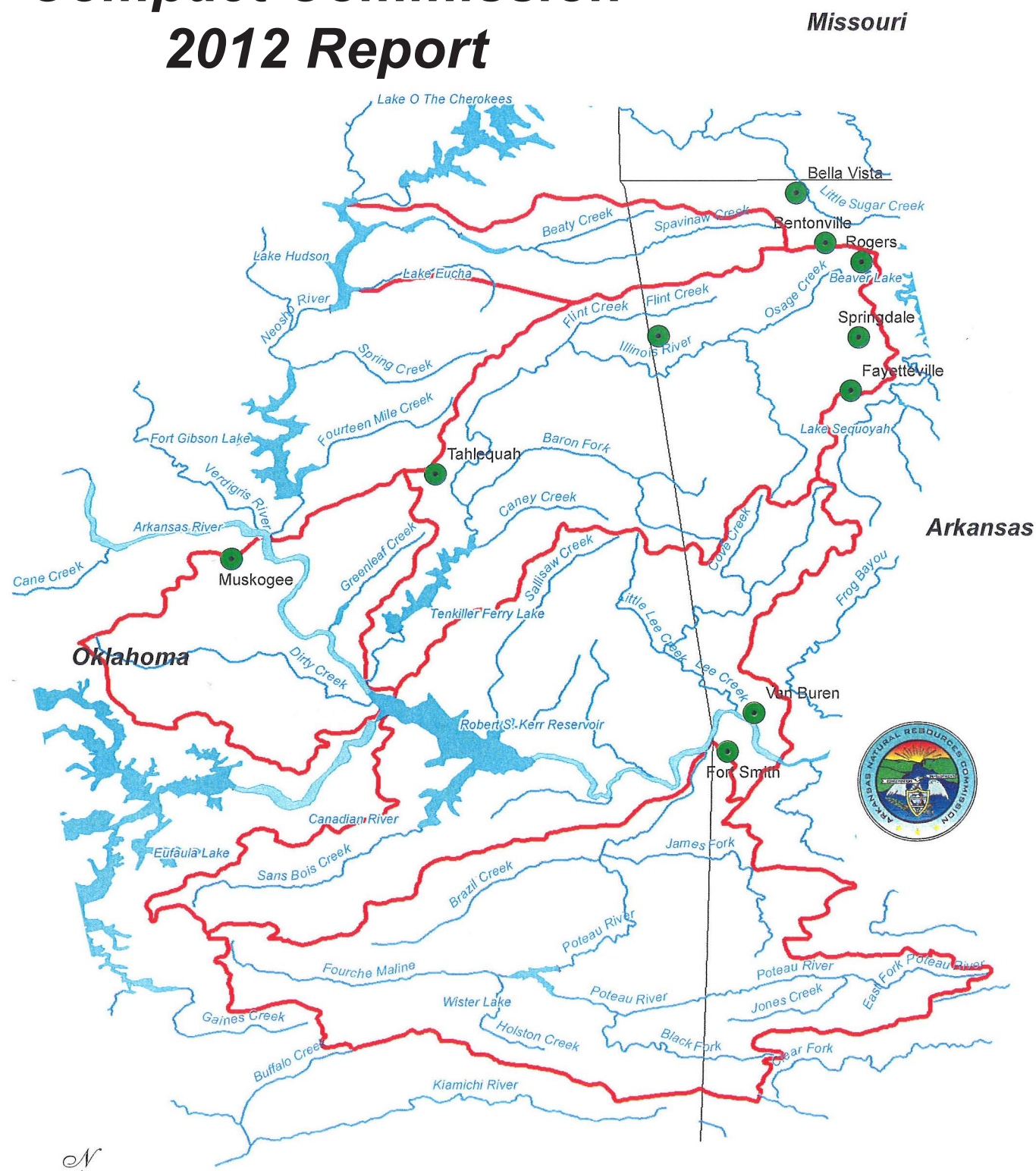
Arkansas River Compact Commission 2012 Report



Compact Area

Arkansas River Compact Commission

ARKANSAS NATURAL
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OKLAHOMA WATER RESOURCES BOARD
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December 2, 2013

The President
United States of America

The Honorable Mary Fallin
Governor, State of Oklahoma

The Honorable Mike Beebe
Governor, State of Arkansas

Dear Mr. President and Governors:

Pursuant to Article 9B(6) of the Arkansas-Oklahoma Arkansas River Compact (AOARC), submitted herewith is a copy of the report of the AOARC covering the activities of the Commission for 2012. A budget covering the anticipated expenses of the Commission for July 1, 2011-June 30, 2012 is also included in the report.

The 2012 Annual meeting was hosted by the State of Arkansas. Reports of the Budget, Engineering, Environmental and Natural Resources, and Legal Committees were made along with the new committee assignments and appointments.

Respectfully submitted,

Richard C. Seybolt
Federal Commissioner and Chairman
Arkansas-Oklahoma Arkansas River Compact Commission

RCS/lab

AOARCC 2012 Annual Report

TABLE OF CONTENTS

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION
2012
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Arkansas River Compact Commission

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AGENDA
ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION
ANNUAL MEETING

September 27, 2012

Embassy Suites Northwest Arkansas
Salons FGH
3303 Pinnacle Hills Parkway
Rogers, AR 72758

A. Call to Order
B. Introductions and Announcements
C. Approval of Agenda
D. Approval of Minutes: **September 15, 2011**
E. Report of the Chairman – Richard Seybolt, Federal Commissioner
F. Report of the Treasurer – Laura Brown
G. Report of the Commissioners
    1. Arkansas
    2. Oklahoma
H. Committee Reports
    1. Budget Committee
    2. Engineering Committee
    3. Environmental & Natural Resources Committee
    4. Legal Committee
I. Unfinished Business
J. New Business
    1. Appointments/Assignments to Committees and Selection of Chairs
        a. Budget Committee
        b. Engineering Committee
        c. Environmental & Natural Resources Committee
        d. Legal Committee
    2. Election of Officers
    3. 2013 Annual Meeting
K. Federal and State Government Representatives Reports
L. Public Comment
M. Adjournment

MINUTES
of the
ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION
Regular Meeting

September 27, 2012
9:00 AM
Embassy Suites Northwest Arkansas
3303 Pinnacle Hills Parkway
Rogers, Arkansas 72758

A. CALL TO ORDER

Chairman and Federal Commissioner Richard C. Seybolt called the annual meeting of the Arkansas-Oklahoma Arkansas River Compact Commission (AOARCC) to order at 9:00 a.m. on Thursday, September 27, 2012, in Salons FGH of the Embassy Suites Northwest Arkansas at Rogers, Arkansas. Chairman Seybolt welcomed everyone to the meeting and advised that Commissioner Thompson was participating by telephone.

B. INTRODUCTIONS AND ANNOUNCEMENTS

Commissioners in attendance were Richard C. Seybolt, Federal Commissioner and Chairman; Oklahoma Commissioners J. D. Strong and Steve Thompson; Arkansas Commissioners Randy Young, Michael Menge, and Mike Carter. Oklahoma Commissioner Gary Sherrer was absent. Chairman Seybolt asked for those in attendance to make self-introductions. (Attachment A.)

C. APPROVAL OF AGENDA

Chairman Seybolt asked for a motion to approve the agenda. There were no additions or deletions to the agenda. Commissioner J. D. Strong moved that the agenda be approved and Commissioner Randy Young seconded. There was no discussion; the motion carried unanimously. (Attachment B.)

D. APPROVAL OF THE MINUTES - September 15, 2011

Chairman Seybolt stated that the minutes of the September 15, 2011, Annual Meeting had been distributed. Commissioner Randy Young made a motion to approve the minutes of the meeting and Commissioner J. D. Strong seconded. There was no discussion; the motion carried unanimously.

E. REPORT OF THE CHAIRMAN - Chairman Seybolt saved remarks.

F. REPORT OF THE TREASURER

Treasurer Laura Brown referenced the 2012 Year-end Financial Report covering July 1, 2011 through June 30, 2012 detailing income and expenses. The beginning balance was $25,714.96, total income $7,009.58, total expenses $11,133.51, for a net total of -$4,166.50.

The bank balance June 29, 2012 was $21,548.46, and the Certificate of Deposit balance May 29, 2012 was $10,875.04. The bank balance August 2012 was $21,550.31 and the Certificate of Deposit balance was $10,901.16 for total assets of $32,451.47.

The proposed budget for 2012 through 2015 is to remain at $15,500 per year. Actual expenses for 7/1/2011 through 6/30/2012 totaled $11,176.08.

Commissioner Mike Carter stated that for a number of years the Commission and guests benefited from large and charitable contributions made by the Chairman in the form of BBQs which may have saved the Compact money. He then made a motion to compensate Chairman Seybolt for his expenses in treating the Commissioners to BBQ and mileage as provided by the law for as long as the Commission can afford it. Commissioner Steve Thompson seconded. Discussion followed; the motion carried unanimously. Chairman Seybolt thanked the Commissioners.

Commissioner Randy Young made a motion to accept the Treasurer's Report and the Budget with the suggestion that the Budget be modified to incorporate the expense previously authorized. Commissioner J. D. Strong seconded. There was no discussion; the motion carried unanimously.

G. REPORT OF THE COMMISSIONERS

Arkansas: Commissioner Young stated that he would make the initial report, a handout would be distributed, and then he would yield to the Arkansas Commissioners. He advised that the Arkansas Natural Resources Commission has initiated the process to update the Arkansas Water Plan in partnership with a number of state agencies in Arkansas and with the Little Rock District of the US Army Corps of Engineers. The Arkansas Game and Fish Commission are helping fund the costs to update the Plan. ANRC has entered into a contract with CDM Smith, a nationally recognized engineering firm with significant experience in helping develop water plans in other states. Great effort is continued in implementing the state's non-point source pollution management program. Significant resources are utilized from that program in Northwest Arkansas and in the Compact area. One initiative is the development of a comprehensive watershed management plan for the

Illinois Basin in Arkansas to work with the Illinois River Watershed Partnership. It is presently under review by EPA Region VI and approval is expected by the end of this calendar year. Mr. Young stated that last year he reported ANRC worked with the USDA Farm Services Agency as did Oklahoma to bring substantial resources into the Illinois Watershed. Technical and cost share assistance was provided to riparian landowners along the Illinois River in Arkansas for the purpose of enrolling those properties in USDA Best Management Practices (essentially to provide buffers and restore riparian buffer areas.) ANRC worked with USDA to encourage farmers to enroll by increasing the cost share rate to $400 per acre for the first 1,000 acres. The target acreage was lowered from 15,000 to 10,000 acres. Guidelines under the USDA Program require 300-400 feet setback from the streams for the buffer, the problem being that ownership of property along the Illinois River is narrow acreage. ANRC will continue to work with the conservation districts, NRCS, FSA, and other local interested parties to promote the program. He concluded the key to water quality protection and improvement will be landowner enrollment. There were no further comments presented by the Arkansas Commissioners.

Oklahoma: Commissioner Strong presented the report for Oklahoma. The drought continues, especially with relation to reservoirs, there was a break and a decent wheat harvest had occurred. The Comprehensive Water Plan was completed, copies were made available and all documents are on the website. He estimated the Water Plan cost eleven million dollars ($11,000,000) a behemoth effort with the public, the best engineers, and scientists involved. It took five years and was delivered to the Governor February 2012. The plan included 20-30 key and eight priority recommendations. The legislature took action on most of the eight priorities. It added funding for a new groundwater monitoring program, restored funding and appropriated Water Plan money to address technical studies in modeling stream water systems and groundwater basins for water right permitting. He stated it was fortunate his office received a 75% increase in the state appropriated dollars for their budget to implement the two priority recommendations. The November ballot will include a legislature authorized amendment to the constitution for a water infrastructure credit enhancement reserve fund (a pledge of credit by the state to back the loans in the financial assistance program.) The comprehensive water planning process forecasts an 82 billion dollar infrastructure price tag for drinking water/waste water needs across the state. They were faced with the prospect of meeting only 6-8% of the need in the future compared to their triple-A-rated program financing 65-70% drinking water/waste water infrastructure historically. One priority recommendation hotly debated and contested was a regional water planning process that failed. The Panhandle adopted it despite the legislature.

H. COMMITTEE REPORTS

Budget Committee: Mr. Edward Swaim presented the Budget Committee Report which recommended the same budget be utilized next year with the addition of an expense reimbursement. He asked if the Commission had a recommendation as to the amount for the expense reimbursement. Commissioner Young suggested five hundred dollars ($500) and Chairman Seybolt concurred.

Engineering Committee: Mr. Chris Soller reported he was filling in for Mr. Ken Brazil. The Engineering Committee had been directed to create an understandable methodology for the annual yield report and a written procedure. Mr. Soller stated that Ms. Maria Moreno of the Oklahoma Water Resources Board staff produced a workbook in an easy to follow format that retrieves flow data from the USGS websites and calculates the annual yield. He did not however have sufficient time to review the worksheets presented to him the week before. A conference call was held last week in which both states agreed to a number of different coefficients to use, specifically for evaporation and runoff.

There is the question of which gauge to use for the Poteau River (one near Loving, OK or one near Cauthron, AR) for the report. The Loving gauge is closer to the state line and has less interpolation for actual run off while the Cauthron gauge has more history and a better ratings curve. The two states are going to work with each other and determine which gauge should be used in the future.

The Committee has two issues for the Commission. The current Annual Yield Report created by Mr. Terrance Lamb, Hydrologic Information Services, has water quality data included to reflect watershed activity. Oklahoma found it redundant of the Environmental Committee Report. Ms. Julie Cunningham clarified there was no summarization or analysis of the water quality data portion of the report. The Engineering Committee asked if water quality data should continue to be included in the Annual Yield Report.

Commissioner Young stated we clearly need to eliminate redundancy, and Commissioner Carter commented there is a benefit in having an unbiased view.

Mr. Soller stated the next question of the Engineering Committee was who should do the report. Should the states alternate years doing the report or involve a third party person?

Commissioner Strong added that the spreadsheet Ms. Moreno designed utilized compact formulas and automates the data calculations available on the internet from USGS. It was understood everyone needed time to review and become comfortable with the process. It

could be reviewed whether by third party or performed openly by either state with an advance 30-60 days' notice to pour through it and be comfortable with the results.

Mr. Young asked if a report from Mr. Lamb and Oklahoma's process could be compared in the same year results.

Ms. Moreno answered yes, Oklahoma had a conference call with ANRC and Mr. Lamb the previous week and reviewed the data collection process and formulas based on work from previous years and the statute.

Ms. Cunningham stated per last year's assignment the methodology is agreed upon by both states.

Mr. Soller noted that the issue is whether a third party is to be involved in the calculations.

Chairman Seybolt stated technology available today is not being utilized properly by Mr. Lamb. The Commission could save $4,000 yearly. The report would be provided in fewer pages and reviewed in June, months before the Commission meeting.

Commissioner Young stated the Arkansas Commissioners had not seen the information prior to the Commission Meeting, so he could not support any action at this time.

Mr. Soller stated the methodology of the calculation is simple but the actual understanding of the calculation is the difficult part. Mr. Lamb's vast experience and history in the yield reports is vital.

Commissioner Thompson stated that it would be important to have a third party at some point if there was an issue between the two states about the information provided by the process. However, if the calculations are done upon a method of formula calculations, etc., and both parties agree that one prepares the report and the other reviews it with no issues, why is a third party necessary?

Commissioner Menge stated he understood a methodology was agreed upon. He did not hear definitive support from both Arkansas and Oklahoma that the agreed upon methodology compared to Mr. Lamb's methodology this year comes up with results that both states believe correct.

Ms. Cunningham and Mr. Soller concurred.

Ms. Moreno stated she developed the report based on conversations with Mr. Lamb to reproduce his work. The results were basically the same as Mr. Lamb's with a small difference in a couple hundred acre feet from his 2011 report.

Commissioner Menge stated he understood that both states found the methodology proposed was in agreement with Mr. Lamb's report with a small margin of error.

Ms. Moreno stated Mr. Lamb reviewed the report, explained issues, and answered questions about the use of coefficients on a conference call with both states.

Commissioner Menge stated that in the past Mr. Lamb acted as a third party, he did the work as the states watched him and there was a self-correcting process. He emphasized that, there needs to be a process to resolve differences between the states that might occur before the Commission meets, or it will be difficult to process anything at the meetings.

Commissioner Young stated he was confident the Commission was headed in the right direction. He was not confident about the fact that there was not time to verify the calculations made by Ms. Moreno. He suggested the Commission continue with Mr. Lamb functioning as a third party for a couple of years, allowing the Commission an opportunity to verify Ms. Moreno's method to get comfortable with it.

Commissioner Strong was concerned with justifying the expenditure of $4,000 for something that takes two hours to do with technology.

Commissioner Carter stated we are talking about an issue that impacts a lot of people and money between two states. There is merit in having a third party, an outside independent auditor, and that is what Mr. Lamb did. He asked if Mr. Lamb had been consulted as to his replacement.

Commissioner Strong answered it has not been presented to Mr. Lamb.

Commissioner Carter stated this Annual Yield Report is the single most important document the Commission deals with. If a disagreement occurs it will typically concern this report. It is important to get a third party review and would be a serious error to think we could anticipate everything.

Chairman Seybolt suggested they retain Mr. Lamb for another year as the two states each run the calculations independently for comparison.

Commissioner Thompson stated if there is a desire (for a year) to verify a new method of calculation with a third party, he would not oppose. If after a year, there is found no appreciable error in the calculation and it is in fact self-auditing, because both states get an opportunity to review and discuss, then money will be saved.

Chairman Seybolt stated the consensus of the Committee is to continue with Mr. Lamb for another year and test the methodology. The Commission can make an educated decision next year.

Commissioner Strong added with the goal to have a consensus by next year, not later.

Commissioner Young stated he wants his staff to utilize the software Oklahoma developed and to perform the calculations to compare findings as that is the only way to understand the process.

Commissioner Strong stated Arkansas and Oklahoma will each perform the calculations and Mr. Lamb will conduct a third party review.

Commissioner Young stated that the question of a third party review in the future is still open as Mr. Carter made a valid point.

Commissioner Menge stated he wanted the Engineering Committee to discuss and come to agreement on a methodology for a third-party review in the event there is a disagreement between the two states.

Commissioner Thompson added as long as the disagreement is not a policy issue.

Commissioner Menge stated he would like to have in place a method to help the two states resolve unanticipated issues.

Commissioner Strong concurred.

Chairman Seybolt stated the consensus of the committee was to continue with Mr. Lamb for another year and test the Oklahoma methodology. Both states are to prepare a report separately. He charged the Engineering Committees of both states to continue to meet and the Executive Directors to monitor the process so the Compact Commission may act intelligently on the issue in 2013.

Environmental & Natural Resources Committee: Chris Soller reported there were no assignments from last year for the Committee. He referenced and reviewed the Phosphorus Report. There are some upticks on two streams, the Illinois and Flint with almost double high flow levels, phosphorus levels went down. The higher flows of Flint Creek and Siloam Springs in 2008 could affect flow averages for two more years.

Julie Chambers reviewed the Phosphorus Loading Report for Oklahoma advising it was similar to Arkansas', however with additional information on water quality, various tables, programs, plus lakes and stream sites within the compact area.

Commissioner Young inquired as to data for Lake Tenkiller and what is happening there.

Ms. Chambers stated that they had not been to Lake Tenkiller for several years, so the summary table is old.

Commissioner Young asked whether Lake Tenkiller was improving or declining.

Ms. Chambers responded that there are still issues with extremely high Chlorophyll A. Next year's report will include additional quality information with a full four season (fall 2011-2012) rotation that will reveal any change.

She reviewed Oklahoma's report. One section illustrates different flow regimes (both high and low) from 1993 -2011 to reveal a significant downward trend with the exception of Flint Creek. Other sections include a list of stream level sites in the compact area, an update of water quality standards, phosphorus level flow, stream levels, water quality standards, the financial assistance program, permitting, information from the Conservation Commission, basins, and the web site.

