333	58	138	109	19	2.7	.67	e.24	e.18
15	.35	283	237	279	52	e108	99	17	3.9	e.57	e.22	.09
16	.49	207	121	324	48	e91	86	20	5.1	e.46	e.21	e.09
17	.40	64	71	681	46	e152	104	18	2.9	e.37	e.20	e.20
18	.23	44	67	424	55	e525	239	16	4.7	.21	e.20	1.1
19	.89	50	2360	368	132	e345	151	15	2.7	2.9	e.19	6.3
20	.93	39	2350	295	111	e262	113	13	1.9	.63	e.18	.73
21	1.0	31	726	242	83	e213	94	12	1.5	e.56	e.17	.56
22	.74	26	613	214	71	e182	81	11	1.4	e.54	e.17	.62
23	.67	23	471	204	61	e169	67	12	1.2	e.52	.62	.85
24	1.7	32	358	188	52	155	59	12	e1.0	e.50	.67	1.3
25	7.2	224	2310	164	49	131	55	10	e1.0	e.48	.53	.79
26	8.4	180	2760	140	48	112	50	8.7	1.3	e.47	.18	.69
27	4.7	125	1050	124	49	98	46	7.6	1.3	e.46	.83	.73
28	2.5	74	782	118	46	92	42	7.1	1.5	.76	1.4	.58
29	2.4	54	553	109	45	730	40	7.2	37	e.52	1.4	2.5
30	2.4	44	465	103	---	477	42	8.5	19	e.48	.78	.82
31	2.2	---	416	98	---	313	---	8.1	---	e.46	.76	---
TOTAL	46.93	1530.1	16167	8468	1869	13994	6504	624.2	163.5	26.90	14.60	25.61
MEAN	1.51	51.0	522	273	64.4	451	217	20.1	5.45	.87	.47	.85
MAX	8.4	283	2760	681	132	2680	1410	43	37	4.0	1.4	6.3
MIN	.23	1.4	21	98	45	47	40	7.1	1.0	.21	.17	.09
AC-FT	93	3030	32070	16800	3710	27760	12900	1240	324	53	29	51

CAL YR 1987 TOTAL 79077.28 MEAN 217 MAX 10100 MIN .23 AC-FT 156800  
WTR YR 1988 TOTAL 49433.84 MEAN 135 MAX 2760 MIN .09 AC-FT 98050

e Estimated



07229427 CANADIAN SANDY CREEK NEAR ADA, OK--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD---October 1986 to September 1988 (discontinued).

REMARKS.--Samples were collected monthly. Specific conductance, pH, water temperature, air temperature, dissolved oxygen, and alkalinity were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	TUR- BID- ITY (NTU)	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)
OCT												
05...	1300	1028	80020	4.23	0.69	711	7.70	22.0	14.0	5.1	738	8.6
NOV												
04...	1300	1028	80020	4.39	1.5	933	7.20	29.0	18.0	3.5	740	8.9
DEC												
16...	1300	1028	80020	5.53	117	480	--	11.0	0.0	48	746	9.5
JAN												
20...	1300	1028	80020	6.81	299	470	--	-1.0	3.0	41	732	9.4
FEB												
24...	1300	1028	80020	5.02	51	719	8.10	20.0	11.0	4.0	746	10.1
MAR												
24...	1300	1028	80020	5.73	152	608	7.70	23.0	21.0	13	733	8.4
29...	1420	1028	80020	11.23	1120	412	8.00	8.5	2.5	330	740	12.6
29...	2030	1028	80020	9.33	724	322	7.90	6.5	2.5	160	740	13.1
30...	0845	1028	80020	7.97	502	357	8.00	11.0	3.0	96	740	11.4
APR												
26...	0930	1028	80020	5.00	50	758	8.20	16.0	15.0	4.4	730	11.8
MAY												
18...	0700	1028	80020	4.58	16	783	7.90	27.0	20.5	7.1	737	8.1
JUN												
22...	0815	1028	80020	4.02	1.3	916	8.10	26.0	24.0	4.9	740	7.8
JUL												
18...	1405	1028	80020	3.92	0.21	1020	8.30	37.5	31.5	4.9	740	6.0
AUG												
26...	0825	1028	80020	3.93	0.18	1200	8.30	28.5	23.0	5.0	730	5.6
SEP												
15...	1300	1028	80020	3.95	0.07	1270	8.20	29.0	24.5	5.1	740	7.9

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	HARD- NESS TOTAL (MG/L AS CACO3)	HARD- NESS NONCARB WH WAT TOT FLD (MG/L AS CACO3)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH FET FIELD (MG/L AS HCO3)	CAR- BONATE WATER WH FET FIELD (MG/L AS CO3)	ALKA- LINITY WAT WH TOT FET FIELD (MG/L AS CACO3)
OCT												
05...	86	240	0	65	20	45	26	1	24	--	--	--
NOV												
04...	97	290	0	77	24	67	31	2	25	--	--	--
DEC												
16...	66	160	4	44	12	19	20	0.7	5.6	190	0	156
JAN												
20...	73	200	0	58	13	19	17	0.6	4.0	--	--	--
FEB												
24...	94	320	2	91	23	36	19	0.9	5.1	390	0	320
MAR												
24...	98	250	0	74	17	23	16	0.7	3.5	--	--	--
29...	95	130	0	35	9.8	20	25	0.8	4.2	180	0	146
29...	99	130	0	36	9.3	15	20	0.6	1.3	160	0	132
30...	87	160	0	45	11	15	17	0.5	3.0	200	0	164
APR												
26...	123	300	0	83	23	33	19	0.9	3.7	390	0	324
MAY												
18...	93	320	0	86	26	42	22	1	7.8	--	--	--
JUN												
22...	96	270	0	68	24	83	39	2	13	430	0	356
JUL												
18...	84	210	0	52	19	120	50	4	44	450	0	370
AUG												
26...	69	170	0	39	18	160	61	5	39	520	0	426
SEP												
15...	98	150	0	32	17	200	71	7	24	510	0	420

## ARKANSAS RIVER BASIN

07229427 CANADIAN SANDY CREEK NEAR ADA, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SI02)	SOLIDS, RESIDUE AT 180° DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO- GEN, TOTAL (MG/L AS N)
OCT												
05...	--	33	27	0.80	12	400	227	0.54	0.75	<0.100	0.40	--
NOV												
04...	--	34	53	0.30	16	534	511	0.73	2.16	<0.100	0.30	--
DEC												
16...	--	17	22	0.30	8.2	241	222	0.33	76.1	0.300	0.60	0.90
JAN												
20...	--	22	17	0.30	11	285	268	0.39	230	0.300	0.70	1.0
FEB												
24...	4.9	29	30	0.40	10	389	416	0.53	53.1	2.40	0.20	2.6
MAR												
24...	--	25	20	0.30	9.5	350	335	0.48	144	0.100	0.50	0.60
29...	2.8	15	20	0.20	8.1	209	200	0.28	632	0.600	2.1	2.7
29...	3.2	14	14	0.20	7.8	190	177	0.26	371	0.400	1.3	1.7
30...	3.2	16	12	0.20	8.1	235	209	0.32	319	0.300	1.3	1.6
APR												
26...	4.0	27	29	0.40	10	386	403	0.52	52.4	--	0.20	--
MAY												
18...	--	28	41	0.40	14	441	440	0.60	18.9	0.200	1.4	1.6
JUN												
22...	5.5	33	65	0.90	13	522	514	0.71	1.78	<0.100	0.30	--
JUL												
18...	3.6	48	71	1.8	10	585	589	0.80	0.33	<0.100	0.80	--
AUG												
26...	4.1	53	91	2.6	7.3	691	668	0.94	0.34	<0.100	0.80	--
SEP												
15...	5.1	53	110	3.4	4.7	761	698	1.03	0.14	<0.100	0.40	--

DATE	NITRO- GEN, TOTAL (MG/L AS NO3)	PHOS- PHOROUS TOTAL (MG/L AS P)	PHOS- PHOROUS ORGANIC TOTAL (MG/L AS P)	BORON, DIS- SOLVED (UG/L AS B)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG)	SEDI- MENT, SUS- PENDE (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
OCT											
05...	--	0.040	0.04	260	15	<5	170	<0.10	22	0.04	73
NOV											
04...	--	0.080	0.08	410	38	10	290	0.50	53	0.21	54
DEC											
16...	4.0	0.140	0.14	60	65	10	8	0.10	123	39	78
JAN											
20...	4.4	0.120	0.12	30	110	10	30	0.20	58	47	100
FEB											
24...	12	0.040	0.04	70	14	<5	24	<0.10	9	1.2	80
MAR											
24...	2.7	0.060	0.06	50	23	<5	15	<0.10	--	--	--
29...	12	0.260	0.26	40	150	23	12	0.10	751	2270	96
29...	7.5	0.170	0.17	40	140	11	11	<0.10	564	1100	99
30...	7.1	0.130	0.13	40	150	<5	15	<0.10	303	411	98
APR											
26...	--	0.050	0.05	70	37	<5	29	--	2	0.27	40
MAY											
18...	7.1	0.080	0.08	100	7	52	82	<0.10	65	2.8	48
JUN											
22...	--	0.040	0.04	470	12	<5	450	<0.10	21	0.07	71
JUL											
18...	--	0.060	0.06	910	4	<5	730	<0.10	31	0.02	59
AUG											
26...	--	0.100	0.10	1400	29	<5	600	<0.10	27	0.01	77
SEP											
15...	--	0.090	0.09	1900	36	<5	150	<0.10	--	--	--

## ARKANSAS RIVER BASIN

## 07229900 LAKE THUNDERBIRD NEAR NORMAN, OK

LOCATION.--Lat 35°13'15", long 97°13'05", in NW 1/4 SE 1/4 sec.29, T.9 N., R.1 E., Cleveland County, Hydrologic Unit 11090203, near center of dam on Little River, just downstream from Hog Creek, 13 mi east of Norman, and at mile 96.4.

DRAINAGE AREA.--256 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1965 to current year.

GAGE.--Nonrecording gage at outlet structure and at pump house. Datum of gage is National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by earth dam. Regulated storage began Mar. 1, 1965; minimum conservation pool first filled September 1965. Capacity, 196,200 acre-ft at elevation 1,049.4 ft, crest of drop inlet; 119,600 acre-ft at elevation 1,039.0 ft, top of conservation pool; 13,640 acre-ft at elevation 1,010.0 ft, minimum conservation pool. Dead storage, 1,200 acre-ft below elevation 997.0 ft, sill of gated outlet. Figures given herein represent total contents. Reservoir is used for flood control, irrigation (inactive), and municipal water supplies diverted to Del City, Midwest City, and Norman.

COOPERATION.--Elevations and data on diversions furnished by Central Oklahoma Master Conservancy District.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 172,900 acre-ft, Mar. 5, 1985, elevation, 1,046.61 ft; minimum since conservation pool first reached, 15,370 acre-ft, Nov. 30, 1965, elevation, 1,011.0 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 155,600 acre-ft, Apr. 4, elevation, 1,044.36 ft; minimum, 105,200 acre-ft, Sept. 15, elevation, 1,036.53 ft.

## MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)	Diversions (acre-feet)
Sept. 30.....	1038.23	115,000	-	-
Oct. 31.....	1037.75	112,200	-2,800	1,366
Nov. 30.....	1037.75	112,200	0	1,151
Dec. 31.....	1039.05	119,900	+7,700	1,257
CAL YR 87.....	-	-	-1,100	17,110
Jan. 31.....	1039.39	122,000	+2,100	1,310
Feb. 29.....	1039.17	120,600	-1,400	1,143
Mar. 31.....	1040.85	131,200	+10,600	1,197
Apr. 30.....	1039.44	122,300	-8,900	1,307
May 31.....	1038.75	118,100	-4,200	1,807
June 30.....	1038.54	116,800	-1,300	2,101
July 31.....	1037.77	112,300	-4,500	2,106
Aug. 31.....	1036.97	107,600	-4,700	2,147
Sept. 30.....	1037.15	108,700	+1,100	1,576
WTR YR 88.....	-	-	-6,300	18,468

## ARKANSAS RIVER BASIN

351307097132401 LAKE THUNDERBIRD DAMSITE CROSS SECTION SITE NO. 1

LOCATION.--Lat 35°13'07", long 97°13'24".

PERIOD OF RECORD.--Water years 1980 to current year.

REMARKS.--Specific conductance, pH, water temperature and dissolved oxygen were measured quarterly in the field at 5-foot intervals.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	SAM- PLING DEPTH (FEET)	RESER- VOIR STORAGE (AC-FT)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE WATER (DEG C)	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)
DEC											
01...	1035	1028	1028	1.00	112000	422	7.50	10.0	730	9.8	91
01...	1042	1028	1028	5.00	112000	421	7.40	10.0	730	10.0	92
01...	1044	1028	1028	10.0	112000	446	7.60	10.0	730	10.2	94
01...	1047	1028	1028	15.0	112000	445	7.60	10.0	730	10.1	93
01...	1050	1028	1028	20.0	112000	442	7.60	10.0	730	10.1	93
MAR											
23...	1020	1028	1028	1.00	120000	402	7.70	11.0	730	11.8	112
23...	1028	1028	1028	5.00	120000	398	7.80	11.0	730	11.5	109
23...	1031	1028	1028	10.0	120000	384	7.90	10.5	730	11.8	111
23...	1035	1028	1028	15.0	120000	394	8.00	11.0	730	11.6	110
23...	1038	1028	1028	20.0	120000	384	8.00	9.5	730	11.6	106
23...	1040	1028	1028	25.0	120000	390	8.00	9.5	730	11.6	107
23...	1042	1028	1028	30.0	120000	392	8.00	9.5	730	11.6	106
23...	1045	1028	1028	35.0	120000	393	8.00	9.5	730	11.6	106
23...	1048	1028	1028	39.0	120000	390	7.90	9.5	730	11.4	104
JUN											
15...	1309	1028	1028	1.00	117000	434	8.60	26.0	740	8.6	109
15...	1311	1028	1028	10.0	117000	434	8.60	25.5	740	8.3	105
15...	1313	1028	1028	20.0	117000	434	8.50	25.0	740	7.8	97
15...	1315	1028	1028	30.0	117000	440	8.10	21.5	740	3.7	43
15...	1317	1028	1028	36.0	117000	435	8.00	21.0	740	2.2	25
SEP											
21...	1039	1028	1028	1.00	107000	361	7.60	23.5	740	6.4	78
21...	1055	1028	1028	5.00	107000	341	7.80	22.5	740	6.4	76
21...	1058	1028	1028	10.0	107000	350	7.70	19.0	740	6.1	68
21...	1103	1028	1028	15.0	107000	366	--	23.0	740	6.4	77
21...	1105	1028	1028	20.0	107000	347	--	23.5	740	6.3	77
21...	1107	1028	1028	25.0	107000	365	--	20.0	740	6.5	74
21...	1108	1028	1028	30.0	107000	353	--	22.5	740	6.2	74
21...	1110	1028	1028	35.0	107000	352	--	23.0	740	6.0	72
21...	1112	1028	1028	36.0	107000	353	--	22.5	740	5.7	68



## ARKANSAS RIVER BASIN

351317097145101 LAKE THUNDERBIRD LITTLE RIVER CROSS SECTION

LOCATION.--Lat 35°13'17", long 97°14'51".

PERIOD OF RECORD.--Water years 1980 to current year.

REMARKS.--Specific conductance, pH, water temperature and dissolved oxygen were measured quarterly in the field at 5-foot intervals.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	SAM- PLING DEPTH (FEET)	RESER- VOIR STORAGE (AC-FT)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE WATER (DEG C)	BARO- METRIC PRES- SURE (MM HG)	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)
DEC											
01...	1217	1028	1028	1.00	112000	448	7.90	10.0	730	9.8	91
01...	1219	1028	1028	5.00	112000	444	7.90	10.0	730	10.0	93
01...	1221	1028	1028	10.0	112000	447	7.90	10.0	730	9.8	91
01...	1223	1028	1028	15.0	112000	445	8.00	10.0	730	9.9	92
01...	1226	1028	1028	20.0	112000	445	7.90	10.0	730	9.9	91
01...	1228	1028	1028	25.0	112000	446	7.90	9.5	730	9.6	88
01...	1231	1028	1028	30.0	112000	446	8.00	9.5	730	9.9	91
01...	1233	1028	1028	34.0	112000	448	7.90	9.5	730	9.8	90
MAR											
23...	1300	1028	1028	1.00	120000	386	8.30	11.5	730	11.2	107
23...	1303	1028	1028	5.00	120000	387	8.20	11.0	730	11.4	108
23...	1306	1028	1028	10.0	120000	388	8.20	10.5	730	11.3	106
23...	1308	1028	1028	15.0	120000	385	8.20	10.5	730	11.4	107
23...	1310	1028	1028	20.0	120000	386	8.20	10.0	730	11.4	106
23...	1312	1028	1028	25.0	120000	385	8.20	10.0	730	11.3	105
23...	1315	1028	1028	30.0	120000	387	8.20	10.0	730	11.3	105
23...	1317	1028	1028	35.0	120000	386	8.30	9.5	730	11.4	105
JUN											
15...	1120	1028	1028	1.00	117000	404	8.60	26.0	740	8.1	103
15...	1123	1028	1028	10.0	117000	407	8.60	26.0	740	8.1	103
15...	1124	1028	1028	20.0	117000	407	8.60	25.5	740	7.3	92
15...	1126	1028	1028	30.0	117000	405	8.10	22.5	740	7.5	89
15...	1127	1028	1028	40.0	117000	408	8.00	19.5	740	7.0	79
SEP											
21...	1323	1028	1028	1.00	107000	342	--	24.5	740	8.7	108
21...	1324	1028	1028	5.00	107000	344	--	25.0	740	8.4	105
21...	1325	1028	1028	10.0	107000	342	--	24.5	740	8.3	103
21...	1326	1028	1028	15.0	107000	343	--	24.5	740	8.2	102
21...	1327	1028	1028	20.0	107000	343	--	24.5	740	7.8	97
21...	1328	1028	1028	25.0	107000	343	--	24.0	740	7.6	93
21...	1330	1028	1028	30.0	107000	344	--	24.0	740	6.8	83
21...	1331	1028	1028	31.0	107000	349	--	24.0	740	1.5	18

## ARKANSAS RIVER BASIN

157

351255097151001 LAKE THUNDERBIRD CLEAR CREEK CROSS SECTION

LOCATION.--Lat 35°12'55", long 97°15'10".

PERIOD OF RECORD.--Water years 1980 to current year.

REMARKS.--Specific conductance, pH, water temperature and dissolved oxygen were measured quarterly in the field at 5-foot intervals.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	SAM- PLING DEPTH (FEET)	RESER- VOIR STORAGE (AC-FT)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE WATER (DEG C)	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)
DEC											
01...	1235	1028	1028	1.00	112000	441	8.00	10.0	730	10.0	92
01...	1238	1028	1028	5.00	112000	445	8.00	10.0	730	9.7	89
01...	1241	1028	1028	10.0	112000	448	8.00	10.0	730	9.9	91
01...	1243	1028	1028	15.0	112000	448	8.00	10.0	730	9.8	90
01...	1245	1028	1028	20.0	112000	446	8.00	9.5	730	10.0	92
01...	1248	1028	1028	25.0	112000	446	8.00	9.5	730	10.0	92
01...	1250	1028	1028	27.0	112000	445	8.00	9.5	730	9.9	91
MAR											
23...	1319	1028	1028	1.00	120000	388	8.30	11.0	730	11.6	109
23...	1321	1028	1028	5.00	120000	383	8.20	10.5	730	11.4	107
23...	1323	1028	1028	10.0	120000	383	8.20	10.5	730	11.4	107
23...	1325	1028	1028	15.0	120000	388	8.20	10.0	730	11.3	105
23...	1327	1028	1028	20.0	120000	389	8.20	10.0	730	11.3	105
23...	1329	1028	1028	25.0	120000	387	8.20	10.0	730	11.4	105
23...	1331	1028	1028	30.0	120000	385	8.30	10.0	730	11.3	104
JUN											
15...	1030	1028	1028	1.00	117000	456	8.40	24.5	740	7.4	92
15...	1036	1028	1028	10.0	117000	428	8.40	24.0	740	7.5	92
15...	1037	1028	1028	20.0	117000	416	8.40	24.5	740	7.5	93
15...	1038	1028	1028	28.0	117000	484	8.00	15.5	740	5.6	58
SEP											
21...	1340	1028	1028	1.00	107000	343	--	24.5	740	7.7	95
21...	1341	1028	1028	5.00	107000	347	--	24.5	740	7.5	93
21...	1342	1028	1028	10.0	107000	345	--	24.0	740	7.5	92
21...	1343	1028	1028	15.0	107000	351	--	23.5	740	7.3	89
21...	1344	1028	1028	20.0	107000	346	--	24.0	740	7.1	87
21...	1346	1028	1028	25.0	107000	346	--	24.0	740	6.5	80
21...	1347	1028	1028	30.0	107000	348	--	23.0	740	5.1	61

## ARKANSAS RIVER BASIN

351442097140201 LAKE THUNDERBIRD HOG CREEK CROSS SECTION

LOCATION.--Lat 35°14'42", long 97°14'02".

PERIOD OF RECORD.--Water years 1980 to current year.

REMARKS.--Specific conductance, pH, water temperature and dissolved oxygen were measured quarterly in the field at 5-foot intervals.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	SAM- PLING DEPTH (FEET)	RESER- VOIR STORAGE (AC-FT)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE WATER (DEG C)	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)
DEC											
01...	1150	1028	1028	1.00	112000	442	7.90	10.0	730	9.6	89
01...	1153	1028	1028	5.00	112000	448	7.90	10.0	730	9.7	90
01...	1155	1028	1028	10.0	112000	444	7.80	10.0	730	9.7	90
01...	1158	1028	1028	15.0	112000	445	7.80	10.0	730	9.6	89
01...	1200	1028	1028	20.0	112000	442	7.80	10.0	730	9.6	89
01...	1203	1028	1028	25.0	112000	442	7.90	9.5	730	9.7	89
01...	1205	1028	1028	30.0	112000	443	7.80	10.0	730	9.8	91
01...	1207	1028	1028	33.0	112000	441	7.80	9.5	730	9.6	88
MAR											
23...	1206	1028	1028	1.00	120000	383	8.20	11.0	730	11.2	106
23...	1208	1028	1028	5.00	120000	373	8.20	11.0	730	11.2	106
23...	1210	1028	1028	10.0	120000	378	8.20	10.5	730	11.0	104
23...	1212	1028	1028	15.0	120000	379	8.20	10.5	730	11.2	105
23...	1215	1028	1028	20.0	120000	377	8.20	10.5	730	11.2	105
23...	1218	1028	1028	25.0	120000	379	8.20	10.0	730	11.2	104
23...	1220	1028	1028	30.0	120000	382	8.20	10.0	730	11.2	104
JUN											
15...	1150	1028	1028	1.00	117000	466	8.10	26.5	740	8.0	103
15...	1151	1028	1028	10.0	117000	445	8.40	25.5	740	7.8	98
15...	1152	1028	1028	20.0	117000	450	8.20	24.0	740	7.1	87
15...	1155	1028	1028	23.0	117000	440	8.50	24.0	740	7.2	88
SEP											
21...	1248	1028	1028	1.00	107000	344	--	24.5	740	7.9	98
21...	1249	1028	1028	5.00	107000	341	--	25.0	740	8.1	101
21...	1251	1028	1028	10.0	107000	342	--	25.0	740	8.0	100
21...	1252	1028	1028	15.0	107000	342	--	24.5	740	7.8	97
21...	1253	1028	1028	20.0	107000	348	--	23.5	740	7.6	92
21...	1254	1028	1028	25.0	107000	346	--	24.0	740	7.0	86
21...	1255	1028	1028	28.0	107000	346	--	23.5	740	6.3	77

## ARKANSAS RIVER BASIN

351318097155901 LAKE THUNDERBIRD LITTLE RIVER ABOVE CLEAR CREEK

LOCATION.--Lat 35°13'18", long 97°15'59".

PERIOD OF RECORD.--Water years 1980 to current year.

REMARKS.--Specific conductance, pH, water temperature, and dissolved oxygen were measured quarterly in the field at 5-foot intervals.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	SAM- PLING DEPTH (FEET)	RESER- VOIR STORAGE (AC-FT)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE WATER (DEG C)	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)
DEC											
01...	1254	1028	1028	1.00	112000	442	8.00	10.5	730	9.8	92
01...	1256	1028	1028	5.00	112000	446	8.00	10.5	730	9.8	92
01...	1258	1028	1028	10.0	112000	444	8.00	10.0	730	9.9	92
01...	1300	1028	1028	15.0	112000	445	8.00	10.0	730	9.8	91
01...	1303	1028	1028	20.0	112000	443	8.00	10.0	730	9.7	90
01...	1306	1028	1028	25.0	112000	441	8.00	10.0	730	9.6	89
MAR											
23...	1333	1028	1028	1.00	120000	387	8.30	11.0	730	11.3	107
23...	1335	1028	1028	5.00	120000	387	8.30	11.0	730	11.2	106
23...	1338	1028	1028	10.0	120000	384	8.30	10.5	730	11.5	108
23...	1341	1028	1028	15.0	120000	383	8.30	10.5	730	11.6	108
23...	1343	1028	1028	20.0	120000	386	8.30	10.5	730	11.2	104
23...	1346	1028	1028	25.0	120000	389	8.30	10.0	730	11.6	107
23...	1348	1028	1028	27.0	120000	388	8.30	10.0	730	11.2	104
JUN											
15...	1101	1028	1028	1.00	117000	418	8.60	25.5	740	8.2	104
15...	1103	1028	1028	10.0	117000	414	8.50	26.0	740	7.6	97
15...	1105	1028	1028	20.0	117000	410	8.40	24.5	740	7.2	89
15...	1106	1028	1028	25.0	117000	478	8.40	16.5	740	6.7	71
SEP											
21...	1355	1028	1028	1.00	107000	347	--	24.5	740	7.8	97
21...	1356	1028	1028	5.00	107000	344	--	25.0	740	8.0	100
21...	1357	1028	1028	10.0	107000	345	--	24.5	740	7.9	98
21...	1359	1028	1028	15.0	107000	346	--	24.0	740	7.0	86
21...	1400	1028	1028	20.0	107000	345	--	24.0	740	6.4	78
21...	1401	1028	1028	25.0	107000	346	--	24.0	740	7.1	87
21...	1402	1028	1028	30.0	107000	347	--	23.0	740	5.8	70
21...	1404	1028	1028	33.0	107000	359	--	23.0	740	2.6	31



351333097131201 LAKE THUNDERBIRD DAMSITE CROSS SECTION NO. 3

LOCATION.--Lat 35°13'33", long 97°13'12".

PERIOD OF RECORD.--Water years 1980 to current year.

REMARKS.--Specific conductance, pH, water temperature and dissolved oxygen were measured quarterly in the field at 5-foot intervals.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	SAM- PLING DEPTH (FEET)	RESER- VOIR STORAGE (AC-FT)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE WATER (DEG C)	BARO- METRIC PRES- SURE (MM HG)	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)
DEC											
01...	1130	1028	1028	1.00	112000	438	7.80	10.5	730	9.7	91
01...	1132	1028	1028	5.00	112000	442	7.80	10.5	730	9.8	91
01...	1133	1028	1028	10.0	112000	450	7.80	10.0	730	9.7	90
01...	1135	1028	1028	15.0	112000	440	7.80	10.0	730	9.8	91
01...	1138	1028	1028	20.0	112000	443	7.80	10.0	730	9.6	89
01...	1140	1028	1028	25.0	112000	437	7.90	10.0	730	9.8	91
01...	1143	1028	1028	30.0	112000	446	7.80	10.0	730	9.8	91
01...	1145	1028	1028	35.0	112000	438	7.80	9.5	730	9.9	91
MAR											
23...	1140	1028	1028	1.00	120000	387	8.10	10.0	730	11.2	104
23...	1143	1028	1028	5.00	120000	392	8.20	10.0	730	11.1	103
23...	1145	1028	1028	10.0	120000	389	8.20	10.0	730	11.3	104
23...	1147	1028	1028	15.0	120000	386	8.20	10.0	730	11.4	105
23...	1149	1028	1028	20.0	120000	383	8.20	9.5	730	11.3	104
23...	1151	1028	1028	25.0	120000	385	8.20	9.5	730	11.1	102
23...	1153	1028	1028	30.0	120000	387	8.20	9.5	730	11.2	103
23...	1155	1028	1028	35.0	120000	382	8.20	9.5	730	11.2	103
23...	1158	1028	1028	41.0	120000	381	8.20	9.5	730	11.7	107
JUN											
15...	1220	1028	1028	1.00	117000	433	8.50	27.0	740	8.6	111
15...	1223	1028	1028	10.0	117000	433	8.10	26.0	740	8.7	111
15...	1228	1028	1028	20.0	117000	432	8.30	24.5	740	7.6	94
15...	1229	1028	1028	30.0	117000	449	7.80	21.0	740	2.8	32
15...	1230	1028	1028	35.0	117000	--	7.70	18.0	740	0.7	8
SEP											
21...	1226	1028	1028	1.00	107000	344	--	24.5	740	7.4	92
21...	1227	1028	1028	5.00	107000	345	--	24.5	740	7.3	90
21...	1229	1028	1028	10.0	107000	342	--	24.0	740	7.3	90
21...	1230	1028	1028	15.0	107000	350	--	24.0	740	7.2	88
21...	1232	1028	1028	20.0	107000	349	--	23.5	740	7.1	86
21...	1233	1028	1028	25.0	107000	352	--	23.0	740	7.1	85
21...	1234	1028	1028	30.0	107000	352	--	23.0	740	7.1	85
21...	1236	1028	1028	36.0	107000	348	--	23.5	740	6.8	83

## ARKANSAS RIVER BASIN

351320097131801 LAKE THUNDERBIRD DAMSITE CROSS SECTION SITE NO. 2

LOCATION.--Lat 35°13'20", long 97°13'18".

PERIOD OF RECORD.--Water years 1980 to current year.

REMARKS.--Samples were collected in a Kemmerer sampler. Specific conductance, pH, water temperature and dissolved oxygen were measured quarterly in the field at 5-foot intervals.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	SAM- PLING DEPTH (FEET)	RESER- VOIR STORAGE (AC-FT)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE WATER (DEG C)	TUR- BID- ITY (NTU)	BARO- METRIC PRES- SURE (MM OF HG)
DEC										
01...	1055	1028	80020	1.00	112000	446	7.70	10.0	5.3	730
01...	1057	1028	1028	5.00	112000	448	7.70	10.0	--	730
01...	1100	1028	1028	10.0	112000	444	7.80	10.0	--	730
01...	1103	1028	1028	15.0	112000	444	7.80	10.0	--	730
01...	1105	1028	80020	20.0	112000	442	7.80	9.5	6.8	730
01...	1107	1028	1028	25.0	112000	441	7.70	10.0	--	730
01...	1109	1028	1028	30.0	112000	442	7.80	10.0	--	730
01...	1111	1028	1028	35.0	112000	440	7.80	9.5	--	730
01...	1113	1028	80020	37.0	112000	439	7.80	9.5	29	730
MAR										
23...	1100	1028	80020	1.00	120000	390	8.10	10.5	21	730
23...	1104	1028	1028	5.00	120000	397	8.10	10.0	--	730
23...	1107	1028	1028	10.0	120000	393	8.10	10.0	--	730
23...	1109	1028	1028	15.0	120000	393	8.10	9.5	--	730
23...	1112	1028	80020	20.0	120000	390	8.10	9.5	--	730
23...	1114	1028	1028	25.0	120000	388	8.00	9.5	23	730
23...	1117	1028	1028	30.0	120000	391	8.10	9.5	--	730
23...	1120	1028	1028	35.0	120000	393	8.20	9.5	--	730
23...	1123	1028	1028	40.0	120000	392	8.20	9.5	--	730
23...	1125	1028	1028	45.0	120000	384	8.20	9.5	--	730
23...	1128	1028	80020	50.0	120000	389	8.20	9.5	38	730
JUN										
15...	1246	1028	80020	1.00	117000	430	8.70	27.5	2.4	740
15...	1248	1028	1028	10.0	117000	433	8.60	25.5	--	740
15...	1252	1028	80020	20.0	117000	448	8.60	24.0	4.6	740
15...	1254	1028	1028	30.0	117000	447	8.10	21.5	--	740
15...	1300	1028	80020	42.0	117000	438	8.10	22.0	46	740
SEP										
21...	1119	1028	80020	1.00	107000	348	--	24.0	3.6	740
21...	1122	1028	1028	5.00	107000	350	--	23.0	--	740
21...	1123	1028	1028	10.0	107000	348	--	23.5	--	740
21...	1125	1028	1028	15.0	107000	349	--	23.5	--	740
21...	1127	1028	1028	20.0	107000	350	--	23.0	--	740
21...	1128	1028	80020	25.0	107000	347	--	23.0	35	740
21...	1130	1028	1028	30.0	107000	345	--	23.5	--	740
21...	1132	1028	1028	35.0	107000	363	--	24.0	--	740
21...	1151	1028	1028	40.0	107000	346	--	25.0	--	740
21...	1200	1028	1028	45.0	107000	343	--	23.5	--	740
21...	1208	1028	1028	50.0	107000	345	--	23.5	--	740
21...	1210	1028	80020	55.0	107000	371	--	20.5	--	740

## ARKANSAS RIVER BASIN

351320097131801 LAKE THUNDERBIRD DAMSITE CROSS SECTION SITE NO. 2--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	HARD- NESS TOTAL (MG/L AS CAC03)	HARD- NESS NONCARB WH WAT TOT FLD (MG/L AS CAC03)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)
DEC										
01...	9.8	91	180	1	36	22	16	16	0.5	3.3
01...	9.9	91	--	--	--	--	--	--	--	--
01...	9.8	91	--	--	--	--	--	--	--	--
01...	9.8	90	--	--	--	--	--	--	--	--
01...	9.8	90	180	5	36	23	16	16	0.5	3.3
01...	9.8	90	--	--	--	--	--	--	--	--
01...	9.7	89	--	--	--	--	--	--	--	--
01...	9.8	90	--	--	--	--	--	--	--	--
01...	9.6	88	180	5	36	23	16	16	0.5	3.4
MAR										
23...	11.7	109	180	2	36	22	16	16	0.5	3.0
23...	11.2	104	--	--	--	--	--	--	--	--
23...	11.2	104	--	--	--	--	--	--	--	--
23...	11.2	103	--	--	--	--	--	--	--	--
23...	11.2	103	--	--	--	--	--	--	--	--
23...	11.2	103	190	5	37	23	16	15	0.5	3.0
23...	11.2	103	--	--	--	--	--	--	--	--
23...	11.3	104	--	--	--	--	--	--	--	--
23...	11.4	105	--	--	--	--	--	--	--	--
23...	11.3	104	--	--	--	--	--	--	--	--
23...	11.2	103	180	0	36	22	16	16	0.5	3.0
JUN										
15...	8.4	110	180	3	36	21	15	15	0.5	3.0
15...	8.3	105	--	--	--	--	--	--	--	--
15...	7.7	94	180	4	36	21	15	15	0.5	3.0
15...	3.6	42	--	--	--	--	--	--	--	--
15...	0.9	11	180	6	36	21	15	15	0.5	2.9
SEP										
21...	5.9	72	190	10	35	24	16	15	0.5	3.2
21...	6.3	76	--	--	--	--	--	--	--	--
21...	6.3	77	--	--	--	--	--	--	--	--
21...	6.2	75	--	--	--	--	--	--	--	--
21...	6.2	75	--	--	--	--	--	--	--	--
21...	6.1	73	180	6	35	23	16	16	0.5	3.2
21...	6.1	74	--	--	--	--	--	--	--	--
21...	6.2	76	--	--	--	--	--	--	--	--
21...	5.8	72	--	--	--	--	--	--	--	--
21...	5.0	61	--	--	--	--	--	--	--	--
21...	3.9	47	--	--	--	--	--	--	--	--
21...	0.1	1	180	0	36	23	16	16	0.5	3.8

## ARKANSAS RIVER BASIN

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351320097131801 LAKE THUNDERBIRD DAMSITE CROSS SECTION SITE NO. 2--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	BICAR- BONATE WATER WH IT FIELD (MG/L AS HCO3)	CAR- BONATE WATER WH IT FIELD (MG/L AS CO3)	ALKA- LINITY WAT WH TOT IT FIELD (MG/L AS CAC03)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)
DEC								
01...	--	--	--	13	21	229	219	0.31
01...	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--
01...	217	0	178	12	20	232	218	0.32
01...	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--
01...	--	--	--	12	23	230	221	0.31
MAR								
23...	--	--	--	12	19	230	215	0.31
23...	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--
23...	214	0	175	12	19	230	219	0.31
23...	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--
23...	--	--	--	13	19	230	218	0.31
JUN								
15...	202	4	174	12	17	218	208	0.30
15...	--	--	--	--	--	--	--	--
15...	198	2	166	12	17	223	208	0.30
15...	--	--	--	--	--	--	--	--
15...	200	0	164	12	17	217	206	0.30
SEP								
21...	--	--	--	11	19	234	214	0.32
21...	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--
21...	261	0	214	11	19	222	213	0.30
21...	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--
21...	--	--	--	7.8	19	252	218	0.34



## ARKANSAS RIVER BASIN

07230000 LITTLE RIVER BELOW LAKE THUNDERBIRD NEAR NORMAN, OK

LOCATION.--Lat 35°13'18", long 97°12'49", in NE 1/4 SE 1/4 sec.29, T.9 N., R.1 E., Cleveland County, Hydrologic Unit, 11090203, at right bank of outlet channel, 170 ft upstream from State Highway 9, 1,200 ft downstream from Lake Thunderbird, 1.0 mi upstream from Prairie Creek, 13.0 mi east of Norman, and at mile 96.2.

DRAINAGE AREA.--257 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1952 to current year. Prior to October 1964, published as Little River below Hog Creek near Norman.

REVISED RECORDS.--WSP 1341: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 965.62 ft above National Geodetic Vertical Datum of 1929. Prior to Nov. 28, 1956, nonrecording gage 800 ft downstream at same datum. Nov. 28, 1956 to Oct. 14, 1964, water-stage recorder at site 800 ft downstream at same datum. Oct. 15, 1964 to Sept. 1, 1965, nonrecording gage at site 170 ft downstream at same datum.

REMARKS.--No estimated daily discharges. Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Flow regulated by Lake Thunderbird since March 1965 (station 07229900). In prior years, occasional small diversions above station for irrigation.

AVERAGE DISCHARGE.--Prior to regulation by Lake Thunderbird, 12 years (water years 1953-64), 58.9 ft<sup>3</sup>/s, 42,640 acre-ft/yr; since regulation by Lake Thunderbird, 23 years (water years 1966-88), 42.8 ft<sup>3</sup>/s, 31,010 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 34,600 ft<sup>3</sup>/s, May 25, 1957, gage height, 28.85 ft, from high-water mark, at site then in use, from rating curve extended above 15,000 ft<sup>3</sup>/s; no flow at times in 1954-56, 1964.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 736 ft<sup>3</sup>/s, Apr. 8, gage height, 6.83 ft; minimum daily discharge, 0.40 ft<sup>3</sup>/s, May 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.53	.53	.52	.53	146	.56	139	374	.46	.50	.59	.69
2	.50	.53	.53	.53	302	1.3	.58	374	.49	.49	.58	.69
3	.53	.53	.52	.53	300	.55	.53	315	.61	.49	.63	.66
4	.53	.53	.53	.52	299	148	184	113	.52	.50	.60	.65
5	.52	.53	.53	.53	157	310	438	.49	.53	.56	.62	.63
6	.52	.53	.53	.61	.45	309	585	.45	.51	.56	.69	.61
7	.53	.54	.53	.52	.45	309	624	.47	.46	.58	.69	.69
8	.52	.52	.50	.53	.45	309	685	.45	.50	.71	.69	.69
9	.53	.52	.52	.52	.45	407	727	.45	.49	.61	.75	.69
10	.51	.53	.53	.53	.43	482	569	.46	.48	.61	.72	.69
11	.52	.53	.52	.55	.43	479	633	.47	.48	.61	.69	.69
12	.53	.53	.52	.61	.45	477	716	.48	.49	.60	.69	.68
13	.53	.53	.53	.53	.45	478	714	.48	.49	.57	.68	.69
14	.53	.53	.73	.53	.44	475	712	.45	.49	.57	.68	.72
15	.53	.57	.53	.53	.45	474	710	.46	.49	.56	.69	.93
16	.53	.53	.53	.59	.45	474	709	.46	.54	.56	.69	.69
17	.53	.53	.53	.57	.45	438	613	.45	.49	.55	.69	.69
18	.53	.59	.56	.55	.66	332	488	.44	.48	.56	.69	1.3
19	.53	.53	1.3	.61	.53	289	564	.44	.45	.59	.69	1.1
20	.52	.53	.55	.58	.49	289	600	.46	.45	.56	.69	.69
21	.53	.52	.53	.61	.45	161	599	.46	.45	.57	.69	.68
22	.53	.53	.53	.61	.46	.51	597	.46	.45	.59	.69	.68
23	.53	.53	.53	.64	.45	.52	595	.44	.45	.58	.69	.89
24	.64	.97	.53	.78	.51	.50	596	.42	.48	.58	.69	.72
25	.53	.54	1.1	.77	.53	.45	592	.42	.48	.58	.69	.69
26	.55	.53	.69	.84	.53	.45	590	.40	.71	.58	.69	.69
27	.53	.53	.63	.61	.52	.45	590	.42	.64	.67	.69	.69
28	.53	.50	.53	.61	.53	.74	589	.42	.74	.61	.70	.68
29	.53	.52	.53	.67	.50	.60	453	.43	.54	.59	.69	.70
30	.53	.52	.53	.66	---	176	375	.43	.49	.59	.69	.69
31	.55	---	.53	.64	---	263	---	.44	---	.59	.69	---
TOTAL	16.48	16.38	18.20	18.44	1215.51	7085.63	15987.11	1188.10	15.33	17.87	21.04	21.98
MEAN	.53	.55	.59	.59	41.9	229	533	38.3	.51	.58	.68	.73
MAX	.64	.97	1.3	.84	302	482	727	374	.74	.71	.75	1.3
MIN	.50	.50	.50	.52	.43	.45	.53	.40	.45	.49	.58	.61
AC-FT	33	32	36	37	2410	14050	31710	2360	30	35	42	44

CAL YR 1987 TOTAL 35369.63 MEAN 96.9 MAX 683 MIN .45 AC-FT 70160  
WTR YR 1988 TOTAL 25622.07 MEAN 70.0 MAX 727 MIN .40 AC-FT 50820

## ARKANSAS RIVER BASIN

07230500 LITTLE RIVER NEAR TECUMSEH, OK

LOCATION (REVISED).--Lat 35°10'21", long 96°55'54", NE 1/4 NE 1/4 sec.13, T.8 N., R.3 E., Pottawatomie County, Hydrologic Unit 11090203, on downstream side of center pier of bridge on U.S. Highway 177, 1.5 mi downstream from Dance Creek, 5.0 mi south of Tecumseh, and at mile 77.2.

DRAINAGE AREA.--456 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1943 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1117: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 898.52 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Flow regulated or diverted since 1965 by Lake Thunderbird, 19.2 mi upstream (station 07229900). U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Prior to regulation by Lake Thunderbird, 21 years (water years 1944-64), 149 ft<sup>3</sup>/s, 107,900 acre-ft/yr; since regulation by Lake Thunderbird, 23 years (water years 1966-88), 117 ft<sup>3</sup>/s, 84,770 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 32,400 ft<sup>3</sup>/s, May 25, 1957, gage height, 18.84 ft, maximum gage height, 19.68 ft, May 18, 1949; no flow at times in several years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1932 reached a stage of 25.58 ft, from floodmark.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 8,920 ft<sup>3</sup>/s, Apr. 1, gage height, 17.84 ft; minimum daily discharge, .88 ft<sup>3</sup>/s, Sept. 8-10.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e12	12	27	55	43	31	5600	447	e11	e12	e1.8	e.92
2	e9.0	12	27	48	302	1350	5390	422	e10	e11	e1.6	1.9
3	e7.6	12	26	49	326	798	1050	366	e13	e10	e1.8	e1.5
4	e7.0	12	25	44	327	282	471	176	e12	e9.8	2.2	e1.0
5	e6.6	11	25	38	292	484	710	23	e11	e10	2.2	e.94
6	e6.0	11	25	e36	49	458	879	19	e10	e9.8	2.0	e.92
7	e5.8	11	24	e34	37	443	880	e14	e9.2	e9.6	1.8	e.90
8	e5.2	13	24	e33	36	439	822	e11	e8.6	22	1.7	e.88
9	e5.0	12	22	e32	35	504	932	e8.8	e8.4	51	1.9	e.88
10	e4.9	12	22	e32	35	661	854	e7.2	e8.2	17	2.4	e.88
11	e5.0	11	22	e31	33	527	602	e6.6	e8.0	13	2.1	e.90
12	e5.2	12	22	e33	35	494	868	e6.2	e8.2	12	1.9	e.90
13	e5.0	12	21	e32	33	486	822	e6.0	e8.0	9.4	2.3	e.92
14	e5.2	12	134	e40	33	476	809	e6.0	e7.8	7.3	1.9	e1.1
15	e5.8	21	121	135	30	431	780	e5.8	e7.6	5.8	1.7	2.4
16	e6.6	28	61	293	e28	428	770	e5.6	e7.4	e5.1	1.5	2.9
17	e7.4	19	47	208	e27	483	795	e5.8	e7.2	e4.5	1.4	2.4
18	e8.0	17	54	87	31	353	575	5.7	e7.4	e4.2	1.5	4.1
19	9.9	31	941	73	79	274	546	e7.0	e7.2	e4.2	1.8	298
20	10	25	339	51	44	307	616	e6.8	e7.4	e4.0	1.9	14
21	9.8	19	120	40	35	293	643	e6.0	e7.2	e3.6	e1.4	4.5
22	9.5	16	75	36	33	67	671	e5.6	e7.2	e3.2	e1.2	4.0
23	10	16	60	35	e29	43	626	e7.0	e7.0	e2.9	e1.0	44
24	20	79	54	34	e28	42	593	e6.8	e7.2	e2.7	e.98	76
25	23	222	817	31	e27	37	583	e9.0	e7.0	e2.5	e.96	8.4
26	17	59	409	29	e26	34	563	e8.6	e7.2	e2.3	e.94	5.8
27	14	41	265	27	e27	32	541	e7.8	42	5.1	e.94	5.7
28	13	36	205	27	e28	167	537	e7.4	61	5.8	e.94	5.5
29	12	33	106	27	31	1390	484	e6.7	e30	3.9	e1.1	12
30	12	30	81	27	---	322	433	e7.4	e15	2.8	e1.0	6.2
31	12	---	75	27	---	576	---	e6.4	---	e2.0	e.94	---
TOTAL	289.5	857	4276	1724	2119	12712	30445	1634.2	368.4	268.5	48.80	510.44
MEAN	9.34	28.6	138	55.6	73.1	410	1015	52.7	12.3	8.66	1.57	17.0
MAX	23	222	941	293	327	1390	5600	447	61	51	2.4	298
MIN	4.9	11	21	27	26	31	433	5.6	7.0	2.0	.94	.88
AC-FT	574	1700	8420	3420	4200	25210	60390	3240	731	533	97	1010

CAL YR 1987 TOTAL 79789.6 MEAN 219 MAX 2860 MIN 4.9 AC-FT 158300  
WTR YR 1988 TOTAL 55252.84 MEAN 151 MAX 5600 MIN .88 AC-FT 109600

e Estimated

## ARKANSAS RIVER BASIN

07230597 LITTLE RIVER NEAR BOWLEGS, OK

LOCATION.--Lat 35°06'19", long 96°40'06", in NW 1/4 SE 1/4 sec.3, T.7 N., R.6 E., Seminole County, Hydrologic Unit 11090203, on the right downstream abutment of state highways 3 and 99, 6.7 miles south of Seminole and at mile 57.8.

DRAINAGE AREA.--550 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--January 1983 to September 1988 (discontinued).

GAGE.--Water-stage recorder and a crest stage gage. Datum of gage is 826.20 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records poor. Flow regulated by Lake Thunderbird (station 07229900) 38.8 mi upstream.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,300 ft<sup>3</sup>/s, Oct. 22, 1983, gage height, 24.84 ft. No flow at times in 1983, 1984.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,880 ft<sup>3</sup>/s, Apr. 3, gage height, 23.53 ft; minimum daily discharge, 1.2 ft<sup>3</sup>/s, Sept. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	13	29	126	73	41	3790	e475	25	e30	3.0	e1.5
2	10	14	27	97	218	1150	5080	e450	34	e20	e2.5	e1.7
3	10	14	27	93	289	2550	5490	402	30	e16	e2.0	e1.8
4	9.9	14	26	92	294	746	2490	349	62	e13	e2.5	e1.6
5	e9.6	e14	25	78	289	557	1290	e230	48	e14	e2.7	e1.5
6	e9.3	e13	26	85	180	476	e1200	e150	27	9.2	e2.5	e1.4
7	e9.0	e13	26	113	76	436	e1100	e80	21	9.3	e2.3	e1.5
8	e8.7	e16	26	193	74	406	999	e76	19	34	e2.3	e1.4
9	e8.3	e17	25	210	73	391	1020	e70	17	e65	e2.4	e1.3
10	e8.0	e16	24	163	71	516	1050	e64	14	e45	e2.4	e1.4
11	e8.5	e15	23	152	e60	523	821	e60	12	e30	e2.3	e1.4
12	e9.1	e15	23	207	e57	512	927	e56	12	e20	e2.2	e1.3
13	10	e15	23	314	63	502	947	e50	11	e18	e2.3	e1.2
14	12	e14	72	193	64	496	947	46	11	e13	e2.2	e1.4
15	11	e80	132	188	58	495	928	40	10	e8.0	e1.9	e2.4
16	10	e74	76	325	53	494	898	39	9.9	e7.0	e1.8	e3.0
17	11	e40	51	664	51	614	942	38	13	e5.0	e1.7	e2.8
18	11	e30	48	307	61	580	877	34	12	4.8	e1.6	e5.0
19	11	e40	1120	286	201	357	725	31	11	e4.6	e1.9	268
20	11	e50	1110	242	168	341	784	31	9.6	e4.4	e4.5	123
21	11	e45	252	175	100	338	781	30	9.2	e4.2	e2.5	27
22	11	e35	149	135	79	210	795	29	8.6	e4.0	e2.0	21
23	10	e25	110	122	65	108	e760	40	8.0	e3.8	e1.9	21
24	15	e60	81	116	54	99	e778	35	8.3	e3.6	e1.8	138
25	25	e350	1370	100	48	91	804	32	8.6	e3.4	e1.7	61
26	31	e450	1690	87	46	79	e720	28	10	e3.2	e1.6	22
27	20	e150	570	81	45	67	e680	25	23	e3.0	e1.5	e20
28	16	e70	335	77	43	65	e650	23	101	8.0	e1.4	e18
29	14	e50	183	77	42	2280	e600	24	62	10	e1.5	37
30	13	31	172	76	---	1030	e500	24	e54	e6.0	e1.5	43
31	13	---	165	78	---	713	---	22	---	e4.0	e1.4	---
TOTAL	378.4	1783	8016	5252	2995	17263	39373	3083	701.2	423.5	65.8	832.6
MEAN	12.2	59.4	259	169	103	557	1312	99.5	23.4	13.7	2.12	27.8
MAX	31	450	1690	664	294	2550	5490	475	101	65	4.5	268
MIN	8.0	13	23	76	42	41	500	22	8.0	3.0	1.4	1.2
AC-FT	751	3540	15900	10420	5940	34240	78100	6120	1390	840	131	1650

CAL YR 1987 TOTAL 110603.2 MEAN 303 MAX 4130 MIN 8.0 AC-FT 219400  
WTR YR 1988 TOTAL 80166.5 MEAN 219 MAX 5490 MIN 1.2 AC-FT 159000

e Estimated

## ARKANSAS RIVER BASIN

07230597 LITTLE RIVER NEAR BOWLEGS, OK--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1953, 1959, 1961, February 1983 to September 1988 (discontinued).

REMARKS.--Samples were collected monthly and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. CUBIC (FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	TUR- BID- ITY (NTU)	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)
OCT												
13...	1400	1028	80020	12.27	10	*1560	8.00	21.0	18.0	8.2	740	9.4
NOV												
30...	1400	1028	80020	12.64	30	853	7.70	12.5	8.0	47	740	13.8
DEC												
17...	1100	1028	80020	12.81	44	675	7.70	5.0	1.0	97	750	15.0
JAN												
04...	1300	1028	80020	13.33	92	808	7.70	3.0	3.5	26	760	14.4
FEB												
25...	1200	1028	80020	12.80	48	1170	8.20	18.5	11.0	11	750	13.4
MAR												
29...	1500	1028	80020	20.60	2640	276	7.50	9.5	12.0	840	740	10.8
30...	1000	1028	80020	16.93	1080	398	7.50	6.0	9.5	490	750	10.2
APR												
05...	1100	1028	80020	17.86	1370	478	7.70	23.0	18.0	300	740	8.5
MAY												
19...	1145	1028	80020	13.30	31	1150	8.50	27.0	26.0	3.8	740	6.2
JUN												
23...	1315	1028	80020	12.96	8.3	1640	8.40	33.5	30.5	2.2	740	7.0
JUL												
18...	1120	1028	80020	12.80	4.8	*1600	8.70	31.5	29.5	2.3	740	6.5
AUG												
01...	1530	1028	80020	12.71	2.8	1620	8.60	34.0	35.5	2.9	740	8.6
SEP												
26...	1400	1028	80020	13.09	22	605	7.60	27.0	25.0	320	740	8.4

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	HARD- NESS TOTAL (MG/L AS CAC03)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH FET FIELD (MG/L AS HC03)	CAR- BONATE WATER WH FET FIELD (MG/L AS C03)	ALKA- LITY WAT WH TOT FET FIELD (MG/L AS CAC03)
OCT											
13...	103	370	72	47	160	48	4	3.1	380	0	309
NOV											
30...	120	280	61	32	81	38	2	4.3	290	0	240
DEC											
17...	107	240	51	27	58	34	2	3.8	220	0	179
JAN											
04...	109	280	59	31	71	36	2	3.0	290	0	234
FEB											
25...	124	390	81	45	120	40	3	2.5	380	0	311
MAR											
29...	103	90	20	9.7	18	29	0.8	3.0	100	0	82
30...	91	130	28	14	26	30	1	3.1	140	0	116
APR											
05...	93	150	35	16	33	31	1	3.0	180	0	149
MAY											
19...	79	370	68	48	140	45	3	2.4	340	7	292
JUN											
23...	97	340	49	53	200	56	5	2.8	290	10	250
JUL											
18...	89	330	50	50	200	57	5	3.4	240	6	206
AUG											
01...	129	310	40	50	230	62	6	3.4	--	--	198
SEP											
26...	105	140	31	16	62	47	2	4.6	150	0	124

\* SPECIFIC CONDUCTANCE, LAB (US/CM)

## ARKANSAS RIVER BASIN

07230597 LITTLE RIVER NEAR BOWLEGS, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	SULFATE DIS- SOLVED (MG/L AS S04)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SiO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO- GEN, TOTAL (MG/L AS N)
OCT 13...	53	290	0.40	13	844	824	1.15	23.2	<0.100	0.60	--
NOV 30...	26	160	0.30	13	523	522	0.71	41.7	<0.100	0.30	--
DEC 17...	22	100	0.30	11	414	381	0.56	49.6	<0.100	6.4	--
JAN 04...	25	130	0.30	12	487	472	0.66	120	<0.100	0.50	--
FEB 25...	36	220	0.30	12	722	703	0.98	93.6	<0.100	0.30	--
MAR 29...	16	27	0.20	5.8	172	149	0.23	1230	0.300	1.8	2.1
30...	17	39	0.20	6.6	218	204	0.30	636	0.200	1.1	1.3
APR 05...	19	48	0.20	8.0	264	252	0.36	977	0.100	0.90	1.0
MAY 19...	47	240	0.40	14	758	743	1.03	63.0	<0.100	<0.20	--
JUN 23...	63	350	0.50	8.6	941	888	1.28	21.0	<0.100	0.40	--
JUL 18...	59	380	0.40	8.7	889	881	1.21	11.6	0.100	--	--
AUG 01...	57	430	0.40	5.8	1020	936	1.39	7.82	<0.100	0.60	--
SEP 26...	27	96	0.20	7.2	325	318	0.44	19.1	<0.100	0.40	--
DATE	NITRO- GEN, TOTAL (MG/L AS NO3)	PHOS- PHOROUS TOTAL (MG/L AS P)	BARIUM, DIS- SOLVED (UG/L AS BA)	BORON, DIS- SOLVED (UG/L AS B)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, TOTAL RECOV- ERABLE (UG/L AS PB)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG)	SEDI- MENT, SUS- PENDE (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
OCT 13...	--	0.020	--	330	6	<5	20	<0.10	75	2.1	20
NOV 30...	--	0.050	--	160	13	<5	19	0.10	54	4.3	93
DEC 17...	--	0.120	--	90	86	6	37	<0.10	119	14	79
JAN 04...	--	0.080	--	110	45	5	41	0.10	40	9.9	73
FEB 25...	--	0.050	--	200	6	<5	63	0.10	52	6.7	41
MAR 29...	9.3	0.180	--	60	150	20	17	0.20	2380	17000	85
30...	5.8	0.140	--	80	140	<5	19	0.10	907	2640	89
APR 05...	4.4	0.120	--	100	140	<5	15	0.30	694	2570	79
MAY 19...	--	0.040	--	300	10	<5	14	0.10	24	2.0	91
JUN 23...	--	<0.010	370	420	8	--	5	<0.10	9	0.20	66
JUL 18...	--	0.030	--	360	6	7	20	<0.10	8	0.10	71
AUG 01...	--	0.020	--	450	16	<5	15	1.9	15	0.12	51
SEP 26...	--	0.100	--	180	45	<5	3	0.20	414	24	98



## 07231000 LITTLE RIVER NEAR SASAKWA, OK

LOCATION.--Lat 34°59'02", long 96°33'01", NE 1/4 sec.22, T.6 N., R.7 E., Seminole County, Hydrologic Unit 11090203, near left abutment on downstream side of county road bridge, 2.8 mi northwest of Sasakwa, 8.7 mi downstream from Salt Creek, and at mile 24.1.

DRAINAGE AREA.--865 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1942 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1117: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 744.34 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Apr. 11, 1946, nonrecording gage at same site and datum. Prior to Oct. 1, 1979, gage at same site and datum, 4.87 ft higher.

REMARKS.--Records fair. Flow regulated by Lake Thunderbird (station 07229900) 72.3 mi upstream since March 1965.

AVERAGE DISCHARGE.--Prior to regulation by Lake Thunderbird, 22 years (water years 1943-64), 410 ft<sup>3</sup>/s, 296,800 acre-ft/yr; since regulation by Lake Thunderbird, 23 years (water years 1966-88), 306 ft<sup>3</sup>/s, 221,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 44,600 ft<sup>3</sup>/s, May 11, 1950, gage height, 33.48 ft; no flow at times most years after 1952.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 7,760 ft<sup>3</sup>/s, Apr. 3, gage height, 23.62 ft; minimum daily discharge, 1.6 ft<sup>3</sup>/s, Sept. 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	29	22	e70	440	159	102	3960	541	47	63	e11	e1.8
2	22	21	e60	352	151	2580	6500	530	55	32	e8.0	e1.9
3	17	21	e50	306	331	3980	7160	e490	55	20	e5.0	e2.0
4	14	21	44	276	386	2850	6040	e460	57	e18	3.4	e1.9
5	13	20	42	237	388	1290	3500	e380	73	e21	3.8	e1.8
6	12	19	41	151	366	1050	1720	e200	64	e20	2.6	e1.8
7	12	19	43	112	208	860	1440	e130	46	e19	2.7	e1.7
8	11	25	42	209	155	739	1320	e122	e44	e20	3.2	e1.6
9	11	24	40	271	e145	659	1220	e120	e42	e25	2.6	e1.8
10	10	21	38	283	e140	662	1310	e114	e41	e50	e2.3	e1.7
11	11	20	36	252	e135	770	1240	e107	e39	e90	e2.4	e1.8
12	11	20	34	526	127	735	1070	e100	e36	e50	e2.3	e1.8
13	11	19	33	901	135	688	1120	e93	e33	e40	e2.4	e1.7
14	11	19	164	622	135	660	1090	e90	e30	e35	e2.2	e1.9
15	12	414	340	455	140	652	1060	e85	e27	e30	e2.0	e2.3
16	14	289	239	646	133	642	1040	e79	e24	e25	e2.1	e2.4
17	14	108	161	1810	114	831	1130	e73	e22	e20	e2.0	e2.3
18	12	77	135	1090	140	1170	1400	e69	e20	e13	e2.1	2.6
19	13	85	3290	791	306	744	1010	62	e21	260	e2.0	97
20	16	76	3350	599	313	543	920	58	e19	e50	12	350
21	16	65	1450	423	e280	499	928	57	17	e22	3.3	121
22	15	55	681	336	e150	436	895	55	14	e17	e2.4	47
23	15	45	479	295	e130	285	856	55	12	e10	e2.2	25
24	24	85	382	268	e120	215	831	67	11	e10	e2.1	19
25	55	487	3280	232	e115	196	817	63	14	e9.0	e2.0	117
26	309	e600	4950	205	113	178	807	54	13	e6.0	e1.9	74
27	95	e250	3420	187	112	159	786	e51	10	e6.0	e1.9	36
28	47	e100	1600	179	107	149	779	e48	19	e5.0	e1.8	20
29	35	e90	989	174	104	1060	773	45	124	e5.0	e1.8	18
30	28	e80	693	169	---	1890	696	48	84	e9.0	e1.9	60
31	25	---	547	166	---	1140	---	50	---	e12	e1.8	---
TOTAL	940	3197	26723	12963	5338	28414	53418	4496	1113	1012.0	99.2	1018.8
MEAN	30.3	107	862	418	184	917	1781	145	37.1	32.6	3.20	34.0
MAX	309	600	4950	1810	388	3980	7160	541	124	260	12	350
MIN	10	19	33	112	104	102	696	45	10	5.0	1.8	1.6
AC-FT	1860	6340	53010	25710	10590	56360	106000	8920	2210	2010	197	2020

CAL YR 1987 TOTAL 214144.8 MEAN 587 MAX 7100 MIN 7.9 AC-FT 424800  
WTR YR 1988 TOTAL 138732.0 MEAN 379 MAX 7160 MIN 1.6 AC-FT 275200

e Estimated

## ARKANSAS RIVER BASIN

07231000 LITTLE RIVER NEAR SASAKWA, OK--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1951 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1955 to April 1982.

WATER TEMPERATURE: October 1955 to April 1982.

REMARKS.--Samples were collected at six-week intervals and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)
OCT												
19...	1300	1028	80020	5.19	13	1900	7.80	19.0	18.0	740	9.1	100
DEC												
04...	1515	1028	80020	5.64	44	1530	7.80	14.0	9.0	750	14.3	126
JAN												
14...	1330	1028	80020	8.67	582	668	7.30	3.0	1.0	750	17.0	122
FEB												
26...	1330	1028	80020	6.06	113	*1990	8.30	20.5	11.5	750	13.2	124
APR												
04...	1430	1028	80020	21.17	6550	305	7.60	28.0	15.0	740	9.2	94
MAY												
19...	0830	1028	80020	5.67	62	*1960	8.20	25.0	23.0	740	8.9	108
JUN												
21...	1330	1028	80020	5.07	17	2160	8.30	32.5	31.0	740	8.6	120
AUG												
04...	0800	1028	80020	2.72	3.7	2080	7.70	23.0	24.0	750	6.4	78
SEP												
29...	1300	1028	80020	5.10	19	600	7.60	22.5	21.0	750	7.5	86

DATE	HARD- NESS TOTAL (MG/L AS CAC03)	HARD- NESS NONCARB WAT TOT FLD (MG/L AS CAC03)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH IT FIELD (MG/L AS HC03)	CAR- BONATE WATER WH IT FIELD (MG/L AS C03)	ALKA- LINITY WAT WH TOT IT FIELD (MG/L AS CAC03)	SULFATE DIS- SOLVED (MG/L AS SO4)
OCT												
19...	440	440	88	53	230	--	5	--	360	0	295	--
DEC												
04...	400	150	87	43	180	50	4	4.1	328	0	269	30
JAN												
14...	200	200	46	21	68	--	2	--	181	0	148	--
FEB												
26...	490	180	110	52	220	49	4	3.1	392	0	321	41
APR												
04...	95	95	23	9.1	20	--	0.9	--	103	0	84	--
MAY												
19...	440	150	86	55	240	54	5	3.3	356	0	292	47
JUN												
21...	400	400	69	56	260	--	6	--	319	0	262	--
AUG												
04...	390	160	64	55	270	60	6	3.9	259	0	212	54
SEP												
29...	150	150	32	16	57	--	2	--	139	0	114	--

\* SPECIFIC CONDUCTANCE, LAB (US/CM)

## ARKANSAS RIVER BASIN

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07231000 LITTLE RIVER NEAR SASAKWA, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	SILICA, DIS- SOLVED (MG/L AS SI02)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)
OCT 19...	--	11	--	--	--	--	<1	500	<0.5	<1	<5	<3
DEC 04...	330	11	902	952	1.23	106	1	400	<0.5	<1	<5	<3
JAN 14...	--	9.1	--	--	--	--	<1	170	<0.5	<1	<5	<3
FEB 26...	450	10	1090	1070	1.48	333	<1	410	<0.5	1	<5	<3
APR 04...	--	6.4	--	--	--	--	<1	110	<0.5	<1	<5	<3
MAY 19...	440	12	1130	1060	1.54	189	1	470	<1	<2	<10	<6
JUN 21...	--	9.2	--	--	--	--	1	400	<0.5	1	<5	<3
AUG 04...	510	5.2	1140	1100	1.55	11.3	<1	430	<0.5	<1	<5	<3
SEP 29...	--	6.4	--	--	--	--	1	240	<0.5	<1	<5	<3

DATE	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY DIS- SOLVED (UG/L AS HG)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	SILVER, DIS- SOLVED (UG/L AS AG)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V)	ZINC, DIS- SOLVED (UG/L AS ZN)
OCT 19...	<10	6	<10	14	150	0.3	<10	<10	<1.0	1000	<6	3
DEC 04...	<10	17	<10	13	76	0.1	<10	<10	<1.0	990	<6	4
JAN 14...	<10	170	<10	<4	29	<0.1	<10	<10	<1.0	400	<6	5
FEB 26...	<10	4	<10	24	71	<0.1	<10	<10	<1.0	1200	<6	4
APR 04...	<10	160	<10	<4	12	0.1	<10	<10	<1.0	160	<6	<3
MAY 19...	<20	7	<20	19	45	0.1	<20	<20	<2.0	1200	<12	8
JUN 21...	<10	12	<10	21	37	0.4	<10	<10	<1.0	1000	<6	28
AUG 04...	<10	12	<10	17	160	--	<10	<10	<1.0	930	<6	9
SEP 29...	<10	41	<10	6	1	<0.1	<10	<10	<1.0	280	<6	18

## 07231500 CANADIAN RIVER AT CALVIN, OK

LOCATION.--Lat 34°58'32", long 96°14'24", in NE 1/4 SW 1/4 sec.22, T.6 N., R.10 E., Hughes County, Hydrologic Unit 11090202, near left bank on downstream side of pier of bridge on old U.S. Highway 75, 0.5 mi northeast of Calvin, 2.4 mi upstream from Shawnee Creek, 8.5 mi downstream from Little River, and at mile 93.9.

DRAINAGE AREA.--27,952 mi<sup>2</sup>, of which 4,801 mi<sup>2</sup> is probably noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--January 1905 to December 1908 (gage heights and discharge measurements only, except for period July 1905 to December 1906), October 1938 to September 1942, July 1944 to current year. Monthly discharge only for some periods, published in WSP 1311. Gage-height records collected in this vicinity since 1904 are contained in reports of National Weather Service.

REVISED RECORDS.--WSP 1341: Drainage area. WSP 1391: 1941.

GAGE.--Water-stage recorder and nonrecording gage. Datum of gage is 682.72 ft above National Geodetic Vertical Datum of 1929. January 1905 to December 1908, nonrecording gage at site 0.8 mi upstream at datum 4.00 ft higher. Oct. 1, 1938 to Aug. 12, 1944, nonrecording gage at present site and datum. Aug. 13, 1944 to July 31, 1977, water-stage recorder at present site and datum 2.00 ft higher.

REMARKS.--Records poor. Occasional slight regulation by dams in New Mexico and Texas since 1964; Lake Thunderbird (station 07229900) since March 1965. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--49 years (water years 1906, 1939-42, 1945-88), 1,642 ft<sup>3</sup>/s, 1,190,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 174,000 ft<sup>3</sup>/s May 11, 1950, gage height, 17.35 ft, maximum gage height, 21.00 ft, Aug. 7, 1906, from floodmark, site and datum then in use; no flow at times in several years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 25,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Dec. 19	1600	31,300	8.01	Mar. 29	2300	25,800	7.51
Dec. 25	2100	38,400	8.65	Apr. 1	2030	*83,200	*11.85
Mar. 2	2300	43,800	9.11				

Minimum daily discharge 168 ft<sup>3</sup>/s, June 26, 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	429	246	521	868	1110	740	33700	1620	493	405	217	e185
2	383	242	508	819	1130	16700	45500	1680	553	355	201	e186
3	300	430	495	810	1280	30200	22500	1650	564	256	175	e184
4	293	376	490	819	1440	17400	11800	1560	565	234	213	e182
5	e280	321	476	850	1470	7100	6960	1360	577	228	186	e180
6	e260	296	481	883	1410	4510	3290	1110	686	207	177	e178
7	e255	274	483	864	1180	4010	2480	885	949	180	e198	e177
8	246	275	476	626	e1090	4400	2270	819	585	e183	e180	e176
9	240	308	476	625	999	3870	2270	773	432	e186	e175	e174
10	234	289	469	758	977	3440	2430	716	328	e189	e173	e172
11	229	275	468	889	852	3160	2390	689	283	194	e173	e171
12	228	269	469	1730	884	2660	2350	662	267	217	e170	e170
13	218	263	484	4170	978	2000	2150	637	258	217	e172	e169
14	212	264	569	2090	998	1750	2270	600	246	199	e171	e169
15	217	755	1140	1590	920	1750	2310	588	237	e190	e170	e169
16	205	1800	1240	1710	901	2120	2350	587	223	e185	e171	e170
17	198	762	979	4990	921	3000	2570	564	223	e180	e170	e169
18	195	663	859	6370	1070	3150	3660	543	217	e200	e180	e200
19	196	701	15400	4660	1490	2280	4400	543	209	419	e178	243
20	213	675	14400	3560	1410	1960	2470	575	209	307	e205	2660
21	224	596	5780	3700	1250	1590	2350	485	209	e250	e203	7850
22	211	587	3670	2810	1130	1530	2590	476	184	e225	e200	3090
23	197	469	2770	2110	921	1440	2530	484	175	199	e197	1430
24	213	453	2210	1690	816	1440	2310	531	234	179	e195	1130
25	235	1350	16600	1440	764	1680	2000	575	203	e170	e190	2810
26	827	1160	24300	1230	721	1650	1860	477	168	e169	e195	1160
27	644	958	10400	1200	712	1330	2000	446	168	e195	e191	566
28	344	745	3720	1150	714	1470	2180	430	187	e200	e178	501
29	284	589	1850	1110	714	4830	1930	871	249	e195	e190	419
30	270	543	1340	1110	---	11500	1820	468	493	e190	e188	444
31	256	---	1020	1110	---	4500	---	484	---	e185	e186	---
TOTAL	8736	16934	114543	58341	30252	149160	181690	23888	10374	6888	5768	25484
MEAN	282	564	3695	1882	1043	4812	6056	771	346	222	186	849
MAX	827	1800	24300	6370	1490	30200	45500	1680	949	419	217	7850
MIN	195	242	468	625	712	740	1820	430	168	169	170	169
AC-FT	17330	33590	227200	115700	60000	295900	360400	47380	20580	13660	11440	50550

CAL YR 1987 TOTAL 1371439 MEAN 3757 MAX 140000 MIN 155 AC-FT 2720000  
WTR YR 1988 TOTAL 632058 MEAN 1727 MAX 45500 MIN 168 AC-FT 1254000

e Estimated

## ARKANSAS RIVER BASIN

07231500 CANADIAN RIVER AT CALVIN, OK--Continued  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1950-53, 1960-61, 1965 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 1965 to January 1982.

WATER TEMPERATURE: July 1965 to January 1982.

REMARKS.--Samples were collected at six-week intervals. Specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	TUR- BID- ITY (NTU)	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)
OCT												
15...	1200	1028	80020	1.05	215	1410	8.00	24.0	19.0	19	750	11.8
DEC												
02...	1400	1028	80020	2.04	514	1270	7.90	14.0	9.5	--	740	13.5
JAN												
06...	1000	1028	80020	3.62	867	*1230	7.60	-2.0	0.0	97	760	--
FEB												
24...	1530	1028	80020	3.57	820	*1510	8.00	10.5	12.0	58	750	11.5
MAR												
30...	1600	1028	80020	5.83	8260	554	7.80	15.0	15.0	--	750	9.6
MAY												
18...	1230	1028	80020	3.13	510	*1610	8.50	30.5	26.0	12	740	6.8
JUN												
22...	1200	1028	80020	2.64	192	1500	8.80	33.0	28.5	3.8	740	12.4
AUG												
03...	0930	1028	80020	2.62	175	1220	7.80	31.0	27.0	--	750	13.2
SEP												
28...	1330	1028	80020	2.99	478	623	7.90	27.5	26.0	380	740	9.8

DATE	DIS- SOLVED (PER- CENT SATUR- ATION)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD- NESS TOTAL (MG/L AS CAC03)	HARD- NESS NONCARB WH WAT TOT FLD (MG/L AS CAC03)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH IT FIELD (MG/L AS HC03)	
OCT 15...	130	44	42	390	240	82	45	150	45	3	5.4	168
DEC 02...	122	--	--	410	170	100	39	110	37	2	4.9	294
JAN 06...	--	560	450	430	170	110	37	110	36	2	5.3	317
FEB 24...	108	K7	K21	490	210	120	47	130	36	3	4.5	354
MAR 30...	97	--	--	170	39	42	16	43	35	1	3.6	151
MAY 18...	86	K26	--	470	240	100	54	160	42	3	4.7	273
JUN 22...	166	K27	K14	330	230	53	48	170	52	4	4.6	105
AUG 03...	169	--	--	290	290	67	30	140	51	4	5.9	63
SEP 28...	125	1200	--	210	91	52	20	45	31	1	4.3	--

\* SPECIFIC CONDUCTANCE, LAB (US/CM)



## ARKANSAS RIVER BASIN

07231500 CANADIAN RIVER AT CALVIN, OK--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	CAR- BONATE WATER WH IT FIELD (MG/L AS C03)	ALKA- LINITY WAT WH TOT IT FIELD (MG/L AS CAC03)	SULFATE DIS- SOLVED (MG/L AS S04)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SI02)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N)
OCT 15...	0	138	280	210	0.60	4.4	902	868	1.23	524	--	<0.010
DEC 02...	0	241	180	160	--	12	796	755	1.08	1100	0.670	0.020
JAN 06...	0	260	180	160	0.50	12	778	773	1.06	1820	0.740	0.020
FEB 24...	0	290	230	200	0.50	12	952	923	1.29	2110	0.710	0.040
MAR 30...	0	124	68	60	--	7.4	319	322	0.43	7110	0.410	0.040
MAY 18...	5	232	280	230	0.60	10	1010	979	1.37	1390	--	<0.010
JUN 22...	15	110	250	250	0.70	9.7	910	847	1.24	472	--	0.010
AUG 03...	0	52	220	200	--	3.2	735	667	1.0	347	--	<0.010
SEP 28...	--	--	100	49	0.40	9.2	367	359	0.50	474	1.03	0.170
DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N02)	NITRO- GEN, N02+N03 DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS- PHOROUS TOTAL (MG/L AS P)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS P04)	PHOS- PHOROUS ORGANIC TOTAL (MG/L AS P)
OCT 15...	--	<0.100	0.020	0.010	0.01	1.9	1.9	0.370	0.010	0.010	0.03	0.37
DEC 02...	0.07	0.690	--	0.100	0.13	--	--	--	--	0.080	0.25	--
JAN 06...	0.07	0.760	0.390	0.390	0.50	0.41	0.80	0.250	0.180	0.140	0.43	0.25
FEB 24...	0.13	0.750	0.110	0.110	0.14	0.59	0.70	0.200	0.120	0.100	0.31	0.20
MAR 30...	0.13	0.450	--	0.140	0.18	--	--	--	--	0.040	0.12	--
MAY 18...	--	<0.100	0.020	--	--	0.38	0.40	0.150	0.080	0.050	0.15	0.15
JUN 22...	0.03	<0.100	0.040	--	--	4.9	4.9	0.200	<0.010	<0.010	--	0.20
AUG 03...	--	<0.100	--	0.010	0.01	--	--	--	--	<0.010	--	--
SEP 28...	0.56	1.20	0.040	--	--	0.66	0.70	0.310	0.090	0.090	0.28	0.31

## ARKANSAS RIVER BASIN

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07231500 CANADIAN RIVER AT CALVIN, OK--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	PHOS- PHOROUS ORGANIC DIS- SOLVED (MG/L AS P)	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)
OCT 15...	0.0	<10	3	270	<0.5	<1	<1	<3	2	<3	<5	32
DEC 02...	--	--	3	300	<0.5	<1	<5	<3	<10	7	<10	24
JAN 06...	0.04	--	2	300	<10	<1	1	<50	10	20	<100	20
FEB 24...	0.02	<10	3	300	<0.5	2	2	<3	2	7	<5	34
MAR 30...	--	--	1	19	<0.5	<1	<5	<3	20	190	<10	6
MAY 18...	0.03	<10	4	320	<0.5	1	<1	<3	12	<3	<5	36
JUN 22...	--	--	--	--	--	--	--	--	--	--	--	--
AUG 03...	--	--	7	230	<0.5	<1	<5	<3	<10	23	<10	29
SEP 28...	0.0	40	3	170	<0.5	<1	1	<3	3	66	<5	10

DATE	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY DIS- SOLVED (UG/L AS HG)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V)	ZINC, DIS- SOLVED (UG/L AS ZN)	SEDI- MENT, SUS- PENDE (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
OCT 15...	3	<0.1	<10	2	<1	<1.0	1100	9	4	79	46	66
DEC 02...	17	<0.1	<10	<10	--	<1.0	1100	6	4	--	--	--
JAN 06...	40	<0.1	<10	<100	--	<1.0	1000	<6	<10	201	471	100
FEB 24...	18	<0.1	<10	1	<1	<1.0	1300	7	7	1200	2660	14
MAR 30...	12	<0.1	<10	<10	--	<1.0	410	<6	23	--	--	--
MAY 18...	4	0.2	<10	3	<1	1.0	1400	11	5	27	37	78
JUN 22...	--	--	--	--	--	--	--	--	--	20	10	44
AUG 03...	1	<0.1	<10	<10	--	<1.0	880	16	180	--	--	--
SEP 28...	2	0.2	<10	3	<1	<1.0	580	7	13	611	789	93

## ARKANSAS RIVER BASIN

07232500 BEAVER RIVER NEAR GUYMON, OK  
(Headwater of the North Canadian River)

LOCATION (REVISED).--Lat 36°43'17", long 101°29'21", SW 1/4 SW 1/4 sec.18, T.3 N., R.15 E., Texas County, Hydrologic Unit 11100101, near right bank on downstream side of roadway on U.S. Highway 64 at Dry Sand Draw, 1.2 mi upstream from Goff Creek, 2.5 mi north of Guymon, and at mile 650.7.

DRAINAGE AREA.--2,139 mi<sup>2</sup>, which includes that of Dry Sand Draw, and of which 964 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--October 1937 to current year. Monthly discharge only for some periods, published in WSP 1311. Prior to October 1970, published as North Canadian River near Guymon.

REVISED RECORDS.--WSP 1117: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,970.69 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records fair. Natural flow affected by irrigation development. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--51 years, 20.7 ft<sup>3</sup>/s, 15,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 55,400 ft<sup>3</sup>/s, June 15, 1964, gage height, 13.68 ft; maximum gage height, 13.82 ft, Sept 23, 1941, from floodmark; no flow at times in most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,400 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Sept. 15	1700	*3,410	*11.50	No other peak greater than base discharge.			
No flow most days.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	968
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	510
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	67
18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	26
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	17
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	13
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	11
22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	9.4
23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	5.8
24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	4.4
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	4.0
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	3.8
27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	3.7
28	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	2.4
29	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.7
30	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	1.6
31	.00	---	.00	.00	---	.00	---	.00	---	.00	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1648.80
MEAN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	55.0
MAX	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	968
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	3270

CAL YR 1987 TOTAL 57.03 MEAN .16 MAX 18 MIN .00 AC-FT 113  
WTR YR 1988 TOTAL 1648.80 MEAN 4.50 MAX 968 MIN .00 AC-FT 3270

## ARKANSAS RIVER BASIN

07232900 COLDWATER CREEK NR GUYMON, OK

LOCATION.--Lat 36°34'19", long 101°22'52", NW 1/4 NW 1/4 sec.7, T.1 N., R.16 E., Texas County, Hydrologic Unit 11100103, near left bank on downstream side of pier of bridge on county road, 0.3 mi downstream from Frisco Creek, 4.0 mi east and 7.5 mi south of Guymon, and at mile 18.0.

DRAINAGE AREA.--1,903 mi<sup>2</sup>, of which 1,178 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--October 1980 to current year.

GAGE.--Water-stage recorder. Datum of gage 2,870.83 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records good. Natural flow affected by irrigation development.

AVERAGE DISCHARGE.--8 years, 1.61 ft<sup>3</sup>/s, 1,170 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,800 ft<sup>3</sup>/s, June 20, 1982, gage height, 14.34 ft; no flow each year.

EXTREMES FOR CURRENT PERIOD.--Peak discharges greater than base discharge of 300 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
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No flow during entire year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
30	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
31	.00	---	.00	.00	---	.00	---	.00	---	.00	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MEAN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MAX	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CAL YR 1987 TOTAL 122.74 MEAN .34 MAX 61 MIN .00 AC-FT 243  
WTR YR 1988 TOTAL 0.00 MEAN .00 MAX .00 MIN .00 AC-FT .0

## ARKANSAS RIVER BASIN

07233200 OPTIMA LAKE NEAR HARDESTY, OK

LOCATION.--Lat 36°39'23", long 101°08'13", in NE 1/4 NE 1/4 sec.8, T.2 N., R.18 E., Texas County, Hydrologic Unit 11100102, in control tower for dam on Beaver River, 4.5 mi northeast of Hardesty, and at mile 623.2.