Commissioner Young asked if phosphorus levels of 0.037 mg. per liter were being met anywhere on the Illinois River.

Commissioner Strong explained the percentages show when the goal (.037) is exceeded.

Commissioner Young stated it would be nice to present more meaningful data than 100% of the time it doesn't meet it.

Commissioner Strong stated it does not show a trend in the data and Mr. Smithee concurred.

Chairman Seybolt requested the pages be numbered in the future.

Commissioner Young asked that the report be produced in a manner that the average citizen is able to understand whether or not there is a nutrient reduction.

Chairman Seybolt directed Ms. Chambers and Mr. Soller to make the two states' reports read similarly so the information is comparable.

Legal Committee: Crystal Phelps stated the Legal Committee had no assignment, however they had a recommendation. The ANRC controller questioned if there was a dual signature requirement on checks. The Legal Committee recommended revision of rule 7.2 to reflect the requirement of dual signatures on checks written by treasurer and any commissioner.

Commissioner Strong made a motion to amend rule 7.2 accordingly, and Commissioner Young seconded. There was no discussion; the motion carried unanimously.

I. **Unfinished Business:** – None

J. **New Business:** Chairman Seybolt advised that Oklahoma would host the 2013 meeting. Committee and Chairs will be:

Budget Committee - Laura Brown
Engineering Committee - Julie Cunningham
Environmental & Natural Resources Committee – Derek Smithee
Legal Committee – Dean Couch

Dean Couch stated that Mr. Lamb contracts through the State of Arkansas and not directly with the Commission.

Commissioner Strong asked if the Compact could contract directly with Mr. Lamb.

Chairman Seybolt directed that the Commission contract with Mr. Lamb.

Commissioner Young made a motion to ask the Engineering and Legal Committees to work together to develop a contract with Mr. Lamb for his new assignment as reviewer. Commissioner Strong seconded the motion. There was no discussion; the motion carried unanimously.

Election of Officers – Vice Chairman, Secretary, and Treasurer
Commissioner Strong moved that Gary Sherrer be elected Vice chairman and Mary Schooley, Secretary, Commissioner Young seconded. There was no discussion; the motion carried unanimously.

Commissioner Young moved Laura Brown be elected Treasurer, and Commissioner Strong seconded. There was no discussion; the motion carried unanimously.

Chairman Seybolt advised that the 2013 Annual Meeting will be held at Grand Lake, Oklahoma on Thursday, September 26th.

K. FEDERAL AND STATE GOVERNMENT REPRESENTATIVE REPORTS

Mr. Reed Green, USGS in Arkansas, presented the 2012 report and referenced a table titled, "Streamgaging and Water-Quality Monitoring Activities in the Arkansas and Oklahoma Arkansas River Compact Commission Watersheds in Arkansas." He reported that the Cities of Rogers and Springdale have tapped into the USGS network. A gauge was restarted by Rogers Water Utility to measure water quality as wastewater is discharged upstream. The City of Springdale is operating three stations. He stated other cities are building upon the network and knowledge would increase. The Sparrow Model for the Arkansas, Red, and White Rivers compares geospatial differences in stream water quality as related to human activities and natural processes. Six of the stations are actual calibration points for USGS.

Commissioner Young asked for the latest renditions of the Sparrow Model.

Mr. Green stated the hot spots relate to different activities producing phosphorus and nitrogen to the Gulf of Mexico.

The process to determine phosphorus decay in the stream flow includes a calibration of data in basins and the watershed attributes (urban, agriculture, waste water treatment plants, etc.), monitoring of stream gauge loads off the landscapes are calibrated to the measurements to determine the takeoff and uptake coefficients.

A question of radioisotopes was presented and Mr. Green explained that the use of radioisotopes is academic - not routine or readily available at this time.

Mr. Jason Lewis, USGS in Oklahoma, advised that they are doing real time web mapping on Hill Creek above Grand Lake and a site has been selected for natural water quality assessments, with regional studies based on that site. Water flow is below average with the exception of the Illinois River.

Mr. John Gage, Bureau of Reclamation, stated that the report format was changed to a two-year report. He reviewed the number of completed and initiated projects in Oklahoma. The Native American Program and Water Conservation Services Plan are on a five year basis. The only Rural Water Supply Program is in the City of Sulphur, OK. A Water Conservation Field Services (WCFS) Program requires water conservation plans for any entity taking water from a Reclamation project or that has a Reclamation contract. All WaterSMART Program grants go through a transparency process on line at time of funding

announcement. Basin studies evolve for the Lower Grande and Upper Ouachita Basin within the State of Oklahoma. The Science and Technology Program requires a Reclamation staff member to enter an idea into the electronic system. At this time, the Bureau is looking for ideas to control energy, climate, zebra mussels or other invasive species. The Texas Water Development Board's evaluation of emergency water supply options is the only activity in the Drought Program. The last page of the report is a list of web sites for Reclamation grant funding.

Commissioner Young stated that historically Arkansas is not eligible for Bureau of Reclamation projects because the agency is restricted to seventeen (17) Western States.

Mr. Gage replied that he will do his best to come up with a list of potential options or alternatives that Arkansas can seek access to Reclamation funds that may not be restricted to those states.

L. PUBLIC COMMENT: There was no public comment.

Chairman Seybolt urged the committees to standardize reports so that the two states will provide their information in the same format.

Mr. Strong asked that the water quality data found in the engineering report be captured in the environment report.

M. ADJOURNMENT: There being no further business, Chairman Seybolt thanked all in attendance and adjourned the meeting at 10:50 AM.

Richard C. Seybolt
Federal Commissioner and Chairman

Laura Brown, Secretary/Treasurer

ARKANSAS-OKLAHOMA
ARKANSAS RIVER COMPACT COMMISSION

LIST OF ATTENDEES
DATE September 27, 2012
Arkansas Oklahoma Arkansas River Compact Commission
Arkansas

NAME (Please Print)	**BUSINESS/ADDRESS (Please Print) TELEPHONE**
Jason Lewis USGS	202 NW 66th Street Bldg 7 OKC, OK 73116
Tom Myers City of	Po. Box 50, Siloam Springs, AR 72761
Ryan Benefield ADEQ	5301 Northshore Drive North Little Rock AR 501-682-0960
Carly Schnaithman Oklahoma Secretary of Environment	3800 N. Classen Blvd OKC, OK 73118
Chris Soller ANRC	101 E Capitol, Little Rock AR 501-371-5141
Frank Ledne	Bldg Lock & Dam Rd. Russellville, AR 72802
Steve Filipek 501-350-5825	AR Game & Fish #2 Natural Resources Dr., L.R., 72205
Dan Carthel	USDA-NRCS 501-301-3127 700 W. Capitol Ave., Little Rock, AR 72201
Reed Green USGS	401 Hardin Rd, Little Rock, AR 72211 501 2296-3600
Gene Higginbotham Arkansas Waterways Commission/	101 E. Capitol Suite 370 Little Rock AR 72201
Dean Couch Okla Member Legal Comm.	3800 N Classen Blvd OKC Ok 73118
Qiang Zhang	Ok. Dept. of Ag. Food & Forestry 2800 N. Lincoln, OKC OK 73105
Ed Fite OSRC	Po Box 292 Tahlequah, OK 74465-0292 918 456 3251
Rob Smith NWA Rt Council	4100 Corporate Center Drive, Springdale AR
Crystal Phelps ANRC	101 E. Capitol, Ste 350, Little Rock, AR 72201
Edward Swaim ANRC	" "

ARKANSAS-OKLAHOMA
ARKANSAS RIVER COMPACT COMMISSION

LIST OF ATTENDEES

DATE September 27, 2012

Arkansas Oklahoma Arkansas River Compact Commission
Arkansas

NAME (Please Print)	**BUSINESS/ADDRESS (Please Print) TELEPHONE**
J.D. Strong	3800 N. Classen Blvd. OKC, OK 73118 405/530-8800
Dick Seyhoot	Monkey Island, OK 620 423 2910
Randy Young	501 682 3986 101 EAST CAPITOL, S.350 LR, AR 72201
Mitchard C. Carter	3500 Cliff Drive 479 783-0849 Ft. Smith, AR 72903
Michael Menge	172 Menge Drive 479 Dover, AR 72837 331-2921
Laura Brown	ANRC

ARKANSAS-OKLAHOMA
ARKANSAS RIVER COMPACT COMMISSION

LIST OF ATTENDEES

DATE September 27, 2012

Arkansas Oklahoma Arkansas River Compact Commission

Arkansas

NAME (Please Print)	**BUSINESS/ADDRESS (Please Print) TELEPHONE**
John Gage U.S.B.R.	Oklahoma City, OK 73128 405-470-4815
Michael Armstrong	AGFC #2 Natural Resource, L.R. 72205
Maria A. Moreno	3800 N. Classen Blvd. Oklahoma City, OK 73118
Julie Cunningham OWRB	"
Julie Chambers OWRB	" "
Derek Smithee	OWRB
GARY UTLEY 405-742-1229	NRCS - OK 100 USDA - SUITE 206 STILLWATER, OK 74074
Dorcia Routh 501-661-2023	AR Dept Health Sloan 4815 W Markham St Little Rock AR 72205

Report of the Treasurer

Arkansas Oklahoma Arkansas River Compact Commission

September 26, 2013

The 2013 Year-end Financial Report covering July 1, 2012 through June 30, 2013 details income and expenses.

Regions Bank Balance on July 1, 2012	$ 21,548.46	
Total Income	$ 107,020.07	
Total Expenses	$ 4,680.00	
NET TOTAL	$ 102,340.07	
Regions Bank Balance June 29, 2013		$123,888.53
Certificate of Deposit Balance June 30, 2013		$ 10,970.54

Most Recent Account Balances

Regions Bank Balance July 31, 2013	$223,897.14
Certificate of Deposit Balance June 30, 2013	$ 10,970.54
TOTAL	**$234,867.68**

Assessments for both states are current.

Register Report 2012:3

7/1/2011 through 6/29/2012

Date	Account	Num	Description	Memo	Category	Clr	Amount
BALANCE 6/30/2011							**25,714.96**
7/29/2011	AOARCC	DEP	Regions Bank	July 2011	Div Income	R	1.02
8/10/2011	AOARCC	1148	Oklahoma Wa...	Stream Gagi...	Stream Gagin...	R	-6,250.00
8/31/2011	AOARCC	DEP	Regions Bank	August 2011	Div Income	R	0.97
9/20/2011	AOARCC	1150	Terrance Lamb	Water Year ...	Yield Report	R	-4,000.00
9/30/2011	AOARCC	DEP	Regions Bank	September 2...	Div Income	R	0.74
10/31/2011	AOARCC	DEP	Regions Bank	October 2011	Div Income	R	0.66
11/30/2011	AOARCC	DEP	Regions Bank	November 2...	Div Income	R	0.64
12/13/2011	AOARCC	1149	Fed Ex	2010 AR	Printing And ...	R	-552.76
12/30/2011	AOARCC	DEP	Regions Bank	December 2...	Div Income	R	0.62
1/31/2012	AOARCC	DEP	Regions Bank	January 2012	Div Income	R	0.65
2/21/2012	AOARCC	DEP	Arkansas-Okl...	2012 Assess...	Assessments ...	R	7,000.00
2/29/2012	AOARCC	DEP	Regions Bank	February 2012	Div Income	R	0.67
3/30/2012	AOARCC	DEP	Regions Bank	March 2012	Div Income	R	0.90
4/30/2012	AOARCC	DEP	Regions Bank	April 2012	Div Income	R	0.93
5/29/2012	AOARCC	1151	Embassy Suites	2012 Rogers...	Mtg. Expense	R	-373.32
5/31/2012	AOARCC	DEP	Regions Bank	May 2012	Div Income	R	0.93
6/29/2012	AOARCC	DEP	Regions Bank	June 2012	Div Income	R	0.85
7/1/2011 - 6/29/2012							-4,166.50
BALANCE 6/29/2012							**21,548.46**

TOTAL INFLOWS	**7,009.58**
TOTAL OUTFLOWS	-11,176.08
NET TOTAL	-4,166.50

ARKANSAS - OKLAHOMA
ARKANSAS RIVER COMPACT COMMISSION
Statement of Cash Receipts
and Disbursements
July 1, 2010 through June 30, 2011
and
July 1, 2011 through June 30, 2012

Arkansas - Oklahoma Arkansas River Compact Commission

Statements of Cash Receipts and Disbursements
For the Period July 1, 2010 through June 30, 2011
and
For the Period July 1, 2011 through June 30, 2012

Cash in bank, checking as of July 1, 2010	$	29,663
Cash receipts		
Member assessments		7,000
Interest income		13
Total cash receipts	$	7,013
Cash disbursements		
Accounting		275
Bank charges		36
Conference expense		400
Stream gaging		6,250
Yield report		4,000
Total cash disbursements	$	10,961
Cash in bank, checking as of June 30, 2011	$	25,715
Cash in certificate of deposit as of June 30, 2011		10,595
Cash and cash equivalents as of June 30, 2011	$	36,310
Cash in bank, checking as of July 1, 2011	$	25,715
Cash receipts		
Member assessments		7,000
Interest income		10
Total cash receipts	$	7,010
Cash disbursements		
Printing & reproduction		553
Conference expense		374
Stream gaging		6,250
Yield report		4,000
Total cash disbursements	$	11,177
Cash in bank, checking as of June 30, 2012	$	21,548
Cash in certificate of deposit as of July 1, 2010		10,595
Interest income certificate of deposit		280
Cash in certificate of deposit as of June 30, 2012	$	10,875
Cash and cash equivalents as of June 30, 2012	$	32,423

2012
Report of Arkansas Commissioners
To
Arkansas-Oklahoma Arkansas River Compact Commission

Water Plan
The update of the Arkansas Water Plan is well underway. The Natural Resources Commission has hired CDM Smith to complete the update by November of 2014. We are currently in the resource assessment phase and are gathering data to put together our updated basin reports. Our stakeholder involvement effort will involve a website launch in the next few weeks, electronic newsletters, and informational meetings around the state. Once the resource assessments and forecasts are farther along, our stakeholder effort will engage the public around the state in formulating management responses

Nonpoint Source Management Program
The Arkansas Natural Resources Commission continues to utilize 319(h) program to fund water quality projects in the Illinois and Upper White River watersheds. Projects updates and of interest include:

The Illinois River Watershed Partnership (IRWP) - development of a comprehensive Watershed Management Plan:
The latest IRWP Watershed Management Plan was submitted to EPA Region VI for review in July 2012. This project was originally completed in June 2010. During the review by ANRC it became obvious that additional data and information would be needed to develop a plan meeting all 9 elements as required by EPA. The IRWP worked with it partners and FTN and associates to address concerns and needs ANRC identified in the 2010 version. Review, comments or acceptance by EPA is expected to be received by December 2012.

The Illinois River Watershed Partnership (IRWP) – development and implementation of Rain Gardens - The IRWP in cooperation with the Beaver Water District are in the process of developing 60 rain gardens within the Illinois River and Beaver watersheds. Each watershed will have 30 rain gardens, designed, developed and installed when the project is completed. Monitoring (in-flow and out flow) is occur in 2 rain garden in each watershed. The monitoring will assess the functionality of the garden to reduce pollutant loads, both sediment and nutrients. The project began in July 2011 and is scheduled to be completed June 2014.

IL River CREP
There has been little change to slow landowner sign-up and participation over the past year. ANRC submitted proposed amendments to original CREP agreement in 2011 to increase incentives for landowner participation. Those amendments were approved in

April 2012 by the national FSA office. It is hoped that further public outreach and education activities during 2012-2013 will increase program participation. To date, the ANRC has paid out $10,320 in state incentives for completed projects and outreach activities. The project acreage was reduced from 15,000 to 10,000 and the state incentive payment was increased to $400/acre for the first 1,000 acres enrolled.

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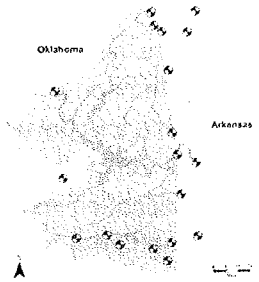
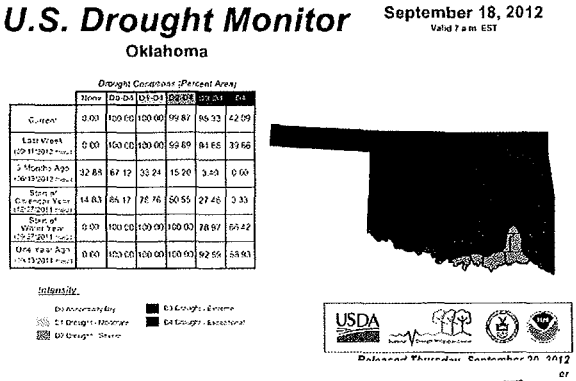
OKLAHOMA COMMISSIONERS' REPORT

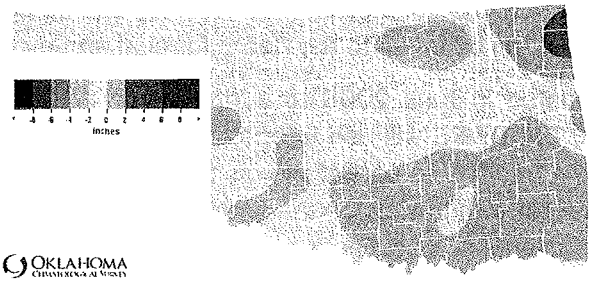
Arkansas – Oklahoma
Arkansas River Compact Commission
Rogers, Arkansas
September 27, 2012

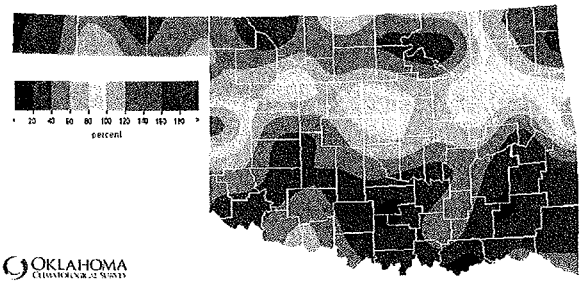


CLIMATE

According to the most recent U.S. Drought Monitor, the entire state is now categorized in drought, with more than 64 percent of the state's area in "severe" drought and almost 16 percent classified as "extreme." The Northeast and the East Central climate divisions received 34.79 and 36.20 inches of precipitation, respectively, which is around 80 percent of normal rainfall.

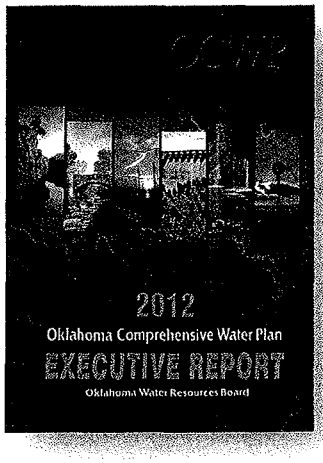






OKLAHOMA COMPREHENSIVE WATER PLAN

In October 2011, the OWRB finalized and approved the *2012 Update of the Oklahoma Comprehensive Water Plan*, the most ambitious water planning effort ever undertaken by the state. The final OCWP included a wealth of technical data and information assembled into 13 Watershed Planning Region Reports. The reports include water supply/demand assessments, future supply challenges, and potential options to secure water for planning basins and regions through the next 50 years and beyond. Considerable attention was given to creating both sensible and functional planning documents, which will serve as indispensable technical resources for water providers, policy makers, and water users in making informed decisions concerning future local and regional water use and management. The 2012 OCWP Update also features an Executive Report containing eight priority recommendations and thirteen supporting recommendation categories to guide Oklahoma's future water policy decisions.



WATER RESOURCES STUDIES

SURFACE WATER STUDIES

Progress has been made in the development and implementation of stream water allocation models for stream systems in Oklahoma, which are being used as both a planning and water rights management tool. Allocation models have been developed for the Blue River, Muddy Boggy River, Clear Boggy Creek, Kiamichi River, Little River (state line), Upper Canadian, Deep Red, Cache Creek, and Beaver Creek Basins. More recently, allocation models have been developed for the Middle Canadian, Lower Canadian and Little River (central Oklahoma) basins. Hydrologic investigations for these basins are also being completed. Stream water allocation models are currently being constructed for two basins in the Washita River and the Verdigris River systems.

The OWRB and Bureau of Reclamation recently announced a cooperative study of western Oklahoma's Upper Washita River Basin. The study will augment an ongoing hydrologic investigation of the Rush Springs aquifer and ongoing development of the Washita surface water allocation model. Reclamation will directly contribute to the study by identifying the water supply impacts posed by climate variability scenarios as well as formulating options to augment the ability of Foss and Fort Cobb Master Conservancy Districts to satisfy the region's growing water needs.

GROUNDWATER STUDIES

The OWRB is in the process of establishing the Maximum Annual Yield and Equal Proportionate Share for the Arbuckle-Simpson aquifer. After an extensive investigation of the aquifer that began in 2003, the Maximum Annual Yield hearing was held in Sulphur, Oklahoma on May 15-16, 2012. The Hearing Examiner took evidence from multiple parties and will draft a Final Order that will be taken to the Board for final approval.

The Garber-Wellington Water Management Study was initiated in June 2008 to address growing concerns about the future of water availability in central Oklahoma. The OWRB will use information obtained from the investigation to determine the Maximum Annual Yield of the aquifer. As part of the study, a groundwater-flow model will be used to test the impacts of long-term groundwater withdrawals on the aquifer as well as simulate water management strategies. A draft of the USGS Scientific Investigations Report—tentatively titled "Hydrogeology, Hydrologic Framework, and Simulation of Groundwater Flow in the Central Oklahoma (Garber-Wellington) aquifer, Oklahoma, 2012"—is currently under review. The report is scheduled to be finalized in 2013. The study was funded with state monies through the Oklahoma Comprehensive Water Plan and federal funds through the Bureau of Reclamation and U.S. Geological Survey.

The OWRB initiated a study on the Rush Springs aquifer in west-central Oklahoma in October 2011 and will be collecting groundwater and surface water information to better understand the groundwater-flow system. The major goals of the project are to 1) better define the aquifer boundaries, 2) develop a groundwater-flow model, and 3) determine the Maximum Annual Yield of the aquifer. The groundwater-flow model will be used to simulate water management scenarios, project current use impacts, and assess climate variability utilizing available climate modeling information. The OWRB will be working with the Bureau of Reclamation as part of the WaterSMART Program as part of the Bureau's Washita Basin River Basin Water Supply Study. The project is scheduled to be complete by December 31, 2014.

The OWRB entered into a cooperative agreement with the USGS to fund a 20-year Maximum Annual Yield update on the North Canadian River Alluvium and Terrace Groundwater Basin Reach I and II. The objective of this project is to update the 1981 (Reach I) and 1983 (Reach II) hydrologic survey from the Oklahoma Panhandle to Lake Overholser and to develop new groundwater-flow models that will be used to simulate th

effects of groundwater withdrawals. The simulations will be used to evaluate the allocation of water rights within the groundwater basin. The two-year project will be completed by September 30, 2013.

One of the 2012 Oklahoma Comprehensive Plan recommendations was to 'address projected increases in water demands and related decreases in availability' by completing the 'backlog of statutorily-required maximum annual yield studies and overdue 20-year updates' on the aquifers of the state. As a result, four new aquifer investigations are on the horizon, which includes the Canadian River Alluvium and Terrace aquifer and twenty-year updates on the Elk City Sandstone, Enid Isolated Terrace, and North Fork of the Red River Alluvium and Terrace aquifers. The OWRB plans to initiate these investigations during the 2013 State Fiscal Year.

WATER QUALITY PROJECTS & MONITORING

OWRB staff continue to work cooperatively with the Central Oklahoma Master Conservancy District to monitor and improve water quality in Lake Thunderbird where a new system to oxygenate lake water was implemented. The OWRB and other agencies are also finalizing cooperative development of a total maximum daily load (TMDL) calculation to address Thunderbird water quality impairments, including high turbidity, algae, and low dissolved oxygen.

In addition to educating lake managers on the many benefits of establishing aquatic plants, the OWRB is involved in several lake re-vegetation projects, including the establishment of wetland plants at Fort Cobb, a two-year project with the Oklahoma Department of Wildlife Conservation that has already successfully introduced 10 beneficial species to the lake and the employment of floating islands consisting of recycled plastic planted with aquatic plants at Lake Eucha. Funded by EPA, the OWRB continues to collaborate with Oklahoma City to maintain aquatic plant founder colonies at Lakes Draper and Atoka, which are designated as an impaired waterbody by the ODEQ 303d list for excessive turbidity. For all the project the native wetland plants serve as an inexpensive yet innovative method to combat erosion and suspended sediment, reduce nutrients, and provide valuable habitat for birds, fish, and other wildlife.

The U.S. Army Corps of Engineers (USACE) is continues to monitor the waterbodies they manage for blue-green algae based on historical occurrence and respond to others as needed. Updates to conditions on USACE reservoirs can be found on the Tulsa Districts' website: http://www.swt.usace.army.mil/.

Through an ongoing successful partnership with the Grand River Dam Authority, the OWRB continued dissolved oxygen monitoring on both Grand and Hudson Lakes to support Federal Energy Regulatory Commission (FERC) relicensing, and will begin installation and monitoring work in 2012 on W.R. Holway Reservoir to support its relicensing.

The OWRB's groundwater monitoring team assessed Swine Licensed Managed Feeding Operations compliance in an additional 550 wells through a continuing partnership with the Oklahoma Department of Agriculture, Food and Forestry (ODAFF). Staff also acquired a wealth of historical groundwater quality data—now available to the public—to support the Garber-Wellington aquifer study. Staff are also beginning work on implementing a holistic groundwater monitoring program in Oklahoma, building upon historical quantity monitoring and expanding into the water quality arena. The new groundwater program should begin in the winter/spring of 2013

The OWRB's Water Quality Division continues to monitor water quality conditions and trends statewide through the Beneficial Use Monitoring Program (BUMP), recognized by EPA as one of the finest state monitoring

programs in the nation as it facilitates science-based decision-making concerning Oklahoma's impaired waters. In 2011, BUMP lake sampling underwent a thorough reevaluation and modification to incorporate a probabilistic sampling approach to maximize benefits and efficiencies in the program while reducing expenses.

The OWRB continues to participate in the EPA's National Aquatic Resource Surveys. Monitoring staff are currently conducting the National Lakes Assessment. Sampling is being conducted on thirty lakes across Oklahoma and will provide data to assess environmental integrity of the waters. This national study is designed to establish comparable lake conditions between states to facilitate standardized assessment. Work will begin next year on the next round of work to support the National Flowing Waters Study. Staff will collect data to assess wadeable and non-wadeable streams.

Additional OWRB water quality projects include:

- Probabilistic biological monitoring to assess stream ecosystem integrity throughout Oklahoma;
- Confirmatory stream and reservoir monitoring to assess OWQS beneficial use attainment status;
- Monitoring to assist GRDA in management of their reservoirs for ecosystem support;
- Completing cooperative work for ODAFF to investigate pesticides in certain Oklahoma streams.

OKLAHOMA WATER QUALITY STANDARDS

Consistent with the 2003 interstate agreement with Arkansas, OWRB staff initiated the ten-year review of Oklahoma's 0.037 milligram/liter phosphorus standard for Oklahoma's six Scenic Rivers, including the Upper Mountain Fork. A technical advisory group (TAG) consisting of state, federal, and tribal officials and point and nonpoint source dischargers from both states was formed to evaluate the current appropriateness of the numerical standard based on the latest, best scientific information available. At its April 2012 meeting, the OWRB accepted the TAG report and Arkansas TAG minority report and did not direct further action regarding the criterion.

During the fall of 2012, OWRB staff will be initiating its next triennial revision of the OWQS with updates on various human health criteria reflecting new EPA guidance and requirements. Discussions concerning nutrient and chlorophyll-a criteria for Lake Texoma are ongoing with the Texas Water Quality Standards staff. This effort will require substantial coordination between the states for developing criteria and their implementation.

DAM SAFETY PROGRAM

The OWRB Dam Safety Program ensures the safety of more than 4,600 dams in the state and implements statewide hazard prevention through the National Flood Insurance Program. The OWRB conducts inspections and provides public outreach for dam owners, emergency management officials, and floodplain administrators. Special emphasis is being given to emergency action plans, high-hazard reclassification, dam breach inundation maps, and rehabilitation of dams. The OWRB has developed a Dam Inventory Viewer available online at: www.owrb.ok.gov/maps/server/wims.php.

In the past year, the OWRB Dam Safety Program released two new guidelines titled "Hydrologic and Hydraulic Guidelines for Dams in Oklahoma" and "Hazard-Potential Classification Guidelines for Dams in Oklahoma." Also, the OWRB conducted two workshops in Oklahoma City and Tulsa where private and local government dam owners, as well as dam safety engineers, learned about the condition assessment of dams, emergency action plans, and breach inundation maps. In 2011, the OWRB received 13 new/updated Emergency Action

Plans, 13 construction/rehabilitation applications, and 74 inspection reports for high and significant hazard dams.

Downstream development has become a significant problem in Oklahoma, as in other states, with nearly 26% of the state's low hazard dams requiring reclassification to a more protective and costly hazard level in the coming years. This presents a tremendous challenge to both the state and dam owners. As of August 2012, there are approximately 615 low hazard and significant dams that could be reclassified to higher hazard classification. Simplified breach inundation maps will be made for dams which, based on field inspections and structural information, appear most likely to be reclassified as high hazard. Site visits have been conducted at approximately 306 dams and 58 simplified breach inundation maps have been completed in the past year.

FLOODPLAIN MANAGEMENT

The OWRB continues to assist communities in adopting new Flood Insurance Rate Maps (FIRM) through the Federal Emergency Management Agency (FEMA) Map Modernization and RiskMAP program. Updated FIRM maps have been issued for 9 counties and 84 participating communities in Oklahoma. Staff also participated in FEMA RISKMap Discovery projects for the Lower North Canadian River Basin, and Polecat/Snake River Basin. Meetings were held with communities and the public to collect data and information for use in identifying areas that may be eligible for mapping, mitigation, and compliance projects. The OWRB continues to train accredited floodplain administrators in Oklahoma's 391 participating National Flood Insurance Program (NFIP) member communities. With assistance from the Oklahoma Floodplain Managers Association, the OWRB conducted 18 training opportunities in 2011-2012.

The OWRB is also an active participant with FEMA in the Cooperating Technical Partnership (CTP) Program, an innovative approach to fostering working partnerships between FEMA and participating NFIP communities, regional agencies, state agencies, tribes, and universities in the FEMA flood hazard mapping program. The OWRB is currently assisting the communities of Broken Arrow and El Reno through the CTP program. The OWRB and the US Army Corps Engineers are actively working toward a partnership in the Silver Jackets program fostering data sharing and flood resiliency.

WATER RESOURCES FINANCING

The OWRB administers the State Financial Assistance Program (FAP), backed by the Statewide Water Development Revolving Fund, which awards loans and grants for the construction and improvement of water and sewer facilities. In all, through the OWRB's five loan and grant programs, more than $2.7 billion in financing has been approved for water and sewer projects in Oklahoma with a total estimated savings of $943 million to Oklahoma communities.

PROGRAM	NUMBER AND AMOUNT
FAP Loans	343 for $787,930,000
CWSRF Loans	253 for $1,059,033,629
DWSRF Loans	143 for $768,074,642
REAP Grants	578 for $51,284,406
Emergency Grants	566 for $33,776,351
Drought Response Grants	2 for $200,000
TOTAL	**1,885 for $2,700,299,028**

OKLAHOMA STATE LEGISLATURE

The 2012 legislative session resulted in landmark water policy improvements for the State of Oklahoma, including implementation of most of the priority recommendations offered by the 2012 Update of the Oklahoma Comprehensive Water Plan.

- SB 1975: General Appropriations Bill—Provides $6,999,671 to the OWRB, a 27 percent increase over FY-2012. An additional $1.5 million, coupled with extension to 2016 of the existing Gross Production Tax proceeds pledged to general implementation of the Oklahoma Comprehensive Water Plan, will allow the OWRB to begin implementation of OCWP recommendations, resulting in establishment of Oklahoma's first comprehensive statewide groundwater monitoring program, restoration of the state's comprehensive statewide stream and lake monitoring program to the level realized in the late 1990s, and reducing the growing backlog of statutorily mandated groundwater and stream water allocation studies.
- HB 3055: Water for 2060 Act—Establishes a statewide goal to use no more fresh water in 2060 than what is used today. The Act creates a 15-member advisory council—chaired by the OWRB Executive Director with members appointed by the Governor, House Speaker and Senate President Pro Tempore—to make recommendations on water conservation practices and incentives necessary to achieve this goal. The advisory council is required to submit a final report of its findings and recommendations to the Governor, Speaker of the House of Representatives, and President Pro Tempore of the Senate within three years.
- HJR 1085: Water Infrastructure Credit Enhancement Reserve Fund—Sends State Question 764 to a vote of the people in November's general election. Approval of SQ 764 would create the Credit Enhancement Reserve Fund, which would allow the OWRB to increase the leveraging capacity of the State Financial Assistance Program sufficient to address the identified $82 billion water and wastewater infrastructure financing need in Oklahoma over the next 50 years.
- HB 1910: Water Well Drilling Inspection and Compliance—Grants the OWRB authority to inspect specific water wells upon consent of the landowner or as allowed by district court order and disapprove use of any well found to be noncompliant with state laws and regulations. The bill also authorizes the OWRB to prepare exams and other licensing requirements for water well drillers and pump installers.
- HB 2835: Gray Water Reuse—Allows for the use of up to 250 gallons per day of private, residential gray water for household gardening, composting or landscape irrigation without a permit from the Oklahoma Department of Environmental Quality. (Greywater is wastewater generated from domestic activities—laundry, dishwashing, bathing, etc.—that can be recycled on-site for landscape irrigation and related uses. Greywater does not contain human waste.) The bill also establishes requirements of approved gray water systems.
- SB 1043: Water Reuse—Requires DEQ, no later than July 1, 2013, to promulgate rules for the indirect potable reuse of treated wastewater. By August 31 of this year, DEQ is also required to convene a workgroup of municipalities, consulting engineers, technical experts, and the general public to explore opportunities for water reuse and to review and make recommendations on rules defining indirect potable reuse.
- SJR91: Municipal Water Reuse Rules—A Joint Resolution approving permanent Department of Environmental Quality rules relating to municipal water reuse.

LEGAL MATTERS

On August 18, 2011, the Chickasaw and Choctaw Nations filed a lawsuit in U.S. District Court for the Western District of Oklahoma. As subsequently amended, the lawsuit names as defendants Gov. Mary Fallin, OWRB members and Executive Director, the City of Oklahoma City and Oklahoma City Water Utility Trust (OCWUT). The lawsuit alleges the Nations have federally-protected rights to the water within a 22-county territory in

southeastern Oklahoma. Among other things, the lawsuit seeks (1) declaratory judgments against any action by the OWRB on a pending application by Oklahoma City and OCWUT for a permit to use stream water from Sardis Reservoir in southeastern Oklahoma, or any other withdrawal or export of water from the area at issue, unless and until there is initiated a general stream adjudication that satisfies the requirements of the federal law known as the McCarran Amendment; and (2) permanent injunctions against any such action unless and until a general stream adjudication that satisfies the McCarran Amendment is completed. In December, the OWRB authorized its counsel to institute adjudication proceedings, if necessary, to fairly and accurately determine all rights to the use of water in the Kiamichi, Clear Boggy, and Muddy Boggy stream systems.

On March 27, 2012, the federal court issued an order to stay formal proceedings (put the case on hold) for 60 days to allow more time for mediation among the parties. The case has been further stayed until mid-November to allow more time for mediation. Frances McGovern is the federal court mediator.

OKLAHOMA GOVERNOR'S WATER CONFERENCE & RESEARCH SYMPOSIUM

On November 13-14, the OWRB and Oklahoma Water Resources Research Institute will co-host the 33rd Annual Oklahoma Governor's Water Conference and Water Research Symposium at the Southern Hills Marriott in Tulsa. This year's theme is "Water for 2060," highlighting water conservation, efficiency and reuse and related initiatives recommended by the *2012 Update of the Oklahoma Comprehensive Water Plan*, approved last year.

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION

BUDGET

7/1/2012 – 6/30/15

ITEM	(BUDGET) FY – 2011 7/1/2011 6/30/12 (Dollars)	(ACTUAL EXPENSES) FY – 2011 7/1/2011 6/30/12 (Dollars)	(BUDGET) FY - 2012 7/1/2012 6/30/13 (Dollars)	(PROPOSED) FY – 2013 7/1/2013 6/30/14 (Dollars)
Postage	60.00		60.00	60.00
Stationery	75.00		75.00	75.00
Printing & Reproduction	1,000.00	552.76	1,000.00	1,000.00
Personnel Service & Office Expenses	120.00		120.00	120.00
Biennial Audit	275.00		275.00	275.00
Meeting Place	800.00	373.32	800.00	800.00
Security Bond	250.00		250.00	250.00
Contingency	420.00		420.00	420.00
Computation of Annual Water Yield	6,250.00	4,000.00	6,250.00	6,250.00
Stream Gaging FY 2012	6,250.00	6,250.00	6,250.00	6,250.00
TOTALS:	**15,500**	**11,176.08**	**15,500**	**15,500**
• **½ Annual budget to be paid by each state**		**3,500.00**	**3,500.00**	**3,500.00**
•				

ANNUAL YIELD AND SELECTED HYDROLOGIC DATA FOR THE ARKANSAS RIVER BASIN COMPACT, ARKANSAS-OKLAHOMA, 2011 WATER YEAR

By Terrance E. Lamb

Hydrologic Information Services

Prepared for the
ARKANSAS RIVER COMPACT COMMISSION,
ARKANSAS-OKLAHOMA

Little Rock, Arkansas
2012

CONTENTS

ILLUSTRATIONS

TABLES

CONVERSION FACTORS

Multiply	By	To obtain
inch (in.)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
acre	4,047	square meter (m^2)
	0.004047	square kilometer (km^2)
square mile (mi^2)	2.590	square kilometer (km^2)
cubic foot (ft^3)	0.02832	cubic meter (m^3)
acre-foot (acre-ft)	1,233	cubic meter (m^3)
	1.233x10-6	cubic kilometer (km^3)
cubic foot per second (ft^3/s)	28.32	liter per second (L/s)
	0.02832	cubic meter per second (m^3/s)
ton per day (ton/d)	0.9072	megagram per day (Mg/d)

Temperature in degrees Celsius (C) can be converted to degrees Fahrenheit (F) as follows:

$$F = 1.8 \times C + 32$$

ABBREVIATIONS

AC-FT	Acre-foot
ACID M.	Acidification method
CHLOR-A	Chlorophyll a
CHROMO FLUOROM	Chromatographic/fluorometric
COLS./100ML	Number of colonies per 100 milliliters
DEG. C	Degrees Celsius
DIS IT	Dissolved incremental titration
E.	Escherichia
FLTRD (other abbreviations sometimes used)	Filtered
Ft	Feet
FT FM L BANK	Feet from left bank
INST	Instantaneous
K	Non-ideal count
MG/L	Milligrams per liter
MM of Hg	Millimeters of mercury
m	Micron
mG/L	Micrograms per liter
ML	Milliliters
MM	Millimeters
NTU	Nephelometric turbidity units
SED.	Sediment
SUSP.	Suspended
T/DAY	Tons per day
TOT IT	Total incremental titration
UM-MF	Micron membrane filter
UNCORR.	Uncorrected
US/CM	Microsiemens per centimeter at 25 degrees Celsius
WAT DIS	Water dissolved
<	Less than
>	Greater than
-- or ---	No data available
%	Percent

ANNUAL YIELD AND SELECTED HYDROLOGIC DATA FOR THE ARKANSAS RIVER BASIN COMPACT, ARKANSAS-OKLAHOMA, 2011 WATER YEAR

By Terrance E. Lamb

ABSTRACT

The computed annual yield and deficiency of the sub-basins as defined in the Arkansas River Basin Compact, Arkansas-Oklahoma, are given in tables for the 2011 water year. Actual runoff from the sub-basins, depletion caused by major reservoirs in the compact area, and depletions due to other water uses also are given in tabular form. Computed monthly mean discharges are shown for stream-flow stations in the Arkansas River Basin. Water-quality data are shown for some water-quality stations sampled in the Arkansas River Basin.