DRAINAGE AREA.--5,029 mi<sup>2</sup>, of which 2,688 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--October 1978 to current year.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS.--Reservoir is formed by earth dam having a concrete gate tower with a 12- by 16-foot, 5-inch oblong conduit. Discharges are controlled by two drum-hoist operated tractor-type service gates and a 36-inch low-flow control pipe. Closure for storage was made Oct. 2, 1978. Capacity, 618,500 acre-ft at elevation 2,814.2 ft, maximum pool; 382,500 acre-ft at elevation 2,796.0 ft, uncontrolled spillway crest; 229,500 acre-ft at elevation 2,779.0 ft, top of flood-control pool; 129,000 acre-ft at elevation 2,763.5 ft, top of conservation pool. Figures given herein represent total contents. Reservoir is used for flood control, sediment control, and water supply. Capacity table based on original survey.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 7,610 acre-ft, May 30 to June 2, 1980, elevation, 2,722.90 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 2,810 acre-ft, Sept. 19-23, elevation, 2,717.55 ft; minimum, 537 acre-ft, July 6, elevation, 2,712.05 ft.

Capacity table (elevation, in feet, and contents, in acre-ft):

2,712	526	2,716	1,890
2,713	760	2,717	2,450
2,714	1,060	2,718	3,110
2,715	1,430	2,719	3,870

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	849	748	724	713	713	713	760	910	748	584	2250	1820
2	835	748	713	713	713	713	774	910	748	584	2220	1870
3	835	736	713	713	713	713	789	910	748	572	2200	1940
4	819	736	713	713	713	713	789	910	736	572	2200	2030
5	819	736	713	713	713	713	789	910	736	561	2200	2060
6	804	736	713	713	713	713	789	894	724	537	2170	2070
7	804	736	713	713	713	713	774	894	713	1470	2170	2030
8	804	736	713	713	713	713	789	879	701	2340	2140	2000
9	804	736	713	713	713	713	789	879	701	2390	2140	2000
10	804	736	713	713	713	713	789	879	689	2450	2110	1970
11	789	736	713	713	713	713	804	879	689	2480	2110	1940
12	789	724	713	713	713	713	819	864	678	2480	2080	1940
13	789	724	713	713	713	713	819	864	678	2480	2060	1920
14	804	724	713	713	713	713	819	849	666	2450	2030	1920
15	789	724	713	713	713	713	819	849	666	2450	2030	1940
16	774	724	713	713	713	713	849	835	666	2450	2000	2110
17	774	724	713	713	713	713	894	819	654	2450	2000	2680
18	774	724	713	713	713	713	894	819	654	2420	1970	2780
19	774	724	713	713	713	713	894	819	654	2420	1970	2810
20	774	724	713	713	713	713	894	804	643	2390	1970	2810
21	774	724	713	713	713	713	894	804	631	2390	1940	2810
22	774	724	713	713	713	724	894	804	631	2390	1970	2810
23	760	724	713	713	713	724	894	804	631	2390	1920	2810
24	760	724	713	713	713	724	910	789	619	2390	1890	2780
25	760	724	713	713	713	724	910	789	619	2390	1890	2780
26	760	724	713	713	713	724	910	774	619	2360	1890	2780
27	760	724	713	713	713	724	910	760	607	2360	1870	2780
28	760	724	713	713	713	736	910	748	607	2340	1870	2750
29	760	724	713	713	713	736	910	736	596	2340	1840	2710
30	748	724	713	713	---	736	910	736	596	2310	1820	2710
31	748	---	713	713	---	736	---	748	---	2280	1820	---
MAX	849	748	724	713	713	736	910	910	748	2480	2250	2810
MIN	748	724	713	713	713	713	760	736	596	537	1820	1820
(+)	2712.95	2712.85	2712.80	2712.80	2712.80	2712.90	2713.50	2712.95	2712.30	2716.70	2715.85	2717.40
(++)	-116	-24	-11	0	0	+23	+174	-162	-152	+1,680	-460	+890
CAL YR 1987	MAX 1590	MIN 713	(++)	-717								
WTR YR 1988	MAX 2810	MIN 537	(++)	+1,850								

(+) ELEVATION, IN FEET, AT END OF MONTH  
(++) CHANGE IN CONTENTS, IN ACRE-FEET



07234000 BEAVER RIVER AT BEAVER, OK  
(Headwater of the North Canadian River)

LOCATION.--Lat 36°49'20", long 100°31'08", SW 1/4 sec.7, T.4 N., R.24 E., Beaver County, Hydrologic Unit 11100201, near right bank on downstream side of pier of bridge on U.S. Highway 270 at Beaver, 1.1 mi downstream from Home Creek, 5.0 mi upstream from Clear Creek, and at mile 576.0.

DRAINAGE AREA.--7,955 mi<sup>2</sup>, of which 4,270 mi<sup>2</sup> is probably noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1904 to December 1905 (gage heights only), October 1937 to current year. Monthly discharge only for some periods, published in WSP 1311. Published as Beaver Creek at Beaver 1904-5, and October 1937 to September 1970 as North Canadian River at Beaver.

REVISED RECORDS.--WSP 1341: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,368.16 ft, National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Mar. 29, 1904 to Dec. 31, 1905, nonrecording gage at same vicinity at different datum. Mar. 1, 1938 to Sept. 30, 1946, water-stage recorder at present site at datum 3.0 ft higher.

REMARKS.--Records fair except for periods of ice effect, which are poor. Natural flow affected by irrigation development upstream from station. Minor regulation by Optima Dam (station 07233200) 47.0 mi upstream, since Oct. 1978. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Prior to regulation by Optima Dam, 41 years (water years 1938-78), 103 ft<sup>3</sup>/s, 74,620 acre-ft/yr; since regulation by Optima Dam, 10 years (water years 1979-88), 18.8 ft<sup>3</sup>/s, 13,620 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 70,000 ft<sup>3</sup>/s, Oct. 8, 1946, maximum gage height, 14.55 ft by slope-area measurement of peak flow in overflow section and extension of rating curve for main channel above 42,000 ft<sup>3</sup>/s; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge 1,120 ft<sup>3</sup>/s, July 17, gage height, 7.28 ft; minimum daily discharge, 0.17 ft<sup>3</sup>/s, Sept. 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	54	8.5	12	e14	19	15	26	29	18	67	5.6	.19
2	44	8.4	12	e14	e14	16	38	28	16	147	4.5	.58
3	38	8.0	12	e15	e13	e17	41	25	12	52	3.6	.71
4	31	7.7	12	e15	e11	e27	39	24	135	34	2.8	.48
5	26	8.1	13	e14	e10	29	35	24	177	24	2.6	.40
6	21	8.2	13	e11	e10	38	32	22	93	19	1.9	.34
7	19	19	12	e10	e11	41	31	21	64	18	1.3	.29
8	18	19	13	e8.0	e12	35	29	19	47	20	.86	.25
9	16	16	12	e6.8	e12	33	27	18	35	18	.78	.23
10	14	15	12	e6.2	e9.8	31	27	18	28	17	.64	.22
11	14	14	12	e6.2	e9.0	29	27	18	22	15	.55	.18
12	13	14	12	e11	e15	26	26	18	18	13	.48	.17
13	12	13	13	e12	e20	25	26	17	14	11	.45	.19
14	11	13	8.9	e16	21	25	23	15	12	9.2	.41	.24
15	20	12	e8.0	e20	19	24	23	14	9.5	8.4	.38	.54
16	19	12	e7.6	e26	19	24	22	13	8.4	9.3	.35	.38
17	16	11	e7.6	e27	18	22	31	12	7.0	474	.36	.30
18	14	11	e9.0	e28	18	29	57	10	5.1	75	.36	.27
19	12	10	24	e21	17	29	60	9.9	3.1	117	.36	.24
20	11	10	25	e19	16	28	53	9.5	1.8	123	.32	.24
21	11	10	24	e13	16	27	47	9.1	1.1	60	.27	.24
22	10	10	22	e14	17	25	43	12	.67	49	.24	.23
23	9.8	9.9	22	e20	15	23	37	14	.46	37	.23	.33
24	9.2	10	20	28	15	22	35	14	.27	29	.23	.26
25	9.7	9.9	e14	25	15	20	37	12	.22	23	.22	.25
26	9.4	10	e12	24	15	19	33	9.8	.22	19	.23	.24
27	8.8	13	e11	23	15	19	30	8.9	.21	16	.20	.24
28	8.7	13	e12	22	15	19	28	9.5	.19	13	.24	.22
29	8.6	12	e12	22	15	19	28	7.7	.18	11	.23	.21
30	8.9	12	e13	21	---	19	29	7.6	7.6	8.6	.22	.24
31	8.8	---	e13	20	---	19	---	13	---	7.3	.20	---
TOTAL	525.9	347.7	425.1	532.2	431.8	774	1020	482.0	737.02	1543.8	31.11	8.90
MEAN	17.0	11.6	13.7	17.2	14.9	25.0	34.0	15.5	24.6	49.8	1.00	.30
MAX	54	19	25	28	21	41	60	29	177	474	5.6	.71
MIN	8.6	7.7	7.6	6.2	9.0	15	22	7.6	.18	7.3	.20	.17
AC-FT	1040	690	843	1060	856	1540	2020	956	1460	3060	62	18

CAL YR 1987 TOTAL 11673.30 MEAN 32.0 MAX 608 MIN .04 AC-FT 23150  
WTR YR 1988 TOTAL 6859.53 MEAN 18.7 MAX 474 MIN .17 AC-FT 13610

e Estimated

## ARKANSAS RIVER BASIN

07234000 BEAVER RIVER AT BEAVER, OK--Continued  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1952, 1958-59, 1962-63, 1968 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1967 to January 1982.

WATER TEMPERATURE: October 1967 to January 1982.

REMARKS.--Samples were collected quarterly and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	TUR- BID- ITY (NTU)	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)
NOV												
18...	1400	1028	80020	2.60	10	5600	8.20	7.0	8.5	1.4	706	10.5
FEB												
25...	1330	1028	80020	2.71	15	6220	8.20	15.5	11.0	2.8	703	10.6
APR												
12...	1028	1028	1028	2.91	25	6680	8.30	12.0	9.5	--	--	--
MAY												
11...	1100	1028	80020	2.81	18	6770	8.30	18.0	17.5	4.1	703	9.1
JUN												
15...	1800	1028	1028	2.68	9.7	4850	8.40	30.0	30.0	--	--	--
JUL												
26...	1330	1028	80020	2.78	18	5180	8.40	25.5	26.0	3.6	701	7.5

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD- NESS TOTAL (MG/L AS CAC03)	HARD- NESS NONCARB WH WAT TOT FLD (MG/L AS CAC03)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH FET FIELD (MG/L AS HC03)
NOV											
18...	99	K16	77	--	--	170	--	890	--	9.1	310
FEB											
25...	107	K6	K15	880	660	200	92	980	71	6.7	280
APR											
12...	--	--	--	--	--	--	--	--	--	--	--
MAY											
11...	106	K260	200	850	640	180	95	1000	72	9.3	250
JUN											
15...	--	--	--	--	--	--	--	--	--	--	--
JUL											
26...	103	190	97	820	600	180	90	790	67	7.0	260

DATE	CAR- BONATE WATER WH FET FIELD (MG/L AS C03)	ALKA- LINITY WAT WH TOT FET FIELD (MG/L AS CAC03)	CARBON DIOXIDE DIS- SOLVED (MG/L AS C02)	SULFATE DIS- SOLVED (MG/L AS S04)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SI02)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N)
NOV												
18...	0	252	3.1	480	1300	1.6	25	3340	--	--	--	<0.010
FEB												
25...	0	227	2.8	570	1500	1.5	21	3660	3510	4.98	152	<0.010
APR												
12...	--	--	--	--	--	--	--	--	--	--	--	--
MAY												
11...	0	206	2.0	620	1600	1.5	18	3920	3650	5.33	193	<0.010
JUN												
15...	--	--	--	--	--	--	--	--	--	--	--	--
JUL												
26...	7	229	1.7	500	1200	1.3	24	3130	2940	4.26	155	<0.010

## ARKANSAS RIVER BASIN

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07234000 BEAVER RIVER AT BEAVER, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS- PHOROUS TOTAL (MG/L AS P)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS P04)	PHOS- PHOROUS ORGANIC TOTAL (MG/L AS P)	PHOS- PHOROUS ORGANIC DIS- SOLVED (MG/L AS P)
NOV 18...	<0.100	0.030	0.050	0.06	0.17	0.20	0.020	0.020	<0.010	--	0.02	0.02
FEB 25...	<0.100	0.020	0.030	0.04	0.38	0.40	0.010	0.010	<0.010	--	0.01	0.01
APR 12...	--	--	--	--	--	--	--	--	--	--	--	--
MAY 11...	<0.100	0.040	0.020	0.03	0.26	0.30	0.020	0.010	<0.010	--	0.02	0.01
JUN 15...	--	--	--	--	--	--	--	--	--	--	--	--
JUL 26...	<0.100	0.030	0.050	0.06	0.47	0.50	0.080	0.030	0.030	0.09	0.08	0.0

DATE	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)
NOV 18...	<10	4	200	<10	1	<1	<1	1	20	<5	140	50
FEB 25...	<10	2	100	<10	1	<1	<1	3	20	<5	140	60
APR 12...	--	--	--	--	--	--	--	--	--	--	--	--
MAY 11...	<10	3	<100	<10	<1	1	1	1	30	<5	160	40
JUN 15...	--	--	--	--	--	--	--	--	--	--	--	--
JUL 26...	<10	7	200	<10	1	<1	1	1	20	<5	120	20

DATE	MERCURY DIS- SOLVED (UG/L AS HG)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V)	ZINC, DIS- SOLVED (UG/L AS ZN)	SEDI- MENT, SUS- PENDE (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY)	SED. SIEVE DIAM. % FINER THAN .062 MM
NOV 18...	0.2	5	1	<1	<1.0	3600	16	<10	14	0.40	70
FEB 25...	<0.1	6	<1	<1	5.0	4100	21	10	16	0.67	83
APR 12...	--	--	--	--	--	--	--	--	--	--	--
MAY 11...	0.2	4	<1	<1	1.0	4000	22	10	21	1.0	46
JUN 15...	--	--	--	--	--	--	--	--	--	--	--
JUL 26...	<0.1	4	2	<1	1.0	3500	<1	10	26	1.3	73

07234100 CLEAR CREEK NEAR ELMWOOD, OK

LOCATION.--Lat 36°38'42", long 100°30'07", SW 1/4 SW 1/4 sec.8, T.2 N., R.24 E., Beaver County, Hydrologic Unit 11100201, on downstream side of concrete pier of county road bridge, 2.8 mi northeast of Elmwood, and at mile 16.9.

DRAINAGE AREA.--170 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1965 to current year.

REVISED RECORDS.--WSP 2121: 1966.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 2,541.26 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Low flows sustained by nearby springs; natural flows affected by diversion ponds and occasional diversion for irrigation.

AVERAGE DISCHARGE.--23 years, 5.90 ft<sup>3</sup>/s, 4,270 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,000 ft<sup>3</sup>/s, Oct. 16, 1969, gage height, 13.97 ft, from floodmark, from rating curve extended above 12,500 ft<sup>3</sup>/s, on basis of slope-area measurement at gage height, 13.15 ft; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
June 30	2330	*653	*7.21	No other peak greater than base discharge.			

Minimum daily discharge, 0.85 ft<sup>3</sup>/s, Aug. 16, 17, 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.4	1.9	1.8	2.0	1.8	1.9	3.4	3.2	3.1	79	1.2	1.1
2	1.3	2.0	1.7	2.0	1.9	2.5	2.7	3.2	2.6	2.9	1.1	1.6
3	1.3	2.1	1.7	1.9	1.9	2.4	2.4	3.0	2.5	2.1	1.1	1.5
4	1.3	2.0	1.7	1.7	1.9	2.2	2.4	3.1	2.5	1.8	1.1	1.2
5	1.3	2.0	1.7	1.7	1.8	2.4	2.4	3.1	2.4	1.6	1.3	1.1
6	1.3	2.0	1.7	1.8	1.9	2.4	2.4	2.9	2.4	1.5	1.2	1.1
7	1.4	2.2	1.7	1.7	1.9	2.5	2.5	2.4	2.4	1.7	1.1	1.0
8	1.4	2.0	1.7	1.6	1.8	2.4	2.5	2.3	2.3	1.7	1.0	.98
9	1.4	2.0	1.7	1.6	1.9	2.4	2.4	2.3	2.2	1.5	1.1	.97
10	1.5	2.1	1.7	1.6	1.9	2.4	2.5	2.2	2.2	1.4	1.1	.97
11	1.6	2.1	1.8	1.6	1.8	2.4	2.4	2.3	2.1	1.3	1.1	.92
12	1.6	2.1	1.9	1.7	1.8	2.4	2.5	2.3	2.1	1.2	1.0	.91
13	1.6	2.1	2.0	1.6	1.8	2.2	2.5	2.3	2.1	1.1	1.1	1.0
14	1.6	1.9	2.3	1.6	1.8	2.5	2.5	2.2	2.0	1.1	.96	1.1
15	2.0	1.9	2.1	1.7	1.9	2.4	2.6	2.1	2.1	1.0	.88	1.3
16	1.5	1.9	2.0	1.8	1.8	2.4	2.6	2.1	2.0	1.7	.85	1.3
17	1.5	1.9	2.0	1.8	1.8	2.7	3.4	2.1	1.9	12	.85	1.2
18	1.5	1.9	2.2	1.9	1.8	2.4	3.5	2.1	1.8	1.8	.93	1.2
19	1.6	1.8	2.2	1.8	1.8	2.5	3.0	2.1	1.5	1.9	1.2	1.3
20	1.5	1.8	2.1	1.7	1.7	2.4	3.0	2.2	1.3	1.6	1.1	1.2
21	1.5	1.8	2.0	1.7	1.8	2.3	3.0	2.4	1.3	1.5	1.1	1.2
22	1.6	1.7	2.0	1.7	1.9	2.3	2.9	2.8	1.2	1.4	.98	1.2
23	1.6	1.7	2.0	1.7	1.8	2.2	2.8	2.8	1.2	1.3	.92	1.5
24	1.7	1.8	2.0	1.7	1.8	2.3	3.3	2.7	1.1	1.3	.92	1.6
25	1.7	1.7	2.1	1.8	1.9	2.2	3.6	2.6	1.1	1.3	.85	1.4
26	1.7	1.8	2.1	1.8	1.9	2.2	3.1	2.5	1.1	1.3	.93	1.4
27	1.7	1.9	2.0	1.8	1.9	2.2	3.1	2.5	1.1	1.4	.93	1.3
28	1.7	1.8	2.0	1.8	1.8	2.3	3.2	2.4	1.0	1.3	1.1	1.3
29	1.8	1.7	2.1	1.9	1.9	2.4	3.4	2.4	.96	1.2	1.1	1.3
30	1.9	1.8	2.1	1.9	---	2.3	3.2	2.4	28	1.2	1.1	1.4
31	1.9	---	2.1	1.9	---	2.3	---	3.7	---	1.2	1.0	---
TOTAL	48.4	57.4	60.2	54.5	53.4	72.8	85.2	78.7	81.56	134.3	32.20	36.55
MEAN	1.56	1.91	1.94	1.76	1.84	2.35	2.84	2.54	2.72	4.33	1.04	1.22
MAX	2.0	2.2	2.3	2.0	1.9	2.7	3.6	3.7	28	79	1.3	1.6
MIN	1.3	1.7	1.7	1.6	1.7	1.9	2.4	2.1	.96	1.0	.85	.91
AC-FT	96	114	119	108	106	144	169	156	162	266	64	72

CAL YR 1987 TOTAL 654.49 MEAN 1.79 MAX 6.9 MIN .91 AC-FT 1300  
WTR YR 1988 TOTAL 795.21 MEAN 2.17 MAX 79 MIN .85 AC-FT 1580

## 07236500 FORT SUPPLY LAKE NEAR FORT SUPPLY, OK

LOCATION.--Lat 36°33'14", long 99°34'16", in NE 1/4 SE 1/4 sec.17, T.24 N., R.22 W., Woodward County, Hydrologic Unit 11100203, in control tower at left end of Fort Supply Dam on Wolf Creek, 1.5 mi south of Fort Supply and at mile 5.5.

DRAINAGE AREA.--1,735 mi<sup>2</sup>, of which 241 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--June 1942 to current year. Prior to October 1970, published as Fort Supply Reservoir near Fort Supply.

REVISED RECORDS.--WSP 1117: Drainage area.

GAGE.--Water-stage recorder. Datum of gage at National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by an earth dam. Outlet works consist of a 540-foot uncontrolled gravity-type concrete weir, one 36-inch diameter gated bypass, and one 18-foot oval-shaped conduit controlled by three vertical-lift sluice gates. Regulated storage began May 4, 1942; conservation pool first filled in June 1942. Capacity, 100,700 acre-ft at elevation 2,028.0 ft, crest of spillway, 13,890 acre-ft at elevation 2,004.0 ft, conservation pool designated in 1965. No storage below elevation 1,987.0 ft. Figures given herein represent total contents. Reservoir is used for flood control and conservation. Revised capacity table, based on survey in 1969, used since Oct. 1, 1972. U.S. Army Corps of Engineers' satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 99,500 acre-ft, June 25, 1957, elevation, 2,026.97 ft; no contents at times November 1942 to January 1943.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 16,220 acre-ft, Oct. 1, elevation, 2,005.19 ft; minimum, 13,370 acre-ft, Nov. 8, elevation 2,003.71 ft.

Capacity table (elevation, in feet, and contents, in acre-ft):

2,003	12,080	2,006	17,890
2,004	13,890	2,007	20,100
2,005	15,830	2,008	22,490

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15970	14160	13650	14160	13730	13470	14010	14030	14570	14450	13840	14220
2	15670	14220	13640	14030	13760	13730	14120	13760	14920	14410	13800	14200
3	15380	14140	13620	13870	13760	14220	14140	13710	15170	14360	13780	14080
4	15050	14010	13690	13730	13780	14410	14050	13670	15110	14320	13750	13970
5	14670	13930	13780	13670	13800	14550	13870	13650	15020	14220	13760	13870
6	14320	13840	13870	13750	13800	14630	13750	13710	14900	14140	13760	13780
7	13990	13650	14030	13710	13800	14760	13710	13620	14740	14060	13750	13730
8	13850	13420	14080	13650	13850	14840	13670	13530	14570	14180	13820	13690
9	13910	13460	14120	13650	13950	14760	13650	13530	14410	14300	13840	13710
10	13990	13550	14120	13670	13780	14570	13710	13560	14240	14340	13850	13730
11	14080	13670	14080	13710	13850	14370	13730	13580	14050	14470	13870	13780
12	14180	13730	14060	13730	13850	14180	13750	13600	13870	14390	13910	13690
13	14320	13800	14060	13760	13950	13990	13780	13650	13640	14160	13840	13710
14	14280	14050	14220	13820	13950	13850	13760	13620	13580	13970	13850	13760
15	14360	14030	14240	13890	14050	13870	13780	13580	13620	13870	13820	14080
16	14160	14080	14200	13970	13970	13870	13800	13580	13650	13840	13780	14260
17	13970	14100	14220	14080	14010	14140	13990	13600	13710	13970	13990	14370
18	13750	14050	14240	14220	14030	14140	14160	13560	13760	14050	13990	14470
19	13640	13950	14360	14140	14030	14010	14280	13530	13760	14080	14050	14410
20	13670	13910	14450	13930	14030	13910	14240	13530	13760	14160	14120	14320
21	13750	14030	14530	13710	14060	13950	14080	13530	13760	14220	14100	14180
22	13690	13820	14610	13580	13970	14100	13950	13600	13750	14200	14080	13950
23	13760	13800	14550	13550	13930	14100	13970	13710	13780	14050	14080	13840
24	13800	13760	14470	13510	13850	14060	14060	13800	13800	13970	14080	13780
25	13840	13760	14450	13530	13780	13930	14180	13870	13840	13890	14120	13730
26	13870	13750	14490	13550	13710	14030	14220	13970	13990	13780	14120	13690
27	13910	13750	14450	13600	13650	14240	14160	13950	14140	13780	14120	13850
28	13970	13730	14410	13670	13550	13990	13950	13930	14280	13850	14120	13780
29	13990	13710	14370	13800	13530	14140	13870	13950	14340	13840	14140	13850
30	14140	13670	14370	13730	---	13950	13890	13870	14410	13840	14140	13930
31	14080	---	14300	13730	---	13760	---	14300	---	13840	14120	---
MAX	15970	14220	14610	14220	14060	14840	14280	14300	15170	14470	14140	14470
MIN	13640	13420	13620	13510	13530	13470	13650	13530	13580	13780	13750	13690
(+)	2004.10	2003.88	2004.21	2003.91	2003.80	2003.93	2004.00	2004.21	2004.27	2003.97	2004.12	2004.02
(++)	-2,140	-410	+630	-570	-200	+230	+130	+410	+110	-570	+280	-190
CAL YR 1987	MAX 18820	MIN 13080	(++)	-40								
WTR YR 1988	MAX 15970	MIN 13420	(++)	-2,290								

(+) ELEVATION, IN FEET, AT END OF MONTH

(++) CHANGE IN CONTENTS, IN ACRE-FEET



## ARKANSAS RIVER BASIN

07237000 WOLF CREEK NEAR FORT SUPPLY, OK

LOCATION.--Lat 36°34'00", long 99°33'05", SE 1/4 SE 1/4 sec.9, T.24 N., R.22 W., Woodward County, Hydrologic Unit 11100203, on left bank on downstream side of U.S. Highway 270, 1.0 mi southeast of Fort Supply, 1.6 mi downstream from Fort Supply Dam, and at mile 3.9.

DRAINAGE AREA.--1,739 mi<sup>2</sup>, of which 241 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--October 1937 to current year. Prior to October 1, 1941, published as "Near Supply".

REVISED RECORDS.--WSP 1117: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,958.38 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). See WSP 1921 for history of changes prior to Sept. 30, 1962.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Flow completely regulated since May 1942 by Fort Supply Lake (station 07236500).

AVERAGE DISCHARGE.--Prior to regulation by Fort Supply Lake, 5 years (water years 1938-42), 104 ft<sup>3</sup>/s, 73,350 acre-ft/yr; since regulation by Fort Supply Lake, 46 years (water years 1943-88), 55.2 ft<sup>3</sup>/s, 39,990 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,200 ft<sup>3</sup>/s, June 24, 1939, gage height, 15.60 ft, present datum, from rating curve extended above 8,000 ft<sup>3</sup>/s; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--A stage of 19.6 ft, present datum, was reached prior to October 1937, from information provided by Oklahoma State Highway Department.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 207 ft<sup>3</sup>/s, Oct. 1, gage height, 6.69 ft; minimum daily discharge, .57 ft<sup>3</sup>/s, Aug. 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	206	26	61	122	63	84	190	123	11	15	1.5	55
2	203	26	61	122	63	69	189	122	3.8	52	4.0	55
3	199	54	60	123	62	69	189	121	11	53	2.4	60
4	198	87	30	123	62	91	190	120	117	54	1.8	62
5	195	87	3.7	89	62	128	e190	111	117	54	1.7	61
6	194	86	2.9	63	62	129	e190	90	118	54	1.5	61
7	192	86	2.4	63	61	130	e155	90	119	53	1.5	36
8	98	61	2.3	62	61	158	e125	89	120	43	1.8	3.0
9	5.2	22	29	62	63	190	e96	80	120	29	1.6	2.2
10	3.8	5.0	53	62	64	191	e94	65	119	29	1.4	2.3
11	3.2	3.0	55	62	64	191	e93	65	119	29	1.3	2.1
12	3.1	2.6	55	62	65	190	92	65	119	70	3.2	1.8
13	2.9	2.3	55	61	65	190	92	65	118	126	2.4	1.6
14	29	2.3	57	58	65	161	92	64	72	127	1.7	1.5
15	56	2.3	59	58	65	94	93	64	29	73	1.5	2.7
16	92	2.3	59	58	65	92	93	63	28	4.3	1.4	2.0
17	125	e45	59	57	65	93	94	63	28	3.4	1.9	1.6
18	125	68	59	58	64	132	94	62	28	2.7	1.8	1.4
19	86	75	59	105	64	186	94	62	28	2.6	1.0	29
20	34	66	59	176	64	190	120	47	28	2.3	1.6	77
21	27	58	59	178	65	156	189	31	28	2.3	.83	89
22	27	58	68	123	75	122	145	30	28	21	.67	89
23	27	58	76	94	96	118	96	30	20	53	.75	83
24	27	58	76	93	95	125	95	30	3.7	53	.58	63
25	27	61	76	79	94	145	95	30	2.7	53	3.3	62
26	27	61	76	65	94	94	95	30	3.2	54	1.0	45
27	26	61	76	64	94	90	141	36	3.3	37	.64	4.2
28	26	61	76	64	94	89	189	57	2.4	3.7	.62	2.8
29	26	61	76	63	94	88	158	57	2.3	2.4	.57	1.9
30	26	61	76	63	---	136	125	56	2.1	2.0	.57	1.8
31	26	---	102	63	---	185	---	34	---	1.8	19	---
TOTAL	2342.2	1406.8	1718.3	2595	2070	4106	3893	2052	1548.5	1159.5	65.53	959.9
MEAN	75.6	46.9	55.4	83.7	71.4	132	130	66.2	51.6	37.4	2.11	32.0
MAX	206	87	102	178	96	191	190	123	120	127	19	89
MIN	2.9	2.3	2.3	57	61	69	92	30	2.1	1.8	.57	1.4
AC-FT	4650	2790	3410	5150	4110	8140	7720	4070	3070	2300	130	1900

CAL YR 1987 TOTAL 30924.8 MEAN 84.7 MAX 477 MIN 1.9 AC-FT 61340  
WTR YR 1988 TOTAL 23916.73 MEAN 65.3 MAX 206 MIN .57 AC-FT 47440

e Estimated

## 07237500 NORTH CANADIAN RIVER AT WOODWARD, OK

LOCATION.--Lat 36°26'12", long 99°16'41", SW 1/4 SW 1/4 sec.30, T.23 N., R.19 W., Woodward County, Hydrologic Unit 11100301, near right bank on downstream side of pier of bridge on State Highway 15, 200 ft downstream from The Atchison, Topeka and Santa Fe Railway Co. bridge, 6.0 mi east of Woodward, 7.2 mi upstream from Indian Creek, 27.5 mi downstream from Wolf Creek, and at mile 460.2.

DRAINAGE AREA.--11,589 mi<sup>2</sup>, of which 4,812 mi<sup>2</sup> is probably noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1903 to September 1905 (gage heights only), October 1905 to June 1906, October 1938 to current year. Monthly discharge only for some periods, published in WSP 1311. Published as Canadian River (North Fork) near Woodward 1903-06. Gage-height records collected in this vicinity since 1919 are contained in reports of National Weather Service.

REVISED RECORDS.--WSP 1341: Drainage area. WSP 1731: 1951(M).

GAGE.--Water-stage recorder. Datum of gage is 1,829.95 ft above National Geodetic Vertical Datum of 1929.

Prior to July 1906, nonrecording gage at railway bridge 200 ft upstream at different datum. Oct. 1, 1938 to Oct. 26, 1943, nonrecording gage and Oct. 27, 1943 to July 12, 1951, water-stage recorder, at site 7.8 mi upstream at datum 37.01 ft higher than present datum.

REMARKS.--Records good except for periods of ice effect which are poor. Some regulation since May 1942 by Fort Supply Lake (station 07236500) on Wolf Creek, 33.0 mi upstream. Flow regulated since October 1978 by Optima Lake (station 07233200), 163.0 mi upstream. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Prior to regulation by Optima Lake, 40 years (water years 1939-78), 194 ft<sup>3</sup>/s, 140,600 acre-ft/yr; since regulation by Optima Lake, 10 years (water years 1979-88), 117 ft<sup>3</sup>/s, 84,770 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 42,000 ft<sup>3</sup>/s Oct. 10, 1946, gage height, 9.80 ft, site and datum then in use; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Oct. 12, 1923, reached a stage of 11.0 ft, site and datum then in use; from reports of National Weather Service.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 574 ft<sup>3</sup>/s, Apr. 1, gage height, 6.12 ft; minimum daily discharge, 16 ft<sup>3</sup>/s, Aug. 31, Sept. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	354	76	107	169	162	171	494	352	221	67	60	16
2	319	76	107	185	154	245	551	349	197	63	54	42
3	308	74	108	186	151	265	556	332	167	94	50	58
4	297	86	108	185	147	249	525	317	152	104	47	62
5	289	114	94	183	147	281	503	305	212	108	44	66
6	277	119	75	e170	141	340	480	286	213	110	41	66
7	271	122	69	e183	136	370	464	261	211	105	38	65
8	267	125	67	e146	142	403	417	252	215	102	36	55
9	192	124	65	e164	148	457	341	242	225	97	36	33
10	114	98	69	e211	150	472	323	228	218	88	35	25
11	94	72	89	e326	140	453	312	211	211	106	33	21
12	85	67	92	340	134	443	304	204	206	97	32	18
13	80	65	95	e202	146	423	297	198	199	118	30	17
14	76	63	104	e179	155	407	290	192	199	156	30	17
15	82	62	102	e162	153	363	285	185	163	155	29	46
16	104	60	96	e157	151	304	278	182	132	120	27	44
17	128	59	e88	169	150	306	300	178	122	138	27	30
18	161	71	107	182	148	297	363	172	114	101	28	28
19	166	104	142	191	146	359	356	168	107	73	31	27
20	136	110	150	242	145	456	348	166	101	68	e26	25
21	98	106	145	289	144	480	367	153	96	113	e23	62
22	90	99	144	286	145	481	428	138	91	149	e21	79
23	87	97	150	238	155	419	374	136	87	138	e20	88
24	84	97	158	208	168	392	320	137	81	151	e19	89
25	81	97	155	200	168	383	365	134	71	143	e18	77
26	80	99	148	185	171	387	342	131	68	134	e18	74
27	79	105	148	173	173	322	329	124	69	129	e21	70
28	77	106	146	171	174	302	359	124	71	112	e19	48
29	76	107	143	170	173	293	403	137	73	84	18	40
30	77	107	146	171	---	288	384	137	67	73	18	36
31	77	---	152	168	---	335	---	192	---	67	16	---
TOTAL	4706	2767	3569	6191	4417	11146	11458	6323	4359	3363	945	1424
MEAN	152	92.2	115	200	152	360	382	204	145	108	30.5	47.5
MAX	354	125	158	340	174	481	556	352	225	156	60	89
MIN	76	59	65	146	134	171	278	124	67	63	16	16
AC-FT	9330	5490	7080	12280	8760	22110	22730	12540	8650	6670	1870	2820

CAL YR 1987 TOTAL 71831 MEAN 197 MAX 867 MIN 30 AC-FT 142500  
WTR YR 1988 TOTAL 60668 MEAN 166 MAX 556 MIN 16 AC-FT 120300

e Estimated

## ARKANSAS RIVER BASIN

07237500 NORTH CANADIAN RIVER AT WOODWARD, OK--Continued  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1955, 1958-59, 1961-63, 1975 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1974 to January 1982.

WATER TEMPERATURE: October 1974 to January 1982.

REMARKS.--Samples were collected bimonthly and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	TUR- BID- ITY (NTU)	BARO- METRIC PRES- SURE (MM OF HG)
OCT											
02...	1200	1028	1028	4.91	318	1000	8.20	16.0	18.0	--	--
NOV											
17...	1330	1028	80020	3.30	60	2220	8.20	13.0	9.0	0.70	710
JAN											
22...	1400	1028	80020	4.74	289	*1590	8.30	7.0	1.5	48	715
MAR											
02...	1130	1028	80020	4.73	280	1560	8.10	8.0	9.0	32	706
MAY											
10...	1030	1028	80020	4.53	232	2060	8.30	20.0	18.5	16	714
JUL											
25...	1400	1028	80020	3.94	143	1720	8.50	29.5	28.0	87	714
SEP											
07...	1400	1028	80020	3.29	65	*1280	8.40	21.0	28.5	57	707
DATE		OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD- NESS TOTAL (MG/L AS CAC03)	HARD- NESS NONCARB WH WAT TOT FLD (MG/L AS CAC03)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM AD- SORP- TION RATIO
OCT											
02...	--	--	--	--	--	--	--	--	--	--	--
NOV											
17...	11.1	104	K15	K23	590	340	150	51	270	50	5
JAN											
22...	12.8	98	K23	K110	410	180	110	34	170	48	4
MAR											
02...	9.5	89	810	7200	370	200	100	30	160	48	4
MAY											
10...	8.4	96	54	69	520	300	130	47	250	51	5
JUL											
25...	8.4	116	K8300	800	370	190	92	33	200	54	5
SEP											
07...	8.4	118	1000	850	340	160	80	33	150	49	4

\*SPECIFIC CONDUCTANCE, LAB (US/CM)

## ARKANSAS RIVER BASIN

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07237500 NORTH CANADIAN RIVER AT WOODWARD, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH FET FIELD (MG/L AS HCO3)	CAR- BONATE WATER WH FET FIELD (MG/L AS CO3)	ALKA- LINITY WAT WH TOT FET FIELD (MG/L AS CACO3)	CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SiO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L)
OCT 02...	--	--	--	--	--	--	--	--	--	--	--
NOV 17...	5.4	300	0	245	3.0	370	400	0.90	27	1470	1430
JAN 22...	5.2	280	0	231	2.2	180	260	0.70	23	957	924
MAR 02...	5.1	210	0	175	2.7	200	220	0.60	17	857	842
MAY 10...	4.8	270	0	219	2.1	290	390	0.80	19	1290	1270
JUL 25...	7.9	210	5	180	1.1	200	340	0.70	19	1080	1010
SEP 07...	4.6	180	15	173	1.2	200	200	0.70	20	808	811

DATE	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS NO2)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N)
OCT 02...	--	--	--	--	--	--	--	--	--	--
NOV 17...	2.00	238	--	<0.010	--	0.550	0.140	0.150	0.19	0.26
JAN 22...	1.30	747	--	<0.010	--	0.520	0.110	0.100	0.13	0.59
MAR 02...	1.17	648	0.660	0.030	0.10	0.690	0.290	0.300	0.39	2.4
MAY 10...	1.75	808	0.140	0.020	0.07	0.160	0.040	0.020	0.03	0.36
JUL 25...	1.47	417	--	<0.010	--	<0.100	0.020	0.020	0.03	1.8
SEP 07...	1.10	142	--	<0.010	--	0.300	<0.010	0.040	0.05	--

DATE	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS- PHOROUS TOTAL (MG/L AS P)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4)	PHOS- PHOROUS ORGANIC TOTAL (MG/L AS P)	PHOS- PHOROUS ORGANIC DIS- SOLVED (MG/L AS P)	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)
OCT 02...	--	--	--	--	--	--	--	--	--	--
NOV 17...	0.40	0.070	0.070	0.040	0.12	0.07	0.03	<10	2	300
JAN 22...	0.70	0.160	0.040	0.010	0.03	0.16	0.03	--	--	--
MAR 02...	2.7	0.460	0.080	0.080	0.25	0.46	0.0	<10	2	120
MAY 10...	0.40	--	0.010	<0.010	--	--	0.01	<10	3	100
JUL 25...	1.8	0.200	0.030	0.020	0.06	0.20	0.01	--	--	--
SEP 07...	0.40	0.160	0.050	0.020	0.06	0.16	0.03	80	5	130

## ARKANSAS RIVER BASIN

07237500 NORTH CANADIAN RIVER AT WOODWARD, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	BERYL- LIUM, DIS- SOLVED (UG/L AS BE)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY DIS- SOLVED (UG/L AS HG)
OCT 02...	--	--	--	--	--	--	--	--	--	--
NOV 17...	<10	<1	1	<1	1	<10	<5	60	20	0.1
JAN 22...	--	--	--	--	--	--	--	--	--	--
MAR 02...	<0.5	1	<1	<3	1	8	<5	44	2	<0.1
MAY 10...	<10	1	<1	<1	2	10	<5	60	10	<0.1
JUL 25...	--	--	--	--	--	--	--	--	--	--
SEP 07...	<0.5	2	<1	<3	<1	66	<5	45	9	<0.1
DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V)	ZINC, DIS- SOLVED (UG/L AS ZN)	SEDI- MENT, SUS- PENDE (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
OCT 02...	--	--	--	--	--	--	--	--	--	--
NOV 17...	3	<1	<1	<1.0	1800	6	<10	10	1.6	62
JAN 22...	--	--	--	--	--	--	--	143	112	71
MAR 02...	<10	<1	<1	<1.0	1000	6	14	929	702	82
MAY 10...	3	<1	<1	<1.0	1500	9	10	113	71	40
JUL 25...	--	--	--	--	--	--	--	252	97	89
SEP 07...	<10	<1	<1	1.0	1000	7	8	145	25	79



## 07238000 NORTH CANADIAN RIVER NEAR SEILING, OK

LOCATION.--Lat 36°11'00", long 98°55'15", in NW 1/4 sec.28, T.20 N., R.16 W., Major County, Hydrologic Unit 11100301, near center of span on downstream side of pier of bridge on U.S. Highway 60, 2.0 mi upstream from Seiling Creek, 2.2 mi north of Seiling, 2.8 mi downstream from Deep Creek, and at mile 422.6.

DRAINAGE AREA.--12,261 mi<sup>2</sup>, of which 4,847 mi is probably noncontributing.

PERIOD OF RECORD.--July 1946 to current year.

REVISED RECORDS.--WSP 1341: Drainage area. WSP 1731: 1951 (M).

GAGE.--Water-stage recorder. Datum of gage is 1,675.53 ft above National Geodetic Vertical Datum of 1929. July 1, 1946 to Aug. 17, 1964, at site 60 ft downstream and prior to Oct. 1, 1954, at datum 5.00 ft higher.

REMARKS.--Records good except for estimated winter periods which are poor. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Some regulation since May 1942 by Fort Supply Lake (station 07236500) on Wolf Creek, 70.6 mi upstream. Flow regulated since October 1978 by Optima Lake (07233200), 201.0 mi upstream. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Prior to regulation by Optima Lake, 32 years (water years 1947-78), 215 ft<sup>3</sup>/s, 155,800 acre-ft/yr; since regulation by Optima Lake, 10 years (water years 1979-88), 153 ft<sup>3</sup>/s, 110,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 33,000 ft<sup>3</sup>/s, May 19, 1951, gage height, 15.61 ft, present datum; maximum gage height, 16.00 ft, Oct. 11, 1946, present datum; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 820 ft<sup>3</sup>/s, Mar. 7, gage height, 7.94 ft; minimum daily discharge, 14 ft<sup>3</sup>/s, Sept. 1, 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	370	115	164	215	268	253	543	535	369	96	67	14
2	312	114	164	224	254	281	760	492	415	90	61	14
3	284	113	165	242	244	489	744	468	329	86	56	22
4	276	111	165	234	234	504	672	437	278	105	51	42
5	270	115	165	224	225	467	628	419	240	118	49	47
6	263	147	151	e224	209	505	589	404	290	117	46	50
7	258	154	127	e210	215	700	568	383	287	118	41	50
8	256	e159	122	e200	219	702	552	362	284	117	37	48
9	254	164	117	e194	229	588	505	350	277	122	40	46
10	207	162	115	e196	236	584	439	342	279	121	39	32
11	151	135	119	e200	213	572	420	326	268	104	36	23
12	133	109	139	e240	215	542	409	308	255	110	32	18
13	122	102	144	e231	226	519	402	300	248	142	29	15
14	114	100	160	e242	235	497	394	291	244	119	26	18
15	108	101	e130	e270	242	483	385	281	251	163	24	24
16	110	99	e134	e275	239	443	378	273	250	173	22	39
17	129	99	150	e280	234	414	393	267	211	147	20	49
18	147	98	175	e270	229	409	464	258	176	148	19	41
19	176	109	199	e300	226	419	524	248	154	141	20	40
20	182	141	260	e323	222	525	486	240	139	87	27	34
21	164	152	267	e340	219	620	463	244	129	78	23	31
22	132	152	234	e350	214	597	474	228	118	102	19	41
23	125	147	221	370	211	570	511	216	112	154	19	67
24	123	148	220	328	221	516	457	217	106	140	19	81
25	119	147	218	304	235	483	560	213	102	161	17	85
26	118	149	200	292	239	471	597	204	98	150	16	75
27	116	159	185	276	243	463	502	194	112	142	15	70
28	114	164	191	268	247	411	459	183	111	142	18	67
29	114	166	197	270	250	393	497	178	95	123	20	49
30	114	166	209	273	---	381	566	185	94	89	18	41
31	116	---	217	274	---	380	---	200	---	75	16	---
TOTAL	5477	3997	5424	8139	6693	15181	15341	9246	6321	3780	942	1273
MEAN	177	133	175	263	231	490	511	298	211	122	30.4	42.4
MAX	370	166	267	370	268	702	760	535	415	173	67	85
MIN	108	98	115	194	209	253	378	178	94	75	15	14
AC-FT	10860	7930	10760	16140	13280	30110	30430	18340	12540	7500	1870	2520

CAL YR 1987 TOTAL 100097 MEAN 274 MAX 2040 MIN 28 AC-FT 198500  
WTR YR 1988 TOTAL 81814 MEAN 224 MAX 760 MIN 14 AC-FT 162300

e Estimated

## ARKANSAS RIVER BASIN

07238500 CANTON LAKE NEAR CANTON, OK

LOCATION.--Lat 36°05'03", long 98°36'05", in SE 1/4 NE 1/4 sec.32, T.19 N., R.13 W., Blaine County, Hydrologic Unit 11100301, near right end of Canton Dam on North Canadian River, 2.0 mi northwest of Canton, and at mile 394.3.

DRAINAGE AREA.--12,483 mi<sup>2</sup>, of which 4,883 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--April 1948 to current year. Prior to October 1970, published as Canton Reservoir near Canton.

REVISED RECORDS.--WSP 1341: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by an earth dam. The outlet works consists of a concrete gravity, chute-type weir spillway controlled by 16 taintor gates with net length of 640 ft, three sluice gates and two 24-inch valved pipes. Regulated storage began Apr. 15, 1948; conservation pool was first filled July 4, 1948. Capacity, 377,100 acre-ft at elevation 1,638.0 ft (flood-control pool), 109,700 acre-ft at elevation 1,615.2 ft. (Normal water-supply pool designated in 1965), 93,180 acre-ft at elevation 1,613.0 ft (crest of spillway), and 14,140 acre-ft at elevation 1,596.5 ft (conservation pool). Figures given herein represent total contents. Reservoir was designed for flood control, irrigation, and conservation, but owing to a lack of facilities, it is not being used for irrigation at this time. Revised capacity table, based on survey in 1980, used since Oct. 1, 1981. U.S. Army Corps of Engineers' satellite telemeter at site.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 258,600 acre-ft, May 25, 1951, elevation, 1,628.05 ft; minimum since conservation pool was first filled, 867 acre-ft, May 5, 1955, elevation, 1,585.66 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 120,400 acre-ft, Apr. 5, elevation, 1,616.52 ft; minimum, 77,840 acre-ft, Sept. 13, elevation, 1,610.77 ft.

Capacity table (elevation, in feet, and contents, in acre-ft):

1,609	66,710	1,615	108,200
1,611	79,350	1,617	124,400
1,613	93,180	1,619	142,000

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	114000	112000	112000	111000	112200	111600	114800	111400	113500	114300	83110	79020
2	114400	111900	112200	110600	111600	114300	116000	112000	113700	114200	82830	79020
3	114800	112000	112200	110300	111400	115100	117300	111800	113400	114300	82770	78950
4	114900	112000	112300	110100	111000	115600	118800	111700	112900	114400	82700	78690
5	115500	111700	112500	110300	110700	116000	119700	111500	112400	114400	82700	78630
6	115900	111000	112700	110900	110000	115800	119900	111200	111800	114400	82630	78500
7	116100	111400	112600	110700	110300	116400	119500	111000	111400	114400	82560	78170
8	116400	111900	112700	110400	110500	116300	118900	111200	111200	114500	82460	78300
9	116000	111600	112600	110200	110800	116000	118000	110900	111000	114700	82360	78300
10	115200	111200	112500	110100	111800	115700	116600	111000	110900	114800	82230	78230
11	114300	111100	112300	110100	111400	115800	115400	111600	110700	114800	82160	78100
12	113400	111000	112100	110300	111600	115100	114200	112000	110600	113800	81960	78170
13	112600	111100	112600	110500	111700	114500	113100	112400	110500	111700	81830	78040
14	112300	110800	113100	110900	112600	114000	112200	112700	111400	109200	81760	78060
15	112000	111000	112800	111200	112700	113600	111600	113300	111500	106900	81630	78360
16	112000	111200	112400	111700	113100	113200	111200	113600	112000	105200	81490	78300
17	111800	111000	112000	112200	113200	113200	111600	113500	112300	103500	81420	78430
18	112000	111000	112100	113000	112900	112300	111400	112500	112400	102400	81290	80080
19	111900	111000	113700	113700	112400	111200	111200	111400	112500	100600	81220	80080
20	111700	110900	113900	114500	111800	110500	111300	111900	112600	98450	81090	80020
21	111500	110600	114200	115200	111100	110100	111500	112300	112500	96380	80960	80020
22	111700	111100	114000	115200	111200	110300	111500	112300	112700	94200	80890	80020
23	112000	111200	114100	115000	111100	111200	111100	112500	112700	91960	80750	80290
24	112200	111300	114100	115000	111100	111900	111900	112500	112700	90110	80550	80080
25	112500	111300	114100	114500	111200	112400	111600	112500	112900	88280	80490	80080
26	112600	111700	113500	114200	111200	112600	111600	112500	113600	86330	80080	80150
27	112400	112000	113000	113800	111300	112500	111500	112300	113700	84680	80080	80080
28	112100	111800	112600	113200	111500	113700	111200	112300	113800	83450	79680	80290
29	112200	111900	111900	112800	111400	113500	111600	112000	113800	83310	79410	80080
30	112200	112000	111700	112700	---	113500	111600	112000	114300	83380	79240	80020
31	112000	---	111200	112600	---	113800	---	113400	---	83240	79090	---
MAX	116400	112000	114200	115200	113200	116400	119900	113600	114300	114800	83110	80290
MIN	111500	110600	111200	110100	110000	110100	111100	110900	110500	83240	79090	78040
(+)	1615.49	1615.49	1615.39	1615.56	1615.41	1615.71	1615.44	1615.66	1615.77	1611.58	1610.96	1611.10
(++)	-1,800	0	-800	+1,400	-1,200	+2,400	-2,200	+1,800	+900	-31,060	-4,150	+930
CAL YR 1987	MAX 138400	MIN 107400	(++)	-200								
WTR YR 1988	MAX 119900	MIN 78040	(++)	-33,780								

(+) ELEVATION, IN FEET, AT END OF MONTH

(++) CHANGE IN CONTENTS, IN ACRE-FEET

## ARKANSAS RIVER BASIN

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360544098354701 CANTON LAKE CROSS SECTION NO. 1 SITE NO. 1

LOCATION.--Lat 36°05'44", long 98°35'47".

PERIOD OF RECORD.--Water years 1980 to current year.

REMARKS.--Samples were collected in a Kemmerer sampler. Specific conductance, pH, water temperature and dissolved oxygen were measured in the field at 5-foot intervals.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	SAM- PLING DEPTH (FEET)	RESER- VOIR STORAGE (AC-FT)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE WATER (DEG C)	TUR- BID- ITY (NTU)
NOV									
23...	1149	1028	80020	1.00	111000	1590	7.80	9.5	14
23...	1207	1028	80020	5.00	111000	1590	7.80	10.5	16
23...	1212	1028	1028	10.0	111000	1590	8.00	10.0	--
23...	1214	1028	80020	13.0	111000	1600	8.10	10.5	47
MAR									
21...	1200	1028	80020	1.00	110000	1500	8.50	9.0	8.5
21...	1205	1028	1028	5.00	110000	1520	8.60	8.5	--
21...	1210	1028	1028	10.0	110000	1550	8.50	8.0	--
21...	1217	1028	80020	15.0	110000	1520	8.50	7.5	9.8
21...	1219	1028	1028	20.0	110000	1540	8.50	7.0	--
21...	1222	1028	1028	25.0	110000	1560	8.50	8.0	--
21...	1230	1028	80020	29.0	110000	1590	8.50	7.5	12
JUN									
29...	1025	1028	80020	1.00	114000	1680	7.80	25.5	6.9
29...	1026	1028	1028	5.00	114000	1700	7.90	25.0	--
29...	1027	1028	1028	10.0	114000	1710	7.90	24.5	--
29...	1028	1028	80020	15.0	114000	1750	7.80	24.0	12
29...	1029	1028	1028	20.0	114000	1760	7.80	22.5	--
29...	1030	1028	1028	25.0	114000	1740	7.70	23.0	--
29...	1031	1028	80020	28.0	114000	1730	7.80	23.0	8.4
SEP									
22...	1223	1028	80020	1.00	79900	1750	8.10	22.0	12
22...	1237	1028	1028	5.00	79900	1750	8.30	22.5	--
22...	1242	1028	1028	10.0	79900	1740	8.20	22.5	--
22...	1243	1028	80020	15.0	79900	1760	8.20	22.5	18
22...	1245	1028	1028	20.0	79900	1750	8.20	22.5	--
22...	1248	1028	80020	25.0	79900	1760	8.30	22.5	27
DATE	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	HARD- NESS TOTAL (MG/L AS CACO3)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD- SORP- TION RATIO
NOV									
23...	720	9.8	91	410	98	39	150	44	3
23...	720	9.8	93	410	98	39	150	44	3
23...	720	9.8	93	--	--	--	--	--	--
23...	720	9.6	92	400	97	39	150	44	3
MAR									
21...	720	12.4	114	440	110	40	150	42	3
21...	720	12.0	109	--	--	--	--	--	--
21...	720	12.0	108	--	--	--	--	--	--
21...	720	11.9	106	430	110	38	140	41	3
21...	720	11.8	103	--	--	--	--	--	--
21...	720	11.8	106	--	--	--	--	--	--
21...	720	11.9	105	440	110	40	150	42	3
JUN									
29...	710	6.0	79	460	110	46	180	45	4
29...	710	5.3	69	--	--	--	--	--	--
29...	710	4.4	57	--	--	--	--	--	--
29...	710	3.0	39	460	110	46	180	45	4
29...	710	2.9	36	--	--	--	--	--	--
29...	710	1.9	24	--	--	--	--	--	--
29...	710	0.3	4	460	110	46	170	44	3
SEP									
22...	710	8.8	108	420	88	49	190	49	4
22...	710	8.8	110	--	--	--	--	--	--
22...	710	9.3	116	--	--	--	--	--	--
22...	710	9.4	118	420	89	47	180	48	4
22...	710	9.4	118	--	--	--	--	--	--
22...	710	9.4	118	410	88	47	180	48	4

## ARKANSAS RIVER BASIN

360544098354701 CANTON LAKE CROSS SECTION NO. 1 SITE NO. 1 (Continued)

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH IT FIELD (MG/L AS HCO3)	CAR- BONATE WATER WH IT FIELD (MG/L AS CO3)	ALKA- LINITY WAT WH TOT IT FIELD (MG/L AS CACO3)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)
NOV									
23...	7.3	--	--	--	260	210	920	870	1.25
23...	7.1	230	0	192	260	210	919	877	1.25
23...	--	--	--	--	--	--	--	--	--
23...	7.1	--	--	--	260	210	917	869	1.25
MAR									
21...	6.3	--	--	--	260	200	884	885	1.20
21...	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--
21...	6.3	204	13	189	290	210	961	921	1.31
21...	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--
21...	6.2	--	--	--	290	210	957	925	1.30
JUN									
29...	6.1	--	--	--	310	240	1040	998	1.41
29...	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--
29...	5.7	--	--	--	310	240	1040	1000	1.41
29...	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--
29...	5.7	--	--	--	310	240	1040	990	1.41
SEP									
22...	6.7	--	--	--	330	280	1080	1030	1.47
22...	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--
22...	6.6	--	--	--	310	290	1040	958	1.41
22...	--	--	--	--	--	--	--	--	--
22...	6.9	--	--	--	330	280	1090	1020	1.48

## 360558098351501 CANTON LAKE CROSS SECTION NO. 1 SITE NO. 2

LOCATION.--Lat 36°05'58", long 98°35'15".

PERIOD OF RECORD.--Water years 1980 to current year.

REMARKS.--Specific conductance, pH, water temperature and dissolved oxygen were measured in the field at 5-foot intervals.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	SAM- PLING DEPTH (FEET)	RESER- VOIR STORAGE (AC-FT)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE WATER (DEG C)	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)
NOV											
23...	1232	1028	1028	1.00	111000	1580	8.10	10.0	720	9.7	91
23...	1234	1028	1028	5.00	111000	1570	8.10	9.5	720	9.8	92
23...	1236	1028	1028	10.0	111000	1580	8.10	9.5	720	9.8	91
23...	1239	1028	1028	15.0	111000	1560	8.20	9.5	720	9.7	90
23...	1241	1028	1028	20.0	111000	1580	8.20	9.0	720	9.8	91
23...	1243	1028	1028	21.0	111000	1580	8.20	9.0	720	9.8	91
MAR											
21...	1243	1028	1028	1.00	110000	1580	8.60	11.0	720	12.7	122
21...	1245	1028	1028	5.00	110000	1590	8.60	11.0	720	12.1	117
21...	1247	1028	1028	10.0	110000	1580	8.50	9.0	720	12.0	111
21...	1249	1028	1028	15.0	110000	1590	8.60	8.5	720	12.0	109
21...	1250	1028	1028	20.0	110000	1610	8.60	9.5	720	12.4	116
JUN											
29...	1115	1028	1028	1.00	114000	1670	8.20	26.0	710	7.2	96
29...	1116	1028	1028	5.00	114000	1680	8.20	26.0	710	7.0	93
29...	1117	1028	1028	10.0	114000	1690	8.20	25.5	710	6.6	87
29...	1118	1028	1028	15.0	114000	1690	8.00	25.5	710	5.7	75
29...	1119	1028	1028	20.0	114000	1710	7.70	24.0	710	1.4	18
29...	1120	1028	1028	24.0	114000	1690	7.60	23.5	710	0.2	3
SEP											
22...	1307	1028	1028	1.00	79900	1730	8.10	23.0	710	9.5	120
22...	1310	1028	1028	5.00	79900	1770	8.20	23.0	710	10.0	126
22...	1313	1028	1028	10.0	79900	1750	8.20	23.0	710	10.2	129
22...	1316	1028	1028	12.0	79900	1760	8.20	22.5	710	10.2	128

## 360612098344001 CANTON LAKE CROSS SECTION NO. 1 SITE NO. 3

LOCATION.--Lat 36°06'12", long 98°34'40".

PERIOD OF RECORD.--Water years 1980 to current year.

REMARKS.--Specific conductance, pH, water temperature and dissolved oxygen were measured in the field at 5-foot intervals.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	SAM- PLING DEPTH (FEET)	RESER- VOIR STORAGE (AC-FT)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE WATER (DEG C)	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)
NOV											
23...	1248	1028	1028	1.00	111000	1580	8.20	9.5	720	9.8	91
23...	1250	1028	1028	5.00	111000	1580	8.20	9.5	720	9.9	92
23...	1252	1028	1028	10.0	111000	1570	8.20	9.5	720	9.9	92
23...	1255	1028	1028	15.0	111000	1570	8.20	9.0	720	9.8	91
23...	1257	1028	1028	20.0	111000	1570	8.20	9.0	720	9.9	92
23...	1300	1028	1028	25.0	111000	1550	8.20	9.0	720	9.8	91
23...	1302	1028	1028	26.0	111000	1560	8.20	9.0	720	9.8	91
MAR											
21...	1259	1028	1028	1.00	110000	1540	8.60	10.0	720	12.4	117
21...	1300	1028	1028	5.00	110000	1600	8.60	9.5	720	12.2	114
21...	1302	1028	1028	10.0	110000	1590	8.60	7.5	720	11.9	106
21...	1305	1028	1028	15.0	110000	1590	8.60	7.0	720	11.8	103
21...	1306	1028	1028	20.0	110000	1590	8.60	7.0	720	11.7	103
21...	1308	1028	1028	25.0	110000	1600	8.50	7.5	720	11.8	105
JUN											
29...	1131	1028	1028	1.00	114000	1700	8.20	26.0	710	7.9	105
29...	1132	1028	1028	5.00	114000	1700	8.20	26.0	710	7.6	101
29...	1133	1028	1028	10.0	114000	1700	8.20	26.0	710	7.5	100
29...	1134	1028	1028	15.0	114000	1700	8.20	26.0	710	7.5	100
29...	1135	1028	1028	20.0	114000	1700	8.20	26.0	710	4.2	56
29...	1136	1028	1028	23.0	114000	1670	7.80	23.5	710	0.8	10
SEP											
22...	1323	1028	1028	1.00	79900	1750	8.10	22.5	710	10.2	128
22...	1326	1028	1028	5.00	79900	1750	8.10	23.0	710	10.3	130
22...	1328	1028	1028	10.0	79900	1760	8.20	23.0	710	10.2	128
22...	1330	1028	1028	15.0	79900	1760	8.20	22.5	710	10.3	129
22...	1333	1028	1028	20.0	79900	1780	8.20	22.0	710	10.5	129



## ARKANSAS RIVER BASIN

360744098364101 CANTON LAKE CROSS SECTION NO. 2 SITE NO. 1

LOCATION.--Lat 36°07'44", long 98°36'41".

PERIOD OF RECORD.--Water years 1980 to current year.

REMARKS.--Specific conductance, pH, water temperature and dissolved oxygen were measured in the field at 5-foot intervals.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL-LECTING SAMPLE (CODE NUMBER)	AGENCY ANALYZING SAMPLE (CODE NUMBER)	SAMPLING DEPTH (FEET)	RESERVOIR STORAGE (AC-FT)	SPECIFIC CONDUCTANCE (US/CM)	PH (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	BAROMETRIC PRESSURE (MM HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, SATURATION (%)
NOV											
23...	1323	1028	1028	1.00	111000	1530	8.20	10.0	720	9.9	93
23...	1325	1028	1028	5.00	111000	1580	8.20	9.5	720	9.8	91
23...	1327	1028	1028	10.0	111000	1580	8.20	9.0	720	9.8	91
23...	1330	1028	1028	15.0	111000	1580	8.20	9.0	720	9.9	91
23...	1333	1028	1028	18.0	111000	1570	8.20	9.0	720	9.8	90
MAR											
21...	1315	1028	1028	1.00	110000	1600	8.60	10.0	720	12.5	118
21...	1320	1028	1028	5.00	110000	1600	8.60	9.5	720	12.3	115
21...	1322	1028	1028	10.0	110000	1600	8.60	8.5	720	12.0	109
21...	1323	1028	1028	15.0	110000	1600	8.60	8.0	720	12.1	108
21...	1324	1028	1028	18.0	110000	1600	8.50	7.5	720	12.0	106
JUN											
29...	1155	1028	1028	1.00	114000	1700	8.20	26.5	710	7.8	105
29...	1156	1028	1028	5.00	114000	1690	8.20	26.5	710	7.7	104
29...	1157	1028	1028	10.0	114000	1690	8.20	26.5	710	7.6	102
29...	1158	1028	1028	16.0	114000	1700	8.20	26.0	710	6.7	89
SEP											
22...	1346	1028	1028	1.00	79900	1840	8.30	22.0	710	11.4	142
22...	1348	1028	1028	5.00	79900	1800	8.20	22.5	710	11.2	140
22...	1351	1028	1028	10.0	79900	1900	8.30	19.5	710	11.2	132
22...	1353	1028	1028	14.0	79900	1910	8.10	19.0	710	11.4	133

360808098362101 CANTON LAKE CROSS SECTION NO. 2 SITE NO. 2

LOCATION.--Lat 36°08'08", long 98°36'21".

PERIOD OF RECORD.--Water years 1980 to current year.

REMARKS.--Specific conductance, pH, water temperature and dissolved oxygen were measured in the field at 5-foot intervals.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL-LECTING SAMPLE (CODE NUMBER)	AGENCY ANALYZING SAMPLE (CODE NUMBER)	SAMPLING DEPTH (FEET)	RESERVOIR STORAGE (AC-FT)	SPECIFIC CONDUCTANCE (US/CM)	PH (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	BAROMETRIC PRESSURE (MM HG)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, SATURATION (%)
NOV											
23...	1338	1028	1028	1.00	111000	1570	8.20	9.5	720	9.8	91
23...	1340	1028	1028	5.00	111000	1580	8.20	9.5	720	9.9	92
23...	1341	1028	1028	10.0	111000	1580	8.20	9.0	720	9.9	92
23...	1342	1028	1028	15.0	111000	1580	8.20	9.0	720	10.0	92
23...	1343	1028	1028	19.0	111000	1580	8.20	9.0	720	9.8	90
MAR											
21...	1330	1028	1028	1.00	110000	1630	8.60	9.5	720	12.7	118
21...	1332	1028	1028	5.00	110000	1640	8.60	9.0	720	12.4	114
21...	1333	1028	1028	10.0	110000	1630	8.60	8.0	720	12.8	115
21...	1334	1028	1028	15.0	110000	1600	8.60	7.5	720	12.3	109
21...	1335	1028	1028	20.0	110000	1640	8.50	7.0	720	12.1	107
JUN											
29...	1206	1028	1028	1.00	114000	1690	8.20	26.0	710	7.6	101
29...	1207	1028	1028	5.00	114000	1690	8.20	26.0	710	7.6	101
29...	1208	1028	1028	10.0	114000	1690	8.20	26.0	710	7.4	99
29...	1209	1028	1028	15.0	114000	1700	8.20	26.0	710	7.4	99
29...	1210	1028	1028	18.0	114000	1590	8.20	26.0	710	1.2	16
SEP											
22...	1353	1028	1028	1.00	79900	1850	8.20	20.5	710	11.4	137
22...	1402	1028	1028	5.00	79900	1850	8.20	20.5	710	11.8	142
22...	1404	1028	1028	10.0	79900	1830	8.30	22.0	710	11.2	138
22...	1407	1028	1028	15.0	79900	1830	8.40	21.5	710	11.0	136

## ARKANSAS RIVER BASIN

195

360828098360501 CANTON LAKE CROSS SECTION NO. 2 SITE NO. 3

LOCATION.--Lat 36°08'28", long 98°36'05".

PERIOD OF RECORD.--Water years 1980 to current year.

REMARKS.-- Specific conductance, pH, water temperature and dissolved oxygen were measured in the field at 5-foot intervals.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	SAM- PLING DEPTH (FEET)	RESER- VOIR STORAGE (AC-FT)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE WATER (DEG C)	BARO- METRIC PRES- SURE (MM HG)	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)
NOV											
23...	1351	1028	1028	1.00	111000	1580	8.20	9.5	720	9.9	92
23...	1353	1028	1028	5.00	111000	1580	8.20	9.5	720	10.0	93
23...	1355	1028	1028	10.0	111000	1590	8.20	9.0	720	10.0	92
23...	1357	1028	1028	15.0	111000	1600	8.20	9.0	720	10.0	92
23...	1400	1028	1028	16.0	111000	1600	8.30	9.0	720	10.0	92
MAR											
21...	1340	1028	1028	1.00	110000	1630	8.60	8.5	720	13.1	120
21...	1342	1028	1028	5.00	110000	1630	8.60	10.0	720	12.5	118
21...	1344	1028	1028	10.0	110000	1640	8.60	9.0	720	12.4	114
21...	1346	1028	1028	15.0	110000	1660	8.60	8.0	720	12.0	108
21...	1348	1028	1028	18.0	110000	1660	8.50	8.0	720	12.1	109
JUN											
29...	1221	1028	1028	1.00	114000	1710	8.20	26.5	710	7.8	105
29...	1222	1028	1028	5.00	114000	1720	8.20	26.5	710	7.6	102
29...	1223	1028	1028	10.0	114000	1720	8.20	26.5	710	7.7	104
29...	1224	1028	1028	15.0	114000	1720	8.20	26.0	710	7.5	100
SEP											
22...	1410	1028	1028	1.00	79900	1760	8.30	23.0	710	11.6	146
22...	1412	1028	1028	5.00	79900	1760	8.30	23.0	710	11.8	149
22...	1415	1028	1028	10.0	79900	1750	8.30	23.0	710	11.6	146
22...	1417	1028	1028	13.0	79900	1750	8.30	22.5	710	11.4	143

360809098391601 CANTON LAKE CROSS SECTION NO. 3 SITE NO. 1

LOCATION.--Lat 36°08'09", long 98°39'16".

PERIOD OF RECORD.--Water years 1980 to current year.

REMARKS.--Specific conductance, pH, water temperature and dissolved oxygen were measured in the field at 5-foot intervals.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	SAM- PLING DEPTH (FEET)	RESER- VOIR STORAGE (AC-FT)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE WATER (DEG C)	BARO- METRIC PRES- SURE (MM HG)	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)
NOV											
23...	1409	1028	1028	1.00	111000	1600	8.30	9.5	720	10.0	93
23...	1412	1028	1028	5.00	111000	1600	8.30	9.5	720	10.0	93
23...	1415	1028	1028	9.00	111000	1600	8.20	9.0	720	9.9	91
MAR											
21...	1359	1028	1028	1.00	110000	1750	8.60	11.5	720	12.6	124
21...	1400	1028	1028	5.00	110000	1750	8.60	10.5	720	12.6	121
21...	1401	1028	1028	10.0	110000	1710	8.50	9.5	720	12.1	112
JUN											
29...	1238	1028	1028	1.00	114000	1710	8.30	27.0	710	8.0	109
29...	1239	1028	1028	5.00	114000	1720	8.20	27.0	710	7.9	107
29...	1240	1028	1028	10.0	114000	1720	8.20	27.0	710	7.8	106
29...	1241	1028	1028	15.0	114000	1660	8.20	26.5	710	7.3	98
SEP											
22...	1428	1028	1028	1.00	79900	2080	8.43	15.0	710	11.2	120
22...	1430	1028	1028	5.00	79900	1930	8.30	18.5	710	11.6	134
22...	1433	1028	1028	10.0	79900	2080	8.30	15.0	710	10.6	114
22...	1435	1028	1028	14.0	79900	2070	8.40	15.0	710	11.2	120

## ARKANSAS RIVER BASIN

360828098390701 CANTON LAKE CROSS SECTION NO. 3 SITE NO. 2

LOCATION.--Lat 36°08'28", long 98°39'07".

PERIOD OF RECORD.--Water years 1980 to current year.

REMARKS.--Specific conductance, pH, water temperature and dissolved oxygen were measured in the field at 5-foot intervals.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	SAM- PLING DEPTH (FEET)	RESER- VOIR STORAGE (AC-FT)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE WATER (DEG C)	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)
NOV											
23...	1418	1028	1028	1.00	111000	1600	8.20	9.5	720	10.0	93
23...	1420	1028	1028	5.00	111000	1600	8.30	9.5	720	9.9	92
23...	1421	1028	1028	10.0	111000	1610	8.30	9.0	720	9.9	92
23...	1422	1028	1028	12.0	111000	1580	8.30	9.0	720	10.1	93
MAR											
21...	1406	1028	1028	1.00	110000	1750	8.60	11.5	720	12.8	125
21...	1408	1028	1028	5.00	110000	1770	8.50	11.0	720	12.0	115
21...	1411	1028	1028	10.0	110000	1800	8.40	9.5	720	11.8	110
21...	1414	1028	1028	12.0	110000	1770	8.50	9.0	720	11.8	109
JUN											
29...	1250	1028	1028	1.00	114000	1710	8.20	27.5	710	7.7	106
29...	1251	1028	1028	5.00	114000	1720	8.20	27.5	710	7.6	104
29...	1252	1028	1028	10.0	114000	1720	8.20	27.0	710	7.6	103
29...	1253	1028	1028	14.0	114000	1640	8.20	27.0	710	6.1	83
SEP											
22...	1439	1028	1028	1.00	79900	2060	8.40	15.0	710	11.1	119
22...	1442	1028	1028	5.00	79900	2060	8.40	15.0	710	11.2	120
22...	1444	1028	1028	10.0	79900	2070	8.40	15.0	710	11.3	121
22...	1446	1028	1028	13.0	79900	2070	8.40	15.0	710	11.3	121

360844098390000 CANTON LAKE CROSS SECTION NO. 3 SITE NO. 3

LOCATION.--Lat 36°08'44", long 98°39'00".

PERIOD OF RECORD.--Water years 1980 to current year.

REMARKS.--Specific conductance, pH, water temperature and dissolved oxygen were measured in the field at 5-foot intervals.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	SAM- PLING DEPTH (FEET)	RESER- VOIR STORAGE (AC-FT)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE WATER (DEG C)	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)
NOV											
23...	1427	1028	1028	1.00	111000	1600	8.30	9.0	720	9.9	91
23...	1429	1028	1028	5.00	111000	1600	8.30	9.0	720	9.9	91
23...	1431	1028	1028	10.0	111000	1600	8.30	9.0	720	9.9	91
23...	1432	1028	1028	13.0	111000	1600	8.30	9.0	720	9.8	90
MAR											
21...	1417	1028	1028	1.00	110000	1700	8.60	10.5	720	12.9	123
21...	1419	1028	1028	5.00	110000	1690	8.60	10.0	720	12.7	119
21...	1421	1028	1028	10.0	110000	1660	8.60	8.5	720	12.8	116
21...	1422	1028	1028	13.0	110000	1730	8.50	8.5	720	12.4	113
JUN											
29...	1301	1028	1028	1.00	114000	1700	8.20	27.5	710	7.2	99
29...	1302	1028	1028	5.00	114000	1710	8.20	27.5	710	7.2	99
29...	1303	1028	1028	10.0	114000	1720	8.20	27.0	710	7.1	96
29...	1304	1028	1028	14.0	114000	1660	8.20	27.0	710	0.5	7
SEP											
22...	1450	1028	1028	1.00	79900	2080	8.40	14.5	710	11.4	121
22...	1452	1028	1028	5.00	79900	2070	8.40	15.0	710	11.6	124
22...	1453	1028	1028	10.0	79900	1960	8.40	17.5	710	11.6	131
22...	1455	1028	1028	12.0	79900	2090	8.40	14.5	710	11.6	123

## 07239000 NORTH CANADIAN RIVER AT CANTON, OK

LOCATION.--Lat 36°04'45", long 98°35'25", in NE 1/4 SW 1/4 sec.33, T.19 N., R.13 W., Blaine County, Hydrologic Unit 11100301, on right bank 2,700 ft downstream from Canton Lake, 1.5 mi northwest of Canton, 4.8 mi upstream from Minnehaha Creek, and at mile 393.8.

DRAINAGE AREA.--12,484 mi<sup>2</sup>, of which 4,883 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--October 1937 to current year. Monthly discharge only for some periods, published in WSP 1311. Gage-height records collected in this vicinity since 1914 are contained in reports of National Weather Service.

REVISED RECORDS.--WSP 1341: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,562.50 ft above National Geodetic Vertical Datum of 1929. Oct. 1, 1937 to Jan. 5, 1955, water-stage recorder at site 2.5 mi downstream at datum 1.91 ft lower prior to Oct. 1, 1950 and at datum 6.91 ft lower thereafter.

REMARKS.--Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Flow partly regulated by Fort Supply Lake (station 07236500) for period May 1942 to April 1948 and completely regulated thereafter by Canton Lake (station 07238500). U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Prior to regulation by Canton Lake, 11 years (water years 1938-48), 256 ft<sup>3</sup>/s, 185,500 acre-ft/yr; since regulation by Canton Lake, 40 years (water years 1949-88), 160 ft<sup>3</sup>/s, 115,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 24,800 ft<sup>3</sup>/s, Oct. 12, 1946, gage height, 12.83 ft, site and datum then in use; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Oct. 13, 1923, reached a stage of 16.8 ft, at site 300 ft upstream from former site at datum 1.91 ft lower than present datum, from reports of National Weather Service.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,270 ft<sup>3</sup>/s, July 14; gage height, 9.82 ft; minimum daily discharge, 3.3 ft<sup>3</sup>/s, Sept. 2, 7, 11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	115	90	381	476	176	355	427	180	13	52	3.4
2	12	116	90	376	469	176	86	426	230	13	45	e3.3
3	13	116	90	372	460	15	14	436	293	13	32	e3.4
4	14	116	90	317	456	200	14	431	392	12	e25	e3.4
5	16	116	90	210	302	521	147	425	387	12	e22	e3.5
6	18	115	90	145	173	522	436	420	382	11	e18	e3.4
7	19	114	90	144	170	525	673	417	374	12	e16	e3.3
8	86	115	91	146	132	662	815	418	287	12	14	e3.4
9	407	116	121	144	89	786	1030	416	211	12	12	e3.4
10	548	115	154	142	91	756	1010	267	176	12	8.1	e3.4
11	533	114	153	103	92	759	984	61	134	12	7.9	e3.3
12	521	106	152	72	91	762	960	34	125	424	7.7	e3.4
13	399	87	152	74	91	754	938	23	122	1060	7.3	e3.4
14	241	e87	153	74	92	740	884	20	101	1170	7.1	e3.5
15	238	e87	154	74	92	729	657	18	39	1180	7.0	e3.5
16	179	e88	153	74	114	719	549	18	21	1030	6.9	e3.5
17	121	e88	152	75	186	727	536	220	17	968	e6.8	e3.4
18	113	e87	152	75	324	808	535	636	15	901	e6.7	9.4
19	110	e87	153	41	463	894	521	694	14	918	e6.7	6.5
20	108	86	154	13	457	870	422	444	14	953	e6.6	5.8
21	106	87	154	89	449	709	316	141	14	952	e6.6	e5.2
22	84	87	248	366	347	392	427	133	13	1070	e6.4	e4.4
23	25	89	398	498	179	251	576	129	13	1060	e6.4	e4.6
24	13	89	380	499	177	255	568	129	13	1050	e6.4	e4.2
25	9.6	89	354	500	176	256	582	126	13	1050	23	e3.8
26	19	89	352	497	176	258	575	124	13	1040	58	e3.5
27	77	90	344	494	177	257	565	124	13	1040	99	e3.6
28	104	90	339	486	176	260	560	124	13	705	89	e3.6
29	110	90	362	476	177	268	491	124	13	139	54	e3.7
30	113	90	385	473	---	385	430	124	13	88	3.8	e3.8
31	113	---	387	477	---	498	---	124	---	63	3.5	---
TOTAL	4481.6	2961	6227	7907	6854	15890	16656	7653	3645	16995	670.9	120.0
MEAN	145	98.7	201	255	236	513	555	247	121	548	21.6	4.00
MAX	548	116	398	500	476	894	1030	694	392	1180	99	9.4
MIN	9.6	86	90	13	89	15	14	18	13	11	3.5	3.3
AC-FT	8890	5870	12350	15680	13590	31520	33040	15180	7230	33710	1330	238

CAL YR 1987 TOTAL 108493.6 MEAN 297 MAX 1050 MIN 9.6 AC-FT 215200  
WTR YR 1988 TOTAL 90060.5 MEAN 246 MAX 1180 MIN 3.3 AC-FT 178600

e Estimated



## ARKANSAS RIVER BASIN

07239300 NORTH CANADIAN RIVER BELOW WEAVERS CREEK NEAR WATONGA, OK

LOCATION.--Lat 35°48'43", long 98°25'14", NE 1/4, NE 1/4, sec.1, T.15 N., R.12 W., Blaine County, Hydrologic Unit 11100301, on downstream pier on U.S. Highway 281 bridge, 2.0 mi south of intersection of U.S. Highway 281 and State Highway 33 and at mile 361.2.

DRAINAGE AREA.--12,736 mi<sup>2</sup>, of which 4,899 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--October 1983 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,453.60 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair except for estimated periods which are poor. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--5 years, (water years 1984-88), 208 ft<sup>3</sup>/s, 150,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,740 ft<sup>3</sup>/s, Oct. 3, 1986, gage height, 19.24; minimum daily discharge, 5.0 ft<sup>3</sup>/s, Sept. 26-27, 1985.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,940 ft<sup>3</sup>/s, Sept. 18, gage height, 14.24 ft; minimum daily discharge, 10 ft<sup>3</sup>/s, Sept. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	52	e142	120	427	547	257	862	520	248	38	102	21
2	45	e141	120	429	535	468	596	514	270	38	89	17
3	40	e142	120	430	527	690	258	506	308	36	79	15
4	38	e142	120	431	522	327	163	506	375	34	70	14
5	36	e141	120	416	513	558	132	503	439	32	65	13
6	35	139	120	364	325	707	276	499	439	31	60	13
7	34	140	120	273	269	669	564	492	433	29	48	12
8	33	142	120	238	261	641	692	490	428	28	43	11
9	34	142	120	228	199	754	818	487	332	27	38	12
10	102	144	124	234	164	806	966	484	281	29	36	12
11	283	146	143	247	159	775	921	250	209	28	32	11
12	411	146	158	247	171	765	916	105	157	28	29	11
13	469	143	168	231	164	754	903	86	151	345	27	10
14	467	135	179	214	156	751	893	76	148	816	25	11
15	e349	129	188	198	153	744	840	70	125	917	22	12
16	e242	125	194	375	153	731	635	67	85	976	21	17
17	e223	120	199	574	193	737	604	62	70	903	21	13
18	e174	118	203	489	252	734	610	304	58	862	26	215
19	e153	117	232	e400	432	818	584	618	52	813	20	719
20	137	117	332	e299	508	856	572	649	48	828	19	125
21	e132	117	315	123	509	838	464	404	46	854	19	61
22	e122	116	289	e203	509	675	416	220	45	862	17	42
23	e107	115	295	e324	364	449	531	189	43	953	16	35
24	e95	115	377	e542	261	366	597	195	41	955	16	30
25	e85	115	415	553	256	357	720	177	39	976	15	26
26	74	115	418	555	255	351	634	167	39	956	15	25
27	65	116	413	558	254	352	613	166	42	1000	30	23
28	e83	118	409	560	254	359	604	166	41	993	79	21
29	e101	119	404	563	253	355	612	165	40	615	81	19
30	e132	120	407	556	---	351	558	164	37	235	71	19
31	e138	---	421	551	---	503	---	168	---	130	29	---
TOTAL	4491	3877	7363	11832	9118	18498	18554	9469	5069	15367	1260	1585
MEAN	145	129	238	382	314	597	618	305	169	496	40.6	52.8
MAX	469	146	421	574	547	856	966	649	439	1000	102	719
MIN	33	115	120	123	153	257	132	62	37	27	15	10
AC-FT	8910	7690	14600	23470	18090	36690	36800	18780	10050	30480	2500	3140

CAL YR 1987 TOTAL 136971 MEAN 375 MAX 2100 MIN 24 AC-FT 271700  
WTR YR 1988 TOTAL 106483 MEAN 291 MAX 1000 MIN 10 AC-FT 211200

e Estimated



## 07239500 NORTH CANADIAN RIVER NEAR EL RENO, OK

LOCATION.--Lat 35°33'44", long 97°57'32", on east line of sec.32, T.13 N., R.7 W., Canadian County, Hydrologic Unit 11100301, near left bank on downstream side of pier of bridge on old U.S. Highway 81, 2.0 mi north of courthouse in El Reno, 2.2 mi downstream from Target Creek, and at mile 307.4.

DRAINAGE AREA.--13,042 mi<sup>2</sup> of which 4,899 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--October 1902 to April 1908, October 1937 to current year. Monthly discharge only for some periods, published in WSP 1311. Gage-height records collected at site 1.0 mi upstream March 1914 to March 1934 and at present site thereafter are contained in reports of National Weather Service. Published as Canadian River (North Fork) near El Reno 1902-4.