INTRODUCTION

In 1955, the Congress of the United States granted consent to Arkansas and Oklahoma to enter into a compact for the apportionment of the waters of the Arkansas River and its tributaries as they affect the two States. An Arkansas-Oklahoma Arkansas River Compact committee was created with a Federal Representative acting as chairman. After research and deliberate negotiations had been completed, both States approved the Arkansas River Basin Compact, Arkansas-Oklahoma, 1972. To meet the requirements of the Compact, State-line yields of the Arkansas River Sub-Basins are determined at the end of each year.

This report was prepared for the Arkansas River Compact Commission, Arkansas-Oklahoma by Hydrologic Information Services. Stream-flow and water-quality data were collected by the U.S. Geological Survey, in cooperation with the Arkansas Natural Resources Commission and the Oklahoma Water Resources Board. The U.S. Army Corps of Engineers, Tulsa District, furnished data from the Webbers Falls, Tenkiller Ferry, Robert S. Kerr, and Wister Lakes.

PURPOSE AND SCOPE

The purpose of this report is to present the annual yields and deficiencies computed for the 2011 water year and to present some water quality data for the sub-basins in the Arkansas River Basin as defined in the Arkansas River Compact. The report includes data from stream-flow stations and some water-quality stations sampled in the Arkansas River Basin during the 2011 water year. The area included in the Compact is shown on figure 1.

DEFINITION OF TERMS

The following terms used in this report are taken from Article II of the Arkansas River Basin Compact, Arkansas-Oklahoma, 1972.

The term "Arkansas River Basin" means all of the drainage basin of the Arkansas River and its tributaries from a point immediately downstream from the confluence of the Neosho River

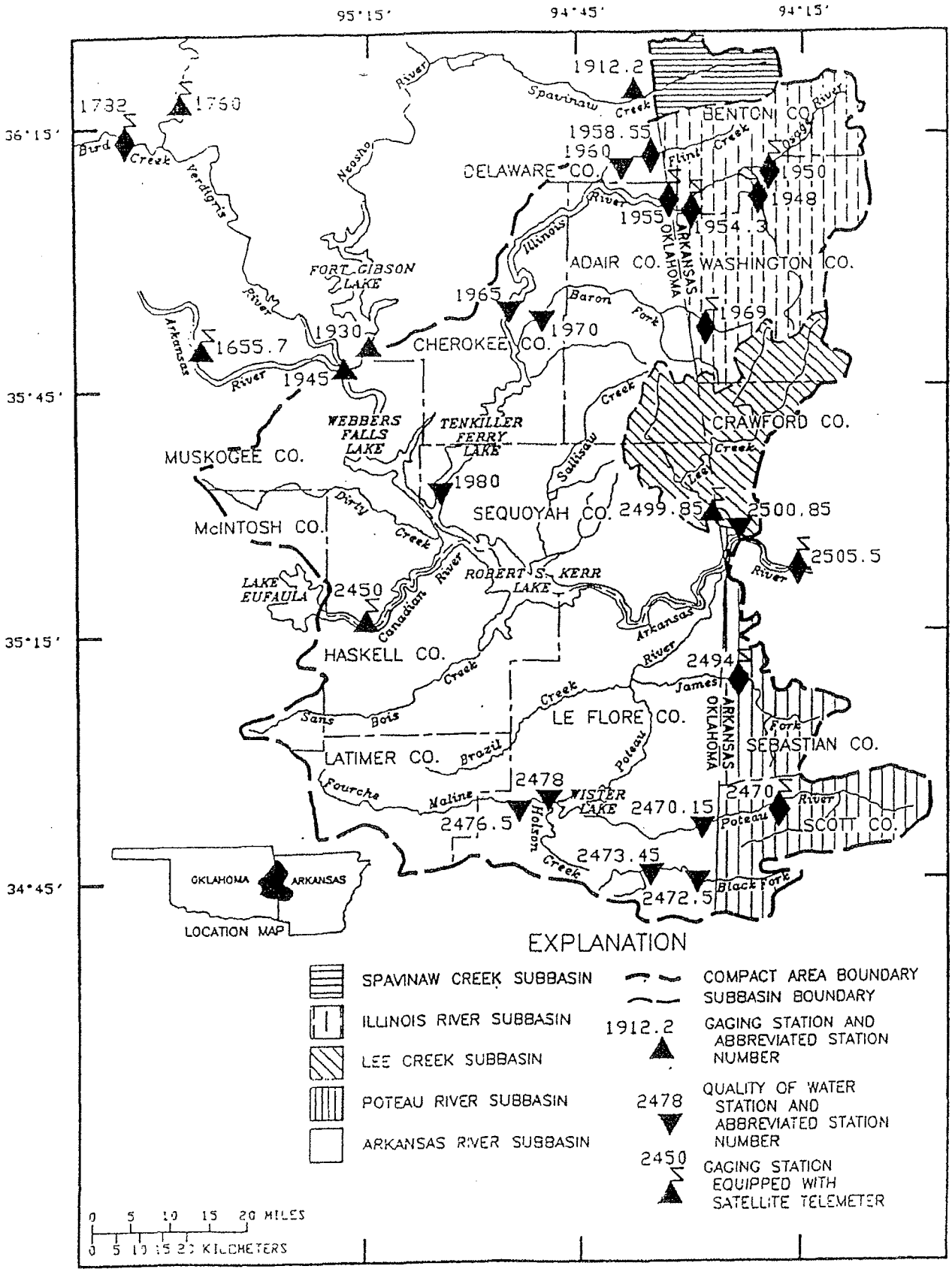


Figure 1.--Arkansas-Oklahoma Arkansas River Basin Compact area and subbasins.

with the Arkansas River (fig. 1) to a point immediately downstream from the confluence of Lee Creek with the Arkansas River, together with the drainage basin of Spavinaw Creek in Arkansas (fig. 1), but excludes that part of the drainage basin of the Canadian River upstream from Lake Eufaula Dam.

The term "Spavinaw Creek Sub-basin" means the drainage area of Spavinaw Creek in the State of Arkansas.

The term "Illinois River Sub-basin" means the drainage area of the Illinois River in the State of Arkansas.

The term "Lee Creek Sub-basin" means the drainage area of Lee Creek in the State of Arkansas upstream from the Oklahoma State line and in the State of Oklahoma.

The term "Poteau River Sub-basin" means the drainage area of the Poteau River in the State of Arkansas.

The term "Arkansas River Sub-basin" means all areas of the Arkansas River Basin in the Compact area except the four sub-basins described previously.

The term "water year" means a 12-month period beginning on October 1 and ending September 30.

The term "annual yield" means the computed annual gross runoff from any specified sub-basin. The runoff would have passed any certain point on a stream and would have originated within any specified area under natural conditions without any manmade depletion or accretion during the water year.

Terms related to stream-flow, water-quality, and other hydrologic data, as used in this report, are defined below.

Acre-foot is the quantity of water required to cover 1 acre to a depth of 1 foot and is equivalent to 43,560 cubic feet.

Bacteria are microscopic unicellular organisms, typically spherical, rod like, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease; 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.

Escherichia coli (E. coli) are present in the digestive tract of warm-blooded animals. In the laboratory, E. coli are defined as all organisms that produce orange/yellow colonies when incubated for two hours at 35 °C± 0,2 °C and transferred to 44,5 °C±0,2 ° for 22-24 hours on mTEC agar (nutrient medium for E. coli growth), and stained with phenol red solution. Their concentrations are expressed as number of colonies per 100 ml of sample.

Fecal coliform bacteria are present in the intestines 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 the organisms that produce blue colonies within 24 hours when incubated at 44.5 °C ±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 also are present in intestines of warm-blooded animals. Their presence in water is considered to verify fecal pollution. They are characterized as gram-positive, cocci bacteria that are capable of growth in brain-heart infusion broth. These bacteria also are defined as all the organisms that produce red or pink colonies within 48 hours at 35 °C±0.5 °C on KF-streptococcus agar (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 ml of sample.

Code numbers have been assigned for agencies collecting and analyzing samples, and are listed in water-quality tables of this report as follows:

1028 Oklahoma District, Water Resources Division (WRD), U.S. Geological Survey
80513 Arkansas District, WRD, U.S. Geological Survey
80020 National Water Quality Laboratory, WRD, U.S. Geological Survey.

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

Cubic foot per second is the rate of discharge representing a volume of 1 cubic foot passing a specified point during 1 second.

Deficiency is the amount the actual runoff is less than the minimum required flow.

Depletion is the difference between the inflow and outflow caused by major reservoirs.

Discharge is the volume of water that passes a given point within a given period.

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

Mean discharge is the arithmetic average of individual daily mean discharges during a specific period.

Dissolved refers to the material in a representative water sample that passes through a 0.45-micron 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 oxygen content of water in equilibrium with air is a function of atmospheric pressure and temperature and the dissolved-solids concentration of the water. The ability of water to retain oxygen decreases with increasing temperature or dissolved solids, with small temperature changes having the more significant effect. Photosynthesis and respiration may cause diurnal variations in dissolved-oxygen concentration in water of some streams.

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 upstream from the specified point. Figures of drainage area given herein include all closed basins, or noncontributing areas within the area, unless otherwise noted.

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 attributable to the presence of alkaline earths (principally calcium and magnesium) and is expressed as equivalent calcium

carbonate ($CaCO_3$).

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.

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

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).

Suspended-sediment discharge (tons/day) is the rate at which dry weight of sediment passes a section of a stream or is the quantity of sediment, as measured by dry weight or volume that passes a section in a given time. It is computed by multiplying discharge by milligrams per liter by 0.0027.

Sodium-absorption-ratio (SAR) is the expression of relative activity of sodium ions in exchange reactions with soil and is an index of sodium or alkali hazard to the soil. Water varies, in respect to sodium hazard, from that which can be used for irrigation on almost all soils to that which generally is unsatisfactory for irrigation.

Specific conductance is a measure of the ability of 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 concentration 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 past the gage in a channel.

STORET parameter codes are codes assigned to specific hydrologic measurement types and constituents for computer storage of data. These five-digit codes (shown in parentheses) are included with the water-quality information in the Hydrologic Station Records section.

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

Tons per day is the quantity of 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 that the sample consists of a water-suspended-sediment mixture and that the analytical method determines all of the constituent in the sample.)

COMPUTATION OF ANNUAL YIELDS

The annual yield and deficiency (table 1) for each sub-basin was computed as defined by the Arkansas River Compact (1972). Actual runoff for the sub-basins (table 2) was computed as defined by the Compact except for the station Lee Creek near Van Buren, which has been moved 3.2 miles upstream near Short, Oklahoma.

Table 1. --Annual yield and deficiency for the sub-basins for the 2011 water year, as defined in the Arkansas River Basin Compact, Arkansas-Oklahoma, 1972

[Flow in cubic feet per second]

Sub-basin	Actual runoff from the Sub-basins	Total depletions or accretions (-)	Annual yield	[a]Percent depletion allowed	Minimum required flow	[b]Deficiency
Spavinaw Creek	126	[c]0.001	126	50	63	0
Illinois River	1,116	[e]-32.2	1,084	60	434	0
Lee Creek	736	[c]2.48	738	100	0	0
Poteau River	374	[c]0.96	375	60	150	0
Arkansas River	4,303	[d]103.5	4,407	60	1,763	0

a Defined in the Arkansas River Basin Compact, Arkansas-Oklahoma, 1972.

b The amount of actual runoff less than the minimum required flow.

c Based on best available water-use data.

d Based on best available water-use data and 2011 direct diversions from lake storage.

e Based on best available water-use data and 37.1 cfs imported from the White River Basin in 2011.

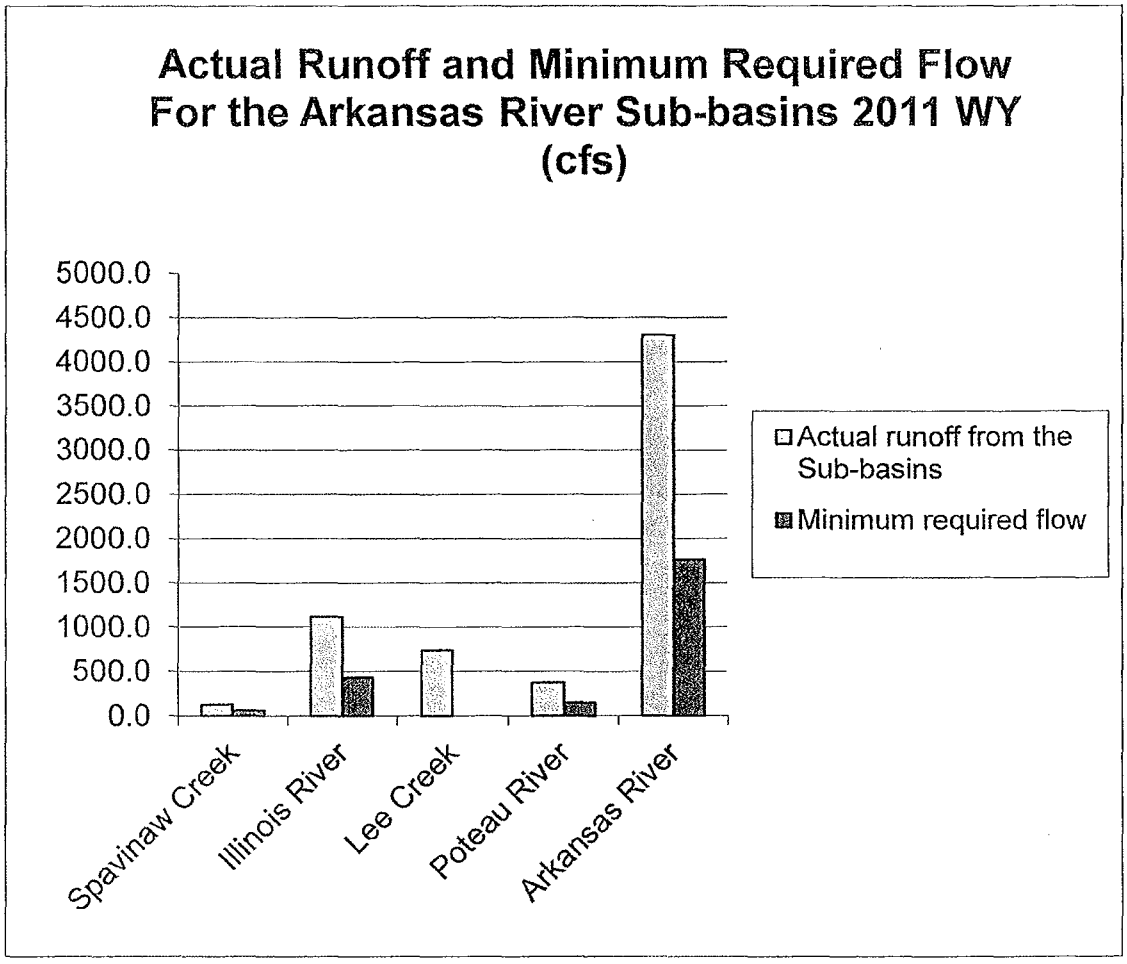

Actual Runoff and Minimum Required Flow For the Arkansas River Sub-basins 2011 WY (cfs)
5000.0
4500.0
4000.0
3500.0
3000.0
2500.0
2000.0
1500.0
1000.0
500.0
0.0
Spavinaw Creek
Illinois River
Lee Creek
Poteau River
Arkansas River
Actual runoff from the Sub-basins
Minimum required flow

Table 1a. --Annual yield and deficiency for the sub-basins for the 2011 water year, as defined in the Arkansas River Basin Compact, Arkansas-Oklahoma, 1972

[Quantity in acre-feet]

Sub-basin	Actual runoff from the Sub-basins	Total depletions or accretions (-)	Annual yield	[a]Percent depletion allowed	Minimum required flow	[b]Deficiency
Spavinaw Creek	91,220	[c]1	91,221	50	45,610	0
Illinois River	807,947	[e]-23,312	784,635	60	314,202	0
Lee Creek	532,840	[c]1,795	534,635	100	0	0
Poteau River	270,764	[c]695	271,459	60	108,595	0
Arkansas River	3,115,230	[d]74,931	3,190,161	60	1,276,352	0

a Defined in the Arkansas River Basin Compact, Arkansas-Oklahoma, 1972.

b The amount of actual runoff less than the minimum required flow.

c Based on best available water-use data.

d Based on best available water-use data and 2011 direct diversions from lake storage.

e Based on best available water-use data and 26,838 acre-ft imported from the White River Basin in 2011.

Table 2.--Actual runoff from the sub-basins for the 2011 water year

[In cubic feet per second; D.A. = drainage area; mi^2 = square mile; acre-ft = acre-feet]

Month	Spavinaw Creek D.A.=133 mi^2	[b,e] Illinois River D.A.=744 mi^2	Lee Creek D.A.=426 mi^2	[c] Poteau River D.A.=536 mi^2	[d] Arkansas River D.A.=4,062 mi^2
October	18.0	204	49.8	93.2	625
November	18.9	255	88.0	38.6	1,628
December	17.5	226	143	21.3	1,483
January	13.1	227	204	3.08	1,345
February	54.6	570	566	135	2,205
March	60.4	600	569	63.8	1,793
April	629	6,008	4,106	1,939	7,455
May	508	3,914	2,969	2,035	28,004
June	109	617	146	108	6,799
July	39.0	283	5.42	10.4	-126
August	28.2	263	7.15	8.79	387
September	22.2	265	8.45	32.4	-217
2011 water year	126	1,116	736	374	4,303
2011 water year (acre-ft)	91,479	808,299	532,875	270,980	3,115,138

b Includes 63 mi^2 ungaged

c Includes 125 mi^2 ungaged.

d Computed by subtracting drainage area at Arkansas River at Muskogee, Canadian River near Whitefield, Illinois River Sub-basin, Lee Creek Sub-basin, and Poteau River Sub-basin from drainage area at Arkansas River near Fort Smith, Arkansas.

e Includes 37.1 cfs discharged from Fayetteville, Rogers, and Springdale sewage treatment plants that was withdrawn from the White River Basin in Arkansas.

Annual depletion caused by major reservoirs was computed for the four major reservoirs in the basin as defined by the Arkansas River Compact (1972). These depletions are shown in tables 3 and summarized in table 1.

A compilation of withdrawals and returns of freshwater in the sub-basins was prepared using data from "Water Use In Arkansas" and "Water Use In Oklahoma", as well as return flow data for the 2011 water year in the Illinois River basin. These depletions and accretions for each sub-basin are shown in Table 4 and summarized in Table 1. Information on depletions continues to be gathered in order to re-evaluate their present impact.

Stream-flow data used in the computations are given in the Hydrologic Station Records section (p.13 to 48). The station description under "Remarks" states the degree of accuracy of the records. "Excellent" means that about 95 percent of the daily discharges are within 5 percent of the actual discharge, "good" means within 10 percent, and "fair" means within 15 percent. "Poor" means that daily discharges have less than "fair" accuracy.

Table 3.--Annual depletion caused by major reservoirs for the 2011 water year

[acre-ft = acre-feet; ft^3/s = cubic feet per second]

Reservoir	Year-end contents (acre-feet)	Change in contents in water year (acre-feet)	[a]Precipitation on reservoir surface (inches)	[b]Evaporation from reservoir (inches)	[a]Diversions (acre-feet)	Depletion (acre-feet)	Depletion (ft^3/s)
Webbers Falls	166,468	4,547	34.83	51.34	0	25,236	34.86
Tenkiller Ferry	594,197	-65,536	38.32	36.01	1,632	-58,974	-81.46
Robert S. Kerr	509,309	-7,328	38.07	51.12	0	62,169	85.9
Wister	37,147	-5,436	39.49	44.65	10,440	12,874	17.8

[a] From U.S. Army Corps of Engineers, Tulsa District.

[b] Adjusted for pan coefficient of 0.70 (from Wisler and Brater, 1949).

Table 4.--Estimates of annual depletion for the sub-basins caused by withdrawals and returns for the 2011 water year*

Sub-basin	Withdrawals ac/ft	Returns ac/ft	Total Withdrawals or Returns (-) ac/ft	Total Withdrawals or Returns (-) cfs
Spavinaw Creek	1	0[1]	1	0.001
Illinois River	3,520	26,838[2]	-23,318	-32.2
Lee Creek	1,797	0[1]	1,797	2.48
Poteau River	696	0[1]	696	0.96
Arkansas River	99,600[3]	24,700[3]	74,900	103.5

[1] No known returns for these sub-basins

[2] Based on 2011 WY returned flow transferred from the White River Basin

[3] Estimated from 2000, 2007, and 2011 WY data

* Including depletions from the 4 major reservoirs in the Arkansas River sub-basin

WATER QUALITY

Beginning in October 1984, water-quality data for the Arkansas-Oklahoma Compact have been published in this report. These data are collected to monitor the water quality in the Arkansas-Oklahoma Compact area. Over the past several years, nutrients, major ions, and sediment data have been collected. Observed concentrations of these constituents are indications of general water quality in the subject area sub-basins. In freshwater, phosphorus is often the nutrient responsible for accelerated eutrophication. To control eutrophication, the Environmental Protection Agency makes the following recommendations:

A) Total phosphates should not exceed 0.05 mg/L (as phosphorus) in a stream at a point where it enters a lake or reservoir, and
B) Total phosphorus should not exceed 0.1 mg/L in streams that do not discharge directly into lakes or reservoirs.

Water-quality data collected at some stations in the compact area in the 2011 water year are shown in tables in the Hydrologic Station Records section of this report.

SELECTED REFERENCES

Arkansas River Basin Compact Arkansas-Oklahoma, 1972, with Supplemental Interpretive Comments, Supplement No. 1: Austin, Texas, 31 p.
Arkansas Soil and Water Conservation Commission, 1981, Arkansas State Water Plan - Lakes of Arkansas, 157 p.
Wisler, C.D., and Brater, E.F., 1949, Hydrology: New York, John Wiley & Sons, Inc., 150 p.

HYDROLOGIC STATION RECORDS 2011 WY

Daily Discharge records denoted by Q and Quality of Water records by QW.

07191220 SPAVINAW CREEK NEAR SYCAMORE, OK

Neosho Basin
Lower Neosho Subbasin

LOCATION.–Lat 36°20'05", long 94°38'29" referenced to North American Datum of 1983, in NE 1/4 NW 1/4 sec.4, T.21 N., R.25 E., Delaware County, OK, 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 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.–October 1961 to current year
REVISED RECORDS.–WSP 2121: 1965 (M).
GAGE.–Water-stage recorder. Datum of gage is 868.34 ft NAVD of 1988. Prior to Nov. 6, 2001, elevation published as 875 ft above NGVD of 1929, from topographic map.
REMARKS.–No estimated daily discharges. Records fair. U.S. Army Corps of Engineers' satellite telemeter at station.
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.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011, DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	24	17	32	14	13	97	55	485	250	57	24	20
2	23	16	29	15	13	87	54	413	221	56	23	19
3	23	16	27	14	13	80	53	352	199	54	22	19
4	22	16	25	14	14	73	51	309	179	53	21	19
5	21	16	23	14	15	68	49	274	164	52	21	18
6	20	16	22	14	16	63	47	249	150	51	20	17
7	20	16	21	14	18	59	46	227	137	49	20	16
8	19	16	20	14	19	56	44	208	127	48	20	15
9	19	15	19	14	21	53	43	191	120	47	20	15
10	19	15	18	14	22	50	41	175	113	46	22	15
11	18	15	18	13	24	49	39	163	107	44	24	15
12	17	15	17	13	25	47	38	157	109	42	29	15
13	17	16	17	13	27	45	37	149	104	40	39	15
14	17	16	16	13	29	45	36	141	99	40	49	15
15	17	17	16	13	34	51	35	134	96	40	50	15
16	17	16	15	13	54	73	35	128	97	40	48	15
17	17	15	15	13	108	83	34	122	93	40	43	16
18	16	15	15	13	120	77	33	121	90	39	39	19
19	16	15	15	12	108	71	33	122	87	37	36	22
20	16	15	15	13	94	65	31	131	83	35	34	26
21	16	15	15	13	85	60	33	211	79	34	32	28
22	17	16	14	13	76	55	240	228	77	33	30	31
23	17	15	14	13	68	52	1,100	1,620	74	32	29	32
24	17	16	15	13	69	50	1,580	4,090	76	31	27	34
25	17	18	15	13	100	48	8,030	2,080	72	30	26	37
26	18	21	15	13	128	45	3,140	1,140	69	29	25	38
27	18	39	14	13	126	48	1,580	750	65	27	25	36
28	18	46	14	13	111	66	1,190	554	62	26	24	34
29	17	41	13	13	---	67	813	431	60	26	23	31
30	17	36	14	13	---	61	610	348	59	25	21	29
31	17	---	14	13	---	57	---	292	---	25	20	---
Total	567	577	552	413	1,550	1,901	19,150	15,995	3,318	1,228	886	676
Mean	18.3	19.2	17.8	13.3	55.4	61.3	638	516	111	39.6	28.6	22.5
Max	24	46	32	15	128	97	8,030	4,090	250	57	50	38
Min	16	15	13	12	13	45	31	121	59	25	20	15
Ac-ft	1,120	1,140	1,090	819	3,070	3,770	37,980	31,730	6,580	2,440	1,760	1,340
Cfsm	0.14	0.14	0.13	0.10	0.42	0.46	4.80	3.88	0.83	0.30	0.21	0.17
In.	0.16	0.16	0.15	0.12	0.43	0.53	5.36	4.47	0.93	0.34	0.25	0.19

WATER-QUALITY RECORDS

PERIOD OF RECORD.–October 1972 to April 1988, December 2001 to current year.

REMARKS.–Samples collected periodically by the U.S. Geological Survey. All water-quality samples were analyzed at the City of Tulsa Quality Assurance Laboratory in Tulsa, Oklahoma. Suspended sediment samples were analyzed by U.S. Geological Survey. Specific conductance, pH, water temperature, air temperature, turbidity, and dissolved oxygen were determined in the field.

COOPERATION.–All analytical records were furnished by City of Tulsa Quality Assurance Laboratory, Tulsa, Oklahoma.

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011

Part 1 of 4

[%, percent; ANC, acid neutralizing capacity; $CaCO_3$, calcium carbonate; FNU, Formazin nephelometric units; LED, light-emitting diode; N, nitrogen; P, phosphorus; ft^3/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; –, no data; <, less than]

Date	Sample start time	Barometric pressure, mm Hg (00025)	Temperature, air, °C (00020)	Discharge, instantaneous, ft^3/s (00061)	Dissolved oxygen, water, unfiltered, mg/L (00300)	Dissolved oxygen, water, unfiltered, % saturation (00301)	pH, water, unfiltered, field, standard units (00400)	Specific conductance, water, unfiltered, µS/cm at 25 °C (00095)	Temperature, water, °C (00010)
04-23-2011	1015	--	--	892	8.8	--	7.2	257	14.3
04-25-2011	1330	725	--	8,080	9.2	94	7.4	149	14.2
05-24-2011	1215	734	26.4	3,190	8.6	90	7.8	138	16.1
06-28-2011	1045	748	35.0	62	8.2	92	7.6	296	20.0

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011

Part 2 of 4

[%, percent; ANC, acid neutralizing capacity; $CaCO_3$, calcium carbonate; FNU, Formazin nephelometric units; LED, light-emitting diode; N, nitrogen; P, phosphorus; ft^3/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; –, no data; <, less than]

Date	Sample start time	Turbidity, water, unfiltered, monochrome near infrared LED light, 780-900 nm, detection angle 90 +/- 2.5 degrees, FNU (63680)	ANC, water, unfiltered, fixed endpoint (pH 4.5) titration, laboratory, mg/L as $CaCO_3$ (90410)	Carbon dioxide, water, unfiltered, mg/L (00405)	Ammonia plus organic nitrogen, water, unfiltered, mg/L as N (00625)	Ammonia, water, unfiltered, milligrams per liter as NH4 (71845)	Ammonia, water, unfiltered, mg/L as N (00610)	Nitrate plus nitrite, water, unfiltered, mg/L as N (00630)	Nitrate, water, unfiltered, mg/L as N (00620)
04-23-2011	1015	64	85	11	1.5	<.155	<.120	4.00	--
04-25-2011	1330	--	53	4.4	3.5	<.155	<.120	3.20	--
05-24-2011	1215	--	64	2.0	1.7	<.155	<.120	3.10	3.10
06-28-2011	1045	.4	110	4.9	<.68	<.155	<.120	3.70	3.60

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 3 of 4

[%, percent; ANC, acid neutralizing capacity; $CaCO_3$, calcium carbonate; FNU, Formazin nephelometric units; LED, light-emitting diode; N, nitrogen; P, phosphorus; ft^3/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than]

Date	Sample start time	Nitrite, water, unfiltered, mg/L as N (00615)	Organic nitrogen, water, unfiltered, mg/L (00605)	Orthophosphate, water, filtered, mg/L (00660)	Orthophosphate, water, filtered, mg/L as P (00671)	Phosphorus, water, filtered, mg/L as P (00666)	Phosphorus, water, unfiltered, mg/L as P (00665)	Total nitrogen, water, unfiltered, mg/L (00600)	Total nitrogen, water, unfiltered, milligrams per liter as nitrate (71887)
04-23-2011	1015	--	< 1.5	.291	.095	.100	.190	5.5	24
04-25-2011	1330	--	< 3.5	.644	.210	.250	.790	6.7	30
05-24-2011	1215	< .100	< 1.7	.399	.130	.150	.460	4.8	21
06-28-2011	1045	< .100	< .68	.202	.066	.064	.070	< 4.4	< 19

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 4 of 4

[%, percent; ANC, acid neutralizing capacity; $CaCO_3$, calcium carbonate; FNU, Formazin nephelometric units; LED, light-emitting diode; N, nitrogen; P, phosphorus; ft^3/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than]

Date	Sample start time	Suspended sediment, sieve diameter, percent smaller than 0.0625 mm (70331)	Suspended sediment concentration, mg/L (80154)	Suspended sediment discharge, tons per day (80155)
04-23-2011	1015	85	94	226
04-25-2011	1330	99	737	16,100
05-24-2011	1215	86	311	2,680
06-28-2011	1045	57	7	1.2

07194500 ARKANSAS RIVER NEAR MUSKOGEE, OK

Robert S. Kerr Reservoir Basin
Dirty-Greenleaf Subbasin

LOCATION.--Lat 35°46'10", long 95°17'49" referenced to North American Datum of 1927, Muskogee County, OK, Hydrologic Unit 11110102, on downstream side of left pier of bridge on U.S. Highway 62, 1.7 miles downstream from Neosho River, 3.5 miles northeast of Muskogee, and at mile 457.8.
DRAINAGE AREA.--96,674 mi² of which 12,541 mi² probably is noncontributing.

SURFACE-WATER RECORDS

PERIOD OF RECORD.--October 1926 to September 1970, July 2003 to current year. Published as "at Webbers Falls" October 1933 to February 1935. Monthly discharge only for some periods, published in WSP 1311.
REVISED RECORDS.--WSP 1341: Drainage area.
GAGE.--Water-stage recorder. Datum of gage is 471.38 ft above NGVD of 1929. See WSP 1921 for history of changes prior to Feb. 21, 1931.
REMARKS.--Records poor. Some regulation since 1940 by Grand Lake; further regulation since 1941 by Great Salt Plains Lake and since 1951 by Hulah Lake. Flow regulated since 1953 by Fort Gibson Lake (station 07193000). Flow regulated since September 1964 by Keystone Lake

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011, DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	3,490	1,650	4,180	1,460	e412	20,900	9,520	81,200	61,500	4,180	1,440	2,990
2	3,650	1,140	2,410	684	e568	19,900	7,710	77,800	48,800	2,460	1,350	1,930
3	3,150	658	1,980	1,190	1,440	21,100	4,330	58,000	42,500	2,260	1,980	2,150
4	2,780	1,610	1,240	4,300	3,380	21,600	10,600	48,900	33,000	3,620	1,310	2,070
5	1,430	1,260	589	1,500	4,490	15,700	8,200	53,100	33,600	2,200	1,390	1,670
6	2,200	371	4,030	4,320	3,660	15,800	6,940	51,900	31,400	2,470	2,920	1,600
7	4,150	334	3,360	6,150	3,510	16,200	8,710	50,200	29,300	2,390	1,780	e1,150
8	2,190	309	2,870	2,260	4,620	18,900	8,280	40,900	29,900	1,910	1,200	e1,100
9	1,920	355	5,820	4,030	4,200	20,900	8,890	41,300	29,000	1,020	1,160	e798
10	3,210	681	4,060	4,060	2,710	20,000	7,820	34,400	19,600	3,290	4,090	e593
11	2,540	1,030	1,780	3,810	1,760	23,700	9,240	22,300	11,600	3,840	2,220	e511
12	1,510	1,890	e465	3,770	2,320	25,000	14,200	18,800	11,400	2,210	2,800	2,010
13	1,000	2,650	1,590	3,480	3,920	23,200	9,340	22,200	11,500	2,020	2,400	2,040
14	4,230	1,400	1,230	2,270	4,040	22,700	6,590	14,400	6,680	2,810	2,020	1,910
15	1,070	1,900	1,190	2,570	3,130	22,700	10,200	12,700	8,310	2,000	2,670	1,430
16	1,280	1,700	3,920	2,270	7,790	21,300	14,900	13,100	7,440	1,460	3,370	1,420
17	1,800	5,910	2,520	917	14,900	20,800	14,600	6,850	7,500	2,210	3,190	899
18	1,560	3,530	1,110	2,470	13,500	19,800	13,800	7,530	4,490	1,380	3,090	1,270
19	1,710	1,210	626	3,880	11,000	19,100	15,500	7,040	5,070	1,050	3,500	3,380
20	1,690	712	813	1,150	8,080	18,400	14,500	18,900	4,490	1,390	4,210	2,580
21	903	e388	753	2,440	8,910	19,300	12,600	32,800	4,530	1,760	4,240	2,440
22	2,690	769	584	2,090	9,040	21,200	9,860	30,400	4,160	1,540	4,780	2,580
23	3,820	767	1,550	2,000	10,300	28,200	16,100	35,800	5,130	1,890	4,620	1,790
24	2,270	1,640	3,260	3,170	9,820	27,500	27,500	41,600	6,210	1,720	4,980	1,440
25	3,660	7,290	2,340	1,480	25,800	27,500	62,100	56,000	2,680	1,790	5,310	1,990
26	2,300	11,200	2,910	564	23,200	24,500	63,400	73,700	2,540	1,420	4,350	2,340
27	1,360	7,630	1,410	413	18,000	20,700	62,700	81,600	4,110	1,240	4,350	2,830
28	3,010	3,360	2,250	1,080	20,000	19,300	52,600	90,200	2,980	1,760	2,230	3,630
29	2,930	5,440	648	1,290	---	14,600	67,100	86,900	3,660	1,490	2,330	3,040
30	e987	5,520	1,650	1,280	---	12,400	79,800	81,000	3,590	1,520	1,190	1,430
31	1,260	---	2,510	1,150	---	11,300	---	75,900	---	2,140	2,960	---
Total	71,750	74,304	65,648	73,498	224,500	634,200	657,630	1,367,420	476,670	64,440	89,430	57,011
Mean	2,315	2,477	2,118	2,371	8,018	20,460	21,920	44,110	15,890	2,079	2,885	1,900
Max	4,230	11,200	5,820	6,150	25,800	28,200	79,800	90,200	61,500	4,180	5,310	3,630
Min	903	309	465	413	412	11,300	4,330	6,850	2,540	1,020	1,160	511
Ac-ft	142,300	147,400	130,200	145,800	445,300	1,258,000	1,304,000	2,712,000	945,500	127,800	177,400	113,100

07194800 ILLINOIS RIVER AT SAVOY, AR

Robert S. Kerr Reservoir Basin

Illinois Subbasin

LOCATION.--Lat 36°06'11", long 94°20'40" referenced to North American Datum of 1983, in SE 1/4 sec.36, T.17 N., R.32 W., Washington County, AR, Hydrologic Unit 11110103, on eastern boundary of Ozark National Forest, on left bank downstream end of State Hwy 16 bridge, 0.3 mi downstream from tributary of Lake Weddington, 0.4 mi upstream from Clear Creek, and 0.9 mi southwest of Savoy.

DRAINAGE AREA.--167 mi^2.

SURFACE-WATER RECORDS

PERIOD OF RECORD.--Jul 1979 to Dec 1981, Oct 1985 to Sep 1986, and Aug 1995 to current year. Occasional low-flow discharge measurements 1957 to 1963; occasional discharge measurements 1974 to 1978, 1982 to 1985, and 1990 to 1995.

REVISED RECORDS.--WDR Arkansas 2000: 1986 (M)(P), 1997-99 (M).

GAGE.--Water-stage recorder. Datum of gage is 1,017.90 ft above NGVD of 1929.