REVISED RECORDS.--WSP 1341: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,299.02 ft above National Geodetic Vertical Datum of 1929. October 1902 to April 1908, nonrecording gage at site about 50 ft downstream at different datum.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Some regulation by Fort Supply Lake (station 07236500) for period May 1942 to April 1948 and by Canton Lake (station 07238500) thereafter. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Prior to regulation by Canton Lake, 16 years (water years 1903-07, 1938-48), 264 ft<sup>3</sup>/s, 191,300 acre-ft/yr; since regulation by Canton Lake, 40 years (water years 1949-88), 206 ft<sup>3</sup>/s, 149,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,000 ft<sup>3</sup>/s, Oct. 28, 1941, gage height, 15.98 ft; maximum gage height, 18.20 ft, Sept. 21, 1965; no flow at times in most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Oct. 15, 1923, reached an elevation of 1,326.3 ft above mean sea level at railroad bridge 1.0 mi above station, from reports of National Weather Service.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,000 ft<sup>3</sup>/s, Apr. 1, gage height, 12.78 ft; minimum daily discharge, 17 ft<sup>3</sup>/s, Sept. 12, 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	85	141	120	451	609	334	3290	805	e260	102	291	e60
2	77	135	120	444	600	515	3850	695	e290	92	248	e42
3	70	135	120	438	583	3420	1360	678	e330	83	e190	e37
4	67	136	121	e436	570	1900	787	660	e400	80	e150	e32
5	64	135	121	e420	566	879	610	645	e460	77	e120	e28
6	e60	134	123	e400	557	919	597	634	e450	70	e100	e25
7	e59	135	123	e365	475	931	597	627	e440	62	e86	e23
8	e56	138	122	e310	382	835	652	622	e440	56	e76	e21
9	e54	138	122	e295	372	780	811	e600	e390	52	e70	e20
10	e53	135	122	e299	344	838	977	e590	342	49	e64	e18
11	154	136	130	e437	338	909	1170	e570	240	47	e58	e18
12	398	137	163	456	341	868	1110	e480	199	e44	e52	e17
13	444	138	168	526	323	843	1070	e260	170	e43	e48	e17
14	454	134	182	550	300	818	1060	e132	150	e42	e43	18
15	394	180	e190	519	295	823	1050	e115	155	199	e40	e20
16	259	196	e205	897	292	815	981	e98	161	e880	e36	e45
17	242	134	e245	1910	292	828	818	e86	152	e840	e33	e150
18	209	123	e390	1240	297	843	834	e80	132	e820	e32	372
19	155	122	591	923	338	854	804	e280	116	e800	e30	2560
20	142	120	1620	718	395	945	756	e560	101	799	e28	1750
21	135	119	732	257	493	999	724	620	87	779	e27	678
22	e125	118	495	118	505	961	688	625	75	821	e26	384
23	e115	117	375	135	507	788	641	e370	67	807	e25	275
24	e105	120	382	485	458	622	618	223	62	911	e24	e210
25	98	125	534	609	369	517	795	e200	60	927	e24	e160
26	88	118	524	610	356	499	1010	e190	64	943	e22	e110
27	85	119	503	606	350	482	826	e180	79	943	e22	80
28	80	122	496	608	343	472	760	e180	83	976	e23	e70
29	100	123	495	611	338	468	740	e179	96	982	e24	64
30	124	122	461	616	---	462	815	e178	103	678	e40	60
31	138	---	428	615	---	473	---	e210	---	369	e70	---
TOTAL	4689	3985	10523	17304	11988	26640	30801	12372	6154	14373	2122	7364
MEAN	151	133	339	558	413	859	1027	399	205	464	68.5	245
MAX	454	196	1620	1910	609	3420	3850	805	460	982	291	2560
MIN	53	117	120	118	292	334	597	80	60	42	22	17
AC-FT	9300	7900	20870	34320	23780	52840	61090	24540	12210	28510	4210	14610

CAL YR 1987 TOTAL 174512 MEAN 478 MAX 6960 MIN 25 AC-FT 346100  
WTR YR 1988 TOTAL 148315 MEAN 405 MAX 3850 MIN 17 AC-FT 294200

e Estimated

## ARKANSAS RIVER BASIN

07240000 LAKE HEFNER CANAL NEAR OKLAHOMA CITY, OK

LOCATION.--Lat 35°33'11", long 97°37'11", in SW 1/4 SW 1/4 sec.34, T.13 N., R.4 W., Oklahoma County, Hydrologic Unit 11050002, attached to left wing wall just downstream from outlet of inverted siphon, 2,600 ft upstream from Lake Hefner, 3.0 mi northeast of Bethany, and 7.6 mi northwest of the State Capitol in Oklahoma City.

PERIOD OF RECORD.--March 1944 to current year.

REVISED RECORDS.--WDR OK-80-1: 1968-80 (Datum).

GAGE.--Water stage recorder and concrete control. Datum of gage is 1,196.06 ft above National Geodetic Vertical Datum of 1929. Prior to Apr. 8, 1947, nonrecording gage at site 2.7 mi upstream at different datum. Apr. 8, 1947 to Apr. 30, 1950, water-stage recorder at site 3.0 mi upstream at different datum. May 1, 1950 to May 19, 1954, Apr. 26, 1957 to Feb. 19, 1968 at present site and datum 4.90 ft higher. May 20, 1954 to Apr. 25, 1957, water-stage recorder and concrete control at site 2,500 ft downstream at datum 2.10 ft higher than present datum.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Use of canal began in March 1944. Canal diverts water from North Canadian River just upstream from Lake Overholser (station 07240500) and delivers water to Lake Hefner, capacity, 80,600 acre-ft, for municipal water supply of Oklahoma City. Subsequent to April 1950, small ground-water seepage, when head gates are closed, included in records.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 1,500 ft<sup>3</sup>/s, May 28, 1955; no flow at times in each year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.36	.30	.21	.47	e.30	e.50	27	e.53	e.90	e.21	227	e.00
2	.27	.24	.22	.58	e.35	1.9	332	e.30	e.35	e.13	195	e.00
3	.35	.23	.22	.68	e.31	514	9.7	e.27	e.12	e.06	191	e.00
4	.33	.23	.20	.55	e.28	257	e1.0	e.26	e.11	e.00	183	e.00
5	.27	.32	.20	.45	e.30	6.7	e.50	e.28	e.13	e.00	101	e.00
6	.30	.19	.19	.43	e.30	3.6	e.35	e.29	e.06	e.00	2.8	e.00
7	.28	.13	.15	.54	e.28	2.8	e.30	e.23	e.00	e.00	e1.8	e.00
8	.27	.22	.20	.44	e.31	e1.4	e.27	e.21	e.00	e.00	e1.0	e.00
9	.23	.16	.07	.38	e.32	e1.0	1.4	e.20	e.00	e.00	e2.9	e.00
10	.24	.17	.00	.34	e.33	e.70	4.1	e.19	e.00	e.15	e1.0	e.00
11	.23	.22	.00	.35	e.30	e.54	e1.0	e.17	e.00	e.11	e.10	e.00
12	.22	.23	.00	.54	e.29	e.43	e.50	e.18	e.00	e.00	e.00	e.00
13	.13	.27	.00	.45	e.30	e.42	e.47	e.19	e.00	e.00	e.00	e.00
14	.01	.24	.16	.43	e.28	e.41	e.53	e.21	e.00	e.00	e.00	e.00
15	.00	.70	.26	.69	e.28	e.40	e.50	e.40	e.00	e.00	e.00	e.00
16	.00	.25	.23	10	e.27	e.44	e.48	e.27	e.00	e.45	e.00	e.00
17	.00	.19	.19	1.8	e.28	e1.0	6.3	e.22	e.00	e.10	e.00	e.00
18	.00	.25	202	639	e.47	e.37	7.6	e.25	e.00	e.00	e.00	e.00
19	.00	.24	566	1100	e.27	e.32	e1.0	e.21	e.00	e.00	e.00	563
20	.00	.18	943	451	e.30	e.34	e.42	e.20	e.00	e.00	e.00	1060
21	.00	.18	1070	7.2	e.27	e.35	e.35	e.19	e.00	e.00	e.00	1020
22	.00	.20	706	5.9	e.28	e.47	e.33	e.45	e.00	e.00	e.00	490
23	.00	.14	595	1.7	e.25	e.35	e.30	e.21	e.00	e.00	e.00	276
24	.00	.51	331	.78	e.24	e.20	e.34	e.18	e.00	e.00	e.00	54
25	.00	.31	2.6	e.50	e.26	e.18	e1.0	e.20	e.00	751	e.00	56
26	.00	.16	1.6	e.40	e.26	e.18	e.37	e.15	e.00	1100	e.00	18
27	.00	.27	1.2	e.37	e.24	e.21	e.33	e.16	e.80	905	e.00	12
28	.00	.23	.82	e.32	e.24	e.23	e.28	e.13	1.8	905	e.00	12
29	.00	.20	.47	e.30	e.30	e.18	e.54	e.14	72	925	e.00	11
30	.00	.21	.53	e.28	---	e.17	e.25	e.17	.66	904	e.00	125
31	2.9	---	.45	e.28	---	1.8	---	e.15	---	545	e.00	---
TOTAL	6.39	7.37	4423.17	2227.15	8.46	798.59	399.51	7.19	76.93	6036.21	906.60	3697.00
MEAN	.21	.25	143	71.8	.29	25.8	13.3	.23	2.56	195	29.2	123
MAX	2.9	.70	1070	1100	.47	514	332	.53	72	1100	227	1060
MIN	.00	.13	.00	.28	.24	.17	.25	.13	.00	.00	.00	.00
AC-FT	13	15	8770	4420	17	1580	792	14	153	11970	1800	7330

CAL YR 1987 TOTAL 11571.83 MEAN 31.7 MAX 1070 MIN .00 AC-FT 22950  
WTR YR 1988 TOTAL 18594.57 MEAN 50.8 MAX 1100 MIN .00 AC-FT 36880

e Estimated

## ARKANSAS RIVER BASIN

## 07240500 LAKE OVERHOLSER NEAR OKLAHOMA CITY, OK

LOCATION.--Lat 35°29'11", long 97°39'58", on north line of SW 1/4 sec.30, T.12 N., R.4 W., Oklahoma County, Hydrologic Unit 11100301, at control tower at left end of dam on North Canadian River, 2.9 mi upstream from Mustang Creek, 9.0 mi west of State Capitol in Oklahoma City, and at mile 281.5.

DRAINAGE AREA.--13,221 mi<sup>2</sup>, of which 4,899 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--October 1937 to current year.

GAGE.--Nonrecording gage. Datum of gage is National Geodetic Vertical Datum of 1929 (levels by Oklahoma City Water Department). Prior to Oct. 1, 1955, at same site at datum, 1,065.77 ft elevation. Oct. 1, 1955 to Sept. 30, 1962, water-stage recorder at same site and present datum.

REMARKS.--Reservoir is formed by Ambursen-type dam flanked by long earth-fill sections. Outlet facilities are twenty-three taintor gates and one uncontrolled spillway. Storage began in 1917. Dam was partly washed out in 1923 and rebuilt in 1924. Capacity, 17,100 acre-ft below elevation 1,242.27 ft, top of spillway gates. Dead storage, 1,400 acre-ft below elevation 1,229.77 ft, sill of outlet works. Figures given herein represent total contents. Water diverted for municipal water supply by Oklahoma City. Revised capacity table used since Oct. 1, 1950.

COOPERATION.--Elevations and capacity table provided by Oklahoma City Water Department.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 20,900 acre-ft, June 14, 1944, elevation, 1,242.67 ft, from capacity table then in use; minimum observed, 1,870 acre-ft, May 14, 1955, elevation, 1,230.62 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 17,060 acre-ft, Mar. 6, elevation, 1,242.30 ft; minimum, 5,270 acre-ft, July 15, elevation, 1,234.20 ft.

## MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	1241.70	16,240	-
Oct. 31.....	1241.20	15,480	-760
Nov. 30.....	1241.10	15,320	-160
Dec. 31.....	1242.00	16,700	+1,380
CAL YR 87.....	-	-	+770
Jan. 31.....	1239.20	12,420	+4,280
Feb. 29.....	1238.70	11,660	-760
Mar. 31.....	1238.80	11,820	+160
Apr. 30.....	1237.30	9,570	-2,250
May 31.....	1236.00	7,690	-1,880
June 30.....	1234.50	5,650	-2,040
July 31.....	1241.45	15,860	+10,210
Aug. 31.....	1241.00	15,170	-690
Sept. 30.....	1242.00	16,700	+1,530
WTR YR 88.....	-	-	+460

## ARKANSAS RIVER BASIN

07241550 NORTH CANADIAN RIVER NEAR HARRAH, OK

LOCATION (REVISED).--Lat 35°30'01", long 97°11'37", in SW 1/4 NW 1/4 sec.22, T.12 N., R.1 E., Oklahoma County, Hydrologic Unit 11100302, on left bank downstream side county road bridge, 2.2 mi northwest of Harrah, 3.8 mi downstream from Choctaw Creek, and at mile 230.0.

DRAINAGE AREA.--13,501 mi<sup>2</sup>, of which 4,899 mi<sup>2</sup> is probably noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1968 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,055.69 ft above National Geodetic Vertical Datum of 1929. June 19, 1981 to May 31, 1987, gage 0.8 mi downstream at same datum.

REMARKS.--Records good. Flow regulated by Canton Lake (station 07238500) and by Lake Overholser (station 07240500) where diversions are made into Lake Hefner Canal (station 07240000). Low flow sustained in part by sewage effluent from Oklahoma City. U.S. Army Corps of Engineers' satellite telemeter located at station.

AVERAGE DISCHARGE.--20 years, 387 ft<sup>3</sup>/s, 280,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 27,200 ft<sup>3</sup>/s, May 29, 1987, gage height, 19.60 ft; minimum, 23 ft<sup>3</sup>/s, Aug. 8, 1972.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 7,630 ft<sup>3</sup>/s, Apr. 2, gage height, 15.28 ft; minimum daily discharge, 101 ft<sup>3</sup>/s, Sept. 6, 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e315	e760	239	755	879	406	5850	1380	540	450	146	112
2	e350	314	261	566	858	751	7420	1250	563	352	136	116
3	e280	300	260	561	840	5950	6210	1060	426	222	134	158
4	e230	286	262	575	828	3850	5180	960	424	191	167	122
5	e200	259	262	635	812	2850	2810	921	416	163	197	104
6	e185	257	262	627	783	1770	2210	877	429	161	140	101
7	180	268	251	509	775	954	1590	867	446	161	134	104
8	e173	e278	248	564	748	2320	1320	853	503	154	123	101
9	138	283	260	428	641	1670	1270	808	526	162	131	133
10	e137	300	263	373	587	1390	1920	781	525	160	261	170
11	e141	280	257	442	553	1350	2430	756	437	150	289	174
12	e153	269	259	724	494	1400	2500	759	212	150	167	174
13	e168	266	252	1030	441	1350	2350	730	198	149	146	170
14	e180	268	274	856	437	1280	1780	596	199	359	135	163
15	e250	277	324	803	457	1250	1680	460	469	377	123	154
16	e340	706	390	914	429	1220	1610	576	463	237	121	378
17	e280	393	351	1490	413	1270	1610	539	356	309	119	199
18	e240	483	315	1280	404	1640	3580	370	348	195	121	166
19	e230	342	742	2030	484	1310	2450	347	335	177	124	640
20	e400	321	2110	833	469	1260	1620	308	311	221	139	494
21	e450	295	661	1130	452	1250	1400	324	268	160	170	228
22	e390	288	352	1210	523	1340	1260	638	224	136	120	249
23	e375	280	294	1180	606	1310	1180	766	210	136	113	370
24	e360	300	270	1180	619	1210	1030	717	199	126	114	1670
25	e355	719	400	1050	623	1020	982	531	198	125	112	1160
26	e330	334	1230	1480	550	1160	1130	433	213	129	112	320
27	e290	269	1150	1250	466	819	1330	397	325	170	110	225
28	224	282	1200	944	438	740	1290	380	316	579	112	196
29	e240	261	964	911	422	4600	1130	361	1260	257	126	573
30	e310	241	838	897	---	2630	1250	349	547	250	133	515
31	e530	---	823	888	---	1330	---	341	---	175	115	---
TOTAL	8424	10179	16024	28115	17031	52650	69372	20435	11886	6743	4390	9439
MEAN	272	339	517	907	587	1698	2312	659	396	218	142	315
MAX	530	760	2110	2030	879	5950	7420	1380	1260	579	289	1670
MIN	137	241	239	373	404	406	982	308	198	125	110	101
AC-FT	16710	20190	31780	55770	33780	104400	137600	40530	23580	13370	8710	18720

CAL YR 1987 TOTAL 336002 MEAN 921 MAX 20000 MIN 137 AC-FT 666500  
WTR YR 1988 TOTAL 254688 MEAN 696 MAX 7420 MIN 101 AC-FT 505200

e Estimated

## ARKANSAS RIVER BASIN

07241550 NORTH CANADIAN RIVER NEAR HARRAH, OK--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1969 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1968 to current year.

WATER TEMPERATURE: October 1968 to current year.

REMARKS.--Samples were collected by a local observer on a daily basis; partial analyses were made on those samples on or near the 5th, 15th, and 25th of each month. Additional samples were collected biweekly and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 4,700 microsiemens, Sept. 25, 1980; minimum daily, 262 microsiemens, June 9, 1974.

WATER TEMPERATURE: Maximum daily, 36.0 °C, July 11, 1982; minimum daily, 0.0 °C on several days during winter periods.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily (more than 20 percent missing record), 1,720 microsiemens, Sept. 8, 9; minimum daily, 466 microsiemens, Sept. 24.

WATER TEMPERATURE: Maximum daily (more than 20 percent missing record), 33.5 °C, Aug. 7; minimum daily, 6.0 °C, Jan. 24, Feb. 2, 3, Mar. 15.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	TUR- BID- ITY (NTU)	BARO- METRIC PRES- SURE (MM OF HG)
OCT											
05...	1920	1028	80020	--	*200	1410	8.30	--	20.0	--	--
07...	1230	1028	80020	5.17	179	1630	7.80	20.0	18.0	--	740
13...	1900	1028	80020	--	*168	1570	8.60	--	18.0	--	--
25...	1708	1028	80020	--	*355	1460	8.10	--	17.0	--	--
28...	1400	1028	80020	5.32	221	1440	8.10	21.0	17.0	--	740
NOV											
05...	2230	1028	80020	--	*260	1220	7.60	--	18.0	--	--
06...	1030	1028	80020	5.46	257	1270	7.80	13.0	15.5	--	740
15...	2033	1028	80020	5.53	279	1330	7.50	--	12.0	--	--
25...	1030	1028	80020	6.91	882	1000	7.40	3.0	13.0	--	740
25...	1735	1028	80020	6.35	607	755	7.20	--	13.0	--	--
DEC											
30...	1030	1028	80020	6.85	838	1160	7.80	-0.5	2.5	--	740
JAN											
20...	1030	1028	80020	6.97	893	870	7.60	1.5	5.5	--	740
21...	1645	1028	80020	7.99	1470	927	7.30	--	9.0	--	--
25...	1653	1028	80020	7.24	1030	740	7.50	--	7.0	--	--
29...	1400	1028	80020	7.01	909	1340	7.80	16.5	9.0	--	740
30...	1717	1028	80020	7.01	911	1480	7.60	--	9.0	--	--
FEB											
05...	1640	1028	80020	6.83	801	**1530	7.60	--	8.0	--	--
15...	1643	1028	80020	6.01	420	**1470	7.90	--	6.0	--	--
18...	1400	1028	80020	5.97	404	880	7.60	14.0	10.0	--	740
26...	1100	1028	80020	6.35	550	1490	7.80	15.0	11.0	--	740
26...	1639	1028	80020	6.12	453	**1500	7.30	--	11.0	--	--
MAR											
03...	1530	1028	80020	14.58	6860	986	7.74	1.0	8.0	--	740
05...	1647	1028	80020	9.69	2620	1370	7.80	--	14.0	--	--
15...	1641	1028	80020	7.88	1350	1390	7.60	--	6.0	--	--
22...	1030	1028	80020	7.99	1410	1460	7.80	16.0	13.5	--	740
25...	1743	1028	80020	7.41	1060	582	7.80	--	14.0	--	--

\* MEAN DAILY DISCHARGE

\*\* SPECIFIC CONDUCTANCE, LAB (US/CM)



## ARKANSAS RIVER BASIN

07241550 NORTH CANADIAN RIVER NEAR HARRAH, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	TUR- BID- ITY (NTU)	BARO- METRIC PRES- SURE (MM OF HG)
APR											
12...	1300	1028	80020	9.65	2600	1350	7.80	17.0	14.0	--	740
14...	1923	1028	80020	8.63	1840	1490	--	--	12.0	--	--
15...	1859	1028	80020	8.49	1740	1260	--	--	13.0	--	--
27...	1200	1028	80020	7.93	1350	--	--	--	--	--	--
MAY											
05...	1220	1028	80020	7.21	914	1500	7.90	--	20.5	--	--
15...	1900	1028	80020	6.29	436	1480	7.80	--	26.0	--	--
19...	1130	1028	80020	6.08	342	1500	7.80	28.0	24.5	--	730
25...	1215	1028	80020	6.44	528	1490	7.90	--	24.0	--	--
31...	1030	1028	80020	5.98	346	1540	8.00	26.5	22.5	--	740
JUN											
04...	1015	1028	80020	6.14	424	1400	7.40	--	24.0	--	--
08...	1100	1028	80020	6.28	503	1560	7.80	28.0	26.5	--	730
15...	1650	1028	80020	6.29	532	1610	7.40	--	26.0	--	--
25...	1915	1028	80020	5.38	199	1490	7.50	--	29.0	--	--
JUL											
05...	1830	1028	80020	5.18	163	1270	7.30	--	32.5	--	--
07...	0900	1028	80020	5.15	159	1360	8.30	27.0	26.0	--	740
13...	1300	1028	80020	5.09	149	1350	8.40	35.0	31.5	8.1	740
15...	1700	1028	80020	5.75	361	1440	7.40	--	27.0	--	--
18...	0900	1028	80020	5.26	197	1570	7.80	26.0	27.0	--	730
25...	1850	1028	80020	4.97	125	1440	7.60	--	31.0	--	--
AUG											
05...	1800	1028	80020	5.07	158	1150	7.80	--	30.0	--	--
09...	1200	1028	80020	4.91	121	1520	8.00	37.5	28.5	5.9	740
15...	2010	1028	80020	4.90	118	1550	7.90	--	32.0	--	--
23...	1920	1028	80020	4.88	113	1540	7.80	--	31.0	--	--
SEP											
03...	1400	1028	80020	4.99	140	1180	8.30	--	26.0	--	--
15...	1150	1028	80020	5.06	158	1450	8.30	--	23.0	--	--
24...	1215	1028	80020	8.39	1760	466	8.20	--	21.0	--	--
30...	1100	1028	80020	6.05	499	508	7.40	13.0	18.5	96	740

## ARKANSAS RIVER BASIN

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07241550 NORTH CANADIAN RIVER NEAR HARRAH, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	HARD- NESS TOTAL (MG/L AS CAC03)	HARD- NESS NONCARB TOT FLD (MG/L AS CAC03)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)
OCT											
05...	--	--	--	--	--	--	--	--	--	--	--
07...	8.8	96	--	--	--	--	--	--	--	--	--
13...	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
28...	9.5	102	--	--	--	--	--	--	--	--	--
NOV											
05...	--	--	--	--	--	--	--	--	--	--	--
06...	6.5	67	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
DEC											
30...	13.2	100	--	340	340	86	31	120	--	3	--
JAN											
20...	11.9	97	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
29...	11.0	98	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--	--
FEB											
05...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
18...	11.7	107	--	--	--	--	--	--	--	--	--
26...	--	--	--	440	440	110	40	150	--	3	--
26...	--	--	--	--	--	--	--	--	--	--	--
MAR											
03...	10.8	94	--	--	--	--	--	--	--	--	--
05...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
22...	6.8	68	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
APR											
12...	7.6	76	--	--	--	--	--	--	--	--	--
14...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--	--
MAY											
05...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
19...	6.8	86	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
31...	7.0	84	--	--	--	--	--	--	--	--	--
JUN											
04...	--	--	--	--	--	--	--	--	--	--	--
08...	7.5	98	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
JUL											
05...	--	--	--	--	--	--	--	--	--	--	--
07...	7.2	92	--	--	--	--	--	--	--	--	--
13...	14.2	200	1000	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
18...	6.1	80	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
AUG											
05...	--	--	--	--	--	--	--	--	--	--	--
09...	7.1	95	150	310	150	81	26	180	55	5	10
15...	--	--	--	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--	--	--	--
SEP											
03...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
24...	--	--	--	--	--	--	--	--	--	--	--
30...	6.0	66	5600	130	28	34	9.7	49	--	2	--

07241550 NORTH CANADIAN RIVER NEAR HARRAH, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1997 TO SEPTEMBER 1998

DATE	BICAR- BONATE WATER WH IT FIELD (MG/L AS HC03)	CAR- BONATE WATER WH IT FIELD (MG/L AS C03)	ALKA- LITY WAT WH TOT IT FIELD (MG/L AS CAC03)	SULFATE DIS- SOLVED (MG/L AS S04)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SI02)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)
OCT											
05...	--	--	--	120	230	--	--	815	--	--	--
07...	305	0	250	--	--	--	--	--	--	--	--
13...	--	--	--	190	220	--	--	950	--	--	--
25...	--	--	--	180	230	--	--	863	--	--	--
28...	--	--	--	--	--	--	--	--	--	--	--
NOV											
05...	--	--	--	170	150	--	--	728	--	--	--
06...	268	0	220	--	--	--	--	--	--	--	--
15...	--	--	--	190	160	--	--	793	--	--	--
25...	185	0	152	--	--	--	--	--	--	--	--
25...	--	--	--	90	89	--	--	433	--	--	--
DEC											
30...	220	0	180	--	--	--	11	--	--	--	--
JAN											
20...	227	0	186	--	--	--	--	--	--	--	--
21...	--	--	--	120	100	--	--	560	--	--	--
25...	--	--	--	100	74	--	--	437	--	--	--
29...	276	0	226	--	--	--	--	--	--	--	--
30...	--	--	--	240	190	--	--	909	--	--	--
FEB											
05...	--	--	--	230	200	--	--	956	--	--	--
15...	--	--	--	200	190	--	--	901	--	--	--
18...	229	0	188	--	--	--	--	--	--	--	--
26...	261	0	214	--	--	--	13	--	--	--	--
26...	--	--	--	230	200	--	--	931	--	--	--
MAR											
03...	105	0	86	--	--	--	--	--	--	--	--
05...	--	--	--	230	180	--	--	860	--	--	--
15...	--	--	--	240	180	--	--	883	--	--	--
22...	278	0	228	--	--	--	--	--	--	--	--
25...	--	--	--	75	62	--	--	351	--	--	--
APR											
12...	--	--	--	--	--	--	--	--	--	--	--
14...	--	--	--	260	200	--	--	952	--	--	--
15...	--	--	--	210	160	--	--	793	--	--	--
27...	--	--	--	--	--	--	--	--	--	--	--
MAY											
05...	--	--	--	240	190	--	--	951	--	--	--
15...	--	--	--	220	190	--	--	936	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	220	210	--	--	925	--	--	--
31...	224	0	184	--	--	--	--	--	--	--	--
JUN											
04...	--	--	--	210	190	--	--	863	--	--	--
08...	205	0	168	--	--	--	--	--	--	--	--
15...	--	--	--	270	240	--	--	1000	--	--	--
25...	--	--	--	210	210	--	--	894	--	--	--
JUL											
05...	--	--	--	130	210	--	--	727	--	--	--
07...	249	5	212	--	--	--	--	--	--	--	--
13...	251	5	214	--	--	--	--	--	--	--	--
15...	--	--	--	230	190	--	--	894	--	--	--
18...	239	0	196	--	--	--	--	--	--	--	--
25...	--	--	--	150	250	--	--	820	--	--	--
AUG											
05...	--	--	--	97	170	--	--	597	--	--	--
09...	--	--	--	160	230	0.80	10	876	828	1.19	286
15...	--	--	--	140	250	--	--	834	--	--	--
23...	--	--	--	130	250	--	--	822	--	--	--
SEP											
03...	--	--	--	98	190	--	--	657	--	--	--
15...	--	--	--	170	210	--	--	840	--	--	--
24...	--	--	--	33	52	--	--	265	--	--	--
30...	--	--	--	--	--	--	6.7	--	--	--	--

## ARKANSAS RIVER BASIN

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07241550 NORTH CANADIAN RIVER NEAR HARRAH, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDE (MG/L)	NITRO- GEN, NITRATE TOTAL (MG/L AS N)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE TOTAL (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N02)	NITRO- GEN, N02+N03 TOTAL (MG/L AS N)	NITRO- GEN, N02+N03 DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4)	NITRO- GEN, ORGANIC DIS- SOLVED (MG/L AS N)
OCT											
05...	--	--	--	--	--	--	--	--	--	--	--
07...	14	--	3.79	--	0.210	0.69	--	4.00	0.180	0.23	0.72
13...	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
28...	37	--	--	--	--	--	3.60	--	--	--	--
NOV											
05...	--	--	--	--	--	--	--	--	--	--	--
06...	80	1.78	--	0.120	--	--	1.90	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
25...	432	1.10	--	0.100	--	--	1.20	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
DEC											
30...	85	1.05	--	0.050	--	--	1.10	--	--	--	--
JAN											
20...	58	0.720	--	0.080	--	--	0.800	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
29...	14	0.940	--	0.060	--	--	1.00	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--	--
FEB											
05...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
18...	6	1.20	--	0.100	--	--	1.30	--	--	--	--
26...	112	2.28	--	0.020	--	--	2.30	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--
MAR											
03...	929	0.650	--	0.050	--	--	0.700	--	--	--	--
05...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
22...	239	0.850	--	0.050	--	--	0.900	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
APR											
12...	432	0.560	--	0.040	--	--	0.600	--	--	--	--
14...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
27...	233	0.640	--	0.060	--	--	0.700	--	--	--	--
MAY											
05...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
19...	124	0.660	--	0.240	--	--	0.900	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
31...	94	1.04	--	0.360	--	--	1.40	--	--	--	--
JUN											
04...	--	--	--	--	--	--	--	--	--	--	--
08...	244	0.740	--	0.260	--	--	1.00	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
JUL											
05...	--	--	--	--	--	--	--	--	--	--	--
07...	58	3.02	--	0.280	--	--	3.30	--	--	--	--
13...	26	2.55	--	0.150	--	--	2.70	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
18...	41	3.97	--	0.130	--	--	4.10	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
AUG											
05...	--	--	--	--	--	--	--	--	--	--	--
09...	20	--	4.55	--	2.25	7.4	--	6.80	0.120	0.15	--
15...	--	--	--	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--	--	--	--
SEP											
03...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
24...	--	--	--	--	--	--	--	--	--	--	--
30...	422	--	1.33	--	0.070	0.23	--	1.40	0.080	0.10	--

## ARKANSAS RIVER BASIN

07241550 NORTH CANADIAN RIVER NEAR HARRAH, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N)	NITRO- GEN, TOTAL (MG/L AS N)	NITRO- GEN, TOTAL (MG/L AS NO3)	PHOS- PHOROUS TOTAL (MG/L AS P)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P)	PHOS- PHOROUS, ORTHO, TOTAL (MG/L AS P)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS P04)	PHOS- PHOROUS ORGANIC TOTAL (MG/L AS P)	PHOS- PHOROUS ORGANIC DIS- SOLVED (MG/L AS P)
OCT											
05...	--	--	--	--	--	--	--	--	--	--	--
07...	--	0.90	--	--	--	3.60	--	2.70	8.3	--	0.90
13...	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
28...	1.4	--	5.0	22	2.20	--	--	--	--	2.2	--
NOV											
05...	--	--	--	--	--	--	--	--	--	--	--
06...	1.6	--	3.5	15	1.60	--	1.30	--	--	0.30	--
15...	--	--	--	--	--	--	--	--	--	--	--
25...	2.6	--	3.8	17	0.860	--	0.730	--	--	0.13	--
25...	--	--	--	--	--	--	--	--	--	--	--
DEC											
30...	2.4	--	3.5	15	0.850	--	0.880	--	--	0.0	--
JAN											
20...	3.6	--	4.4	19	1.00	--	0.740	--	--	0.26	--
21...	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
29...	1.2	--	2.2	9.7	0.620	--	0.460	--	--	0.16	--
30...	--	--	--	--	--	--	--	--	--	--	--
FEB											
05...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
18...	3.0	--	4.3	19	1.00	--	0.740	--	--	0.26	--
26...	1.0	--	3.3	15	0.560	--	0.450	--	--	0.11	--
26...	--	--	--	--	--	--	--	--	--	--	--
MAR											
03...	1.0	--	1.7	7.5	0.240	--	0.160	--	--	0.08	--
05...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
22...	1.5	--	2.4	11	0.420	--	0.300	--	--	0.12	--
25...	--	--	--	--	--	--	--	--	--	--	--
APR											
12...	2.1	--	2.7	12	0.550	--	0.290	--	--	0.26	--
14...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
27...	1.4	--	2.1	9.3	0.590	--	0.400	--	--	0.19	--
MAY											
05...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
19...	3.8	--	4.7	21	1.20	--	0.950	--	--	0.25	--
25...	--	--	--	--	--	--	--	--	--	--	--
31...	0.60	--	2.0	8.9	0.970	--	0.540	--	--	0.43	--
JUN											
04...	--	--	--	--	--	--	--	--	--	--	--
08...	0.90	--	1.9	8.4	0.420	--	0.270	--	--	0.15	--
15...	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
JUL											
05...	--	--	--	--	--	--	--	--	--	--	--
07...	1.4	--	4.7	21	1.60	--	1.10	--	--	0.50	--
13...	2.1	--	4.8	21	3.40	--	1.80	1.46	4.5	1.6	--
15...	--	--	--	--	--	--	--	--	--	--	--
18...	1.9	--	6.0	27	1.20	--	1.20	--	--	0.0	--
25...	--	--	--	--	--	--	--	--	--	--	--
AUG											
05...	--	--	--	--	--	--	--	--	--	--	--
09...	--	--	--	--	--	0.050	--	0.120	0.37	--	0.0
15...	--	--	--	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--	--	--	--
SEP											
03...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
24...	--	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	0.280	--	0.730	2.2	--	0.0



## ARKANSAS RIVER BASIN

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07241550 NORTH CANADIAN RIVER NEAR HARRAH, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)
OCT											
05...	--	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	--	--	--
13...	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--	--
NOV											
05...	--	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
DEC											
30...	3	160	<0.5	<1	<5	<3	<10	12	<10	24	16
JAN											
20...	--	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--	--
FEB											
05...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
18...	--	--	--	--	--	--	--	--	--	--	--
26...	3	170	<0.5	<1	<5	<3	<10	12	<10	32	2
26...	--	--	--	--	--	--	--	--	--	--	--
MAR											
03...	--	--	--	--	--	--	--	--	--	--	--
05...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
APR											
12...	--	--	--	--	--	--	--	--	--	--	--
14...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--	--
MAY											
05...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
31...	--	--	--	--	--	--	--	--	--	--	--
JUN											
04...	--	--	--	--	--	--	--	--	--	--	--
08...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
JUL											
05...	--	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	--	--	--
13...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
18...	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--
AUG											
05...	--	--	--	--	--	--	--	--	--	--	--
09...	5	120	<0.5	<1	<5	<3	<10	15	<10	35	10
15...	--	--	--	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--	--	--	--
SEP											
03...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
24...	--	--	--	--	--	--	--	--	--	--	--
30...	3	97	<0.5	<1	<5	<3	<10	60	<10	11	2

07241550 NORTH CANADIAN RIVER NEAR HARRAH, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	MERCURY DIS- SOLVED (UG/L AS HG)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V)	ZINC, DIS- SOLVED (UG/L AS ZN)	CARBON, ORGANIC TOTAL (MG/L AS C)	PHENOLS TOTAL (UG/L)
OCT										
05...	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	--	--
13...	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--
NOV										
05...	--	--	--	--	--	--	--	--	--	--
06...	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--
DEC										
30...	<0.1	<10	<10	1	<1.0	900	<6	6	--	3
JAN										
20...	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--
FEB										
05...	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--
18...	--	--	--	--	--	--	--	--	--	--
26...	<0.1	<10	<10	<1	<1.0	1200	8	26	--	4
26...	--	--	--	--	--	--	--	--	--	--
MAR										
03...	--	--	--	--	--	--	--	--	--	--
05...	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--
APR										
12...	--	--	--	--	--	--	--	--	--	--
14...	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--
MAY										
05...	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--
31...	--	--	--	--	--	--	--	--	--	--
JUN										
04...	--	--	--	--	--	--	--	--	--	--
08...	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--
JUL										
05...	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	--	--
13...	--	--	--	--	--	--	--	--	9.0	--
15...	--	--	--	--	--	--	--	--	--	--
18...	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--
AUG										
05...	--	--	--	--	--	--	--	--	--	--
09...	<0.1	<10	<10	<1	<1.0	1100	<6	9	9.8	--
15...	--	--	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--	--	--
SEP										
03...	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--
24...	--	--	--	--	--	--	--	--	--	--
30...	<0.1	<10	<10	<1	<1.0	360	7	8	15	1

## ARKANSAS RIVER BASIN

07241550 NORTH CANADIAN RIVER NEAR HARRAH, OK--Continued

## PHYTOPLANKTON ANALYSES, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE TIME	OCT 28, 87 1400	NOV 25, 87 1030	DEC 30, 87 1030	FEB 26, 88 1100	MAR 22, 88 1030
TOTAL CELLS/ML	26000	15000	6000	23000	23000
	CELLS PER- /ML CENT	CELLS PER- /ML CENT	CELLS PER- /ML CENT	CELLS PER- /ML CENT	CELLS PER- /ML CENT
CHLOROPHYTA (GREEN ALGAE)					
..CHLOROPHYCEAE					
...CHLOROCOCCALES					
...OOCYSTACEAE					
....ANKISTRODESMUS	1200 5	800 5	600 10	6600 29	3600 16
...SCENEDESMACEAE					
....SCENEDESMUS	600 2	--	--	--	400 2
..VOLVOCALES					
...CHLAMYDOMONADACEAE					
....CHLAMYDOMONAS	200 <1	800 5	--	--	800 3
CHRYSOPHYTA (YELLOW-GREEN ALGAE)					
..BACILLARIOPHYCEAE					
...CENTRALES					
...COSCINODISCACEAE					
....CYCLOTELLA	--	200 1	--	200 <1	800 3
..PENNALES					
...NAVICULACEAE					
....NAVICULA	600 2	3200 21	1200 20	1600 7	1000 4
CYANOPHYTA (BLUE-GREEN ALGAE)					
..CYANOPHYCEAE					
...CHROOCOCCALES					
...CHROOCOCCACEAE					
....AGMENELLUM					
.....A. QUADRUPLICATUM	--	--	--	2200 10	800 3
....ANACYSTIS	23000 88	9800 65	4200 70	10000 43	15000 65
..OSCILLATORIALES					
...NOSTOCACEAE					
....ANABAENA	--	--	--	200 <1	--
...OSCILLATORIA					
....OSCILLATORIA	600 2	400 3	--	--	--
EUGLENOPHYTA (EUGLENOIDS)					
..EUGLENOPHYCEAE					
...EUGLENALES					
...EUGLENACEAE					
....EUGLENA	--	--	--	1800 8	200 <1

## ARKANSAS RIVER BASIN

07241550 NORTH CANADIAN RIVER NEAR HARRAH, OK--Continued

## PHYTOPLANKTON ANALYSES, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE TIME	APR 27, 88 1200	MAY 21, 88 1130	JUL 07, 88 0900	JUL 13, 88 1300	AUG 09, 88 1200
TOTAL CELLS/ML	14000	26000	26000	8200	13000
	CELLS PER- /ML CENT	CELLS PER- /ML CENT	CELLS PER- /ML CENT	CELLS PER- /ML CENT	CELLS PER- /ML CENT
CHLOROPHYTA (GREEN ALGAE)					
.CHLOROPHYCEAE					
..CHLOROCOCCALES					
...HYDRODICTYACEAE					
....PEDIASTRUM	--	--	1000 4	--	200 2
...OOCYSTACEAE					
....ANKISTRODESMUS	200 1	4800 18	1000 4	1200 15	3000 23
....CHLORELLA	--	2800 11	--	--	1000 8
...SCENEDESMACEAE					
....SCENEDESMUS	--	4600 18	14000 54	200 2	3600 28
..VOLVOCALES					
...CHLAMYDOMONADACEAE					
....CHLAMYDOMONAS	400 3	--	--	--	--
..ZYGNEMATALES					
....DESMIDIACEAE					
....CLOSTERIUM	--	2000 8	2000 8	--	--
....STAUSTRUM	--	--	200 <1	--	--
CHRYSTOPHYTA (YELLOW-GREEN ALGAE)					
.BACILLARIOPHYCEAE					
..CENTRALES					
...COSCINODISCACEAE					
....CYCLOTELLA	200 1	--	--	1000 12	400 3
..PENNALES					
...CYMBELLACEAE					
....CYMBELLA	--	--	--	--	200 2
...NAVICULACEAE					
....NAVICULA	1400 10	1600 6	1600 6	1200 15	3200 25
CYANOPHYTA (BLUE-GREEN ALGAE)					
.CYANOPHYCEAE					
..CHROOCOCCALES					
...CHROOCOCCACEAE					
....AGMENELLUM					
....ANACYSTIS	9400 67	9800 38	3600 14	4600 56	1400 11
EUGLENOPHYTA (EUGLENOIDS)					
.EUGLENOPHYCEAE					
..EUGLENALES					
...EUGLENACEAE					
....EUGLENA	400 3	200 <1	3000 12	--	200 2

ARKANSAS RIVER BASIN

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07241550 NORTH CANADIAN RIVER NEAR HARRAH, OK--Continued

PHYTOPLANKTON ANALYSES, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	SEP 30, 88
TIME	1100
TOTAL CELLS/ML	28000
	CELLS PER- /ML CENT
CHLOROPHYTA (GREEN ALGAE)	
..CHLOROPHYCEAE	
...CHLOROCOCCALES	
...OOCYSTACEAE	
....ANKISTRODESMUS	1000 4
CHRYSTOPHYTA (YELLOW-GREEN ALGAE)	
..BACILLARIOPHYCEAE	
...CENTRALES	
...COSCINODISCACEAE	
....CYCLOTELLA	600 2
..PENNALES	
...NAVICULACEAE	
....NAVICULA	2200 8
CYANOPHYTA (BLUE-GREEN ALGAE)	
..CYANOPHYCEAE	
...CHROOCOCCALES	
...CHROOCOCCACEAE	
....ANACYSTIS	24000 86



## ARKANSAS RIVER BASIN

07241550 NORTH CANADIAN RIVER NEAR HARRAH, OK--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1220	712	---	---	1670	622	---	1250	1530	1140	1380	1500
2	1360	1090	---	---	1700	---	---	1420	1240	1050	1460	1460
3	1450	1210	---	---	1690	871	---	1370	1250	1060	1550	1180
4	1530	1140	---	---	1630	1300	---	1460	1400	1280	1600	---
5	1410	1220	---	---	1700	1370	---	1500	1440	1270	1150	1530
6	1510	1270	---	---	---	---	---	1490	1330	1300	1440	1640
7	1680	1310	---	---	---	---	---	1500	1510	1340	1620	1610
8	---	---	---	---	1680	1170	---	1520	1560	1380	1490	1720
9	1530	---	---	---	1670	---	---	1540	1570	1430	---	1720
10	---	---	---	---	1680	---	---	1560	1570	1380	---	1590
11	1650	---	---	---	---	---	---	1550	1560	1410	880	1540
12	1570	---	---	---	1690	1430	---	1540	1500	1420	1320	1540
13	1570	---	---	---	1580	1390	---	1480	1480	1400	1490	1510
14	1580	---	---	---	1640	1340	1490	1470	1540	1410	1570	1520
15	---	1330	---	---	1640	1390	1260	1480	1610	1440	1550	1450
16	---	1350	---	---	---	1450	---	1150	1600	1470	1610	---
17	---	1360	---	---	1660	1450	---	1440	1560	1560	---	---
18	---	---	---	---	1650	1460	---	1500	---	1450	1640	1230
19	---	1160	---	---	---	1460	---	1520	1500	---	1630	1290
20	---	1140	---	---	1650	1420	---	1640	1430	986	1640	626
21	---	1240	---	927	1650	---	---	1660	1490	1240	1390	997
22	1520	---	---	774	---	---	---	1620	1480	1340	1480	1350
23	1550	1320	---	955	---	---	---	1560	1430	1340	1540	715
24	1380	1220	---	1140	1670	---	---	1490	1460	1420	1610	466
25	1460	755	---	740	---	582	---	1490	1490	1440	---	560
26	1360	1220	---	1060	1670	---	---	1430	1400	1450	1670	---
27	1370	1230	---	1440	---	---	---	1480	1480	1380	1660	988
28	1370	1270	---	1470	---	---	---	1490	1220	609	1610	---
29	1310	---	---	1480	---	523	---	1490	472	930	1600	1100
30	1300	---	---	1480	---	---	---	1490	524	936	1560	---
31	1280	---	---	---	---	---	---	1510	---	1080	1560	---

WATER TEMPERATURE, DEGREES CENTIGRADE, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24.0	21.0	---	---	8.0	11.0	---	19.0	25.0	30.0	30.0	28.0
2	24.0	20.0	---	---	6.0	---	---	19.0	25.0	27.0	30.0	27.0
3	22.0	21.0	---	---	6.0	12.0	---	16.5	23.0	24.0	30.0	26.0
4	21.0	21.0	---	---	9.0	14.0	---	21.5	24.0	31.0	31.0	---
5	20.0	18.0	---	---	8.0	14.0	---	20.5	23.5	32.5	30.0	27.0
6	20.0	17.0	---	---	---	---	---	21.5	28.0	29.0	32.5	28.0
7	20.0	16.0	---	---	---	---	---	21.0	29.0	29.0	33.5	26.5
8	---	---	---	---	7.0	11.0	---	23.0	31.0	29.0	28.5	26.0
9	20.5	---	---	---	8.0	---	---	22.0	28.0	30.0	---	24.0
10	---	---	---	---	9.0	---	---	25.0	27.5	29.0	---	28.5
11	14.0	---	---	---	---	---	---	24.5	27.0	27.5	29.5	28.5
12	18.0	---	---	---	9.0	7.0	---	27.0	28.0	32.0	31.0	27.0
13	18.0	---	---	---	8.0	8.0	---	24.0	27.0	31.0	32.0	26.0
14	19.0	---	---	---	7.0	7.0	12.0	25.0	26.0	30.0	30.5	25.5
15	---	12.0	---	---	6.0	6.0	13.0	26.0	26.0	27.0	32.0	23.0
16	---	15.0	---	---	---	9.0	---	25.5	26.0	27.0	32.0	---
17	---	14.0	---	---	8.0	10.0	---	25.5	29.0	30.0	---	---
18	---	---	---	---	10.0	9.0	---	27.0	---	31.0	32.0	25.0
19	---	11.0	---	---	---	10.0	---	26.5	26.0	---	29.0	24.0
20	---	12.0	---	---	11.0	11.0	---	27.0	29.5	28.0	32.0	25.5
21	---	12.0	---	9.0	13.0	---	---	25.0	30.0	28.0	32.0	26.5
22	14.0	---	---	8.0	---	---	---	21.0	29.0	27.0	32.0	28.5
23	16.0	14.0	---	8.0	---	---	---	20.0	31.0	28.0	31.0	23.5
24	---	15.0	---	6.0	14.0	---	---	22.0	31.0	28.0	31.0	21.0
25	17.0	13.0	---	7.0	---	14.0	---	24.0	29.0	31.0	---	21.0
26	19.0	9.0	---	9.0	11.0	---	---	26.5	25.0	31.5	31.0	---
27	16.5	8.0	---	10.0	---	---	---	23.0	29.0	28.5	28.0	26.0
28	16.5	9.0	---	13.0	---	---	---	26.0	32.0	28.0	22.0	---
29	18.0	---	---	14.0	---	15.0	---	23.0	29.0	30.0	26.0	21.0
30	18.0	---	---	9.0	---	---	---	26.0	29.0	32.0	26.0	---
31	21.0	---	---	---	---	---	---	25.0	---	32.0	26.0	---

## ARKANSAS RIVER BASIN

## 07242000 NORTH CANADIAN RIVER NEAR WETUMKA, OK

LOCATION.--Lat 35°15'56", long 96°12'22" (revised), in center of SW 1/4 sec.12, T.9 N., R.10 E., Hughes County, Hydrologic Unit 11100302, on left downstream side of bridge on U.S. Highway 75, 2.3 mi upstream from Wewoka Creek, 2.5 mi northeast of Wetumka, and at mile 84.4.

DRAINAGE AREA.--14,290 mi<sup>2</sup> of which 4,899 mi<sup>2</sup> is probably noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1937 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 977: 1942. WSP 1341: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 683.28 ft above National Geodetic Vertical Datum of 1929. Prior to Jan. 19, 1939, nonrecording gage at same site and datum.

REMARKS.--Records good. Some regulation by Lake Overholser (station 07240500) and other dams upstream. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--51 years, 720 ft<sup>3</sup>/s, 521,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 66,000 ft<sup>3</sup>/s, Apr. 15, 1945, gage height, 26.40 ft, no flow Aug. 27 to Oct. 11, 1954, Aug. 25 to Oct. 22, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in October 1923 reached a stage of 26.9 ft, from information provided by U.S. Army Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 16,300 ft<sup>3</sup>/s, Apr. 2, gage height, 12.84 ft; minimum daily discharge, 69 ft<sup>3</sup>/s, Sept. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	363	329	428	1210	1030	697	12200	1550	514	339	329	78
2	495	321	411	1060	1010	1540	15500	1450	509	489	241	78
3	441	307	397	1040	989	6340	14700	1510	499	765	216	85
4	340	570	380	1000	981	4840	13900	1600	506	486	e170	87
5	292	590	368	919	968	4350	11700	1500	618	461	e155	93
6	272	439	376	863	937	4300	8920	1360	603	390	e146	93
7	258	400	382	563	915	3750	6430	1280	526	319	e143	91
8	258	398	372	577	905	2550	3800	1240	511	283	140	87
9	251	378	363	648	898	1640	2920	1200	498	258	135	85
10	244	355	352	668	890	1870	2520	1170	496	247	130	84
11	235	350	350	827	867	2060	2400	1150	498	276	123	75
12	238	360	350	1130	815	1620	2240	1120	522	269	121	71
13	235	375	351	1750	792	1450	2750	1090	532	249	117	69
14	230	381	409	1580	778	1380	2670	1070	530	219	131	73
15	240	437	774	1600	745	1380	2900	1050	461	200	164	76
16	361	638	622	1900	706	1340	2330	1030	394	199	139	91
17	356	498	565	3840	690	1370	2150	963	361	201	117	100
18	308	450	510	2910	717	1920	2330	885	349	258	97	133
19	330	472	2860	2200	1100	1790	2240	817	459	343	98	289
20	468	594	4450	2160	1060	1690	2880	915	464	296	95	455
21	498	528	2270	2030	957	1640	3280	774	418	270	91	431
22	492	517	1790	1660	822	1420	2390	737	401	256	91	373
23	478	470	1530	1160	773	1360	2000	730	391	200	93	384
24	467	460	923	1320	709	1350	1800	692	376	216	95	449
25	421	739	3200	1310	694	1470	1660	753	357	197	96	314
26	397	726	6180	1230	731	1400	1570	839	328	183	95	285
27	358	600	4210	1240	775	1270	1450	785	318	186	87	535
28	337	593	2830	1130	782	1150	1390	683	310	2770	82	991
29	367	597	2190	1430	763	7390	1460	590	309	1110	80	639
30	375	473	1630	1320	---	8520	1580	545	315	364	80	435
31	358	---	1450	1090	---	6070	---	524	---	244	82	---
TOTAL	10763	14345	43273	43365	24799	80917	136060	31602	13373	12543	3979	7129
MEAN	347	478	1396	1399	855	2610	4535	1019	446	405	128	238
MAX	498	739	6180	3840	1100	8520	15500	1600	618	2770	329	991
MIN	230	307	350	563	690	697	1390	524	309	183	80	69
AC-FT	21350	28450	85830	86010	49190	160500	269900	62680	26530	24880	7890	14140

CAL YR 1987 TOTAL 563894 MEAN 1545 MAX 13900 MIN 230 AC-FT 1118000  
WTR YR 1988 TOTAL 422148 MEAN 1153 MAX 15500 MIN 69 AC-FT 837300

e Estimated

07242000 NORTH CANADIAN RIVER NEAR WETUMKA, OK--Continued  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1952, 1954 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1953 to current year.

WATER TEMPERATURE: October 1953 to current year.

REMARKS.--Samples were collected by a local observer on a daily basis. Additional samples were collected on a 6-week schedule. Specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 37,100 microsiemens, Dec. 31, 1954; minimum daily, 98 microsiemens, Apr. 30, 1977.

WATER TEMPERATURE: Maximum daily, 39.0 °C, July 5, 1971; minimum daily, 0.0 °C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 1,820 microsiemens, Mar. 1; minimum daily, 192 microsiemens, Dec. 26.

WATER TEMPERATURE: Maximum daily, 30.0 °C, July 17; minimum daily, 0.0 °C, Jan. 6.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	TUR- BID- ITY (NTU)	BARO- METRIC PRES- SURE (MM OF HG)
OCT											
14...	1330	1028	80020	1.31	227	*1350	8.70	23.5	18.0	14	750
DEC											
01...	1315	1028	80020	1.91	421	785	7.50	11.0	8.0	--	750
JAN											
05...	1430	1028	80020	2.96	926	*1100	7.60	-2.5	0.5	82	760
FEB											
23...	1401	1028	80020	2.58	778	1040	7.80	15.0	11.5	74	750
APR											
01...	1330	1028	80020	11.57	14800	275	7.30	17.0	13.0	--	740
MAY											
17...	1300	1028	80020	1.97	970	*1440	8.80	31.0	24.5	80	740
JUN											
23...	0850	1028	80020	1.16	390	1510	8.50	27.5	28.0	30	740
AUG											
02...	1200	1028	80020	1.18	281	1250	8.20	33.0	31.0	--	750
SEP											
27...	1300	1028	80020	1.25	394	791	8.20	24.0	24.0	94	750

DATE	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP- TOCOC- CI FECAL, KF AGAR (COLS. PER 100 ML)	HARD- NESS TOTAL (MG/L AS CAC03)	HARD- NESS NONCARB WH WAT TOT FLD (MG/L AS CAC03)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM AD- SORP- TION RATIO	
OCT 14...	--	--	6	11	350	80	90	29	150	48	4
DEC 01...	14.4	124	--	--	240	67	62	20	76	40	2
JAN 05...	17.0	118	540	230	320	120	82	27	110	42	3
FEB 23...	--	--	84	60	350	100	90	31	110	40	3
APR 01...	9.6	94	--	--	180	120	43	17	--	--	--
MAY 17...	10.4	129	60	--	440	170	110	39	140	41	3
JUN 23...	8.2	109	10	21	370	150	86	37	150	47	4
AUG 02...	7.8	107	--	--	290	100	68	30	140	50	4
SEP 27...	10.9	132	210	190	200	53	53	17	76	44	2

\* SPECIFIC CONDUCTANCE, LAB (US/CM)

07242000 NORTH CANADIAN RIVER NEAR WETUMKA, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH FET FIELD (MG/L AS HC03)	CAR- BONATE WATER WH FET FIELD (MG/L AS C03)	ALKA- LINITY WAT WH TOT FET FIELD (MG/L AS CAC03)	CARBON DIOXIDE DIS- SOLVED (MG/L AS C02)	SULFATE DIS- SOLVED (MG/L AS S04)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SI02)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L)
OCT 14...	7.3	320	0	266	1.0	84	220	0.70	8.2	772	752
DEC 01...	5.5	210	0	171	11	78	110	--	11	470	475
JAN 05...	6.3	250	0	202	9.8	150	160	0.50	11	657	675
FEB 23...	5.4	300	0	250	7.7	140	150	0.50	15	704	703
APR 01...	3.7	77	0	63	6.1	28	--	--	7.0	156	--
MAY 17...	5.8	280	24	266	0.7	210	190	0.70	8.4	860	890
JUN 23...	6.2	250	10	218	1.2	210	210	0.80	5.3	869	847
AUG 02...	8.6	230	0	192	2.3	130	200	--	3.2	719	704
SEP 27...	6.2	--	--	--	--	72	110	0.60	8.6	445	441
DATE	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N02)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N)	
OCT 14...	1.05	473	--	<0.010	--	<0.100	0.020	0.010	0.01	3.7	
DEC 01...	0.64	534	--	<0.010	--	1.50	--	0.050	0.06	--	
JAN 05...	0.89	1640	0.940	0.020	0.07	0.960	0.860	0.930	1.2	1.6	
FEB 23...	0.96	1480	1.90	0.100	0.33	2.00	0.050	0.050	0.06	0.75	
APR 01...	--	--	0.340	0.010	0.03	0.350	--	0.060	0.08	--	
MAY 17...	1.17	2250	--	--	--	--	0.030	--	--	0.27	
JUN 23...	1.18	915	--	0.010	0.03	<0.100	0.090	0.110	0.14	1.8	
AUG 02...	0.98	546	1.49	0.110	0.36	1.60	--	0.060	0.08	--	
SEP 27...	0.61	473	1.18	0.020	0.07	1.20	0.020	0.030	0.04	0.58	
DATE	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS- PHOROUS TOTAL (MG/L AS P)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS P04)	PHOS- PHOROUS ORGANIC TOTAL (MG/L AS P)	PHOS- PHOROUS ORGANIC DIS- SOLVED (MG/L AS P)	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	
OCT 14...	3.7	1.20	0.720	0.630	1.9	1.2	0.09	<10	8	180	
DEC 01...	--	--	--	0.680	2.1	--	--	--	3	140	
JAN 05...	2.5	0.440	0.440	0.330	1.0	0.44	0.11	--	2	200	
FEB 23...	0.80	0.660	0.580	0.480	1.5	0.66	0.10	<10	3	190	
APR 01...	--	--	--	0.040	0.12	--	--	--	1	150	
MAY 17...	0.30	0.400	0.300	--	--	0.40	0.30	<10	6	240	
JUN 23...	1.9	0.490	0.200	0.150	0.46	0.49	0.05	--	--	--	
AUG 02...	--	--	--	0.150	0.46	--	--	--	6	230	
SEP 27...	0.60	0.830	0.670	0.530	1.6	0.83	0.14	30	7	140	

## ARKANSAS RIVER BASIN

07242000 NORTH CANADIAN RIVER NEAR WETUMKA, OK--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	BERYL- LIUM, DIS- SOLVED (UG/L AS BE)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON; DIS- SOLVED (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY DIS- SOLVED (UG/L AS HG)
OCT 14...	<0.5	<1	<1	<3	3	3	<5	45	10	0.1
DEC 01...	<0.5	<1	<5	<3	<10	21	<10	24	10	<0.1
JAN 05...	<10	<1	1	<50	<10	40	<100	20	20	<0.1
FEB 23...	<0.5	<1	1	<3	2	22	<5	29	14	<0.1
APR 01...	<0.5	1	<5	<3	10	95	<10	15	8	<0.1
MAY 17...	<0.5	<1	<1	<3	7	8	<5	40	2	0.2
JUN 23...	--	--	--	--	--	--	--	--	--	--
AUG 02...	<0.5	<1	<5	<3	<10	10	10	29	1	0.3
SEP 27...	<0.5	<1	1	<3	1	31	<5	18	1	0.2
DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V)	ZINC, DIS- SOLVED (UG/L AS ZN)	SEDI- MENT, SUS- PENDED (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
OCT 14...	<10	3	<1	1.0	1200	11	<3	--	--	--
DEC 01...	<10	<10	--	<1.0	610	<6	4	--	--	--
JAN 05...	<10	<100	--	<1.0	800	<6	10	--	--	--
FEB 23...	<10	<1	<1	<1.0	940	6	4	189	397	90
APR 01...	<10	<10	--	<1.0	420	<6	8	--	--	--
MAY 17...	<10	2	<1	1.0	1100	14	4	238	623	94
JUN 23...	--	--	--	--	--	--	--	308	324	43
AUG 02...	10	10	--	<1.0	860	17	33	--	--	--
SEP 27...	<10	5	<1	<1.0	610	10	<3	670	713	92



## 07242000 NORTH CANADIAN RIVER NR WETUMKA, OK--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1090	1180	963	893	1440	1820	451	1360	1330	1320	1040	1160
2	1120	1290	1090	882	1450	1230	254	1280	1340	1360	1360	1220
3	876	1300	1180	992	1460	423	257	1300	1370	1260	1060	1300
4	712	1300	1160	1090	1490	374	272	1360	1310	689	833	1060
5	769	1280	1210	1130	1490	442	402	1180	1340	652	909	1020
6	886	697	1200	1070	1480	458	432	1300	1400	723	1060	1160
7	---	1040	1210	1100	1500	540	555	1350	1170	903	1010	1170
8	1070	778	1230	1040	1540	541	529	1310	1140	1060	1080	1090
9	1160	1130	1230	1150	1510	568	634	1380	1260	1070	1090	---
10	1220	1160	1260	1170	1320	808	756	1400	1260	1020	1120	1180
11	1290	1150	1260	1190	1540	815	820	1420	1300	988	1300	1030
12	1200	1210	1280	1220	1550	878	947	1390	1280	1000	1370	1180
13	1290	1270	1260	---	1550	968	1090	1370	1470	1090	1310	1200
14	1310	1270	1210	810	1510	1050	1080	1410	1410	1120	1310	1180
15	1340	1260	890	780	1510	1180	993	1360	1470	1150	1300	1320
16	1280	1070	920	871	1540	1220	1080	1440	1410	1200	1270	1300
17	1480	1050	1010	755	1550	1240	1110	1420	1390	1230	1320	1400
18	1310	1100	1040	815	1520	1100	1250	1390	1310	1220	1130	1200
19	1300	1190	860	497	1470	1190	1220	1320	1300	1230	1070	930
20	1390	1230	372	555	1140	1170	1290	1300	1370	1340	1150	949
21	1510	881	452	772	1110	1240	1250	1350	1490	1340	1260	842
22	1400	1180	490	714	1330	1080	794	1140	1450	1320	1340	744
23	1440	1210	784	791	1250	1190	852	1180	1430	1330	1370	668
24	1470	1220	501	824	1270	1270	1040	1290	1360	1390	1490	967
25	1370	1050	279	844	1420	1290	1190	1320	1260	1180	1390	660
26	1380	1010	192	824	1440	1300	1260	1300	1390	1310	1360	730
27	1380	701	216	897	1540	1360	1300	1460	1280	1220	1340	782
28	1390	977	267	941	1380	1360	1350	1530	1290	527	1380	713
29	1380	933	452	1050	1530	910	1340	1470	1270	231	1400	495
30	1340	1060	535	1170	---	376	1390	1380	1320	732	1270	563
31	1300	---	704	1070	---	420	---	1370	---	354	1280	---
MEAN	1250	1110	862	930	1440	962	906	1350	1340	1050	1220	1010
WTR YR 1988		MEAN	1120	MAX	1820	MIN	192					

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19.0	17.0	6.0	1.0	11.0	10.0	14.0	18.0	24.5	28.5	27.5	20.0
2	17.0	17.0	6.0	.5	7.5	12.5	12.0	19.0	24.0	27.0	28.0	23.5
3	14.0	17.0	7.0	2.5	4.5	10.5	14.0	15.5	23.5	22.0	28.0	24.0
4	14.0	20.0	7.0	1.0	3.0	9.0	14.5	17.0	22.0	28.0	27.0	22.0
5	16.0	20.0	7.0	.5	.5	9.0	15.0	18.0	21.5	27.0	28.0	22.0
6	14.0	17.0	10.0	.0	1.0	8.0	15.0	20.0	22.0	27.0	28.0	20.0
7	---	17.0	12.0	.5	1.0	9.5	16.0	20.0	24.0	27.0	29.5	21.0
8	14.0	17.0	12.0	---	2.0	10.0	17.0	20.5	25.0	26.5	29.0	21.5
9	17.5	13.5	9.0	.5	4.0	10.0	17.0	20.5	24.0	25.0	29.5	---
10	15.0	9.5	7.5	1.0	1.0	11.0	15.0	21.0	22.0	25.0	28.0	22.0
11	12.0	5.0	7.0	1.0	5.5	12.0	13.5	20.5	21.5	25.5	28.5	22.0
12	12.0	6.0	7.0	2.0	.5	11.0	14.0	21.0	21.5	25.5	27.5	23.0
13	12.0	7.5	7.0	---	6.0	9.0	18.0	22.0	23.0	27.0	28.0	23.0
14	14.5	10.0	5.0	1.0	4.5	7.0	19.0	22.5	23.5	28.0	28.5	24.0
15	14.0	14.0	3.5	2.0	7.0	7.0	16.0	22.5	24.0	28.5	29.0	24.0
16	14.0	13.5	.5	2.5	4.5	7.0	15.0	23.0	25.0	29.0	28.0	25.0
17	14.5	19.0	2.5	5.5	7.5	7.5	12.0	23.0	24.5	30.0	28.0	25.5
18	14.0	19.0	4.0	1.0	8.0	9.5	15.5	25.0	26.5	28.0	29.0	25.0
19	18.0	7.0	5.0	5.0	7.0	8.5	12.0	25.5	27.0	28.0	28.0	24.0
20	15.5	7.0	7.0	7.5	7.0	9.5	14.0	25.0	26.5	28.0	28.0	20.0
21	15.0	8.5	5.0	5.5	5.5	12.5	17.0	23.0	27.5	25.5	28.0	23.0
22	14.5	9.0	5.0	6.0	7.5	13.0	19.0	24.0	28.0	23.0	28.0	24.0
23	15.0	10.0	7.5	3.5	9.0	15.0	12.5	20.0	28.0	23.0	28.0	25.0
24	16.0	14.0	8.5	4.5	8.0	16.5	18.0	20.0	28.0	25.0	28.0	23.0
25	16.0	12.0	7.0	4.0	7.5	15.0	18.0	23.0	28.5	26.0	28.0	20.0
26	17.0	9.0	3.0	2.0	10.5	15.0	17.0	22.5	28.5	26.5	28.0	20.0
27	15.0	10.0	1.5	2.5	11.0	15.0	15.0	21.0	26.0	---	28.0	20.0
28	16.0	5.0	1.0	4.5	7.0	12.5	15.0	20.0	28.0	22.0	24.0	21.0
29	17.0	5.5	2.0	7.0	10.5	10.0	17.0	23.0	28.0	24.0	20.0	20.0
30	16.0	6.0	2.0	10.0	---	14.5	17.5	24.0	28.0	26.5	20.0	20.0
31	16.5	---	2.5	14.0	---	14.0	---	24.0	---	28.0	20.0	---
MEAN	15.0	12.0	5.5	3.5	6.0	11.0	15.5	21.5	25.0	26.5	27.5	22.5
WTR YR 1988		MEAN	16.0	MAX	30.0	MIN	.0					

## 07242340 ARCADIA LAKE NEAR ARCADIA, OK

LOCATION.--Lat 35°38'54", long 97°21'47", in NW 1/4 SE 1/4 sec.36, T.14 N., R.2 W., Oklahoma County, Hydrologic Unit 11100303, 2.0 mi southwest of Arcadia and at mile 213.8.

DRAINAGE AREA.--105 mi<sup>2</sup>.

PERIOD OF RECORD.--November 1986 to current year.

REVISED RECORDS.--WDR OK-88-1: 1987 (M).

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by rolled earth dam. An uncontrolled saddle spillway is located on the left end of the dam. Outlet works consist of a 7- by 10-foot conduit and an 18-inch water-supply pipe. Impoundment began Nov. 9, 1986; conservation pool first filled May 29, 1987. Capacity 92,101 acre-ft at elevation 1,029.5 ft, top of flood-control pool and spillway crest; 27,580 acre-ft at elevation 1,006.0 ft, top of conservation pool. Dead storage 190 acre-ft below elevation 970.0 ft. Figures given herein represent total contents. Reservoir is used for flood control, water-quality control, recreation, fish and wildlife, and future water supply. U.S. Army Corps of Engineers' satellite telemeter located at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 42,200 acre-ft, June 11, 12, 1987, elevation, 1013.06 ft; minimum since conservation pool first filled, 15,000 acre-ft, July 29, 1987, November 23, 1987, elevation, 997.91 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents 26,400 acre-ft, Mar. 11, elevation 1,005.36 ft; minimum, 15,000 acre-ft, Nov. 23, elevation, 997.91 ft.

REVISIONS.--The maximum contents for the water year 1987 has been revised to 42,200 acre-ft, June 11, 12, 1987, elevation, 1,013.06 ft.

Capacity table (elevation, in feet, and contents, in acre-ft):

980	1,630	1,030	93,937
990	6,989	1,040	138,717
1,000	17,841	1,050	197,302
1,010	35,428	1,060	272,330
1,020	60,273	1,070	367,981

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15300	15900	15300	18200	21000	20900	25700	20700	20800	22700	21100	21000
2	15100	15800	15300	18300	21000	24000	25900	20800	20900	22400	21000	21300
3	15100	15800	15300	18400	20900	25300	26000	20800	20900	22200	21100	21400
4	15100	15700	15200	18400	20900	25500	26200	20800	20900	21900	21000	21300
5	15100	15600	15200	18500	20900	25900	26200	20800	20900	21600	21000	21300
6	15100	15500	15200	18600	20900	26000	26300	20800	20900	21300	21000	21300
7	15200	15500	15200	18600	20900	26200	26300	20900	20900	21100	21000	21200
8	15200	15400	15200	18700	20900	26300	26100	20900	20900	21000	21000	21100
9	15200	15300	15200	18800	20900	26300	26000	20900	20800	21000	21000	21100
10	15200	15200	15100	18800	20800	26300	26200	20900	20900	20900	21100	21000
11	15200	15200	15100	18900	20800	26300	25800	20900	20900	20900	21100	20900
12	15300	15100	15100	19100	20800	26300	25300	21000	20900	20900	21000	20800
13	15300	15100	15100	19300	20900	26300	24700	21000	20800	20900	21000	20800
14	15200	15200	15400	19400	20800	26000	24100	21000	20800	20800	20900	20800
15	15300	15600	15500	19500	20800	25300	23400	21200	20800	20800	20900	21000
16	15300	15700	15600	20000	20800	24700	22500	21300	20800	20800	20900	21200
17	15300	15600	15600	20200	20800	24500	22800	21200	20800	20800	20800	21200
18	15300	15500	15700	20300	20900	23700	22400	21000	20800	20800	20800	21500
19	15300	15400	17000	20500	21000	22900	21600	20800	20700	20800	20800	22000
20	15300	15300	17400	20500	21000	22100	21100	20700	20700	20800	21100	21900
21	15300	15100	17400	20600	21000	21300	20800	20600	20700	20700	21100	21600
22	15300	15100	17300	20600	20800	20800	20700	20600	20600	20700	21100	21400
23	15300	15000	17300	20700	20800	20700	20700	20600	20600	20600	21100	21600
24	15400	15300	17200	20700	20700	20800	20600	20600	20600	20600	21100	21800
25	15500	15300	17400	20700	20800	20800	20700	20600	20600	20600	21000	21600
26	15500	15300	17500	20700	20800	20900	20700	20600	20600	20600	21000	21500
27	15400	15400	17700	20800	20800	20900	20600	20600	20600	21100	20900	21300
28	15300	15400	17800	20900	20800	21400	20600	20600	21500	21200	20900	21200
29	15200	15400	17900	21000	20800	21600	20600	20600	22800	21200	21000	22000
30	15200	15400	18000	21000	---	21600	20700	20600	22700	21100	21000	21800
31	15900	---	18200	21000	---	23000	---	20700	---	21100	21000	---
MAX	15900	15900	18200	21000	21000	26300	26300	21300	22800	22700	21100	22000
MIN	15100	15000	15100	18200	20700	20700	20600	20600	20600	20600	20800	20800
(+)	998.60	998.19	1000.22	1002.13	1002.01	1003.34	1001.92	1001.97	1003.19	1002.18	1002.10	1002.62
(++)	-100	-500	+2,800	+2,800	-200	+2,200	-2,300	0	+2,000	-1,600	-100	+800

CAL YR 1987 MAX 42200 MIN 7460 (++) +10,770  
WTR YR 1988 MAX 26300 MIN 15000 (++) +5,800

(+) ELEVATION, IN FEET, AT END OF MONTH  
(++) CHANGE IN CONTENTS, IN ACRE-FEET

## 07242350 DEEP FORK NEAR ARCADIA, OK

LOCATION.--Lat 35°38'50", long 97°21'35", in NE 1/4 SW 1/4 sec.36, T.14 N., R.2 W., Oklahoma County, Hydrologic Unit 11100303, on right bank 400 ft downstream from Arcadia Dam, 2.0 mi southwest of Arcadia, 2.6 mi upstream from Coffee Creek, and at mile 213.7.

DRAINAGE AREA.--105 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1969 to current year.

REVISED RECORDS.--WDR OK-77-1: 1975 (M) (gage height only), WDR OK-84-1: 1983 (m).

GAGE.--Water-stage recorder. Datum of gage is 900.00 ft above National Geodetic Vertical Datum of 1929. Prior to Nov. 1, 1974, at site 0.9 mi downstream at datum 41.65 ft higher. May 2, 1978 to May 14, 1979, the gage was temporarily moved 1.9 mi downstream to county road bridge at datum 36.65 ft higher. May 15, 1979 to March 10, 1987, at site 0.6 mi downstream at datum 41.65 ft higher.

REMARKS.--Records fair. Regulation since November 1986 by Arcadia Lake (station 07242340), 400 ft upstream. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Prior to regulation by Arcadia Lake, 17 years (water years 1970-86), 66.3 ft<sup>3</sup>/s, 48,030 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,300 ft<sup>3</sup>/s, Nov. 2, 1974, gage height, 26.9 ft from floodmark at former site and datum; minimum daily, 0.03 ft<sup>3</sup>/s, July 10, 1988.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 509 ft<sup>3</sup>/s, Mar. 18, gage height, 54.87 ft; minimum daily discharge, 0.03 ft<sup>3</sup>/s, July 10.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	325	23	26	.17	e15	.09	2.0	.25	.49	143	.10	.09
2	58	23	26	.17	e29	2.7	.19	.29	.59	137	.10	.09
3	.06	42	26	.18	e29	.63	.20	.79	.52	136	.10	.09
4	.06	52	20	.18	e29	.11	.22	1.5	.48	135	.10	.09
5	.07	52	12	.18	e19	.13	.22	.70	.46	134	.10	.09
6	.07	52	12	.19	e14	.10	.21	.34	.46	134	.10	.09
7	.07	53	12	.19	e14	.12	.23	.37	.45	90	.10	.21
8	.08	52	9.9	.20	14	.09	93	.41	.42	28	.09	.33
9	.07	51	17	.17	14	1.3	187	.48	.41	.53	.09	.23
10	.07	50	21	.16	14	1.1	186	.57	.39	.03	.08	.18
11	.07	51	7.8	.16	15	.12	285	2.3	.36	.11	.08	.18
12	.07	25	.16	.19	16	.11	344	.51	.36	.07	.08	.18
13	.15	.11	.15	.16	16	.11	344	.58	.36	.07	.08	6.3
14	.09	.11	.17	.16	15	200	343	.88	.33	.08	.08	.10
15	.09	.11	.17	e.15	15	357	441	.74	.32	.08	.08	.10
16	.09	.11	e.16	e.14	16	356	507	.69	.30	.08	.08	.10
17	.07	58	e25	e.14	17	354	507	64	.28	.09	.08	.10
18	.07	110	e40	e.13	6.0	466	507	114	.28	.09	.08	.10
19	.10	110	e40	e.10	9.1	501	503	113	.27	.09	.08	.49
20	.10	80	e41	.09	27	497	331	64	.26	.09	.09	.99
21	.09	53	e50	e.10	27	494	164	26	.25	.09	.09	.99
22	.09	53	e69	e.10	51	268	96	25	.25	.33	.09	.99
23	.10	42	e69	e.12	74	55	45	9.7	.23	.08	.09	.99
24	.09	25	69	e.12	19	.11	45	.98	.21	.08	.09	.99
25	.09	25	70	e.12	.16	.11	45	.45	.21	.09	.09	.99
26	22	25	70	e.12	.11	.11	34	.44	.21	.09	.09	.99
27	50	25	69	e.12	.08	.13	28	.44	.21	.11	.09	.99
28	50	25	41	e.12	.08	.19	28	.41	.27	.10	.09	.99
29	50	25	.16	e.12	.09	.16	11	.42	.17	.10	.09	.99
30	36	26	.16	e.14	---	.17	.24	.45	96	.10	.09	.99
31	23	---	.17	e.15	---	.34	---	.47	---	.10	.09	---
TOTAL	615.91	1208.44	844.00	4.54	514.62	3556.03	5077.51	431.16	105.80	939.68	2.76	1276.34
MEAN	19.9	40.3	27.2	.15	17.7	115	169	13.9	3.53	30.3	.089	42.5
MAX	325	110	70	.20	74	501	507	114	96	143	.10	.99
MIN	.06	.11	.15	.09	.08	.09	.19	.25	.17	.03	.08	.09
AC-FT	1220	2400	1670	9.0	1020	7050	10070	855	210	1860	5.5	2530

CAL YR 1987 TOTAL 36219.93 MEAN 99.2 MAX 1100 MIN .06 AC-FT 71840  
WTR YR 1988 TOTAL 14576.79 MEAN 39.8 MAX 507 MIN .03 AC-FT 28910

e Estimated

## ARKANSAS RIVER BASIN

07242350 DEEP FORK NEAR ARCADIA, OK--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1970 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1969 to January 1980.

WATER TEMPERATURE: October 1969 to January 1980.

REMARKS.--A sample was collected monthly and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY	AGENCY	GAGE	DIS-	SPE-	PH	TEMPER-	TEMPER-	BARO-	OXYGEN,	
		COL- LECTING SAMPLE (CODE NUMBER)	ANA- LYZING SAMPLE (CODE NUMBER)		CHARGE, INST. (CUBIC FEET PER SECOND)	CIFIC CON- DUCT- ANCE (US/CM)						ATURE AIR (DEG C)
OCT 28...	1200	1028	80020	52.01	46	568	8.00	20.0	16.5	740	9.4	
NOV 04...	1200	1028	80020	52.02	52	511	8.20	22.0	19.5	740	8.6	
DEC 30...	1245	1028	80020	50.19	0.16	687	8.40	0.0	5.0	740	--	
JAN 20...	1400	1028	80020	50.11	0.12	*906	7.80	-1.0	3.0	740	13.3	
FEB 26...	1300	1028	80020	50.15	0.09	831	7.60	17.0	16.5	740	--	
MAR 22...	1245	1028	80020	53.09	161	610	8.20	21.0	12.0	740	8.6	
APR 28...	1100	1028	80020	51.56	28	608	7.80	18.0	16.5	740	8.9	
MAY 26...	1300	1028	80020	50.18	0.46	1350	7.80	27.0	25.0	735	10.3	
JUL 07...	1430	1028	80020	52.14	60	576	8.10	29.0	29.0	740	7.0	
27...	1045	1028	80020	50.14	0.12	*721	7.90	22.0	24.0	740	--	
AUG 30...	1230	1028	80020	50.10	0.09	806	8.20	20.0	25.0	740	12.4	
SEP 28...	1430	1028	80020	52.57	99	590	8.00	27.5	23.5	730	8.3	
DATE		OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	OXYGEN DEMAND, CHEM- ICAL (HIGH LEVEL) (MG/L)	HARD- NESS TOTAL (MG/L AS CAC03)	HARD- NESS NONCARB WH WAT TOT FLD (MG/L AS CAC03)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM AD- SORP- TION RATIO	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	SILICA, DIS- SOLVED (MG/L AS SiO2)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)
OCT 28...	99	22	180	180	42	19	28	0.9	37	5.1	0.300	
NOV 04...	97	--	200	200	45	20	30	1	36	5.0	--	
DEC 30...	--	15	320	320	66	38	36	0.9	28	8.4	3.30	
JAN 20...	102	28	450	450	88	56	39	0.8	--	6.9	4.10	
FEB 26...	--	--	--	--	--	--	--	--	--	--	--	3.00
MAR 22...	82	110	210	210	47	23	43	1	60	3.6	0.240	
APR 28...	94	31	200	200	45	22	40	1	53	2.3	<0.100	
MAY 26...	130	64	290	290	54	38	39	1	45	4.5	1.70	
JUL 07...	94	14	210	210	44	25	41	1	53	--	<0.100	
27...	--	30	320	320	61	40	34	0.9	32	14	4.40	
AUG 30...	155	20	360	360	61	51	44	1	35	17	6.80	
SEP 28...	102	19	230	230	46	27	42	1	54	3.2	<0.100	

\*SPECIFIC CONDUCTANCE, LAB (US/CM)



## ARKANSAS RIVER BASIN

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07242350 DEEP FORK NR ARCADIA, OK--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

		NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P)	PHOS- PHOROUS ORGANIC DIS- SOLVED (MG/L AS P)	BARIUM, DIS- SOLVED (UG/L AS BA)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)
OCT 28...		0.020	0.03	0.030	0.03	240	<0.5	<1	<5	<3	<10	8
NOV 04...		--	--	0.010	0.01	240	<0.5	<1	<5	<3	<10	5
DEC 30...		0.100	0.13	0.020	0.02	390	<0.5	1	<5	<3	<10	28
JAN 20...		0.140	0.18	0.020	0.02	610	<0.5	<1	<5	<3	<10	<3
FEB 26...		--	--	--	--	--	--	--	--	--	--	--
MAR 22...		0.010	0.01	<0.010	--	220	<0.5	<1	<5	<3	<10	7
APR 28...		0.260	0.33	0.020	0.02	230	<0.5	<1	<5	<3	<10	10
MAY 26...		0.040	0.05	0.050	0.05	280	<0.5	<1	<5	<3	<10	9
JUL 07...		0.010	0.01	0.020	0.02	230	<0.5	<1	<5	<3	<10	5
JUL 27...		0.130	0.17	0.040	0.04	440	<0.5	3	<5	<3	<10	64
AUG 30...		0.120	0.15	0.080	0.08	380	<0.5	2	<5	<3	<10	70
SEP 28...		0.040	0.05	0.020	0.02	240	<0.5	<1	<5	<3	<10	6
DATE		LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY DIS- SOLVED (UG/L AS HG)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	SILVER, DIS- SOLVED (UG/L AS AG)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V)	ZINC, DIS- SOLVED (UG/L AS ZN)	
OCT 28...		<10	8	3	<0.1	<10	<10	<1.0	570	<6	7	
NOV 04...		<10	<4	3	<0.1	<10	<10	<1.0	590	<6	<3	
DEC 30...		<10	6	430	<0.1	<10	<10	<1.0	810	<6	5	
JAN 20...		<10	9	280	<0.1	<10	<10	<1.0	1100	<6	4	
FEB 26...		--	--	--	--	--	--	--	--	--	--	
MAR 22...		<10	10	5	<0.1	<10	<10	<1.0	670	<6	6	
APR 28...		<10	9	590	<0.1	<10	<10	<1.0	650	<6	<3	
MAY 26...		<10	10	100	<0.1	<10	<10	<1.0	800	<6	5	
JUL 07...		<10	8	20	<0.1	<10	<10	1.0	680	<6	<3	
JUL 27...		<10	12	620	<0.1	<10	<10	<1.0	820	<6	20	
AUG 30...		<10	11	260	<0.1	<10	<10	<1.0	850	<6	5	
SEP 28...		<10	8	25	<0.1	<10	<10	<1.0	730	<6	5	



## ARKANSAS RIVER BASIN

07242380 DEEP FORK NEAR WARWICK, OK

LOCATION (REVISED).--Lat 35°40'51", long 97°00'29", NW 1/4 NE 1/4 sec. 20, T.14 N., R.3 E., Lincoln County, Hydrologic Unit 11100303, on left downstream abutment on U.S. Highway 66, 0.5 mi southwest of Warwick, and at mile 190.9.