REMARKS.--Water-discharge records good. Estimated days are fair. Satellite telemeter at station. Water quality data available at the files of the USGS. EXTREMES

FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft^3/s and (or) maximum (*):

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011, DAILY MEAN VALUES, [e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	23	21	36	99	43	341	82	685	133	33	21	18
2	21	29	34	73	51	233	80	2,030	116	32	21	18
3	20	35	32	62	50	184	72	973	104	32	21	17
4	19	27	30	55	47	159	65	570	95	32	21	18
5	20	22	27	50	48	355	61	380	86	32	20	18
6	20	21	26	47	53	230	58	295	81	31	20	18
7	20	20	25	45	86	180	55	179	74	30	21	18
8	19	20	25	43	104	152	53	107	70	30	21	17
9	18	21	25	41	97	134	50	86	66	29	20	17
10	17	21	25	37	98	115	45	70	63	28	25	16
11	17	21	24	36	90	104	310	62	60	27	37	17
12	17	21	21	35	81	94	240	71	61	26	31	17
13	16	21	21	35	137	87	150	241	58	26	44	17
14	16	20	22	35	389	351	115	84	55	27	34	17
15	17	21	22	35	352	285	302	64	54	26	28	17
16	17	21	33	34	282	203	211	55	52	25	27	18
17	16	21	60	34	206	166	142	49	51	25	26	19
18	17	21	61	34	161	140	110	45	48	25	24	26
19	22	21	61	34	132	121	99	42	46	24	23	44
20	25	22	43	34	116	106	82	324	44	24	22	26
21	21	22	23	33	105	98	153	1,660	42	23	21	22
22	20	22	20	33	92	89	e676	262	40	24	21	53
23	23	29	20	33	85	82	e2,970	5,120	40	30	23	46
24	32	32	20	34	148	73	e12,100	6,680	40	26	22	35
25	34	101	19	33	298	69	e20,000	1,440	39	24	22	32
26	27	113	18	33	185	66	e12,300	867	37	23	21	30
27	26	59	16	32	156	65	1,650	658	36	22	20	28
28	24	47	18	42	1,200	61	1,070	516	37	21	19	26
29	22	41	21	46	---	63	731	283	36	21	19	e26
30	21	38	25	46	---	62	596	190	35	21	18	e25
31	21	---	53	44	---	64	---	154	---	21	18	---
Total	648	951	906	1,307	4,892	4,532	54,628	24,242	1,799	820	731	716
Mean	20.9	31.7	29.2	42.2	175	146	1,821	782	60.0	26.5	23.6	23.9
Max	34	113	61	99	1,200	355	20,000	6,680	133	33	44	53
Min	16	20	16	32	43	61	45	42	35	21	18	16
Ac-ft	1,290	1,890	1,800	2,590	9,700	8,990	108,400	48,080	3,570	1,630	1,450	1,420
Cfsm	0.13	0.19	0.18	0.25	1.05	0.88	10.9	4.68	0.36	0.16	0.14	0.14

07195000 OSAGE CREEK NEAR ELM SPRINGS, AR

Robert S. Kerr Reservoir Basin

Illinois Subbasin

LOCATION.--Lat 36°13'19", long 94°17'18" referenced to North American Datum of 1983, in NE 1/4 sec.21, T.18 N., R.31 W., Benton County, AR, Hydrologic Unit 11110103, on left bank 0.7 mi downstream from Little Osage Creek, and 3.2 mi northwest of Elm Springs.

DRAINAGE AREA.--130 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--Oct 1950 to Sep 1975 and Aug 1995 to current year. Oct 1976 to Sep 1979 a crest-stage partial-record station. Occasional discharge measurements 1977 to 1979 and 1982 to 1995. Monthly discharge only for some periods, published in WSP 1731.

REVISED RECORDS.--WDR Arkansas 1970: Drainage area. WDR Arkansas 1974: 1969.

GAGE.--Water-stage recorder. Prior to Oct 1, 1979 the water-stage recorder was located about 400 ft downstream at present datum.

REMARKS.--Water-discharge records good. Flow slightly regulated by operation of Lake Keith at Cave Springs, City of Rogers wastewater treatment plant, and City of Springdale wastewater treatment plant (located on Spring Creek, tributary to Osage Creek that discharges upstream of gage). Water quality data available at the files of the USGS. Satellite telemeter at station.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,000 ft³/s and (or) maximum (*):

DISCHA

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011, DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	68	88	89	114	76	107	98	513	310	219	90	86
2	65	92	87	95	65	101	88	834	295	231	89	84
3	60	91	87	95	63	97	83	559	278	216	86	79
4	63	87	81	95	67	97	85	422	256	233	87	73
5	66	97	76	95	65	125	85	366	237	195	86	72
6	63	97	79	92	65	102	84	332	230	172	81	74
7	62	91	80	90	74	100	83	292	222	167	76	78
8	60	92	81	86	75	100	81	262	212	144	89	81
9	57	98	80	78	78	96	79	249	214	135	198	90
10	55	99	79	82	66	92	76	239	217	152	220	84
11	59	102	75	84	67	89	191	228	206	152	303	78
12	63	103	71	84	72	86	119	222	207	133	174	77
13	62	99	73	84	91	79	104	270	202	166	246	79
14	61	90	77	84	129	164	99	209	197	169	161	80
15	63	97	77	79	142	123	142	190	200	153	140	77
16	60	103	75	75	152	109	106	183	192	142	136	78
17	57	101	73	79	137	107	93	177	187	139	130	102
18	60	102	70	83	123	104	95	174	187	114	122	198
19	71	100	66	82	111	95	96	167	190	102	111	203
20	69	94	70	83	104	89	92	302	192	96	103	121
21	72	89	75	81	103	91	216	653	199	93	102	109
22	76	97	69	79	98	92	759	358	190	92	102	364
23	79	116	69	73	94	88	3,960	6,670	186	89	103	200
24	103	116	71	77	120	84	5,590	3,980	182	87	100	140
25	95	272	63	82	141	81	15,800	2,380	184	88	96	124
26	109	157	59	80	112	78	3,260	928	197	91	92	114
27	103	113	65	79	103	74	1,790	645	235	90	86	108
28	100	98	70	80	139	78	1,030	514	238	92	78	105
29	95	96	76	70	---	85	645	422	227	91	93	101
30	90	93	75	54	---	83	496	367	220	88	92	94
31	86	---	150	59	---	91	---	333	---	97	87	---
Total	2,252	3,170	2,388	2,553	2,732	2,987	35,525	23,440	6,489	4,228	3,759	3,353
Mean	72.6	106	77.0	82.4	97.6	96.4	1,184	756	216	136	121	112
Max	109	272	150	114	152	164	15,800	6,670	310	233	303	364
Min	55	87	59	54	63	74	76	167	182	87	76	72
Ac-ft	4,470	6,290	4,740	5,060	5,420	5,920	70,460	46,490	12,870	8,390	7,460	6,650
Cfsm	0.56	0.81	0.59	0.63	0.75	0.74	9.11	5.82	1.66	1.05	0.93	0.86
In.	0.64	0.91	0.68	0.73	0.78	0.85	10.17	6.71	1.86	1.21	1.08	0.96

07195430 ILLINOIS RIVER SOUTH OF SILOAM SPRINGS, AR

Robert S. Kerr Reservoir Basin
Illinois Subbasin

LOCATION.--Lat 36°06'31", long 94°32'00" referenced to North American Datum of 1983, in SE 1/4 NE 1/4 sec.31, T.17 N., R.33 W., Benton County, AR,
Hydrologic Unit 11110103, at bridge on State Hwy 59, 5.0 mi south of Siloam Springs, and 0.6 mi downstream from mouth of Cincinnati Creek.
DRAINAGE AREA.--575 mi^2.

SURFACE-WATER

RECORDS PERIOD OF RECORD.--Aug 1995 to current year. Occasional low-flow measurements in 1971. REVISED RECORDS.--WDR Arkansas 1997: 1996.
GAGE.--Water-stage recorder.
REMARKS.--Water-discharge records good except estimated daily discharges, which are poor. Water quality data available at the files of the USGS. Satellite telemeter at station.
EXTREMES FOR CURRENT YEAR.--Maximum discharge, 106,000 ft^3/s, Apr. 26, gage height, 27.71 ft; minimum discharge, 130 ft^3/s, Sept. 13, gage height, 2.38 f

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011, DAILY MEAN VALUES, [e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	236	180	248	411	193	1,150	319	3,040	1,090	299	190	162
2	224	183	237	302	235	701	320	7,520	995	291	184	158
3	212	200	227	256	211	560	290	5,640	907	323	182	156
4	204	198	220	238	209	490	269	3,430	828	309	177	148
5	205	182	206	227	213	765	264	2,530	757	335	178	144
6	204	180	197	218	213	698	252	2,040	707	301	171	141
7	202	177	198	211	231	556	241	1,660	671	286	167	141
8	198	172	197	200	283	489	237	1,270	629	278	164	144
9	193	175	196	192	300	448	230	1,080	594	272	224	143
10	186	179	194	184	292	406	218	959	566	259	329	142
11	182	177	192	182	274	372	471	871	541	250	465	140
12	185	180	182	178	275	348	811	802	547	246	507	137
13	188	181	e180	177	298	329	468	1,270	533	251	463	137
14	182	187	e181	179	.673	642	374	932	496	291	475	138
15	181	176	182	179	865	943	527	774	502	270	318	139
16	182	177	183	175	858	634	633	694	485	251	280	140
17	176	178	198	172	733	530	432	642	468	236	263	149
18	174	173	216	176	607	473	355	608	445	228	249	357
19	190	174	215	175	516	428	326	585	422	224	233	783
20	220	175	214	178	457	391	308	658	403	221	216	408
21	205	173	191	177	424	364	303	5,540	395	215	203	284
22	193	171	177	178	393	349	2,670	2,150	384	211	197	489
23	193	181	169	175	363	333	4,140	6,290	368	216	209	907
24	241	210	173	170	357	308	24,400	31,600	373	211	207	444
25	251	323	171	173	753	292	44,900	12,800	355	201	193	344
26	227	776	162	174	613	281	42,700	6,060	338	203	184	297
27	229	428	158	173	510	277	9,600	3,840	324	199	178	269
28	210	324	163	174	2,180	265	8,790	2,840	324	193	172	248
29	198	283	177	184	---	266	4,830	2,000	321	187	165	234
30	192	264	192	180	---	270	3,610	1,450	308	186	173	218
31	185	---	221	176	---	265	---	1,200	---	192	170	---
Total	6,248	6,737	6,017	6,144	13,529	14,623	153,288	112,775	16,076	7,635	7,486	7,741
Mean	202	225	194	198	483	472	5,110	3,638	536	246	241	258
Max	251	776	248	411	2,180	1,150	44,900	31,600	1,090	335	507	907
Min	174	171	158	170	193	265	218	585	308	186	164	137
Med	198	180	192	178	360	406	403	1,660	490	246	197	157
Ac-ft	12,390	13,360	11,930	12,190	26,830	29,000	304,000	223,700	31,890	15,140	14,850	15,350
Cfsm	0.35	0.39	0.34	0.34	0.84	0.82	8.89	6.33	0.93	0.43	0.42	0.45
In.	0.40	0.44	0.39	0.40	0.88	0.95	9.92	7.30	1.04	0.49	0.48	0.50

07195500 ILLINOIS RIVER NEAR WATTS, OK

Robert S. Kerr Reservoir Basin

Illinois Subbasin

LOCATION.--Lat 36°07'48", long 94°34'19" referenced to North American Datum of 1927, in NW 1/4 NE 1/4 sec.18, T.19 N., R.26 E., Adair County, OK, Hydrologic Unit 11110103, near the downstream side of right abutment of U.S. Highway 59 bridge, 1.5 mi north of Watts, 4.5 mi downstream from Cincinnati Creek, and at mile 106.2.

DRAINAGE AREA.--635 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--August 1955 to current year.

GAGE.--Water-stage recorder. Datum of gage is 893.78 ft above NGVD of 1929.

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011, DAILY MEAN VALUES, [e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	224	170	277	431	e202	1,300	341	2,690	1,130	342	202	174
2	216	175	260	353	e247	803	353	5,970	1,020	331	193	166
3	207	189	248	290	e229	638	e317	4,740	939	351	190	159
4	197	194	240	266	e228	553	300	3,020	867	357	186	154
5	196	179	230	253	e229	793	289	2,350	801	368	184	149
6	195	175	224	243	229	786	272	1,970	750	341	179	145
7	191	171	223	234	245	621	261	1,660	713	325	177	145
8	185	165	222	225	305	549	252	1,350	675	317	178	147
9	178	165	221	215	337	507	240	1,180	636	303	203	147
10	170	169	217	208	e297	460	226	1,080	612	289	349	147
11	168	169	212	205	e289	417	383	995	580	276	461	144
12	175	171	208	202	e287	381	911	935	583	269	533	141
13	178	171	203	197	317	359	538	1,300	574	280	451	138
14	173	175	203	194	640	595	411	1,070	547	317	523	146
15	169	166	205	191	829	1,040	480	904	552	305	354	150
16	166	165	207	187	827	718	692	828	535	283	305	154
17	161	166	217	183	706	595	469	772	512	262	282	162
18	158	163	241	186	596	537	383	739	495	251	267	253
19	174	163	240	190	503	483	342	712	471	249	249	860
20	205	164	234	196	442	438	329	779	445	248	233	457
21	196	163	218	197	414	402	316	4,460	439	242	218	304
22	183	e163	201	194	384	380	2,150	2,130	429	234	215	376
23	180	172	191	192	348	366	2,990	4,680	412	234	230	902
24	215	187	193	187	341	340	21,800	33,600	414	232	230	468
25	238	296	194	189	672	319	53,100	11,400	402	222	213	356
26	219	815	185	190	607	311	47,500	5,250	382	220	202	306
27	223	499	179	189	494	308	8,180	3,280	368	215	194	271
28	209	367	181	184	1,930	291	7,280	2,510	368	208	186	245
29	192	310	192	189	---	291	4,130	1,930	369	203	179	227
30	183	291	205	189	---	300	3,160	1,480	357	201	185	210
31	177	---	242	184	---	295	---	1,260	---	201	183	---
Total	5,901	6,688	6,713	6,733	13,174	16,176	158,395	107,024	17,377	8,476	7,934	7,803
Mean	190	223	217	217	470	522	5,280	3,452	579	273	256	260
Max	238	815	277	431	1,930	1,300	53,100	33,600	1,130	368	533	902
Min	158	163	179	183	202	291	226	712	357	201	177	138
Ac-ft	11,700	13,270	13,320	13,350	26,130	32,090	314,200	212,300	34,470	16,810	15,740	15,480
Cfsm	0.30	0.35	0.34	0.34	0.74	0.82	8.31	5.44	0.91	0.43	0.40	0.41
In.	0.35	0.39	0.39	0.39	0.77	0.95	9.28	6.27	1.02	0.50	0.46	0.46

WATER-QUALITY RECORDS

PERIOD OF RECORD.--October 1989 to July 1995, July 1996 to current year.

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

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011

Part 1 of 4

[%, percent; FNU, Formazin nephelometric units; LED, light-emitting diode; MPN/100 mL, most probable number per 100 milliliters; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than; >, greater than]

Date	Sample start time	Barometric pressure, mm Hg (00025)	Temperature, air, °C (00020)	Discharge, instantaneous, ft³/s (00061)	Dissolved oxygen, water, unfiltered, mg/L (00300)	Dissolved oxygen, water, unfiltered, % saturation (00301)	pH, water, unfiltered, field, standard units (00400)	Specific conductance, water, unfiltered, µS/cm at 25 °C (00095)	Temperature, water, °C (00010)
10-05-2010	1115	--	--	195	10.2	--	8.1	352	17.3
12-01-2010	1230	746	6.1	273	12.6	107	8.0	343	7.3
02-15-2011	1200	742	14.4	847	12.8	105	7.9	374	6.0
04-13-2011	1045	742	21.4	538	9.1	96	7.8	297	16.9
04-19-2011	1200	--	25.4	323	9.0	--	8.0	315	18.1
04-25-2011	1415	728	--	55,800	8.6	88	7.2	97	14.7
04-26-2011	1000	--	--	51,300	8.4	--	7.2	92	14.6
04-27-2011	1430	--	--	6,900	9.8	--	7.5	185	14.2
05-24-2011	1130	734	28.2	45,200	9.6	95	6.8	53	13.5
06-01-2011	1330	744	--	1,110	8.9	104	7.8	261	21.7
08-02-2011	0945	746	38.1	194	8.1	111	8.2	334	30.7

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 2 of 4

[%, percent; FNU, Formazin nephelometric units; LED, light-emitting diode; MPN/100 mL, most probable number per 100 milliliters; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than; >, greater than]

Date	Sample start time	Turbidity, water, unfiltered, monochrome near infrared LED light, 780-900 nm, detection angle 90 +/- 2.5 degrees, FNU (63680)	Ammonia plus organic nitrogen, water, unfiltered, mg/L as N (00625)	Ammonia, water, filtered, mg/L as NH4 (71846)	Ammonia, water, filtered, mg/L as N (00608)	Nitrate plus nitrite, water, filtered, mg/L as N (00631)	Nitrate, water, filtered, mg/L (71851)	Nitrate, water, filtered, mg/L as N (00618)	Nitrite, water, filtered, mg/L (71856)
10-05-2010	1115	5.9	.139	<.013	<.010	2.30	10.2	2.30	.010
12-01-2010	1230	2.3	.209	<.013	<.010	2.39	10.6	2.39	.006
02-15-2011	1200	15	.644	.019	.0145	2.49	11.0	2.48	.034
04-13-2011	1045	13	.567	.071	.0555	1.62	7.09	1.60	.064
04-19-2011	1200	8.9	.252	.023	.0176	1.66	7.29	1.65	.027
04-25-2011	1415	240	1.42	.060	.0466	1.02	4.50	1.02	.025
04-26-2011	1000	420	1.73	.046	.0360	.920	4.04	.912	.027
04-27-2011	1430	79	.664	.036	.0282	2.78	12.3	2.77	.025
05-24-2011	1130	91	1.47	.080	.0621	.648	2.82	.637	.035
06-01-2011	1330	140	.160	.013	.0103	3.10	13.7	3.10	.008
08-02-2011	0945	5.1	.193	.015	.0114	1.81	7.96	1.80	.025

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 3 of 4

[%, percent; FNU, Formazin nephelometric units; LED, light-emitting diode; MPN/100 mL, most probable number per 100 milliliters; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than; >, greater than]

Date	Sample start time	Nitrite, water, filtered, mg/L as N (00613)	Organic nitrogen, water, unfiltered, mg/L (00605)	Orthophosphate, water, filtered, mg/L (00660)	Orthophosphate, water, filtered, mg/L as P (00671)	Phosphorus, water, filtered, mg/L as P (00666)	Phosphorus, water, unfiltered, mg/L as P (00665)	Total nitrogen, water, unfiltered, mg/L (00600)	Enterococci, Defined Substrate Technology, water, MPN/100 mL (99601)
10-05-2010	1115	.00317	<.14	.154	.0501	.0524	.0630	2.4	6
12-01-2010	1230	.00192	<.21	.173	.0564	.0583	.0682	2.6	19
02-15-2011	1200	.0104	.63	.260	.0849	.0968	.147	3.1	200
04-13-2011	1045	.0196	.51	.348	.113	.119	.159	2.2	39
04-19-2011	1200	.00816	.23	.121	.0393	.0426	.0662	1.9	22
04-25-2011	1415	.00767	1.4	.766	.250	.285	.699	2.4	>4,800
04-26-2011	1000	.00836	1.7	.515	.168	.188	.712	2.7	>4,800
04-27-2011	1430	.00757	.64	.359	.117	.120	.295	3.4	>4,800
05-24-2011	1130	.0108	1.4	.592	.193	.205	.654	2.1	>4,800
06-01-2011	1330	.00254	.15	.219	.0714	.0788	.102	3.3	49
08-02-2011	0945	.00766	.18	.193	.0630	.0627	.0755	2.0	32

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 4 of 4

[%, percent; FNU, Formazin nephelometric units; LED, light-emitting diode; MPN/100 mL, most probable number per 100 milliliters; N, nitrogen; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; –, no data; <, less than; >, greater than]

Date	Sample start time	Escherichia coli, Defined Substrate Technology, water, MPN/100 mL (50468)	Total coliform, Defined Substrate Technology, water, MPN/100 mL (50569)	Suspended sediment, sieve diameter, percent smaller than 0.0625 mm (70331)	Suspended sediment concentration, mg/L (80154)	Suspended sediment discharge, tons per day (80155)
10-05-2010	1115	< 10	5,000	81	13	6.8
12-01-2010	1230	10	2,200	93	3	2.2
02-15-2011	1200	200	4,200	91	16	37
04-13-2011	1045	120	2,200	86	21	31
04-19-2011	1200	20	2,800	81	15	13
04-25-2011	1415	7,600	73,000	98	353	53,200
04-26-2011	1000	4,900	48,000	99	469	65,000
04-27-2011	1430	240	1,600	97	124	2,310
05-24-2011	1130	1,000	110,000	99	387	47,200
06-01-2011	1330	20	6,300	88	32	96
08-02-2011	0945	20	20,000	93	11	5.8

07195855 FLINT CREEK NEAR WEST SILOAM SPRINGS, OK

Robert S. Kerr Reservoir Basin

Illinois Subbasin

LOCATION.--Lat 36°12'58", long 94°36'19" referenced to North American Datum of 1983, in NE 1/4 NE 1/4 sec.14, T.20 N., R.25 E., Delaware County, OK, Hydrologic Unit 11110103, on left bank 800 ft downstream from county bridge, 1.4 mi upstream from Sager Creek, 2.5 mi from Arkansas-Oklahoma State line, and northwest of West Siloam Springs, Oklahoma.

DRAINAGE AREA --59.8 mi²

SURFACE-WATER RECORDS

PERIOD OF RECORD.--Jul 1979 to current year.

GAGE.--Water-stage recorder. Datum of gage is 958.00 ft above NGVD of 1929.

REMARKS.--Water-discharge records good except estimated daily discharges, which are poor. Flow is regulated by Lake Siloam Springs, 4.5 mi upstream, and sewage discharge into Flint Creek from city of Gentry. Water quality data available at the files of the USGS. Satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011, DAILY MEAN VALUE

EXTREMES	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	20	16	16	10	16	13	17	224	126	44	19	16
2	20	17	15	11	10	12	20	210	114	42	20	15
3	20	16	15	10	9.5	13	20	184	105	41	17	15
4	20	15	14	11	9.7	12	19	167	96	42	16	15
5	20	15	15	11	11	14	19	152	90	41	15	14
6	20	16	14	10	10	12	19	141	84	39	14	14
7	19	15	14	10	10	12	20	129	79	38	14	15
8	19	16	11	10	10	11	20	119	71	38	16	14
9	19	14	14	10	13	11	20	110	59	37	19	14
10	19	e18	11	9.9	11	10	20	102	56	36	21	14
11	19	e20	13	13	9.7	10	23	95	54	35	26	14
12	20	17	12	9.9	9.8	9.8	19	92	56	33	25	13
13	20	18	13	9.9	11	9.9	21	87	52	37	39	13
14	19	17	12	10	13	22	21	81	52	38	21	14
15	19	16	12	10	15	25	20	76	55	33	19	14
16	19	17	11	11	24	23	22	71	56	32	18	14
17	19	15	11	11	24	20	22	68	53	31	16	16
18	19	16	11	11	20	17	21	68	51	30	15	28
19	22	18	12	10	16	16	22	73	52	29	15	30
20	e23	17	12	11	14	16	20	92	50	29	14	10
21	e20	17	11	10	12	15	29	143	48	27	14	7.0
22	16	17	11	11	11	15	75	131	43	26	14	130
23	17	17	10	11	12	14	272	768	42	26	17	61
24	18	17	11	11	15	13	488	1,340	53	26	16	28
25	17	29	10	11	19	12	5,300	1,160	42	26	12	18
26	17	22	9.9	11	18	13	805	482	40	26	11	13
27	16	17	10	11	17	12	482	320	38	24	11	9.2
28	16	19	10	11	15	15	401	256	46	20	11	10
29	16	17	11	10	---	14	297	203	47	24	12	10
30	16	16	11	11	---	13	252	157	44	24	18	8.0
31	16	---	12	12	---	14	---	139	---	22	17	---
Total	580	517	374.9	329.7	385.7	438.7	8,806	7,440	1,854	996	532	606.2
Mean	18.7	17.2	12.1	10.6	13.8	14.2	294	240	61.8	32.1	17.2	20.2
Max	23	29	16	13	24	25	5,300	1,340	126	44	39	130
Min	16	14	9.9	9.9	9.5	9.8	17	68	38	20	11	7.0
Ac-ft	1,150	1,030	744	654	765	870	17,470	14,760	3,680	1,980	1,060	1,200

07196900 BARON FORK AT DUTCH MILLS, AR

Robert S. Kerr Reservoir Basin

Illinois Subbasin

LOCATION.--Lat 35°52'48", long 94°29'11" referenced to North American Datum of 1983, in NE 1/4 SE 1/4 sec.21, T.14 N., R.33 W., Washington County, AR, Hydrologic Unit 11110103, near right bank on downstream side of bridge on State Hwy 59 at Dutch Mills, 2.2 mi downstream from Fly Creek, and 2.9 mi upstream from Arkansas-Oklahoma State line.

DRAINAGE AREA.--40.6 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--Apr 1958 to current year. Prior to Oct 1969, published as "Barren Fork at Dutch Mills".

REVISED RECORDS.--WDR Arkansas 1970: Drainage area. WDR Arkansas 1993: 1992 (M). GAGE. Water-stage recorder. Datum of gage is 986.47 ft above NGVD of 1929.

REMARKS.--Water-discharge records good except estimated daily discharges, which are poor. Water quality data available at the files of the USGS. Satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011, DAILY MEAN VALUES, [e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	4.7	5.8	13	30	6.5	63	26	344	32	5.7	1.8	2.9
2	4.5	22	11	18	8.5	49	23	489	29	5.7	1.9	2.6
3	4.3	14	9.7	14	8.5	42	21	218	26	4.5	2.1	2.4
4	4.2	8.9	8.4	11	8.5	39	20	111	23	4.2	2.1	2.4
5	4.2	7.5	7.4	9.9	8.5	73	17	79	21	4.1	2.1	2.2
6	3.9	6.7	6.7	8.8	9.8	48	16	64	20	4.0	1.8	2.1
7	3.9	6.5	6.5	8.0	23	41	14	50	19	3.4	1.9	2.0
8	3.9	6.3	6.3	7.1	22	36	14	41	17	3.1	1.9	1.9
9	3.9	6.3	5.7	6.6	20	33	14	34	16	2.9	1.9	1.7
10	e3.9	6.6	5.5	6.2	20	29	13	30	15	2.7	14	1.8
11	e3.9	6.7	5.0	5.7	20	27	86	27	14	2.5	12	1.8
12	e3.9	7.2	4.6	5.5	19	25	48	26	15	2.4	8.3	1.7
13	3.9	8.4	4.0	5.5	78	23	31	34	13	2.4	21	1.7
14	3.9	8.2	4.2	5.3	131	115	26	25	12	2.4	13	1.8
15	3.9	7.5	4.2	5.1	107	80	88	22	11	2.4	7.8	1.6
16	3.7	7.3	4.0	5.0	82	59	44	20	14	2.5	6.6	2.1
17	3.6	7.0	3.9	4.8	66	49	32	18	14	2.6	7.3	2.2
18	3.7	6.9	3.8	4.9	54	43	28	17	11	2.6	6.4	3.2
19	8.3	7.0	3.6	4.7	47	39	25	16	9.5	2.4	5.6	3.6
20	7.5	7.5	3.5	4.9	41	35	21	237	8.6	2.3	4.7	3.2
21	5.6	7.4	3.5	4.7	38	33	33	262	7.8	2.2	4.0	3.2
22	4.9	8.2	3.3	4.5	34	30	72	68	7.5	2.2	3.9	18
23	6.1	13	3.2	5.0	31	29	263	2,460	7.1	2.2	5.2	20
24	15	15	3.3	5.2	75	26	2,900	891	6.9	2.1	6.7	11
25	10	64	3.5	5.1	93	25	4,860	209	7.1	2.2	6.8	7.6
26	8.2	46	3.2	5.0	61	25	565	118	6.2	2.1	5.5	6.0
27	7.2	25	3.0	4.7	50	23	375	85	5.6	2.0	4.5	5.2
28	6.1	19	3.0	4.7	113	22	194	66	5.8	2.0	4.1	4.6
29	5.5	17	5.9	4.5	---	22	111	51	5.8	1.9	3.8	4.4
30	5.6	16	8.5	4.4	---	23	80	41	5.3	1.8	3.2	4.0
31	5.6	---	47	4.2	---	22	---	36	---	1.7	3.1	---
Total	167.5	394.9	208.4	223.0	1,275.3	1,228	10,060	6,189	405.2	87.2	175.0	128.9
Mean	5.40	13.2	6.72	7.19	45.5	39.6	335	200	13.5	2.81	5.65	4.30
Max	15	64	47	30	131	115	4,860	2,460	32	5.7	21	20
Min	3.6	5.8	3.0	4.2	6.5	22	13	16	5.3	1.7	1.8	1.6
Ac-ft	332	783	413	442	2,530	2,440	19,950	12,280	804	173	347	256
Cfsm	0.13	0.32	0.17	0.18	1.12	0.98	8.26	4.92	0.33	0.07	0.14	0.11
In.	0.15	0.36	0.19	0.20	1.17	1.13	9.22	5.67	0.37	0.08	0.16	0.12

07245000 CANADIAN RIVER NEAR WHITEFIELD, OK

Lower Canadian Basin

Lower Canadian Subbasin

LOCATION.--Lat 35°15'44", long 95°14'13" referenced to North American Datum of 1927, in SW 1/4 SW 1/4 sec.7, T.9 N., R.20 E., Haskell County, OK, Hydrologic Unit 11090204, on right 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 mi² of which 9,700 mi² probably is noncontributing.

SURFACE-WATER RECORDS

PERIOD OF RECORD.--October 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 NGVD 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, 1948 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.--Records poor. Prior to February 1964, occasional slight regulation by Conchas Lake in New Mexico and, except for 54 mi² of intervening area, completely regulated thereafter by Eufaula Lake (station 07244800). U.S. Army Corps of Engineers' satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011, DAILY MEAN VALUES, [e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	95	113	2,980	156	2,660	765	77	461	1,190	1,540	3,860	2,240
2	98	1,620	2,190	122	1,790	150	63	3,560	1,150	979	3,620	2,000
3	91	3,250	180	1,400	3,310	94	53	10,000	2,150	973	4,210	2,090
4	338	1,650	122	1,690	2,950	217	65	7,380	1,130	643	4,540	520
5	821	4,810	106	1,200	1,910	100	49	11,900	e5,800	1,530	2,270	112
6	642	3,870	1,870	1,020	248	81	47	12,900	e7,700	1,370	3,260	103
7	1,390	209	2,910	2,270	2,610	85	50	12,800	3,980	1,180	2,220	97
8	2,250	1,850	2,100	912	278	86	53	12,900	e4,130	1,140	3,500	892
9	846	791	1,420	1,780	314	73	57	12,900	4,630	514	808	447
10	121	860	1,280	3,050	4,400	62	51	12,000	12,900	393	268	102
11	1,430	522	163	3,340	4,420	56	85	13,800	17,600	1,450	129	95
12	2,650	122	1,590	6,410	3,540	91	58	19,600	17,600	1,620	126	356
13	3,820	105	4,620	4,280	267	73	52	20,000	17,600	1,100	129	2,580
14	828	518	2,660	3,930	1,110	82	49	19,800	16,600	1,510	96	2,400
15	1,950	145	1,290	1,010	2,090	69	63	19,900	4,390	623	93	675
16	1,290	635	569	453	543	62	45	17,800	1,710	675	95	128
17	414	5,690	436	1,390	137	61	39	13,400	1,650	1,200	135	111
18	1,950	4,100	790	2,170	118	65	45	8,740	1,770	1,540	2,170	153
19	1,920	2,840	445	5,580	108	63	45	8,640	1,580	1,270	2,820	788
20	1,840	715	1,850	5,680	99	61	48	5,800	1,390	1,140	799	677
21	2,180	128	4,450	4,520	166	58	66	2,830	1,560	1,050	421	429
22	1,700	103	4,440	3,240	643	48	88	499	1,530	1,260	942	294
23	829	103	1,520	239	133	46	97	777	1,530	971	525	108
24	125	98	1,650	1,290	111	40	1,730	2,050	1,520	414	1,810	99
25	4,880	151	187	631	615	45	3,580	2,240	655	313	2,320	99
26	5,340	121	1,860	3,690	148	94	3,040	486	246	1,870	2,650	99
27	4,960	100	4,990	4,920	101	67	13,200	2,860	904	3,280	636	103
28	6,470	93	5,220	3,330	343	677	13,100	1,560	769	2,790	416	407
29	4,240	95	3,290	2,330	---	124	15,600	302	1,110	3,800	308	1,110
30	1,030	506	601	980	---	1,030	3,050	253	927	1,550	337	671
31	185	---	228	3,970	---	161	---	1,310	---	1,040	2,000	---
Total	56,723	35,913	58,007	76,983	35,162	4,786	54,645	259,448	137,401	40,728	47,513	19,985
Mean	1,830	1,197	1,871	2,483	1,256	154	1,822	8,369	4,580	1,314	1,533	666
Max	6,470	5,690	5,220	6,410	4,420	1,030	15,600	20,000	17,600	3,800	4,540	2,580
Min	91	93	106	122	99	40	39	253	246	313	93	95
Ac-ft	112,500	71,230	115,100	152,700	69,740	9,490	108,400	514,600	272,500	80,780	94,240	39,640

07247000 POTEAU RIVER AT CAUTHRON, AR

Robert S. Kerr Reservoir Basin

Poteau Subbasin

LOCATION.--Lat 34°55'08", long 94°17'58" referenced to North American Datum of 1983, in NW 1/4 SE 1/4 sec.16, T.3 N., R.31 W., Scott County, AR, Hydrologic Unit 11110105, on right bank at downstream side of Scott County Road 56 bridge at Cauthron, 200 ft south of junction with State Hwy 28, 2.9 mi downstream from Cross Creek, 7.8 mi downstream from Jones Creek, and at river mile 109.0.

DRAINAGE AREA.--203 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--Mar 1939 to current year.

REVISED RECORDS.--WSP 1037: 1939 (M). WDR Arkansas 1970: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 569.53 ft above NGVD of 1929. Prior to May 2, 1939, nonrecording gage at present site and datum.

REMARKS.--Water-discharge records good. As of Sep 1974, flow from 92.2 mi² upstream from this station is controlled by 16 floodwater-detention reservoirs that have a total combined capacity of 39,082 acre-ft below the flood spillway crests, of which 33,524 acre-ft is flood detention capacity, 2,100 acre-ft is water-supply storage, and 3,458 acre-ft is sediment storage capacity. Water quality data available at the files of the USGS. Satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011, DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	68	5.2	1.7	9.8	3.1	38	37	1,060	57	9.5	3.8	1.2
2	68	5.4	2.7	4.2	19	33	31	5,700	44	8.4	3.3	1.2
3	68	5.5	2.4	2.3	4.4	29	26	4,150	35	7.6	2.9	1.2
4	70	5.6	2.4	18	2.6	27	25	1,660	29	6.6	2.3	1.1
5	70	5.5	2.5	15	2.3	25	21	1,230	24	6.0	1.8	1.3
6	71	5.3	2.4	13	4.7	22	20	1,030	20	5.2	1.7	1.1
7	72	5.1	2.9	11	387	20	21	821	17	4.7	1.6	0.97
8	74	5.3	2.9	0.97	221	19	21	557	15	4.3	1.6	0.85
9	73	6.0	2.8	0.90	122	23	18	386	14	4.1	1.9	0.82
10	74	6.8	2.5	0.83	88	44	18	285	13	3.8	2.1	0.75
11	75	7.3	2.5	0.84	70	33	88	218	11	3.4	2.6	0.59
12	75	7.9	2.5	0.82	73	27	126	176	11	3.0	3.4	0.50
13	75	8.5	2.7	0.78	72	25	59	139	10	2.9	6.3	0.40
14	52	10	3.2	0.61	64	23	43	108	9.7	2.9	8.4	0.27
15	48	13	3.5	0.52	53	22	911	86	9.3	2.8	8.1	0.12
16	50	16	3.3	0.54	46	22	307	68	9.1	2.7	5.8	0.29
17	50	18	3.0	0.55	44	21	144	52	9.1	2.7	4.7	0.66
18	50	28	3.3	0.65	42	19	101	42	9.2	2.6	4.3	1.3
19	58	36	3.9	0.67	38	18	80	36	8.8	2.5	3.2	2.8
20	59	31	3.8	0.73	34	17	68	37	8.3	2.5	1.6	4.9
21	54	23	3.7	0.77	31	17	110	763	9.0	2.3	1.7	3.1
22	53	22	4.4	0.85	28	15	250	253	629	2.3	1.5	1.8
23	57	31	4.9	0.91	26	14	211	159	262	2.7	1.7	1.3
24	63	84	5.9	0.87	26	13	531	2,600	134	3.1	1.8	1.1
25	63	102	6.0	0.73	76	13	7,880	1,110	51	3.2	1.8	0.94
26	42	108	7.1	0.59	65	12	4,680	557	31	3.2	1.7	0.90
27	14	17	9.9	0.72	47	12	2,690	288	19	3.0	1.5	0.73
28	7.3	3.7	8.8	0.95	42	12	1,380	198	14	3.1	1.3	0.52
29	6.0	1.4	103	1.0	---	28	1,030	138	13	3.5	1.5	0.40
30	6.1	1.3	108	1.2	---	38	903	99	11	4.4	1.6	0.30
31	5.9	---	8.5	1.2	---	48	---	75	---	4.6	1.4	---
Total	1,671.3	624.8	327.1	41.20	1,731.1	729	21,830	24,081	1,536.5	123.6	88.9	33.41
Mean	53.9	20.8	10.6	1.33	61.8	23.5	728	777	51.2	3.99	2.87	1.11
Max	75	108	108	9.8	387	48	7,880	5,700	629	9.5	8.4	4.9
Min	5.9	1.3	1.7	0.52	2.3	12	18	36	8.3	2.3	1.3	0.12
Ac-ft	3,320	1,240	649	82	3,430	1,450	43,300	47,760	3,050	245	176	66

07247015 POTEAU RIVER NEAR LOVING, OK

Robert S. Kerr Reservoir Basin
Poteau Subbasin

LOCATION.--Lat 34°52'47", long 94°29'02" referenced to North American Datum of 1927, in SW 1/4 NW 1/4 sec.29, T.5 N., R.27 E., Le Flore County, OK, Hydrologic Unit 11110105, on right downstream bank of county road bridge, 0.6 mi northwest of Loving, 1.0 mi above Loving Creek, and at mile 93.6.
DRAINAGE AREA.--269 mi^2.

SURFACE-WATER RECORDS

PERIOD OF RECORD.--April 1992 to current year.
REVISED RECORDS.--OK-2000-1: 1999.
GAGE.--Water-stage recorder. Datum of gage is 507.76 ft above NGVD of 1929.
REMARKS- Records poor. Some regulation by small flood-retarding structures. U.S. Geological Survey satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011, DAILY MEAN VALUES
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	79	6.5	8.9	83	17	37	48	1,120	119	42	0.09	e3.0
2	79	6.5	7.3	82	71	33	37	6,750	93	36	0.06	e2.9
3	79	6.6	5.8	48	90	29	31	6,450	72	32	0.04	e2.7
4	79	6.6	5.1	34	53	24	27	2,150	57	28	0.02	e2.6
5	79	6.4	5.2	27	42	21	25	1,490	45	24	0.02	e2.4
6	79	6.5	3.1	21	42	18	21	1,160	37	21	0.01	e2.2
7	79	6.7	3.5	18	330	17	18	949	e31	19	0.00	e2.0
8	79	6.7	5.9	15	431	15	17	769	e25	17	0.00	e1.8
9	79	6.5	6.8	13	193	14	16	607	e26	13	0.00	e1.5
10	78	6.4	7.2	12	127	15	16	501	29	12	0.00	e1.2
11	79	6.3	8.4	11	91	33	28	408	30	11	e0.00	e1.0
12	79	6.6	8.7	9.9	78	26	183	345	31	9.8	0.04	e0.82
13	78	7.0	7.8	9.3	84	20	105	293	24	8.9	0.12	e0.67
14	78	6.6	6.1	9.3	78	19	65	240	21	7.8	0.14	e0.53
15	60	6.7	5.1	9.2	65	16	1,100	201	19	7.5	4.6	e0.40
16	52	7.6	5.0	8.8	53	15	601	170	18	6.1	15	e0.95
17	54	7.2	5.2	8.1	45	15	229	142	16	6.3	16	e1.9
18	55	7.0	5.5	7.8	39	14	131	120	15	6.7	13	e2.9
19	59	6.9	5.7	7.4	35	13	94	106	15	5.4	9.7	e2.5
20	62	6.9	6.1	7.3	30	12	74	107	14	3.5	7.9	e10
21	61	7.2	5.6	7.1	26	12	67	713	14	2.0	e6.2	e6.0
22	56	7.7	5.3	6.8	22	11	232	546	783	1.1	e5.0	e4.4
23	61	9.8	5.6	6.8	20	9.7	322	336	375	0.85	e4.2	e3.2
24	70	10	6.7	7.0	20	8.9	336	2,170	255	0.62	e3.5	e2.4
25	64	12	7.9	7.4	24	8.4	8,480	1,400	127	0.46	e2.9	e2.0
26	64	52	9.6	7.6	81	8.0	9,460	802	85	0.37	e2.7	e1.7
27	51	79	9.7	7.4	57	7.8	3,580	511	68	0.34	e2.6	e1.5
28	28	35	9.6	7.3	43	7.4	1,790	e328	57	0.25	e2.6	e1.3
29	16	19	25	6.7	---	7.9	1,250	e239	50	0.22	e2.7	e1.2
30	9.2	13	330	6.7	---	15	1,040	e195	46	0.17	e2.8	e0.97
31	6.8	---	132	8.4	---	38	---	153	---	0.13	e2.9	---
Total	1,932.0	378.9	669.4	520.3	2,287	540.1	29,423	31,471	2,597	323.51	104.84	68.64
Mean	62.3	12.6	21.6	16.8	81.7	17.4	981	1,015	86.6	10.4	3.38	2.29
Max	79	79	330	83	431	38	9,460	6,750	783	42	16	10
Min	6.8	6.3	3.1	6.7	17	7.4	16	106	14	0.13	0.00	0.40
Ac-ft	3,830	752	1,330	1,030	4,540	1,070	58,360	62,420	5,150	642	208	136

WATER-QUALITY RECORDS

PERIOD OF RECORD.--December 1991 to current year.