DRAINAGE AREA.--532 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1983 to current year.

GAGE.--Water-stage recorder. Datum of gage is 823.05 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair. Considerable regulation by Arcadia Lake (station 07242340), 22.9 miles upstream, since November 1986. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--5 years, 306 ft<sup>3</sup>/s, 221,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,700 ft<sup>3</sup>/s Oct. 21, 1983, gage height, 22.05 ft, from high-water mark; minimum daily discharge, 0.05 ft<sup>3</sup>/s Aug. 23, 1987.

EXTREMES FOR CURRENT YEAR.--Maximum discharge 11,200 ft<sup>3</sup>/s, Apr. 2, gage height, 18.68 ft; minimum daily discharge, 3.9 ft<sup>3</sup>/s, Dec. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	539	101	56	42	30	28	8680	e145	57	305	49	14
2	217	84	52	27	54	2830	2040	e138	128	247	34	21
3	86	e74	52	28	58	4430	e1200	e130	99	238	25	82
4	61	e65	46	20	59	987	e800	e122	70	229	23	17
5	53	e54	36	7.4	55	e950	e750	e118	57	228	87	11
6	47	e47	32	4.3	43	e750	e700	e114	52	223	101	10
7	44	e40	26	179	e42	e600	e640	e109	51	211	32	11
8	43	e55	25	287	e39	e425	e650	e107	47	138	22	44
9	44	e53	17	193	e38	e315	e620	105	44	72	36	58
10	42	e51	24	141	e37	e250	e580	93	40	46	145	43
11	40	e47	26	117	e36	e170	e560	88	38	42	37	41
12	43	e45	8.3	204	e36	e120	e550	87	37	40	25	41
13	44	e44	3.9	291	51	e100	e520	83	35	39	25	40
14	42	e42	12	187	48	e91	e500	80	34	36	20	18
15	37	e75	40	188	42	e300	e550	85	33	29	18	24
16	38	e225	79	249	41	e500	e545	372	33	25	16	24
17	36	e200	70	171	42	e500	e1500	167	35	23	15	16
18	36	e175	68	104	72	e500	e2500	216	34	20	23	73
19	37	153	60	139	67	e600	e800	203	30	25	20	290
20	36	142	250	95	66	e700	e580	196	28	34	21	190
21	35	93	175	68	62	e700	e350	102	27	32	23	178
22	35	87	135	56	71	e700	e250	98	29	25	17	178
23	34	82	102	60	83	e400	e185	109	31	23	13	972
24	41	212	66	51	52	e150	e180	88	32	21	13	452
25	42	160	270	40	30	e80	e177	75	34	20	14	203
26	40	86	292	38	30	e51	e172	64	37	19	14	170
27	95	76	427	31	29	e47	e167	56	72	44	12	157
28	105	78	264	33	27	e250	e162	53	102	560	18	205
29	104	66	100	32	24	e215	e157	53	571	216	28	460
30	104	59	69	33	---	e190	e152	51	197	128	20	203
31	154	---	77	32	---	e170	---	52	---	78	17	---
TOTAL	2354	2771	2960.2	3147.7	1364	18099	27217	3559	2114	3416	963	4246
MEAN	75.9	92.4	95.5	102	47.0	584	907	115	70.5	110	31.1	142
MAX	539	225	427	291	83	4430	8680	372	571	560	145	972
MIN	34	40	3.9	4.3	24	28	152	51	27	19	12	10
AC-FT	4670	5500	5870	6240	2710	35900	53980	7060	4190	6780	1910	8420

CAL YR 1987 TOTAL 127476.09 MEAN 349 MAX 8950 MIN .05 AC-FT 252800  
WTR YR 1988 TOTAL 72210.9 MEAN 197 MAX 8680 MIN 3.9 AC-FT 143200

e Estimated

## 07243000 DRY CREEK NEAR KENDRICK, OK

LOCATION.--Lat 35°46'55", long 96°51'14" (revised), in NW 1/4 NW 1/4 sec.14, T.15 N., R.4 E., Lincoln County, Hydrologic Unit 11100303, near left bank on downstream side of county road bridge, 1.0 mi downstream from Beaver Creek and 4.5 mi west of Kendrick.

DRAINAGE AREA.--69.0 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1955 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 820 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Oct. 1, 1981, gage at same site and datum 5.00 ft higher.

REMARKS.--Records poor. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office.

AVERAGE DISCHARGE.--33 years, 23.9 ft<sup>3</sup>/s, 17,320 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,000 ft<sup>3</sup>/s, Nov. 2, 1974, gage height, 24.20 ft present datum; no flow at times in most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Mar. 2	2045	3,890	19.21	Apr. 1	0530	*6,770	*21.22
Mar. 29	0015	2,910	16.96				

No flow at times.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.7	e15	e2.3	e20	13	13	3240	9.5	4.4	2.1	2.6	.54
2	e9.2	e8.0	e2.4	e17	12	1200	209	9.3	16	2.1	2.2	.81
3	e9.2	e5.2	e2.5	e15	12	629	66	9.3	12	2.3	1.9	.96
4	e9.0	e3.4	e2.7	e13	12	155	43	8.7	5.9	2.0	1.7	.73
5	e8.8	e4.7	e2.5	e12	11	144	31	8.4	5.2	1.5	1.9	.51
6	e8.5	e4.6	e2.3	e11	12	77	24	8.3	5.0	1.4	3.6	.38
7	e8.6	e4.6	e2.6	e11	12	34	22	8.5	4.7	1.3	2.3	.36
8	e8.5	e4.1	e2.2	e11	11	21	20	8.3	4.5	2.0	1.6	.30
9	e8.3	e4.1	e2.5	e11	11	16	18	7.4	4.1	2.1	2.2	.31
10	e8.1	e3.9	e2.6	e11	10	28	101	7.0	3.8	1.4	2.4	.35
11	e7.8	e3.8	e6.0	e11	10	23	35	6.8	3.7	1.4	e1.0	.33
12	e7.0	e3.5	e11	e11	12	12	24	6.7	3.6	1.4	e.50	.28
13	e6.8	e3.2	e18	e11	9.7	10	21	6.4	3.5	1.2	e.30	.00
14	e6.6	e3.2	20	e23	9.5	9.1	19	6.0	3.4	.95	e.15	.00
15	e6.2	e3.4	22	23	8.4	7.8	17	5.8	3.2	.53	e.05	3.2
16	e6.2	e3.5	e21	57	8.1	7.7	15	6.1	3.3	.36	e.03	2.7
17	e5.9	e3.3	21	32	8.0	6.8	24	5.8	3.4	.37	e.03	2.0
18	e6.0	e3.5	28	25	9.5	e6.2	30	5.5	3.2	.33	e.03	9.5
19	e6.0	e3.8	263	25	19	e6.2	19	5.3	2.9	.88	e.00	19
20	e6.1	e3.5	70	21	12	e6.0	17	5.7	2.7	1.9	e.00	4.2
21	e6.0	e10	15	19	8.9	e5.8	16	6.2	2.6	.71	e.00	1.8
22	e5.8	e25	10	18	8.3	e5.6	15	5.6	2.5	.34	e.00	1.3
23	e5.4	40	9.0	18	7.1	e5.4	12	6.7	2.3	.28	e.06	26
24	e5.2	83	8.2	17	6.6	e5.3	12	7.7	2.3	.14	e.05	24
25	e5.1	12	69	15	6.5	e5.7	12	5.6	2.2	.04	e.04	4.7
26	e5.0	4.5	64	15	6.5	5.0	12	5.0	2.3	.03	e.10	2.5
27	e4.9	4.1	134	14	6.4	4.8	11	4.7	3.4	1.3	.27	1.8
28	e4.8	e3.5	72	14	6.0	288	10	4.3	10	83	1.0	3.1
29	e4.8	e3.0	28	14	5.8	954	10	4.4	7.9	8.1	1.2	64
30	27	e2.5	25	14	---	77	10	5.1	2.8	5.0	.82	7.7
31	34	---	32	14	---	247	---	4.4	---	3.4	.67	---
TOTAL	260.5	281.9	970.8	543	284.3	4015.4	4115	204.5	136.8	129.86	28.70	183.36
MEAN	8.40	9.40	31.3	17.5	9.80	130	137	6.60	4.56	4.19	.93	6.11
MAX	34	83	263	57	19	1200	3240	9.5	16	83	3.6	64
MIN	4.8	2.5	2.2	11	5.8	4.8	10	4.3	2.2	.03	.00	.00
AC-FT	517	559	1930	1080	564	7960	8160	406	271	258	57	364

CAL YR 1987 TOTAL 13811.61 MEAN 37.8 MAX 1220 MIN .35 AC-FT 27400  
WTR YR 1988 TOTAL 11154.12 MEAN 30.5 MAX 3240 MIN .00 AC-FT 22120

e Estimated

## 07243500 DEEP FORK NEAR BEGGS, OK

LOCATION.--Lat 35°40'31", long 96°03'55", NW 1/4 SW 1/4 sec.20, T.14 N., R.12 E., Okmulgee County, Hydrologic Unit 11100303, on right bank 1,000 ft downstream from county road bridge, 2.8 mi upstream from Adams Creek, 4.0 mi south of Beggs, 8.2 mi downstream from Flat Rock (Checkerboard) Creek, and at mile 84.8.

DRAINAGE AREA.--2,018 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1938 to current year.

REVISED RECORDS.--WSP 957: 1941. WSP 1117: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 632.55 ft above National Geodetic Vertical Datum of 1929. Prior to Aug. 29, 1939, nonrecording gage at site 550 ft upstream at same datum. Aug. 29, 1939 to June 22, 1953, nonrecording gage at site 1,000 ft upstream and same datum. June 23, 1953 to July 15, 1981, recording gage at site 1,000 ft upstream at same datum.

REMARKS.--Records fair. Some regulation by Arcadia Lake (station 07242340) since November 1986. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--50 years, 874 ft<sup>3</sup>/s, 633,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 66,800 ft<sup>3</sup>/s, May 11, 1943, gage height, 34.55 ft; no flow at times in 1939, 1954, 1956.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Dec. 28	2200	5,900	19.58	Apr. 5	1900	*20,900	*27.53
Mar. 8	0400	11,900	23.68				

Minimum daily discharge, 13 ft<sup>3</sup>/s, Sept. 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	533	68	314	4700	454	446	4280	519	136	106	710	16
2	335	96	273	4440	442	3200	6470	497	135	240	364	15
3	208	103	241	3570	433	4610	11800	464	162	290	206	104
4	321	128	219	1660	421	6140	16300	428	218	209	129	113
5	317	134	205	988	400	7570	20300	403	264	227	92	38
6	198	109	199	770	401	8270	19300	387	266	215	73	25
7	123	92	238	598	383	10900	14900	364	202	199	60	20
8	80	85	345	556	381	11700	10300	351	157	189	53	19
9	63	90	260	675	e380	10300	7370	338	132	175	47	31
10	55	93	208	750	e420	8210	5740	329	119	174	54	29
11	50	97	187	e810	e450	6430	4820	319	110	165	65	23
12	46	108	177	e850	e470	5030	4080	294	102	135	102	19
13	44	112	167	e950	e500	3750	3210	266	92	102	119	15
14	45	104	188	e1100	e470	1880	2630	250	84	75	116	13
15	44	110	442	1400	e460	1100	2340	237	80	61	88	21
16	41	165	591	1900	e500	e950	1990	224	81	51	61	31
17	41	304	469	2790	e500	e1200	1670	209	77	46	45	31
18	41	193	409	2750	e500	e1500	1670	214	73	42	35	33
19	41	140	1010	2780	e500	e1900	1780	253	74	42	29	59
20	42	132	3290	2540	e500	e2100	1790	295	69	43	26	236
21	43	130	3390	1790	e520	1900	1930	265	65	44	23	97
22	43	155	3540	1110	e600	1650	2030	278	62	39	22	81
23	42	199	3560	837	e640	1420	1910	299	61	32	21	157
24	44	196	3520	717	e620	1270	1450	305	55	30	20	182
25	51	714	3650	637	580	1280	1030	266	53	29	19	280
26	57	1330	4460	577	544	1030	801	234	54	27	20	581
27	61	1190	4950	524	526	748	696	229	49	29	19	637
28	57	859	5720	487	487	648	644	204	49	542	19	410
29	54	529	5770	474	443	3150	595	178	60	1250	19	274
30	54	382	5260	463	---	3600	543	161	80	1200	18	214
31	54	---	4900	458	---	3700	---	146	---	1190	17	---
TOTAL	3228	8147	58152	44651	13925	117582	154369	9206	3221	7198	2691	3804
MEAN	104	272	1876	1440	480	3793	5146	297	107	232	86.8	127
MAX	533	1330	5770	4700	640	11700	20300	519	266	1250	710	637
MIN	41	68	167	458	380	446	543	146	49	27	17	13
AC-FT	6400	16160	115300	88570	27620	233200	306200	18260	6390	14280	5340	7550

CAL YR 1987 TOTAL 573123 MEAN 1570 MAX 12900 MIN 37 AC-FT 1137000  
WTR YR 1988 TOTAL 426174 MEAN 1164 MAX 20300 MIN 13 AC-FT 845300

e Estimated

## ARKANSAS RIVER BASIN

07243500 DEEP FORK NEAR BEGGS, OK--Continued  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1952 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: November 1951 to current year.

WATER TEMPERATURE: November 1951 to current year.

REMARKS.--Samples were collected at six-week intervals and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 10,500 microsiemens, Jan. 12, 1955; minimum daily, 74 microsiemens, Oct. 21, 1983.

WATER TEMPERATURE (1951-85): Maximum daily, 38.5 °C, Aug. 8, 1970; minimum daily, 0.0 °C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 1,270 microsiemens, July 2; minimum daily, 153 microsiemens, Dec. 27.

WATER TEMPERATURE: Maximum daily, 32.0 °C many days in July and August; minimum daily, 0.0 °C, Jan. 9-12.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL-LECTING SAMPLE (CODE NUMBER)	AGENCY ANALYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS-CHARGE, INST. (CUBIC FEET PER SECOND)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE AIR (DEG C)	TEMPER-ATURE WATER (DEG C)	TUR-BID-ITY (NTU)	BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)
OCT												
09...	0930	1028	80020	1.51	63	498	7.90	19.5	17.0	--	740	8.8
NOV												
05...	1120	1028	80020	2.16	136	978	8.10	24.5	18.0	55	750	6.2
DEC												
17...	1240	1028	80020	3.77	458	*574	8.10	3.0	6.0	--	750	10.4
FEB												
08...	1450	1028	80020	3.53	375	922	8.20	6.5	5.0	15	740	9.4
MAR												
21...	1510	1028	80020	9.93	1870	*572	--	32.5	15.5	--	--	--
APR												
22...	0900	1028	80020	10.50	2080	595	7.80	28.0	23.0	--	730	7.6
JUN												
07...	1545	1028	80020	2.64	196	1020	8.20	--	26.5	130	740	6.3
JUL												
21...	1220	1028	80020	1.31	44	798	8.20	29.5	28.5	--	750	6.0
SEP												
01...	1615	1028	80020	0.94	17	758	8.10	33.5	26.0	28	745	7.6

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD- NESS TOTAL (MG/L AS CAC03)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH FET FIELD (MG/L AS HC03)	CAR- BONATE WATER WH FET FIELD (MG/L AS C03)	
OCT 09...	94	--	--	210	43	25	43	30	1	3.6	220	0
NOV 05...	67	--	--	350	63	46	110	41	3	3.9	380	0
DEC 17...	--	--	--	180	38	21	53	38	2	3.9	170	0
FEB 08...	76	K34	K39	290	61	34	82	38	2	2.9	280	0
MAR 21...	--	--	--	190	41	22	42	32	1	1.7	--	--
APR 22...	93	--	--	200	42	23	37	28	1	2.9	210	0
JUN 07...	81	330	290	320	61	41	92	38	2	3.2	310	12
JUL 21...	79	--	--	260	51	32	68	36	2	3.4	270	0
SEP 01...	96	K40	480	230	44	28	70	40	2	3.8	230	0

\*SPECIFIC CONDUCTANCE, LAB (US/CM)



## ARKANSAS RIVER BASIN

07243500 DEEP FORK NEAR BEGGS, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	ALKA- LITY WAT WH TOT FET FIELD (MG/L AS CAC03)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SiO2)	SOLIDS, RESIDUE AT 180 DEG. C SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS NO3)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N)
OCT												
09...	184	32	56	--	7.6	320	321	0.44	54.5	--	--	--
NOV												
05...	310	38	170	0.20	4.9	628	623	0.85	231	--	--	<0.010
DEC												
17...	136	23	90	--	7.3	328	320	0.45	406	--	--	<0.010
FEB												
08...	232	--	150	0.30	11	522	--	--	--	0.230	1.0	0.010
MAR												
21...	--	30	68	--	8.7	317	309	0.43	1600	--	--	--
APR												
22...	168	21	60	--	7.5	301	295	0.41	1690	--	--	<0.010
JUN												
07...	275	36	160	0.50	8.9	589	581	0.80	312	0.180	0.80	0.010
JUL												
21...	224	40	240	--	7.3	577	577	0.78	69.2	0.200	0.89	0.010
SEP												
01...	190	33	120	0.30	7.7	417	422	0.57	19.0	--	--	<0.010
DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS NO2)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS NH4)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS- PHOROUS TOTAL (MG/L AS P)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4)
OCT												
09...	--	--	--	--	--	--	--	--	--	--	--	--
NOV												
05...	--	<0.100	0.030	0.020	0.04	0.03	0.67	0.70	0.090	0.090	--	--
DEC												
17...	--	0.280	--	0.100	--	0.13	--	--	--	--	0.030	0.09
FEB												
08...	0.03	0.240	0.050	--	0.06	--	0.35	0.40	0.050	0.030	<0.010	--
MAR												
21...	--	--	--	--	--	--	--	--	--	--	--	--
APR												
22...	--	<0.100	--	0.010	--	0.01	--	--	--	--	<0.010	--
JUN												
07...	0.03	0.190	0.030	--	0.04	--	0.47	0.50	0.060	0.050	0.020	0.06
JUL												
21...	0.03	0.210	--	<0.010	--	--	--	--	--	--	0.040	0.12
SEP												
01...	--	<0.100	<0.010	0.010	--	0.01	--	0.60	0.040	0.020	0.020	0.06
DATE	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE)	BORON, DIS- SOLVED (UG/L AS B)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)
OCT												
09...	--	2	160	<0.5	--	<1	<5	<3	<10	45	<10	5
NOV												
05...	<10	2	230	<0.5	--	<1	1	<3	1	8	<5	9
DEC												
17...	--	1	110	<0.5	--	2	<5	<3	<10	53	10	9
FEB												
08...	10	<1	160	<0.5	--	1	<1	<3	3	15	<5	9
MAR												
21...	--	<1	120	<0.5	--	<1	<5	<3	<10	120	<10	6
APR												
22...	--	1	140	<0.5	90	<1	<5	<3	<10	40	<10	<4
JUN												
07...	<10	1	190	<0.5	--	1	<1	<3	6	70	<5	9
JUL												
21...	--	1	170	<0.5	--	<1	<5	<3	<10	16	<10	8
SEP												
01...	<10	1	170	<0.5	--	<1	<1	<3	<1	6	<5	5



## ARKANSAS RIVER BASIN

07243500 DEEP FORK NEAR BEGGS, OK--Continued

DATE	MANGANESE, DIS- SOLVED (UG/L AS MN)	MERCURY DIS- SOLVED (UG/L AS HG)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V)	ZINC, DIS- SOLVED (UG/L AS ZN)	SEDI- MENT, SUS- PENDE (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
OCT 09...	8	<0.1	<10	<10	--	<1.0	450	<6	<3	--	--	--
NOV 05...	4	0.1	<10	2	<1	<1.0	690	<6	6	90	33	94
DEC 17...	72	<0.1	<10	<10	--	1.0	360	<6	12	--	--	--
FEB 08...	240	<0.1	<10	3	<1	<1.0	570	<6	12	21	21	90
MAR 21...	24	--	<10	<10	--	<1.0	340	<6	15	--	--	--
APR 22...	4	0.3	<10	<10	--	<1.0	360	<6	<3	--	--	--
JUN 07...	15	--	<10	6	<1	1.0	600	<6	28	223	118	97
JUL 21...	12	0.2	<10	<10	--	<1.0	560	<6	5	94	11	96
SEP 01...	<1	<0.1	<10	<1	<1	1.0	460	<6	5	--	--	--

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	659	928	445	218	832	786	319	800	962	1210	414	718
2	580	960	458	242	878	533	282	809	1010	1270	385	731
3	502	990	469	265	893	367	247	834	1060	1240	363	807
4	433	997	536	304	919	295	222	816	1140	1200	362	844
5	465	1050	574	338	928	201	196	837	1190	955	390	681
6	488	1100	643	396	916	216	207	839	1180	816	396	466
7	508	1010	668	435	919	224	201	855	1190	640	401	381
8	548	965	741	471	951	228	233	861	971	656	435	438
9	573	905	777	546	941	231	275	888	961	672	452	468
10	598	874	792	566	990	263	302	891	987	694	461	614
11	605	835	---	514	1010	274	320	939	871	706	504	650
12	609	842	707	472	982	366	372	932	873	717	516	713
13	616	855	710	515	1000	583	405	964	881	732	528	756
14	636	861	756	468	992	390	459	954	889	747	513	824
15	650	874	784	438	1010	380	486	956	936	760	524	838
16	664	903	793	442	1010	454	522	981	962	768	505	852
17	688	850	800	477	1020	544	512	980	944	771	626	940
18	679	832	714	412	1030	575	545	1000	977	776	727	989
19	696	674	569	340	1040	578	606	1020	1000	803	759	1030
20	723	655	481	303	688	572	627	1030	1020	802	792	1040
21	744	529	502	320	718	575	589	1030	1030	802	780	650
22	763	891	390	368	708	582	575	957	1020	808	769	250
23	798	844	283	393	718	584	582	946	1010	810	701	475
24	816	795	221	423	745	643	630	922	1080	860	677	603
25	944	703	196	---	---	646	625	917	1150	896	664	724
26	1040	507	181	500	757	637	670	912	1180	924	643	727
27	1010	515	153	587	857	632	710	908	1140	925	644	657
28	1060	488	162	610	900	630	759	927	1140	933	647	524
29	1070	472	174	678	898	724	736	953	1170	526	677	382
30	1060	449	185	705	---	283	799	944	1180	370	688	408
31	1040	---	200	745	---	290	---	968	---	374	761	---

## ARKANSAS RIVER BASIN

07243500 DEEP FORK NR BEGGS, OK--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23.0	17.0	9.0	4.0	8.0	12.0	15.0	21.0	29.0	32.0	29.0	26.0
2	22.0	17.0	9.0	3.0	7.0	12.0	15.0	22.0	29.0	32.0	30.0	26.0
3	22.0	17.0	9.0	3.0	7.0	11.0	15.0	22.0	28.0	31.0	30.0	26.0
4	20.0	17.0	9.0	3.0	6.0	11.0	15.0	22.0	28.0	31.0	30.0	26.0
5	20.0	17.0	9.0	3.0	5.0	10.0	16.0	22.0	27.0	31.0	31.0	26.0
6	20.0	17.0	9.0	3.0	5.0	10.0	17.0	22.0	26.0	31.0	31.0	25.0
7	20.0	16.0	9.0	2.0	5.0	10.0	18.0	22.0	26.0	31.0	31.0	25.0
8	20.0	16.0	9.0	1.0	5.0	11.0	19.0	23.0	28.0	31.0	32.0	25.0
9	19.0	15.0	10.0	.0	5.0	12.0	18.0	23.0	30.0	31.0	32.0	26.0
10	19.0	15.0	10.0	.0	5.0	12.0	18.0	24.0	29.0	31.0	32.0	26.0
11	17.0	14.0	---	.0	5.0	13.0	17.0	24.0	29.0	31.0	32.0	26.0
12	16.0	13.0	10.0	.0	5.0	13.0	17.0	25.0	29.0	31.0	32.0	27.0
13	16.0	12.0	9.0	---	6.0	9.0	17.0	25.0	29.0	31.0	32.0	27.0
14	19.0	12.0	9.0	---	6.0	12.0	18.0	26.0	30.0	32.0	32.0	27.0
15	19.0	12.0	7.0	---	6.0	11.0	18.0	26.0	30.0	32.0	32.0	27.0
16	19.0	12.0	6.0	1.0	7.0	10.0	17.0	26.0	30.0	32.0	32.0	27.0
17	19.0	12.0	6.0	2.0	8.0	10.0	16.0	26.0	30.0	32.0	31.0	27.0
18	19.0	11.0	5.0	3.0	9.0	9.0	16.0	28.0	30.0	32.0	31.0	26.0
19	18.0	11.0	5.0	3.0	8.0	10.0	16.0	28.0	30.0	32.0	31.0	26.0
20	18.0	10.0	4.0	4.0	9.0	11.0	17.0	28.0	30.0	31.0	32.0	26.0
21	18.0	10.0	4.0	4.0	10.0	11.0	18.0	28.0	31.0	31.0	32.0	26.0
22	17.0	11.0	4.0	5.0	11.0	11.0	19.0	27.0	31.0	30.0	32.0	26.0
23	16.0	11.0	1.0	5.0	10.0	11.0	20.0	26.0	31.0	30.0	32.0	26.0
24	16.0	12.0	5.0	5.0	10.0	12.0	20.0	25.0	31.0	31.0	32.0	26.0
25	16.0	12.0	5.0	5.0	---	13.0	20.0	25.0	31.0	31.0	32.0	25.0
26	16.0	12.0	4.0	5.0	11.0	14.0	20.0	27.0	32.0	31.0	31.0	24.0
27	16.0	13.0	4.0	5.0	12.0	15.0	20.0	26.0	32.0	31.0	31.0	24.0
28	16.0	12.0	4.0	6.0	12.0	16.0	20.0	27.0	32.0	28.0	30.0	24.0
29	16.0	10.0	4.0	7.0	12.0	16.0	20.0	27.0	32.0	26.0	28.0	24.0
30	17.0	9.0	4.0	8.0	---	15.0	20.0	28.0	32.0	26.0	27.0	22.0
31	17.0	---	4.0	9.0	---	15.0	---	28.0	---	28.0	26.0	---

## 07244800 EUFAULA LAKE NEAR BROOKEN, OK

LOCATION.--Lat 35°18'25", long 95°21'45", in SW 1/4 sec.25, T.10 N., R.18 E., McIntosh County, Hydrologic Unit 11090204, in intake structure near left end of dam on Canadian River, 4.0 mi northeast of Brooken, and at mile 27.0.

DRAINAGE AREA.--47,522 mi<sup>2</sup>, of which 9,700 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--February 1964 to current year. Prior to October 1970, published as Eufaula Reservoir near Brooken.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by an earthen dam having a gated, concrete, ogee-type spillway weir controlled by eleven 40-foot taintor gates. Closure for diversion was made Feb. 1, 1963, and regulated storage began Feb. 10, 1964; minimum power pool was first filled June 17, 1964. Capacity, 3,825,400 acre-ft at elevation 597.0 ft, top of flood-control pool; 2,314,600 acre-ft at elevation 585.0 ft, top of power pool, and 851,600 acre-ft at elevation 565.0 ft, bottom of power pool. Dead storage is negligible. Figures given herein represent total contents. Reservoir is used for flood control, sediment control, power development, and other water uses. Revised capacity table, based on survey 1977, used since Oct. 1, 1983. U.S. Army Corps of Engineers' satellite telemeter at station.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 3,791,000 acre-ft, Apr. 25, 1973, elevation, 596.95 ft; minimum since power pool first filled, 1,182,000 acre-ft, Nov. 4, 1964, elevation, 570.23 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 3,266,000 acre-ft, Dec. 28, elevation, 593.02 ft; minimum, 2,088,000 acre-ft, Sept. 16, elevation, 582.77 ft.

Capacity table (elevation, in feet, and contents, in acre-ft):

581	1,923,000	587	2,533,000
583	2,111,000	589	2,764,000
585	2,315,000	591	3,006,000

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2271000	2199000	2391000	3054000	2446000	2298000	2584000	2407000	2175000	2174000	2256000	2126000
2	2270000	2199000	2388000	2996000	2432000	2387000	2670000	2404000	2183000	2174000	2252000	2124000
3	2272000	2200000	2386000	2938000	2417000	2480000	2780000	2404000	2178000	2175000	2247000	2123000
4	2267000	2194000	2365000	2872000	2407000	2598000	2830000	2382000	2179000	2175000	2248000	2124000
5	2268000	2189000	2362000	2802000	2400000	2612000	2890000	2360000	2180000	2176000	2248000	2124000
6	2261000	2191000	2365000	2752000	2398000	2611000	2908000	2346000	2180000	2177000	2249000	2122000
7	2256000	2189000	2359000	2719000	2397000	2616000	2941000	2344000	2180000	2178000	2247000	2118000
8	2248000	2194000	2360000	2685000	2389000	2593000	2949000	2338000	2186000	2180000	2242000	2117000
9	2245000	2196000	2355000	2652000	2377000	2558000	2951000	2329000	2178000	2179000	2238000	2115000
10	2246000	2193000	2352000	2618000	2370000	2536000	2926000	2322000	2178000	2179000	2227000	2114000
11	2246000	2194000	2344000	2595000	2352000	2536000	2910000	2302000	2180000	2180000	2224000	2113000
12	2241000	2184000	2341000	2576000	2341000	2534000	2866000	2298000	2178000	2183000	2221000	2109000
13	2238000	2176000	2341000	2567000	2340000	2527000	2832000	2270000	2178000	2183000	2220000	2104000
14	2233000	2178000	2379000	2563000	2342000	2511000	2735000	2247000	2182000	2182000	2220000	2097000
15	2233000	2220000	2370000	2553000	2330000	2482000	2738000	2226000	2183000	2181000	2214000	2094000
16	2233000	2257000	2368000	2547000	2323000	2449000	2682000	2208000	2186000	2180000	2205000	2090000
17	2226000	2266000	2365000	2555000	2307000	2449000	2640000	2190000	2186000	2180000	2206000	2096000
18	2226000	2296000	2379000	2585000	2312000	2455000	2595000	2172000	2187000	2193000	2198000	2092000
19	2228000	2306000	2343000	2598000	2323000	2448000	2559000	2165000	2187000	2194000	2200000	2105000
20	2220000	2291000	2723000	2592000	2324000	2440000	2527000	2159000	2188000	2194000	2197000	2104000
21	2216000	2289000	2784000	2587000	2328000	2430000	2494000	2163000	2180000	2191000	2194000	2110000
22	2200000	2286000	2767000	2584000	2325000	2416000	2477000	2173000	2178000	2190000	2182000	2123000
23	2194000	2285000	2723000	2570000	2304000	2402000	2472000	2175000	2178000	2188000	2170000	2135000
24	2202000	2284000	2705000	2559000	2299000	2393000	2460000	2173000	2177000	2185000	2160000	2137000
25	2208000	2233000	2705000	2540000	2294000	2384000	2457000	2173000	2177000	2189000	2151000	2139000
26	2207000	2350000	3037000	2525000	2291000	2376000	2444000	2174000	2178000	2184000	2135000	2142000
27	2210000	2371000	3201000	2509000	2289000	2370000	2422000	2172000	2176000	2200000	2125000	2143000
28	2210000	2378000	3250000	2494000	2289000	2374000	2411000	2173000	2173000	2240000	2129000	2146000
29	2202000	2382000	3218000	2486000	2285000	2395000	2402000	2175000	2173000	2252000	2130000	2152000
30	2200000	2387000	3171000	2470000	---	2389000	2401000	2173000	2175000	2259000	2128000	2155000
31	2198000	---	3241000	2461000	---	2459000	---	2175000	---	2262000	2127000	---
MAX	2272000	2387000	3250000	3054000	2446000	2616000	2951000	2407000	2188000	2262000	2256000	2155000
MIN	2194000	2176000	2341000	2461000	2285000	2298000	2401000	2159000	2173000	2174000	2125000	2090000
(+)	583.87	585.68	592.83	586.36	584.72	586.34	585.81	583.65	583.65	584.50	583.17	583.45
(++)	-77,000	+189,000	+854,000	-780,000	-176,000	+174,000	-58,000	-226,000	0	+87,000	-135,000	+28,000
CAL YR 1987	MAX 3250000	MIN 2176000	(++) +889,000									
WTR YR 1988	MAX 3250000	MIN 2090000	(++) -120,000									

(+) ELEVATION, IN FEET, AT END OF MONTH  
(++) CHANGE IN CONTENTS, IN ACRE-FEET

## ARKANSAS RIVER BASIN

07245000 CANADIAN RIVER NEAR WHITEFIELD, OK

LOCATION.--Lat 35°15'50", long 95°14'21", in SE 1/4 SE 1/4 sec.12, T.9 N., R.19 E., Haskell County, Hydrologic Unit 11090204, on left downstream bank at end of bridge on State Highway 2, 0.8 mi north of Whitefield, 5.5 mi upstream from Taloka (Snake) Creek, 8.2 mi downstream from Eufaula Dam, and at mile 18.8.

DRAINAGE AREA.--47,576 mi<sup>2</sup>, of which 9,700 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--July 1938 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1177: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 473.16 ft above National Geodetic Vertical Datum of 1929. Prior to Jan. 11, 1939, nonrecording gage and Jan. 11, 1939 to Dec. 10, 1941, June 12, 1947 to Sept. 30, 1948, water-stage recorder, all at site 2.1 mi downstream at datum 2.20 ft higher. Dec. 11, 1941 to June 1, 1947, and Oct. 1, 1978 to Sept. 30, 1978, water-stage recorder at site 400 ft upstream and at datum 5.00 ft higher. Oct. 1, 1978 to July 26, 1983, water-stage recorder at site 400 ft upstream at same datum.

REMARKS.--No estimated daily discharges. Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Prior to February 1964, occasional slight regulation by Conchas Lake in New Mexico and, except for 54 mi<sup>2</sup> of intervening area, completely regulated thereafter by Eufaula Lake (station 07244800). U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Prior to regulation by Eufaula Dam, 25 years (water years 1939-63), 6,005 ft<sup>3</sup>/s, 4,347,000 acre-ft/yr; since regulation by Eufaula Dam, 21 years (water years 1968-88), 5,864 ft<sup>3</sup>/s, 4,248,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 281,000 ft<sup>3</sup>/s, May 10, 1943, gage height, 25.5 ft datum then in use; minimum daily discharge, 0.4 ft<sup>3</sup>/s, Oct. 8, 1956.

EXTREMES FOR OUTSIDE PERIOD OF RECORD.--Maximum stage since 1898, that of May 10, 1943, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 42,400 ft<sup>3</sup>/s, Dec. 30, gage height, 15.73 ft; minimum daily discharge, 45 ft<sup>3</sup>/s, Nov. 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	239	833	57	40100	8140	5760	11300	1070	710	156	2090	178
2	116	469	4080	39700	11700	7340	12000	6300	792	152	3830	1660
3	106	2280	7840	39700	10900	9820	8570	10900	811	144	3450	602
4	106	3060	7770	39300	11200	8170	10400	10700	442	330	599	204
5	2310	2190	5020	38800	6880	20200	11900	12900	238	369	144	178
6	1620	123	3790	32100	5810	20200	15500	12100	782	178	127	167
7	1220	51	7060	22900	5290	20100	15500	6250	1050	157	118	163
8	2920	45	5130	20300	3660	23900	20900	6310	928	131	2380	163
9	5040	398	3810	20400	6080	30000	30100	6960	893	139	1960	630
10	293	2450	4130	20500	8180	26200	29800	6840	807	170	3000	423
11	139	2990	5130	20300	9240	19100	29400	6680	421	131	3000	181
12	1850	5090	2190	19700	7690	16200	29100	8600	195	132	2550	1300
13	1810	2370	139	18500	4770	15900	29200	12000	195	143	545	2340
14	2500	807	7860	18300	2950	17600	29100	11800	217	115	163	2330
15	2640	342	11800	17200	6390	21000	32500	12300	189	103	2610	2500
16	1450	1790	7340	15300	4750	21100	35300	10400	541	113	3010	2410
17	1290	1070	7620	15400	7770	19600	35200	10700	422	115	3030	681
18	143	349	8270	15100	7340	15000	32400	10300	212	116	3130	211
19	1990	2020	10300	16500	7350	14700	28700	5110	183	130	702	207
20	3680	3010	2800	19700	9460	14700	26800	5050	181	116	205	170
21	3520	8090	4610	14400	5690	10900	24800	942	2060	1030	172	167
22	6880	1500	23800	14400	7930	13500	19300	379	1860	637	4920	161
23	4700	2720	33200	14700	8520	13600	11400	345	1410	137	5260	166
24	256	3460	33900	14700	5840	13600	11100	307	1030	131	6360	186
25	83	3300	23500	14500	5610	13500	11200	318	379	108	5410	174
26	2130	2360	6040	11900	4260	11600	12100	1040	180	109	5090	166
27	2520	170	2400	11200	3180	8620	15400	883	336	119	1170	164
28	1440	103	7590	11700	2940	7590	12900	868	219	160	226	161
29	796	76	31900	12600	3450	8850	10400	306	143	1770	194	169
30	3520	65	41800	8220	---	8790	6230	832	163	564	289	167
31	2250	---	40900	10400	---	8750	---	974	---	110	256	---
TOTAL	59557	53581	361776	628520	192970	465890	608500	180464	17989	8015	65990	18379
MEAN	1921	1786	11670	20270	6654	15030	20280	5821	600	259	2129	613
MAX	6880	8090	41800	40100	11700	30000	35300	12900	2060	1770	6360	2500
MIN	83	45	57	8220	2940	5760	6230	306	143	103	118	161
AC-FT	118100	106300	717600	1247000	382800	924100	1207000	358000	35680	15900	130900	36450

CAL YR 1987 TOTAL 3381333 MEAN 9264 MAX 41800 MIN 45 AC-FT 6707000  
WTR YR 1988 TOTAL 2661631 MEAN 7272 MAX 41800 MIN 45 AC-FT 5279000

## ARKANSAS RIVER BASIN

07246400 ROBERT S. KERR LOCK AND DAM (ARKANSAS RIVER) NEAR SALLISAW, OK

LOCATION.--Lat 35°20'57", long 94°46'43", in SW 1/4 SW 1/4, sec. 9, T.10 N., R.24 E., LeFlore County, Hydrologic Unit 11110104, from lock wall at dam, 0.5 mi upstream from gage on bridge on U.S. Highway 59, 3.5 mi downstream from Sans Bois Creek, 7.5 mi south of Sallisaw, and at mile 395.4.

DRAINAGE AREA.--147,756 mi<sup>2</sup> of which 22,241 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--Water years 1970 to current year.

REVISED RECORDS.--WDR OK-77-1: Drainage area.

REMARKS.--Samples were collected every six weeks and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAUGE HEIGHT (FEET)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	TUR- BID- ITY (NTU)	BARO- METRIC PRES- SURE (MM OF HG)
OCT 30...	1210	1028	80020	12.92	*1140	--	26.0	17.0	2.5	729
DEC 11...	1130	1028	80020	9.54	*457	7.80	18.0	12.0	--	732
JAN 22...	1600	1028	80020	19.69	608	7.40	12.0	10.0	--	732
MAR 11...	1600	1028	80020	22.66	722	8.10	21.0	13.0	--	729
APR 15...	1100	1028	80020	27.83	424	8.00	16.0	13.0	--	729
JUN 16...	1000	1028	80020	11.90	*1010	8.10	29.0	25.0	--	733
JUL 19...	1300	1028	80020	13.00	1180	8.20	36.5	21.0	--	752
AUG 16...	1300	1028	80020	13.50	*1270	8.20	36.0	30.0	3.5	755
SEP 27...	1500	1028	80020	14.19	1190	7.20	26.0	26.0	--	757

DATE	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	OXYGEN DEMAND, CHEM- ICAL (HIGH LEVEL) (MG/L)	HARD- NESS TOTAL (MG/L AS CACO3)	HARD- NESS NONCARB WH WAT TOT FLD (MG/L AS CACO3)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD- SORP- TION RATIO
OCT 30...	--	--	--	--	--	--	--	--	--	--
DEC 11...	--	--	--	130	30	38	8.1	33	35	1
JAN 22...	--	--	21	120	33	36	8.1	73	55	3
MAR 11...	10.1	100	<10	180	88	54	12	97	53	3
APR 15...	10.2	101	21	120	33	38	7.2	33	36	1
JUN 16...	8.4	106	--	210	87	57	17	120	55	4
JUL 19...	8.9	102	24	220	110	56	20	160	61	5
AUG 16...	8.0	107	62	220	220	57	19	160	61	5
SEP 27...	8.2	102	20	220	90	58	18	150	59	5

\* SPECIFIC CONDUCTANCE, LAB (US/CM)



## ARKANSAS RIVER BASIN

07246400 ROBERT S. KERR LOCK AND DAM (ARKANSAS RIVER) NEAR SALLISAW, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH IT FIELD (MG/L AS HC03)	CAR- BONATE WATER WH IT FIELD (MG/L AS C03)	ALKA- LITY WAT WH TOT IT FIELD (MG/L AS CAC03)	SULFATE DIS- SOLVED (MG/L AS S04)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)
OCT 30...	--	--	--	--	120	200	649	--	--	--
DEC 11...	3.7	--	--	--	37	42	226	221	0.31	0.0
JAN 22...	4.0	--	--	--	53	100	350	328	0.48	0.0
MAR 11...	3.3	--	--	--	68	140	432	432	0.59	0.0
APR 15...	2.5	122	0	100	54	50	257	240	0.35	0.0
JUN 16...	3.7	--	--	--	100	170	572	543	0.78	0.0
JUL 19...	4.0	141	0	116	120	230	657	659	0.89	0.0
AUG 16...	4.4	--	--	--	100	260	728	600	0.99	0.0
SEP 27...	4.1	107	0	88	100	230	646	637	0.88	0.0

## ARKANSAS RIVER BASIN

07247500 FOURCHE MALINE NEAR RED OAK, OK

LOCATION.--Lat 34°54'45", long 95°09'20", in NW 1/4 NW 1/4 sec.13, T.5 N., R.20 E., Latimer County, Hydrologic Unit 11110105, on downstream side of left abutment of county road bridge, 0.1 mi downstream from Little Fourche Maline, 5.0 mi southwest of Red Oak, and at mile 41.2.

DRAINAGE AREA.--122 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1938 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1117: Drainage area. WSP 1631: 1940.

GAGE.--Water-stage recorder. Datum of gage is 540.80 ft above National Geodetic Vertical Datum of 1929. Prior to April 25, 1939, nonrecording gage at same site and datum.

REMARKS.--Records fair. Some regulation by several flood-retarding structures.

AVERAGE DISCHARGE.--50 years, 127 ft<sup>3</sup>/s, 92,010 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 41,500 ft<sup>3</sup>/s, May 19, 1960, gage height, 24.79 ft, from floodmarks, from rating curve extended above 25,000 ft<sup>3</sup>/s; no flow at times in most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1935 reached a stage of 25.4 ft, from floodmarks.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Mar. 3	0600	*1,420	*10.82	No peak greater than base discharge.			

Minimum daily discharge, 0.09 ft<sup>3</sup>/s, July 11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	50	7.5	76	e500	50	48	e250	32	2.7	.15	3.8	.25
2	39	6.9	66	e450	48	318	e450	27	2.6	.14	2.3	.46
3	34	5.7	59	201	64	1310	345	23	2.3	.13	1.3	33
4	30	6.7	53	135	67	787	195	20	2.4	.12	1.0	58
5	26	6.4	161	106	62	566	126	17	2.2	.12	.64	27
6	23	6.3	225	95	56	303	140	15	2.2	.12	.91	12
7	19	7.1	128	102	51	192	125	12	1.8	.14	7.6	6.5
8	15	8.8	89	114	46	180	97	9.9	1.5	.12	6.4	3.9
9	11	27	81	103	47	151	78	8.3	1.2	.14	5.4	2.2
10	9.6	41	65	96	47	116	72	7.7	1.1	.10	3.6	1.4
11	7.3	38	55	92	45	101	88	7.6	.86	.09	3.9	.93
12	7.3	29	48	218	48	102	88	7.1	.76	.16	e500	.71
13	5.3	22	43	409	47	92	73	6.3	.63	.58	e250	.44
14	4.9	19	e300	271	48	81	64	5.9	.59	.93	e150	.34
15	5.0	e370	e700	186	48	72	61	5.0	.54	1.1	e110	.29
16	5.3	e600	e450	151	42	66	53	4.4	.52	.80	43	.33
17	6.9	e460	247	208	38	86	111	3.9	.39	.74	11	.28
18	6.3	340	168	277	63	324	e500	3.7	.33	.74	7.0	.30
19	7.1	200	342	290	e560	259	e350	3.5	.35	26	4.7	.33
20	7.0	111	e450	338	e400	184	195	2.8	.39	443	4.2	.36
21	9.2	78	e700	204	230	135	130	3.1	.34	253	3.5	.36
22	9.4	66	e550	143	155	106	93	7.8	.29	83	2.6	.33
23	7.5	60	e460	114	112	87	76	10	.26	41	3.1	.33
24	11	518	e420	98	90	78	66	7.6	.23	27	3.0	1.6
25	21	843	e480	84	80	158	60	4.8	.20	23	2.1	1.1
26	28	383	e580	74	69	133	55	4.1	.16	19	1.4	.65
27	23	285	e700	67	62	97	49	3.4	.14	15	1.1	.43
28	20	193	e900	63	57	77	44	3.1	.15	14	.73	.33
29	15	124	e1010	59	52	195	40	2.9	.20	11	.58	.29
30	12	92	e900	56	---	242	36	2.8	.18	8.0	.42	.28
31	10	---	e680	54	---	149	---	2.8	---	5.5	.28	---
TOTAL	485.1	4954.4	11186	5358	2784	6795	4110	274.5	27.51	974.92	1135.56	154.72
MEAN	15.6	165	361	173	96.0	219	137	8.85	.92	31.4	36.6	5.16
MAX	50	843	1010	500	560	1310	500	32	2.7	443	500	58
MIN	4.9	5.7	43	54	38	48	36	2.8	.14	.09	.28	.25
AC-FT	962	9830	22190	10630	5520	13480	8150	544	55	1930	2250	307

CAL YR 1987 TOTAL 37492.53 MEAN 103 MAX 1170 MIN .44 AC-FT 74370  
WTR YR 1988 TOTAL 38239.71 MEAN 104 MAX 1310 MIN .09 AC-FT 75850

e Estimated

## ARKANSAS RIVER BASIN

07248000 WISTER LAKE NEAR WISTER, OK

LOCATION.--Lat 34°56'10", long 94°43'10", in SE 1/4 NE 1/4 sec.1, T.5 N., R.24 E., Le Flore County, Hydrologic Unit 11110105, in control tower near right end of Wister Dam on Poteau River, 2.0 mi south of Wister, 2.7 mi upstream from Caston Creek, and at mile 60.9.

DRAINAGE AREA.--993 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1949 to current year. Prior to October 1970, published as Wister Reservoir near Wister.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by an earth dam with outlets of an uncontrolled, concrete, chute-type spillway and six 7- by 12-foot vertical liftgates. Regulated storage began Oct. 4, 1949, conservation pool was first filled Dec. 19, 1949. Capacity, 427,900 acre-ft at elevation 502.5 ft crest of spillway and 27,060 acre-ft at elevation 471.6 ft conservation pool. Figures given herein represent total contents. Reservoir is used for flood control and recreation. Revised capacity table used since Oct. 1, 1973.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 507,400 acre-ft, May 27, 1957, elevation, 505.73 ft; minimum since conservation pool was first filled, 4,020 acre-ft, Oct. 16, 1961, elevation, 456.97 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 320,700 acre-ft, Dec. 29, elevation, 497.46 ft; minimum, 35,740 acre-ft, Aug. 11, elevation, 473.56 ft.

Capacity table (elevation, in feet, and contents, in acre-ft):

471	24,720	485	128,100
475	43,240	495	274,700
479	69,990	505	487,900

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	61360	60000	71520	302000	43130	41780	64010	45740	40430	37250	36880	43300
2	61290	60000	68830	293800	42540	44650	82620	43770	40530	37130	36780	43080
3	61290	59930	66330	284600	44370	56660	98480	42640	40690	37030	36780	44540
4	61290	59780	64490	273600	45110	62960	112900	41450	40530	36900	36680	44910
5	61180	59710	64850	262200	44770	64380	117700	40990	40430	36780	36590	44880
6	61110	59570	67550	251900	44030	63780	116400	40860	40320	36550	36440	44680
7	61000	59500	67390	241100	43240	62220	113400	40800	40270	36440	36340	44460
8	60890	59520	65040	227400	42260	59500	113200	40530	40120	36290	36240	44200
9	60710	60000	63180	215100	41670	57210	112600	40430	39990	36190	36140	43980
10	60640	60070	62430	203800	41560	53730	112000	40430	39840	36090	35890	43690
11	60500	60140	62220	191500	41340	51420	112800	40500	39700	36290	35980	43350
12	60430	60280	61810	185600	41180	49820	113400	40530	39540	36590	36380	43080
13	60330	60420	67910	183900	41180	48190	113200	40530	39390	36490	41800	42770
14	60210	60620	84190	176500	41130	45960	111400	40530	39280	36390	42550	42430
15	60070	66720	89150	167200	40910	43690	105200	40500	39180	36240	42980	42100
16	60140	77540	88110	156600	40690	42320	97700	40480	39040	36140	43240	41830
17	60070	79860	84650	147100	40430	42260	98780	40430	38920	35990	44050	41510
18	60140	77580	85640	137500	41880	43750	128200	40370	38810	36040	44540	41180
19	60210	73640	110400	128700	52620	46310	136200	40320	38710	36340	45050	40910
20	60000	70160	120700	118600	58160	47900	134400	40430	38610	36140	45280	40580
21	59930	66570	123500	108500	59850	48370	128600	40690	38450	36540	45410	40440
22	59710	63560	121400	98840	59070	48490	119400	40920	38250	36980	45730	40320
23	59640	63030	118900	89820	56450	47540	108300	41130	38140	37030	45840	41390
24	60360	65140	132500	81070	53340	45390	96000	40960	38090	36980	45840	41720
25	60360	69750	204500	72250	50010	45670	85090	40960	37980	36940	45500	41670
26	60430	73570	271000	64900	47840	45450	73720	40910	37930	37030	45260	41610
27	60360	75470	305900	59070	46310	44030	63830	40900	37830	37080	44880	41510
28	60370	76200	318700	54510	44650	42160	56330	40800	37680	37180	44600	41400
29	60210	76550	320300	51180	42860	43190	51850	40690	37480	37130	44370	41510
30	60140	74020	315200	48550	---	49880	48860	40580	37380	37030	44090	41560
31	60070	---	309200	45670	---	53140	---	40480	---	36980	43690	---
MAX	61360	79860	320300	302000	59850	64380	136200	45740	40690	37250	45840	44910
MIN	59640	59500	61810	45670	40430	41780	48860	40320	37380	35990	35890	40320
(+)	447.68	479.50	496.86	475.43	474.93	476.66	475.97	474.49	473.89	473.81	475.08	474.69
(++)	-1,140	+13,950	+235,180	-263,530	-2,810	+10,280	-4,280	-8,380	-3,100	-400	+6,710	-2,130

CAL YR 1987 MAX 320300 MIN 40480 (++) +267,860  
WTR YR 1988 MAX 320300 MIN 35890 (++) -19,650

(+) ELEVATION, IN FEET, AT END OF MONTH  
(++) CHANGE IN CONTENTS, IN ACRE-FEET

## RED RIVER BASIN

07300500 SALT FORK RED RIVER AT MANGUM, OK

LOCATION.--Lat 34°51'32", long 99°30'28", in SW 1/4 SE 1/4 sec.34. T.5 N, R.22 W., Greer County, Hydrologic Unit 11120202, near left bank on downstream side of pier of bridge on State Highway 34, 0.5 mi south of Mangum, 13.0 mi downstream from Fish Creek, and at mile 35.5.

DRAINAGE AREA.--1,566 mi<sup>2</sup> of which 209 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--April 1905 to June 1906, October 1937 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1211: Drainage area. WSP 1241: 1938.

GAGE.--Water-stage recorder. Datum of gage is 1,490.87 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation). Apr. 11, 1905 to June 30, 1906, nonrecording gage at site 0.2 mi upstream at different datum. Oct. 1, 1937 to Nov. 8, 1938, nonrecording gage at present site and datum.

REMARKS.--Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office.

AVERAGE DISCHARGE.--51 years (water years 1938-88), 85.8 ft<sup>3</sup>/s, 62,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 72,000 ft<sup>3</sup>/s May 16, 1957, gage height, 14.55 ft; maximum gage height 14.7 ft June 16, 1938; no flow at times in most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Sept. 19	0030	*2,880	*9.26	No peak greater than base discharge.			
No flow at times.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	40	63	114	61	52	105	89	e35	45	.00	.00
2	21	35	50	117	61	238	106	98	e40	32	.00	8.6
3	20	32	50	106	62	344	170	96	e35	23	.00	5.0
4	20	29	161	99	62	176	133	86	e25	16	.00	.00
5	19	28	199	98	61	187	103	e67	e21	9.8	.00	.38
6	18	28	212	96	59	162	92	e62	e18	3.2	.00	6.7
7	18	30	70	95	e55	146	86	e58	17	e2.4	.00	.82
8	17	33	47	92	e57	127	81	e54	14	e36	.00	.00
9	16	39	44	91	61	113	79	e50	11	e87	.00	.00
10	16	87	44	90	69	105	90	e47	9.0	e71	.00	.00
11	16	40	43	90	54	99	81	e45	7.2	e47	.00	.00
12	16	38	42	98	e52	95	79	e42	5.2	e49	.00	.00
13	17	37	43	122	e60	95	78	e40	3.5	e59	.00	.00
14	17	39	51	144	69	93	79	e37	2.4	e47	.00	.22
15	18	40	46	190	75	90	78	e34	20	e15	.00	.00
16	19	40	42	198	62	93	77	e32	33	e15	.00	.00
17	18	39	43	184	58	108	285	e30	14	e9.7	.00	.00
18	20	38	73	141	57	117	336	e29	8.0	e4.8	.00	136
19	20	38	125	133	57	134	220	e27	12	e2.2	.00	861
20	20	38	206	107	56	135	211	e30	6.9	2.2	.00	193
21	20	38	108	89	56	124	166	e40	2.2	.75	.00	87
22	20	37	101	70	55	111	146	e30	.22	.59	.00	42
23	21	39	98	66	53	103	120	e25	.00	.18	.00	18
24	31	43	90	72	54	95	107	e23	.00	.00	.00	e8.0
25	26	44	92	74	53	88	95	e21	.0	1.3	.00	e2.0
26	27	46	76	68	51	88	91	e19	43	3.2	.00	e.80
27	26	51	72	63	51	87	85	e18	51	.57	.00	e.50
28	26	51	76	62	51	85	80	e17	29	.15	.00	e.30
29	26	51	87	65	51	81	84	e16	24	.00	.00	e.20
30	30	50	95	65	---	81	111	e16	43	.00	.00	e.15
31	99	---	106	63	---	83	---	e50	---	.00	.00	---
TOTAL	721	1218	2655	3162	1683	3735	3654	1328	529.62	583.04	0.00	1370.67
MEAN	23.3	40.6	85.6	102	58.0	120	122	42.8	17.7	18.8	.00	45.7
MAX	99	87	212	198	75	344	336	98	51	87	.00	861
MIN	16	28	42	62	51	52	77	16	.00	.00	.00	.00
AC-FT	1430	2420	5270	6270	3340	7410	7250	2630	1050	1160	.0	2720

CAL YR 1987 TOTAL 37034 MEAN 101 MAX 1960 MIN 13 AC-FT 73460  
WTR YR 1988 TOTAL 20639.33 MEAN 56.4 MAX 861 MIN .00 AC-FT 40940

e Estimated

## RED RIVER BASIN

07301110 SALT FORK RED RIVER NEAR ELMER, OK

LOCATION.--Lat 34°28'44", long 99°22'55", in NW 1/4 NE 1/4 sec.15, T.1 S., R.21 W., Jackson County, Hydrologic Unit 11120202, on right bank at bridge on State Highway 5, 1.7 mi west of Elmer, and at mile 3.5.

DRAINAGE AREA.--1,878 mi<sup>2</sup>, of which 209 mi<sup>2</sup> is probably noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1979 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,258.55 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records good. Low flows sustained at times by cotton irrigation.

AVERAGE DISCHARGE.--9 years, 218 ft<sup>3</sup>/s, 157,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 44,900 ft<sup>3</sup>/s, October 20, 1983, gage height, 15.35 ft from high-water mark (HWM); maximum gage height, 16.06 ft, May 29, 1987 (from high-water mark); minimum daily discharge, 0.08 ft<sup>3</sup>/s, Sept. 4, 1981.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Oct. 31	1945	*4,720	*8.54	No peaks greater than base discharge.			

Minimum daily discharge, 23 ft<sup>3</sup>/s, Oct. 11-12, 15, 19-20

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	52	2630	89	195	209	99	233	856	81	144	95	95
2	42	402	89	208	199	215	264	404	132	175	95	93
3	37	167	90	224	191	3090	272	343	96	94	94	93
4	32	125	91	224	188	1710	329	324	96	179	94	92
5	31	108	92	207	189	610	305	201	96	72	94	99
6	29	98	92	169	189	458	273	102	85	53	93	94
7	27	88	93	126	188	395	258	102	76	44	93	81
8	27	82	94	118	191	368	249	101	74	42	95	96
9	25	76	94	158	188	340	232	95	77	587	97	89
10	24	75	93	178	176	318	236	89	72	528	94	95
11	23	79	89	190	155	297	244	83	88	702	93	97
12	23	81	89	210	134	278	243	81	85	208	93	99
13	24	80	89	211	152	261	235	79	89	98	97	92
14	24	80	91	230	154	254	234	77	93	99	95	81
15	23	80	100	296	150	254	232	75	84	93	92	72
16	26	79	92	498	140	253	228	73	84	78	94	68
17	25	77	85	659	128	257	299	71	96	76	93	64
18	24	77	88	678	116	272	1340	67	99	95	90	383
19	23	75	135	716	111	286	1450	58	87	99	93	1780
20	23	77	321	519	108	297	765	56	77	98	93	1090
21	25	79	392	342	107	314	604	55	63	98	94	265
22	27	77	253	302	106	305	541	64	60	98	93	128
23	28	75	216	287	104	290	471	60	69	99	99	104
24	414	81	193	279	100	275	413	57	66	97	97	432
25	492	79	309	273	99	255	382	59	57	93	92	305
26	127	84	243	270	101	238	359	57	336	95	91	80
27	89	81	185	256	100	237	341	57	539	95	91	65
28	77	85	167	244	101	239	333	57	211	97	91	62
29	70	88	163	232	100	220	488	64	235	101	92	59
30	74	89	170	228	---	217	1570	71	101	98	90	56
31	2660	---	181	222	---	219	---	76	---	96	93	---
TOTAL	4647	5454	4568	8949	4174	13121	13423	4014	3504	4631	2900	6309
MEAN	150	182	147	289	144	423	447	129	117	149	93.5	210
MAX	2660	2630	392	716	209	3090	1570	856	539	702	99	1780
MIN	23	75	85	118	99	99	228	55	57	42	90	56
AC-FT	9220	10820	9060	17750	8280	26030	26620	7960	6950	9190	5750	12510

CAL YR 1987 TOTAL 143878 MEAN 394 MAX 19800 MIN 23 AC-FT 285400  
WTR YR 1988 TOTAL 75694 MEAN 207 MAX 3090 MIN 23 AC-FT 150100



## RED RIVER BASIN

07301110 SALT FORK RED RIVER NEAR ELMER, OK--Continued  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--October 1978 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1978 to January 1982.

WATER TEMPERATURE: October 1978 to January 1982.

REMARKS.--Samples were collected bimonthly and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	TUR- BID- ITY (NTU)	BARO- METRIC PRES- SURE (MM HG)	OXYGEN, DIS- SOLVED (MG/L)
OCT												
27...	1330	1028	1028	2.60	89	2500	7.60	22.0	19.0	--	--	--
DEC												
08...	1520	1028	80020	2.52	95	4380	7.80	18.0	13.5	7.8	730	9.1
JAN												
26...	1800	1028	80020	3.16	269	*4000	7.90	10.0	5.0	18	730	11.8
FEB												
17...	0910	1028	1028	3.16	132	4600	--	--	6.0	--	--	--
MAR												
07...	1700	1028	80020	3.38	390	3130	8.20	17.0	16.0	75	720	8.7
APR												
19...	1140	1028	80020	4.81	1480	1850	7.70	15.0	15.0	170	720	9.4
JUN												
08...	1045	1028	1028	2.82	75	4360	7.70	23.5	25.0	--	--	--
JUL												
19...	1210	1028	80020	3.00	96	3640	7.80	32.0	29.0	8.5	730	7.0
AUG												
30...	1500	1028	80020	3.24	88	3270	--	28.0	28.0	10	730	7.0

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD- NESS TOTAL (MG/L AS CAC03)	HARD- NESS NONCARB WH WAT TOT FLD (MG/L AS CAC03)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH IT FIELD (MG/L AS HC03)
OCT												
27...	--	--	--	--	--	--	--	--	--	--	--	--
DEC												
08...	93	24	K12	1900	1700	510	140	350	29	4	6.6	205
JAN												
26...	96	K6	56	1700	1500	430	140	330	30	4	6.6	215
FEB												
17...	--	--	--	--	--	--	--	--	--	--	--	--
MAR												
07...	94	K560	160	1100	1000	300	94	--	--	--	8.0	104
APR												
19...	99	K2300	K320	700	600	190	54	110	25	2	7.7	126
JUN												
08...	--	--	--	--	--	--	--	--	--	--	--	--
JUL												
19...	96	--	--	1400	1300	360	120	350	35	4	8.4	--
AUG												
30...	95	K240	96	1100	990	270	110	310	37	4	8.6	--

\*SPECIFIC CONDUCTANCE, LAB (US/CM)

## RED RIVER BASIN

07301110 SALT FORK RED RIVER NR ELMER OK--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	CAR- BONATE WATER WH IT FIELD (MG/L AS CO3)	ALKA- LITY WAT WH TOT IT FIELD (MG/L AS CACO3)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SiO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N)
OCT												
27...	--	--	--	--	--	--	--	--	--	--	--	--
DEC												
08...	0	168	1500	680	0.40	11	3480	3310	4.73	895	2.07	0.030
JAN												
26...	0	176	1400	570	0.50	15	3220	3020	4.38	2340	--	<0.010
FEB												
17...	--	--	--	--	--	--	--	--	--	--	--	--
MAR												
07...	0	85	1200	390	0.50	12	2430	--	--	--	1.28	0.020
APR												
19...	0	103	640	170	0.40	10	1320	1250	1.80	5270	0.530	0.030
JUN												
08...	--	--	--	--	--	--	--	--	--	--	--	--
JUL												
19...	--	--	1200	530	0.40	9.1	2740	2660	3.73	708	--	--
AUG												
30...	--	--	950	470	0.40	11	2330	2220	3.17	554	0.840	0.010
DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS NO2)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS- PHOROUS TOTAL (MG/L AS P)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4)	PHOS- PHOROUS ORGANIC TOTAL (MG/L AS P)
OCT												
27...	--	--	--	--	--	--	--	--	--	--	--	--
DEC												
08...	0.10	2.10	0.090	0.100	0.13	0.71	0.80	0.030	<0.010	<0.010	--	0.03
JAN												
26...	--	2.20	0.160	0.160	0.21	0.74	0.90	0.040	0.020	<0.010	--	0.04
FEB												
17...	--	--	--	--	--	--	--	--	--	--	--	--
MAR												
07...	0.07	1.30	0.140	0.150	0.19	0.86	1.0	0.070	0.050	0.030	0.09	0.07
APR												
19...	0.10	0.560	0.140	0.140	0.18	0.56	0.70	0.090	0.040	0.030	0.09	0.09
JUN												
08...	--	--	--	--	--	--	--	--	--	--	--	--
JUL												
19...	--	--	0.150	--	--	1.2	1.4	0.070	0.020	--	--	0.07
AUG												
30...	0.03	0.850	0.070	0.070	0.09	0.73	0.80	0.110	0.040	0.030	0.09	0.11

## RED RIVER BASIN

07301110 SALT FORK RED RIVER NR ELMER OK--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	PHOS- PHOROUS ORGANIC DIS- SOLVED (MG/L AS P)	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)
OCT 27...	--	--	--	--	--	--	--	--	--	--	--	--
DEC 08...	--	10	2	46	<1	<3	2	<9	2	110	<5	140
JAN 26...	0.02	10	2	63	<1	<2	2	<6	8	16	5	110
FEB 17...	--	--	--	--	--	--	--	--	--	--	--	--
MAR 07...	0.02	--	--	--	--	--	--	--	--	--	--	--
APR 19...	0.01	<10	3	97	<0.5	<1	<1	<3	10	8	<5	42
JUN 08...	--	--	--	--	--	--	--	--	--	--	--	--
JUL 19...	0.02	--	--	--	--	--	--	--	--	--	--	--
AUG 30...	0.01	<10	4	140	<0.5	<1	<1	<3	7	15	5	73

DATE	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY DIS- SOLVED (UG/L AS HG)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V)	ZINC, DIS- SOLVED (UG/L AS ZN)	SEDI- MENT, SUS- PENDED (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
OCT 27...	--	--	--	--	--	--	--	--	--	--	--	--
DEC 08...	41	<0.1	<30	2	7	<1.0	5500	<18	20	344	89	15
JAN 26...	46	<0.1	<20	1	7	<1.0	4900	<12	25	458	333	42
FEB 17...	--	--	--	--	--	--	--	--	--	--	--	--
MAR 07...	--	--	--	--	--	--	--	--	--	1240	1310	23
APR 19...	4	<0.1	<10	2	2	<1.0	2000	<6	4	2420	9670	55
JUN 08...	--	--	--	--	--	--	--	--	--	--	--	--
JUL 19...	--	--	--	--	--	--	--	--	--	41	11	92
AUG 30...	23	<0.1	<10	1	4	<1.0	3400	8	160	--	--	--

## RED RIVER BASIN

07301420 SWEETWATER CREEK NEAR SWEETWATER, OK

LOCATION.--Lat 35°25'25", long 99°58'08", on east-west line of north boundary, in NW 1/4 NE 1/4 sec.20, T.11 N, R.26 W., Roger Mills-Beckham County line, Hydrologic Unit 11120302, on right bank downstream bridge piling of State Highway 152, 0.4 mi downstream from Freezeout Creek, 3.3 mi west of Sweetwater, and at mile 16.0.

DRAINAGE AREA.--424 mi<sup>2</sup>, of which 20 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--April 1986 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,087.76 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 270 ft<sup>3</sup>/s, May 28, 1987, gage height, 11.70; minimum daily discharge, 0.17 ft<sup>3</sup>/s, Aug. 22, 1986.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 260 ft<sup>3</sup>/s, Sept. 17, gage height, 11.56 ft; minimum daily discharge, 0.74 ft<sup>3</sup>/s, Aug. 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.7	13	19	e32	30	27	30	50	31	13	4.3	1.6
2	8.1	13	19	e30	29	47	59	49	37	13	4.0	7.2
3	7.5	13	19	e29	30	147	54	45	31	14	3.8	111
4	7.4	13	19	e28	29	157	42	41	26	13	3.7	94
5	7.4	13	20	e27	30	128	35	40	24	11	3.7	44
6	7.3	13	19	e26	29	114	30	39	22	11	3.4	31
7	7.2	15	19	e25	e28	86	28	38	20	23	3.2	25
8	7.0	18	19	e25	31	67	27	36	18	29	3.1	20
9	6.7	17	19	e26	31	56	24	34	17	27	3.2	17
10	6.7	16	19	e27	28	51	22	33	15	49	3.3	15
11	6.9	16	19	e28	27	46	22	32	15	45	3.1	14
12	7.5	16	19	e29	e28	39	21	32	14	31	2.8	12
13	8.2	17	20	e28	33	34	21	32	13	24	2.6	11
14	8.2	17	22	e26	33	32	21	31	13	20	2.3	12
15	8.4	17	e19	e28	31	32	21	30	24	16	1.9	84
16	9.4	16	e17	e36	31	31	21	29	60	13	.93	198
17	10	16	e22	56	31	34	35	28	38	12	1.8	215
18	10	16	29	61	28	37	106	26	32	11	1.6	103
19	10	16	37	59	28	47	107	25	25	12	1.5	84
20	10	17	71	49	27	54	80	24	20	12	1.8	69
21	10	17	63	40	27	51	68	24	17	11	1.4	55
22	10	17	46	e39	27	41	61	23	14	9.8	1.1	45
23	10	17	41	37	26	36	54	24	12	8.9	.91	41
24	11	16	36	37	25	34	49	24	11	8.2	.89	44
25	12	16	33	35	26	30	52	24	11	7.5	.80	41
26	12	17	e30	34	26	29	60	25	12	7.6	.74	37
27	13	18	e26	33	27	29	55	24	14	6.9	.78	34
28	12	20	e28	32	26	29	49	23	16	6.5	.86	31
29	12	19	e30	32	26	28	48	23	16	6.0	.75	27
30	13	19	e32	32	---	27	49	22	15	5.3	2.5	25
31	13	---	e35	31	---	26	---	23	---	4.8	1.9	---
TOTAL	290.6	484	866	1057	828	1626	1351	953	633	481.5	68.66	1547.8
MEAN	9.37	16.1	27.9	34.1	28.6	52.5	45.0	30.7	21.1	15.5	2.21	51.6
MAX	13	20	71	61	33	157	107	50	60	49	4.3	215
MIN	6.7	13	17	25	25	26	21	22	11	4.8	.74	1.6
AC-FT	576	960	1720	2100	1640	3230	2680	1890	1260	955	136	3070

CAL YR 1987 TOTAL 11501.3 MEAN 31.5 MAX 211 MIN 1.5 AC-FT 22810  
WTR YR 1988 TOTAL 10186.56 MEAN 27.8 MAX 215 MIN .74 AC-FT 20210

e Estimated

## 07301500 NORTH FORK RED RIVER NEAR CARTER, OK

LOCATION.--Lat 35°10'05", long 99°30'25", in NW 1/4 SE 1/4 sec.15, T.8 N., R.22 W., Beckham County, Hydrologic Unit 11120302, near left bank on downstream side of pier of bridge on State Highway 34, 3.0 mi south of Carter, 10.8 mi downstream from Timber Creek, and at mile 110.5.

DRAINAGE AREA.--2,337 mi<sup>2</sup>, of which 399 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--October 1944 to September 1962. Annual maximum and occasional low-flow measurements, water years 1963-64. August 1964 to current year.

REVISED RECORDS.--WSP 1211: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,673.71 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--42 years, (water years 1945-62, 1965-88) 120 ft<sup>3</sup>/s, 86,940 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 53,400 ft<sup>3</sup>/s, May 26, 1959, maximum gage height, 14.98 ft, May 17, 1977; no flow at times in most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Apr. 30	0045	3,590	7.34	Sept. 19	0145	*11,400	*11.68 (HWM)

No flow at times.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e90	88	145	e165	164	e92	171	361	381	34	e7.2	.00
2	e84	80	146	e160	e163	258	326	392	337	28	e9.4	.00
3	e76	76	149	e155	159	1100	317	317	e190	24	e4.8	180
4	e66	74	147	e152	154	638	260	e210	e145	21	e2.9	6.0
5	e62	72	145	e150	152	408	208	e170	e115	17	e1.5	2.1
6	e59	70	148	e149	153	280	168	e150	e96	15	e.74	.12
7	e57	80	146	e146	150	231	136	e140	e85	13	e.42	.00
8	e56	101	146	e143	150	179	e116	e130	e74	16	e.23	.00
9	e53	107	141	e141	e150	131	e110	e122	e64	24	e.12	.00
10	e52	104	138	e139	e140	115	e94	e110	e60	65	e.00	.00
11	e50	104	137	e139	e132	110	e84	e107	e52	79	e.00	.00
12	e48	102	135	e139	e130	114	e80	e102	e48	96	e.00	.22
13	e47	102	139	e138	e128	106	e76	e100	e44	71	e.00	.94
14	e46	104	166	e140	154	99	e74	e98	e40	44	e.00	2.0
15	e45	106	174	e140	183	129	e72	e95	e92	26	e.00	5.8
16	e44	109	175	e141	149	146	e70	e93	e70	17	e.00	114
17	e43	109	172	e146	139	173	264	e88	60	18	e.00	180
18	e42	114	226	145	129	190	1010	e87	61	23	e.00	1250
19	e42	112	327	175	126	266	425	e86	55	26	e.00	5500
20	41	114	564	227	121	275	238	e85	42	109	e.00	410
21	41	114	304	200	117	263	271	e100	34	151	e.00	173
22	41	115	211	183	e117	213	275	e89	29	88	e.00	143
23	45	118	195	195	e110	195	227	e86	26	51	e.00	151
24	57	119	201	227	e108	178	205	e83	26	31	e.00	152
25	60	121	202	213	e106	154	379	e80	26	23	.00	149
26	62	124	186	192	e102	144	408	e77	29	19	.00	154
27	59	138	179	170	e100	128	342	e78	57	32	.00	136
28	55	143	176	167	e97	123	249	e77	45	34	.00	120
29	57	143	175	154	e95	130	807	e75	53	e16	.00	103
30	67	145	e170	154	---	128	958	e74	49	e13	.00	95
31	105	---	e168	156	---	143	---	e72	---	e10	.00	---
TOTAL	1752	3208	5833	5041	3878	6839	8420	3934	2485	1234	27.31	9027.18
MEAN	56.5	107	188	163	134	221	281	127	82.8	39.8	.88	301
MAX	105	145	564	227	183	1100	1010	392	381	151	9.4	5500
MIN	41	70	135	138	95	92	70	72	26	10	.00	.00
AC-FT	3480	6360	11570	10000	7690	13570	16700	7800	4930	2450	54	17910

CAL YR 1987 TOTAL 87374 MEAN 239 MAX 6040 MIN 14 AC-FT 173300  
WTR YR 1988 TOTAL 51678.49 MEAN 141 MAX 5500 MIN .00 AC-FT 102500

e Estimated



## 07302500 LAKE ALTUS AT LUGERT, OK

LOCATION (REVISED).--Lat 34°53'08", long 99°17'43", in SW 1/4 SE 1/4 sec.22, T.5 N., R.20 W., Kiowa County, Hydrologic Unit 11120302, on upstream face of Altus Dam on North Fork Red River, 1.0 mi west of Lugert, 2.6 mi upstream from Elm Fork of North Fork, and at mile 73.5.

DRAINAGE AREA.--2,515 mi<sup>2</sup>, of which 399 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--December 1943 to September 1950 (monthly records only), October 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation). Prior to Nov. 19, 1948, nonrecording or float gage at same site and datum.

REMARKS.--Reservoir is formed by concrete and coursed masonry dam. Storage began in December 1943. Capacity, 134,500 acre-ft at elevation 1,559.0 ft, crest of uncontrolled spillway, and 72,400 acre-ft at elevation 1,547.0 ft, crest of controlled spillway. Dead storage, 1,660 acre-ft below elevation 1,517.5 ft, sill of headgate at irrigation canal. Figures given herein represent total contents. Reservoir is used for flood control, municipal water supply for city of Altus, and irrigation of about 48,000 acres. Revised capacity table used since Jan. 1, 1969. From 1927 to 1943, a dam to form reservoir for municipal water supply was at same site. Elevation of crest was 1,514.31 ft. U.S. Army Corps of Engineers' satellite telemeter at station.

COOPERATION.--Data on diversions provided by U.S. Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 170,600 ft<sup>3</sup>/s, May 19, 1951, elevation 1,562.10 ft; minimum after initial storage, 4,690 acre-ft, Aug. 25, 1944, elevation, 1,520.2 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 140,200 acre-ft, Mar. 4, elevation 1,559.90 ft; minimum, 62,150 acre-ft, Sept. 1, elevation, 1,544.41 ft.

## Capacity table (elevation, in feet, and contents, in acre-feet):

1520	3,844	1540	46,780
1525	10,710	1548	76,580
1529	18,130	1559	134,500
1534	29,620	1563	161,000

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	113300	114700	116700	126000	136100	136600	135300	136100	134900	121100	98510	62190
2	113200	114700	116800	126200	136100	139200	134700	135400	135300	121100	96780	62490
3	113100	114900	116900	126700	136300	140000	134900	134600	135200	121000	95630	62830
4	113100	115100	116800	126900	136400	140100	134900	134600	135000	120900	94280	63320
5	113100	115000	117200	127500	136300	139800	134900	134700	134700	120700	93190	63740
6	113000	114700	117400	127900	135800	138700	134800	134500	134200	121200	92160	63740
7	112800	115100	117600	127900	135700	138400	134600	134700	133600	120900	91190	63630
8	112700	115200	117600	127900	135400	137600	134700	134900	133300	121200	89910	63630
9	113000	115200	117700	127900	135300	136700	134900	135000	132300	121400	88600	63590
10	112900	115000	117900	128200	135600	135800	134800	135000	131600	121400	87420	63630
11	112800	115100	118000	128400	134900	135100	134800	135000	130300	121400	85970	63590
12	112800	115100	118000	128800	134700	134500	134800	134900	129400	121500	84500	63510
13	112500	115000	118300	129000	134600	134400	134800	134600	128500	121200	82900	63400
14	112500	115000	118700	129400	134400	134500	134800	134400	127900	120600	81550	63610
15	112600	115500	118500	129600	134300	134600	134700	134700	127200	119800	80210	63510
16	112800	115500	118600	130600	134900	134700	134700	134900	126700	119100	79010	64040
17	112700	115600	118500	132000	135100	135100	135300	134900	125900	117400	77580	65540
18	112700	115500	118900	133400	135300	135100	135400	134900	125100	116100	76620	66570
19	112800	115500	120100	134900	135600	135300	134900	135100	124400	114800	75100	71770
20	112700	115500	121000	134800	135600	135700	134600	135400	123500	112600	74020	78490
21	112500	115400	121900	134900	135800	135600	134100	135400	122600	111200	72970	81320
22	112500	115700	122400	134900	136000	135600	134200	135400	122000	109800	71920	82130
23	112900	115900	122800	135200	136000	135500	134300	135400	121500	108400	70820	83260
24	113200	116100	123400	135000	136200	135100	135300	135400	120800	107500	69690	83630
25	113500	116100	125000	134900	136300	134700	134800	135500	120300	106400	68400	84360
26	113400	116200	124700	134900	136400	134600	135100	135300	120600	105700	67200	84540
27	113500	116400	124800	134700	136500	134300	135300	134900	120700	104900	66080	84770
28	113400	116400	125000	134600	136600	135500	135400	134600	121000	103800	65130	85550
29	113500	116500	125000	134800	136500	134900	136000	134000	120900	102600	64410	85600
30	114600	116600	125400	135200	---	135000	137400	133700	121000	101500	63740	85790
31	114600	---	125700	135800	---	135400	---	134600	---	100000	63110	---
MAX	114600	116600	125700	135800	136600	140100	137400	136100	135300	121500	98510	85790
MIN	112500	114700	116700	126000	134300	134300	134100	133700	120300	100000	63110	62190
(+)	1555.66	1556.02	1557.56	1559.21	1559.32	1559.15	1559.46	1559.02	1559.78	1552.96	1544.66	1550.06
(++)	+1,300	+2,000	+9,100	+10,100	+700	-1,100	+21,000	-2,800	-13,600	-21,000	-36,890	+22,680
(+++)	0	0	0	0	0	0	0	0	16,834	19,585	33,802	1,325

CAL YR 1987 MAX 150000 MIN 106100 (++) -9,700 (+++) 41,306

WTR YR 1988 MAX 140100 MIN 62190 (++) -27,510 (+++) 71,546

(+) ELEVATION, IN FEET, AT END OF MONTH

(++) CHANGE IN CONTENTS, IN ACRE-FEET

(+++) DIVERSIONS, IN ACRE-FEET

## 07303000 NORTH FORK RED RIVER BELOW ALTUS DAM, NEAR LUGERT, OK

LOCATION.--Lat 34°53'26", long 99°18'22", in SW 1/4 sec.22, T.5 N., R.20 W., Greer County, Hydrologic Unit 11120303, on right bank at State Highway 44A bridge, 3,500 ft downstream from Altus Dam, 1.9 mi upstream from Elm Fork of North Fork, 2.0 mi west of Lugert, and at mile 72.8.

DRAINAGE AREA.--2,515 mi<sup>2</sup>, of which 399 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--March 1930 to December 1932 (published as "at Lugert Dam"), December 1943 to September 1950 (published as spill from Lake Altus), October 1950 to September 1962, August 1964 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1311: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,471.81 ft above National Geodetic Vertical Datum of 1929. Mar. 19, 1930 to Dec. 21, 1932, nonrecording gage at former Lugert Dam, 0.7 mi upstream at datum 1,504.31 ft National Geodetic Vertical Datum of 1929, unadjusted.

REMARKS.--Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Some regulation at low flow by Lugert Lake prior to December 1943, capacity 13,500 acre-ft and completely regulated thereafter by Lake Altus (station 07302500). Diversions at Lake Altus bypass most of streamflow. Seepage from Altus Dam not included for period February 1953 to September 1977.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,100 ft<sup>3</sup>/s, May 18, 1951, gage height, 12.70 ft, maximum gage height, 16.37 ft, May 21, 1977 (backwater from Elm Fork of the North Fork Red River); no flow at times in most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 16, 1928, reached a stage of 14.5 ft, site and datum in use 1930-32, discharge, 14,300 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 951 ft<sup>3</sup>/s, Apr. 30, gage height, 7.39 ft; no flow at times.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.69	1.1	1.0	1.3	29	156	467	902	2.0	.00	.00	.00
2	.52	1.1	1.0	1.2	25	528	379	860	3.6	.00	.00	.27
3	.42	1.1	1.0	1.2	31	885	203	550	6.6	.00	.00	.39
4	.48	1.1	1.1	1.2	38	918	204	173	5.8	.00	.02	.16
5	.76	1.0	1.2	1.3	204	907	213	115	3.0	.00	.06	.10
6	.58	1.0	1.2	1.7	274	856	203	117	1.8	.00	.06	.15
7	.51	1.0	1.1	1.5	265	809	203	116	1.2	.00	.00	.00
8	.33	.77	1.1	1.5	255	766	188	119	.56	.00	.00	.00
9	.41	.60	1.1	1.5	249	715	117	119	3.9	.00	.00	.00
10	.34	.59	1.1	1.5	262	669	112	117	.96	.16	.00	.14
11	.62	.71	.92	1.5	240	646	108	117	.25	.21	.00	.55
12	.85	.83	1.0	1.4	226	492	103	116	.08	.23	.00	.64
13	.93	.86	1.1	1.5	224	215	105	115	.01	.18	.00	.58
14	.97	.86	1.2	2.0	233	140	109	115	.00	.08	.00	.60
15	1.0	.80	1.1	2.1	68	110	118	61	.00	.01	.00	.39
16	1.3	.81	1.1	2.0	3.0	116	112	2.8	.00	.00	.00	.44
17	.89	.85	1.1	2.0	11	126	480	3.3	.00	.00	.00	.49
18	.72	.84	1.2	2.6	6.2	115	838	4.3	.00	.00	.00	2.7
19	.59	.83	1.7	59	7.5	114	835	4.3	.00	.03	.00	1.0
20	.56	.85	1.3	207	12	120	724	4.6	.00	.01	.00	.68
21	.52	.97	1.2	202	14	129	506	7.8	.00	.00	.00	.65
22	.75	.88	1.1	203	22	239	227	9.5	.00	.00	.00	.63
23	1.4	.76	1.1	205	24	412	127	7.8	.00	.00	.00	1.0
24	2.1	.78	1.2	210	25	406	137	6.4	.00	.00	.00	.82
25	1.5	.87	1.5	205	29	356	131	6.8	.00	.00	.00	.67
26	1.2	.90	1.1	203	34	203	141	7.2	.00	.00	.00	.65
27	1.2	.99	1.1	200	46	159	139	5.0	.12	.00	.00	.66
28	1.1	.93	1.3	200	50	48	148	3.2	.15	.00	.00	.57
29	1.1	.92	1.2	69	125	10	300	2.8	.11	.00	.00	.52
30	2.6	.98	1.2	4.5	---	5.3	761	2.8	.02	.00	.00	.57
31	2.0	---	1.2	12	---	106	---	2.8	---	.00	.00	---
TOTAL	28.94	26.58	35.82	2008.5	3031.7	11476.3	8438	3793.4	30.16	0.91	0.14	15.97
MEAN	.93	.89	1.16	64.8	105	370	281	122	1.01	.029	.005	.53
MAX	2.6	1.1	1.7	210	274	918	838	902	6.6	.23	.06	2.7
MIN	.33	.59	.92	1.2	3.0	5.3	103	2.8	.00	.00	.00	.00
AC-FT	57	53	71	3980	6010	22760	16740	7520	60	1.8	.3	32

CAL YR 1987 TOTAL 79864.93 MEAN 219 MAX 5500 MIN .00 AC-FT 158400  
WTR YR 1988 TOTAL 28886.42 MEAN 78.9 MAX 918 MIN .00 AC-FT 57300

## RED RIVER BASIN

07304500 ELK CREEK NEAR HOBART, OK

LOCATION.--Lat 34°54'51", long 99°06'49", in NE 1/4 NE 1/4 sec.17, T.5 N., R.18 W., Kiowa County, Hydrologic Unit 11120303, near right bank on downstream side of pier of county road bridge, 7.0 mi downstream from Little Elk Creek, 7.5 mi south of Hobart, and at mile 10.9.

DRAINAGE AREA.--549 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1904 to March 1908, October 1949 to current year.

REVISED RECORDS.--WSP 1211: Drainage area. WSP 1241: 1905. WDR OK-86-1: 1984 (M).

GAGE.--Water-stage recorder. Datum of gage is 1,429.4 ft above National Geodetic Vertical Datum of 1929. See WSP 1920 for history of changes prior to Apr. 28, 1954.

REMARKS.--Records fair. Part of high flows are diverted 1.0 mi upstream from station, by means of a breach canal (U.S. Bureau of Reclamation), into Tom Steed Reservoir.

AVERAGE DISCHARGE.--42 years, (water years 1905-07, 1950-88), 84.4 ft<sup>3</sup>/s, 61,150 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,000 ft<sup>3</sup>/s, Oct. 3, 1986, gage height, 31.53 ft; no flow at times in most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Mar. 3	1300	*4,690	*25.98	No other peak greater than base discharge.			

Minimum daily discharge, 9.3 ft<sup>3</sup>/s, Aug. 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e82	72	29	48	111	86	152	1570	349	52	15	11
2	e71	54	29	44	114	1270	185	881	267	41	14	16
3	e63	34	28	e45	96	4140	228	506	148	36	13	73
4	e56	30	28	e42	92	2020	170	316	e120	34	14	34
5	e51	29	28	e38	92	962	154	242	e109	33	14	31
6	e46	27	28	e34	93	574	152	199	e89	32	14	18
7	e41	26	28	49	82	361	134	178	e81	29	13	14
8	e37	26	28	78	84	294	127	162	e73	28	13	12
9	e34	26	26	64	88	243	124	148	65	34	13	11
10	e33	32	26	e60	87	220	151	135	64	33	13	11
11	e31	30	26	e54	105	206	134	e128	55	34	13	11
12	e30	27	26	e49	79	197	123	e123	50	44	12	10
13	e29	28	27	e45	83	182	116	e118	49	45	12	9.9
14	e28	28	29	e43	87	174	112	e115	47	29	12	10
15	e27	28	43	59	87	162	112	e111	46	26	11	29
16	e27	28	32	120	79	162	119	e108	46	24	11	67
17	e27	28	30	428	79	168	197	e103	45	22	11	90
18	e26	27	34	914	95	185	531	e99	44	22	10	98
19	e25	27	77	929	77	170	403	e96	42	21	10	1090
20	e25	29	755	89	74	166	216	e103	40	20	11	1320
21	e24	27	305	78	73	165	165	e196	38	18	11	864
22	e24	28	133	e67	72	164	141	e168	38	18	11	1190
23	e40	28	86	e53	76	162	122	e130	36	17	10	881
24	e37	29	70	e50	75	157	113	e112	44	18	10	591
25	e33	29	86	192	69	151	288	e103	49	20	9.8	262
26	e30	28	87	136	68	139	281	e94	42	24	9.4	162
27	e27	29	57	124	68	139	207	e92	59	21	9.3	124
28	e25	29	44	114	71	132	152	e88	73	18	9.5	106
29	e25	29	49	110	69	149	138	e86	46	19	10	98
30	e24	30	49	107	---	142	1150	e83	98	19	10	92
31	129	---	46	108	---	125	---	100	---	16	11	---
TOTAL	1207	922	2369	4371	2425	13567	6397	6693	2352	847	360.0	7335.9
MEAN	38.9	30.7	76.4	141	83.6	438	213	216	78.4	27.3	11.6	245
MAX	129	72	755	929	114	4140	1150	1570	349	52	15	1320
MIN	24	26	26	34	68	86	112	83	36	16	9.3	9.9
AC-FT	2390	1830	4700	8670	4810	26910	12690	13280	4670	1680	714	14550

CAL YR 1987 TOTAL 84163 MEAN 231 MAX 13000 MIN 24 AC-FT 166900  
WTR YR 1988 TOTAL 48845.9 MEAN 133 MAX 4140 MIN 9.3 AC-FT 96890

e Estimated

## 07305000 NORTH FORK RED RIVER NEAR HEADRICK, OK

LOCATION.--Lat 34°38'04", long 99°05'47", in NW 1/4 NE 1/4 sec.21, T.2 N., R.18 W., Tillman County, Hydrologic Unit 11120303, near left bank on downstream side of pier of bridge on old U.S. Highway 62, 2.5 mi east of Headrick, 12.9 mi upstream from Otter Creek, and at mile 33.0.

DRAINAGE AREA.--4,244 mi<sup>2</sup>, of which 399 mi<sup>2</sup> is probably noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1905 to March 1908, October 1937 to current year. Monthly discharge only for some periods, published in WSP 1311. Prior to July 1905, published as "near Snyder".

REVISED RECORDS.--WSP 1211: Drainage area. WSP 1241: 1905-07.

GAGE.--Water-stage recorder. Datum of gage is 1,294.83 ft above National Geodetic Vertical Datum of 1929. Prior to July 18, 1905, nonrecording gage at site 0.2 mi downstream at different datum. July 18, 1905 to Mar. 30, 1908, nonrecording gage at Navajo damsite 10.4 mi upstream at different datum. Oct. 1, 1937 to Jan. 29, 1969, water-stage recorder at present site at datum 5.0 ft higher.

REMARKS.--Records good. Flow regulated since December 1943 by storage and diversion at Lake Altus, 39.5 mi upstream from station (station 07302500). Diversions for irrigation of about 48,000 acres upstream from station; some return flow may re-enter at Stinking Creek, 16 mi downstream from station. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Prior to regulation by Lake Altus, 8 years (1906-07, 1938-43), 455 ft<sup>3</sup>/s, 329,600 acre-ft/yr; since regulation by Lake Altus, 44 years (water years 1945-88), 289 ft<sup>3</sup>/s, 209,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 59,000 ft<sup>3</sup>/s, Oct. 4, 1986, gage height, 19.07 ft, present datum; no flow at times in most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--A stage of 21.1 ft, present datum, occurred sometime prior to 1927, from information provided by Oklahoma State Highway Department.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 9,470 ft<sup>3</sup>/s, Mar. 3, gage height, 12.91 ft; minimum daily discharge, 25 ft<sup>3</sup>/s, Aug. 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	247	504	105	e120	232	250	491	2980	187	167	52	26
2	182	320	104	e115	262	1820	861	2860	858	131	55	64
3	156	214	104	e110	265	8710	831	1960	701	99	63	389
4	148	163	103	e120	260	6500	674	1290	399	86	44	300
5	135	136	103	e110	e240	3230	588	821	294	80	43	288
6	126	122	103	e105	e232	2420	555	626	238	77	41	202
7	121	114	101	e100	e221	1920	536	561	199	75	42	139
8	118	108	101	e96	e212	1630	513	530	175	78	38	101
9	113	102	100	e102	e200	1460	502	492	156	77	33	83
10	107	103	101	e115	e220	1330	449	477	145	199	40	71
11	104	104	100	e100	e250	1230	451	443	144	202	40	64
12	104	105	99	e110	e285	1150	434	403	133	185	40	51
13	104	101	99	e120	361	1020	401	404	119	158	35	59
14	102	100	e96	e145	381	753	392	399	113	139	34	179
15	101	100	e95	e165	365	656	393	369	109	101	35	97
16	100	99	e94	333	307	566	398	348	107	81	36	66
17	99	100	106	1030	215	585	483	260	521	78	36	122
18	99	100	104	1160	208	594	1570	222	307	64	34	1470
19	97	101	130	1520	225	597	2530	216	180	65	33	2420
20	96	101	299	883	206	569	1770	216	144	61	33	4500
21	96	102	766	474	201	555	1250	212	123	60	34	4780
22	95	101	435	405	204	558	964	184	111	65	33	1730
23	96	100	277	370	207	595	703	201	95	78	31	1490
24	462	100	201	349	210	802	530	218	94	83	34	1840
25	180	99	e190	338	212	788	491	201	89	85	27	935
26	136	98	e175	419	212	725	649	192	110	69	26	601
27	120	101	e159	391	214	564	679	184	124	67	25	457
28	117	102	e145	400	222	531	586	184	112	71	27	375
29	112	102	e138	372	236	423	498	159	133	62	28	331
30	111	104	e133	323	---	372	1110	169	125	66	29	294
31	305	---	e129	262	---	360	---	168	---	62	28	---
TOTAL	4289	3906	4995	10762	7065	43263	22282	17949	6345	2971	1129	23524
MEAN	138	130	161	347	244	1396	743	579	211	95.8	36.4	784
MAX	462	504	766	1520	381	8710	2530	2980	858	202	63	4780
MIN	95	98	94	96	200	250	392	159	89	60	25	26
AC-FT	8510	7750	9910	21350	14010	85810	44200	35600	12590	5890	2240	46660

CAL YR 1987 TOTAL 332065 MEAN 910 MAX 32500 MIN 94 AC-FT 658700  
WTR YR 1988 TOTAL 148480 MEAN 406 MAX 8710 MIN 25 AC-FT 294500

e Estimated



07305000 NORTH FORK RED RIVER NEAR HEADRICK, OK--Continued  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1951-52, 1954-63, 1968 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: November 1959 to September 1963, July 1968 to current year.

WATER TEMPERATURE: November 1959 to September 1963, July 1968 to current year.

INSTRUMENTATION.--Water-quality monitor from August 1969 to September 1981.

REMARKS.--Samples were collected by a local observer on a daily basis. Additional samples were collected quarterly and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

EXTREMES FOR PERIOD OF RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 23,300 microsiemens, June 8, 1974; minimum daily, 302 microsiemens, Oct. 20, 1983.

WATER TEMPERATURE: Maximum daily, 38.0 °C, July 19, 1969, Aug. 4, 1977, July 19, 1988; minimum daily, 0.0 °C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 11,500 microsiemens, July 24; minimum daily, 870 microsiemens, Sept. 18.

WATER TEMPERATURE: Maximum daily, 38.0 °C, July 19; minimum daily, 0.0 °C on several days during winter.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL- LECTING SAMPLE (CODE NUMBER)	AGENCY ANA- LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	TUR- BID- ITY (NTU)	BARO- METRIC PRES- SURE (MM OF HG)	OXYGEN, DIS- SOLVED (MG/L)
OCT												
27...	1020	1028	1028	5.44	119	6540	7.70	22.0	16.0	--	--	--
DEC												
08...	1100	1028	80020	5.40	101	7280	7.80	16.0	11.0	3.9	730	9.6
JAN												
26...	1430	1028	80020	6.65	702	2840	8.30	12.0	7.0	190	730	11.3
MAR												
11...	1605	1028	1028	8.04	1210	2470	8.20	16.0	15.0	--	--	--
APR												
18...	1230	1028	80020	8.58	1610	3150	7.90	20.0	14.0	69	720	9.3
JUN												
09...	1130	1028	1028	6.17	157	4690	7.80	28.0	25.5	--	--	--
JUL												
19...	1007	1028	1028	5.66	65	6510	7.80	28.5	26.5	--	--	--
AUG												
30...	1110	1028	80020	5.29	31	6500	--	27.0	24.0	1.1	730	7.6

DATE	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD- NESS TOTAL (MG/L AS CAC03)	HARD- NESS NONCARB WH WAT TOT FLD (MG/L AS CAC03)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH IT FIELD (MG/L AS HC03)
OCT												
27...	--	--	--	--	--	--	--	--	--	--	--	--
DEC												
08...	93	39	35	--	--	--	--	--	--	--	7.4	239
JAN												
26...	98	120	480	790	570	190	77	330	47	5	6.6	234
MAR												
11...	--	--	--	--	--	--	--	--	--	--	--	--
APR												
18...	97	K470	K320	680	520	160	67	390	55	7	5.5	212
JUN												
09...	--	--	--	--	--	--	--	--	--	--	--	--
JUL												
19...	--	--	--	--	--	--	--	--	--	--	--	--
AUG												
30...	94	75	23	910	770	200	100	1000	70	15	7.7	160



07305000 NORTH FORK RED RIVER NEAR HEADRICK, OK--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	CARBONATE WATER FIELD (MG/L AS CO3)	ALKALINITY WAT WH TOT IT FIELD (MG/L AS CACO3)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLORIDE, DIS- SOLVED (MG/L AS CL)	FLUORIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SiO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	NITROGEN, NITRATE DIS- SOLVED (MG/L AS N)	NITROGEN, NITRITE DIS- SOLVED (MG/L AS N)
OCT 27...	--	--	--	--	--	--	--	--	--	--	--	--
DEC 08...	0	196	910	1700	0.40	--	4470	--	--	--	1.78	0.020
JAN 26...	12	212	610	540	0.40	9.5	1980	1910	2.69	3750	--	<0.010
MAR 11...	--	--	--	--	--	--	--	--	--	--	--	--
APR 18...	0	174	570	630	0.40	6.5	2020	1930	2.75	8780	--	--
JUN 09...	--	--	--	--	--	--	--	--	--	--	--	--
JUL 19...	--	--	--	--	--	--	--	--	--	--	--	--
AUG 30...	0	131	830	1500	0.40	5.6	3930	3730	5.34	331	--	<0.010

DATE	NITROGEN, NITRITE DIS- SOLVED (MG/L AS NO2)	NITROGEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, AMMONIA DIS- SOLVED (MG/L AS N)	NITROGEN, AMMONIA DIS- SOLVED (MG/L AS NH4)	NITROGEN, ORGANIC TOTAL (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHOROUS TOTAL (MG/L AS P)	PHOSPHOROUS DIS- SOLVED (MG/L AS P)	PHOSPHOROUS ORTHO, DIS- SOLVED (MG/L AS P)	PHOSPHATE, ORTHO, DIS- SOLVED (MG/L AS PO4)	PHOSPHOROUS ORGANIC TOTAL (MG/L AS P)
OCT 27...	--	--	--	--	--	--	--	--	--	--	--	--
DEC 08...	0.07	1.80	0.060	0.060	0.08	0.34	0.40	0.030	<0.010	<0.010	--	0.03
JAN 26...	--	1.60	0.080	0.070	0.09	0.62	0.70	0.180	0.050	0.020	0.06	0.18
MAR 11...	--	--	--	--	--	--	--	--	--	--	--	--
APR 18...	--	--	0.070	--	--	0.53	0.60	0.070	0.070	--	--	0.07
JUN 09...	--	--	--	--	--	--	--	--	--	--	--	--
JUL 19...	--	--	--	--	--	--	--	--	--	--	--	--
AUG 30...	--	<0.100	0.050	0.060	0.08	0.55	0.60	0.020	<0.010	<0.010	--	0.02

DATE	PHOSPHOROUS ORGANIC DIS- SOLVED (MG/L AS P)	ALUMINUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	BERYLLIUM, DIS- SOLVED (UG/L AS BE)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHROMIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)
OCT 27...	--	--	--	--	--	--	--	--	--	--	--	--
DEC 08...	--	<10	2	--	--	--	4	--	2	--	<5	--
JAN 26...	0.03	<10	2	100	<0.5	2	1	<3	17	24	10	44
MAR 11...	--	--	--	--	--	--	--	--	--	--	--	--
APR 18...	0.07	<10	3	130	<0.5	<1	<1	<3	8	5	<5	42
JUN 09...	--	--	--	--	--	--	--	--	--	--	--	--
JUL 19...	--	--	--	--	--	--	--	--	--	--	--	--
AUG 30...	--	20	3	100	<0.5	1	<1	4	8	17	5	64

## RED RIVER BASIN

07305000 NORTH FORK RED RIVER NEAR HEADRICK, OK--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY DIS- SOLVED (UG/L AS HG)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V)	ZINC, DIS- SOLVED (UG/L AS ZN)	SEDI- MENT, SUS- PENDE (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
OCT 27...	--	--	--	--	--	--	--	--	--	--	--	--
DEC 08...	--	<0.1	--	1	5	<1.0	--	--	--	27	7.4	59
JAN 26...	5	<0.1	<10	<1	2	1.0	2200	<6	13	213	404	98
MAR 11...	--	--	--	--	--	--	--	--	--	--	--	--
APR 18...	21	0.1	<10	<1	2	<1.0	2000	<6	6	3810	16600	92
JUN 09...	--	--	--	--	--	--	--	--	--	--	--	--
JUL 19...	--	--	--	--	--	--	--	--	--	--	--	--
AUG 30...	33	<0.1	20	4	1	<1.0	2800	<6	79	--	--	--

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3040	1380	7270	6130	4960	4680	4030	1870	4710	6550	7470	6530
2	4010	5120	5900	6550	5130	3960	3610	1440	3480	4070	8100	5870
3	4540	4260	7130	1740	4770	876	3090	1840	2680	4820	5840	1440
4	5180	3880	7290	2260	4180	1050	3410	2840	2580	6070	7970	2420
5	5040	4760	6540	2040	3160	1600	3770	2190	3990	6410	8190	4110
6	5520	5730	6370	1990	3340	1800	3660	2250	3900	6610	8080	5440
7	5750	6270	5670	2500	4800	2060	3560	3100	4110	6450	7920	8020
8	5880	6450	5960	3770	3080	2400	3640	3220	4150	6110	8150	7590
9	6000	6700	6270	1940	3710	2550	3690	3400	4860	6020	7990	6760
10	6120	6760	5400	4910	4170	2640	3500	3470	5020	6170	7430	6500
11	6330	7230	5360	5240	3590	2720	3840	3590	5240	3040	7420	6890
12	6340	7120	5680	4870	3760	2780	3910	3660	4870	6100	7980	7840
13	6440	6850	5320	5820	3880	2840	4010	3680	5330	4700	6980	7870
14	6490	6920	6450	7190	4110	3200	4090	3760	5540	5170	7820	1880
15	6590	6750	6360	5120	4420	3320	4210	3860	5540	7030	7850	5200
16	6640	6720	7270	5290	3550	3580	4300	3910	5490	7280	7950	6830
17	6840	6940	6450	2210	5530	3690	3630	3530	8000	6630	8900	8370
18	6970	6930	5130	2460	5380	3710	2760	4260	2400	6550	8480	870
19	7140	7000	5220	1560	5040	3650	2190	4520	2920	6540	8790	1090
20	7130	6990	4320	1150	5370	3800	2530	4270	4180	6510	8430	1650
21	7120	7040	1250	3120	5470	3890	2430	4530	5390	6550	8730	1110
22	7350	7090	1310	3060	5410	3950	2660	4680	6260	7450	8190	1240
23	7210	7140	3300	3420	5470	3820	3020	4880	6280	8130	8150	1390
24	2160	7030	2100	3600	5030	3330	3540	4910	6170	11500	9420	1340
25	3990	7170	3170	3850	5040	3230	3790	5040	6110	8260	9180	1760
26	6190	7000	3330	4110	5240	3290	3860	5050	5970	7840	8600	2710
27	6520	6960	4290	3700	5150	3230	2850	5180	4770	6750	7680	3830
28	6990	7100	3970	3670	5140	3670	3150	5250	4880	6550	7360	3650
29	6860	7170	5010	3720	5070	3850	3430	5300	5300	7700	6880	4050
30	7050	7060	5550	3830	---	3550	---	5360	4890	9970	6890	4310
31	5200	---	5290	3540	---	3990	---	5190	---	9610	7100	---
MEAN WTR YR 1988	5960	6380	5160	3690	4580	3120	3450	3870	4830	6750	7930	4290
		MEAN 5010	MAX 11500	MIN 870								

## RED RIVER BASIN

07305000 NORTH FORK RED RIVER NEAR HEADRICK, OK--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	29.0	20.0	5.0	.0	5.0	10.0	12.0	18.0	26.0	34.0	34.0	33.0
2	23.0	20.0	6.0	.0	4.0	12.0	10.0	20.0	26.0	32.0	34.0	32.0
3	18.0	22.0	7.0	.0	4.0	5.0	8.0	16.0	26.0	33.0	32.0	28.0
4	23.0	23.0	7.0	.0	4.0	3.0	15.0	21.0	26.0	33.0	33.0	20.0
5	25.0	17.0	7.0	.0	5.0	5.0	18.0	16.0	26.0	34.0	34.0	21.0
6	16.0	17.0	10.0	.0	4.0	5.0	18.0	18.0	27.0	34.0	34.0	29.0
7	12.0	17.0	11.0	.0	.0	10.0	18.0	24.0	27.0	33.0	34.0	24.0
8	16.0	17.0	11.0	4.0	2.0	15.0	12.0	20.0	27.0	34.0	35.0	29.0
9	20.0	10.0	9.0	1.0	6.0	15.0	16.0	24.0	27.0	33.0	35.0	28.0
10	20.0	10.0	11.0	.0	6.0	14.0	16.0	20.0	30.0	33.0	34.0	28.0
11	12.0	7.0	12.0	.0	.0	15.0	16.0	27.0	30.0	34.0	35.0	23.0
12	14.0	7.0	12.0	.0	.0	6.0	16.0	24.0	30.0	34.0	34.0	28.0
13	17.0	10.0	9.0	.0	3.0	5.0	20.0	26.0	30.0	34.0	33.0	29.0
14	17.0	9.0	4.0	.0	7.0	12.0	18.0	27.0	32.0	34.0	35.0	23.0
15	20.0	10.0	.0	.0	12.0	14.0	20.0	25.0	31.0	34.0	35.0	22.0
16	20.0	9.0	.0	2.0	7.0	12.0	22.0	25.0	32.0	35.0	35.0	25.0
17	15.0	6.0	.0	2.0	6.0	6.0	21.0	26.0	29.0	32.0	36.0	25.0
18	15.0	5.0	3.0	5.0	5.0	5.0	13.0	28.0	32.0	33.0	35.0	25.0
19	18.0	5.0	9.0	4.0	4.0	20.0	16.0	30.0	30.0	38.0	35.0	18.0
20	21.0	5.0	9.0	3.0	10.0	15.0	16.0	23.0	30.0	37.0	34.0	15.0
21	12.0	5.0	10.0	3.0	6.0	10.0	20.0	22.0	32.0	34.0	34.0	15.0
22	15.0	6.0	7.0	2.0	10.0	10.0	18.0	23.0	32.0	35.0	35.0	15.0
23	17.0	10.0	8.0	2.0	4.0	16.0	15.0	20.0	33.0	34.0	35.0	19.0
24	21.0	10.0	5.0	3.0	5.0	11.0	15.0	20.0	33.0	34.0	35.0	15.0
25	17.0	8.0	4.0	3.0	5.0	17.0	17.0	22.0	33.0	33.0	35.0	15.0
26	16.0	8.0	.0	4.0	10.0	19.0	17.0	24.0	32.0	34.0	34.0	17.0
27	18.0	8.0	1.0	5.0	15.0	13.0	17.0	25.0	31.0	35.0	34.0	29.0
28	18.0	6.0	.0	6.0	5.5	21.0	22.0	26.0	32.0	35.0	31.0	16.0
29	18.0	5.0	.0	8.0	5.0	16.0	18.0	26.0	31.0	34.0	35.0	21.0
30	18.0	5.0	2.0	10.0	---	13.0	---	28.0	34.0	35.0	34.0	14.0
31	21.0	---	2.0	7.0	---	16.0	---	27.0	---	33.0	34.0	---
MEAN	18.1	10.6	5.8	2.4	5.5	11.8	16.6	23.3	29.9	34.0	34.3	22.7
WTR YR 1988		MEAN 17.9	MAX 38.0	MIN .0								

## RED RIVER BASIN

07305500 WEST OTTER CREEK AT SNYDER LAKE, NEAR MOUNTAIN PARK, OK

LOCATION.--Lat 34°44'02", long 98°59'10", in SE 1/4 NE 1/4 sec.16, T.3 N., R.17 W., Kiowa County, Hydrologic Unit 11120303, near east end of Snyder Dam, 0.8 mi upstream from small tributary, 3 mi northwest of Mountain Park, and at mile 26.0.

DRAINAGE AREA.--132 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1903 to March 1908, October 1951 to September 1971, July 1972 to current year. Published as Otter Creek near Mountain Park 1903-8 and as Otter Creek at Snyder Lake, near Mountain Park 1951-60. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1731: 1960 (M). WSP 1920: 1959-60. WDR OK-78-2: 1977.

GAGE.--Water-stage recorder and broad-crested masonry spillway. Datum of gage is 1,361.06 ft above National Geodetic Vertical Datum of 1929. April 1903 to March 1908, nonrecording gage at site 1.8 mi downstream at different datum. October 1951 to September 1971 at intake tower at same site and datum. July 1972 to August 1976, 700 ft downstream at datum 1,344.00 ft.

REMARKS.--Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. The city of Snyder diverted about 130 acre-ft annually prior to October 1958 and none thereafter. Flow completely regulated since June 1975 by Tom Steed Reservoir.

AVERAGE DISCHARGE.--Prior to regulation by Tom Steed Reservoir, 26 years (water years 1904-7, 1952-71, 1973-74), 23.0 ft<sup>3</sup>/s, 16,660 acre-ft/yr; since regulation by Tom Steed Reservoir, 13 years (water years 1976-88), 15.1 ft<sup>3</sup>/s, 10,940 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,200 ft<sup>3</sup>/s, June 6, 1953, gage height, 19.50 ft, from floodmarks, from rating curve extended above 1,600 ft<sup>3</sup>/s on basis of contracted-opening and flow-over-dam measurements of peak flow; no flow at times in most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 333 ft<sup>3</sup>/s, Mar. 9, 15, gage height, 12.99 ft; no flow at times.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	e.00	.00	.00
2	.00	.00	.00	.00	.00	5.6	.00	.00	.00	e.00	.00	.00
3	.00	.00	.00	.00	.00	.01	.00	.00	.00	e.00	.00	.00
4	.00	.00	.00	.00	.00	74	51	.00	.00	e.00	.00	.00
5	.00	12	.00	.00	.00	191	84	.00	.00	e.00	.00	.00
6	.00	.00	.00	.00	.00	192	54	.00	.00	e.00	.00	.00
7	.00	.00	.00	.00	.00	252	.00	.00	.00	e.00	.00	.00
8	.00	.00	.00	.00	.00	308	.00	.00	.00	e.00	.00	.00
9	.00	.00	.00	.00	.00	312	.00	.00	.00	e.00	.00	.00
10	.00	.00	.00	.00	.00	310	.00	.00	.00	e.00	.00	.00
11	.00	.00	.00	.00	.00	308	.00	.00	.00	e.00	.00	.00
12	.00	.00	.00	.00	.00	303	.00	.00	.00	e.00	.00	.00
13	.00	.00	.00	.00	.00	302	.00	.00	.00	e.00	.00	.00
14	.00	.00	.00	.00	.00	304	.00	.00	.00	e.00	.00	.00
15	.00	.00	.00	.00	.00	304	.00	.00	e.00	e.00	.00	.00
16	.00	.00	.00	.00	.00	301	.00	.00	e.00	e.00	.00	.00
17	.00	.00	.00	e.00	.00	295	.00	.00	e.00	e.00	.00	.00
18	.00	.00	.00	e.00	.00	298	32	.00	e.00	e.00	.00	.00
19	.00	.00	.00	e.00	.00	303	59	.00	e.00	.00	.00	.01
20	.00	.00	.00	e.00	.00	308	87	.00	e.00	.00	.00	.00
21	.00	.00	.00	e.00	.00	307	122	.00	e.00	.00	.00	.00
22	.00	.00	.00	e.00	.00	122	120	.00	e.00	.00	.00	.00
23	.00	.00	.00	e.00	.00	.00	116	.00	e.00	.00	.00	.00
24	.00	.00	.00	e.00	.00	.00	114	.00	e.00	.00	.00	.00
25	.00	.00	.00	e.00	.00	.00	46	.00	e.00	.00	.00	.00
26	.00	.00	.00	e.00	.00	.00	.00	.00	e.00	.00	.00	.00
27	.00	.00	.00	e.00	.00	.00	.00	.00	e.00	.00	.00	.00
28	.00	.00	.00	e.00	.00	.00	.00	.00	e.00	.00	.00	.00
29	.00	.00	.00	e.00	.00	.00	.00	.00	e.00	.00	.00	.00
30	.00	.00	.00	.00	---	.00	.00	.00	e.00	.00	.00	.00
31	.00	---	.00	.00	---	.00	---	.00	---	.00	.00	---
TOTAL	0.00	12.00	0.00	0.00	0.00	5099.61	885.00	0.00	0.00	0.00	0.00	0.01
MEAN	.00	.40	.00	.00	.00	165	29.5	.00	.00	.00	.00	.000
MAX	.00	12	.00	.00	.00	312	122	.00	.00	.00	.00	.01
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.0	24	.0	.0	.0	10120	1760	.0	.0	.0	.0	.02

CAL YR 1987 TOTAL 31935.46 MEAN 87.5 MAX 3480 MIN .00 AC-FT 63340  
WTR YR 1988 TOTAL 5996.62 MEAN 16.4 MAX 312 MIN .00 AC-FT 11890

e Estimated

## RED RIVER BASIN

07307028 NORTH FORK RED RIVER NEAR TIPTON, OK

LOCATION.--Lat 34°30'25", long 99°12'27" (revised), in NW 1/4 NE 1/4 sec.5. T.1 S, R.19 W., Tillman County, Hydrologic Unit 11120303, near left bank on downstream side of bridge pier on State Highway 5, 3.8 mi west of intersection of State Highways 5 and 5C in Tipton, 4.8 mi downstream from Otter Creek, and at mile 15.3.

DRAINAGE AREA.--4,691 mi<sup>2</sup> of which 399 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--June 1983 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,234.45 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records poor. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Flow regulated since December 1943 by storage and diversion at Lake Altus 54.2 mi upstream (station 07302500). Diversions for irrigation of about 48,000 acres upstream from station.

AVERAGE DISCHARGE.--5 years, 679 ft<sup>3</sup>/s, 491,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 57,200 ft<sup>3</sup>/s, Oct. 5, 1986, gage height, 19.15 ft (from HWM); minimum daily discharge, 3.7 ft<sup>3</sup>/s, Sept. 7, 1985.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 11,300 ft<sup>3</sup>/s, Mar. 4, gage height, 15.05 ft; minimum daily discharge, 32 ft<sup>3</sup>/s, Aug. 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e320	658	e115	e140	e280	388	e660	2330	e330	361	e70	e62
2	e275	e470	e117	e130	e280	1070	e800	3570	633	324	e68	e115
3	e230	e300	e115	e126	e310	8560	e1080	2150	742	e275	e66	284
4	e195	e240	e115	e120	e305	10400	e820	1680	e520	e170	e64	e295
5	e173	e205	e112	e115	e300	5330	e710	1390	e430	e135	e60	e190
6	e155	e175	e111	e110	e295	3580	e640	e1000	e290	e100	e56	e145
7	e145	e160	e110	e106	e290	2800	e600	e820	e250	e90	e54	e120
8	e140	e140	e110	e104	e260	2290	e580	e635	203	e90	e51	e115
9	e132	e130	110	e102	e270	2050	e555	e500	e175	e90	e49	e100
10	e128	e128	e147	e100	e260	1830	e535	424	e165	e400	e47	e90
11	e124	e125	e110	e106	e300	e1630	e508	e385	e153	e350	e47	e85
12	e120	e125	e110	e116	e390	e1400	e498	e365	e145	e270	e44	e76
13	e118	e120	e110	e140	e460	e1230	e480	e350	e135	e210	e45	e100
14	e118	e118	e105	e168	e470	e1080	e470	e330	e130	e195	e44	e135
15	e120	e115	e103	e270	e430	e840	e450	e315	e120	e180	e43	e175
16	e115	e115	e100	529	e400	e760	e450	e300	e118	e170	e41	e115
17	e112	e116	e107	1790	e370	1090	e500	e280	e215	e160	e42	e110
18	e110	e117	e125	2310	e330	e900	1120	e265	e460	e150	e41	2340
19	e108	e117	236	1950	e270	e750	2710	e255	e285	e138	e40	5260
20	e112	e119	342	1740	e290	e650	2280	e245	e210	e120	e39	6720
21	e108	e119	840	769	e260	e680	1580	e230	e185	e110	e37	7520
22	e105	e114	638	e600	e250	e740	1220	e230	e140	e103	e36	2670
23	e104	e113	362	e500	e240	e820	e980	e350	e125	e95	e35	1880
24	2060	e115	270	e390	e240	e940	e700	e360	e110	e90	e35	1870
25	1690	e110	360	e470	e245	e980	e660	e335	e120	e108	e34	1520
26	e683	270	e300	e520	e245	e760	e825	e225	130	e98	e35	868
27	e240	e170	e250	e520	e255	e700	e740	e210	e155	e84	e34	647
28	150	e120	e180	e500	e265	e600	e660	e205	e140	e80	e33	536
29	170	e115	e170	e481	e325	e570	e780	e200	e170	e76	e32	466
30	320	e115	e160	e430	---	e540	1060	e200	e155	e74	e36	429
31	688	---	e150	e380	---	e500	---	399	---	e72	e37	---
TOTAL	9368	5154	6290	15832	8885	56358	25651	20533	7139	4968	1395	35038
MEAN	302	172	203	511	306	1818	855	662	238	160	45.0	1168
MAX	2060	658	840	2310	470	10400	2710	3570	742	400	70	7520
MIN	104	110	100	100	240	388	450	200	110	72	32	62
AC-FT	18580	10220	12480	31400	17620	111800	50880	40730	14160	9850	2770	69500

CAL YR 1987 TOTAL 471080 MEAN 1291 MAX 39100 MIN 100 AC-FT 934400  
WTR YR 1988 TOTAL 196611 MEAN 537 MAX 10400 MIN 32 AC-FT 390000

e Estimated



## 07308500 RED RIVER NEAR BURKBURNETT, TX

LOCATION.--Lat 34°06'36", long 98°31'53", Cotton County, Okla., Hydrologic Unit 11130102, on left bank at downstream side of bridge on U.S. Highways 277 and 281, 2.5 mi northeast of Burkburnett, and at mile 933.0.  
DRAINAGE AREA.--20,570 mi<sup>2</sup>, of which 5,936 mi<sup>2</sup> probably is noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1924 to August 1925 (monthly discharge only), December 1959 to current year.

GAGE.--Water-stage recorder. Datum of gage is 952.57 ft above National Geodetic Vertical Datum of 1929. July 11, 1924, to Aug. 31, 1925, nonrecording gage at site 1,000 ft downstream, at same datum. December 16, 1959, to Jan. 11, 1960, non-recording gage at present site and datum.

REMARKS.--Records fair, except those for estimated daily discharge, which are fair. There are many small diversions for irrigation upstream from station.

AVERAGE DISCHARGE.--28 years (water years 1961-88), 1,015 ft<sup>3</sup>/s, 735,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 166,000 ft<sup>3</sup>/s, Oct. 21, 1983, gage height, 16.90 ft; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 3, 1957, reached a stage of 13.54 ft, from levels to floodmarks.

According to local residents, higher stages occurred in 1891 and June 1941.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 9,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 5	0350	12,500	8.15	Sept. 19	2100	*23,500	*9.88

Minimum discharge, 95 ft<sup>3</sup>/s, Oct. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1980	2360	269	596	700	505	925	1970	409	1060	250	238
2	1120	4150	277	616	672	845	949	2940	432	864	248	246
3	791	1770	281	642	647	3440	908	4480	416	1400	245	271
4	536	910	289	641	613	10800	1350	3360	471	1490	274	315
5	402	490	299	707	609	9750	1720	2640	1160	583	288	340
6	329	332	294	e600	597	4030	1300	1910	934	451	316	584
7	286	262	294	e510	600	2430	1090	1230	662	256	276	451
8	258	217	299	e500	588	1940	1010	918	523	166	237	373
9	223	205	295	e500	709	1730	914	738	414	132	210	330
10	192	193	302	e510	795	1830	842	726	361	174	200	283
11	181	184	316	e600	748	1800	820	733	328	1620	214	247
12	172	177	334	e750	803	1670	854	733	296	1930	202	206
13	158	179	324	976	755	1510	831	626	287	1720	240	189
14	149	184	386	1160	788	1290	832	558	289	923	231	402
15	146	208	414	1170	830	1200	806	521	292	591	224	522
16	143	211	429	1320	783	983	774	550	313	442	220	398
17	135	186	441	1370	779	1020	933	565	340	373	220	565
18	125	178	450	2710	780	959	1150	537	295	328	234	2640
19	118	191	622	3200	672	908	4130	483	361	312	222	16600
20	108	200	613	2700	589	1150	5130	428	1040	303	216	16900
21	111	212	671	2550	562	1230	3920	391	632	318	253	10700
22	106	217	1540	1250	557	1220	2960	353	429	310	245	8140
23	100	217	1830	1000	499	1160	2280	348	338	290	259	4920
24	132	253	1240	818	503	1120	1820	342	288	276	333	4130
25	279	243	1090	735	483	991	1460	343	272	272	239	4400
26	2990	243	1270	714	468	971	1120	345	349	293	213	4400
27	2240	248	1720	675	470	1090	993	345	567	318	212	2920
28	1040	255	1200	676	495	1040	898	320	3210	378	205	2060
29	497	256	850	731	497	907	1040	299	4720	331	228	1400
30	341	257	709	676	---	822	987	280	2750	327	236	1060
31	275	---	619	673	---	783	---	311	---	287	230	---
TOTAL	15663	15188	19967	32276	18591	61124	44746	30323	23178	18518	7420	86230
MEAN	505	506	644	1041	641	1972	1492	978	773	597	239	2874
MAX	2990	4150	1830	3200	830	10800	5130	4480	4720	1930	333	16900
MIN	100	177	269	500	468	505	774	280	272	132	200	189
AC-FT	31070	30130	39600	64020	36880	121200	88750	60150	45970	36730	14720	171000

CAL YR 1987 TOTAL 983888 MEAN 2696 MAX 88100 MIN 100 AC-FT 1952000

WTR YR 1988 TOTAL 373224 MEAN 1020 MAX 16900 MIN 100 AC-FT 740300

e Estimated.

## RED RIVER BASIN

07308500 RED RIVER NEAR BURKBURNETT, TX--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical analyses: July 1968 to September 1974. Chemical and biochemical: October 1974 to current year. Pesticide analyses: October 1974 to September 1982.

## PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 1968 to September 1981.

WATER TEMPERATURES: July 1968 to September 1981.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 17,400 microsiemens, July 30, 1972; minimum daily, 889 microsiemens, Sept. 24, 1970.

WATER TEMPERATURES: Maximum daily, 35.5 °C, June 29, 1980; minimum daily, 0.0 °C on many days during winter months.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	DIS-CHARGE, INST. (CUBIC FEET PER SECOND)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML)	STREP-TOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CACO3)
DEC 04...	1435	252	8500	8.20	14.0	16	13.4	139	1.2	400	140	1300
JAN 29...	0840	890	6370	8.20	8.0	130	15.5	138	0.8	430	340	1200
MAR 16...	0900	1140	3950	7.90	7.5	230	12.2	107	3.4	120	140	820
MAY 11...	1520	649	4910	8.30	25.0	70	10.8	138	8.9	80	K120	1000
JUL 21...	1415	47	8050	8.20	31.0	45	7.7	110	1.4	<1	<1	1600
AUG 24...	1245	337	5190	8.10	30.0	42	7.7	108	2.8	K56	K40	1100

DATE	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY WAT WH TOT FET FIELD (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SI02)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
DEC 04...	340	110	1200	14	9.1	171	1200	1900	0.50	8.0	5390	4880
JAN 29...	310	95	930	12	9.0	192	940	1300	0.40	11	4050	3720
MAR 16...	210	72	530	8	6.1	177	810	670	0.40	8.4	2620	2420
MAY 11...	250	100	690	9	8.1	104	930	1100	0.50	5.6	3180	3150
JUL 21...	420	140	1300	14	10	69	1300	2100	0.40	7.3	5480	5320
AUG 24...	270	100	670	9	8.9	60	1000	1000	0.40	3.2	3220	3090

## RED RIVER BASIN

07308500 RED RIVER NEAR BURKBURNETT, TX--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS- PHOROUS TOTAL (MG/L AS P)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS P04)	SEDI- MENT, SUS- PENDE (MG/L)
DEC 04...	1.38	0.020	1.40	<0.010	0.010	--	0.40	<0.010	<0.010	<0.010	--	46
JAN 29...	1.49	0.010	1.50	0.130	0.120	0.77	0.90	0.120	0.050	0.050	0.15	157
MAR 16...	0.860	0.010	0.870	0.050	0.070	0.75	0.80	0.060	0.030	0.030	0.09	804
MAY 11...	--	<0.010	<0.100	0.050	0.080	0.55	0.60	0.110	<0.010	<0.010	--	125
JUL 21...	--	<0.010	<0.100	0.110	0.120	0.69	0.80	0.070	<0.010	<0.010	--	112
AUG 24...	--	<0.010	<0.100	0.050	0.080	1.0	1.1	0.080	0.010	0.010	0.03	97

DATE	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)
DEC 04...	31	93	20	2	100	<10	<1	3	<1	2	20
JAN 29...	377	99	--	--	--	--	--	--	--	--	--
MAR 16...	2480	41	30	2	100	<10	1	1	<1	2	30
MAY 11...	219	98	<10	2	100	<10	1	1	<1	2	20
JUL 21...	14	82	--	--	--	--	--	--	--	--	--
AUG 24...	88	32	20	2	200	<10	<1	<1	1	1	30

DATE	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY DIS- SOLVED (UG/L AS HG)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V)	ZINC, DIS- SOLVED (UG/L AS ZN)
DEC 04...	<5	90	20	2.2	2	2	4	<1.0	5200	32	10
JAN 29...	--	--	--	--	--	--	--	--	--	--	--
MAR 16...	<5	60	10	0.1	3	<1	3	1.0	3100	17	10
MAY 11...	<5	60	<10	0.2	4	1	3	<1.0	3500	20	10
JUL 21...	--	--	--	--	--	--	--	--	--	--	--
AUG 24...	<5	60	10	0.1	4	3	2	<1.0	3400	21	<10

## 07311000 EAST CACHE CREEK NEAR WALTERS, OK

LOCATION.--Lat 34°21'44", long 98°16'56", on south line of SE 1/4 SE 1/4 sec.19, T.2 S., R.10 W., Cotton County, Hydrologic Unit 11130202, at right bank on downstream side of bridge on State Highway 53, 1.8 mi east of Walters, 12.2 mi upstream from West Cache Creek, and at mile 19.7.

DRAINAGE AREA.--675 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1938 to December 1963; October 1969 to current year. Prior to October 1969, published as Cache Creek near Walters.

GAGE.--Water-stage recorder. Datum of gage is 938.2 ft above National Geodetic Vertical Datum of 1929 (Oklahoma State Highway Department). Prior to Jan. 8, 1939, nonrecording gage at same site and datum.

REMARKS.--Records fair. Flow partly regulated by Lake Lawtonka, capacity, 42,300 acre-ft on Medicine Creek prior to late 1953, and 63,000 acre-ft thereafter by Lake Thomas, capacity 8,300 acre-ft on Little Medicine Creek; and since March 1961 by Lake Ellsworth, capacity 94,500 acre-ft on East Cache Creek. Low flow sustained by sewage effluent from cities of Lawton and Walters.

AVERAGE DISCHARGE.--44 years, 193 ft<sup>3</sup>/s, 139,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 50,900 ft<sup>3</sup>/s, Oct. 21, 1983, gage height, 30.66 ft; no flow at times in 1939-40.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1906 reached an approximate stage of 29.7 ft, information from local residents.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,100 ft<sup>3</sup>/s, Mar. 5, gage height, 26.51 ft; minimum daily discharge, 14 ft<sup>3</sup>/s, Aug. 5, 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	82	43	42	82	e230	192	1400	183	e28	33	20	20
2	79	41	38	69	e225	1380	3040	176	70	33	e17	28
3	49	38	e36	61	e220	3340	3290	115	71	34	e16	60
4	e42	38	e34	58	e215	3680	1340	108	64	31	e15	81
5	e40	38	e31	51	e210	3630	539	100	60	31	e14	36
6	46	42	e29	41	e210	1640	670	97	e60	30	14	30
7	47	45	e27	39	e208	698	793	97	e58	29	22	21
8	46	43	e26	e37	e205	654	774	98	e55	28	28	e20
9	49	46	e25	e35	e200	960	746	93	e53	28	32	e19
10	50	46	e24	e34	203	1030	443	91	50	34	30	e18
11	45	40	e23	e38	196	984	392	109	51	36	31	e17
12	46	36	e22	e50	234	730	514	107	49	40	30	e16
13	48	36	e22	e60	239	662	268	83	49	26	33	e15
14	47	40	e40	e120	205	650	187	79	49	26	32	328
15	47	72	e83	e250	e200	653	185	75	48	24	24	330
16	46	47	e33	e1000	198	678	318	80	47	26	24	99
17	44	71	e28	e800	197	657	600	78	48	25	25	44
18	e39	53	e25	e630	193	663	1130	56	60	23	21	185
19	e37	43	385	e500	192	668	792	67	54	22	e19	2620
20	e33	39	974	e400	190	535	502	e60	46	27	e17	795
21	e31	e36	540	e350	e188	217	317	e48	42	55	24	145
22	e30	e33	172	e300	183	156	267	e43	39	32	47	75
23	e29	e31	97	e280	194	202	326	e41	38	32	24	70
24	187	30	68	e270	200	204	222	e39	37	24	20	123
25	884	55	412	e260	207	182	142	e38	36	21	e18	127
26	287	43	1000	e255	195	158	126	e36	50	21	e17	104
27	84	43	491	e250	187	177	183	e34	42	20	e16	74
28	112	42	323	e245	185	230	178	e33	46	e19	21	59
29	207	45	274	e235	193	1250	134	e31	38	e18	23	406
30	76	42	156	e230	---	299	124	e30	35	22	24	195
31	48	---	101	e225	---	299	---	e29	---	21	21	---
TOTAL	2937	1297	5581	7255	5902	27458	19942	2354	1473	871	719	6160
MEAN	94.7	43.2	180	234	204	886	665	75.9	49.1	28.1	23.2	205
MAX	884	72	1000	1000	239	3680	3290	183	71	55	47	2620
MIN	29	30	22	34	183	156	124	29	28	18	14	15
AC-FT	5830	2570	11070	14390	11710	54460	39550	4670	2920	1730	1430	12220

CAL YR 1987 TOTAL 242957 MEAN 666 MAX 27500 MIN 22 AC-FT 481900  
WTR YR 1988 TOTAL 81949 MEAN 224 MAX 3680 MIN 14 AC-FT 162500

e Estimated

07311000 EAST CACHE CREEK NEAR WALTERS, OK

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1947, 1948, 1951-55, 1958-63, 1970 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1951 to September 1953, October 1969 to March 1977.

WATER TEMPERATURE: October 1951 to September 1953, October 1969 to March 1977.

REMARKS.--Samples were collected bimonthly. Specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COLLECTING SAMPLE (CODE NUMBER)	AGENCY ANALYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DISCHARGE, INST. (CUBIC FEET PER SECOND)	SPECIFIC CONDUCTANCE (US/CM)	PH (STANDARD UNITS)	TEMPERATURE AIR (DEG C)	TEMPERATURE WATER (DEG C)	BAROMETRIC PRESSURE (MM OF HG)
NOV 16...	1200	1028	80020	6.08	43	910	7.80	13.5	12.0	740
FEB 10...	1230	1028	80020	7.78	209	625	8.00	2.0	5.0	740
MAY 18...	1145	1028	80020	5.76	56	1000	7.60	28.0	24.0	740
JUN 10...	1607	1028	80020	5.69	51	945	7.90	28.0	25.0	740
JUL 21...	1345	1028	80020	5.80	59	817	7.90	23.0	26.0	740
SEP 29...	1200	1028	80020	10.52	488	212	7.50	17.5	18.5	740

DATE	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PERCENT SATURATION)	HARDNESS TOTAL (MG/L AS CaCO3)	HARDNESS NONCARB WH WAT TOT FLD (MG/L AS CaCO3)	CALCIUM DIS-SOLVED (MG/L AS Ca)	MAGNESIUM, DIS-SOLVED (MG/L AS Mg)	SODIUM, DIS-SOLVED (MG/L AS Na)	SODIUM PERCENT	SODIUM ADSORPTION RATIO	POTASSIUM, DIS-SOLVED (MG/L AS K)
NOV 16...	7.3	70	250	7	73	16	85	42	2	6.4
FEB 10...	13.2	107	220	52	65	15	43	29	1	4.4
MAY 18...	7.1	87	300	14	88	19	100	42	3	4.1
JUN 10...	7.7	96	260	13	79	16	92	43	3	5.1
JUL 21...	7.7	98	220	9	67	14	76	42	2	5.6
SEP 29...	6.8	75	56	0	17	3.4	16	36	1	4.1

DATE	BICARBONATE WATER WH IT FIELD (MG/L AS HCO3)	CARBONATE WATER WH IT FIELD (MG/L AS CO3)	ALKALINITY WAT WH TOT IT FIELD (MG/L AS CaCO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLORIDE, DIS-SOLVED (MG/L AS CL)	SOLIDS, RESIDUE AT 180 DEG. C (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N)
NOV 16...	283	0	232	76	74	508	489	0.69	59.4	3.10
FEB 10...	195	0	160	81	38	379	353	0.52	214	0.870
MAY 18...	345	0	283	97	99	626	600	0.85	94.7	5.10
JUN 10...	289	0	237	89	84	549	544	0.75	75.3	6.40
JUL 21...	284	0	233	72	69	481	453	0.65	76.8	4.50
SEP 29...	102	0	84	17	14	152	111	0.21	200	--



07311200 BLUE BEAVER CREEK NEAR CACHE, OK  
(Hydrologic bench-mark station)

LOCATION.--Lat 34°37'24", long 98°33'48", in NE 1/4 NE 1/4 sec.28, T.2 N., R.13 W., Comanche County, Hydrologic Unit 11130203, on downstream side of right bank pier on old U.S. Highway 62, 3,000 ft upstream from St. Louis-San Francisco Railway Co. bridge, 4.0 mi east of Cache, and at mile 12.0.

DRAINAGE AREA.--24.6 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1964 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,215.26 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. Minor regulation by Lake Rush, Lake Jed Johnson, and Lake Ketch, combined surface-area 132 acres.

AVERAGE DISCHARGE.--24 years, 12.4 ft<sup>3</sup>/s, 8,980 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,600 ft<sup>3</sup>/s, Aug. 28, 1977, gage height, 18.02 ft, from floodmark, from rating curve extended above 250 ft<sup>3</sup>/s on basis of contracted-opening measurement; no flow at times each year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since about 1907, that of Aug. 28, 1977, according to local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Mar. 2	1615	*1,800	*11.59	Sept. 18	2300	1,160	10.74

No flow at times during year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.10	1.4	.92	e18	e13	3.0	200	5.8	1.1	.10	.00	.00
2	.11	1.2	.85	e16	e12	468	108	5.2	1.0	.10	.00	.00
3	.17	1.1	.85	e15	e11	323	56	4.5	.99	.11	.00	.00
4	.18	1.1	.85	e13	e10	94	41	4.4	.94	.10	.00	.00
5	.17	1.0	.85	e12	e9.0	58	33	3.8	.85	.08	.00	.00
6	.17	.95	.85	e11	e8.6	45	27	4.0	.84	.06	.00	.00
7	.20	1.0	.85	e10	e8.0	38	22	3.8	.79	.04	.00	.00
8	.20	.99	.85	e9.5	e7.6	32	19	3.2	.74	.05	.00	.00
9	.17	.99	.85	e9.0	e7.1	25	17	2.9	.63	.09	.00	.00
10	.17	1.1	.81	e8.4	7.3	22	26	2.7	.57	.07	.00	.00
11	.17	1.2	.77	e8.0	10	21	21	2.5	.55	.10	.00	.00
12	.20	1.1	.77	24	11	18	19	2.4	.53	.10	.00	.00
13	.21	1.1	.77	44	8.4	15	17	2.3	.47	.05	.00	.00
14	.21	1.1	.83	40	6.9	14	15	2.1	.42	.03	.00	.00
15	.19	1.5	.85	45	6.0	12	13	2.1	.41	.01	.00	.00
16	.27	1.4	.85	97	5.7	9.7	13	1.9	.39	.00	.00	.00
17	.45	1.2	.81	98	5.1	11	27	1.8	.38	.00	.00	.00
18	.49	1.1	.79	66	4.9	14	31	1.6	.34	.00	.00	139
19	.49	1.0	25	64	5.2	12	26	1.5	.29	.00	.00	388
20	.49	1.0	82	50	4.8	10	21	1.5	.24	.00	.00	48
21	.53	1.0	43	39	4.1	9.4	19	1.4	.20	.00	.00	22
22	.55	1.0	28	34	4.0	8.8	17	1.4	.18	.00	.00	11
23	.59	.99	19	31	3.6	8.2	14	1.4	.16	.00	.00	59
24	75	1.0	16	28	4.1	8.0	13	1.4	.12	.00	.00	64
25	19	1.0	47	24	4.2	7.6	10	1.3	.11	.00	.00	30
26	8.5	1.0	49	22	6.7	7.3	9.1	1.2	.29	.00	.00	18
27	4.3	1.0	36	19	3.8	6.4	8.2	1.2	.32	.00	.00	11
28	2.8	1.2	e32	17	3.5	6.8	7.3	1.1	.20	.00	.00	7.0
29	2.1	1.1	e28	e16	3.1	8.6	6.4	1.0	.19	.00	.00	4.1
30	1.7	.94	e23	e15	---	8.7	6.4	1.0	.12	.00	.00	3.6
31	1.6	---	e20	e14	---	9.0	---	1.0	---	.00	.00	---
TOTAL	121.48	32.76	462.97	916.9	198.7	1333.5	862.4	73.4	14.36	1.09	0.00	804.70
MEAN	3.92	1.09	14.9	29.6	6.85	43.0	28.7	2.37	.48	.035	.00	26.8
MAX	75	1.5	82	98	13	468	200	5.8	1.1	.11	.00	388
MIN	.10	.94	.77	8.0	3.1	3.0	6.4	1.0	.11	.00	.00	.00
AC-FT	241	65	918	1820	394	2640	1710	146	28	2.2	.0	1600

CAL YR 1987 TOTAL 9388.28 MEAN 25.7 MAX 1980 MIN .00 AC-FT 18620  
WTR YR 1988 TOTAL 4822.26 MEAN 13.2 MAX 468 MIN .00 AC-FT 9560

e Estimated

## RED RIVER BASIN

07311200 BLUE BEAVER CREEK NEAR CACHE, OK--Continued  
(Hydrologic bench-mark station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1965 to current year.

REMARKS.--Samples were collected quarterly and specific conductance, pH, water temperature, dissolved oxygen, and alkalinity were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL-LECTING SAMPLE (CODE NUMBER)	AGENCY ANALYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS-CHARGE, INST. (CUBIC FEET PER SECOND)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE AIR (DEG C)	TEMPER-ATURE WATER (DEG C)	TUR-BID-ITY (NTU)	BARO-METRIC PRES-SURE (MM OF HG)	
NOV 16...	1500	1028	80020	6.82	1.4	240	--	13.5	14.5	5.4	730	
FEB 10...	0930	1028	80020	6.94	7.3	150	--	10.0	6.5	5.8	730	
MAY 18...	1630	1028	80020	6.78	1.7	200	7.40	31.0	30.0	3.7	730	
SEP 29...	1430	1028	80020	6.96	3.8	148	--	21.0	19.5	5.2	740	
DATE		OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CAC03)	HARD-NESS NONCARB WH WAT TOT FLD (MG/L AS CAC03)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	
NOV 16...	9.5	97	58	91	71	0	20	5.0	14	30	0.8	
FEB 10...	12.5	106	50	41	47	0	13	3.4	10	31	0.7	
MAY 18...	7.5	104	--	K4	70	0	20	4.9	13	28	0.7	
SEP 29...	8.6	97	--	--	50	2	14	3.7	8.4	26	0.5	
DATE		POTAS-SIUM, DIS-SOLVED (MG/L AS K)	BICAR-BONATE WATER WH IT FIELD (MG/L AS HC03)	CAR-BONATE WATER WH IT FIELD (MG/L AS C03)	ALKA-LINITY WAT WH TOT IT FIELD (MG/L AS CAC03)	SULFATE DIS-SOLVED (MG/L AS S04)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SI02)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)
NOV 16...	1.5	102	0	84	--	--	0.50	16	129	130	0.18	
FEB 10...	1.1	61	0	50	13	5.6	0.30	13	92	89	0.13	
MAY 18...	1.4	88	0	72	13	7.9	0.40	14	118	119	0.16	
SEP 29...	1.8	--	--	--	14	--	0.30	16	--	93	0.14	
DATE		SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHOROUS TOTAL (MG/L AS P)	PHOS-PHOROUS DIS-SOLVED (MG/L AS P)	PHOS-PHOROUS ORTHO, DIS-SOLVED (MG/L AS P)	PHOS-PHOROUS ORGANIC TOTAL (MG/L AS P)
NOV 16...	0.49	<0.010	<0.100	<0.010	--	0.08	0.30	0.020	0.010	<0.010	0.02	
FEB 10...	1.82	<0.010	<0.100	<0.010	0.020	0.03	<0.20	0.020	0.010	<0.010	0.02	
MAY 18...	0.55	<0.010	<0.100	<0.010	0.020	0.03	<0.20	0.030	0.020	<0.010	0.03	
SEP 29...	1.04	<0.010	0.480	0.040	<0.010	--	<0.20	0.020	0.010	<0.010	0.02	

## RED RIVER BASIN

07311200 BLUE BEAVER CREEK NEAR CACHE, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	PHOS- PHOROUS ORGANIC DIS- SOLVED (MG/L AS P)	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)
NOV 16...	0.01	10	1	62	<0.5	1	<1	<3	5	77	<5
FEB 10...	0.01	190	<1	41	<0.5	<1	<1	<3	3	180	<5
MAY 18...	0.02	20	<1	63	<0.5	<1	<1	<3	2	52	<5
SEP 29...	0.01	50	<1	55	<0.5	<1	<1	<3	2	35	<5
DATE	LITHIUM DIS- SOLVED (UG/L AS LI)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY DIS- SOLVED (UG/L AS HG)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V)	ZINC, DIS- SOLVED (UG/L AS ZN)	GROSS ALPHA, DIS- SOLVED (UG/L AS U-NAT)
NOV 16...	<4	18	<0.1	<10	<1	<1	<1.0	88	<6	9	--
FEB 10...	<4	15	<0.1	<10	3	<1	<1.0	64	<6	7	--
MAY 18...	<4	26	<0.1	<10	3	<1	<1.0	84	<6	3	0.7
SEP 29...	<4	11	<0.1	<10	<1	<1	<1.0	62	<6	4	0.4
DATE	GROSS ALPHA, SUSP. TOTAL (UG/L AS U-NAT)	GROSS BETA, DIS- SOLVED (PCI/L AS CS-137)	GROSS BETA, SUSP. TOTAL (PCI/L AS CS-137)	GROSS BETA, DIS- SOLVED (PCI/L AS SR/ YT-90)	GROSS BETA, SUSP. TOTAL (PCI/L AS SR/ YT-90)	RADIUM 226, DIS- SOLVED, RADON METHOD (PCI/L)	URANIUM NATURAL DIS- SOLVED (UG/L AS U)	SEDI- MENT, SUS- PENDEED (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDEED (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM	
NOV 16...	--	--	--	--	--	--	--	14	0.05	79	
FEB 10...	--	--	--	--	--	--	--	53	1.0	86	
MAY 18...	<0.4	2.6	0.4	2.1	<0.4	0.05	0.14	11	0.05	79	
SEP 29...	<0.4	2.3	<0.4	2.0	<0.4	0.07	0.03	--	--	--	

## RED RIVER BASIN

07311500 DEEP RED RUN NEAR RANDETT, OK

LOCATION.--Lat 34°13'15", long 98°27'10", in SW 1/4 SW 1/4 sec.10, T.4 S., R.12 W., Cotton County, Hydrologic Unit 11130203, near right bank on downstream side of pier of bridge on U.S. Highway 277, 2.8 mi north of Randlett, and at mile 4.8.

DRAINAGE AREA.--617 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1949 to current year.

REVISED RECORDS.--WSP 1211: Drainage area. WSP 1631: 1956. WSP 1920: 1951.

GAGE.--Water-stage recorder and sharp-crested weir. Datum of gage is 924.49 ft above National Geodetic Vertical Datum of 1929 (Oklahoma State Highway Department). Prior to Nov. 10, 1949, nonrecording gage at same site and datum.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Some regulation by numerous flood-retarding structures.

AVERAGE DISCHARGE.--39 years, 149 ft<sup>3</sup>/s, 108,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 72,300 ft<sup>3</sup>/s, Oct. 20, 1983, gage height, 28.89 ft, from rating curve extended above 13,000 ft<sup>3</sup>/s on basis of contracted-opening measurement at 27.51 ft in 1969; maximum gage height, 29.58 ft, May 29, 1987 (backwater from W. Cache Creek and the Red River); no flow at times in most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1908 reached a stage somewhat exceeding 27 ft, from information provided by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Mar. 4	unknown	*8,500	*24.10(HWM)	Sept. 20	0445	8,250	24.05

Minimum daily discharge, .37 ft<sup>3</sup>/s, Aug. 19, 28, Sept. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	170	57	15	163	41	e40	e2200	e130	e10	25	.77	.42
2	57	47	16	145	39	e200	e1400	e100	e16	13	.62	.37
3	36	39	16	98	38	e1000	e2700	e80	e25	7.8	.60	.44
4	27	33	16	75	38	4000	e1000	e62	e16	4.5	.60	.48
5	21	28	17	66	35	e1500	e300	e52	e10	3.0	.60	.47
6	14	23	17	64	32	e700	e150	e46	e7.0	2.6	.58	6.6
7	11	21	16	71	e31	e300	e140	e41	e5.5	2.1	.54	14
8	10	18	16	56	e30	e230	e130	e35	e4.5	1.9	.54	9.2
9	10	17	16	59	e28	e170	e100	e32	e3.5	1.9	.54	5.5
10	6.3	15	16	56	e27	e140	e80	e30	3.4	1.8	.52	3.4
11	4.1	13	15	52	e33	e110	e110	e27	e2.8	1.6	.50	2.4
12	4.0	13	14	56	e40	e96	e250	e24	e2.8	9.1	.54	1.9
13	3.5	13	15	91	e35	e85	e150	e22	e2.8	13	.55	1.5
14	3.1	12	15	117	e32	e80	e90	e19	2.7	8.7	.58	15
15	2.6	14	16	237	e30	e72	e74	e17	2.6	4.4	.49	49
16	2.5	12	17	598	e28	e64	e60	e15	2.8	2.5	.47	289
17	2.2	11	18	949	e27	e58	e110	e14	3.7	2.1	.45	72
18	2.0	22	18	900	e26	e55	e200	e13	3.3	1.7	.44	365
19	2.0	17	252	476	e25	e51	e400	e12	2.5	1.7	.37	4270
20	1.9	13	333	348	e24	e45	e200	e12	2.4	1.6	.38	6610
21	1.9	13	268	268	e24	e41	e110	e11	2.8	1.4	.42	4110
22	1.8	13	169	158	e23	e38	e90	e10	2.6	1.4	.41	1290
23	1.7	13	80	104	e23	e36	e80	e8.0	2.6	1.2	.42	290
24	3.4	14	61	81	e22	e31	e74	e8.0	3.6	1.0	.42	308
25	190	22	363	71	e21	e29	e60	e7.4	4.1	1.0	.42	189
26	1100	18	1020	65	e20	e26	e56	e6.6	5.9	1.0	.42	88
27	791	16	1110	56	e20	e24	e52	e6.2	7.7	.99	.42	38
28	290	14	589	50	e20	e22	e50	e6.2	15	1.1	.37	26
29	173	12	400	46	e20	e21	e42	e5.6	17	.98	.38	31
30	108	13	265	45	---	e100	e90	e5.3	26	.88	.42	34
31	73	---	183	43	---	e500	---	e5.0	---	.91	.43	---
TOTAL	3124.0	586	5382	5664	832	9864	10548	862.3	216.6	121.86	15.21	18120.68
MEAN	101	19.5	174	183	28.7	318	352	27.8	7.22	3.93	.49	604
MAX	1100	57	1110	949	41	4000	2700	130	26	25	.77	6610
MIN	1.7	11	14	43	20	21	42	5.0	2.4	.88	.37	.37
AC-FT	6200	1160	10680	11230	1650	19570	20920	1710	430	242	30	35940

CAL YR 1987 TOTAL 202990.3 MEAN 556 MAX 35900 MIN 1.7 AC-FT 402600  
WTR YR 1988 TOTAL 55336.65 MEAN 151 MAX 6610 MIN .37 AC-FT 109800

e Estimated

## 07313400 WAURIKA LAKE NEAR WAURIKA, OK

LOCATION.--Lat 34°13'57", long 98°02'51", in SW 1/4 SW 1/4 sec.4, T.4 S., R.8 W., Jefferson County, Hydrologic Unit 11130208, 3,050 ft east of outlet works on Beaver Creek, 5.5 mi north of Waurika and at mile 27.0.

DRAINAGE AREA.--562 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1977 to current year.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929. Prior to Aug. 26, 1977, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by an earth dam with a concrete outlet structure and emergency spillway. Storage began Aug. 1, 1977. Capacity 469,300 acre-ft at elevation 970.0 ft, crest of uncontrolled spillway and 203,100 acre-ft at elevation 951.4 ft, top of conservation pool. Dead storage, 3,400 acre-ft below elevation 910.0 ft. Reservoir is used for flood control, irrigation, water supply, water quality, fish and wildlife, and recreation. U.S. Army Corps of Engineers' satellite telemeter at station.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 368,600 acre-ft, May 30, 1987, elevation, 964.14 ft; minimum since first major filling, 59,170 acre-ft, Dec. 4-5, 1978, elevation, 931.56 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 246,400 acre-ft, Apr. 3, elevation, 955.25 ft; minimum, 187,700 acre-ft, Sept. 1, elevation, 949.92 ft.

Capacity table (elevation, in feet, and contents, in acre-ft):

949	178,800	959	293,800
951	198,900	961	321,600
953	220,400	963	351,100
956	255,300	965	382,400

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	198400	198600	199800	210100	205100	206700	237300	204800	203800	203000	196700	187700
2	198900	198000	200400	207700	204400	214800	246300	204700	204100	202600	196400	191100
3	198400	198100	199900	206400	204200	219800	245500	205100	205200	202000	195600	192000
4	197300	198500	200400	204400	205000	220200	242300	205100	204900	201700	195600	190800
5	198100	198300	199900	204100	205200	218200	238700	205000	204900	201300	195100	190600
6	198000	197000	200800	204900	204100	216800	235400	204900	204800	200900	195500	190700
7	197100	197500	200700	204400	204200	214400	231600	204600	204500	201300	195200	190100
8	197100	198700	200700	203600	204300	210900	228200	204400	204900	201000	195300	189900
9	196400	198200	200900	203500	204600	207600	226200	204600	204500	200600	194800	189900
10	197400	197100	201000	203800	205800	205600	222200	204700	204000	201000	194400	189400
11	195900	196700	200300	203900	203400	206100	218500	204500	202700	200100	194400	189000
12	195600	196500	200300	205500	203400	204900	213700	204500	202700	200400	194000	189200
13	195100	196400	200100	204900	203100	203400	210500	204800	202600	200100	193800	189500
14	195200	196800	202500	205100	204300	203100	207300	204700	202500	200100	192800	189600
15	195200	197900	201200	205700	203500	203800	206300	204000	202300	199600	192700	190100
16	196000	198900	201000	208800	204100	203600	204800	204400	203900	199800	193100	190100
17	195700	198900	200800	211400	204900	204800	205100	203800	203000	199600	192200	190800
18	194800	198300	200800	214600	204700	204300	205600	204400	203600	199000	191500	194600
19	195800	198400	209000	215800	204400	203500	205700	203700	203400	200700	192500	197800
20	194400	198100	211700	213200	204000	203900	205200	204300	202600	200000	191900	198800
21	194100	198200	212200	212300	204300	204100	204000	204500	202500	199600	191900	198800
22	193900	198600	210100	210500	205700	204000	204700	204100	202500	199200	191500	198800
23	193700	198500	206700	209900	204500	204100	204700	203900	202000	198200	191200	199200
24	196300	199600	207500	207700	204200	204200	204100	203500	201800	199800	190400	199400
25	198600	199800	214300	205000	204400	204400	204200	203400	202400	198700	190100	198500
26	199100	199800	217600	204000	204500	204500	205200	203100	203000	198300	189700	198400
27	198500	199700	217500	203600	204300	204700	204000	202200	203000	198000	190300	197900
28	198100	199900	218200	203400	205500	208300	204000	202600	203000	197400	198900	198700
29	198400	199800	215000	203500	205200	224200	204100	201700	202400	196900	189200	197700
30	198100	199800	213400	203800	---	227600	204500	202200	202400	197400	188400	198000
31	198000	---	213300	204600	---	229100	---	201800	---	196800	188400	---
MAX	199100	199900	218200	215800	205800	229100	246300	205100	205200	203000	196700	199400
MIN	193700	196400	199800	203400	203100	203100	204000	201700	201800	196800	188400	187700
(+)	950.91	951.09	952.36	951.55	951.61	953.78	951.54	951.28	951.34	950.80	949.99	950.91
(++)	-1,400	+1,800	+13,500	-8,700	+600	+23,900	-24,600	-2,700	+600	-5,600	-8,400	+9,600

CAL YR 1987 MAX 368200 MIN 193700 (++) +8,600  
WTR YR 1988 MAX 246300 MIN 187700 (++) -1,400

(+) ELEVATION, IN FEET, AT END OF MONTH  
(++) CHANGE IN CONTENTS, IN ACRE-FEET



## RED RIVER BASIN

07313500 BEAVER CREEK NEAR WAURIKA, OK

LOCATION.--Lat 34°13'00", long 98°02'57", on north line of NW 1/4 NW 1/4 sec.16, T.4 S., R.8 W., Jefferson County, Hydrologic Unit 11130208, on left bank on downstream side of bridge on State Highway 5, 4.5 mi northwest of Waurika, 6.2 mi upstream from Cow Creek, and at mile 25.8.

DRAINAGE AREA.--563 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1953 to current year.

REVISED RECORDS.--WSP 1731: 1954 (M).

GAGE.--Water-stage recorder. Datum of gage is 874.17 ft, Oklahoma State Highway Department datum. Prior to Apr. 5, 1966, water-stage recorder at same site at datum 5.00 ft higher.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Flow regulated by Waurika Lake (07313400) 1.2 mi upstream beginning August 1977. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Prior to regulation by Waurika Lake, 23 years (water years 1954-76), 107 ft<sup>3</sup>/s, 77,520 acre-ft/yr; since regulation by Waurika Lake, 11 years (water years 1978-88), 158 ft<sup>3</sup>/s, 114,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 32,200 ft<sup>3</sup>/s, May 20, 1955, gage height, 27.42 ft, present datum; no flow at times in most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 18, 1951, reached a stage of 27.7 ft, present datum, from floodmark, discharge 65,300 ft<sup>3</sup>/s by contracted-opening measurement of peak flow. A similar stage was reached prior to 1889, from information provided by local resident.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,960 ft<sup>3</sup>/s, Apr. 6, gage height, 20.45 ft; minimum daily discharge, 0.66 ft<sup>3</sup>/s, Nov. 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.0	6.8	1.9	1080	37	37	876	4.7	14	9.6	12	11
2	8.1	7.1	1.9	1030	37	255	47	4.5	14	9.8	11	13
3	8.1	1.2	1.9	988	37	173	917	4.4	15	9.8	11	9.5
4	8.3	.66	2.0	917	37	654	1540	4.3	13	9.6	11	8.6
5	8.3	.69	2.1	e600	37	1160	1850	4.3	14	9.7	11	8.1
6	8.3	.79	2.3	e400	37	1310	1890	4.1	13	9.9	12	8.0
7	8.3	.86	2.6	e350	37	1340	1900	4.1	9.1	9.9	12	7.8
8	8.4	.87	2.8	e170	37	1340	1890	4.1	9.1	9.9	12	7.8
9	8.5	.92	2.9	e38	37	1340	1820	4.0	9.1	10	12	7.8
10	8.3	.99	2.9	e38	293	1130	1800	4.0	8.9	10	12	7.8
11	8.1	1.0	3.0	e38	437	612	1840	4.0	9.0	10	12	7.8
12	8.2	1.0	3.0	e38	256	387	1910	6.8	9.2	10	12	7.8
13	8.2	1.0	3.0	e38	37	388	1830	12	9.2	10	12	7.8
14	8.3	1.0	3.6	e38	37	210	1800	12	9.2	10	12	7.8
15	8.3	1.1	4.0	e38	37	37	1190	12	9.4	10	9.9	7.8
16	8.4	1.1	4.0	e38	37	36	607	12	10	10	7.6	7.8
17	8.5	.86	4.0	e38	36	37	580	12	10	10	7.6	8.6
18	8.5	.76	4.0	e38	36	36	588	12	9.5	10	7.6	17
19	8.7	.80	8.1	e150	39	36	583	12	9.6	11	7.6	9.3
20	8.7	e.72	3.0	e702	46	36	582	12	8.8	11	7.6	8.3
21	8.4	e.72	e440	e702	45	36	582	12	8.7	11	7.6	7.8
22	5.7	e.72	e820	e702	41	36	198	13	8.9	11	7.6	7.6
23	5.9	1.5	826	e1080	35	36	29	13	8.9	11	7.6	7.6
24	8.3	1.5	674	e1080	35	36	29	13	8.9	11	7.6	7.6
25	6.3	1.6	500	e1080	35	36	29	13	9.1	11	7.6	7.5
26	6.2	1.8	498	716	35	36	21	13	11	11	7.6	7.4
27	6.2	1.9	443	400	35	36	5.1	13	9.8	11	7.6	7.4
28	6.2	1.9	496	210	35	36	4.9	13	9.7	11	7.6	7.4
29	6.4	1.9	1100	38	35	36	4.8	13	9.8	11	7.6	7.0
30	6.4	1.9	1100	38	---	30	4.7	13	9.6	12	7.6	7.0
31	6.7	---	1080	38	---	702	---	14	---	13	7.6	---
TOTAL	239.2	45.66	8040.0	12851	1955	11610	26947.5	292.3	307.5	324.2	295.5	253.7
MEAN	7.72	1.52	259	415	67.4	375	898	9.43	10.2	10.5	9.53	8.46
MAX	8.7	7.1	1100	1080	437	1340	1910	14	15	13	12	17
MIN	5.7	.66	1.9	38	35	30	4.7	4.0	8.7	9.6	7.6	7.0
AC-FT	474	91	15950	25490	3880	23030	53450	580	610	643	586	503

CAL YR 1987 TOTAL 169263.14 MEAN 464 MAX 2690 MIN .66 AC-FT 335700  
WTR YR 1988 TOTAL 63161.56 MEAN 173 MAX 1910 MIN .66 AC-FT 125300

e Estimated

## 07315500 RED RIVER NEAR TERRAL, OK

LOCATION.--Lat 33°52'43", long 97°56'03", Jefferson County, Hydrologic Unit 11130201, on left bank at downstream side of bridge abutment on U.S. Highway 81, 0.5 mi downstream from Chicago, Rock Island, and Railroad Co. bridge, 1.2 mi south of Terral, 3.6 mi downstream from Little Wichita River, and at mile 872.0.  
DRAINAGE AREA.--28,723 mi<sup>2</sup>, of which 5,936 mi<sup>2</sup> probably is noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--January 1938 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1211: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 770.31 ft above National Geodetic Vertical Datum of 1929. Prior to Jan. 12, 1939, nonrecording gage at same site and datum.

REMARKS.--No estimated daily discharges. Records good. There are many small diversions for irrigation, oil field, and municipal uses upstream from station. Gage-height telemeter at station.

AVERAGE DISCHARGE.--50 years (water years 1939-88), 2,300 ft<sup>3</sup>/s, 1,666,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 225,000 ft<sup>3</sup>/s, May 30, 1987, gage height, 32.65 ft; maximum gage height, 33.60 ft, Oct. 22, 1983, minimum, 43 ft<sup>3</sup>/s, Mar. 15, 1939. Maximum stage since at least 1891, that of Oct. 22, 1983.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 19, 1935, reached a stage of 27.2 ft, although floods in 1891 and on May 1, 1908, are reported to have reached about the same stage.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 21,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 4	1900	26,400	15.99	Sept. 20	1920	*35,300	*17.49

Minimum discharge, 272 ft<sup>3</sup>/s, Aug. 18.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2450	963	590	2670	940	589	3040	1200	477	2210	368	322
2	2590	1250	594	2400	905	1550	6600	1110	449	1650	349	351
3	1730	4850	604	2240	900	11900	8660	2020	500	1350	320	417
4	1320	2620	612	2130	833	23000	7630	2830	515	1320	312	660
5	1090	1780	599	1970	815	25500	6860	3360	512	1540	309	542
6	879	1300	599	1660	806	17800	4780	2200	491	1500	310	509
7	757	1020	602	1400	785	9090	4060	1930	752	1070	319	463
8	674	883	604	1270	725	6160	4060	1480	702	937	325	520
9	652	796	598	1100	749	5470	3950	1120	560	759	326	508
10	626	737	592	740	760	5220	3880	941	466	637	335	431
11	568	712	586	765	913	4710	3660	833	396	609	326	385
12	552	684	583	881	1120	4130	3410	780	359	648	370	347
13	529	642	573	1210	1030	3830	3460	774	336	1660	310	329
14	519	617	592	1940	859	3530	3300	733	316	1870	296	314
15	509	617	650	2310	812	3180	2680	646	310	1580	293	568
16	504	760	725	2680	807	2830	1820	602	321	1090	294	1990
17	481	977	720	3700	761	2640	1660	578	908	831	288	1650
18	475	814	670	5680	762	2450	2310	543	721	690	278	1330
19	475	707	875	5580	810	2350	4740	540	633	625	282	6590
20	458	651	2890	6230	786	2230	6100	524	407	587	301	31900
21	452	611	5670	5510	722	2150	7810	504	362	586	300	26200
22	439	586	3820	5120	662	1920	5070	522	614	507	318	14900
23	430	570	3110	3720	599	1620	3550	495	547	463	325	9800
24	453	560	3040	2670	596	1560	2730	464	431	451	324	5510
25	481	560	3280	2170	598	1490	2330	445	365	410	336	4280
26	1760	696	10800	2090	599	1450	1860	427	352	398	371	4360
27	3620	783	10600	1740	598	1300	1460	400	470	388	340	4420
28	3600	644	7060	1350	586	1290	1240	371	493	389	292	3370
29	2310	606	4760	1190	590	1250	1190	370	553	401	288	2570
30	1480	600	3760	1050	---	6710	1170	379	2120	420	284	2570
31	1210	---	3140	1030	---	4550	---	377	---	394	297	---
TOTAL	34073	29596	73898	76196	22428	163449	115070	29498	16438	27970	9786	128106
MEAN	1099	987	2384	2458	773	5273	3836	952	548	902	316	4270
MAX	3620	4850	10800	6230	1120	25500	8660	3360	2120	2210	371	31900
MIN	430	560	573	740	586	589	1170	370	310	388	278	314
AC-FT	67580	58700	146600	151100	44490	324200	228200	58510	32600	55480	19410	254100

CAL YR 1987 TOTAL 2239292 MEAN 6135 MAX 211000 MIN 430 AC-FT 4442000  
WTR YR 1988 TOTAL 726508 MEAN 1985 MAX 31900 MIN 278 AC-FT 1441000

## RED RIVER BASIN

07315500 RED RIVER NEAR TERRAL, OK--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical analyses: October 1967 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1967 to current year.

WATER TEMPERATURES: October 1967 to current year.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 13,000 microsiemens, June 15, 1984; minimum daily, 255 microsiemens, Jan. 1.

WATER TEMPERATURES: Maximum daily, 35.0 °C, Aug. 13, 16, 17, 1983; minimum daily, 0.0 °C on many days during winter months.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 9,880 microsiemens, June 23; minimum daily, 990 microsiemens, Apr. 3.

WATER TEMPERATURES: Maximum daily, 34.0 °C, Aug. 9; minimum daily, 3.0 °C, Jan. 2, 5, 13.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE WATER (DEG C)	HARD- NESS TOTAL (MG/L AS CACO3)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)
DEC 14...	1137	589	5820	8.00	4.0	940	240	82	840
FEB 05...	1100	830	4450	8.70	3.5	850	220	72	620
MAR 04...	1725	26100	2070	8.90	12.0	440	120	35	250
JUN 30...	1130	2100	4680	7.50	29.5	820	200	78	640
AUG 09...	1005	326	6070	8.10	31.0	1100	280	98	940
11...	1030	326	5250	9.30	30.0	980	230	98	760
SEP 20...	1710	35000	1180	8.20	24.0	220	63	15	150

DATE	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	ALKA- LITY WAT WH TOT FET FIELD (MG/L AS CACO3)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SI02)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)
DEC 14...	12	8.1	203	830	1200	0.50	6.2	3330
FEB 05...	9	6.3	203	710	850	0.40	8.2	2610
MAR 04...	5	5.8	95	300	400	0.30	7.4	1180
JUN 30...	10	9.3	110	760	1000	0.40	11	2760
AUG 09...	12	9.8	89	1000	1400	0.40	4.1	3790
11...	11	9.5	82	830	1200	0.40	2.3	3180
SEP 20...	4	2.3	72	160	230	0.30	9.0	673

## 07315500 RED RIVER NEAR TERRAL, OK--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
EQUIVALENT MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3190	3120	4800	1220	4160	4710	1940	4600	4540	3940	6170	5650
2	2900	3650	5200	1180	4360	4370	1410	4700	4560	5290	6860	5440
3	2960	3030	5730	1280	4360	4050	990	5250	4810	5390	6900	5030
4	2600	2030	5820	1400	4200	1560	1050	3350	4720	5930	7000	3780
5	3020	2430	6000	1330	4280	1350	1100	2730	4830	6170	7110	4620
6	3640	2470	6190	3000	4180	1220	1640	2560	4950	4250	6880	4480
7	4190	2580	6190	3440	4820	1260	1920	2670	5510	4080	6720	4440
8	4480	3270	6210	3540	4830	1770	1720	3070	4080	3980	6540	4880
9	4490	3950	6230	3820	4770	1960	1690	3330	4090	4320	6170	4560
10	4560	4620	6230	4660	2350	2050	1980	3540	5990	4700	5710	3800
11	4690	4680	6280	4170	4360	2070	2030	3790	5610	5050	5240	3940
12	4820	4790	6420	4680	4050	2250	1850	3950	5500	5460	5690	4080
13	4890	4200	6300	4370	3850	2340	2040	4110	5470	7150	5580	5030
14	5010	4720	6130	4320	4290	2510	1900	4060	5350	5780	5150	5630
15	5000	4720	5900	4270	4570	2600	1890	4050	5230	6700	4710	5770
16	4960	5510	5700	4080	4570	2750	2400	4300	5110	6160	5510	3710
17	5120	4670	5460	3290	4830	2600	2800	4360	4940	5370	5660	1960
18	5210	4860	5830	2210	4590	2610	2770	4530	3800	5800	5590	2330
19	5200	4700	5080	3240	4580	2690	2700	4500	3640	6090	5390	2700
20	5250	4670	3930	3020	4600	2770	3370	4550	3630	6530	5540	1170
21	5250	4700	1600	2190	4560	2810	4470	4600	3800	5790	5490	1550
22	5340	4800	1690	2120	4500	2920	4470	4590	5750	6370	5570	1280
23	5350	5000	1960	1720	4690	3450	4300	4310	9880	6560	5710	1280
24	5350	5200	3980	1740	4690	3880	4300	4400	8140	6820	5620	1580
25	5240	5200	4100	2270	4740	4120	4030	4440	7170	6460	5600	1880
26	5050	4680	1710	2590	4640	4080	4140	4600	6100	6200	5410	2000
27	1780	3980	1050	2900	4580	4120	4250	4750	5140	5960	5730	2120
28	2720	4200	2000	3630	4600	4060	4350	4790	4680	5830	5470	2500
29	2950	4400	1730	3830	4550	4340	4420	4890	5570	5890	5220	2470
30	2870	4600	1830	4410	---	1520	4420	4820	4910	5830	5370	3300
31	2950	---	1880	4380	---	1100	---	4830	---	5770	5570	---
MEAN	4230	4180	4490	3040	4420	2770	2740	4160	5250	5670	5830	3430

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23.0	21.0	---	4.0	9.0	---	15.0	18.0	26.0	30.0	20.0	27.0
2	22.0	18.0	---	3.0	---	15.0	14.0	---	28.0	28.0	28.0	26.0
3	15.0	17.0	15.0	5.0	---	10.0	14.0	---	26.0	---	30.0	25.0
4	22.0	18.0	11.0	5.0	4.0	11.0	---	15.0	24.0	27.0	---	22.0
5	20.0	18.0	---	3.0	3.5	9.0	20.0	18.0	---	29.0	32.0	21.0
6	18.0	18.0	17.0	---	5.0	10.0	18.0	22.0	28.0	30.0	29.0	27.0
7	18.0	18.0	15.0	---	---	12.0	17.0	21.0	25.0	27.0	33.0	25.0
8	20.0	---	---	---	---	14.0	19.0	25.0	29.0	29.0	28.0	27.0
9	18.0	13.0	18.0	---	7.0	12.0	18.0	23.0	28.0	27.0	34.0	27.0
10	18.0	---	14.0	---	7.0	15.0	15.0	21.0	28.0	29.0	28.0	29.0
11	---	13.0	15.0	---	---	13.0	17.0	24.0	25.0	27.0	27.0	25.0
12	18.0	9.0	11.0	4.0	8.0	10.0	14.0	22.0	25.0	28.0	29.0	25.0
13	19.0	---	10.0	3.0	10.0	10.0	17.0	23.0	26.0	30.0	28.0	28.0
14	18.0	---	10.0	---	10.0	9.0	20.0	24.0	25.0	31.0	---	26.0
15	19.0	---	---	7.0	10.0	10.0	18.0	24.0	---	30.0	29.0	25.0
16	18.0	14.0	---	9.0	12.0	12.0	18.0	26.0	26.0	28.0	28.0	26.0
17	18.0	9.0	4.0	10.0	11.0	8.0	20.0	26.0	26.0	29.0	30.0	28.0
18	18.0	18.0	9.0	11.0	9.0	7.0	18.0	26.0	27.0	30.0	31.0	---
19	19.0	10.0	10.0	9.0	8.0	7.0	---	24.0	26.0	29.0	30.0	21.0
20	14.0	9.0	9.0	10.0	8.0	15.0	18.0	24.0	27.0	26.0	28.0	25.0
21	15.0	---	8.0	8.0	10.0	14.0	18.0	23.0	31.0	25.0	28.0	26.0
22	14.0	---	10.0	9.0	11.0	16.0	20.0	19.0	29.0	27.0	30.0	25.0
23	17.0	---	9.0	7.0	8.0	18.0	18.0	15.0	30.0	---	26.0	25.0
24	19.0	---	9.0	6.0	14.0	21.0	18.0	21.0	30.0	25.0	30.0	22.0
25	20.0	---	---	7.0	10.0	18.0	19.0	29.0	28.0	27.0	30.0	---
26	19.0	---	---	6.0	15.0	11.0	---	23.0	---	28.0	29.0	25.0
27	17.0	10.0	6.0	6.0	12.0	17.0	20.0	22.0	30.0	29.0	28.0	23.0
28	18.0	---	6.0	10.0	11.0	18.0	19.0	24.0	30.0	31.0	25.0	24.0
29	18.0	---	7.0	12.0	12.0	15.0	26.0	23.0	30.0	30.0	22.0	22.0
30	20.0	---	4.0	12.0	---	12.0	19.0	24.0	28.0	---	26.0	21.0
31	19.0	---	4.0	12.0	---	14.0	---	24.0	---	32.0	26.0	---
MEAN	18.4	14.6	10.0	7.4	9.4	12.8	18.0	22.3	27.4	28.5	28.3	24.9



## RED RIVER BASIN

07315700 MUD CREEK NEAR COURTNEY, OK

LOCATION.--Lat 34°00'15" (revised), long 97°34'00", in NW 1/4 SE 1/4 sec.25, T.6 S., R.4 W., Jefferson County, Hydrologic Unit 11130201, on downstream side of bridge on State Highway 89, 4.0 mi downstream from North Mud Creek, 6.0 mi northwest of Courtney, and at mile 11.5.

DRAINAGE AREA.--572 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1960 to current year.

REVISED RECORDS.--WDR OK-78-2: Maximum gage height.

GAGE.--Water-stage recorder and sharp-crested weir. Datum of gage is 727.72 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 1, 1968, auxiliary water-stage recorder 2.0 mi downstream from base gage.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office.

AVERAGE DISCHARGE.--28 years, 158 ft<sup>3</sup>/s, 114,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 38,700 ft<sup>3</sup>/s, May 29, 1987, gage height, 33.14 ft; no flow at times in most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 1957, reached a stage of 30.6 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,300 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Dec. 20	0015	2,580	23.57	Apr. 3	0500	5,900	26.44
Dec. 28	1000	3,990	25.08	Sept. 3	2200	1,470	21.19
Mar. 4	0315	*8,300	*27.44	Sept. 20	1000	1,700	21.79
Mar. 18	1315	1,580	21.49				

No flow Aug. 26-28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	83	6.8	34	179	88	40	2990	202	e13	e17	.79	.07
2	26	4.7	21	139	85	318	2130	161	20	e15	.64	.13
3	15	3.9	14	111	80	2860	4850	104	77	e14	.49	992
4	11	3.3	10	96	76	6610	3270	88	162	e12	.33	738
5	8.1	2.5	8.4	84	75	3960	1440	77	103	e10	.25	86
6	6.4	2.0	8.2	76	70	2340	299	56	41	e9.0	.21	26
7	5.4	2.2	8.4	60	63	435	216	42	26	e8.0	.20	13
8	4.8	1.9	7.7	57	57	287	176	39	e17	e7.0	.48	7.0
9	3.6	2.2	7.8	72	65	221	156	37	e15	e6.5	.58	5.1
10	3.1	2.2	8.9	81	68	179	141	36	e13	e6.0	.56	3.9
11	2.9	1.8	15	96	67	158	129	32	e11	e5.5	.37	3.0
12	2.8	2.5	17	116	62	141	124	30	e10	e5.0	.29	2.1
13	2.0	2.0	14	525	56	125	113	29	e9.6	e4.7	.21	1.6
14	1.7	1.9	31	849	60	110	105	28	e9.0	e4.3	.19	1.5
15	1.4	15	47	741	76	101	100	26	e8.5	e4.0	.17	2.7
16	1.3	20	60	558	67	96	93	25	e8.0	e3.7	.17	22
17	1.0	8.9	79	745	60	300	133	23	534	e3.4	.17	47
18	1.1	6.2	131	902	76	1360	304	22	939	e3.1	.15	44
19	1.2	64	1220	1110	126	795	581	21	271	e3.0	.14	665
20	.95	42	2410	944	122	334	288	20	47	5.0	.14	1470
21	.90	17	1420	385	89	197	153	e19	25	9.3	.15	614
22	.87	8.7	742	234	73	151	118	e18	22	9.7	.14	121
23	.84	7.3	183	173	58	126	99	e17	e19	9.9	.14	37
24	1.1	6.3	87	145	48	113	100	e16	e18	5.9	.14	28
25	1.2	5.5	325	129	43	105	97	e16	e17	4.2	.09	35
26	1.1	5.6	2530	114	41	94	91	e15	e16	3.5	.00	13
27	123	85	3700	100	41	82	89	e14	e16	2.9	.00	5.6
28	76	140	3750	93	40	74	86	e14	e17	2.2	.00	3.0
29	23	96	2920	88	42	71	83	e14	e18	1.7	.15	2.1
30	11	59	867	86	---	363	90	e13	e19	1.4	.17	1.5
31	8.5	---	253	87	---	1510	---	e13	---	1.1	.17	---
TOTAL	430.26	626.4	20929.4	9175	1974	23656	18644	1267	2521.1	198.0	7.68	4990.30
MEAN	13.9	20.9	675	296	68.1	763	621	40.9	84.0	6.39	.25	166
MAX	123	140	3750	1110	126	6610	4850	202	939	17	.79	1470
MIN	.84	1.8	7.7	57	40	40	83	13	8.0	1.1	.00	.07
AC-FT	853	1240	41510	18200	3920	46920	36980	2510	5000	393	15	9900

CAL YR 1987 TOTAL 181010.36 MEAN 496 MAX 31200 MIN .84 AC-FT 359000  
WTR YR 1988 TOTAL 84419.14 MEAN 231 MAX 6610 MIN .00 AC-FT 167400

e Estimated



## 07316000 RED RIVER NEAR GAINESVILLE, TX

LOCATION.--Lat 33°43'40", long 97°09'35", in SW 1/4 sec.36, T.9 S., R.1 E., Love County, OK, Hydrologic Unit 11130201, on downstream right bank near end of bridge on Interstate 35, 0.2 mi downstream from Gulf, Colorado, and Santa Fe Railway Co. bridge, 5.0 mi downstream from Fish Creek, 4.5 mi southwest of Thackerville, OK, 7.0 mi north of Gainesville, and at mile 791.5.

DRAINAGE AREA.--30,782 mi<sup>2</sup> of which 5,936 mi<sup>2</sup> probably is noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1936 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1211: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 627.91 ft above National Geodetic Vertical Datum of 1929. Prior to Jan. 17, 1939, and Feb. 13, 1965 to Nov. 14, 1966, nonrecording gage at same site and datum.

REMARKS.--Records fair. Flow slightly regulated by Lake Kemp (station 07312000 in Texas), since 1943 by Lake Altus (station 07302500 in Oklahoma), since 1946 by Lake Kickapoo (station 07314000 in Texas), since 1967 by Lake Arrowhead (station 07314800 in Texas) and Moss Lake (station 07315950 in Texas). U.S. Army Corps of Engineers' satellite telemeter at station.

COOPERATION.--Gage-height record and 9 discharge measurements provided by U.S. Army Corps of Engineers, records computed by U.S. Geological Survey.

AVERAGE DISCHARGE.--52 years, 2,978 ft<sup>3</sup>/s, 2,158,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 265,000 ft<sup>3</sup>/s May 31, 1987, gage height, 40.08 ft; minimum discharge, 48 ft<sup>3</sup>/s Jan. 27, 1940.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 24,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Dec. 27	1600	25,700	16.25	Sept. 21	1500	33,700	17.51
Mar. 5	1500	*34,500	*17.63				

Minimum daily discharge, 247 ft<sup>3</sup>/s, Sept. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1440	e1780	787	5080	2260	1500	9170	2000	978	809	460	255
2	1510	e1460	745	4270	2270	1530	e8800	2010	1000	1920	465	247
3	2190	e1180	736	3840	2300	2290	e11000	1980	1040	2700	437	488
4	2490	e1460	725	3570	2230	13900	15600	2010	1310	2220	427	548
5	1990	4470	719	3370	2210	32900	13000	2800	1080	1820	407	1310
6	1570	2480	1460	3280	2120	30000	9770	3490	1060	1700	384	896
7	1310	e2030	1870	3050	2060	18900	6920	2970	992	1930	374	705
8	1110	e1560	960	2720	2070	11200	5950	2550	919	1920	366	584
9	985	e1260	810	2310	2010	8380	e5700	2180	979	1440	352	518
10	876	1220	744	2280	1930	7460	e5400	1860	1080	1220	350	478
11	780	1130	730	2210	1910	6980	5190	1670	964	1090	354	515
12	709	1040	712	2040	1920	6660	5090	1530	854	1170	351	478
13	661	985	697	2280	2100	5940	4870	1440	770	1540	365	418
14	660	969	719	2860	2330	5440	4570	1380	711	969	357	377
15	661	974	768	3240	2240	4970	4540	1360	670	1480	379	387
16	655	1100	801	3880	2030	4700	4320	1290	642	1860	332	375
17	649	952	797	3950	1970	4650	3740	1240	636	1670	310	352
18	641	960	846	4460	1990	5830	3610	1180	687	1290	313	1000
19	657	1150	2780	6270	2280	6160	3950	1140	1560	1070	318	1670
20	645	1120	10500	7650	2200	e4900	4750	1070	1690	972	314	3620
21	606	980	9940	8330	2150	e4280	5810	1050	1170	861	305	31200
22	560	904	7950	7560	2020	e3930	8020	1030	885	772	290	22600
23	557	850	6450	6740	1870	e3790	6920	1000	737	746	279	15300
24	575	816	4510	5970	1730	e3380	4950	1020	786	679	291	11600
25	569	984	4950	4950	1640	e3100	3710	995	908	617	282	7280
26	591	807	9510	4080	1590	e3100	3210	950	819	584	297	4850
27	554	756	23800	3630	1570	e3000	2850	914	780	557	294	4130
28	1140	771	19200	3460	1540	2930	2450	886	702	512	304	3980
29	3090	1010	12200	2990	1520	2680	2170	855	821	488	335	3580
30	e3230	887	9430	e2700	---	2720	2050	825	863	466	320	2930
31	e2420	---	6670	e2480	---	4470	---	818	---	463	277	---
TOTAL	36081	38045	143516	125500	58060	221670	178080	47493	28093	37535	10689	122671
MEAN	1164	1268	4630	4048	2002	7151	5936	1532	936	1211	345	4089
MAX	3230	4470	23800	8330	2330	32900	15600	3490	1690	2700	465	31200
MIN	554	756	697	2040	1520	1500	2050	818	636	463	277	247
AC-FT	71570	75460	284700	248900	115200	439700	353200	94200	55720	74450	21200	243300

CAL YR 1987 TOTAL 3054052 MEAN 8367 MAX 232000 MIN 392 AC-FT 6058000  
WTR YR 1988 TOTAL 1047433 MEAN 2862 MAX 32900 MIN 247 AC-FT 2078000

e Estimated

## RED RIVER BASIN

07316000 RED RIVER NEAR GAINESVILLE, TX--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical analyses: May 1944 to April 1946, October 1952 to September 1964, October 1966 to current year. Chemical and biochemical analyses: January 1968 to September 1986. Pesticide analyses: April 1968 to September 1982. Sediment analyses: January 1978 to September 1986.

## PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: May 1944 to April 1946, October 1952 to September 1964, October 1966 to current year.

WATER TEMPERATURES: October 1952 to September 1963, October 1966 to current year.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 11,100 microsiemens, July 16, 1972, June 19, 1984; minimum daily, 176 microsiemens, Nov. 4, 1958.

WATER TEMPERATURES: Maximum daily, 35.0 °C on several days during summer months; minimum daily, 0.0 °C on many days during winter months.

## EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 7,270 microsiemens, June 27; minimum daily, 725 microsiemens, Dec. 20.

WATER TEMPERATURES: Maximum daily, 33.0 °C, July 17; minimum daily, 0.5 °C, Jan. 10.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE WATER (DEG C)	HARD- NESS TOTAL (MG/L AS CAC03)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)
OCT									
24...	1645	575	4460	--	--	770	180	77	660
JAN									
31...	1030	2480	3250	--	--	660	170	56	430
MAR									
20...	1130	4900	1790	7.60	--	430	110	38	210
APR									
26...	1300	3210	4040	--	20.5	860	230	70	600
JUN									
14...	1100	711	4910	--	26.0	960	250	82	720
AUG									
03...	1600	437	5510	--	28.0	1000	240	100	870

DATE	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	ALKA- LINITY WAT WH TOT FET FIELD (MG/L AS CAC03)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SI02)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)
OCT								
24...	10	7.6	142	600	1100	0.50	5.9	2720
JAN								
31...	7	6.6	200	460	600	0.40	9.7	1850
MAR								
20...	4	5.0	160	270	300	0.30	8.3	1040
APR								
26...	9	7.7	150	610	910	0.50	9.0	2530
JUN								
14...	10	8.3	126	720	1100	0.40	6.6	2960
AUG								
03...	12	10	62	860	1400	0.40	6.0	3520

## 07316000 RED RIVER NEAR GAINESVILLE, TX--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
EQUIVALENT MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3230	2860	4170	769	3590	4000	1730	3690	4080	4380	5680	5350
2	3400	2810	3870	902	3740	3750	911	3680	4000	4670	5610	5300
3	3800	2870	4430	867	3540	3620	1170	3760	3890	4480	5630	4190
4	2880	2350	4820	1590	3490	1600	1390	4060	3700	4770	5520	3750
5	2700	3350	5030	1390	3470	1030	859	4000	3640	5180	5610	2660
6	3050	2440	4460	1850	3720	1250	969	4910	3530	5510	5530	1940
7	2780	2390	2310	2270	3770	1210	1080	3240	3990	5960	6020	4160
8	2730	2500	3520	2720	3800	1190	1270	2700	4170	6260	6080	3070
9	3000	2550	4470	3190	3680	1320	1880	2570	4030	4410	6230	4120
10	3490	2570	5040	3650	3870	1730	1800	2660	4620	4160	6510	4560
11	3830	2700	5270	3910	4050	1890	1770	2860	5030	4120	6390	4100
12	4200	3260	5440	4030	4220	1990	1920	3140	3940	3760	6240	4040
13	4140	3600	5400	3360	4120	1980	1920	3200	3700	2720	6100	4680
14	4220	4070	5170	2960	4270	2140	1910	3410	4870	3100	5930	4260
15	4280	4050	5030	2790	3830	2250	1900	3600	5270	5290	5400	3890
16	4490	4030	5160	2890	3670	2390	1940	3760	5000	6180	5180	3760
17	4380	4150	5260	3120	4080	2310	1830	3890	4890	5910	5230	3750
18	4420	4350	5270	3350	2950	2190	1880	3830	4840	6590	5270	3410
19	4460	4690	1600	3060	3180	1770	1990	3870	4460	6180	5240	2160
20	4470	5020	725	2150	3510	1790	2160	4050	3170	5430	4570	2260
21	4500	4360	766	3510	3720	2040	2350	4100	1630	4950	4840	1920
22	4560	4470	1340	3280	3770	2310	1840	4200	3640	5340	5130	1600
23	4530	4580	1490	2260	3930	2430	4860	4190	3420	5750	5200	1450
24	4530	4020	1290	2230	3940	2490	3920	4200	3430	6190	5210	1210
25	4550	4300	1780	1870	3900	2570	3910	4280	3690	5780	5140	1290
26	4550	4430	1860	1780	3970	3020	4110	4290	5770	5530	5220	1470
27	4540	4680	1270	2140	4100	3360	3950	4110	7270	6040	5360	1780
28	4350	4760	907	2330	4140	3550	3730	4180	6710	6200	5500	1930
29	4120	5010	851	2570	4080	3610	3700	4210	6000	6040	5460	1940
30	2910	5160	1260	2770	---	3650	3730	4280	5630	5920	5400	2260
31	2790	---	1430	3310	---	3530	---	4410	---	5750	5180	---
MEAN	3870	3750	3250	2540	3800	2390	2280	3780	4400	5240	5540	3080

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19.0	19.0	7.0	3.0	13.0	13.5	15.0	18.5	26.0	---	27.0	28.0
2	19.0	19.5	7.0	3.5	6.0	16.5	15.0	19.5	24.0	30.5	26.0	25.0
3	20.0	17.0	8.5	4.0	5.5	11.5	---	20.5	23.0	29.0	26.0	24.5
4	17.0	21.5	9.0	4.0	4.5	11.5	15.0	22.0	26.0	28.0	26.5	---
5	17.0	19.5	13.5	3.5	4.0	10.5	18.0	18.5	---	28.0	27.0	25.0
6	17.0	15.5	13.0	1.5	1.5	9.5	18.0	20.5	23.5	28.0	32.5	27.0
7	16.0	15.0	12.0	---	2.5	12.0	17.0	21.0	24.0	28.0	31.0	28.0
8	17.0	15.5	12.0	---	5.0	13.0	18.0	22.0	26.0	27.0	29.0	27.5
9	17.0	---	10.5	1.5	7.5	13.5	18.5	24.0	27.0	29.0	29.0	27.5
10	21.0	11.0	10.0	.5	6.0	14.0	15.0	20.5	25.5	29.0	27.0	29.0
11	16.0	9.5	10.0	1.5	3.5	15.0	12.0	22.5	25.0	27.5	27.0	26.0
12	16.0	13.0	10.0	5.0	6.5	12.5	17.0	26.0	24.0	26.0	27.5	24.0
13	14.0	9.0	8.5	4.0	6.0	11.5	18.0	23.0	23.5	28.0	31.0	25.5
14	15.0	13.0	6.5	4.0	9.0	9.0	---	26.0	24.0	28.5	30.0	27.0
15	15.0	15.0	3.0	5.0	8.0	10.0	18.0	23.0	25.0	32.0	30.5	25.0
16	17.5	13.0	2.5	8.0	11.5	10.5	18.5	23.0	26.0	30.0	32.5	30.0
17	17.0	13.0	3.0	6.0	10.0	9.0	19.0	29.0	26.0	33.0	27.5	27.0
18	17.0	11.0	5.0	6.0	9.0	8.0	17.0	25.0	27.0	30.0	26.0	26.0
19	19.0	8.0	8.0	6.5	11.0	9.0	14.5	24.0	27.5	29.0	27.0	26.0
20	17.5	8.0	7.5	7.5	10.0	12.0	15.5	25.5	26.0	27.0	28.0	26.5
21	13.5	12.0	7.0	6.0	10.0	11.0	18.0	25.5	27.0	28.0	30.0	23.0
22	16.0	12.0	---	7.5	14.0	13.0	20.0	20.5	26.5	31.0	27.0	23.5
23	16.0	14.0	8.0	12.0	10.0	16.0	20.0	18.5	26.5	---	27.0	25.0
24	17.0	17.0	10.0	10.0	12.0	17.5	19.5	20.0	28.0	30.0	28.0	25.0
25	18.0	13.0	---	8.5	13.5	17.0	17.0	21.0	30.0	30.5	25.5	29.0
26	21.0	11.0	6.0	9.5	11.0	18.0	18.0	22.0	31.5	28.5	26.0	25.0
27	17.0	10.5	4.5	8.0	14.0	16.0	17.0	26.5	27.5	30.0	31.0	25.0
28	15.0	10.5	3.5	7.0	13.0	17.5	17.5	26.5	29.5	29.0	27.0	25.0
29	16.0	7.5	3.0	4.5	16.5	15.5	18.0	24.5	28.0	27.5	22.0	23.0
30	---	10.0	2.5	6.5	---	12.5	18.0	22.5	28.0	28.5	28.5	22.0
31	21.0	---	4.0	14.5	---	14.0	---	25.0	---	29.0	27.5	---
MEAN	17.1	13.2	7.4	5.8	8.8	12.9	17.2	22.8	26.3	28.9	28.0	25.9

## 07316500 WASHITA RIVER NEAR CHEYENNE, OK

LOCATION.--Lat 35°37'35", long 99°40'05", in SE 1/4 sec.5, T.13 N., R.23 W., Roger Mills County, Hydrologic Unit 11130301, on left bank on downstream side of bridge on U.S. Highway 283, 0.5 mi downstream from Sergeant Major Creek, 1.0 mi north of Cheyenne, 5.2 mi upstream from Dead Indian Creek, and at mile 543.9.

DRAINAGE AREA.--794 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1937 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1211: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,900.98 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). May 1, 1938 to Nov. 16, 1946, and Oct. 1, 1947 to Jan. 11, 1948, nonrecording gage at site 50 ft upstream and datum 5.00 ft higher. Jan. 12, 1948 to Dec. 31, 1976, at site 50 ft upstream and datum 5.00 ft higher. Jan. 1, 1976 to Dec. 20, 1979, at site 50 ft upstream at same datum.

REMARKS.--Records fair. Flow regulated since 1961 by numerous flood-retarding structures. U.S. Army Corps of Engineers' satellite telemeter at site. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office.

AVERAGE DISCHARGE.--Prior to regulation by numerous flood-retarding structures, 23 years (water years 1938-60), 41.7 ft<sup>3</sup>/s, 30,190 acre-ft/yr; since regulation by numerous flood-retarding structures, 27 years (water years 1962-88), 16.3 ft<sup>3</sup>/s, 11,810 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 69,800 ft<sup>3</sup>/s, Apr. 29, 1954, gage height, 15.24 ft (datum then in use); from rating curve extended above 27,000 ft<sup>3</sup>/s on basis of contracted-opening measurement of peak flow; no flow at times in most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 3, 1934, reached a stage of 1.0 ft lower than that in 1954, at site on upstream side of highway fill (at old bridge site).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 139 ft<sup>3</sup>/s, Mar. 3, gage height, 7.71 ft; no flow Aug. 10 to Sept. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	14	16	e18	36	31	50	72	32	e5.4	e2.4	.00
2	12	14	16	e18	35	71	60	70	36	e4.7	e1.5	2.2
3	11	16	16	e17	34	121	60	61	32	e4.4	e.90	4.3
4	11	15	16	e17	e33	128	54	54	28	e4.2	e.50	e9.0
5	10	17	16	e17	e32	120	48	50	26	e4.0	e.30	e7.5
6	9.9	13	16	e18	34	110	44	48	23	e3.8	e.20	e4.5
7	9.7	16	17	e18	37	101	42	45	21	e6.0	e.15	e3.0
8	9.7	15	17	e19	38	88	40	42	18	e10	e.12	e2.2
9	9.5	15	16	e20	35	76	39	39	17	e20	.11	e1.7
10	9.2	14	16	e21	35	67	36	36	15	16	.00	e1.2
11	9.2	16	17	e22	e34	59	35	35	14	13	.00	e.90
12	9.8	15	17	e25	34	52	34	36	13	11	.00	e.70
13	11	15	17	e32	39	47	34	35	13	9.4	.00	.50
14	10	15	e16	e50	36	43	33	34	12	8.1	.00	4.4
15	10	16	e15	80	34	42	32	32	12	7.2	.00	40
16	11	14	e14	102	34	41	31	31	13	6.3	.00	20
17	11	15	e15	70	33	43	51	30	13	e5.6	.00	17
18	11	14	e16	57	32	45	77	29	12	e4.8	.00	15
19	10	16	e15	56	32	49	83	26	11	e4.3	.00	15
20	10	15	e17	50	32	53	80	25	9.7	4.8	.00	12
21	13	15	e19	44	32	55	73	24	8.6	5.3	.00	9.6
22	19	15	e23	42	32	54	67	23	7.7	4.8	.00	7.8
23	e23	15	e30	45	32	54	58	23	7.0	e3.2	.00	11
24	19	14	e34	42	31	49	54	24	e6.0	e2.8	.00	12
25	12	15	e31	38	30	49	86	23	e5.2	e2.5	.00	8.1
26	11	15	e27	38	31	44	86	21	6.3	3.7	.00	6.9
27	e10	16	e24	37	31	42	83	19	7.6	e6.6	.00	6.1
28	11	16	e22	37	31	43	77	19	7.4	5.6	.09	5.8
29	12	16	e21	37	31	41	65	18	7.4	4.3	.00	5.0
30	13	16	e20	37	---	39	66	17	6.5	3.8	.00	4.8
31	13	---	e19	37	---	37	---	22	---	e3.2	.00	---
TOTAL	364.0	453	591	1161	970	1894	1678	1063	440.4	198.8	6.27	238.20
MEAN	11.7	15.1	19.1	37.5	33.4	61.1	55.9	34.3	14.7	6.41	.20	7.94
MAX	23	17	34	102	39	128	86	72	36	20	2.4	40
MIN	9.2	13	14	17	30	31	31	17	5.2	2.5	.00	.00
AC-FT	722	899	1170	2300	1920	3760	3330	2110	874	394	12	472

CAL YR 1987 TOTAL 13243.3 MEAN 36.3 MAX 247 MIN 3.2 AC-FT 26270  
WTR YR 1988 TOTAL 9057.67 MEAN 24.7 MAX 128 MIN .00 AC-FT 17970

e Estimated



## RED RIVER BASIN

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## 07324300 FOSS RESERVOIR NEAR FOSS, OK

LOCATION.--Lat 35°32'18", long 99°10'40", in S 1/2 sec.2, T.12 N., R.19 W., Custer County, Hydrologic Unit 11130301, near right end of dam on Washita River, 0.5 mi upstream from Oak Creek, 3.5 mi west of Stafford, 6.0 mi north of Foss, and at mile 474.4.

DRAINAGE AREA.--1,496 mi<sup>2</sup>.

PERIOD OF RECORD.--February 1961 to current year.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation). Prior to October, 1961, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by earth dam. Outlet consists of four 6- by 7-foot, 6-inch high pressure gates and one uncontrolled spillway. Storage began Feb. 13, 1961. Capacity, 436,500 acre-ft, at elevation 1,668.6 ft, crest of drop inlet and 256,100 acre-ft, at elevation 1,652.0 ft, conservation pool. Dead storage, 12,420 acre-ft below elevation 1,597.2 ft, sill of gated outlet. Figures given herein represent total contents. Reservoir is designed for flood control, municipal water supply (inactive), and irrigation release. Revised capacity table used after Sept. 30, 1964. Water-quality samples were collected at 3 profile sites in the Reservoir. U.S. Army Corps of Engineers' telemeter at station.

COOPERATION.--Elevations and data on diversions provided by Foss Reservoir Master Conservancy District.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 208,300 acre-ft, June 11, 1987, elevation, 1,646.20 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 186,100 acre-ft, Dec. 28, elevation, 1,643.18 ft; minimum, 161,500 acre-ft, Sept. 11, elevation, 1,639.48 ft.

## MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

Date	Elevation (feet)*	Contents (acre-feet)	Change in contents (acre-feet)	Diversions (acre-feet)
Sept. 30.....	1642.30	180,000	-	-
Oct. 31.....	1642.20	179,300	-700	82
Nov. 30.....	1642.20	179,300	0	180
Dec. 31.....	1643.13	185,800	+6,500	160
CAL YR 87.....	-	-	+6,400	1,474
Jan. 31.....	1642.41	180,800	-5,000	152
Feb. 29.....	1640.72	169,400	-11,400	146
Mar. 31.....	1641.06	171,600	+2,200	166
Apr. 30.....	1641.35	173,600	+2,000	129
May 31.....	1640.80	169,900	-3,700	156
June 30.....	1640.59	168,600	-1,300	211
July 31.....	1640.27	166,500	-2,100	222
Aug. 31.....	1639.62	162,400	-4,100	226
Sept. 30.....	1639.97	164,600	+2,200	157
WTR YR 88.....	-	-	-15,400	1,987

\* Elevation at 0800 on the following day.



## RED RIVER BASIN

07325000 WASHITA RIVER NEAR CLINTON, OK

LOCATION.--Lat 35°31'51", long 98°58'00", in SW 1/4 NE 1/4 sec.11, T.12 N., R.17 W., Custer County, Hydrologic Unit 11130302, on downstream side of pier of bridge on U.S. Highway 183, 0.5 mi north of Clinton, 0.8 mi upstream from Beaver Creek, 4.8 mi downstream from Barnitz Creek, and at mile 447.4.

DRAINAGE AREA.--1,977 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1935 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1221: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,467.44 ft above National Geodetic Vertical Datum of 1929. See WSP 1920 for history of changes prior to Mar. 19, 1941.

REMARKS.--No estimated daily discharges. Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Flow regulated since February 1961 by Foss Reservoir (station 07324300) and by numerous flood-retarding structures. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Prior to regulation by Foss Reservoir, 25 years (water years 1936-60), 146 ft<sup>3</sup>/s, 105,700 acre-ft/yr; since regulation by Foss Reservoir, 27 years (water years 1962-88), 80.5 ft<sup>3</sup>/s, 58,320 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 66,800 ft<sup>3</sup>/s, May 16, 1951, gage height, 31.09 ft, from rating curve extended above 7,900 ft<sup>3</sup>/s, by contracted-opening measurement of peak flow; no flow at times in 1952-56, 1964, 1966.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 3-4, 1934, reached a stage of 33.9 ft, from floodmarks.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,390 ft<sup>3</sup>/s, Sept. 19, gage height, 21.98 ft; minimum daily discharge, 15 ft<sup>3</sup>/s, Sept. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	71	68	55	207	286	367	279	458	305	86	25	18
2	66	63	55	205	280	504	357	390	259	79	25	19
3	61	61	55	218	278	1230	327	327	216	59	25	31
4	60	56	54	212	277	801	276	273	200	51	25	24
5	59	55	54	201	275	544	260	252	190	56	25	19
6	57	52	55	191	262	414	244	244	184	44	27	18
7	56	55	54	190	278	325	236	241	179	58	25	18
8	55	60	53	190	287	261	231	234	177	54	23	17
9	54	58	52	191	280	301	226	228	173	60	23	17
10	53	55	52	191	282	304	222	213	90	83	23	16
11	52	53	52	194	337	303	220	210	65	80	23	16
12	53	53	53	199	361	299	218	207	60	63	23	16
13	54	54	53	209	374	284	218	205	57	56	22	15
14	53	54	63	247	371	272	218	203	55	48	21	17
15	53	55	63	289	370	268	217	202	65	41	20	26
16	52	54	74	308	369	254	216	197	65	39	20	30
17	52	53	84	379	368	257	228	195	65	37	20	39
18	52	54	70	405	366	267	306	192	66	35	21	533
19	52	56	120	436	365	265	300	187	54	36	21	3130
20	53	55	234	382	365	266	278	186	49	35	21	1620
21	51	54	147	326	366	256	265	193	47	33	21	897
22	51	54	110	307	367	255	255	204	44	32	19	820
23	52	54	98	309	367	262	256	202	42	30	18	709
24	54	53	92	312	364	250	234	197	40	29	18	504
25	55	53	91	300	365	247	335	192	39	30	18	343
26	56	52	81	293	366	241	321	187	40	33	18	238
27	56	55	82	290	368	234	279	185	56	30	18	191
28	57	58	81	294	367	245	259	181	160	30	19	167
29	61	58	76	294	365	237	254	178	212	28	22	148
30	62	56	163	306	---	225	348	178	112	27	21	126
31	71	---	210	299	---	227	---	182	---	26	19	---
TOTAL	1744	1671	2636	8374	9726	10465	7883	6923	3366	1428	669	9782
MEAN	56.3	55.7	85.0	270	335	338	263	223	112	46.1	21.6	326
MAX	71	68	234	436	374	1230	357	458	305	86	27	3130
MIN	51	52	52	190	262	225	216	178	39	26	18	15
AC-FT	3460	3310	5230	16610	19290	20760	15640	13730	6680	2830	1330	19400

CAL YR 1987 TOTAL 122750 MEAN 336 MAX 3610 MIN 51 AC-FT 243500  
WTR YR 1988 TOTAL 64667 MEAN 177 MAX 3130 MIN 15 AC-FT 128300

## RED RIVER BASIN

275

## 07325500 WASHITA RIVER AT CARNEGIE, OK

LOCATION.--Lat 35°07'02", long 98°33'49", in NW 1/4 NW 1/4 sec.3, T.7 N., R.13 W., Caddo County, Hydrologic Unit 11130302, on downstream side of right pier of bridge on State Highway 9, 1,300 ft upstream from Running Creek, 2.7 mi east of Carnegie, and at mile 353.9. Records include flow of Running Creek.

DRAINAGE AREA.--3,129 mi<sup>2</sup>, includes that of Running Creek.

PERIOD OF RECORD.--October 1937 to current year.

REVISED RECORDS.--WSP 1087: 1938. WSP 1211: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,244.23 ft above National Geodetic Vertical Datum of 1929.

Prior to October 1942, water-stage recorder at site 8.0 mi upstream at datum 24.57 ft higher. Prior to Aug. 7, 1985, datum 5.00 ft higher.

REMARKS.--No estimated daily discharges. Records good. Some diversion for irrigation upstream from station. October 1942 to May 1949, occasional fluctuation caused by powerplant at Carnegie, 7.5 mi upstream from station. Flow regulated by Foss Reservoir since February 1961 (station 07324300), and by numerous flood-retarding structures. U.S. Army Corps of Engineers' satellite telemeter at site.

AVERAGE DISCHARGE.--Prior to regulation by Foss Reservoir, 23 years (water years 1938-60), 314 ft<sup>3</sup>/s, 277,500 acre-ft/yr; since regulation by Foss Reservoir, 27 years (water years 1962-88), 298 ft<sup>3</sup>/s, 215,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 50,000 ft<sup>3</sup>/s, May 18, 1949, gage height, 26.21 ft at datum then in use, from rating curve extended above 35,500 ft<sup>3</sup>/s on basis of contracted-opening measurement of peak flow, maximum gage height, 26.70 ft at datum then in use, Oct. 20, 1983; no flow at times in 1956 and 1964.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 23, 1903, reached a stage of about 29 ft, at former site and datum, from information provided by local resident; flood of May 18, 1949, reached a stage of 20.9 ft, from floodmark, at that site and datum.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 9,960 ft<sup>3</sup>/s, Mar. 4, gage height, 25.88 ft; minimum daily discharge, 89 ft<sup>3</sup>/s, Sept. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	329	320	206	298	550	524	1060	1370	377	350	122	96
2	275	292	206	345	549	1800	2270	1100	378	261	117	96
3	255	253	205	354	530	5350	1960	1120	458	215	112	97
4	242	236	204	356	517	8380	1330	949	454	201	110	103
5	236	225	204	360	506	5550	1110	772	398	222	108	117
6	233	219	204	357	483	3390	924	676	375	198	107	111
7	226	212	204	275	475	2620	818	633	361	177	106	103
8	223	210	204	407	464	2210	759	610	351	172	108	95
9	216	207	200	525	468	1890	713	581	338	171	107	94
10	212	207	200	544	479	1640	695	554	325	194	103	91
11	208	207	198	498	480	1530	693	532	316	247	105	90
12	204	207	198	458	475	1420	668	510	276	204	110	90
13	203	205	196	428	520	1310	642	497	234	200	105	89
14	203	204	195	471	547	1210	627	485	219	180	111	96
15	203	206	195	516	556	1100	607	470	212	166	108	95
16	202	208	196	912	552	1010	590	460	216	159	104	100
17	197	208	199	1970	546	934	602	453	215	152	98	111
18	194	208	200	1790	544	907	1140	443	223	146	96	669
19	194	208	287	1430	541	866	1470	433	212	152	95	2060
20	193	208	559	1700	530	823	1100	424	204	149	96	2730
21	190	208	856	1360	526	792	923	426	196	144	104	3180
22	187	207	602	983	518	770	816	429	185	139	102	2320
23	186	206	436	816	517	736	736	431	176	135	95	1710
24	190	206	365	738	511	719	668	437	171	131	95	1920
25	195	206	343	696	506	705	659	435	166	132	92	1810
26	264	206	343	640	505	678	1050	425	166	132	92	1160
27	224	206	343	611	507	657	930	411	183	141	91	848
28	213	206	324	588	507	643	776	398	188	136	90	612
29	207	206	295	571	507	634	972	389	194	132	91	483
30	208	206	287	561	---	634	1470	382	349	126	98	419
31	346	---	282	555	---	634	---	377	---	126	99	---
TOTAL	6858	6513	8936	22113	14916	52066	28778	17612	8116	5390	3177	21595
MEAN	221	217	288	713	514	1680	959	568	271	174	102	720
MAX	346	320	856	1970	556	8380	2270	1370	458	350	122	3180
MIN	186	204	195	275	464	524	590	377	166	126	90	89
AC-FT	13600	12920	17720	43860	29590	103300	57080	34930	16100	10690	6300	42830

CAL YR 1987 TOTAL 316971 MEAN 868 MAX 15000 MIN 186 AC-FT 628700  
WTR YR 1988 TOTAL 196070 MEAN 536 MAX 8380 MIN 89 AC-FT 388900

## RED RIVER BASIN

07325800 COBB CREEK NEAR EAKLY, OK

LOCATION.--Lat 35°17'26", long 98°35'38", in NW 1/4 NE 1/4 sec.5, T.9 N., R.13 W., Caddo County, Hydrologic Unit 11130302, near left downstream abutment of bridge, on State Highway 152, 0.5 mi downstream from Fivemile Creek, 2.4 mi southwest of Eakly, 3.0 mi upstream from Fort Cobb Reservoir, and at mile 22.9.

DRAINAGE AREA.--132 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1968 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,369.70 ft above National Geodetic Vertical Datum of 1929. Oct. 29, 1980 to Aug. 11, 1982 gage at site 0.5 mi downstream at same datum.

REMARKS.--Records good. Flow regulated since 1957 by numerous floodwater-retarding structures. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office.

AVERAGE DISCHARGE.--20 years, 24.5 ft<sup>3</sup>/s, 17,750 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 10,000 ft<sup>3</sup>/s, Sept. 29, 1986, gage height, 24.38 ft; no flow at times in most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,000 ft<sup>3</sup>/s, Mar. 3, gage height, 12.13 ft; minimum daily discharge, 3.0 ft<sup>3</sup>/s, Sept. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15	27	25	21	26	18	340	41	15	32	e4.5	e3.2
2	13	22	24	20	26	275	141	38	14	21	e4.0	e3.0
3	14	19	24	e19	26	430	77	34	13	15	e4.2	e3.5
4	15	19	24	e19	24	239	54	32	12	26	e4.4	e4.0
5	12	17	26	e19	24	117	36	30	10	32	e4.3	e3.5
6	12	17	26	e18	23	71	29	29	9.8	11	e4.1	e3.3
7	12	17	26	e18	23	54	25	30	9.2	e7.8	e4.1	e3.5
8	12	18	26	e18	e22	40	23	30	8.3	e7.6	e4.2	e3.4
9	11	19	27	e18	e22	33	21	28	e8.0	e7.4	e4.2	e3.5
10	11	18	26	e19	e21	29	35	27	e7.6	e7.4	e4.1	e3.5
11	12	17	26	e22	e21	25	25	29	e7.2	15	e4.0	e3.8
12	12	17	27	e24	22	22	22	34	e7.2	e7.0	e3.9	e3.7
13	12	17	27	e28	26	19	20	26	e6.7	e6.4	e3.8	e3.6
14	12	20	e26	e30	25	18	18	25	e6.5	e5.8	e3.7	e3.5
15	12	23	e25	34	24	18	17	23	8.3	e5.4	e3.7	e5.0
16	12	25	e24	58	22	17	16	22	9.4	e5.2	e3.8	e6.0
17	13	22	e26	107	22	25	34	21	20	e5.0	e3.9	e7.0
18	13	20	e35	112	21	29	61	20	12	e4.9	e3.8	e5.6
19	13	22	148	183	20	25	41	19	8.4	e4.8	e3.8	e5.3
20	14	22	106	106	20	21	30	19	e8.6	e4.7	e3.7	e7.0
21	13	22	64	69	19	19	26	20	e7.2	e4.6	e3.8	19
22	13	22	49	54	19	19	23	22	e7.0	e4.5	e3.7	30
23	14	21	36	47	18	17	19	22	e6.8	e4.4	e3.9	23
24	16	21	29	39	18	18	18	22	e6.4	e4.3	e3.8	16
25	16	29	40	31	18	17	142	19	e8.4	e4.4	e3.7	11
26	16	28	46	28	18	16	76	18	13	e4.6	e3.7	9.7
27	16	29	35	26	19	16	55	16	14	e4.5	e3.5	e8.8
28	16	28	28	27	18	17	45	15	30	e4.4	e4.0	e7.4
29	16	26	25	26	18	17	44	15	89	e4.5	e3.4	6.3
30	17	25	e23	28	---	16	49	14	48	e4.3	e3.6	5.8
31	38	---	e22	27	---	18	---	15	---	e4.3	e3.5	---
TOTAL	443	649	1121	1295	625	1715	1562	755	431.0	280.2	120.8	221.9
MEAN	14.3	21.6	36.2	41.8	21.6	55.3	52.1	24.4	14.4	9.04	3.90	7.40
MAX	38	29	148	183	26	430	340	41	89	32	4.5	30
MIN	11	17	22	18	18	16	16	14	6.4	4.3	3.4	3.0
AC-FT	879	1290	2220	2570	1240	3400	3100	1500	855	556	240	440

CAL YR 1987 TOTAL 22131 MEAN 60.6 MAX 2700 MIN 11 AC-FT 43900  
WTR YR 1988 TOTAL 9218.9 MEAN 25.2 MAX 430 MIN 3.0 AC-FT 18290

e Estimated

## RED RIVER BASIN

## 07325900 FORT COBB RESERVOIR NEAR FORT COBB, OK

LOCATION (REVISED).--Lat 35°09'58", long 98°27'23", in SE 1/4 NW 1/4 sec.22, T.8 N., R.12 W., Caddo County, Hydrologic Unit 11130382, in control house at right center of dam on Cobb Creek, 4.0 mi northwest of Fort Cobb, and at mile 7.5.

DRAINAGE AREA.--304 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1959 to current year.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation). Prior to October, 1961, nonrecording gage at same datum.

REMARKS.--Reservoir is formed by earth dam. Outlet consists of two sets of controlled 5- by 5-foot steel gates and an uncontrolled concrete spillway. Storage began Mar. 30, 1959. Conservation pool was first filled in June 1962. Capacity, 143,700 acre-ft at elevation 1,354.8 ft, crest of drop inlet, 80,010 acre-ft at elevation 1,342.0 ft, conservation pool, and 1,664 acre-ft at elevation 1,300.0 ft, crest of gated outlet. Figures given herein represent total contents. Reservoir is used for flood control, for municipal and industrial water supply, and for irrigation releases. Revised capacity table used since May 1, 1964. U.S. Army Corps of Engineers' satellite telemeter at station.

COOPERATION.--Elevations and data on diversions provided by Fort Cobb Reservoir Master Conservancy District.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 114,200 acre-ft, June 4, 1982, elevation, 1,349.44 ft; minimum since conservation pool was first filled, 54,650 acre-ft, Oct. 19, 1972, elevation 1,335.06 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 86,660 acre-ft, Apr. 30, elevation, 1,343.58 ft; minimum, 72,080 acre-ft, Sept. 17, elevation 1,340.00 ft.

## MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

Date	Elevation (feet)*	Contents (acre-feet)	Change in contents (acre-feet)	Diversions (acre-feet)
Sept. 30.....	1,342.00	80,010	-	-
Oct. 31.....	1,341.99	79,970	-40	785
Nov. 30.....	1,342.17	80,710	+740	752
Dec. 31.....	1,342.00	80,010	-700	789
CAL YR 87.....	-	-	+3,650	9,696
Jan. 31.....	1,342.17	80,710	+700	783
Feb. 29.....	1,342.38	81,570	+860	716
Mar. 31.....	1,342.20	80,830	-740	758
Apr. 30.....	1,343.57	86,600	+5,770	988
May 31.....	1,341.81	79,230	-7,370	956
June 30.....	1,341.62	78,460	-770	1,101
July 31.....	1,341.08	76,300	-2,160	1,158
Aug. 31.....	1,340.47	73,900	-2,400	1,142
Sept. 30.....	1,341.43	77,700	+3,800	1,123
WTR YR 88.....	-	-	-2,310	11,051

\* Elevation at 0800 on following day.



## 07326000 COBB CREEK NEAR FORT COBB, OK

LOCATION.--Lat 35°08'37", long 98°26'33", in NE 1/4 NE 1/4 sec.27, T.8 N., R.12 W., Caddo County, Hydrologic Unit 11130302, on left bank 10 ft upstream from county road bridge, 0.3 mi upstream from Punjo Creek, 1.2 mi downstream from Fort Cobb Dam, 3.0 mi north of Fort Cobb, and at mile 5.8.

DRAINAGE AREA.--313 mi<sup>2</sup>. Area at site used prior to Oct. 1, 1969, 319 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1939 to current year. Monthly discharge only for some periods, published in WSP 1311. Prior to October 1960, published as Pond Creek near Fort Cobb.

REVISED RECORDS.--WSP 1087: 1938. WSP 1211: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,254.49 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Bureau of Reclamation). Oct. 1, 1969 to Sept. 30, 1982 gage at same site and datum 5.00 ft higher. Oct. 1, 1939 to Aug. 29, 1940, nonrecording gage and Aug. 30, 1940 to Sept. 30, 1969, water-stage recorder at site 0.8 mi downstream at datum 1.92 ft lower.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Flow regulated since March 1959 by Fort Cobb Reservoir (station 07325900).

AVERAGE DISCHARGE.--Prior to regulation by Fort Cobb Reservoir, 19 years (water years 1940-58), 50.2 ft<sup>3</sup>/s, 36,340 acre-ft/yr; since regulation by Fort Cobb Reservoir, 30 years (water years 1959-88), 23.3 ft<sup>3</sup>/s, 16,890 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,000 ft<sup>3</sup>/s; May 17, 1949, gage height, 18.72 ft, from floodmark in gage well at former site and datum, from rating curve extended above 4,300 ft<sup>3</sup>/s, on basis of contracted-opening measurements at gage heights 16.62 ft, 17.58 ft, and 18.72 ft, at former site and datum; minimum daily, 0.2 ft<sup>3</sup>/s, Sept. 20, 24-28, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 15, 1937, reached a stage of 19.3 ft, site and datum used in 1939, from information by local resident.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 791 ft<sup>3</sup>/s, May 3, gage height, 14.18 ft; minimum daily discharge, 1.7 ft<sup>3</sup>/s, Oct. 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.2	3.0	3.3	3.7	8.9	20	e3.2	178	6.5	3.6	e2.3	e2.1
2	2.1	3.0	3.3	3.1	17	107	e3.1	302	6.2	3.5	e2.2	e2.2
3	2.0	3.0	3.3	3.0	17	48	e3.0	636	5.7	3.5	e2.2	e2.2
4	2.0	3.0	3.3	2.9	17	33	e170	779	5.6	3.3	e3.1	e2.3
5	2.0	3.0	3.3	2.6	17	30	320	698	5.4	3.3	e2.6	e2.3
6	2.0	2.8	3.2	2.7	17	27	320	520	5.3	3.3	e2.4	e2.2
7	2.0	2.8	3.3	2.7	17	78	320	370	5.1	3.6	e2.3	e2.2
8	2.0	3.0	3.3	2.6	17	282	e320	194	5.1	3.4	e2.2	e2.2
9	2.0	3.1	3.3	2.4	17	528	e320	13	5.1	3.3	e5.0	e2.2
10	2.0	3.5	3.3	2.4	17	524	e320	11	5.0	3.5	e3.0	e2.2
11	2.0	3.7	3.3	2.4	17	526	e230	10	4.9	3.6	e2.5	e2.3
12	2.0	3.9	3.3	2.4	17	521	e3.8	9.8	4.9	3.1	e2.3	e2.2
13	1.9	3.7	3.3	2.4	17	521	e3.7	9.5	4.9	3.1	e2.3	e2.3
14	1.8	3.7	3.9	2.3	17	422	e3.4	9.1	4.9	3.1	e2.3	2.2
15	1.7	18	3.9	37	17	168	e3.2	8.8	4.6	2.9	e2.2	2.8
16	2.0	3.7	3.9	174	17	13	e3.1	8.4	4.9	2.9	e2.2	2.4
17	2.0	3.2	3.9	172	17	e4.0	e3.0	8.2	5.1	2.8	e2.3	2.1
18	1.9	3.0	35	176	17	e3.7	e80	8.1	4.8	2.6	e2.3	53
19	1.8	3.0	162	e190	17	e3.3	e200	7.7	4.7	2.3	e4.0	e20
20	2.0	3.0	163	e220	17	e3.1	e200	7.8	4.5	e2.3	e2.9	e5.0
21	2.1	3.0	200	e265	17	e3.0	e62	7.5	4.3	e2.3	e2.5	e2.7
22	2.0	3.0	266	e298	17	e40	e3.8	7.4	4.2	e2.2	e2.3	2.3
23	2.3	3.0	255	e300	17	e140	e3.5	7.4	4.2	e2.2	e2.3	80
24	2.8	3.3	223	e300	17	e200	e3.3	7.3	4.0	e2.2	e2.3	25
25	2.6	3.7	189	e300	18	e200	e3.1	7.0	5.9	e2.3	e2.3	4.5
26	2.6	3.7	187	e136	18	e200	e3.0	6.6	7.9	e2.3	e2.3	3.6
27	2.6	3.7	188	e20	18	e200	e2.9	6.6	10	e2.3	e2.2	2.8
28	2.5	3.5	187	3.4	18	e4.1	e2.8	6.4	10	e2.2	e2.1	2.6
29	2.5	3.3	188	3.2	18	e3.8	70	6.4	10	e2.3	e2.0	2.2
30	2.7	3.3	187	2.9	---	e3.5	189	6.4	3.9	e2.2	e2.1	2.2
31	5.6	---	101	2.7	---	e3.4	---	6.5	---	e2.3	e2.1	---
TOTAL	69.7	112.6	2589.4	2637.8	489.9	4859.9	3172.9	3863.9	167.6	87.8	77.1	244.3
MEAN	2.25	3.75	83.5	85.1	16.9	157	106	125	5.59	2.83	2.49	8.14
MAX	5.6	18	266	300	18	528	320	779	10	3.6	5.0	80
MIN	1.7	2.8	3.2	2.3	8.9	3.0	2.8	6.4	3.9	2.2	2.0	2.1
AC-FT	138	223	5140	5230	972	9640	6290	7660	332	174	153	485

CAL YR 1987 TOTAL 39867.5 MEAN 109 MAX 1270 MIN 1.7 AC-FT 79080  
WTR YR 1988 TOTAL 18372.9 MEAN 50.2 MAX 779 MIN 1.7 AC-FT 36440

e Estimated



## RED RIVER BASIN

279

07326500 WASHITA RIVER AT ANADARKO, OK

LOCATION.--Lat 35°05'06", long 98°14'35", in NW 1/4 sec.15, T.7 N., R.10 W., Caddo County, Hydrologic Unit 11130302 at left bank 100 ft upstream from bridge on U.S. Highway 281 at north edge of Anadarko, 8.1 mi upstream from Sugar Creek, and at mile 305.2.

DRAINAGE AREA.--3,656 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1902 to September 1908; June 1924 to June 1925, published as "near Anadarko", October 1935 to February 1938; October 1963 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1311: 1903, 1907-08, drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,150.00 ft above National Geodetic Vertical Datum of 1929.

October 26, 1902 to June 30, 1908, nonrecording gage at former bridge 125 ft downstream at datum estimated to be 2.8 ft higher. May 25, 1924 to June 30, 1925, nonrecording gage at county road bridge 14 mi downstream at different datum. Jan. 10, 1936 to Mar. 7, 1938, non-recording gage on upstream side of bridge on U.S. Highway 281 at datum 1.88 ft higher.

REMARKS.--No estimated daily discharges. Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Flow regulated by low-water dams upstream and since March 1959, by Fort Cobb Reservoir (station 07325900), since February 1961, by Foss Reservoir (station 07324300), and by numerous flood-retarding structures. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Prior to regulation by Fort Cobb and Foss Reservoirs, 8 years (water years 1903-08, 1936-37), 595 ft<sup>3</sup>/s, 430,800 acre-ft/yr; since regulation by Fort Cobb and Foss Reservoirs, 25 years (water years 1964-88), 364 ft<sup>3</sup>/s, 263,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 44,700 ft<sup>3</sup>/s, Oct. 21, 1983, gage height, 25.20 ft (from HWM); no flow Aug. 1, 1964.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 1949, reached an elevation of 1,176.7 ft, from floodmark, at right bank on downstream side of bridge on U.S. Highway 281.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,670 ft<sup>3</sup>/s, Mar. 6, gage height, 19.92 ft; minimum daily discharge, 102 ft<sup>3</sup>/s, Sept. 12, 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	571	477	274	598	704	712	912	1530	520	340	158	107
2	504	493	288	483	691	1010	1700	1540	513	459	155	107
3	426	441	320	528	691	3950	2170	1400	506	427	152	107
4	384	388	317	551	670	4610	1810	1570	513	343	149	105
5	359	355	317	553	661	5500	1420	1630	555	303	147	105
6	339	339	317	520	650	5320	1330	1520	559	292	145	105
7	335	326	315	490	637	3490	1250	1360	543	290	139	112
8	329	315	312	570	631	2670	1180	1220	525	255	137	113
9	320	305	312	543	633	2370	1150	1090	510	235	136	112
10	316	291	310	619	645	2190	1150	906	495	220	133	110
11	305	292	308	703	657	1970	1130	860	480	235	131	105
12	296	296	308	720	650	1820	1070	818	467	289	128	102
13	291	297	308	721	637	1710	914	781	450	290	127	102
14	283	295	317	709	689	1590	889	751	423	268	124	104
15	281	301	326	728	737	1390	862	723	393	248	123	105
16	282	732	334	835	754	1190	841	696	371	221	121	105
17	282	438	336	1640	753	1070	827	673	359	203	121	105
18	277	342	340	2160	740	1010	910	654	353	196	121	608
19	275	324	365	1980	731	974	1310	634	345	193	121	2080
20	272	319	694	1760	725	932	1530	618	343	185	121	1980
21	265	312	941	1910	723	913	1310	602	335	185	116	2510
22	260	308	1190	1580	720	901	1160	591	330	182	115	2700
23	259	308	1010	1330	663	884	1010	587	325	178	115	2200
24	277	308	868	1220	712	892	933	580	321	170	115	1940
25	287	315	802	1140	713	890	890	580	315	168	115	1940
26	485	313	768	1080	711	882	873	579	312	165	113	1840
27	772	312	744	931	707	867	1080	574	309	164	112	1400
28	454	312	725	799	710	850	1100	567	306	164	107	1050
29	357	312	707	750	714	831	977	556	301	164	107	818
30	325	312	667	729	---	783	1120	543	299	164	105	695
31	338	---	659	716	---	757	---	531	---	161	105	---
TOTAL	10806	10478	15799	29596	20059	54928	34808	27264	12376	7357	3914	23572
MEAN	349	349	510	955	692	1772	1160	879	413	237	126	786
MAX	772	732	1190	2160	754	5500	2170	1630	559	459	158	2700
MIN	259	291	274	483	631	712	827	531	299	161	105	102
AC-FT	21430	20780	31340	58700	39790	108900	69040	54080	24550	14590	7760	46760

CAL YR 1987 TOTAL 428050 MEAN 1173 MAX 20400 MIN 259 AC-FT 849000  
WTR YR 1988 TOTAL 250957 MEAN 686 MAX 5500 MIN 102 AC-FT 497800

## 07328500 WASHITA RIVER NEAR PAULS VALLEY, OK

LOCATION.--Lat 34°45'17", long 97°15'04", in NE 1/4, SE 1/4 (revised) sec.1. T.3 N., R.1 W., Garvin County, Hydrologic Unit 11130303, on downstream side of left pier of bridge on U.S. Highway 77, 2.0 mi northwest of Pauls Valley, 6.0 mi downstream from Owl Creek, 7.0 mi upstream from Washington Creek, and at mile 146.5.

DRAINAGE AREA.--5,330 mi<sup>2</sup>.

PERIOD OF RECORD.--May to December 1899 (gage heights only), October 1937 to current year. Monthly discharge only for some periods, published in WSP 1311. Published as "at Pauls Valley, Indian Territory" in 1899.

GAGE.--Water-stage recorder. Datum of gage is 854.61 ft above National Geodetic Vertical Datum of 1929. During 1899, nonrecording gage at site 9 mi downstream, at different datum. Mar. 29, 1938 to Jan. 25, 1939, nonrecording gage and Jan. 26, 1939 to Oct. 6, 1948, water-stage recorder at site 0.7 mi upstream, at datum 1.53 ft higher. Mar. 11, 1975 to Jan. 26, 1981, water-stage recorder at site 200 ft upstream, and at same datum.

REMARKS.--Records poor. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Some diversion for irrigation upstream from station. Some regulation since March 1959, by Fort Cobb Reservoir (station 07325900); since February 1961, by Foss Reservoir (station 07324300); and by numerous flood-retarding structures. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Prior to regulation, 21 years (water years 1938-58), 829 ft<sup>3</sup>/s, 600,200 acre-ft/yr; since regulation, 27 years (water years 1962-88), 735 ft<sup>3</sup>/s, 532,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 43,600 ft<sup>3</sup>/s, May 29, 1987, gage height, 28.72 ft; maximum gage height, 29.88 ft, May 11, 1950; no flow in 1956, 1964, 1966-67, 1970-72.

EXTREMES OUTSIDE PERIOD OF RECORD.--Stream is reported to have receded to no flow in 1882 and in 1897 (information provided by local resident).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 16,400 ft<sup>3</sup>/s, Apr. 1, gage height, 17.16 ft; minimum daily discharge, 141 ft<sup>3</sup>/s, Sept. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e760	683	496	1660	1440	845	e11300	1780	725	e530	263	141
2	e710	858	484	1540	1360	e1550	11000	1960	753	e510	271	145
3	e690	815	477	1410	1350	3350	8090	2120	750	e490	230	154
4	e680	775	467	1220	1350	5320	5660	1960	792	e480	215	157
5	e640	699	438	1090	1360	5080	5000	1840	737	e470	235	156
6	e620	622	452	1090	1320	5360	4120	2020	722	e450	221	152
7	e600	557	455	611	1250	5860	3770	2020	712	e430	198	148
8	e590	522	449	797	1200	6300	e3400	1840	725	e420	196	146
9	e580	497	439	738	1190	4840	e3100	1620	724	e410	193	145
10	e560	476	425	849	1150	3650	e2850	1420	711	e400	240	144
11	e540	463	423	1150	1100	3260	e2500	1250	689	e490	253	147
12	e530	452	415	1200	1080	3000	e2210	1060	655	e450	256	148
13	e520	438	407	1680	1070	2800	e2000	998	628	e420	213	146
14	e510	438	559	1710	1070	2650	e1750	951	605	e400	198	147
15	e500	583	623	1700	1060	2530	e1600	902	590	e370	177	150
16	e500	524	545	2020	1030	2450	e1500	904	576	e360	161	260
17	e490	532	482	2650	1040	2370	e1420	904	580	e340	157	272
18	e480	805	465	2820	1060	2230	e1400	870	852	e320	155	259
19	e480	816	1770	2760	1080	2010	e1700	811	600	e320	151	1710
20	e470	601	2850	3030	1080	1830	e1950	762	538	e310	152	956
21	e470	499	2420	2910	1040	1690	e1790	742	e510	290	163	1960
22	e470	477	2040	2640	993	1590	e1680	732	e480	273	178	1890
23	700	459	1850	2610	954	1480	e1610	718	e460	251	174	2310
24	1140	566	1890	2440	927	1390	e1510	710	e420	241	160	3100
25	1030	1030	3260	2190	868	1310	e1450	700	e400	243	153	3650
26	1980	584	3970	2050	812	1260	1350	693	e450	230	147	2480
27	2150	543	2820	1980	822	1230	1320	693	530	238	144	2090
28	e1720	500	2390	1920	850	1200	1260	685	693	254	143	1680
29	e1750	476	2110	1820	e863	1440	1380	680	657	251	143	1460
30	972	480	1900	1640	---	3280	1580	675	563	239	143	1940
31	781	---	1780	1530	---	2010	---	662	---	235	142	---
TOTAL	24613	17770	39551	55455	31769	85165	91250	35682	18827	11115	5825	28243
MEAN	794	592	1276	1789	1095	2747	3042	1151	628	359	188	941
MAX	2150	1030	3970	3030	1440	6300	11300	2120	852	530	271	3650
MIN	470	438	407	611	812	845	1260	662	400	230	142	141
AC-FT	48820	35250	78450	110000	63010	168900	181000	70780	37340	22050	11550	56020

CAL YR 1987 TOTAL 1015553 MEAN 2782 MAX 41700 MIN 407 AC-FT 2014000  
WTR YR 1988 TOTAL 445265 MEAN 1217 MAX 11300 MIN 141 AC-FT 883200

e Estimated

## 07329000 RUSH CREEK AT PURDY, OK

LOCATION (REVISED).--Lat 34°41'46", long 97°35'55", in SE 1/4 SE 1/4 sec.27, T.3 N., R.4 W., on left downstream bank near end of bridge on State Highway 76, 1.6 mi southwest of Purdy, 9.7 mi south of Lindsay, and at mile 27.3.

DRAINAGE AREA.--145 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1939 to December 1953, February 1982 to current year. Prior to May 1940 monthly discharges only, published in WSP 1311.

REVISED RECORD.--WSP 1211: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,004.12 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 1, 1942, nonrecording gage, at site 1.2 mi downstream, at datum 9.42 ft lower. Oct. 1, 1942 to Aug. 22, 1943, and May 11, 1950 to Sept. 18, 1952, nonrecording gage, 1.2 mi downstream, at datum 14.42 ft lower. Aug. 23, 1943 to May 10, 1950, and Sept. 19, 1952 to Dec. 31, 1953, water-stage recorder, at site 1.2 mi downstream, at datum 14.42 ft lower.

REMARKS.--Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Flow partially regulated since 1960 by numerous soil-conservation reservoirs.

AVERAGE DISCHARGE.--Prior to regulation by soil-conservation reservoirs, 14 years (water years 1940-53), 23.1 ft<sup>3</sup>/s, 52,130 acre-ft; since regulation by soil-conservation reservoirs, 6 years (water years 1983-88), 91.3 ft<sup>3</sup>/s, 66,150 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 30,000 ft<sup>3</sup>/s, May 10, 1950, gage height, 27.00 ft at site and datum then in use, from floodmark, and from rating extended above 5,000 ft<sup>3</sup>/s on the basis of a slope-area measurement, at 27.00 ft. No flow at times in several years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,250 ft<sup>3</sup>/s, Apr. 1, gage height, 20.21 ft; minimum daily discharge, 7.5 ft<sup>3</sup>/s, Aug. 8, 9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	30	e57	30	61	44	37	1800	54	31	11	7.7	11
2	e29	e48	30	50	44	263	1050	44	26	11	7.8	13
3	e28	e38	28	48	45	489	811	38	36	10	7.8	18
4	e28	31	27	44	45	227	629	33	43	10	7.8	12
5	e26	29	28	39	44	139	454	29	30	10	8.2	11
6	e26	25	30	34	e48	95	300	28	24	9.7	7.9	11
7	e26	24	30	e32	e47	77	216	28	21	9.6	7.8	11
8	e25	25	30	e30	e47	60	160	28	18	9.6	7.5	11
9	e25	25	29	e29	e48	51	132	25	16	10	7.5	11
10	e24	23	28	e30	e48	42	127	22	14	10	8.4	11
11	e24	21	29	e34	e49	38	98	22	12	11	8.2	11
12	e24	21	31	e41	e50	34	67	28	12	12	7.9	12
13	e23	22	30	e50	e49	30	51	22	11	11	7.8	13
14	e23	24	56	e60	e48	28	62	20	12	9.7	7.7	19
15	e24	30	68	e80	e48	28	60	18	12	9.3	7.7	27
16	e23	34	62	221	e47	25	46	20	13	9.0	7.8	19
17	e23	36	55	218	e45	53	86	19	17	8.8	8.1	16
18	e24	34	52	148	e45	74	149	17	15	8.8	9.0	19
19	e23	34	292	124	e45	62	108	15	14	9.1	9.4	152
20	e23	31	424	94	e45	52	78	15	12	9.6	9.6	69
21	e24	31	223	74	e44	46	48	15	12	9.0	9.7	27
22	e23	31	154	63	e45	40	37	15	11	8.7	9.1	16
23	e22	29	153	58	e44	39	34	13	11	8.4	8.9	12
24	e22	32	121	54	e42	40	33	16	10	8.1	9.0	12
25	e130	42	460	48	42	36	30	16	17	8.3	9.1	10
26	e350	38	526	45	41	33	28	15	15	8.4	9.1	9.5
27	e220	34	268	44	43	30	26	16	15	9.0	9.2	9.4
28	e160	34	199	44	42	35	39	14	13	9.3	10	9.1
29	e120	33	139	44	38	284	32	12	13	8.4	11	19
30	e90	31	102	45	---	173	54	13	12	7.9	11	14
31	e70	---	78	46	---	248	---	14	---	7.7	11	---
TOTAL	1732	947	3812	2032	1312	2908	6845	684	518	292.4	268.7	615.0
MEAN	55.9	31.6	123	65.5	45.2	93.8	228	22.1	17.3	9.43	8.67	20.5
MAX	350	57	526	221	50	489	1800	54	43	12	11	152
MIN	22	21	27	29	38	25	26	12	10	7.7	7.5	9.1
AC-FT	3440	1880	7560	4030	2600	5770	13580	1360	1030	580	533	1220

CAL YR 1987 TOTAL 65008.0 MEAN 178 MAX 8740 MIN 8.1 AC-FT 128900  
WTR YR 1988 TOTAL 21966.1 MEAN 60.0 MAX 1800 MIN 7.5 AC-FT 43570

e Estimated

## 07329700 WILDHORSE CREEK NEAR HOOVER, OK

LOCATION.--Lat 34°32'29", long 97°14'49", on west line of SW 1/4 sec.19, T.1 N., R.1 E., Garvin County, Hydrologic Unit 11130303, on downstream left bank at bridge on State Highway 19A, 1.5 mi north of Hoover, 1.8 mi downstream from Sandy Creek, and at mile 7.9.

DRAINAGE AREA.--604 mi<sup>2</sup>.

PERIOD OF RECORD.--Occasional low-flow measurements, water years 1944, 1951-69. October 1969 to current year.

GAGE.--Water-stage recorder. Datum of gage is 803.3 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records poor. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Flow regulated by Duncan, Clear Creek, Humphries and Fuqua Lakes, combined surface-area, 3,340 acres, and capacity, 44,800 acre-ft, and numerous flood-retarding structures.

AVERAGE DISCHARGE.--19 years, 239 ft<sup>3</sup>/s, 173,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 36,000 ft<sup>3</sup>/s, May 29, 1987, gage height, 25.54 ft; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Dec. 19	1730	5,950	14.37	Mar. 29	0745	*13,400	*20.65
Mar. 2	0930	11,300	19.28	Apr. 1	2330	11,900	19.68

Minimum daily discharge, 4.1 ft<sup>3</sup>/s, Aug. 31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	71	154	100	e3050	211	124	7880	267	78	34	e9.6	e5.8
2	69	141	91	e2900	215	7090	6660	227	88	32	e8.6	40
3	66	123	84	e3400	225	3780	2590	203	84	32	e8.1	33
4	64	71	80	e3900	195	1680	1980	193	73	34	e8.0	e13
5	64	57	76	e5000	193	1260	1710	178	73	30	e7.4	e12
6	63	49	74	e6200	170	1050	1480	166	63	28	e7.2	e10
7	62	46	79	e4500	166	891	1320	159	59	27	e6.9	e9.0
8	63	47	77	e3000	164	690	1260	154	56	28	e7.0	e8.1
9	60	45	72	e1700	164	572	1180	144	52	29	e13	e7.9
10	60	45	71	e1000	159	471	1130	137	50	29	e26	e6.8
11	61	45	70	e700	202	398	1030	131	48	31	e23	e6.0
12	60	44	70	e600	245	336	941	126	47	33	e13	e5.8
13	61	43	69	e520	218	315	823	119	46	32	e11	e5.1
14	38	44	113	e480	185	285	744	101	44	29	e10	69
15	29	360	374	e440	178	260	681	95	50	27	e10	450
16	26	284	235	e420	168	231	630	90	47	19	e9.0	e130
17	26	102	187	e400	160	564	677	91	55	e18	e8.4	105
18	25	77	171	e360	173	885	1110	86	55	e15	e7.8	130
19	31	70	2980	e410	217	488	698	83	46	e14	e7.1	1580
20	38	65	2220	e480	208	367	531	80	42	14	e6.9	604
21	33	62	1630	e450	219	312	460	77	41	e15	e6.4	286
22	28	58	1240	e365	204	279	401	75	39	e20	e6.1	201
23	27	57	e2550	e320	200	259	352	75	36	e17	e5.8	135
24	58	78	e3010	e290	194	248	328	75	35	e13	e5.8	104
25	347	939	e3800	e270	133	229	295	74	34	e12	e5.2	87
26	1390	370	e6600	e245	125	214	297	71	36	e10	e5.1	74
27	611	232	e7800	e230	125	197	272	68	38	e10	e4.8	62
28	309	170	e4800	e210	126	198	245	64	43	14	e4.6	57
29	267	134	e4300	230	125	7470	229	61	41	e13	e4.4	67
30	214	112	e3700	225	---	4990	280	61	37	e11	e4.2	69
31	177	---	e3300	218	---	1830	---	60	---	e10	e4.1	---
TOTAL	4498	4124	50023	42513	5267	37963	38214	3591	1536	680	264.5	4372.5
MEAN	145	137	1614	1371	182	1225	1274	116	51.2	21.9	8.53	146
MAX	1390	939	7800	6200	245	7470	7880	267	88	34	26	1580
MIN	25	43	69	210	125	124	229	60	34	10	4.1	5.1
AC-FT	8920	8180	99220	84320	10450	75300	75800	7120	3050	1350	525	8670

CAL YR 1987 TOTAL 248567 MEAN 681 MAX 27000 MIN 25 AC-FT 493000  
WTR YR 1988 TOTAL 193046.0 MEAN 527 MAX 7880 MIN 4.1 AC-FT 382900

e Estimated



## RED RIVER BASIN

07329849 ANTELOPE SPRING AT SULPHUR, OK

LOCATION.--Lat 34°30'16", long 96°56'28", in NW 1/4 NE 1/4 sec.1, T.1 S., R.3E., Murray County, Hydrologic Unit 11130303, 10 ft downstream from spring in the Chickasaw National Park, 1.1 mi up the self-guiding nature trail from the nature center.

PERIOD OF RECORD.--November 1985 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,080 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11 ft<sup>3</sup>/s, Mar. 28, Apr. 1, 2, 1988, gage height, 0.75 ft; minimum discharge 1.3 ft<sup>3</sup>/s, many days in 1987.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 11 ft<sup>3</sup>/s, Mar. 28, Apr. 1, 2, gage height, 0.75 ft; minimum discharge, 2.4 ft<sup>3</sup>/s, Oct. 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.7	4.0	4.3	7.6	7.6	e6.4	11	7.6	5.8	4.0	3.0	3.0
2	2.7	4.0	4.3	7.6	7.6	e6.4	11	6.4	5.2	4.0	3.0	3.3
3	2.7	4.0	4.3	7.6	7.6	e6.4	9.5	5.8	5.2	4.0	3.0	3.6
4	2.7	4.0	4.7	7.6	7.6	e7.0	7.0	5.8	5.2	4.0	3.0	3.3
5	2.7	3.6	4.7	7.6	7.6	e7.0	7.0	5.8	5.2	4.0	3.0	3.0
6	2.7	3.6	4.7	7.6	7.6	e7.0	7.0	5.8	5.2	4.0	3.0	3.0
7	2.7	3.6	4.7	7.0	7.6	e7.0	7.0	5.8	5.2	4.0	3.0	3.0
8	2.4	3.6	4.3	7.0	7.6	e7.0	7.6	5.2	5.2	4.0	3.0	3.0
9	2.7	3.6	4.3	7.0	7.6	e7.0	7.6	5.8	5.2	4.0	3.3	3.0
10	2.7	3.6	4.3	7.0	7.6	e7.0	8.2	5.8	5.8	4.3	3.3	2.7
11	3.0	3.6	4.0	7.0	7.6	e7.6	8.2	6.4	5.8	4.3	3.3	2.7
12	3.0	3.3	4.0	7.6	7.6	e7.6	8.2	6.4	5.8	4.3	3.3	3.0
13	3.0	3.3	4.0	7.6	7.0	e7.6	8.2	6.4	5.8	4.3	3.3	3.3
14	3.0	3.3	4.0	7.6	7.6	e7.6	9.5	6.4	5.8	4.3	3.3	3.0
15	3.0	3.3	3.6	7.0	7.0	e7.6	9.5	5.8	5.8	4.3	3.0	3.3
16	3.3	3.6	3.6	7.0	7.0	e7.6	8.2	5.2	5.8	4.0	3.0	3.3
17	3.0	4.0	3.6	7.0	7.0	e7.6	7.0	5.2	4.7	3.6	3.0	3.3
18	3.0	4.0	4.0	7.6	7.0	e7.6	7.0	5.2	4.7	4.0	3.0	3.3
19	3.0	4.0	4.3	7.6	7.0	e7.6	7.0	5.8	4.7	4.0	3.0	3.6
20	3.3	4.0	4.7	7.6	7.0	e7.6	7.0	5.8	4.7	4.0	3.3	3.6
21	3.3	4.0	5.2	7.6	7.0	e8.2	7.0	5.8	4.7	4.0	3.3	3.6
22	3.6	4.3	4.7	7.6	6.4	e8.2	7.0	5.8	4.3	3.6	3.3	3.6
23	3.6	4.3	5.2	7.0	6.4	e8.2	7.0	5.8	4.3	3.3	3.3	3.3
24	3.6	4.3	5.2	7.6	6.4	e8.2	7.0	5.8	4.3	2.7	3.3	3.3
25	4.0	4.3	5.8	7.6	6.4	e8.2	7.0	5.8	4.7	e2.7	3.0	3.6
26	3.6	4.3	5.8	7.6	e6.4	e8.2	7.6	5.8	4.7	3.0	3.3	3.6
27	3.6	4.0	6.4	7.6	e6.4	e8.2	7.6	5.8	4.7	3.0	3.3	3.3
28	3.6	4.0	7.0	8.2	e6.4	11	7.6	5.8	4.7	3.0	3.3	3.3
29	3.6	4.0	7.6	8.2	e6.4	10	8.2	5.8	4.3	3.0	3.3	3.3
30	4.0	4.0	7.0	8.2	---	9.5	9.5	5.8	4.3	3.0	3.0	3.3
31	4.0	---	7.0	7.6	---	10	---	5.8	---	3.0	3.0	---
TOTAL	97.8	115.5	151.3	232.0	206.0	242.1	238.2	182.2	151.8	115.7	97.5	97.5
MEAN	3.15	3.85	4.88	7.48	7.10	7.81	7.94	5.88	5.06	3.73	3.15	3.25
MAX	4.0	4.3	7.6	8.2	7.6	11	11	7.6	5.8	4.3	3.3	3.6
MIN	2.4	3.3	3.6	7.0	6.4	6.4	7.0	5.2	4.3	2.7	3.0	2.7
AC-FT	194	229	300	460	409	480	472	361	301	229	193	193

CAL YR 1987 TOTAL 1485.5 MEAN 4.07 MAX 7.6 MIN 2.4 AC-FT 2950  
WTR YR 1988 TOTAL 1927.6 MEAN 5.27 MAX 11 MIN 2.4 AC-FT 3820

e Estimated



07329851 VENDOME WELL AT SULPHUR, OK

LOCATION.--Lat 34°30'21", long 96°58'19", in NW 1/4 NE 1/4 sec.3, T.1 S., R.3E., Murray County, Hydrologic Unit 11130303, .2 mi west and 300 ft south of intersection of State Highways 7 and 177, in Sulphur.

PERIOD OF RECORD.--November 1985 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 950 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1.6 ft<sup>3</sup>/s at times each year; minimum discharge 0.80, Aug. 28-30, 1986, Sept. 3-30, 1988.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1.6 ft<sup>3</sup>/s at times; minimum discharge, 0.80 ft<sup>3</sup>/s, Sept. 3-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.4	1.1	1.1	1.1	e1.1	e1.1	1.6	1.4	1.4	1.4	1.4	1.1
2	1.4	1.1	1.1	1.1	e1.1	e1.1	1.6	1.4	1.4	1.4	1.4	1.1
3	1.4	1.1	1.1	1.1	e1.1	e1.1	1.6	1.4	1.4	1.4	1.4	.80
4	1.4	1.1	1.1	1.1	e1.1	e1.4	1.6	1.4	1.4	1.4	1.1	.80
5	1.4	1.1	1.1	1.1	e1.1	e1.4	1.6	1.4	1.4	1.4	1.1	.80
6	1.4	1.1	1.1	1.1	e1.1	e1.4	1.6	1.4	1.4	1.4	1.1	.80
7	1.4	1.1	1.1	1.1	e1.1	e1.4	1.6	1.6	1.4	1.4	1.1	.80
8	1.4	1.1	1.1	1.1	e1.1	e1.4	1.6	1.4	1.4	1.4	1.1	.80
9	1.4	1.1	1.1	1.1	e1.1	e1.4	1.6	1.4	1.4	1.4	1.1	.80
10	1.4	1.1	1.1	1.1	e1.1	e1.4	1.6	1.4	1.4	1.4	1.1	.80
11	1.1	1.1	1.1	1.1	e1.1	e1.4	1.6	1.4	1.4	1.4	1.1	.80
12	1.4	1.1	1.1	1.4	e1.1	e1.4	1.6	1.4	1.4	1.4	1.1	.80
13	1.4	1.1	1.1	1.1	e1.1	e1.4	1.6	1.4	1.4	1.4	1.1	.80
14	1.4	1.1	1.1	1.1	e1.1	e1.4	1.6	1.4	1.4	1.4	1.1	.80
15	1.4	1.1	1.1	1.4	e1.1	e1.4	1.6	1.4	1.4	1.4	1.1	.80
16	1.4	1.1	1.1	1.4	e1.1	e1.4	1.6	1.4	1.4	1.4	1.1	.80
17	1.4	1.1	1.1	1.4	e1.1	e1.4	1.6	1.4	1.4	1.4	1.1	.80
18	1.4	1.1	1.1	1.4	e1.1	e1.4	1.6	1.4	1.4	1.4	1.1	.80
19	1.4	1.1	1.1	1.4	e1.1	e1.6	1.4	1.4	1.4	1.4	1.1	.80
20	1.4	1.1	1.1	1.1	e1.1	e1.6	1.4	1.4	1.4	1.4	1.1	.80
21	1.4	1.1	1.1	1.1	e1.1	e1.6	1.4	1.4	1.4	1.4	1.1	.80
22	1.4	1.1	1.1	1.1	e1.1	e1.6	1.4	1.4	1.4	1.4	1.1	.80
23	1.4	1.1	1.1	1.1	e1.1	e1.6	1.4	1.4	1.4	1.4	1.1	.80
24	1.4	1.1	1.1	1.1	e1.1	e1.6	1.4	1.4	1.4	1.4	1.1	.80
25	1.4	1.1	1.1	1.1	e1.1	e1.6	1.4	1.4	1.4	1.4	1.1	.80
26	1.4	1.1	1.1	1.1	e1.1	e1.6	1.4	1.4	1.4	1.4	1.1	.80
27	1.4	1.1	1.1	1.1	e1.1	e1.6	1.4	1.4	1.4	1.4	1.1	.80
28	1.4	1.1	1.1	e1.1	e1.1	e1.6	1.4	1.4	1.4	1.4	1.1	.80
29	1.4	1.1	1.1	e1.1	e1.1	e1.6	1.4	1.4	1.4	1.4	1.1	.80
30	1.4	1.1	1.4	e1.1	---	e1.6	1.4	1.4	1.4	1.4	1.1	.80
31	1.4	---	1.4	e1.1	---	1.6	---	1.4	---	1.4	1.1	---
TOTAL	43.1	33.0	34.7	35.9	31.9	45.1	45.6	43.6	42.0	43.4	35.0	24.60
MEAN	1.39	1.10	1.12	1.16	1.10	1.45	1.52	1.41	1.40	1.40	1.13	.82
MAX	1.4	1.1	1.4	1.4	1.1	1.6	1.6	1.6	1.4	1.4	1.4	1.1
MIN	1.1	1.1	1.1	1.1	1.1	1.1	1.4	1.4	1.4	1.4	1.1	.80
AC-FT	85	65	69	71	63	89	90	86	83	86	69	49

CAL YR 1987 TOTAL 514.8 MEAN 1.41 MAX 1.6 MIN 1.1 AC-FT 1020  
WTR YR 1988 TOTAL 457.90 MEAN 1.25 MAX 1.6 MIN .80 AC-FT 908

e Estimated

## 07331000 WASHITA RIVER NEAR DICKSON, OK

LOCATION (REVISED).--Lat 34°14'03", long 96°58'32", in SW 1/4 SE 1/4 sec.3, T.4 S., R.3 E., Carter County, Hydrologic Unit 11130303, near left bank on downstream side of bridge on U.S. Highway 177, 1.3 mi downstream from Caddo Creek, 3.2 mi north of Dickson, 12.0 mi northeast of Ardmore, and at mile 63.4.

DRAINAGE AREA.--7,202 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1928 to current year. Monthly discharge only for some periods, published in WSP 1311. Prior to Oct. 1, 1979, published as Washita River near Durwood.

REVISED RECORDS.--WSP 1211: Drainage area. WSP 1281: 1935(M).

GAGE.--Water-stage recorder. Datum of gage is 650.57 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Feb. 16, 1939, nonrecording gage, at same site and datum. Dec. 15, 1950 to Feb. 19, 1952, nonrecording gage, at site 500 ft upstream, at same datum. Apr. 24, 1975 to May 8, 1986, water-stage recorder, at site 500 ft upstream, at same datum.

REMARKS.--Records fair. Some diversions for irrigation upstream from station. Flow regulated by Fort Cobb Reservoir (station 07325900) since March 1959; by Foss Reservoir (station 07324300) since February 1961; and by numerous flood-retarding structures. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--Prior to regulation, 30 years (water years 1929-58), 1,573 ft<sup>3</sup>/s, 1,139,600 acre-ft/yr; since regulation by Fort Cobb and Foss reservoirs, 27 years (water years 1962-88), 1,442 ft<sup>3</sup>/s, 1,045,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 105,000 ft<sup>3</sup>/s, May 30, 1987, gage height, 45.24 ft; no flow Aug. 28, Sept. 14 to Oct. 1, 7-12, 1956.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 34,100 ft<sup>3</sup>/s, Apr. 2, gage height, 26.23 ft; minimum daily discharge, 188 ft<sup>3</sup>/s, Aug. 31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1390	1450	1480	4360	2520	2010	13500	2320	1120	725	322	189
2	1300	1360	1470	3680	2590	10400	30500	2530	1190	623	337	200
3	1180	1500	1380	3400	2570	20400	19100	2670	1310	584	350	322
4	1140	1430	1410	3040	2550	12000	12100	2730	1390	620	333	408
5	1090	1220	1390	2720	2490	10200	9710	2520	1320	583	316	275
6	1020	1170	1880	e2580	2350	9150	8140	2500	1220	606	307	243
7	964	1120	1570	e2290	2240	8690	6700	2630	1080	655	320	218
8	892	1080	1270	e2070	2200	8560	5780	2500	1030	637	299	202
9	846	1040	1230	e2020	2180	7930	4970	2290	1050	614	285	199
10	820	997	1190	e2180	2180	6280	4500	2070	982	568	281	197
11	802	932	1190	e2490	2190	5600	4330	1960	894	623	271	193
12	782	903	1160	2980	2170	4980	4300	1880	831	824	293	194
13	777	878	1130	3990	2160	4570	3860	1730	784	672	318	191
14	768	851	1140	4270	2170	4250	3350	1620	755	532	309	190
15	745	929	1710	3990	2150	4120	3000	1510	741	e510	276	199
16	725	1610	1870	4480	2130	4100	2680	1440	739	e485	242	563
17	723	1470	1640	6030	2280	4880	2510	1400	758	e463	227	511
18	716	1230	1660	6100	2440	5880	2460	1360	771	e445	254	459
19	737	1360	8860	5570	2690	4920	2730	1300	1070	536	239	814
20	739	1520	19000	5560	2670	4220	3410	1260	989	691	240	4030
21	729	1300	10100	5340	2530	4080	3430	1210	751	486	242	1950
22	720	1140	7030	4670	2420	4050	3060	1160	668	436	237	2620
23	708	1080	5290	4370	2330	4020	2850	1150	621	418	228	2540
24	759	1040	4360	4090	2160	4000	2610	1130	593	399	213	3000
25	1050	2010	7660	3810	2120	3970	2390	1150	584	388	202	3950
26	3350	2220	24200	e3140	2050	3340	2230	1120	579	379	201	4120
27	4030	1640	14400	e2850	2010	3070	2040	1120	586	371	197	3070
28	2730	1490	9200	2820	2040	3070	1960	1100	600	360	189	2760
29	2080	1400	7580	2860	2040	7380	1900	1090	732	381	193	2440
30	1920	1330	6260	2740	---	11000	2070	1080	869	403	197	2230
31	1710	---	5560	2600	---	7110	---	1060	---	356	188	---
TOTAL	37942	38700	155270	113090	66620	198230	172170	52590	26607	16373	8106	38477
MEAN	1224	1290	5009	3648	2297	6395	5739	1696	887	528	261	1283
MAX	4030	2220	24200	6100	2690	20400	30500	2730	1390	824	350	4120
MIN	708	851	1130	2020	2010	2010	1900	1060	579	356	188	189
AC-FT	75260	76760	308000	224300	132100	393200	341500	104300	52770	32480	16080	76320

CAL YR 1987 TOTAL 1766262 MEAN 4839 MAX 93400 MIN 708 AC-FT 3503000  
WTR YR 1988 TOTAL 924175 MEAN 2525 MAX 30500 MIN 188 AC-FT 1833000

e Estimated

## RED RIVER BASIN

07331000 WASHITA RIVER NEAR DICKSON, OK--Continued  
(National stream-quality accounting network station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1944 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: May 1944 to January 1982, February 1984 to current year.

WATER TEMPERATURE: April 1947 to January 1982, February 1984 to current year.

REMARKS.--Samples were collected bimonthly and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 2,120 microsiemens, Nov. 15, 1963; minimum daily, 95 microsiemens, Nov. 2, 1951.

WATER TEMPERATURE: Maximum daily, 38.0 °C, July 16, 1985; minimum daily, 0.0 °C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 1,870 microsiemens, Aug. 5; minimum daily, 342 microsiemens, Apr. 2.

WATER TEMPERATURE: Maximum daily, 37.0 °C, July 16, 25; minimum daily, 4.0 °C, Dec. 15, Jan. 5, 12, 14.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL-LECTING SAMPLE (CODE NUMBER)	AGENCY ANALYZING SAMPLE (CODE NUMBER)	SAMPLE LOC-ATION, CROSS SECTION (FT FM L BANK)	GAGE HEIGHT (FEET)	DIS-CHARGE, INST. (CUBIC FEET PER SECOND)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE AIR (DEG C)	TEMPER-ATURE WATER (DEG C)	TUR-BID-ITY (NTU)
OCT											
08...	1300	1028	1028	--	7.81	894	1150	7.40	30.0	21.0	--
29...	1300	1028	80020	--	9.33	2060	849	7.20	29.0	16.5	220
29...	1301	1028	1028	10.0	9.33	2060	849	7.20	--	16.5	--
29...	1302	1028	1028	20.0	9.33	2060	849	7.20	--	16.5	--
29...	1303	1028	1028	30.0	9.33	2060	849	7.20	--	16.5	--
29...	1304	1028	1028	50.0	9.33	2060	849	7.20	--	16.5	--
29...	1305	1028	1028	90.0	9.33	2060	849	7.20	--	16.5	--
29...	1306	1028	1028	130	9.33	2060	841	7.20	--	16.5	--
29...	1307	1028	1028	180	9.33	2060	844	7.20	--	16.5	--
JAN											
21...	1300	1028	80020	--	11.80	5450	1020	--	0.0	5.5	380
MAR											
31...	1515	1028	1028	--	13.04	6220	1990	8.00	11.5	7.5	--
MAY											
24...	1300	1028	80020	--	8.42	1140	1560	7.90	23.0	21.5	2.9
JUL											
19...	1200	1028	80020	--	7.30	525	1520	8.20	32.0	29.0	18
AUG											
25...	0940	1028	80020	--	6.61	216	1480	8.30	29.5	27.0	5.0
SEP											
13...	1000	1028	80020	--	6.51	195	1700	8.50	29.5	26.5	17
		BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML)	STREP-TOCOC CI, FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CAC03)	HARD-NESS NONCARB WH WAT TOT FLD (MG/L AS CAC03)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT
OCT											
08...	--	--	--	--	--	--	--	--	--	--	--
29...	745	8.6	90	81	120	360	190	89	34	33	16
29...	--	8.6	--	--	--	--	--	--	--	--	--
29...	--	8.5	--	--	--	--	--	--	--	--	--
29...	--	8.6	--	--	--	--	--	--	--	--	--
29...	--	8.6	--	--	--	--	--	--	--	--	--
29...	--	8.6	--	--	--	--	--	--	--	--	--
29...	--	8.5	--	--	--	--	--	--	--	--	--
29...	--	8.6	--	--	--	--	--	--	--	--	--
JAN											
21...	733	9.1	75	--	--	410	220	100	39	42	18
MAR											
31...	--	--	--	--	--	--	--	--	--	--	--
MAY											
24...	745	8.4	98	--	--	660	530	130	80	82	21
JUL											
19...	740	7.6	102	260	150	650	490	130	78	87	23
AUG											
25...	740	6.2	81	16	7	640	470	120	82	100	25
SEP											
13...	740	7.9	102	40	24	680	500	130	86	110	26

## RED RIVER BASIN

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07331000 WASHITA RIVER NR DICKSON,OK--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE WATER WH FET FIELD (MG/L AS HCO3)	CAR- BONATE WATER WH FET FIELD (MG/L AS CO3)	ALKA- LINITY WAT WH TOT FET FIELD (MG/L AS CACO3)	CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SI02)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)
OCT											
08...	--	--	--	--	--	--	--	--	--	--	--
29...	0.8	4.5	210	0	172	21	210	38	0.10	9.7	554
29...	--	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--	--
JAN											
21...	0.9	3.9	--	--	--	--	280	42	0.30	18	708
MAR											
31...	--	--	--	--	--	--	--	--	--	--	--
MAY											
24...	1	3.8	150	0	124	3.0	580	88	0.40	0.60	1130
JUL											
19...	2	4.6	190	0	156	1.9	580	97	0.40	9.4	1110
AUG											
25...	2	4.8	210	0	172	1.7	540	110	0.10	8.0	1140
SEP											
13...	2	4.9	210	10	186	1.0	640	120	0.50	5.0	1210
DATE	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS NO2)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4)	NITRO- GEN, ORGANIC TOTAL (MG/L AS N)
OCT											
08...	--	--	--	--	--	--	--	--	--	--	--
29...	525	0.75	3080	0.370	0.020	0.07	0.390	0.050	0.070	0.09	0.75
29...	--	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--	--
JAN											
21...	643	0.96	10400	--	<0.010	--	0.610	0.110	--	--	1.1
MAR											
31...	--	--	--	--	--	--	--	--	--	--	--
MAY											
24...	1040	1.54	3480	0.190	0.010	0.03	0.200	0.050	0.070	0.09	1.2
JUL											
19...	1080	1.51	1570	--	0.020	0.07	<0.100	0.300	0.070	0.09	0.30
AUG											
25...	1070	1.55	665	0.080	0.050	0.16	0.130	0.050	--	0.48	0.85
SEP											
13...	1220	1.65	637	--	<0.010	--	<0.100	<0.010	--	0.04	--

## RED RIVER BASIN

07331000 WASHITA RIVER NR DICKSON, OK--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS- PHOROUS TOTAL (MG/L AS P)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P)	PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS P04)	PHOS- PHOROUS ORGANIC TOTAL (MG/L AS P)	PHOS- PHOROUS ORGANIC DIS- SOLVED (MG/L AS P)	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)
OCT										
08...	--	--	--	--	--	--	--	--	--	--
29...	0.80	0.090	0.010	0.030	0.09	0.09	0.0	480	2	160
29...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
JAN										
21...	1.2	0.320	0.050	0.030	0.09	0.32	0.02	--	--	--
MAR										
31...	--	--	--	--	--	--	--	--	--	--
MAY										
24...	1.2	0.060	0.030	<0.010	--	0.06	0.03	<10	1	190
JUL										
19...	0.60	0.130	<0.010	<0.010	--	0.13	--	--	--	--
AUG										
25...	0.90	0.140	0.070	0.050	0.15	0.14	0.02	<10	2	190
SEP										
13...	0.40	0.180	0.040	0.030	0.09	0.18	0.01	<10	2	180
DATE	BERYL- LIUM, DIS- SOLVED (UG/L AS BE)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY DIS- SOLVED (UG/L AS HG)
OCT										
08...	--	--	--	--	--	--	--	--	--	--
29...	<0.5	<1	3	<3	8	300	8	13	39	<0.1
29...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
JAN										
21...	--	--	--	--	--	--	--	--	--	--
MAR										
31...	--	--	--	--	--	--	--	--	--	--
MAY										
24...	<0.5	<1	3	<3	7	7	<5	32	5	<0.1
JUL										
19...	--	--	--	--	--	--	--	--	--	--
AUG										
25...	<0.5	2	<1	<3	2	7	<5	31	2	0.1
SEP										
13...	<0.5	<1	4	<3	<1	9	<5	34	10	0.1



## RED RIVER BASIN

07331000 WASHITA RIVER NR DICKSON, OK--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V)	ZINC, DIS- SOLVED (UG/L AS ZN)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
OCT										
08...	--	--	--	--	--	--	--	--	--	--
29...	<10	3	<1	1.0	930	6	26	1170	6510	98
29...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
29...	--	--	--	--	--	--	--	--	--	--
JAN										
21...	--	--	--	--	--	--	--	1590	23400	93
MAR										
31...	--	--	--	--	--	--	--	--	--	--
MAY										
24...	<10	3	<1	<1.0	2000	<6	13	--	--	--
JUL										
19...	--	--	--	--	--	--	--	112	159	87
AUG										
25...	<10	1	<1	1.0	1900	<6	4	75	44	80
SEP										
13...	10	2	<1	<1.0	2000	<6	11	58	31	89

## RED RIVER BASIN

07331000 WASHITA RIVER NR DICKSON, OK--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1040	1400	1120	774	1180	1380	616	1350	1540	1300	1750	1590
2	1090	1300	1190	810	1290	1360	342	1410	1530	1270	1740	1540
3	1140	1010	1280	926	---	445	569	1330	1500	1390	1780	1460
4	1180	1290	1130	865	---	648	615	1460	1460	1480	1840	1210
5	---	1430	1170	970	---	777	744	1080	1460	1500	1870	1350
6	1290	1410	1130	---	1350	840	760	1170	1430	1530	1800	1500
7	---	---	1020	---	1580	690	838	1250	1470	1560	1820	1590
8	1310	1480	1210	---	1410	608	794	1150	1510	1660	1700	1610
9	1570	1420	1460	---	1520	737	901	1160	1530	1680	1690	1640
10	1550	1460	1360	---	1490	787	934	1100	---	1690	1730	1630
11	1500	1510	1380	---	---	865	984	1170	1610	1370	1710	1620
12	1460	1520	1350	1050	1430	933	1020	1220	1630	1080	1720	1680
13	1560	1560	1400	937	1540	980	1020	1170	1600	1120	1700	1660
14	1540	1590	1350	885	1380	980	1040	1270	1510	1260	1520	1700
15	1600	1400	1170	931	1390	1000	1070	1290	1540	1340	1590	1620
16	1640	1340	1040	964	1530	1070	1060	1430	1590	1410	1610	1210
17	1600	948	1060	840	1390	835	1040	1470	1570	---	1610	1010
18	1600	1270	1030	706	1430	826	1080	1480	1550	---	1660	1200
19	1570	1310	510	914	1400	856	1080	1500	1610	1560	1580	1150
20	1540	1620	375	966	1430	897	1230	1470	1620	1340	1650	658
21	1570	1560	471	980	1350	1030	1200	1490	1240	1340	1650	545
22	1600	1600	583	904	1340	1060	986	1510	1230	1500	1680	1270
23	1610	1230	700	906	1420	1170	1370	1520	1390	1580	1750	673
24	1580	1130	760	1060	1460	1220	1260	1530	1510	1620	1700	662
25	1560	1190	---	1140	1480	1240	1220	1520	1570	1570	1680	522
26	922	887	373	---	1590	1310	1310	1530	1570	1550	1740	552
27	671	933	407	---	1460	1440	1340	1540	1560	1560	1760	704
28	714	1220	487	1180	1600	1470	1440	1550	1540	1560	1750	655
29	898	1310	547	1260	1580	586	1450	1530	1520	1560	1800	649
30	1180	1400	589	---	---	512	1440	1530	1480	1590	1800	643
31	1280	---	636	1320	---	703	---	1560	---	1560	1810	---

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24.0	21.0	14.0	5.0	12.0	15.0	16.0	23.0	27.0	35.0	34.0	29.0
2	23.0	20.0	10.0	6.0	8.0	16.0	15.0	20.0	30.0	31.0	34.0	27.0
3	20.0	19.0	11.0	5.0	---	15.0	17.0	22.0	28.0	35.0	32.0	27.0
4	16.0	20.0	14.0	7.0	---	15.0	19.0	23.0	27.0	33.0	33.0	27.0
5	---	19.0	17.0	4.0	---	12.0	21.0	24.0	28.0	34.0	30.0	23.0
6	21.0	18.0	15.0	---	5.0	14.0	22.0	24.0	30.0	30.0	30.0	28.0
7	---	---	15.0	---	5.0	13.0	21.0	22.0	31.0	28.0	34.0	27.0
8	22.0	20.0	14.0	---	7.0	14.0	20.0	24.0	30.0	30.0	30.0	30.0
9	23.0	14.0	15.0	---	6.0	13.0	20.0	24.0	30.0	33.0	35.0	30.0
10	22.0	13.0	15.0	---	7.0	17.0	16.0	23.0	---	33.0	34.0	30.0
11	20.0	13.0	15.0	---	---	16.0	17.0	27.0	29.0	28.0	28.0	30.0
12	18.0	14.0	12.0	4.0	5.0	15.0	17.0	27.0	29.0	32.0	32.0	30.0
13	18.0	18.0	10.0	5.0	6.0	13.0	20.0	28.0	29.0	33.0	35.0	31.0
14	19.0	13.0	10.0	4.0	7.0	13.0	21.0	28.0	29.0	35.0	34.0	30.0
15	18.0	15.0	4.0	5.0	8.0	13.0	21.0	28.0	31.0	34.0	35.0	32.0
16	18.0	15.0	9.0	6.0	---	12.0	21.0	30.0	32.0	37.0	36.0	31.0
17	18.0	15.0	9.0	8.0	---	9.0	19.0	30.0	29.0	---	28.0	21.0
18	18.0	12.0	7.0	9.0	---	11.0	18.0	30.0	31.0	---	34.0	26.0
19	19.0	13.0	10.0	9.0	9.0	12.0	17.0	30.0	32.5	34.0	33.0	28.0
20	15.0	13.0	10.0	7.0	11.0	15.0	20.0	28.0	32.0	30.0	31.0	26.0
21	14.0	14.0	9.0	7.0	12.0	16.0	24.5	28.0	32.0	32.0	35.0	28.0
22	15.0	15.0	10.0	9.0	14.0	19.0	22.0	28.0	32.0	33.0	33.0	29.0
23	16.0	16.0	12.0	6.0	14.0	17.0	23.0	23.0	29.0	33.0	30.0	28.0
24	20.0	17.0	12.0	8.0	16.0	21.0	22.0	28.0	---	33.0	33.0	24.0
25	20.0	13.0	---	5.0	16.0	21.0	21.0	26.0	29.0	37.0	33.0	26.0
26	17.0	13.0	6.0	---	16.0	22.0	21.0	26.0	32.0	33.0	33.0	27.0
27	18.0	12.0	5.0	---	18.0	21.0	21.0	27.0	33.0	28.0	---	25.0
28	15.0	11.0	5.0	7.0	16.0	21.0	23.0	27.0	33.0	35.0	27.0	26.0
29	20.0	9.0	6.0	11.0	17.0	17.0	22.0	26.0	33.0	33.0	27.0	24.0
30	22.0	11.0	7.0	---	---	17.0	23.0	27.0	33.0	28.0	29.0	23.0
31	20.0	---	---	15.0	---	16.0	---	28.0	---	35.0	27.0	---

## RED RIVER BASIN

07331500 LAKE TEXOMA NEAR DENISON, TX

LOCATION.--Lat 33°49'05", long 96°34'20", in NE 1/4 sec.33, T.8 S., R.7 E., Bryan County, OK, Hydrologic Unit 11130210, in control tower of Denison Dam on Red River, 1.2 mi upstream from Shawnee Creek, 1.8 mi upstream from Sand Creek, 4.0 mi northwest of Denison, 6.0 mi southwest of Colbert, and at mile 725.9.

DRAINAGE AREA.--39,719 mi<sup>2</sup> of which 5,936 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD.--July 1942 to current year. Month-end contents only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1211: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929. Prior to Mar. 30, 1944, nonrecording gage at same site and datum. Prior to Oct. 1, 1948, supplementary nonrecording gage in Cumberland pool at the same datum.

REMARKS.--Reservoir is formed by a rolled earthfill dam. The controlled outlet consists of eight 20-foot diameter conduits and the uncontrolled outlet is a concrete, ogee-type weir spillway. Flow was diverted through conduits July 27, 1942; regulated storage began Oct. 31, 1943; power pool was first filled March 15, 1945. Capacity, based on 1969 survey, 5,312,000 acre-ft at elevation 640.0 ft, crest of spillway, 2,643,000 acre-ft at elevation 617.0 ft maximum power pool; 1,031,000 acre-ft at elevation 590.0 ft, minimum power pool, in Denison pool. Dead storage, 11,000 acre-ft at elevation 610.0 ft in Cumberland pool. When contents are below 2,105,000 acre-ft, the reservoir is divided into two pools by protective levees around the Cumberland oil field on the Washita River arm with bottom outlet channel for the upper pool (known as Cumberland pool) at elevation 610 ft. At higher elevations the two pools are considered as being at a common level, contents being computed from gage in Denison pool. Figures given herein represent total contents of both pools. Reservoir is used principally for flood control and power development. Revised capacity table, based on survey in 1969, used since Oct. 1, 1977. U.S. Army Corps of Engineers' satellite telemeter at station.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 5,991,300 acre-ft, June 5, 1957, elevation, 643.18 ft.

Minimum contents since power pool was first filled, 1,565,100 acre-ft, Sept. 16, 1964; minimum elevation, 599.96 ft, Mar. 1, 2, 1957.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 2,999,000 acre-ft, Dec. 31, Jan. 1, elevation, 620.81 ft. Minimum, 2,251,000 acre-ft, Sept. 15-17, elevation, 612.03 ft.

Capacity table (elevation, in feet, and contents, in acre-ft)

612	2,248,000	618	2,733,000
614	2,399,000	620	2,920,000
616	2,557,000	622	3,117,000

RESERVOIR STORAGE, (AC-FT), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2520000	2434000	2433000	2986000	2673000	2500000	2680000	2589000	2492000	2452000	2383000	2262000
2	2510000	2430000	2428000	2969000	2662000	2507000	2696000	2577000	2492000	2450000	2377000	2262000
3	2510000	2428000	2426000	2949000	2658000	2515000	2712000	2570000	2495000	2447000	2380000	2263000
4	2514000	2425000	2425000	2926000	2642000	2527000	2737000	2557000	2496000	2448000	2375000	2262000
5	2514000	2422000	2428000	2901000	2629000	2584000	2769000	2546000	2494000	2450000	2371000	2261000
6	2509000	2421000	2460000	2888000	2612000	2650000	2777000	2539000	2493000	2448000	2368000	2259000
7	2505000	2423000	2467000	2865000	2596000	2699000	2773000	2537000	2493000	2446000	2364000	2258000
8	2498000	2431000	2474000	2839000	2582000	2719000	2760000	2538000	2492000	2446000	2358000	2258000
9	2493000	2439000	2467000	2818000	2571000	2717000	2751000	2536000	2491000	2446000	2352000	2257000
10	2490000	2431000	2459000	2794000	2558000	2703000	2732000	2535000	2488000	2445000	2348000	2256000
11	2484000	2424000	2450000	2771000	2546000	2697000	2716000	2534000	2487000	2446000	2343000	2256000
12	2478000	2414000	2452000	2777000	2532000	2695000	2707000	2530000	2485000	2449000	2338000	2255000
13	2471000	2411000	2440000	2773000	2523000	2686000	2701000	2526000	2483000	2451000	2336000	2253000
14	2467000	2413000	2443000	2768000	2525000	2676000	2692000	2522000	2481000	2451000	2330000	2252000
15	2460000	2438000	2429000	2763000	2515000	2668000	2686000	2515000	2480000	2449000	2326000	2251000
16	2457000	2436000	2418000	2760000	2509000	2659000	2683000	2517000	2478000	2447000	2322000	2251000
17	2453000	2428000	2413000	2761000	2510000	2668000	2691000	2514000	2477000	2445000	2318000	2256000
18	2451000	2424000	2410000	2766000	2524000	2678000	2689000	2512000	2475000	2444000	2316000	2262000
19	2452000	2415000	2467000	2771000	2524000	2678000	2685000	2507000	2474000	2441000	2311000	2264000
20	2440000	2410000	2512000	2777000	2523000	2675000	2683000	2505000	2472000	2440000	2308000	2264000
21	2435000	2403000	2555000	2780000	2523000	2667000	2681000	2503000	2472000	2437000	2301000	2307000
22	2433000	2410000	2587000	2784000	2520000	2656000	2679000	2502000	2472000	2433000	2298000	2356000
23	2433000	2402000	2611000	2770000	2522000	2648000	2678000	2499000	2470000	2429000	2294000	2401000
24	2432000	2411000	2636000	2758000	2517000	2643000	2667000	2495000	2466000	2425000	2291000	2430000
25	2429000	2412000	2695000	2742000	2510000	2645000	2662000	2493000	2463000	2420000	2287000	2453000
26	2439000	2420000	2763000	2735000	2503000	2645000	2654000	2490000	2460000	2416000	2282000	2474000
27	2439000	2429000	2835000	2725000	2505000	2641000	2639000	2488000	2457000	2410000	2277000	2488000
28	2437000	2432000	2913000	2715000	2502000	2635000	2625000	2485000	2456000	2406000	2274000	2499000
29	2434000	2435000	2952000	2703000	2502000	2641000	2612000	2482000	2460000	2402000	2269000	2519000
30	2432000	2439000	2986000	2695000	---	2651000	2604000	2481000	2456000	2396000	2267000	2526000
31	2433000	---	2999000	2690000	---	2660000	---	2476000	---	2391000	2265000	---
MAX	2520000	2439000	2999000	2986000	2673000	2719000	2777000	2589000	2496000	2452000	2383000	2526000
MIN	2429000	2402000	2410000	2690000	2502000	2500000	2604000	2476000	2456000	2391000	2265000	2251000
(+)	614.44	614.52	620.81	617.52	615.31	617.19	616.55	615.00	614.70	613.87	612.22	615.61
(++)	-96,000	+6,000	+560,000	-309,000	-188,000	+158,000	-56,000	-128,000	-20,000	-65,000	-126,000	+261,000
CAL YR 1987	MAX 4635000	MIN 2402000	(++)	+353,000								
WTR YR 1988	MAX 2999000	MIN 2251000	(++)	-3,000								

(+) ELEVATION, IN FEET, AT END OF MONTH

(++) CHANGE IN CONTENTS, IN ACRE-FEET

## 07331600 RED RIVER AT DENISON DAM NEAR DENISON, TX

LOCATION.--Lat 33°49'08", long 96°33'47", Grayson County, Hydrologic Unit 11140101, on right bank 1,800 ft downstream from Denison Dam powerhouse, 0.4 mi upstream from Shawnee Creek (spillway flow return), 4.5 mi north of Denison, and at mile 725.5.

DRAINAGE AREA.--39,720 mi<sup>2</sup>, of which 5,936 mi<sup>2</sup> is probably noncontributing. At site used prior to October 1961, drainage area was 39,777 mi<sup>2</sup>, of which 5,936 mi<sup>2</sup> probably was noncontributing.

## WATER DISCHARGE RECORDS

PERIOD OF RECORD.--October 1923 to current year. Monthly discharge only for some periods, published in WSP 1311.

Prior to October 1934, published as "near Denison, TX", and October 1934 to September 1961, published as "near Colbert, OK". Gage-height records collected at various sites in this vicinity 1892-93, 1906-28, 1931-49 are contained in reports of the National Weather Service.

REVISED RECORDS.--WSP 807: 1935 (M). WSP 1211: Drainage area. WSP 1241: 1924-29, 1932-33, 1934 (M), 1935.

GAGE.--Water-stage recorder. Datum of gage is 500.00 ft above National Geodetic Vertical Datum of 1929. Oct. 9, 1923 to Sept. 24, 1934, nonrecording gage, and July 29, 1942 to Sept. 30, 1961, water-stage recorder, at county road bridge 2.5 mi downstream. Prior to Oct. 1, 1931, at datum 6.85 ft higher; Oct. 1, 1931 to Sept 24, 1934, at datum 7.07 ft higher; and July 29, 1942 to Sept. 30, 1961, at datum 2.64 ft lower; Sept. 25, 1934 to July 28, 1942, water-stage recorder at railway bridge 1.9 mi downstream at datum 7.36 ft higher.

REMARKS.--Records good. Flow regulated since October 1943 by Lake Texoma (station 07331500).

COOPERATION.--Gage-height record and 4 discharge measurements provided by U.S. Army Corps of Engineers; records computed by U.S. Geological Survey.

AVERAGE DISCHARGE.--Prior to regulation by Lake Texoma, 20 years (water years 1924-43), 5,684 ft<sup>3</sup>/s, 4,118,000 acre-ft/yr; since regulation by Lake Texoma, 44 years (water years 1945-88), 4,734 ft<sup>3</sup>/s, 3,430,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 201,000 ft<sup>3</sup>/s May 21, 1935, gage height, 31.8 ft (at site and datum then in use); maximum gage height, 32.0 ft, Apr. 25, 1942 (at site and datum used in 1943); minimum daily discharge, 12 ft<sup>3</sup>/s Jan. 10, 1944.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 26, 1908, reached a stage of 45.5 ft (at site and datum used July 29, 1942 to Sept. 30, 1961); from record of National Weather Service.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 20,800 ft<sup>3</sup>/s, Mar. 10, gage height, 11.11 ft; minimum daily, 111 ft<sup>3</sup>/s, Nov. 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5840	3890	3860	17100	10700	3530	10900	9250	1920	2030	2130	912
2	5860	3890	3870	17200	10700	6760	10800	9250	1860	2010	1970	936
3	243	3930	1670	17300	10700	10100	10700	9170	1890	2020	1950	918
4	113	3910	2750	17200	10800	11000	12600	9220	2590	2000	1970	901
5	5700	3120	124	17300	10700	10900	15600	9150	2640	2040	1950	892
6	3180	3120	289	17300	10800	10900	18300	6800	2090	2050	2060	895
7	3110	1950	2840	17200	10800	10800	20400	6060	1960	2050	2060	722
8	3130	818	3290	15000	10800	16900	19400	5570	1840	2060	2220	710
9	3970	3020	5900	13600	9470	20600	17800	6080	1820	2020	2230	715
10	3110	3850	5890	13700	9410	20600	17700	4130	1920	2020	2070	710
11	3110	3850	5860	11500	9390	17800	15400	4120	1530	2070	2050	707
12	3110	5460	304	10600	9480	14600	12300	4220	1470	157	2010	710
13	3480	2820	6210	10600	6710	14600	11600	4210	1420	2010	2040	708
14	3120	117	6890	10600	6240	13100	11600	4220	1480	2030	2050	703
15	4010	283	6650	10500	6270	11500	9310	4210	1590	1670	2050	732
16	3090	5930	7040	10600	5620	11500	7800	2840	1520	2040	2060	728
17	2310	5880	4300	10500	3210	11700	7790	3050	1510	2060	2050	549
18	2300	5960	4000	10500	3240	11500	7720	3050	1520	2050	2040	564
19	3400	5730	4590	10500	5560	11500	7740	3060	1490	2080	2040	236
20	5180	4890	4090	10500	5450	11500	7750	3060	1890	2070	2060	205
21	2310	2830	3950	10500	4620	11600	8860	2460	1570	2060	2050	203
22	159	121	5770	15300	5490	11600	10600	2420	2100	2090	2050	196
23	2270	5730	6460	16600	1950	11600	10500	2270	2090	2070	1650	204
24	3890	3900	6750	16500	6500	8240	10600	2490	2110	2060	1650	209
25	2420	4360	7430	13400	6400	5600	10500	2280	2670	2060	1660	200
26	4040	235	5590	10700	6270	5570	10500	2290	2660	2400	1660	200
27	5080	124	2280	10600	2680	5590	10600	2290	2690	2120	1290	204
28	5060	111	1970	10600	3410	5640	10600	1930	3350	2110	1280	221
29	5080	113	5790	10600	3590	5610	9270	1890	2680	2100	920	224
30	5070	1470	10300	e10600	---	5580	9230	1900	2630	2130	918	204
31	3890	---	13300	e10700	---	7290	---	1880	---	2120	909	---
TOTAL	106635	91412	150007	405400	206960	335310	354470	134820	60500	61857	57097	16218
MEAN	3440	3047	4839	13080	7137	10820	11820	4349	2017	1995	1842	541
MAX	5860	5960	13300	17300	10800	20600	20400	9250	3350	2400	2230	936
MIN	113	111	124	10500	1950	3530	7720	1880	1420	157	909	196
AC-FT	211500	181300	297500	804100	410500	665100	703100	267400	120000	122700	113300	32170

CAL YR 1987 TOTAL 4470628 MEAN 12250 MAX 51200 MIN 65 AC-FT 8867000  
WTR YR 1988 TOTAL 1980686 MEAN 5412 MAX 20600 MIN 111 AC-FT 3929000

e Estimated

## RED RIVER BASIN

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07331600 RED RIVER AT DENISON DAM NEAR DENISON, TX--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical analyses: May 1944 to current year. Chemical and biochemical analyses: October 1974 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: May 1944 to current year.

WATER TEMPERATURES: October 1945 to current year.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 3,520 microsiemens, Aug. 14, 1944; minimum daily, 656 microsiemens, Oct. 16, 1945.

WATER TEMPERATURES (1945-69): Maximum daily, 31.0 °C, July 17, 1969; minimum daily, 3.0 °C, Feb. 2-4, 7, 1966.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 1,620 microsiemens, Sept. 30; minimum daily, 1,340 microsiemens, Apr. 14-18.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE WATER (DEG C)	HARD- NESS TOTAL (MG/L AS CACO3)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)
OCT 24...	1530	3890	1430	--	--	360	90	32	160
JAN 31...	0900	10700	1400	--	--	370	94	33	160
MAR 20...	1300	11500	1450	7.70	--	340	87	30	170
APR 26...	0945	10500	1360	--	16.5	350	89	32	140
JUN 14...	0930	1480	1500	--	20.5	390	100	33	160
AUG 03...	1430	1950	1520	--	28.0	390	92	38	170

DATE	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	ALKA- LITY WAT WH TOT FET FIELD (MG/L AS CACO3)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SI02)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L)
OCT 24...	4	5.8	120	230	260	0.40	7.5	858
JAN 31...	4	5.4	128	240	230	0.30	8.0	847
MAR 20...	4	4.2	136	230	250	0.30	7.0	860
APR 26...	3	4.2	149	220	210	0.40	7.3	792
JUN 14...	4	4.3	169	210	250	<0.10	9.1	868
AUG 03...	4	4.4	138	260	250	0.30	7.2	905



## 07331600 RED RIVER AT DENISON DAM NEAR DENISON, TX--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
EQUIVALENT MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1420	1470	1530	1550	1430	1430	1470	1380	1390	1430	1490	1510
2	1420	1470	1530	1530	1420	1390	1460	1400	1400	1430	1480	1520
3	1480	1470	1540	1530	1400	1390	1460	1380	1400	1440	1470	1510
4	1450	1470	1540	1510	1400	1400	1460	1370	1400	1450	1490	1510
5	1430	1480	1540	1510	1400	1400	1460	1370	1400	1460	1490	1500
6	1450	1480	1540	1510	1400	1400	1450	1370	1400	1460	1520	1490
7	1440	1480	1540	1510	1400	1400	1440	1370	1400	1450	1480	1480
8	1440	1490	1520	1540	1390	1450	1430	1370	1400	1450	1440	1500
9	1440	1490	1520	1520	1390	1470	1420	1370	1400	1450	1470	1450
10	1440	1500	1520	1510	1390	1480	1400	1360	1400	1450	1480	1470
11	1440	1500	1520	1500	1390	1480	1380	1380	1400	1450	1480	1490
12	1440	1500	1520	1500	1390	1480	1360	1360	1400	1460	1490	1520
13	1440	1500	1520	1490	1400	1480	1350	1370	1400	1450	1490	1470
14	1460	1500	1530	1490	1410	1480	1340	1380	1400	1490	1490	1490
15	1450	1510	1530	1480	1410	1470	1340	1370	1410	1450	1490	1540
16	1450	1510	1540	1480	1420	1470	1340	1370	1410	1460	1500	1540
17	1450	1510	1540	1470	1400	1460	1340	1380	1400	1470	1490	1540
18	1450	1510	1540	1470	1420	1450	1340	1370	1410	1480	1500	1540
19	1450	1500	1550	1470	1400	1450	1350	1380	1420	1460	1500	1540
20	1460	1510	1550	1480	1400	1450	1360	1380	1420	1460	1500	1550
21	1450	1510	1560	1480	1410	1450	1370	1380	1410	1470	1510	1560
22	1450	1520	1560	1470	1410	1450	1390	1380	1420	1460	1510	1560
23	1460	1520	1560	1450	1390	1450	1380	1380	1420	1460	1510	1550
24	1460	1530	1560	1440	1400	1450	1370	1380	1420	1470	1510	1550
25	1450	1550	1560	1430	1390	1460	1360	1390	1420	1470	1510	1560
26	1450	1530	1560	1440	1410	1460	1370	1380	1430	1470	1510	1560
27	1460	1520	1560	1440	1410	1470	1370	1390	1430	1480	1510	1540
28	1460	1520	1560	1430	1420	1470	1360	1390	1430	1480	1510	1560
29	1460	1530	1570	1430	1420	1480	1360	1390	1430	1490	1510	1580
30	1460	1530	1580	1430	---	1480	1370	1390	1430	1490	1520	1620
31	1460	---	1570	1430	---	1470	---	1400	---	1490	1510	---
MEAN	1450	1500	1540	1480	1400	1450	1390	1380	1410	1460	1500	1530

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25.0	---	---	---	9.0	14.0	13.0	---	18.0	19.5	21.5	20.5
2	25.0	---	---	---	8.0	7.0	---	17.0	18.0	---	21.5	21.0
3	20.0	---	---	---	9.0	8.0	---	---	19.5	---	21.5	---
4	---	---	---	10.0	8.0	9.0	---	18.5	---	---	21.5	---
5	24.0	20.0	---	10.0	8.0	---	13.5	17.5	---	22.0	21.5	---
6	24.0	20.0	---	10.0	---	---	---	19.5	20.0	22.0	20.0	---
7	23.0	---	12.0	10.0	---	8.0	---	---	19.5	21.0	---	20.5
8	23.0	---	14.5	10.0	---	---	---	---	20.0	20.0	21.0	20.5
9	---	---	14.5	---	9.0	---	---	18.0	20.5	---	20.0	21.0
10	---	19.0	14.5	---	7.0	14.0	---	18.6	20.0	---	21.0	---
11	---	---	12.5	8.5	6.5	---	---	17.1	---	---	21.0	---
12	---	---	---	---	6.5	---	---	18.4	---	19.5	20.5	22.0
13	22.0	---	---	---	---	---	15.4	17.0	18.0	19.5	---	21.0
14	21.5	---	13.0	---	---	10.0	14.0	19.0	18.5	21.5	---	21.0
15	21.5	---	13.0	8.0	---	10.0	---	---	18.5	19.0	20.0	21.0
16	---	---	---	---	---	---	---	17.5	18.5	---	20.0	20.0
17	---	---	---	---	---	10.5	---	18.5	18.5	---	20.5	---
18	---	---	---	---	---	10.0	16.0	19.0	---	22.5	20.5	---
19	21.0	16.0	---	7.0	7.0	---	---	---	---	22.5	20.0	21.0
20	21.0	15.0	---	7.0	---	---	---	18.0	20.0	21.0	---	21.0
21	20.0	---	12.0	7.0	---	9.5	---	---	20.0	---	---	21.0
22	21.0	---	12.0	7.0	8.0	---	16.0	---	20.0	19.5	21.0	21.0
23	20.0	15.5	12.0	---	8.0	---	---	18.0	20.0	---	21.0	21.0
24	---	15.5	12.5	---	8.0	11.0	---	18.0	---	---	21.0	---
25	---	15.0	---	7.5	8.5	---	17.0	20.0	---	20.0	21.0	---
26	---	---	---	7.5	---	---	17.0	18.0	---	---	---	22.0
27	---	---	---	7.0	---	---	16.0	19.0	19.0	21.0	---	22.0
28	20.0	---	11.0	7.0	---	---	17.0	---	20.0	21.0	---	---
29	---	---	11.0	---	---	11.5	17.0	---	---	21.0	---	22.0
30	---	---	11.0	---	---	---	---	---	19.5	---	20.5	---
31	---	---	---	---	---	12.5	---	19.5	---	---	---	---
MEAN	22.0	17.0	12.5	8.2	7.9	10.4	15.6	18.3	19.3	20.7	20.8	21.1

## 07332500 BLUE RIVER NEAR BLUE, OK

LOCATION.--Lat 33°59'49", long 96°14'27", on line between sec.27 and 34, T.6 S., R.10 E., Bryan County, Hydrologic Unit 11140102, near left bank on downstream side of pier of bridge on U.S. Highway 70, 1.0 mi west of Blue, 7.0 mi east of Durant, 7.7 mi upstream from Caddo Creek, and at mile 38.8.

DRAINAGE AREA.--476 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1936 to current year. Monthly discharge only for some periods, published in WSP 1311, 1731.

REVISED RECORDS.--WSP 957: 1938. WSP 1241: 1936, drainage area.

GAGE.--Water-stage recorder. Datum of gage is 503.36 ft above National Geodetic Vertical Datum of 1929.

Prior to Mar. 13, 1945, nonrecording gage and Mar. 13, 1945 to Feb. 2, 1960, water-stage recorder at site 1.2 mi downstream at datum 5.00 ft lower.

REMARKS.--Records poor. Some regulation at low flow by a State fish hatchery, 16.0 mi upstream from station. Small diversion for municipal water supply for city of Durant upstream from station. U.S. Army Corps of Engineers' satellite telemeter at station.

COOPERATION.--Gage-height record and 6 discharge measurements provided by U.S. Army Corps of Engineers; records computed by U.S. Geological Survey.

AVERAGE DISCHARGE.--52 years, 298 ft<sup>3</sup>/s, 8.50 in/yr, 215,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 65,200 ft<sup>3</sup>/s, Oct. 14, 1981, gage height, 44.20 ft, from high-water mark; no flow Aug. 3, 4, 1936, result of regulation at fish hatchery, and no flow Sept. 19 to Oct. 16, 1956.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Dec. 20	0430	5,630	21.76	Dec. 26	1200	*6,560	*23.12

Minimum daily discharge, 16 ft<sup>3</sup>/s, Sept. 12, 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	48	55	123	e370	221	172	262	131	98	36	22	20
2	44	53	110	e340	229	834	614	128	111	31	21	19
3	43	52	103	e350	390	2380	411	125	145	28	e20	20
4	42	52	100	e370	418	1850	273	126	189	30	21	25
5	42	51	96	e400	313	e2200	231	124	110	49	54	26
6	41	47	1220	e900	261	e1300	213	120	83	45	64	22
7	39	49	2350	e1600	232	e750	200	118	73	35	23	20
8	41	49	481	e900	229	e1000	190	118	69	34	21	20
9	38	56	244	e500	232	e1500	185	116	66	44	21	20
10	38	110	185	e450	223	e600	181	110	64	52	e19	19
11	40	79	157	e400	213	e350	179	106	61	42	e19	e17
12	40	64	141	e330	206	e250	170	96	59	58	21	e16
13	40	57	131	e300	209	e225	163	97	58	108	27	e16
14	40	56	578	e270	216	e250	158	97	59	77	22	e17
15	34	336	674	e230	208	e300	155	93	58	50	21	e18
16	37	1610	334	e210	194	e300	151	91	56	43	21	19
17	41	443	220	e200	185	e280	181	91	55	40	e19	20
18	47	198	184	e200	333	e1000	399	91	54	37	21	22
19	44	163	2940	e210	1690	e350	225	86	53	33	26	27
20	57	176	5140	e300	629	e300	189	85	48	28	30	38
21	57	136	3410	e360	345	e280	172	e84	47	44	26	28
22	46	113	673	308	267	e250	164	83	46	54	23	23
23	44	100	425	283	232	260	155	82	43	39	21	22
24	42	107	655	271	209	257	147	74	38	33	21	22
25	51	1940	2920	259	194	268	141	68	44	35	21	23
26	63	651	6000	242	188	239	131	67	45	34	e18	22
27	563	334	e3000	233	186	221	128	72	43	30	21	22
28	308	257	e700	228	184	212	124	73	48	24	e19	21
29	133	180	e500	225	178	221	129	69	54	24	e17	22
30	73	144	e450	222	---	224	130	71	42	24	e18	26
31	59	---	e410	222	---	223	---	73	---	22	20	---
TOTAL	2275	7718	34654	11683	8814	18846	6151	2965	2019	1263	738	652
MEAN	73.4	257	1118	377	304	608	205	95.6	67.3	40.7	23.8	21.7
MAX	563	1940	6000	1600	1690	2380	614	131	189	108	64	38
MIN	34	47	96	200	178	172	124	67	38	22	17	16
AC-FT	4510	15310	68740	23170	17480	37380	12200	5880	4000	2510	1460	1290
CFSM	.15	.54	2.35	.79	.64	1.28	.43	.20	.14	.09	.05	.05
IN.	.18	.60	2.71	.91	.69	1.47	.48	.23	.16	.10	.06	.05

CAL YR 1987 TOTAL 120231 MEAN 329 MAX 6000 MIN 33 AC-FT 238500 CFSM .69 IN. 9.40  
WTR YR 1988 TOTAL 97778 MEAN 267 MAX 6000 MIN 16 AC-FT 193900 CFSM .56 IN. 7.64

e Estimated

## 07334000 MUDDY BOGGY CREEK NEAR FARRIS, OK

LOCATION.--Lat 34°16'17", long 95°54'43", in NE 1/4 NW 1/4 sec.26, T.3 S., R.13 E., Atoka County, Hydrologic Unit 11140103, on downstream left bank of bridge on State Highway 3, 1.3 mi downstream from McGee Creek, 2.8 mi northwest of Farris, and at mile 57.7.

DRAINAGE AREA.--1,087 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1937 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1211: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 444.58 ft above National Geodetic Vertical Datum of 1929.

Prior to Mar. 13, 1945, nonrecording gage, and Mar. 13, 1945 to Sept. 30, 1961, water-stage recorder at same site at datum 2.00 ft higher.

REMARKS.--Records fair. Some regulation since June 1959 by Atoka Reservoir, capacity, 125,000 acre-ft, on North Boggy Creek, drainage area, 176 mi<sup>2</sup>; pipeline diversions to Oklahoma City since November 1963, normal capacity, 60 Mgal/d and McGee Creek Reservoir.

COOPERATION.--Gage-height records and 4 discharge measurements provided by U.S. Army Corps of Engineers; records computed by U.S. Geological Survey.

AVERAGE DISCHARGE.--51 years, 872 ft<sup>3</sup>/s, 631,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 61,900 ft<sup>3</sup>/s, June 17, 1945, gage height, 44.94 ft, datum then in use, from rating curve extended above 37,000 ft<sup>3</sup>/s; no flow at times in many years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 10,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Dec. 20	1600	11,100	29.03	Dec. 27	2000	*13,400	*31.88

Minimum daily discharge, 13 ft<sup>3</sup>/s, Sept. 20-22, 27-29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24	61	255	1430	193	152	606	55	22	15	16	14
2	23	50	171	1090	252	920	1180	51	55	16	15	14
3	25	42	124	863	460	7140	2420	49	63	22	15	14
4	42	38	101	759	423	7620	1770	49	32	23	15	14
5	39	34	86	668	373	7500	1010	52	32	23	15	14
6	34	31	108	587	311	4240	826	50	38	22	15	14
7	29	29	1050	559	251	2370	593	52	48	20	15	14
8	27	31	1510	538	207	1700	287	53	43	19	15	14
9	26	32	784	484	163	1340	208	46	35	19	15	14
10	24	49	451	516	152	1130	178	41	29	19	15	14
11	22	46	268	492	171	698	236	38	25	18	15	14
12	23	46	179	889	199	660	193	37	22	46	16	14
13	21	39	128	2820	148	483	145	36	21	24	15	14
14	20	36	457	2700	147	431	124	35	20	20	15	14
15	20	145	1430	1490	137	498	106	33	19	20	14	14
16	20	1650	2010	1010	138	348	97	31	18	20	14	14
17	22	1560	1190	890	118	469	106	30	18	20	14	14
18	21	999	757	1730	255	2660	514	29	17	20	15	15
19	23	550	1910	2140	2980	4140	988	27	17	19	23	14
20	21	338	10400	2210	2710	2350	1020	27	17	17	21	13
21	21	266	10400	1890	1750	1310	546	26	16	16	16	13
22	22	238	9320	984	1290	651	378	25	16	70	15	13
23	20	160	7720	706	984	500	262	24	16	91	15	14
24	33	111	2690	575	738	403	202	24	16	58	16	15
25	41	1050	3120	528	360	1060	126	23	16	41	14	14
26	342	2720	10500	446	276	1510	102	23	16	31	14	13
27	207	2080	13100	329	220	1150	86	23	16	25	14	13
28	451	914	12600	263	188	850	82	23	16	22	14	13
29	294	569	10600	231	160	732	68	22	16	19	14	13
30	121	396	6530	216	---	846	59	21	15	18	14	14
31	79	---	2120	219	---	1070	---	21	---	17	14	---
TOTAL	2137	14310	112069	30252	15754	56931	14518	1076	750	830	473	415
MEAN	68.9	477	3615	976	543	1836	484	34.7	25.0	26.8	15.3	13.8
MAX	451	2720	13100	2820	2980	7620	2420	55	63	91	23	15
MIN	20	29	86	216	118	152	59	21	15	15	14	13
AC-FT	4240	28380	222300	60000	31250	112900	28800	2130	1490	1650	938	823

CAL YR 1987 TOTAL 349146.7 MEAN 957 MAX 13100 MIN 9.2 AC-FT 692500  
WTR YR 1988 TOTAL 249515 MEAN 682 MAX 13100 MIN 13 AC-FT 494900

## RED RIVER BASIN

07334200 BYRD'S MILL SPRING NEAR FITTSTOWN, OK

LOCATION.--Lat 34°35'45", long 96°39'55", in SW 1/4 SW 1/4 sec.34, T.2 N., R.6 E., Pontotoc County, Hydrologic Unit 11140104, upstream from weir outlet of spring, 0.5 mi upstream from Big Spring Creek, 2.0 mi west of Fittstown, and 12.0 mi south of Ada.

PERIOD OF RECORD.--April 1959 to current year.

GAGE.--Water-stage recorder and V-notch sharp-crested weir. Datum of gage is 1,021.17 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Records do not include diversion of about 6 to 10 ft<sup>3</sup>/s by city of Ada for municipal water supply, a part of which is discharged as effluent to Sandy Creek, tributary to Canadian River. Records of zero flow do not include seepage of up to 0.10 ft<sup>3</sup>/s.

AVERAGE DISCHARGE.--29 years, 7.72 ft<sup>3</sup>/s, 5,593 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 30 ft<sup>3</sup>/s, May 30, 1960, gage height, 3.22 ft; no flow at times in several years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 19 ft<sup>3</sup>/s, Mar. 8-13, gage height, 3.11 ft; minimum daily discharge, 2.9 ft<sup>3</sup>/s, Sept. 11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.1	6.2	5.8	13	16	15	15	15	11	7.5	6.0	5.2
2	7.9	6.2	5.9	14	16	15	15	15	10	7.4	5.8	5.3
3	7.7	6.3	5.8	14	16	15	15	15	10	7.3	5.8	5.2
4	7.7	6.3	5.7	14	16	15	15	15	10	7.3	5.8	5.2
5	7.8	6.2	6.1	14	16	18	15	14	10	7.3	5.8	5.0
6	7.7	6.2	5.9	14	16	18	15	14	10	7.2	5.6	5.1
7	7.7	6.2	5.8	14	16	18	15	14	10	6.9	5.5	4.9
8	7.7	6.2	5.8	14	16	18	15	14	10	7.3	5.3	4.8
9	7.7	6.2	5.8	14	16	19	15	16	9.4	7.2	5.3	3.9
10	7.7	6.2	5.8	14	16	19	15	16	8.8	7.3	5.2	3.1
11	7.7	6.2	5.8	14	15	19	15	13	8.7	7.3	5.2	2.9
12	7.7	6.2	5.8	14	15	19	15	13	9.2	7.2	5.0	3.4
13	7.3	6.2	5.9	14	15	18	15	13	9.0	6.9	5.0	3.6
14	7.3	6.2	6.1	15	15	17	15	13	8.8	6.9	4.9	3.7
15	7.3	6.1	5.8	15	15	16	15	13	8.6	6.8	4.8	4.9
16	7.3	5.8	5.8	15	15	17	15	13	8.6	6.7	4.8	4.8
17	7.3	5.8	5.8	15	15	e17	15	13	8.6	6.6	4.8	4.6
18	7.3	5.8	5.8	15	15	e17	15	12	8.5	6.6	4.9	4.6
19	7.3	5.8	7.4	16	14	e17	15	11	8.4	7.0	4.9	4.7
20	6.8	5.8	7.7	16	14	e17	15	11	8.5	6.9	4.9	5.1
21	6.8	5.8	8.1	16	14	e17	16	11	8.3	6.9	4.7	5.5
22	6.7	5.9	8.3	16	14	e17	17	11	8.1	6.6	5.3	6.3
23	6.9	6.1	8.6	16	15	e17	17	11	8.0	6.6	6.6	6.6
24	6.7	6.2	9.0	16	15	e17	17	11	7.8	6.6	6.4	6.6
25	6.6	6.0	9.7	16	15	17	17	11	7.7	6.5	5.9	6.6
26	6.6	5.8	11	16	15	15	17	11	7.7	6.3	5.2	6.4
27	6.6	5.8	11	16	15	15	16	11	7.7	6.5	5.2	5.8
28	6.6	5.8	12	16	15	15	17	11	7.7	6.4	5.0	5.8
29	6.6	5.8	13	16	15	15	16	11	7.7	6.3	4.8	7.6
30	6.3	5.8	13	16	---	15	15	11	7.6	6.1	5.4	10
31	6.2	---	13	16	---	15	---	11	---	6.0	5.4	---
TOTAL	223.6	181.1	237.0	464	441	519	465	394	264.4	212.4	165.2	157.2
MEAN	7.21	6.04	7.65	15.0	15.2	16.7	15.5	12.7	8.81	6.85	5.33	5.24
MAX	8.1	6.3	13	16	16	19	17	16	11	7.5	6.6	10
MIN	6.2	5.8	5.7	13	14	15	15	11	7.6	6.0	4.7	2.9
AC-FT	444	359	470	920	875	1030	922	781	524	421	328	312

CAL YR 1987 TOTAL 4067.1 MEAN 11.1 MAX 20 MIN 5.7 AC-FT 8070  
WTR YR 1988 TOTAL 3723.9 MEAN 10.2 MAX 19 MIN 2.9 AC-FT 7390

e Estimated



## RED RIVER BASIN

07335000 CLEAR BOGGY CREEK NEAR CANEY, OK

LOCATION.--Lat 34°15'09", long 96°12'19", in NW 1/4 SE 1/4 sec.36, T.3 S., R.10 E., Atoka County, Hydrologic Unit 11140104, on downstream side of left pier of bridge on old U.S. Highways 69 and 75, 0.5 mi downstream from Caney Creek, 1.5 mi north of Caney, and at mile 24.1.

DRAINAGE AREA.--720 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1942 to current year. Monthly discharge only for some periods, published in WSP 1311. REVISED RECORDS.--WSP 1211: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 485.05 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Mar. 13, 1945, nonrecording gage at same site and datum.

REMARKS.--Records poor. Some regulation since 1964 by numerous floodwater-retarding structures.

COOPERATION.--Gage-height record and 4 discharge measurements provided by U.S. Army Corps of Engineers; records computed by U.S. Geological Survey.

AVERAGE DISCHARGE.--46 years, 488 ft<sup>3</sup>/s, 9.20 in/yr, 353,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 53,500 ft<sup>3</sup>/s, Oct. 14, 1981, gage height, 26.60 ft, maximum gage height, 26.77 ft, Dec. 11, 1946; no flow at times in several years.

EXTREMES OUTSIDE PERIOD OF RECORD.--A stage of 26.9 ft occurred in February 1938, information provided by local resident.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Mar. 4	0600	*4,050	*17.80	No peak greater than base discharge.			

Minimum daily discharge, 3.7 ft<sup>3</sup>/s, Sept. 15-17.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	48	e58	176	e350	290	184	273	97	44	16	12	4.8
2	50	e47	142	e300	280	593	882	91	50	16	12	4.0
3	42	e42	119	e350	309	e3550	1120	88	53	15	11	5.5
4	36	e39	102	e250	318	3680	609	86	80	18	10	6.5
5	33	e36	91	e230	295	1480	457	88	77	28	9.1	6.5
6	31	e33	419	e450	268	1050	364	85	57	16	8.3	6.5
7	29	e30	775	e700	250	788	302	79	48	12	8.1	6.5
8	27	e35	526	e450	240	707	263	76	44	25	19	4.9
9	23	e45	318	e380	237	762	235	73	38	24	14	4.8
10	21	e70	231	e350	226	617	217	69	34	17	11	4.9
11	19	e45	189	e320	e220	507	201	69	30	22	9.0	5.2
12	18	e30	161	e300	216	445	194	65	27	45	8.3	4.9
13	17	e27	142	1360	226	392	176	61	23	31	8.3	4.5
14	16	e25	e300	1020	223	331	164	56	19	25	8.2	4.7
15	16	e800	e800	900	207	311	161	52	17	24	7.3	3.7
16	15	e560	e600	748	190	288	152	54	18	19	6.1	3.7
17	15	e400	e450	688	186	288	177	50	18	16	6.9	3.7
18	16	256	e350	1040	245	1920	273	48	18	14	8.7	3.9
19	17	197	e600	1040	935	1800	226	47	18	13	7.4	4.7
20	16	190	e3500	1300	779	915	209	50	17	98	6.8	6.0
21	16	164	e2000	846	488	633	179	49	17	285	6.3	15
22	16	132	e1400	631	380	506	160	50	17	105	6.3	21
23	19	103	e800	538	315	430	148	55	17	61	6.8	20
24	26	e80	e500	482	258	380	127	e52	16	42	9.2	15
25	28	654	e800	426	236	394	120	e51	13	31	10	12
26	180	e630	e3500	380	218	347	114	e50	13	24	9.0	10
27	149	e480	e2000	351	208	291	110	e48	13	19	8.1	9.6
28	190	e390	e1200	332	202	257	103	e44	13	17	7.3	8.6
29	132	288	e700	317	193	246	99	e40	15	15	6.8	8.0
30	e100	226	e520	305	---	243	97	e36	16	13	5.9	8.4
31	e74	---	e400	299	---	269	---	e32	---	12	5.2	---
TOTAL	1435	6112	23811	17433	8638	24604	7912	1891	880	1118	272.4	227.5
MEAN	46.3	204	768	562	298	794	264	61.0	29.3	36.1	8.79	7.58
MAX	190	800	3500	1360	935	3680	1120	97	80	285	19	21
MIN	15	25	91	230	186	184	97	32	13	12	5.2	3.7
AC-FT	2850	12120	47230	34580	17130	48800	15690	3750	1750	2220	540	451
CFSM	.06	.28	1.07	.78	.41	1.10	.37	.08	.04	.05	.01	.01
IN.	.07	.32	1.23	.90	.45	1.27	.41	.10	.05	.06	.01	.01

CAL YR 1987 TOTAL 176597 MEAN 484 MAX 7610 MIN 15 AC-FT 350300 CFSM .67 IN. 9.12  
WTR YR 1988 TOTAL 94333.9 MEAN 258 MAX 3680 MIN 3.7 AC-FT 187100 CFSM .36 IN. 4.87

e Estimated



## RED RIVER BASIN

299

07335300 MUDDY BOGGY CREEK NEAR UNGER, OK

LOCATION.--Lat 34°01'36", long 95°45'00", in SE 1/4 SE 1/4 sec.17, T.6 S., R.15 E., Choctaw County, Hydrologic Unit 11140103, at bridge on U.S. Highway 70, 3.5 mi west of Soper, 1.8 mi east of Unger and at mile 18.6.

DRAINAGE AREA.--2,273 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1982 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 392.72 ft above National Geodetic Vertical Datum of 1929. Auxiliary gage 7.4 mi downstream. Prior to Sept. 19, 1985, gage 500 ft downstream at same datum.

REMARKS.--Records fair. Several unpublished observations of water temperature, specific conductance, and pH were made during the year and are available at the District Office. Some regulation by Atoka Reservoir, capacity, 125,000 acre-ft, on North Boggy Creek, drainage area 176 mi<sup>2</sup>.

AVERAGE DISCHARGE.--6 years, 1,666 ft<sup>3</sup>/s, 1,207,000 acre-ft/year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,000 ft<sup>3</sup>/s, Apr. 26, 1985, gage height, 44.05 ft; minimum daily discharge, 1.8 ft<sup>3</sup>/s, Sept. 8, 1984.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 18,900 ft<sup>3</sup>/s, Dec. 28, gage height, 41.72 ft; minimum daily discharge, 23 ft<sup>3</sup>/s, July 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	54	120	635	e13500	613	467	1340	173	48	24	39	25
2	51	85	468	11300	994	864	1650	162	50	23	33	25
3	46	67	363	7910	1700	4370	2150	155	90	25	30	25
4	47	56	292	3710	1630	7030	3410	146	163	53	29	25
5	51	49	245	2020	1290	8280	2710	139	97	30	30	25
6	59	44	543	1680	1000	9490	1760	135	82	29	30	25
7	60	39	1480	1470	800	9790	1360	132	84	28	29	25
8	54	41	2420	1430	697	8330	1050	129	82	32	28	25
9	50	61	2250	1320	627	4750	757	124	78	30	26	25
10	46	147	1340	1160	581	2560	608	117	68	28	25	25
11	45	163	762	1120	599	2090	542	108	58	42	27	25
12	42	140	513	1400	732	1680	537	99	50	583	33	25
13	40	94	390	2780	537	1470	466	94	45	207	32	25
14	39	72	604	4870	527	1140	409	89	40	188	30	25
15	37	544	1880	5410	510	892	365	85	37	151	28	25
16	36	4560	2750	3870	477	792	334	79	34	124	26	25
17	35	4480	2610	2450	445	848	384	74	33	105	25	25
18	37	3090	1790	2070	1080	2260	1340	71	32	91	25	25
19	63	1780	2520	3010	3480	4780	1450	68	31	79	39	25
20	64	925	6150	3620	5040	5960	1430	65	30	67	33	32
21	52	576	7800	3820	4590	5100	1200	64	29	56	31	36
22	49	448	e15000	3280	2860	2640	734	61	28	78	34	32
23	48	375	e11000	2040	1940	1530	544	60	27	168	29	28
24	59	301	e9000	1550	1470	1160	438	59	26	157	25	28
25	79	1070	e6000	1280	1040	1180	369	58	26	134	25	28
26	591	2440	e15000	1100	707	1720	305	57	26	101	25	28
27	688	4050	e17000	909	604	1870	256	55	25	80	25	28
28	535	3150	e18000	771	545	1460	231	53	24	65	25	28
29	362	1630	e17000	696	502	1360	210	51	25	56	25	28
30	320	941	e16000	650	---	1220	192	50	25	49	25	28
31	194	---	e15000	628	---	1170	---	50	---	43	25	---
TOTAL	3933	31538	176805	92824	37617	98253	28531	2862	1493	2926	891	799
MEAN	127	1051	5703	2994	1297	3169	951	92.3	49.8	94.4	28.7	26.6
MAX	688	4560	18000	13500	5040	9790	3410	173	163	583	39	36
MIN	35	39	245	628	445	467	192	50	24	23	25	25
AC-FT	7800	62560	350700	184100	74610	194900	56590	5680	2960	5800	1770	1580

CAL YR 1987 TOTAL 674435 MEAN 1848 MAX 18000 MIN 34 AC-FT 1338000  
WTR YR 1988 TOTAL 478472 MEAN 1307 MAX 18000 MIN 23 AC-FT 949000

e Estimated

## RED RIVER BASIN

07335500 RED RIVER AT ARTHUR CITY, TX

LOCATION.--Lat 33°52'32", long 95°30'08", in NW 1/4 sec.11, T.8 S., R.17 E., Choctaw County, OK, Hydrologic Unit 11140101, on right downstream bank of bridge on U.S. Highway 271 at Arthur City, 10.6 mi downstream from Muddy Boggy River, 26.0 mi upstream from Kiamichi River, and at mile 633.1.

DRAINAGE AREA.--44,531 mi<sup>2</sup>, of which 5,936 mi<sup>2</sup> probably is noncontributing.

PERIOD OF RECORD.--January to September 1905 (gage heights and discharge measurements only), October 1905 to December 1911, July 1936 to current year. Monthly discharge only for some periods, published in WSP 1311.

Gage-height records collected at same site since 1891 are contained in reports of the National Weather Service.

REVISED RECORDS.--WSP 1241: Drainage area. WSP 1311: 1906-11.

GAGE.--Water-stage recorder. Datum of gage is 380.07 ft above National Geodetic Vertical Datum of 1929. From 1905-11 nonrecording gage at St. Louis-San Francisco Railway Co. bridge 200 ft upstream at same datum. July 1, 1936 to Mar. 24, 1940, nonrecording gage at present site and datum.

REMARKS.--Records fair. Flow regulated since October 1943 by Lake Texoma (station 07331500), 92.8 mi upstream from station.

COOPERATION.--Gage-height record and 9 discharge measurements provided by U.S. Army Corps of Engineers; records computed by U.S. Geological Survey.

AVERAGE DISCHARGE.--Prior to regulation by Lake Texoma, 13 years (water years 1906-11, 1937-43), 9,266 ft<sup>3</sup>/s, 6,713,000 acre-ft/yr; since regulation by Lake Texoma, 44 years (water years 1945-88), 8,250 ft<sup>3</sup>/s, 5,977,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 400,000 ft<sup>3</sup>/s, May 28, 1908, gage height, 43.2 ft, from rating curve extended above 41,000 ft<sup>3</sup>/s, on basis of records for later years; minimum, 130 ft<sup>3</sup>/s, Dec. 11-12, 1956, gage height, 4.49 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 34,600 ft<sup>3</sup>/s, Dec. 27, gage height, 15.87 ft; minimum daily discharge, 397 ft<sup>3</sup>/s, Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1120	5500	2480	e22100	12000	5450	8950	10500	2750	3800	2420	1250
2	3730	4530	2290	e23000	12400	5600	13600	10300	2820	3330	2410	1160
3	5750	4320	4800	e21500	16500	11000	16400	10300	3020	3110	2390	1150
4	5880	4260	5000	e21000	16700	20400	16400	10300	3210	2690	2410	1210
5	2520	4220	3750	e21000	14400	20000	15800	10200	3030	2630	2280	1690
6	1060	4130	3870	e21000	13100	19600	17600	10300	3130	2600	2340	1390
7	3680	3580	5210	e21000	12400	19900	18900	9250	3460	2560	2300	1210
8	3900	3460	8990	e21000	12100	19300	21300	8050	3300	2550	2340	1130
9	3530	2860	8720	e20900	12000	19000	21200	7370	2890	2570	2380	1100
10	3440	2740	6430	e17000	11600	21900	19300	7050	2740	2580	2350	997
11	4010	3620	7290	15600	10900	21900	18800	7310	2650	2540	2450	923
12	3580	5130	7260	15200	10800	20400	18500	5650	2610	3210	2630	889
13	3440	4650	7040	17200	10700	17000	15600	5270	2560	5210	2530	860
14	3450	5510	4110	20500	9440	16300	13800	5340	2290	5390	2440	845
15	3780	4970	9170	18500	8330	15800	13200	5270	2220	3680	2400	837
16	3490	14000	12200	16900	8010	13600	12900	5230	2160	3310	2360	836
17	4180	21200	11000	15700	7880	13100	10600	5200	2240	2780	2350	833
18	3580	18100	9610	15100	8660	15800	14200	4070	2250	2470	2380	854
19	3100	11700	8840	14900	13900	19600	17200	4080	2200	2590	2390	886
20	2850	8530	19200	15900	17000	18900	14000	4040	2180	2580	2440	826
21	3470	7510	23000	15800	15400	17800	11600	4020	2160	2550	2430	730
22	5060	6510	20800	15300	11400	15700	10700	4020	2180	2530	2430	629
23	3140	5010	18200	14500	9250	14100	11300	3780	2360	2570	2420	480
24	2000	2550	18600	e14600	8370	13700	12100	3460	2170	2670	2380	425
25	1560	6380	20300	15500	5940	13700	11900	3290	2500	2660	2300	417
26	5290	11000	25300	e14500	8170	10300	11800	3330	2610	2610	2030	446
27	6580	13200	31000	14200	8260	9250	11600	3250	2770	2550	1970	496
28	7090	8170	e27500	12400	7890	8590	11500	3140	3190	2550	1960	464
29	6470	4930	e23400	12100	5370	9630	11500	3120	3280	2710	1900	399
30	5970	3390	e21200	12000	---	11300	11300	3060	3800	2500	1640	397
31	5710	---	e22700	12000	---	9300	---	2820	---	2460	1580	---
TOTAL	122410	205660	399260	527900	318870	467920	433550	182370	80730	90540	71030	25759
MEAN	3949	6855	12880	17030	11000	15090	14450	5883	2691	2921	2291	859
MAX	7090	21200	31000	23000	17000	21900	21300	10500	3800	5390	2630	1690
MIN	1060	2550	2290	12000	5370	5450	8950	2820	2160	2460	1580	397
AC-FT	242800	407900	791900	1047000	632500	928100	859900	361700	160100	179600	140900	51090

CAL YR 1987 TOTAL 6007580 MEAN 16460 MAX 61300 MIN 1060 AC-FT 11920000  
WTR YR 1988 TOTAL 2925999 MEAN 7995 MAX 31000 MIN 397 AC-FT 5804000

e Estimated

07335700 KIAMICHI RIVER NEAR BIG CEDAR, OK  
(Hydrologic bench-mark station)

LOCATION.--Lat 34°38'18", long 94°36'45", in SW 1/4 SE 1/4 sec.18, T.2 N., R.26 E., Le Flore County, Hydrologic Unit 11140105, in Ouachita National Forest, on downstream side of right bank pier of bridge on State Highway 63, 0.2 mi upstream from Rattlesnake Creek, 1.1 mi upstream from Big Branch, 2.1 mi east of Big Cedar, and at mile 157.6.

DRAINAGE AREA.--40.1 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1965 to current year.

GAGE.--Water-stage recorder. Datum of gage is 886.97 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records good.

AVERAGE DISCHARGE.--23 years, 78.5 ft<sup>3</sup>/s, 26.58 in/yr, 56,870 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 21,500 ft<sup>3</sup>/s, Dec. 10, 1971, gage height, 17.08 ft; from rating curve extended above 9,000 ft<sup>3</sup>/s; no flow at times in most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Dec. 19	1530	3,150	10.47	Apr. 17	2115	4,470	11.51
Dec. 25	1515	*10,900	*14.85	Aug. 12	1345	6,830	12.96
Apr. 1	2300	4,980	11.86				

No flow at times.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.4	.92	90	127	46	41	659	22	.62	.00	.00	.56
2	2.2	.92	76	112	46	114	955	18	.46	.00	.00	.89
3	1.9	.87	65	105	52	242	288	17	.42	.00	.00	7.2
4	1.7	.80	54	95	44	157	185	15	.36	.00	.00	3.4
5	1.6	.83	46	84	40	119	146	12	.20	.00	.00	1.3
6	1.4	.89	70	81	37	96	130	9.7	.13	.00	.00	.86
7	1.2	.95	90	85	36	78	102	7.9	.09	.00	.00	.54
8	1.1	6.2	88	84	36	89	88	8.1	.05	.00	.00	.42
9	.95	36	84	79	36	81	76	7.1	.02	.00	.00	.34
10	.86	76	76	70	36	72	89	5.4	.00	.00	.00	.27
11	.86	47	70	64	38	68	126	4.1	.00	.00	.00	.25
12	.79	37	61	89	37	78	126	9.3	.00	.00	1030	.23
13	.73	31	60	113	36	65	105	10	.00	.00	105	.17
14	.67	25	227	107	37	59	91	5.2	.00	.00	44	.13
15	.60	166	291	106	37	54	80	3.6	.00	.00	28	.12
16	.52	593	187	123	36	48	74	2.6	.00	.00	18	.12
17	.51	254	147	239	50	55	612	1.8	.00	.00	42	.13
18	.51	146	127	206	234	72	636	1.2	.00	.00	90	.13
19	.51	117	1130	174	534	64	254	1.1	.00	.00	70	.13
20	.50	97	501	143	246	59	168	1.2	.00	.00	45	.10
21	.47	80	243	125	177	56	126	11	.00	.00	32	.05
22	.41	67	179	112	147	52	101	4.8	.00	.00	25	.01
23	.34	60	148	104	124	49	81	14	.00	.00	18	.00
24	.64	52	155	95	106	50	66	14	.00	.00	12	.00
25	1.2	194	2520	85	93	95	55	9.3	.00	.00	7.0	.00
26	1.9	171	1610	75	80	81	46	5.4	.00	.00	4.1	.00
27	1.8	144	708	66	68	75	38	3.8	.00	.00	2.5	.00
28	1.4	129	324	58	57	69	33	2.8	.00	.00	1.7	.00
29	1.2	114	218	53	48	272	29	1.9	.00	.00	3.7	.00
30	1.1	102	175	50	---	265	25	1.3	.00	.00	2.0	.00
31	.99	---	149	49	---	177	---	.96	---	.00	.98	---
TOTAL	32.96	2750.38	9969	3158	2594	2952	5590	231.56	2.35	0.00	1580.98	17.35
MEAN	1.06	91.7	322	102	89.4	95.2	186	7.47	.078	.00	51.0	.58
MAX	2.4	593	2520	239	534	272	955	22	.62	.00	1030	7.2
MIN	.34	.80	46	49	36	41	25	.96	.00	.00	.00	.00
AC-FT	65	5460	19770	6260	5150	5860	11090	459	4.7	.0	3140	34
CFSM	.03	2.29	8.02	2.54	2.23	2.37	4.65	.19	.00	.00	1.27	.01
IN.	.03	2.55	9.25	2.93	2.41	2.74	5.19	.21	.00	.00	1.47	.02

CAL YR 1987 TOTAL 27836.13 MEAN 76.3 MAX 2520 MIN .00 AC-FT 55210 CFSM 1.90 IN. 25.82  
WTR YR 1988 TOTAL 28878.58 MEAN 78.9 MAX 2520 MIN .00 AC-FT 57280 CFSM 1.97 IN. 26.79

## RED RIVER BASIN

07335700 KIAMICHI RIVER NEAR BIG CEDAR, OK--Continued  
(Hydrologic bench-mark station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1966 to current year.

REMARKS.--Samples were collected quarterly and specific conductance, pH, water temperature, and dissolved oxygen were determined in the field.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	AGENCY COL-LECTING SAMPLE (CODE NUMBER)	AGENCY ANA-LYZING SAMPLE (CODE NUMBER)	GAGE HEIGHT (FEET)	DIS-CHARGE, INST. (CUBIC FEET PER SECOND)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE AIR (DEG C)	TEMPER-ATURE WATER (DEG C)	TUR-BID-ITY (NTU)	BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)	
DEC 08...	1100	1028	80020	3.91	87	30	7.10	18.0	13.0	7.8	713	9.4	
MAR 08...	1210	1028	80020	4.24	95	32	6.70	18.0	12.5	6.1	729	10.3	
AUG 17...	1100	1028	80020	3.37	12	37	6.40	36.0	27.0	14	742	8.1	
DATE		OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CAC03)	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CAC03	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	BICAR-BONATE WATER WH IT FIELD (MG/L AS HC03)
DEC 08...	95	--	--	8	2	1.7	0.79	2.8	42	0.5	0.80	7	
MAR 08...	101	300	260	11	6	2.1	1.3	--	--	--	0.70	7	
AUG 17...	105	67	48	7	0	1.4	0.86	2.2	37	0.4	0.90	--	
DATE		CAR-BONATE WATER WH IT FIELD (MG/L AS C03)	ALKA-LINITY WAT WH TOT IT FIELD (MG/L AS CAC03)	SULFATE DIS-SOLVED (MG/L AS S04)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SI02)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N)	
DEC 08...	0	6	4.8	2.3	0.10	8.4	--	26	0.03	6.02	0.010		
MAR 08...	0	6	5.7	2.3	0.10	7.5	--	--	--	--	<0.010		
AUG 17...	--	--	8.3	1.8	0.10	9.4	39	30	0.05	1.27	<0.010		
DATE		NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N02)	NITRO-GEN, N02+N03 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS NH4)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHOUS TOTAL (MG/L AS P)	PHOS-PHOUS DIS-SOLVED (MG/L AS P)	PHOS-PHOUS ORTHO, DIS-SOLVED (MG/L AS P)	PHOS-PHATE, ORTHO, DIS-SOLVED (MG/L AS P04)	
DEC 08...	0.03	<0.100	0.030	0.020	0.03	0.27	0.30	0.020	0.030	0.010	0.03		
MAR 08...	--	<0.100	<0.010	0.010	0.01	--	<0.20	0.010	0.010	<0.010	--		
AUG 17...	--	<0.100	<0.010	0.030	0.04	--	0.20	0.040	0.030	<0.010	--		

## RED RIVER BASIN

303

07335700 KIAMICHI RIVER NEAR BIG CEDAR, OK--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	PHOS- PHOROUS ORGANIC TOTAL (MG/L AS P)	PHOS- PHOROUS ORGANIC DIS- SOLVED (MG/L AS P)	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)
DEC 08...	0.02	0.02	30	<1	12	<6	2	<1	<3	2	73
MAR 08...	0.01	0.01	200	<1	11	<0.5	<1	<1	<3	3	120
AUG 17...	0.04	0.03	120	<1	14	<0.5	2	2	<3	2	200
DATE	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY DIS- SOLVED (UG/L AS HG)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V)	ZINC, DIS- SOLVED (UG/L AS ZN)
DEC 08...	<5	<4	<10	<0.1	<10	1	<1	<1.0	<10	14	10
MAR 08...	<5	<4	5	<0.1	<10	2	<1	<1.0	24	<6	13
AUG 17...	<5	<4	12	<0.1	<10	<1	<1	<1.0	12	<6	28
DATE	GROSS ALPHA, DIS- SOLVED (UG/L AS U-NAT)	GROSS ALPHA, SUSP. TOTAL (UG/L AS U-NAT)	GROSS BETA, DIS- SOLVED (PCI/L AS CS-137)	GROSS BETA, SUSP. TOTAL (PCI/L AS CS-137)	GROSS BETA, DIS- SOLVED (PCI/L AS SR/ YT-90)	GROSS BETA, SUSP. TOTAL (PCI/L AS SR/ YT-90)	RADIUM 226, DIS- SOLVED, RADON METHOD (PCI/L)	URANIUM NATURAL DIS- SOLVED (UG/L AS U)	SEDI- MENT, SUS- PENDE (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
DEC 08...	--	--	--	--	--	--	--	--	5	1.2	87
MAR 08...	--	--	--	--	--	--	--	--	--	--	--
AUG 17...	<0.4	0.9	1.0	0.6	0.9	0.6	0.02	0.01	--	--	--



## 07335775 SARDIS LAKE NEAR CLAYTON, OK

LOCATION.--Lat 34°37'45", long 95°21'03", in NE 1/4 SW 1/4 sec.19. T.2 N, R.19 E., Pushmataha County, Hydrologic Unit 11140105, on the northeast end of parking area on top of dam, 2.5 mi north of Clayton, and at mile 2.8.

DRAINAGE AREA.--275 mi<sup>2</sup>.

PERIOD OF RECORD.--December 1982 to current year.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by earth dam. The controlled outlet consists of two sluice gates and the uncontrolled outlet is a concrete spillway. Flow was diverted through control structure May 4, 1981; regulated storage began Dec. 27, 1982; conservation pool first filled Oct. 20, 1984. Capacity, 735,800 acre-ft at elevation 624.0 ft, maximum pool; 468,100 acre-ft, at elevation 611.0 ft, spillway crest; 396,900 acre-ft at elevation 607.0 ft, top of flood pool; 274,300 acre-ft, at elevation 599.0 ft, top of conservation pool. Figures given herein represent total contents. Reservoir is designed for flood control, water supply, water-quality control and conservation. Capacity table used since Dec. 27, 1982. U.S. Army Corps of Engineers' satellite telemeter at station.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 345,400 acre-ft, Oct. 28, 1984, elevation, 603.84 ft; minimum since conservation pool was first filled, 219,200 acre-ft, Oct. 9-12, 1985, elevation, 594.65 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 339,500 acre-ft, Dec. 29, elevation, 603.46 ft; minimum contents, 260,000 acre-ft, Sept. 28, 29, elevation, 597.93 ft.

Capacity table (elevation, in feet, and contents, in acre-ft):

592	189,100	598	260,900
594	211,600	601	302,500
596	235,500	604	347,900

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	270600	267900	275000	321600	275300	275600	281800	274300	270500	265800	265500	263200
2	270300	267900	274200	316100	275400	280600	284400	273500	270400	265300	265100	263900
3	269800	267900	274500	307700	275900	284000	284400	273900	270400	265300	264900	264000
4	269500	268000	274900	300400	275600	283500	281800	274100	270400	265300	264500	264000
5	269500	267800	275300	293200	274500	281800	278900	273900	270400	265100	264500	263600
6	269600	267600	275700	286800	274200	278900	276500	273500	270300	264800	264400	263300
7	269600	267600	276000	282000	274100	276700	274900	273100	270000	264400	264100	262700
8	268300	267600	274900	278500	274200	274900	274200	273200	269900	264400	263900	262500
9	268000	268300	273700	277100	275000	274100	274600	273000	269700	264300	263500	262500
10	267900	268600	273700	274900	275200	274100	274600	273000	269100	264100	263500	262400
11	267600	268700	274200	273900	275200	274300	274600	273000	268800	264100	263200	262000
12	267400	268700	274500	275700	275300	274900	274300	272800	268400	264900	264400	261900
13	267100	269500	274900	276600	275000	276000	274300	272800	268300	264800	264400	261900
14	267100	270000	278500	277700	274800	275700	274300	272700	268100	264800	264400	261700
15	266800	278500	278800	277500	274600	274300	274300	272600	267800	264400	264400	261500
16	266700	286800	277700	278100	274300	273700	274300	272600	268300	264300	264300	261500
17	266800	289100	275000	279000	276400	276000	276100	272300	268300	264000	264000	261500
18	266800	286800	274100	279600	278100	277700	278200	272200	268300	264900	264000	260800
19	267200	282800	286800	279700	279500	276800	278400	271900	268100	266900	264200	261300
20	267200	280200	291100	278500	279200	275600	277100	271600	267800	266900	264200	261200
21	267000	278500	292200	276700	278200	274300	275000	271300	267400	266600	264200	260900
22	266300	277400	291800	275700	276300	274300	274700	271200	267400	266500	264000	260700
23	266700	276100	287500	275600	274600	274500	274700	271600	267000	265800	264500	260900
24	267900	277100	293800	275300	273900	276000	274100	272400	266800	265700	264500	260900
25	267900	278800	311300	274900	274100	277100	274200	272300	266600	265600	264300	260800
26	268300	279600	329600	274700	274300	277100	274700	271800	266500	265500	264100	260500
27	268200	280000	336700	273900	274800	277000	274600	271600	266500	266100	264200	260400
28	267900	278900	339300	274100	275300	277100	274500	271200	266400	266100	263700	260000
29	267900	277500	338600	274100	275400	279000	274300	270800	266100	266100	263600	260200
30	267900	276400	333900	274800	---	279300	274300	270700	266000	265800	263500	260200
31	267900	---	328300	275200	---	279900	---	270500	---	265800	263300	---
MAX	270600	289100	339300	321600	279500	284000	284400	274300	270500	266900	265500	264000
MIN	266300	267600	273700	273900	273900	273700	274100	270500	266000	264000	263200	260000
(+)	598.52	599.15	602.73	599.06	599.08	599.40	599.00	598.72	598.38	598.37	598.18	597.94
(++)	-3,000	+8,500	+51,900	-53,100	+200	+4,500	-5,600	-3,800	-4,500	-200	-2,500	-3,100

CAL YR 1987 MAX 339300 MIN 264700 (++) +63,900  
WTR YR 1988 MAX 339300 MIN 260000 (++) -10,700

(+) ELEVATION, IN FEET, AT END OF MONTH  
(++) CHANGE IN CONTENTS, IN ACRE-FEET

## RED RIVER BASIN

305

07335790 KIAMICHI RIVER NEAR CLAYTON, OK

LOCATION.--Lat 34°34'30", long 95°20'26", in NE 1/4 SE 1/4 sec.7, T.1 N., R.19 E., Pushmataha County, Hydrologic Unit 11140105, on left bank near downstream bridge abutment on U.S. Highway 271, approximately 1 mi southeast of Clayton, and at mile 101.6.

DRAINAGE AREA.--708 mi<sup>2</sup>.

PERIOD OF RECORD.--November 1980 to current year.

GAGE.--Water-stage recorder. Datum of gage is 520.00 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records fair. Some regulation since December 1982 by Sardis Lake (station 07335775), on Jackfork Creek 4.5 mi upstream. U.S. Army Corps of Engineers' satellite telemeter at station.

AVERAGE DISCHARGE.--7 years (water years 1982-88), 990 ft<sup>3</sup>/s, 717,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 24,800 ft<sup>3</sup>/s, June 7, 1981, gage height, 20.21 ft; no flow Oct. 3-18, 1983.

EXTREMES FOR CURRENT YEAR.--Maximum discharge 16,300 ft<sup>3</sup>/s, Dec. 27, gage height, 15.60 ft; minimum daily discharge, .18 ft<sup>3</sup>/s, Aug. 11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	122	11	1390	4740	229	267	1790	158	19	2.2	3.4	39
2	70	8.2	986	4490	270	486	11300	138	18	2.1	2.7	37
3	41	5.9	364	4330	937	2710	7480	129	19	2.4	2.3	103
4	25	4.3	314	4270	1090	2620	3260	119	20	3.8	1.8	927
5	17	3.7	278	4170	1280	2670	3210	106	17	2.9	1.5	450
6	12	2.6	649	4060	431	2440	3100	97	15	2.4	1.2	282
7	9.0	2.0	1830	3570	354	2290	2110	87	11	2.3	1.0	194
8	7.2	2.0	1710	2280	331	2110	1290	81	9.6	2.5	.80	143
9	6.3	8.0	1390	1520	314	1580	576	74	8.9	2.7	.55	112
10	5.5	154	655	1510	285	858	480	61	7.1	2.5	.35	87
11	4.3	469	386	1170	264	553	947	52	6.2	2.1	.18	68
12	3.7	286	336	1160	255	481	937	46	5.5	18	433	54
13	3.2	201	296	1860	254	446	738	43	5.2	62	7320	42
14	3.0	161	1210	1120	254	612	538	37	4.7	103	1990	35
15	2.3	462	4540	924	234	1110	437	33	4.2	51	461	32
16	2.1	7470	3240	1090	210	761	386	28	3.9	26	329	28
17	2.6	6340	2850	1120	192	382	756	26	4.4	18	252	23
18	2.2	3300	1840	1250	738	1710	5680	26	4.7	13	1540	22
19	1.9	3440	3120	1490	4740	1900	3900	23	4.3	27	930	18
20	1.7	2640	7610	1980	3590	1590	2450	18	3.6	61	588	16
21	1.0	1450	3270	1760	2390	1450	1980	17	3.0	25	398	15
22	.83	1340	2880	1370	2000	952	1340	15	2.6	11	311	13
23	.66	1280	3590	806	1770	401	537	19	2.3	7.8	250	11
24	2.0	1240	2590	771	1130	372	416	25	2.2	8.4	211	9.7
25	3.5	4300	6370	696	462	1120	346	19	2.8	7.9	164	9.5
26	6.2	3160	13900	636	403	1190	297	24	3.3	5.9	130	8.3
27	9.8	2240	16000	602	361	924	258	37	3.4	5.8	106	7.8
28	86	1920	8800	446	320	829	218	42	3.4	22	108	6.7
29	56	1690	3470	255	290	1350	190	33	3.0	15	81	6.5
30	30	1500	4260	245	---	2310	174	28	2.6	7.3	63	6.5
31	17	---	4530	233	---	1690	---	23	---	4.8	48	---
TOTAL	554.99	45090.7	104654	55924	25378	40164	57121	1664	219.9	527.8	15728.78	2806.0
MEAN	17.9	1503	3376	1804	875	1296	1904	53.7	7.33	17.0	507	93.5
MAX	122	7470	16000	4740	4740	2710	11300	158	20	103	7320	927
MIN	.66	2.0	278	233	192	267	174	15	2.2	2.1	.18	6.5
AC-FT	1100	89440	207600	110900	50340	79670	113300	3300	436	1050	31200	5570

CAL YR 1987 TOTAL 346553.49 MEAN 949 MAX 16000 MIN .66 AC-FT 687400  
WTR YR 1988 TOTAL 349833.17 MEAN 956 MAX 16000 MIN .18 AC-FT 693900

## RED RIVER BASIN

07336200 KIAMICHI RIVER NEAR ANTLERS, OK

LOCATION.--Lat 34°14'55", long 95°36'18", in SW 1/4 sec.35, T.3 S., R.16 E., Pushmataha County, Hydrologic Unit 11140105, on right bank, 50 ft downstream from bridge on U.S. Highway 271 and State Highway 2, 2.0 mi northeast of Antlers, 7.7 mi downstream from Tenmile Creek, 5.4 mi upstream from Cedar Creek and at mile 59.6.

DRAINAGE AREA.--1,138 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1972 to current year.

GAGE.--Water-stage recorder. Datum of gage is 419.82 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. Some regulation since December 1982 by Sardis Lake (station 07335775), located on Jackfork Creek, 42.0 miles upstream from station. Small diversion for municipal water supply for city of Antlers upstream from station. U.S. Army Corps of Engineers' satellite telemeter at station.

COOPERATION.--Gage-height record, 8 discharge measurements provided by U.S. Army Corps of Engineers; records computed by U.S. Geological Survey.

AVERAGE DISCHARGE.--Prior to regulation by Sardis Lake, 10 years (water years 1973-82), 1,484 ft<sup>3</sup>/s, 17.70 in/yr, 1,075,000 acre-ft/yr; since regulation by Sardis Lake, 5 years (water years 1983-88), 1,607 ft<sup>3</sup>/s, 19.17 in/yr, 1,164,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 50,000 ft<sup>3</sup>/s, Mar. 28, 1977, gage height, 38.33 ft; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 25,500 ft<sup>3</sup>/s, Dec. 27, gage height, 25.97 ft; minimum daily discharge, 1.7 ft<sup>3</sup>/s, July 11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	30	76	1590	5360	365	424	2160	226	30	5.4	53	44
2	74	59	1420	5060	501	941	7050	200	33	4.5	34	37
3	91	46	845	4840	1040	6980	12600	181	138	3.8	24	105
4	65	37	459	4780	1450	4630	5070	165	67	3.2	18	282
5	48	31	365	4640	1810	3770	4070	151	34	3.2	16	463
6	37	25	684	4520	1090	3230	4040	135	26	3.2	15	350
7	30	22	2530	4420	655	2860	3480	120	23	2.8	11	212
8	24	24	2280	3120	575	2850	2210	111	20	2.3	8.9	151
9	21	59	2030	1910	533	2610	1400	103	18	2.1	7.0	113
10	18	261	1160	1760	492	1650	846	94	17	1.8	5.8	85
11	16	265	757	1720	455	1100	767	86	15	1.7	5.2	67
12	14	496	522	1660	424	1040	1230	78	12	1180	5.1	54
13	12	343	449	3400	414	944	1100	72	11	541	1880	45
14	11	241	899	2290	406	766	869	66	10	170	5910	38
15	10	1930	4960	1600	390	992	707	61	9.0	93	850	33
16	9.3	12100	5070	1630	350	1300	614	55	7.8	64	357	28
17	8.8	11900	3600	2000	322	1020	1030	52	7.3	60	236	27
18	8.8	5350	3060	1960	1090	3110	5530	47	7.3	49	185	41
19	9.5	4010	6060	1850	6990	3300	6880	42	6.7	1190	1320	34
20	10	3640	13900	2460	6260	2500	3530	39	5.9	737	697	26
21	10	2090	7930	1850	3660	2090	2610	36	5.9	274	450	19
22	9.5	1490	3470	806	2750	1830	2130	32	5.9	161	299	17
23	9.3	1340	4250	653	2320	1090	1170	30	5.9	105	215	15
24	14	1300	4510	1050	1990	713	674	30	5.2	69	170	15
25	22	4530	8350	947	1090	2650	539	30	4.6	47	136	16
26	362	5840	23700	859	691	2680	449	30	11	33	115	e16
27	559	3320	24100	792	603	1760	379	30	64	23	92	e12
28	280	2610	18000	744	534	1360	326	30	27	89	75	e11
29	155	2200	5650	545	475	1330	283	28	11	203	62	e11
30	104	1830	5030	403	---	3280	253	26	7.0	152	54	e10
31	95	---	5180	378	---	3010	---	29	---	88	48	---
TOTAL	2167.2	67465	162810	70007	39725	67810	73996	2415	645.5	5362.0	13354.0	2377
MEAN	69.9	2249	5252	2258	1370	2187	2467	77.9	21.5	173	431	79.2
MAX	559	12100	24100	5360	6990	6980	12600	226	138	1190	5910	463
MIN	8.8	22	365	378	322	424	253	26	4.6	1.7	5.1	10
AC-FT	4300	133800	322900	138900	78790	134500	146800	4790	1280	10640	26490	4710

CAL YR 1987 TOTAL 532575.0 MEAN 1459 MAX 24100 MIN 2.8 AC-FT 1056000  
WTR YR 1988 TOTAL 508133.7 MEAN 1388 MAX 24100 MIN 1.7 AC-FT 1008000

e Estimated

## 07336600 HUGO LAKE NEAR HUGO, OK

LOCATION.--Lat 34°00'42", long 95°22'49", in NW 1/4 SW 1/4 sec.25, T.6 S., R.18 E., Choctaw County, Hydrologic Unit 11140105, on upstream face of Hugo Dam on Kiamichi River, 700 ft to left of spillway, 7.0 mi east of Hugo, and at mile 17.6.

DRAINAGE AREA.--1,709 mi<sup>2</sup>.

PERIOD OF RECORD.--January 1974 to current year.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by rolled earth dam. The outlet works consists of a gate-controlled concrete gravity ogee-type weir with six 40- by 50-foot gates. Regulated storage began Jan. 18, 1974; conservation pool was first filled Mar. 12, 1974. Total capacity, 1,561,500 acre-ft, at elevation 452.5 ft, top of dam, 966,700 acre-ft, at elevation 437.5 ft, top of flood control pool. Dead storage 21,080 acre-ft, at elevation 387.5 ft, crest of gated spillway. Figures given herein represent total contents. Reservoir is used for flood control, water supply, recreation and conservation. U.S. Army Corps of Engineers' satellite telemeter at station.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 577,800 acre-ft, June 17, 1982, elevation, 425.00 ft; minimum since conservation pool was first filled, 88,860 acre-ft, Nov. 15, 1978, elevation, 398.47 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 450,900 acre-ft, Dec. 29, elevation, 420.15 ft; minimum, 132,300 acre-ft, July 12, elevation, 402.50 ft.

Capacity table (elevation, in feet, and contents, in acre-ft):

401	115,000	415	334,000
407	192,700	420	447,100
410	239,900	425	577,800

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	147000	152000	201600	425400	158600	156500	174800	157600	150600	139100	152400	161400
2	146800	152000	192300	412000	160500	161300	185400	156500	152700	138300	151800	161200
3	146500	152000	187400	397600	167400	176500	204600	157700	153500	137300	151600	161500
4	145800	152100	185400	385800	168200	174800	203900	157600	153100	136800	151100	161200
5	145800	152100	186500	372000	168100	173400	192300	157500	152600	136200	150600	161200
6	145600	151600	188300	360400	166900	169900	178200	157100	152000	135300	149700	161200
7	145000	151300	192000	347500	164600	166100	168100	156900	151500	134500	149300	161200
8	144500	152000	191200	330500	162500	162100	163300	157700	150800	133400	148600	161500
9	144400	154800	187100	313300	159800	159400	163900	158000	150400	133000	147800	161400
10	144800	156700	186200	296000	160000	157500	160600	157900	149800	132500	147200	160500
11	144000	157600	186800	279400	158200	159200	158100	157700	148900	133600	146700	159300
12	143500	158900	187400	261800	158400	161200	158100	157300	148400	140100	147000	158400
13	143100	159700	188300	252700	159200	162000	159200	157600	147600	142100	147700	158300
14	142700	160200	194200	239900	162300	161900	158300	156900	147200	142100	159900	158600
15	142400	174000	195700	227600	161100	160900	157100	156500	146900	141900	161900	158900
16	143100	216500	193100	218900	161100	160500	156800	156900	146000	141600	161900	158900
17	142700	238100	186800	213100	159800	162900	160800	156900	145700	141300	162000	159100
18	142700	234200	185200	205400	167400	166700	177200	156200	145000	143400	162000	159200
19	144600	223700	207300	199300	185400	167400	185000	155700	144100	153000	162000	159300
20	143700	216000	243000	193100	200900	165700	179400	155700	144500	156000	162000	157700
21	143400	209200	261300	186500	207300	162100	170800	155100	144100	157300	162000	156800
22	142900	201600	258600	180100	206100	159200	167700	155100	143400	157200	162000	155300
23	142600	193400	251800	175500	194900	157400	169100	154900	143100	156800	161600	154600
24	143700	188600	249300	170000	183500	158900	167000	154900	142100	155700	162300	154500
25	143600	197600	258100	165500	171100	166200	167000	154500	141700	155700	163000	152300
26	146800	207600	325100	162300	163900	169200	165900	152700	141500	155200	163200	151900
27	150400	211600	390900	162000	161900	169300	163500	152300	141300	154100	164600	150700
28	151300	212800	439200	161600	159700	168400	161500	151500	140900	153900	164000	149200
29	151500	212800	450900	160800	157800	175200	159900	151500	140100	153800	163200	153400
30	151700	209200	447600	160200	---	175200	159200	151300	139600	153700	162600	153500
31	151700	---	438300	158900	---	171900	---	151200	---	153400	161800	---
MAX	151700	238100	450900	425400	207300	176500	204600	158000	153500	157300	164600	161500
MIN	142400	151300	185200	158900	157800	156500	156800	151200	139600	132500	146700	149200
(+)	404.07	408.10	419.63	404.60	404.52	405.56	404.62	404.03	403.09	404.19	404.81	404.20
(++)	+4,100	+57,500	+229,100	-279,400	-1,100	+14,100	-12,700	-8,000	-11,600	+13,800	+8,400	-8,300

CAL YR 1987 MAX 450900 MIN 142400 (++) +252,100  
WTR YR 1988 MAX 450900 MIN 132500 (++) +5,900

(+) ELEVATION, IN FEET, AT END OF MONTH

(++) CHANGE IN CONTENTS, IN ACRE-FEET



## RED RIVER BASIN

07336820 RED RIVER NEAR DE KALB, TX

LOCATION.--Lat 33°41'15", long 94°41'39", Bowie County, TX-McCurtain County, Okla. state line, Hydrologic Unit 11140106, near left bank at downstream side of bridge on U.S. Highway 259, 4.8 mi upstream from North Mill Creek, 13 mi north of De Kalb, and at mile 556.9.

DRAINAGE AREA.--47,348 mi<sup>2</sup>, of which 5,936 mi<sup>2</sup> probably is noncontributing.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--December 1967 to current year.

GAGE.--Water-stage recorder. Datum of gage is 302.92 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records good. At times, flood peaks may be affected by storage in Lake Texoma (station 07331500) located approximately 169 mi upstream, and low flows may be affected by releases for generation of electric power. Storage and/or releases from Lake Hugo on the Kiamichi River, a tributary to the Red River about 45 miles upstream, may also affect flows. Gage-height telemeter located at station.

AVERAGE DISCHARGE.--20 years (water years 1969-88), 12,690 ft<sup>3</sup>/s, 9,194,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 189,000 ft<sup>3</sup>/s, Dec. 11, 1971, gage height, 31.55 ft, from graph based on gage readings; minimum, 213 ft<sup>3</sup>/s, Nov. 30, 1979, from graph based on gage readings.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge since 1957, 205,000 ft<sup>3</sup>/s, June 1957, gage height, 32.2 ft, from rating curve extended above 186,500 ft<sup>3</sup>/s. The greatest flood since 1936 occurred in February 1938, stage unknown.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 81,900 ft<sup>3</sup>/s, Dec. 27 at 2115 hours, gage height, 24.79 ft; minimum daily, 1,090 ft<sup>3</sup>/s, Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3970	7290	8970	47900	15200	8530	18500	12400	2950	3850	2720	1830
2	2880	6990	9400	48700	15300	6880	21500	11700	2980	4480	2660	1730
3	2710	6400	8940	49100	16700	7410	23800	11000	3230	4220	2630	1520
4	5460	5690	8870	44800	20400	15300	26600	10500	3250	3830	2620	1630
5	6690	5450	7530	39000	22000	28900	30400	10500	3300	3430	2620	1500
6	5760	5290	5660	36800	20100	30500	33500	10400	3310	3100	2600	1620
7	3190	5230	5190	36500	18100	29400	33100	10300	3110	2990	2510	1830
8	2700	5120	6270	36000	17000	29700	33100	10000	3370	2960	2530	1570
9	4730	5780	12200	35700	16600	28300	30000	8710	3520	2920	2480	1460
10	4620	7600	14600	34500	16400	26600	27600	7850	3140	2940	2550	1460
11	4410	6480	10400	31100	15600	28800	24900	7480	2770	2960	2640	1460
12	4490	5120	9020	31700	14000	30200	22700	7360	2660	3780	3510	1450
13	4770	5920	8700	31400	13300	26200	21200	6370	2590	4930	3910	1420
14	4500	6240	8970	34800	12600	21400	17900	5310	2570	5030	3230	1360
15	4420	6250	8940	39100	11700	19900	16300	5310	2420	6210	2880	1310
16	4470	14300	14400	35200	10000	19000	15200	5250	2260	5090	2700	1290
17	4660	27900	21000	30900	9710	16900	14300	5240	2190	4120	2680	1270
18	4710	40200	20000	28700	10800	15900	15100	5210	2710	3520	2750	1260
19	5150	36700	16500	27100	16200	19300	17400	4590	2740	3000	2720	1260
20	4860	26200	18100	26100	22200	26200	24500	4150	2690	2940	2700	1250
21	4280	19600	29300	26800	24900	26400	25800	4120	2680	2970	2710	1240
22	4120	16100	34100	26600	22900	24300	21300	4050	2630	2880	2710	1240
23	5090	14700	32800	24700	20700	21100	16700	4040	2610	2830	2750	1220
24	5710	12900	30300	22600	20400	17600	13000	4030	2720	2800	2870	1180
25	4710	11200	35700	25000	18900	16000	13500	3610	2780	2880	2700	1160
26	3900	11500	59300	25300	16000	16400	13500	3430	2740	2910	2640	1130
27	5380	16700	78000	22900	14000	14800	13200	3320	3030	2880	2440	1110
28	8240	19800	74100	19100	11600	12500	13100	3370	3140	2810	2230	1100
29	8590	15400	55600	16300	10800	11800	12900	3210	3430	2770	2170	1100
30	8450	10800	45700	15300	---	15900	12800	3150	3740	2850	2130	1090
31	7740	---	42100	15200	---	19300	---	3130	---	2850	1970	---
TOTAL	155360	384850	740660	964900	474110	631420	623400	199090	87260	107730	82960	41050
MEAN	5012	12830	23890	31130	16350	20370	20780	6422	2909	3475	2676	1368
MAX	8590	40200	78000	49100	24900	30500	33500	12400	3740	6210	3910	1830
MIN	2700	5120	5190	15200	9710	6880	12800	3130	2190	2770	1970	1090
AC-FT	308200	763300	1469000	1914000	940400	1252000	1237000	394900	173100	213700	164600	81420

CAL YR 1987 TOTAL 7836570 MEAN 21470 MAX 78000 MIN 2700 AC-FT 15540000  
WTR YR 1988 TOTAL 4492790 MEAN 12280 MAX 78000 MIN 1090 AC-FT 8911000



## RED RIVER BASIN

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07336820 RED RIVER NEAR DE KALB, TX--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Chemical and biochemical analyses: January 1968 to current year. Pesticide analyses: October 1970 to September 1981. Sediment analyses: November 1979 to current year.

## PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: January 1968 to current year.

WATER TEMPERATURES: January 1968 to current year.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 2,140 microsiemens, July 13, 1980; minimum daily, 114 microsiemens, Oct. 31, 1984.

WATER TEMPERATURES: Maximum daily, 34.0 °C on several days during July and August 1969-70; minimum daily, 0.0 °C, Jan. 11, 1977.

## EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 1,430 microsiemens, Oct. 6; minimum daily, 171 microsiemens, Dec. 31.

WATER TEMPERATURES: Maximum daily, 30.0 °C on several days during summer months; minimum daily, 4.0 °C, Jan. 14-16, Feb. 6.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DATE	TIME	DIS- CHARGE, INST. (CUBIC FEET PER SECOND)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (STAND- ARD UNITS)	TEMPER- ATURE WATER (DEG C)	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	OXYGEN DEMAND, BIO- CHEM- ICAL, 5 DAY (MG/L)	HARD- NESS TOTAL (MG/L AS CAC03)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)
OCT											
27...	1440	5240	920	8.00	18.5	8.9	95	3.3	240	65	20
JAN											
26...	1645	25000	1150	8.00	5.5	13.4	106	0.5	300	77	25
MAR											
16...	1300	19100	1210	7.90	9.0	11.6	101	1.3	310	80	27
MAY											
03...	1500	10700	1280	7.10	19.5	9.5	106	0.7	330	84	29
JUN											
21...	1400	2600	1260	7.20	30.0	7.8	105	1.5	330	82	31
AUG											
09...	1300	2480	1340	8.00	32.0	7.7	107	2.3	350	85	34

DATE	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	ALKA- LINITY WAT WH TOT FET FIELD (MG/L AS CAC03)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SI02)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	NITRO- GEN, NITRATE TOTAL (MG/L AS N)	NITRO- GEN, NITRITE TOTAL (MG/L AS N)
OCT											
27...	91	3	4.6	133	120	130	0.30	8.0	519	--	<0.010
JAN											
26...	120	3	5.0	115	180	180	0.30	7.4	664	0.180	0.020
MAR											
16...	130	3	4.0	131	170	190	0.30	6.7	687	0.180	0.020
MAY											
03...	120	3	4.3	135	180	180	0.40	6.7	685	0.290	0.010
JUN											
21...	130	3	4.5	161	190	190	0.40	7.3	732	--	0.010
AUG											
09...	150	3	4.2	159	210	200	0.20	7.3	786	--	<0.010

07336820 RED RIVER NEAR DE KALB, TX--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

[illegible]

## 07336820 RED RIVER NEAR DE KALB, TX--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
EQUIVALENT MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1250	1180	326	178	1170	980	578	1190	1190	1350	1350	1340
2	1240	1220	180	385	1150	858	583	1210	1210	1280	1350	1320
3	1170	1260	222	513	1170	951	690	1200	1170	1240	1340	1310
4	1300	1300	231	637	1140	906	773	1300	1180	1260	1350	1300
5	1410	1340	603	773	976	842	813	1310	1170	1300	1360	1290
6	1430	1380	828	856	863	780	669	1310	1170	1290	1360	1230
7	1240	1390	1060	915	945	707	708	1320	1110	1240	1350	1140
8	1250	1340	940	946	1010	653	862	1300	1100	1300	1330	1080
9	1180	1310	739	978	1050	658	1010	1290	1180	1310	1360	1110
10	1410	973	319	1000	1070	1010	1140	1270	1200	1310	1350	1120
11	1380	831	297	1030	1100	1010	1210	1270	1160	1300	1290	1130
12	1350	944	575	1030	1130	1140	1230	1240	1130	765	1280	1140
13	1380	1010	875	930	1150	1160	1260	1280	1100	754	1290	1140
14	1380	1140	1170	806	1150	1170	1270	1170	1220	880	1280	1150
15	1380	1170	907	707	1160	1200	1280	1190	1230	1080	1270	1150
16	1370	700	633	583	1160	1210	1290	1210	1170	920	1270	1160
17	1370	585	418	657	1170	1200	1300	1210	1160	740	1300	1170
18	1370	307	432	725	1060	1160	1190	1210	1160	581	1360	1170
19	1370	278	447	778	915	1170	959	1220	1180	710	1370	1180
20	1310	376	460	802	838	933	856	1150	1200	987	1340	1220
21	1290	469	476	812	748	760	576	1180	1210	1290	1310	1210
22	1270	592	332	798	665	794	611	1200	1190	1290	1280	1240
23	1190	720	249	795	584	829	681	1220	1200	1290	1340	1240
24	1390	702	172	908	479	921	897	1220	1210	1300	1350	1220
25	1250	578	260	1010	535	1050	1140	1210	1340	1250	1300	1170
26	1130	602	357	1100	547	1150	1170	1180	1330	1310	1340	1120
27	930	621	355	1220	462	1040	1170	1190	1320	1310	1350	1120
28	1020	640	285	1170	464	955	1180	1210	1300	1320	1360	1060
29	1070	505	276	1180	969	860	1190	1210	1320	1320	1370	1060
30	1100	395	208	1170	---	844	1190	1210	1340	1330	1300	986
31	1150	---	171	1170	---	674	---	1190	---	1340	1340	---
MEAN	1270	862	478	857	925	954	983	1230	1200	1160	1330	1180

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
ONCE-DAILY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	10.0	5.0	11.0	13.0	15.0	---	24.0	30.0	29.0	24.0
2	20.0	---	9.0	5.0	10.0	13.0	14.0	19.0	24.0	---	29.0	24.0
3	19.0	---	10.0	---	9.0	12.0	---	19.0	23.0	---	29.0	---
4	---	---	10.0	5.0	7.0	10.0	16.0	19.0	23.0	28.0	29.0	---
5	17.0	19.0	10.0	5.0	5.0	---	17.0	19.0	---	28.0	29.0	---
6	18.0	17.0	---	5.0	4.0	---	17.0	20.0	23.0	27.0	29.0	---
7	17.0	15.0	12.0	---	---	---	17.0	20.0	24.0	26.0	---	---
8	17.0	---	14.0	---	5.0	12.0	17.0	---	25.0	26.0	29.0	---
9	17.0	15.0	13.0	---	5.0	11.0	---	---	27.0	26.0	30.0	---
10	19.0	14.0	12.0	---	5.0	11.0	---	21.0	25.0	---	30.0	---
11	---	11.0	11.0	---	---	12.0	15.0	22.0	24.0	28.0	29.0	---
12	18.0	10.0	---	---	---	12.0	13.0	22.0	---	26.0	26.0	---
13	17.0	10.0	---	---	5.0	---	---	22.0	25.0	26.0	26.0	---
14	---	11.0	9.0	4.0	---	9.0	---	23.0	26.0	28.0	---	---
15	---	---	6.0	4.0	7.0	9.0	---	---	26.0	29.0	28.0	---
16	---	15.0	6.0	4.0	7.0	9.0	---	24.0	26.0	---	28.0	---
17	---	13.0	6.0	---	9.0	10.0	---	25.0	26.0	---	28.0	---
18	---	12.0	---	6.0	10.0	9.0	---	25.0	26.0	29.0	28.0	25.0
19	19.0	13.0	---	8.0	9.0	9.0	15.0	25.0	---	29.0	28.0	26.0
20	19.0	12.0	---	7.0	---	---	15.0	25.0	28.0	29.0	---	26.0
21	16.0	12.0	8.0	6.0	---	10.0	17.0	---	28.0	29.0	---	27.0
22	16.0	---	8.0	5.0	---	12.0	18.0	---	29.0	28.0	28.0	27.0
23	16.0	13.0	8.0	7.0	10.0	14.0	20.0	21.0	29.0	28.0	28.0	27.0
24	16.0	14.0	10.0	---	10.0	15.0	---	21.0	29.0	---	28.0	---
25	---	15.0	---	---	---	---	19.0	21.0	30.0	25.0	28.0	---
26	18.0	---	9.0	---	10.0	16.0	19.0	21.0	---	---	28.0	24.0
27	17.0	---	7.0	5.0	11.0	---	18.0	21.0	30.0	---	---	23.0
28	16.0	11.0	5.0	6.0	11.0	---	18.0	22.0	30.0	---	---	23.0
29	---	---	5.0	7.0	12.0	17.0	18.0	---	30.0	---	25.0	24.0
30	---	10.0	5.0	---	---	14.0	18.0	23.0	30.0	---	25.0	23.0
31	---	---	5.0	---	---	14.0	---	24.0	---	---	24.0	---
MEAN	17.5	13.1	8.7	5.5	8.2	11.9	16.8	21.8	26.5	27.6	27.9	24.8

## 07337300 PINE CREEK LAKE NEAR WRIGHT CITY, OK

LOCATION.--Lat 34°06'43", long 95°04'46", in NE 1/4 NW 1/4 sec.23, T.5 S., R.21 E., McCurtain County, Hydrologic Unit 11140107, at left of outlet works of dam on Little River, 4.7 mi upstream from bridge on State Highway 98, 5.0 mi northwest of Wright City, and at mile 145.3.

DRAINAGE AREA.--635 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1969 to current year. Prior to October 1970, published as Pine Creek Reservoir near Wright City.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by rolled earth dam; regulated storage began June 1, 1969; conservation pool was first filled Jan. 7, 1970. Total capacity, 1,136,000 acre-ft at elevation 509.0 ft, top of dam, 465,800 acre-ft at elevation 480.0 ft, crest of spillway, 53,800 acre-ft at elevation 438.0 ft top of conservation pool, 7,140 acre-ft dead storage at elevation 414.0 ft. Figures given herein represent total contents. Reservoir is designed for flood control, municipal and industrial water supply, and recreation. U.S. Army Corps of Engineers' satellite telemeter at station.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 356,500 acre-ft, Nov. 4, 1984, elevation, 473.13 ft; minimum since conservation pool was first filled, 28,220 acre-ft, Oct. 21, 1972, elevation, 429.34 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 201,600 acre-ft, Dec. 31, elevation, 460.44 ft; minimum 50,720 acre-ft, Oct. 21, 23, elevation, 437.17 ft.

Capacity table (elevation, in feet, and contents, in acre-ft):

436	46,650	448	102,600
439	57,610	462	217,470
442	70,490	474	369,400

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	54680	55830	78720	198200	54210	53750	106400	73120	68890	62440	70310	61980
2	54140	54790	69770	195100	55260	54870	139600	73170	68800	62270	69850	61850
3	53680	54600	63440	192000	56840	61190	142400	73310	68700	62320	69340	62320
4	53280	53980	59890	187400	57610	62320	139600	73260	68470	62360	69070	62020
5	53200	53830	58260	178400	57980	62150	135100	73170	68250	62140	68610	61850
6	53020	53710	57420	167200	58020	61350	129400	73170	67980	61930	68110	61610
7	53130	53570	56880	156500	58020	60170	121400	73120	67750	61640	67710	61380
8	52950	52950	56300	149300	57610	59360	112800	73310	67580	61450	67160	61250
9	52760	54950	54790	134900	56370	58220	103900	73170	67310	61280	66590	61120
10	52510	60210	54440	124500	55100	56370	94500	73120	67000	61120	66060	60990
11	52030	62880	54480	113800	53750	55100	85820	72980	66680	61350	65490	60820
12	52110	63610	54600	103800	53570	55250	78900	72740	66460	66190	80480	60690
13	51700	63400	54980	94700	54140	54750	75280	72600	66240	68250	86200	60520
14	51630	62540	56720	86260	54720	54060	74170	72450	66010	68890	87170	60340
15	51410	73100	59730	79720	54870	53680	73690	72270	65790	69160	86250	60260
16	51230	109600	58630	76780	55100	53640	73500	72120	65620	69300	83700	60030
17	51160	124100	56100	75630	54870	54640	75720	71940	65620	69300	80990	59840
18	51010	124200	54720	74470	59080	57420	91200	71750	65450	69480	78300	59450
19	51270	120300	76580	71200	68320	60050	94150	71510	65190	69340	75870	59400
20	51010	115700	94640	65630	73710	62020	92040	71330	64970	69760	73360	59160
21	50720	110300	100200	60580	76630	63520	88700	71140	64710	70260	70820	58870
22	50830	104400	99350	58220	76130	64900	85330	70810	64490	70260	68200	58630
23	50720	98330	93610	57530	71910	65880	82120	70770	64230	70220	65540	58240
24	51490	92240	92920	56680	67780	67510	78700	70670	64020	70170	63720	57950
25	52330	95900	111500	55370	63480	71440	75430	70440	63800	70080	63380	57760
26	60050	97310	157500	54720	59850	74420	72930	70170	63500	69890	63120	57490
27	61680	96080	182100	54290	57530	76580	72360	70030	63460	69530	62950	57260
28	61070	94240	191500	53940	55100	78570	72640	69800	63210	70120	62700	57020
29	59970	91950	196300	53980	53980	85550	72930	69570	63040	70490	62490	56900
30	58550	87030	200200	54210	---	89000	73020	69340	62820	70630	62230	56900
31	57070	---	200700	54140	---	90100	---	69160	---	70580	62150	---
MAX	61680	124200	200700	198200	76630	90100	142400	73310	68890	70630	87170	62320
MIN	50720	52950	54440	53940	53570	53640	72360	69160	62820	61120	62150	56900
(+)	438.86	445.29	460.35	438.10	438.06	445.85	442.54	441.71	440.27	442.02	440.11	438.82
(++)	+1,700	+29,960	+113,670	-146,560	-160	+36,120	-17,080	-3,860	-6,340	+7,760	-8,430	-5,250

CAL YR 1987 MAX 200700 MIN 50720 (++) +1,530  
WTR YR 1988 MAX 200700 MIN 50720 (++) +145,870

(+) ELEVATION, IN FEET, AT END OF MONTH  
(++) CHANGE IN CONTENTS, IN ACRE-FEET

## 07337500 LITTLE RIVER NEAR WRIGHT CITY, OK

LOCATION.--Lat 34°04'10", long 95°02'47", in NE 1/4 NW 1/4 sec.6, T.6 S., R.22 E., McCurtain County, Hydrologic Unit 11140107, on left bank on downstream side of bridge on State Highway 98, 1.8 mi upstream from White Oak Creek, 2.0 mi west of Wright City, 4.7 mi downstream from Pine Creek Lake, and at mile 140.6.

DRAINAGE AREA.--645 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1929 to September 1931, October 1944 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1211: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 346.76 ft above National Geodetic Vertical Datum of 1929. Oct. 12, 1929 to Sept. 30, 1931, nonrecording gage at railroad bridge 1.0 mi downstream at datum 4.15 ft higher. Dec. 6, 1944 to July 30, 1951, nonrecording gage at present site and datum.

REMARKS.--Records good. Except for 10 mi<sup>2</sup> intervening area, flow completely regulated since June 1969 by Pine Creek Lake (station 07337300). U.S. Army Corps of Engineers' satellite telemeter at station.

COOPERATION.--Gage-height record and 7 discharge measurements provided by U.S. Army Corps of Engineers; records computed by U.S. Geological Survey.

AVERAGE DISCHARGE.--Prior to regulation by Pine Creek Lake, 26 years (water years 1930-31, 1945-68), 907 ft<sup>3</sup>/s, 656,600 acre-ft/yr; since regulation by Pine Creek Lake, 18 years (water years 1971-88), 905 ft<sup>3</sup>/s, 655,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 78,200 ft<sup>3</sup>/s, May 6, 1961, gage height, 45.60 ft; maximum gage height, 45.77 ft, Sept. 16, 1950; no flow at times in 1930, 1954, 1956, 1964.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,270 ft<sup>3</sup>/s, Jan. 6, gage height, 20.90 ft; minimum daily discharge, 31 ft<sup>3</sup>/s, Mar. 22, 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	324	819	4860	2250	248	384	e1140	46	71	50	56	48
2	306	723	4920	2250	256	242	e1140	46	80	47	160	47
3	210	315	4560	2240	293	453	e2500	47	70	55	184	69
4	165	236	2630	2720	364	1340	4010	47	65	64	189	61
5	150	151	1050	4500	507	1340	3940	52	65	58	192	55
6	100	104	1050	6180	507	1340	4280	51	67	52	192	51
7	68	84	1050	6260	507	1330	5220	51	67	54	195	49
8	60	85	1100	6200	665	1350	5210	54	58	55	200	48
9	58	102	1290	6130	991	1500	5140	53	35	53	202	48
10	54	112	703	6050	987	1820	5060	52	36	53	202	49
11	51	92	649	5970	920	1490	4980	51	45	e53	205	51
12	53	141	441	5920	530	909	4370	52	49	e50	256	47
13	53	599	413	5940	113	882	2580	53	49	e48	240	47
14	53	784	437	5850	111	875	783	56	50	43	233	48
15	51	853	931	5250	104	724	523	56	53	40	353	47
16	51	1840	2590	3080	168	454	282	59	49	39	822	51
17	50	2010	2580	2950	440	271	351	56	53	39	1040	51
18	52	2930	1960	2920	496	60	403	56	57	39	1150	53
19	72	3930	1000	3140	550	36	1140	59	55	41	1210	55
20	75	3910	1910	4200	479	33	2630	57	54	43	1220	51
21	66	3840	808	3990	472	33	2630	61	55	42	1220	49
22	63	3790	1900	2370	1150	31	2440	66	53	44	1220	49
23	63	3740	4450	963	2910	31	1930	72	55	43	1220	53
24	86	3710	3070	956	2910	34	1900	76	54	43	1020	51
25	99	1370	963	950	2860	e34	1880	74	47	39	184	49
26	122	2350	4760	854	2350	e36	1440	75	47	41	154	49
27	173	2340	3930	544	1500	41	449	73	46	39	76	51
28	522	2320	974	503	1480	39	46	75	47	41	58	49
29	713	2270	58	390	974	e39	43	75	47	39	51	47
30	789	2780	57	249	---	e300	43	72	50	41	49	56
31	812	---	865	249	---	1140	---	71	---	41	49	---
TOTAL	5564	48330	57959	102018	25842	18591	68483	1844	1629	1429	13802	1529
MEAN	179	1611	1870	3291	891	600	2283	59.5	54.3	46.1	445	51.0
MAX	812	3930	4920	6260	2910	1820	5220	76	80	64	1220	69
MIN	50	84	57	249	104	31	43	46	35	39	49	47
AC-FT	11040	95860	115000	202400	51260	36880	135800	3660	3230	2830	27380	3030

CAL YR 1987 TOTAL 278389.5 MEAN 763 MAX 5350 MIN 7.5 AC-FT 552200  
WTR YR 1988 TOTAL 347020 MEAN 948 MAX 6260 MIN 31 AC-FT 688300

e Estimated



## 07337900 GLOVER CREEK NEAR GLOVER, OK

LOCATION.--Lat 34°05'51", long 94°54'07", in NW 1/4 NE 1/4 sec.28, T.5 S., R.23 E., McCurtain County, Hydrologic Unit 11140107, on right downstream end of bridge on State Highways 3 and 7, 2.0 mi north of Glover, 11.0 mi northwest of Broken Bow, and at mile 9.2.

DRAINAGE AREA.--315 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1961 to current year.

GAGE.--Water-stage recorder. Datum of gage is 378.70 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair. U.S. Army Corps of Engineers' satellite telemeter at station.

COOPERATION.--Gage-height record and 7 discharge measurements provided by U.S. Army Corps of Engineers; records computed by U.S. Geological Survey.

AVERAGE DISCHARGE.--27 years, 453 ft<sup>3</sup>/s, 19.53 in/yr, 328,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 98,600 ft<sup>3</sup>/s, Dec. 10, 1971, gage height, 29.72 ft; no flow at times in several years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in May 1961 reached a stage of 28.84 ft, from floodmark. Flood in 1908 was higher than in May 1961, from information provided by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 8,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage Height (ft)
Oct. 25	1300	9,160	9.80	Mar. 29	1500	8,550	9.47
Nov. 16	0700	11,900	11.20	Apr. 2	0600	15,900	13.04
Dec. 19	2200	15,700	12.96	Aug. 12	1900	14,700	12.52
Dec. 26	0700	*20,300	*14.80				

Minimum daily discharge, 0.83 ft<sup>3</sup>/s on Aug. 11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	27	154	330	531	167	e230	1410	109	11	2.7	7.2	21
2	18	124	269	437	172	e240	7820	96	11	2.4	6.6	17
3	14	104	224	376	393	e620	2000	90	14	3.5	4.9	32
4	13	88	195	348	428	580	983	81	14	10	3.6	23
5	11	76	168	320	342	467	662	74	12	11	2.8	15
6	11	68	148	287	297	386	596	66	9.8	11	2.8	12
7	9.7	60	302	286	259	335	476	59	8.6	8.0	2.8	9.6
8	8.3	80	360	273	241	409	389	64	7.6	6.0	2.2	8.3
9	7.6	681	289	249	229	626	335	60	7.0	4.8	1.8	7.3
10	6.9	2260	238	241	212	453	287	52	6.3	3.9	1.2	7.2
11	6.5	963	204	233	205	377	269	47	5.1	7.6	.83	6.2
12	5.9	552	181	241	197	615	247	43	4.3	690	5210	5.4
13	5.2	383	165	488	183	526	217	39	3.7	1300	1930	4.7
14	4.4	292	356	562	172	398	190	34	3.9	390	621	4.2
15	3.9	557	1600	508	163	343	171	36	3.6	213	374	3.6
16	3.2	7920	911	533	155	301	155	35	4.1	144	262	3.4
17	4.2	4360	605	1160	144	275	193	29	8.3	101	199	3.1
18	4.4	1500	461	1210	274	427	2440	29	13	75	646	3.1
19	8.0	1140	4890	820	4230	506	1070	25	11	57	425	3.1
20	11	588	5790	637	1830	435	636	21	9.1	45	208	4.6
21	8.5	436	1720	499	938	381	465	19	7.4	36	149	4.9
22	7.7	352	926	418	649	333	376	18	5.7	32	125	3.7
23	8.1	301	643	365	491	295	311	16	4.4	27	113	3.3
24	25	265	748	332	390	265	251	16	3.7	21	126	2.9
25	3580	1000	6240	294	329	1280	209	16	3.4	16	103	2.7
26	e3250	1200	13500	256	286	878	184	14	3.4	13	80	2.3
27	1180	740	6120	229	e255	567	163	14	3.8	11	62	2.2
28	568	612	2570	210	e247	435	147	14	4.3	9.3	50	1.9
29	359	484	1300	196	e240	3400	131	14	4.2	8.2	40	1.9
30	253	392	844	184	---	2230	118	12	3.4	7.1	32	5.4
31	193	---	661	177	---	931	---	11	---	6.9	26	---
TOTAL	9615.5	27732	52958	12900	14118	19544	22901	1253	211.1	3273.4	10817.73	225.0
MEAN	310	924	1708	416	487	630	763	40.4	7.04	106	349	7.50
MAX	3580	7920	13500	1210	4230	3400	7820	109	14	1300	5210	32
MIN	3.2	60	148	177	144	230	118	11	3.4	2.4	.83	1.9
AC-FT	19070	55010	105000	25590	28000	38770	45420	2490	419	6490	21460	446
CFSM	.98	2.93	5.42	1.32	1.55	2.00	2.42	.13	.02	.34	1.11	.02
IN.	1.14	3.28	6.25	1.52	1.67	2.31	2.70	.15	.02	.39	1.28	.03

CAL YR 1987 TOTAL 155992.2 MEAN 427 MAX 13500 MIN 2.1 AC-FT 309400 CFSM 1.36 IN. 18.42  
WTR YR 1988 TOTAL 175548.73 MEAN 480 MAX 13500 MIN .83 AC-FT 348200 CFSM 1.52 IN. 20.73

e Estimated

## 07338500 LITTLE RIVER BELOW LUKFATA CREEK NEAR IDABEL, OK

LOCATION.--Lat 33°56'28", long 94°45'30", In SE 1/4 SE 1/4 sec.14, T.7 S., R.24 E., McCurtain County, Hydrologic Unit 11140107, on left bank at downstream side of bridge on U.S. Highway 70 just downstream from Lukfata Creek, 5.0 mi northeast of Idabel, and at mile 103.4.

DRAINAGE AREA.--1,226 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1946 to current year.

REVISED RECORDS.--WSP 1211: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 312.08 ft above National Geodetic Vertical Datum of 1929.

Oct. 1, 1946 to Oct. 26, 1950, and for stages below 9.0 ft Oct. 26, 1950 to Oct. 10, 1951, nonrecording gage at same site and datum.

REMARKS.--Records good. Flow regulated since June 1969 by Pine Creek Lake (station 07337300), 41.9 mi upstream. U.S. Army Corps of Engineers' satellite telemeter at station.

COOPERATION.--Gage-height record and 8 discharge measurements provided by U.S. Army Corps of Engineers; records computed by U.S. Geological Survey.

AVERAGE DISCHARGE.--Prior to regulation by Pine Creek Lake, 22 years (water years 1947-68), 1,622 ft<sup>3</sup>/s, 1,174,000 acre-ft/yr; since regulation by Pine Creek Lake, 18 years (water years 1971-88), 1,721 ft<sup>3</sup>/s, 1,247,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 103,000 ft<sup>3</sup>/s, Dec. 10, 1971, gage height, 39.39 ft; minimum discharge, 0.4 ft<sup>3</sup>/s, Sept. 15-16, and Sept. 21 to Oct. 1, 1956.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in February 1938 reached a stage of 39.7 ft, from information provided by local resident, discharge, 86,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 14,600 ft<sup>3</sup>/s, Dec. 27, gage height, 29.34 ft; minimum daily discharge, 50 ft<sup>3</sup>/s, Oct. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	338	1150	3860	2610	606	1160	3050	255	101	66	71	90
2	329	1100	4850	3290	661	869	6440	229	113	66	71	84
3	295	765	5020	3200	1250	869	8750	216	125	67	140	100
4	174	342	4590	3100	1420	1710	7240	201	142	72	205	175
5	144	286	2730	3620	1320	2480	5820	191	119	115	210	132
6	137	197	1480	4920	1240	2250	5040	182	105	127	209	100
7	85	144	1460	6030	1130	2100	5170	175	98	95	209	86
8	59	140	1700	6350	1080	2220	5540	170	95	78	205	79
9	54	713	2020	e7800	1340	2720	5520	174	91	74	203	77
10	52	2590	1750	e11700	1530	2870	5340	174	78	74	200	76
11	51	2430	1160	e11800	1530	2800	5190	156	64	73	202	74
12	51	1200	929	6210	1380	2650	5090	141	61	1020	1350	73
13	50	1180	702	6340	861	2300	4400	135	64	1910	4820	71
14	51	1430	946	6600	547	1880	2580	132	66	1190	2650	71
15	52	1470	2220	6630	505	1650	1240	128	65	566	876	71
16	52	5390	3590	5970	464	1270	807	125	64	367	1270	71
17	57	9330	3890	4810	546	947	669	124	66	264	1660	71
18	60	8830	3600	4910	1050	900	2300	120	68	197	1670	72
19	99	6530	3310	4720	3950	1030	3320	111	69	157	2170	74
20	97	5240	7230	4660	5490	906	3140	110	71	131	1880	76
21	82	4650	8060	5000	3330	773	3560	113	72	123	1610	70
22	69	4310	4840	4540	2050	670	3390	112	72	113	1530	70
23	62	4150	4120	2930	2850	579	2970	110	71	104	1510	69
24	76	4050	5090	1780	3640	524	2510	112	68	99	1520	68
25	133	4430	5870	1640	3570	1460	2390	116	64	95	1060	73
26	956	4130	11200	1560	3440	2390	2310	114	63	87	375	64
27	2960	4170	14100	1300	2680	1400	1610	107	64	83	260	64
28	1770	3830	13900	1030	2100	961	680	104	64	80	168	64
29	1520	3500	10900	903	2000	1190	328	103	64	72	113	63
30	1330	3240	5400	734	---	5890	280	103	65	71	98	71
31	1230	---	1860	608	---	4670	---	103	---	71	89	---
TOTAL	12475	90917	142377	137295	53560	56088	106674	4446	2392	7707	28604	2399
MEAN	402	3031	4593	4429	1847	1809	3556	143	79.7	249	923	80.0
MAX	2960	9330	14100	11800	5490	5890	8750	255	142	1910	4820	175
MIN	50	140	702	608	464	524	280	103	61	66	71	63
AC-FT	24740	180300	282400	272300	106200	111300	211600	8820	4740	15290	56740	4760

CAL YR 1987 TOTAL 544235 MEAN 1491 MAX 14100 MIN 50 AC-FT 1079000  
WTR YR 1988 TOTAL 644934 MEAN 1762 MAX 14100 MIN 50 AC-FT 1279000

e Estimated

07338900 BROKEN BOW LAKE NEAR BROKEN BOW, OK

LOCATION.--Lat 34°08'35", long 94°41'00", in SW 1/4 sec.3, T.5 S., R.25 E., McCurtain County, Hydrologic Unit 11140108, at intake structure on upstream side of dam on Mountain Fork, 9.0 mi northeast of Broken Bow, and at mile 20.3.

DRAINAGE AREA.--754 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1968 to current year. Prior to October 1970, published as Broken Bow Reservoir near Broken Bow.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by a rolled earth and gravel structure. Outlet works consists of power-generated turbines and a concrete ogee-type weir controlled by eight 40- by 40-foot taintor gates. Regulated storage began Oct. 3, 1968; conservation pool was first filled Jan. 30, 1969. Total capacity, 1,368,000 acre-ft at elevation 627.5 ft, top of flood pool and spillway gates, 918,100 acre-ft at elevation 599.5 ft, top of power pool, and 448,200 acre-ft at elevation 559.0 ft, bottom of power pool. Figures given herein represent total contents. Reservoir is used for flood control, power development and water supply. U.S. Army Corps of Engineers' satellite telemeter at station.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 1,244,400 acre-ft, Nov. 3, 4, 1984, elevation, 620.40 ft; minimum since conservation pool was first filled, 672,000 acre-ft, Oct. 21, 1972, elevation 580.48 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 1,153,000 acre-ft, Dec. 30, elevation 614.93 ft; minimum 810,500 acre-ft, Oct. 23, elevation, 591.62 ft.

Capacity table (elevation, in feet, and contents, in acre-ft):

590	789,300	607	1,028,500
594	842,100	615	1,154,600
598	897,000	621	1,254,600

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
2400-HR VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	820100	822300	933500	1136000	925900	915100	940400	902600	884000	871000	872100	875700
2	819000	822400	928700	1125000	922600	915100	963800	902300	883400	871300	871300	875300
3	818300	821900	922800	1115000	920500	916200	973500	900700	883400	872000	870200	875300
4	818200	822000	918900	1103000	917900	914200	972300	900300	883000	871700	870500	875000
5	817500	822200	918300	1091000	916900	915700	966000	898900	882600	871000	869400	875200
6	816400	821200	918100	1080000	917500	917100	957600	898400	882100	870800	869200	874200
7	816000	821100	917200	1068000	917800	917500	949000	898500	881400	870500	869000	873600
8	814500	823400	918900	1055000	918400	915400	940100	899000	881000	869500	868700	872700
9	813600	829900	918800	1043000	918500	912800	937800	898900	880800	869200	868300	871600
10	814200	837000	917500	1031000	917800	909900	939100	898200	879800	869000	867600	871400
11	813500	840600	913400	1018000	913300	908500	934200	897500	879300	870100	866500	e870800
12	812700	842700	918200	1009000	913300	912000	931500	896700	879200	876700	879800	e870200
13	811900	842600	920200	996000	914200	913400	928000	896200	878600	878600	881900	e869900
14	811500	844100	923000	985200	915400	913000	924300	896100	878000	878900	882900	e865500
15	811400	849600	932000	975200	e915200	912000	920800	896100	877900	878600	883600	e862000
16	811400	886400	932300	976600	e914800	912000	921500	895600	877900	878300	882100	e859400
17	811400	905800	930500	984800	e914100	909300	926000	894600	877200	878600	878000	e858000
18	811600	912400	928000	987200	916100	907500	936600	894200	877100	878200	878300	e857900
19	812700	915400	953200	986200	927000	908200	937100	893000	877000	878000	879700	e856800
20	812100	918100	971500	977700	930900	911800	934200	892300	876500	877600	881000	e856700
21	811900	917600	977600	967700	933900	909300	929200	892300	875800	877100	882300	e856600
22	811600	918200	974000	957500	931900	905400	922800	892200	875300	875800	880400	e856300
23	810700	918900	973800	957500	929000	901700	920500	891900	875400	875600	879800	856100
24	812900	921300	976000	956700	927300	899900	917900	891500	874700	875400	880100	855900
25	813100	930300	1028000	947000	925200	901600	910300	890700	874600	875200	879400	855600
26	818700	938900	1103000	940200	921600	905100	905600	888600	874900	874500	878900	855600
27	820700	936900	1131000	933000	921200	908500	903900	886800	873100	874100	878900	854500
28	821500	939600	1144000	929600	921200	909000	901800	886500	872400	873800	878900	854000
29	822000	942100	1151000	926700	918900	917900	901800	886500	872100	872700	878700	853700
30	821800	936000	1152000	927600	---	925800	902000	885400	872000	872700	877500	854100
31	822300	---	1147000	927300	---	930600	---	884600	---	872400	876900	---
MAX	822300	942100	1152000	1136000	933900	930600	973500	902600	884000	878900	883600	875700
MIN	810700	821100	913400	926700	913300	899900	901800	884600	872000	869000	866500	853700
(+)	592.52	600.76	614.51	600.25	599.56	600.38	598.36	597.11	596.20	596.23	596.56	594.89
(++)	+1,400	+113,700	+211,000	-219,700	-8,400	+11,700	-28,600	-17,400	-12,600	+400	+4,500	-22,800

CAL YR 1987 MAX 1152000 MIN 810700 (++) +229,100  
WTR YR 1988 MAX 1152000 MIN 810700 (++) +33,200

(+) ELEVATION, IN FEET, AT END OF MONTH  
(++) CHANGE IN CONTENTS, IN ACRE-FEET

e Estimated

## 07339000 MOUNTAIN FORK NEAR EAGLETOWN, OK

LOCATION.--Lat 34°02'30", long 94°37'15", in SE 1/4 SE 1/4 sec.7, T.6 S., R.26 E., McCurtain County, Hydrologic Unit 11140108, near center of span on downstream side of pier of bridge on U.S. Highway 70, 2.0 mi west of Eagletown, 10.7 mi downstream from Broken Bow Dam, and at mile 8.9.

DRAINAGE AREA.--787 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1924 to December 1925, October 1929 to current year. Published as Mountain Fork River near Broken Bow 1924-25 and as Mountain Fork River near Eagletown 1929-60. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1211: Drainage area. WSP 1241: 1924-26, 1930 (M), 1936-37 (M), 1938, 1939 (M) 1942 (M).

GAGE.--Water-stage recorder. Datum of gage is 333.87 ft above National Geodetic Vertical Datum of 1929. See WSP 1920 for history of changes prior to July 23, 1950.

REMARKS.--Records fair from Oct. 1 to Jan. 4 and good from Jan. 5 to Sept. 30. Except for 33 mi<sup>2</sup> intervening area, flow completely regulated since October 1968 by Broken Bow Lake (station 07338900). U.S. Army Corps of Engineers' satellite telemeter at station.

COOPERATION.--Gage-height record and 4 discharge measurements provided by U.S. Army Corps of Engineers; records computed by U.S. Geological Survey.

AVERAGE DISCHARGE.--Prior to regulation by Broken Bow Lake, 40 years (water years 1925, 1930-68), 1,291 ft<sup>3</sup>/s, 934,600 acre-ft/yr; since regulation by Broken Bow Lake, 19 years (water years 1970-88), 1,389 ft<sup>3</sup>/s, 1,006,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 101,000 ft<sup>3</sup>/s, May 20, 1960, gage height, 26.73 ft; from rating curve extended above 65,000 ft<sup>3</sup>/s; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Aug. 18-19, 1915, reached a stage of 26.4 ft, from information provided by local resident, discharge, 92,500 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 8,080 ft<sup>3</sup>/s, Feb. 20, gage height, 7.59 ft; minimum daily discharge, 99 ft<sup>3</sup>/s, Nov. 6, Aug. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988  
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	433	137	2500	e6700	1050	2240	502	183	307	167	121	346
2	361	120	e3000	e6800	2320	1580	1240	172	401	175	99	449
3	275	108	3500	e6900	2490	2420	436	468	439	172	134	219
4	172	118	3000	e6800	2330	3310	2480	706	304	162	225	172
5	163	115	995	6900	1930	2000	4780	534	184	147	167	159
6	165	99	836	7230	436	735	6220	726	174	150	158	147
7	243	114	1570	7020	164	834	6150	274	214	150	143	156
8	176	121	1290	6990	410	2690	5960	194	249	136	139	154
9	264	254	814	7180	294	3040	2870	183	182	141	144	282
10	342	354	1240	7010	665	3290	919	184	171	141	509	312
11	181	203	948	6970	2440	2680	2540	306	170	133	445	184
12	166	159	585	6250	1340	1430	2190	380	167	260	191	170
13	166	294	168	7360	252	303	2320	514	158	179	157	270
14	239	250	616	7670	150	1020	2710	297	147	154	140	401
15	177	195	1170	6950	708	1480	2710	183	155	172	579	797
16	169	1050	2110	2090	368	1130	1090	180	153	208	2010	1530
17	172	571	2100	1430	473	1640	232	320	141	169	336	875
18	170	233	2310	2650	1410	2220	1310	258	155	158	432	209
19	165	224	2210	4490	3190	903	3480	358	152	159	198	190
20	144	298	3030	5870	4210	190	3870	435	137	170	167	178
21	141	1120	2150	7170	1590	1180	4190	338	131	158	950	173
22	142	681	4020	7040	1810	2490	4710	189	141	145	549	167
23	139	407	e3000	2310	3190	2660	2940	177	152	154	531	159
24	164	592	e2200	649	2500	2450	2030	189	183	147	555	165
25	160	365	e1000	5580	2110	2160	4490	285	301	135	312	161
26	160	288	e450	4220	2460	802	2760	571	181	119	336	140
27	164	3450	e190	3730	1730	194	1490	1070	197	128	323	115
28	156	1760	e170	3590	706	283	1420	561	534	125	175	128
29	144	752	e800	2350	1250	898	713	194	414	107	161	131
30	137	3220	e2500	678	---	366	199	183	184	133	147	117
31	141	---	e6800	169	---	193	---	459	---	137	159	---
TOTAL	5991	17652	57272	158746	43976	48811	78951	11071	6578	4791	10692	8656
MEAN	193	588	1847	5121	1516	1575	2632	357	219	155	345	289
MAX	433	3450	6800	7670	4210	3310	6220	1070	534	260	2010	1530
MIN	137	99	168	169	150	190	199	172	131	107	99	115
AC-FT	11880	35010	113600	314900	87230	96820	156600	21960	13050	9500	21210	17170

CAL YR 1987 TOTAL 334631 MEAN 917 MAX 6800 MIN 99 AC-FT 663700  
WTR YR 1988 TOTAL 453187 MEAN 1238 MAX 7670 MIN 99 AC-FT 898900

e Estimated



## DISCHARGE AT PARTIAL-RECORD STATIONS

As the number of streams on which stream flow information is likely to be desired far exceeds the number of stream-gaging stations feasible to operate at one time, the Geological Survey collects limited streamflow data at sites other than stream-gaging stations. When limited streamflow data are collected on a systematic basis over a period of years for use in hydrologic analyses, the site at which the data are collected is called a partial-record station. Data collected at these partial-record stations are usable in low-flow or floodflow analyses, depending on the type of data collected. In addition, discharge measurements are made at other sites not included in the partial-record program. These measurements are generally made in times of drought or flood to give better areal coverage to those events. Those measurements and others collected for some special reason are called measurements at miscellaneous sites.

## Crest-stage partial-record stations

The following table contains annual maximum discharges for crest-stage stations. A crest-station gage is a device which will register the peak stage occurring between inspections of the gage. A stage-discharge relation for each gage is developed from discharge measurements made by indirect measurements of peak flow or by current meter. The date of the maximum discharge is not always certain, but is usually determined by comparison with nearby continuous-record stations, weather records, or local inquiry. Only the maximum discharge for each water year is given. Information on some lower floods may have been obtained, but is not published herein. The years given in the period of record represent water years for which the annual maximum has been determined.

Annual maximum discharge at crest-stage partial-record stations during water year 1988

Station number	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Date	Annual maximum	
						Gage height (ft)	Discharge (ft <sup>3</sup> /s)
ARKANSAS RIVER BASIN							
07159200	Kingfisher Creek near Kingfisher, Okla.	Lat 35°50'30", long 98°03'57", in NW 1/4 SW 1/4 sec.28, T.16 N., R.8 W., Kingfisher County, at county road bridge, 7.6 mi west of Kingfisher.	157	1967-70† 1971-88	03-04-88 21.00	3,400	
07237800	Bent Creek near Seiling, Okla.	Lat 36°11'26", long 99°00'36", in SE 1/4 SE 1/4, sec.21, T.20 N., R.17 W., Woodward County, at bridge on U.S. Highway 183 and 270, 6 mi northwest of Seiling.	139	1964-70† 1971-88	Unknown <12.90	<1,210	
07242160	Alabama Creek near Weleetka, Okla.	Lat 35°21'40", long 96°08'55", in NW 1/4 NE 1/4 sec.9, T.10 N., R.11 E., Okfuskee County, at county road multi-barrel culvert, 2.0 mi north of Weleetka.	16.5	1965-74 1976-88	04-01-88 12.49	2,690	

† Operated as a continuous-record station.

## Low-flow partial-record stations

Measurements of streamflow in the area covered by this report made at low-flow partial-record stations are given in the following table. Most of these measurements were made during periods of base flow when streamflow is primarily from ground-water storage. These measurements, when correlated with the simultaneous discharge of a nearby stream where continuous records are available, will give a picture of the low-flow potentiality of a stream. The column headed "Period of record" shows the water years in which measurements were made at the same, or practically the same, site.

Discharge measurements made at low-flow partial-record stations during water year 1988

Station number	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Measurements	
					Date	Discharge (ft <sup>3</sup> /s)
RED RIVER BASIN						
07329847	Buffalo Spring near Sulphur, Okla.	Lat 34°30'08", long 96°56'21", in SW 1/4 NE 1/2 sec.1, T.1 S., R.3 E., Murray County, 0.1 mi upstream from Travertine Creek and 2 mi east of Sulphur.		1986-88	10-08-87 11-05-87 12-17-87 01-27-88 05-18-88 07-26-88 08-31-88	.31 .27 .42 1.50 .77 .16 .15



## Flood hydrograph stations

The following table contains rainfall and discharge for indicated times at a flood hydrograph station. Records of discharge above the base discharge are obtained from a water-stage recorder. A stage-discharge relation for each gage is selected and developed from discharge measurements made by indirect measurements of peak discharge. Records of rainfall are obtained from a water-stage recorder collecting rain in a holding pipe.

## ARKANSAS RIVER BASIN

## 07229030 Merkle Creek at Norman, Ok.

LOCATION.--Lat 35°12'24", long 97°28'51", in SW 1/4, SE 1/4, sec. 35, T.9 N., R.3 W., at the Lindsey Street southbound exit ramp of I-35 in Norman, Ok., Cleveland County, Hydrologic Unit 11090202, 1.1 mi upstream of Canadian River.

DRAINAGE AREA.--3.75 mi<sup>2</sup>.

PERIOD OF RECORD.--January to September 1988.

DISCHARGE, IN CUBIC FEET PER SECOND, AND RAINFALL, IN INCHES, AT INDICATED TIME, 1988 WATER YEAR

DATE	TIME	DISCHARGE	RAINFALL
JULY 8	1715	338	N/A
	1730	296	N/A
	1745	292	N/A
	1800	489	N/A
	1815	366	N/A

## 07229055 Bishop Creek at Norman, Ok.

LOCATION.--Lat 35°12'13", long 97°25'52", in NW 1/4, NE 1/4, sec. 5, T.8 N., R.2 W., at the intersection of Classen and Lindsey Streets in Norman, Ok., Cleveland County, Hydrologic Unit 11090202, 3.2 mi upstream of Canadian River.

DRAINAGE AREA.--2.10 mi<sup>2</sup>.

PERIOD OF RECORD.--January to September 1988.

DISCHARGE, IN CUBIC FEET PER SECOND, AND RAINFALL, IN INCHES, AT INDICATED TIME, 1988 WATER YEAR

DATE	TIME	DISCHARGE	RAINFALL	DATE	TIME	DISCHARGE	RAINFALL
SEPT. 18	2030	218	.14	SEPT. 23	0445	216	.64
	2045	289	.05		0500	451	.20
	2100	321	.02		0515	635	.03
	2115	274	.03		0530	453	.00
	2130	233	.05		0545	282	.03
					0600	233	.03
	2215	233	.13		0615	224	.00
	2230	274	.13				
	2245	332	.01		1745	213	.02
	2300	311	.02		1800	500	.40
	2315	242	.02		1815	951	.30
	2330	225	.00		1830	873	.03
					1845	579	.01
					1900	439	.01
					1915	357	.00
					1930	282	.00
					1945	232	.00

## DISCHARGE AT PARTIAL-RECORD STATIONS--Continued

## Special studies base streamflow measurement sites

The following table contains measurements of stream flow that were obtained as part of the Central Oklahoma aquifer study of the National Water Quality Assessment Program.

Station number	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Date	Discharge (ft <sup>3</sup> /s)
07229320	Little Buckhead Creek near Lexington, Okla.	Lat 35°03'31", long 98°13'39", in SW 1/4 SW 1/4 SE 1/4 Sec. 20, T.7 N., R.1 E., Cleveland County, Hydrologic Unit 11090202, below low-water crossing of state game refuge road about 8.0 miles northeast of Lexington.	2.4	1988	12-10-87 2-25-88 9-01-88	0.19 .37 No flow
07229325	Buckhead Creek near Lexington, Okla.	Lat 35°00'55", long 97°14'06", in SE 1/4 SW 1/4 SE 1/4 Sec. 6, T.6 N., R.1 E., Cleveland County, Hydrologic Unit 11090202, near State Hwy. 39 bridge, 5.7 miles east of Lexington.	19.2	1988	12-10-87 2-25-88 9-01-88	1.77 4.48 .39
07229360	Pond Creek above Helzel Creek near Lexington, Okla.	Lat 35°03'04", long 97°09'34", in NE 1/4 SE 1/4 SE 1/4 Sec. 26, T.7 N., R.1 E., Cleveland County, Hydrologic Unit 11090202, at county road bridge 10 miles east of Lexington on State Hwy. 39, then 3.5 miles north.	10.7	1988	12-10-87 2-25-88 9-01-88	0.64 1.43 .04
07229365	Pond Creek near Eason, Okla.	Lat 35°00'55", long 97°08'50", in NE 1/4 NW 1/4 NE 1/4 Sec. 12, T.6 N., R.1 E., Cleveland County, Hydrologic Unit 11090202, near State Hwy. 39 Bridge, 10.7 miles east of Lexington, or 1 mile west of Eason.	27.6	1988	12-10-87 2-25-88 9-01-88	2.05 .37 .14
07230200	Pecan Creek near Stella, Okla.	Lat 35°16'30", long 97°08'55", in SE 1/4 SW 1/4 SW 1/4 Sec. 1, T. 9 N., R. 1 E., Cleveland County, Hydrologic Unit 11090203, at county road bridge 1 mile west of the Cleveland-Pottawatomie county line on State Highway 9, then 2.9 miles north and 0.7 mile east.	15.5	1988	12-10-87 2-25-88 9-01-88	1.15 2.55 No flow
07230205	Pecan Creek near Pink, Okla.	Lat 35°12'09", long 97°07'05", in NW 1/4 NE 1/4 NE 1/4 Sec. 5, T.8 N., R.2 E., Pottawatomie County, Hydrologic Unit 11090203, downstream from county road bridge 4 miles south and 0.6 mile west of State Hwy. 9 at Pink.	37.4	1988	12-10-87 2-25-88 9-01-88	3.17 5.60 .39

## DISCHARGE AT PARTIAL-RECORD STATIONS--Continued

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Special studies base streamflow measurement sites

Station number	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Date	Discharge (ft <sup>3</sup> /s)
07230300	Jim Creek near Pink, Okla.	Lat 35°13'03", long 97°04'00", in SW 1/4 SE 1/4 SE 1/4 Sec. 28, T.9 N., R.2 E., Pottawatomie County, Hydrologic Unit 11090203, at county road bridge 5 miles east of the Cleveland-Pottawatomie county line on State Hwy. 9, then 3 miles south and 0.8 mile west.	7.46	1988	12-10-87 2-25-88 9-01-88	0.83 1.47 .09
07230302	Jim Creek near Morvin, Okla.	Lat 35°11'20", long 97°03'49", in SW 1/4 SE 1/4 SE 1/4 Sec. 2, T. 8 N., R. 2 E., Pottawatomie County, Hydrologic Unit 11090203, at county road bridge 5 miles east of the Cleveland-Pottawotamie county line on State Highway 9, then 5 miles south and 0.6 mile west.	11.2	1988	12-10-87 2-25-88 9-01-88	1.11 1.81 .18
07241570	Deer Creek near Newalla, Okla.	Lat 35°23'54", long 97°09'36", in SE 1/4 NE 1/4 NE 1/4 Sec. 26, T.11 N., R.1 E., Oklahoma County, Hydrologic Unit 11100302, near county road bridge 0.6 mile south of the east edge of Newalla.	15.3	1988	12-10-87 2-25-88 9-01-88	0.22 1.36 No flow
07241580	Un-named Tributary to Deer Creek near Newalla, Okla.	Lat 35°23'29", long 97°09'17", in SW 1/4 SE 1/4 SW 1/4 Sec. 25, T.11 N, R.1 E., Oklahoma County, Hydrologic Unit 11100302, near county road bridge 1 mile south and 0.3 mile east of the northeast corner of Newalla.	8.70	1988	12-10-87 2-25-88 9-01-88	0.16 0.60 No flow
07241590	Deer Creek near McLoud, Okla.	Lat 35°24'07", long 97°05'22", in NE 1/4 SE 1/4 NE 1/4 Sec. 28, T.11 N., R.2E., Pottawotamie County, Hydrologic Unit 11100302, near State Hwy. 102 bridge 1.5 miles north of State Hwy. 102 exit from Interstate 40.	40.4	1988	12-10-87 2-05-88 9-01-88	0.85 4.96 No flow
07242368	Wildhorse Creek near Luther, Okla.	Lat 35°37'27", long 97°11'03", in SW 1/4 SE 1/4 SE 1/4 Sec. 3, T.13 N., R. 1 E., Oklahoma County, Hydrologic Unit 11100303, near county road bridge 3 miles south and 0.5 mile east of State Hwy. 66 at north edge of Luther.	9.50	1988	12-10-87 2-25-88 9-01-88	2.44 2.83 .72

## DISCHARGE AT PARTIAL-RECORD STATIONS--Continued

Special studies base streamflow measurement sites

Station number	Station name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Date	Discharge (ft <sup>3</sup> /s)
07242371	Wildhorse Creek at Luther, Okla.	Lat 35°39'55", long 97°11'01", in NE 1/4 NW 1/4 NW 1/4 Sec. 27, T. 14 N., R. 1 E., Oklahoma County, Hydrologic Unit 11100303, at State Highway 66 bridge at north- east corner of Luther.	18.2	1988	12-10-87 2-05-88 9-01-88	3.07 4.06 0.86
07242375	West Captain Creek in Bryan Township near Wellston, Okla.	Lat 35°36'00", long 97°06'19", in SE 1/4 NE 1/4 NE 1/4 Sec. 17, T. 13 N., R. 2 E., Lincoln County, Hydrologic Unit 11100303, near county road bridge 6 miles south, 1 mile west and 0.4 mile north of county road junc- tion with State Hwy. 66, 1.9 miles west of Turner Turn- pike tollgate entrance at Wellston.	29.2	1988	12-10-87 2-25-88 9-01-88	1.08 7.06 1.16
07242376	West Captain Creek near Wellston, Okla.	Lat 35°38'17", long 97°05'24", in SE 1/4 SE 1/4 SW 1/4 Sec. 33, T. 14 N., R. 2 E., Lincoln County, Hydrologic Unit 11100303, at county road bridge 2.6 miles south and 0.1 mile west of county road junction with State Highway 66 at a point 1.9 miles west of Turner Turnpike tollgate entrance at Wellston.	28.6	1988	12-10-87 2-25-88 9-01-88	4.71 8.27 .98
07242377	East Captain Creek near Wellston, Okla.	Lat 35°38'23", long 97°05'08", in SW 1/4 NW 1/4 NW 1/4 Sec. 34, T. 14 N., R. 2 E., Lincoln County, Hydrologic Unit 11100303, at county road bridge 2.8 miles south of junction with State Highway 66 at a point 1.9 miles west of Turner Turnpike tollgate entrance at Wellston.	12.4	1988	12-10-87 2-25-88 9-01-88	0.67 1.82 .11
07242378	Captain Creek near Wellston, Okla.	Lat 35°40'14", long 97°05'16", in SE 1/4 NE 1/4 SE 1/4 Sec. 21, T. 14 N., R. 2 E., Lincoln County, Hydrologic Unit 11100303, at county road bridge 1.9 miles west of Turner Turnpike entrance at Wellston on State High- way 66, then 0.6 miles south.	57.9	1988	12-10-87 2-25-88 9-01-88	7.09 10.9 1.13

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## FACTORS FOR CONVERTING INCH-POUND UNITS TO INTERNATIONAL SYSTEM UNITS (SI)

The following factors may be used to convert the inch-pound units published herein to the International System of Units (SI).

Multiply inch-pound units	By	To obtain SI units
<i>Length</i>		
inches (in)	$2.54 \times 10^1$	millimeters (mm)
	$2.54 \times 10^{-2}$	meters (m)
feet (ft)	$3.048 \times 10^{-1}$	meters (m)
miles (mi)	$1.609 \times 10^0$	kilometers (km)
<i>Area</i>		
acres	$4.047 \times 10^3$	square meters (m <sup>2</sup> )
	$4.047 \times 10^{-1}$	square hectometers (hm <sup>2</sup> )
	$4.047 \times 10^{-3}$	square kilometers (km <sup>2</sup> )
square miles (mi <sup>2</sup> )	$2.590 \times 10^0$	square kilometers (km <sup>2</sup> )
<i>Volume</i>		
gallons (gal)	$3.785 \times 10^0$	liters (L)
	$3.785 \times 10^0$	cubic decimeters (dm <sup>3</sup> )
	$3.785 \times 10^{-3}$	cubic meters (m <sup>3</sup> )
million gallons	$3.785 \times 10^3$	cubic meters (m <sup>3</sup> )
	$3.785 \times 10^{-3}$	cubic hectometers (hm <sup>3</sup> )
cubic feet (ft <sup>3</sup> )	$2.832 \times 10^1$	cubic decimeters (dm <sup>3</sup> )
	$2.832 \times 10^{-2}$	cubic meters (m <sup>3</sup> )
cfs-days	$2.447 \times 10^3$	cubic meters (m <sup>3</sup> )
	$2.447 \times 10^{-3}$	cubic hectometers (hm <sup>3</sup> )
acre-feet (acre-ft)	$1.233 \times 10^3$	cubic meters (m <sup>3</sup> )
	$1.233 \times 10^{-3}$	cubic hectometers (hm <sup>3</sup> )
	$1.233 \times 10^{-6}$	cubic kilometers (km <sup>3</sup> )
<i>Flow</i>		
cubic feet per second (ft <sup>3</sup> /s)	$2.832 \times 10^1$	liters per second (L/s)
	$2.832 \times 10^1$	cubic decimeters per second (dm <sup>3</sup> /s)
	$2.832 \times 10^{-2}$	cubic meters per second (m <sup>3</sup> /s)
gallons per minute (gal/min)	$6.309 \times 10^{-2}$	liters per second (L/s)
	$6.309 \times 10^{-2}$	cubic decimeters per second (dm <sup>3</sup> /s)
	$6.309 \times 10^{-5}$	cubic meters per second (m <sup>3</sup> /s)
million gallons per day	$4.381 \times 10^1$	cubic decimeters per second (dm <sup>3</sup> /s)
	$4.381 \times 10^{-2}$	cubic meters per second (m <sup>3</sup> /s)
<i>Mass</i>		
tons (short)	$9.072 \times 10^{-1}$	megagrams (Mg) or metric tons



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