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

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 1 of 4

[%, percent; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than; E, estimated]

Date	Sample start time	Barometric pressure, mm Hg (00025)	Temperature, air, °C (00020)	Discharge, instantaneous, ft³/s (00061)	Dissolved oxygen, water, unfiltered, mg/L (00300)	Dissolved oxygen, water, unfiltered, % saturation (00301)	pH, water, unfiltered, field, standard units (00400)	Specific conductance, water, unfiltered, µS/cm at 25 °C (00095)	Temperature, water, °C (00010)
10-19-2010	1600	750	18.6	61	8.3	87	7.6	67	17.2
12-09-2010	1600	752	12.3	7.0	9.5	78	7.5	106	6.3
03-07-2011	1455	749	15.5	17	11.1	104	7.7	195	11.6
04-11-2011	1530	743	--	32	6.2	74	7.2	202	22.7
04-15-2011	1330	742	17.3	1,400	7.1	75	6.9	107	17.3
04-20-2011	1430	753	--	73	5.7	63	6.8	90	19.7
04-26-2011	1200	734	--	10,400	7.3	79	6.3	47	17.1
05-02-2011	1330	754	15.4	7,070	9.2	89	6.7	51	13.0
05-23-2011	1430	748	--	323	6.4	75	6.9	80	22.1
06-07-2011	1200	755	--	30	6.2	81	7.3	80	28.9
08-16-2011	0900	752	23.7	12	3.6	47	7.2	103	28.3

07247015 Poteau River nr Loving, OK - continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 2 of 4

[%, percent; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than; E, estimated]

Date	Sample start time	Turbidity, water, unfiltered, broad band light source (400-680 nm), detectors at multiple angles including 90 +/- 30 degrees, ratiometric correction, NTRU (63676)	Ammonia plus organic nitrogen, water, unfiltered, mg/L as N (00625)	Ammonia, water, filtered, mg/L as NH4 (71846)	Ammonia, water, filtered, mg/L as N (00608)	Nitrate plus nitrite, water, filtered, mg/L as N (00631)	Nitrate, water, filtered, mg/L (71851)	Nitrate, water, filtered, mg/L as N (00618)	Nitrite, water, filtered, mg/L (71856)
10-19-2010	1600	E 7.92	.367	.016	.0126	.774	3.26	.736	.122
12-09-2010	1600	E 5.79	.435	< .039	< .030	< .008	< .035	< .008	< .003
03-07-2011	1455	E 9.96	.516	< .013	< .010	.331	1.44	.325	.019
04-11-2011	1530	E 15.2	.583	.015	.0115	< .008	< .029	< .007	.005
04-15-2011	1330	187	1.42	.057	.0444	.247	1.05	.238	.030
04-20-2011	1430	29.1	.663	.111	.0864	.243	1.04	.236	.023
04-26-2011	1200	92.2	.923	.029	.0225	.107	.449	.102	.018
05-02-2011	1330	153	1.28	.092	.0717	.169	.724	.163	.018
05-23-2011	1430	32.0	.833	.134	.104	.385	1.63	.369	.054
06-07-2011	1200	E 7.77	.416	.024	.0189	.017	.075	.017	< .003
08-16-2011	0900	E 6.53	.521	.014	.0106	< .008	< .035	< .008	< .003

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 3 of 4

[%, percent; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than; E, estimated]

Date	Sample start time	Nitrite, water, filtered, mg/L as N (00613)	Organic nitrogen, water, unfiltered, mg/L (00605)	Orthophos-phate, water, filtered, mg/L (00660)	Orthophos-phate, water, filtered, mg/L as P (00671)	Phos-phorus, water, filtered, mg/L as P (00666)	Phosphorus, water, unfiltered, mg/L as P (00665)	Total nitrogen, water, unfiltered, mg/L (00600)	Suspended sediment, sieve diameter, percent smaller than 0.0625 mm (70331)
10-19-2010	1600	.0372	.35	.343	.112	.122	.152	1.1	97
12-09-2010	1600	< .0010	< .43	.019	.00633	.0150	.0474	< .44	90
03-07-2011	1455	.00592	< .52	.014	.0045	.0108	.0567	.85	94
04-11-2011	1530	.00147	.57	.018	.00578	.0170	.0695	< .59	92
04-15-2011	1330	.00915	1.4	.113	.0367	.0579	.391	1.7	72
04-20-2011	1430	.00711	.58	.103	.0338	.0549	.0971	.91	85
04-26-2011	1200	.00546	.90	.115	.0375	.0612	.187	1.0	99
05-02-2011	1330	.00552	1.2	.439	.143	.171	.461	1.4	56
05-23-2011	1430	.0164	.73	.558	.182	.219	.302	1.2	67
06-07-2011	1200	< .0010	.40	.031	.0101	.0264	.0616	.43	78
08-16-2011	0900	< .0010	.51	.016	.00522	.0175	.0683	< .53	--

07247015 Poteau River nr Loving, OK - continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 4 of 4
[%, percent; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; ft^3/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than; E, estimated]

Date	Sample start time	Suspended sediment concentration, mg/L (80154)	Suspended sediment discharge, tons per day (80155)
10-19-2010	1600	9	1.5
12-09-2010	1600	5	.09
03-07-2011	1455	12	.55
04-11-2011	1530	28	2.4
04-15-2011	1330	315	1,190
04-20-2011	1430	22	4.3
04-26-2011	1200	88	2,460
05-02-2011	1330	66	1,270
05-23-2011	1430	50	44
06-07-2011	1200	14	1.1
08-16-2011	0900	--	--

07247250 BLACK FORK BELOW BIG CREEK NEAR PAGE, OK

Robert S. Kerr Reservoir Basin
Poteau Subbasin

LOCATION.--Lat 34°46'25", long 94°30'43" referenced to North American Datum of 1927, in NE 1/4 SW 1/4 sec.31, T.4 N., R.27 E., Le Flore County, OK, Hydrologic Unit 11110105, on downstream side of bridge pier of county road bridge, 2.2 mi above Haw Creek, 5.0 mi north of Page, and at mile 24.6.
DRAINAGE AREA.--74.4 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--March 1992 to current year.
REVISED RECORDS.--WDR OK-96-1: 1993(M), 1995(M).
GAGE.--Water-stage recorder. Datum of gage is 684.00 ft above NGVD of 1929, from topographic map.
REMARKS.-- Records poor. U.S. Army Corps of Engineers' satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011, DAILY MEAN VALUES, [e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	e1.7	e0.97	27	216	159	91	29	522	60	e1.5	0.01	0.00
2	e1.6	e1.00	23	140	175	80	27	4,310	e45	e1.3	0.00	0.00
3	e1.3	e1.1	e19	103	140	73	26	2,120	e33	e1.2	0.00	0.00
4	e1.0	e1.4	e18	82	137	67	27	748	e25	e1.0	0.01	0.00
5	e0.81	e1.2	e15	67	107	62	28	420	e22	e1.2	0.00	0.00
6	e0.71	e1.0	e14	55	108	54	26	281	e20	e0.94	0.00	0.00
7	e0.67	e0.97	e12	46	350	48	25	200	e17	e0.75	0.00	0.00
8	e0.63	e0.92	e11	39	240	47	25	152	e14	e0.65	0.00	0.00
9	e0.61	e0.81	e10	35	201	88	25	121	e12	e0.59	0.00	0.00
10	e0.59	e0.79	e9.7	33	157	79	23	96	e11	e0.54	0.00	0.00
11	e0.51	e0.81	e9.1	29	133	74	160	82	e190	e0.48	0.00	0.00
12	e0.45	e1.1	e8.4	25	119	69	164	78	159	e0.44	0.00	0.00
13	e0.39	e1.1	e7.9	22	126	64	117	85	41	e0.40	0.00	0.00
14	e0.32	e1.0	e7.3	e21	141	65	93	67	e17	e0.35	0.00	e0.00
15	e0.30	e1.0	e7.1	e20	154	62	314	56	e12	e0.32	0.00	e0.00
16	e0.28	e1.4	e6.8	e19	160	55	218	46	e9.5	e0.27	0.00	e0.00
17	e0.24	e1.2	e6.3	e18	139	51	154	38	e7.5	e0.24	0.00	e0.00
18	e0.22	e1.0	e6.1	e17	113	48	119	33	e5.6	e0.20	0.00	e1.4
19	e0.80	e0.93	e6.3	e17	95	45	101	30	e4.8	e0.17	0.00	e1.9
20	e0.43	e0.85	e6.3	e16	83	42	248	48	e4.3	e0.13	0.00	e0.88
21	e0.40	e0.77	e6.3	e16	75	40	356	584	e3.9	0.09	0.00	e0.28
22	e0.33	e0.79	e6.0	e15	65	37	477	246	e3.5	0.07	0.00	0.19
23	e1.6	e6.2	e5.5	e15	57	35	448	176	e3.3	0.04	0.00	0.20
24	e2.5	e6.8	11	e16	60	32	327	2,040	e3.0	0.03	0.00	0.17
25	e2.1	18	16	e16	197	30	4,470	616	e2.7	0.02	0.00	0.15
26	e1.7	59	20	e16	137	29	2,460	317	e2.5	0.00	0.00	0.12
27	e1.5	27	18	e15	116	30	1,260	219	e2.3	0.00	0.00	0.10
28	e1.2	20	18	e15	108	32	591	160	e2.1	0.00	0.00	0.09
29	e1.1	20	369	e15	---	30	357	121	e1.9	0.00	0.00	0.08
30	e1.00	34	483	e14	---	32	244	92	e1.7	0.00	0.00	0.06
31	e0.96	---	285	e14	---	31	---	76	---	0.01	0.00	---
Total	27.95	213.11	1,468.1	1,187	3,852	1,622	12,939	14,180	736.6	12.93	0.02	5.62
Mean	0.90	7.10	47.4	38.3	138	52.3	431	457	24.6	0.42	0.00	0.19
Max	2.5	59	483	216	350	91	4,470	4,310	190	1.5	0.01	1.9
Min	0.22	0.77	5.5	14	57	29	23	30	1.7	0.00	0.00	0.00
Ac-ft	55	423	2,910	2,350	7,640	3,220	25,660	28,130	1,460	26	0.04	11

WATER-QUALITY RECORDS

PERIOD OF RECORD.–December 1991 to current year.

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

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011

Part 1 of 4

[%, percent; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than; E, estimated]

Date	Sample	Barometric pressure, mm Hg (00025)	Temperature, air, °C (00020)	Discharge, instantaneous, ft³/s (00061)	Dissolved oxygen, water, unfiltered, mg/L (00300)	Dissolved oxygen, water, unfiltered, % saturation (00301)	pH, water, unfiltered, field, standard units (00400)	Specific conductance, water, unfiltered, µS/cm at 25 °C (00095)	Temperature, water, °C (00010)
10-19-2010	1350	744	17.9	E .80	8.7	94	8.1	39	18.2
12-09-2010	1330	748	12.0	E 10	11.3	93	7.5	35	6.1
03-07-2011	1315	754	11.4	48	10.8	96	7.3	29	10.1
04-12-2011	1115	751	--	160	8.4	87	6.7	35	16.9
06-06-2011	1600	749	31.1	E 20	6.3	83	7.3	34	28.4
08-15-2011	1330	753	28.1	E .00	6.3	80	7.4	66	27.5

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011

Part 2 of 4

[%, percent; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than; E, estimated]

Date	Sample sta	Turbidity, water, unfiltered, broad band light source (400-680 nm), detectors at multiple angles including 90 +/- 30 degrees, ratiometric correction, NTRU (63676)	Ammonia plus organic nitrogen, water, unfiltered, mg/L as N (00625)	Ammonia, water, filtered, mg/L as NH4 (71846)	Ammonia, water, filtered, mg/L as N (00608)	Nitrate plus nitrite, water, filtered, mg/L as N (00631)	Nitrate, water, filtered, mg/L (71851)	Nitrate, water, filtered, mg/L as N (00618)	Nitrite, water, filtered, mg/L (71856)
10-19-2010	1350	E 3.10	.273	< .013	< .010	< .008	< .035	< .008	< .003
12-09-2010	1330	E 4.56	.142	.013	.0103	.0346	.149	.034	.003
03-07-2011	1315	E 6.87	.085	< .013	< .010	.075	.332	.075	< .003
04-12-2011	1115	21.7	.303	.019	.0151	.087	.375	.085	.008
06-06-2011	1600	E 5.20	.216	.015	.0117	.036	.159	.036	< .003
08-15-2011	1330	E 2.84	.422	.025	.0192	.023	.097	.022	.004

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 3 of 4

[%, percent; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; –, no data; <, less than; E, estimated]

Date	Sample start time	Nitrite, water, filtered, mg/L as N (00613)	Organic nitrogen, water, unfiltered, mg/L (00605)	Orthophos-phate, water, filtered, mg/L (00660)	Orthophos-phate, water, filtered, mg/L as P (00671)	Phos-phorus, water, filtered, mg/L as P (00666)	Phosphorus, water, unfiltered, mg/L as P (00665)	Total nitrogen, water, unfiltered, mg/L (00600)	Suspended sediment, sieve diameter, percent smaller than 0.0625 mm (70331)
10-19-2010	1350	< .0010	< .27	< .012	< .004	.0092	.0181	< .28	86
12-09-2010	1330	.001	.13	.020	.00638	.0039	.0103	.18	75
03-07-2011	1315	< .0010	< .09	.017	.00557	.0044	.0089	.16	88
04-12-2011	1115	.00229	.29	.024	.00778	.0109	.0351	.39	89
06-06-2011	1600	< .0010	.20	< .012	< .004	.0071	.0197	.25	86
08-15-2011	1330	.00119	.40	< .012	< .004	.0073	.0264	.45	82

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 4 of 4

[%, percent; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; –, no data; <, less than; E, estimated]

Date	Sample start time	Suspended sediment concen-tration, mg/L (80154)	Suspended sediment discharge, tons per day (80155)
10-19-2010	1350	2	E .00
12-09-2010	1330	4	E .11
03-07-2011	1315	2	.26
04-12-2011	1115	13	5.6
06-06-2011	1600	5	E .27
08-15-2011	1330	3	E .00

07247345 BLACK FORK AT HODGEN, OK

Robert S. Kerr Reservoir Basin
Poteau Subbasin

LOCATION.–Lat 34°50'35", long 94°37'28" referenced to North American Datum of 1927, in SE 1/4 SE 1/4 sec.1, T.4 N., R.25 E., Le Flore County, OK, Hydrologic Unit 11110105, at county road bridge 0.4 mi east of Hodgen, OK.

DRAINAGE AREA.–179 mi^2.

SURFACE-WATER RECORDS

PERIOD OF RECORD.–Discharge measurements only: 1992 to current year.

DISCHARGE MEASUREMENTS
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011

Date	Discharge, in ft^3/s
Oct 20, 2010	0.24
Dec 10, 2010	13.6
Mar 7, 2011	63.4
Apr 12, 2011	324
Jun 6, 2011	36.8
Aug 15, 2011	0.001

WATER-QUALITY RECORDS

PERIOD OF RECORD.--December 1991 to current year.

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

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 1 of 4

[%, percent; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; <, less than; E, estimated]

Date	Sample start time	Barometric pressure, mm Hg (00025)	Temperature, air, °C (00020)	Discharge, instantaneous, ft³/s (00061)	Dissolved oxygen, water, unfiltered, mg/L (00300)	Dissolved oxygen, water, unfiltered, % saturation (00301)	pH, water, unfiltered, field, standard units (00400)	Specific conductance, water, unfiltered, µS/cm at 25 °C (00095)	Temperature, water, °C (00010)
10-20-2010	1045	750	16.2	.24	6.9	76	6.9	55	19.5
12-10-2010	0930	753	5.1	13.6	11.2	93	7.8	47	6.8
03-07-2011	1050	750	9.4	63.4	10.5	97	7.2	36	11.1
04-12-2011	0930	756	10.8	324	8.0	88	6.9	47	19.2
06-06-2011	1430	756	29.8	36.8	7.2	100	7.2	39	32.8
08-15-2011	1200	752	28.5	.001	6.0	79	7.8	72	29.2

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 2 of 4

[%, percent; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; <, less than; E, estimated]

Date	Sample start time	Turbidity, water, unfiltered, broad band light source (400-680 nm), detectors at multiple angles including 90 +/- 30 degrees, ratiometric correction, NTRU (63676)	Ammonia plus organic nitrogen, water, unfiltered, mg/L as N (00625)	Ammonia, water, filtered, mg/L as NH4 (71846)	Ammonia, water, filtered, mg/L as N (00608)	Nitrate plus nitrite, water, filtered, mg/L as N (00631)	Nitrate, water, filtered, mg/L (71851)	Nitrate, water, filtered, mg/L as N (00618)	Nitrite, water, filtered, mg/L (71856)
10-20-2010	1045	E 3.20	.392	.023	.0180	.0385	.164	.037	.004
12-10-2010	0930	< 2.0	.254	< .013	< .010	.0116	.051	.012	< .003
03-07-2011	1050	E 6.93	.151	< .013	< .010	.063	.279	.063	< .003
04-12-2011	0930	E 6.28	.207	.020	.0155	.037	.158	.036	.004
06-06-2011	1430	E 5.54	.207	.021	.0162	.032	.142	.032	< .003
08-15-2011	1200	E 2.71	.367	.025	.0191	.022	.093	.021	.003

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 3 of 4

[%, percent; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; <, less than; E, estimated]

Date	Sample start time	Nitrite, water, filtered, mg/L as N (00613)	Organic nitrogen, water, unfiltered, mg/L (00605)	Orthophosphate, water, filtered, mg/L (00660)	Orthophosphate, water, filtered, mg/L as P (00671)	Phosphorus, water, filtered, mg/L as P (00666)	Phosphorus, water, unfiltered, mg/L as P (00665)	Total nitrogen, water, unfiltered, mg/L (00600)	Suspended sediment, sieve diameter, percent smaller than 0.0625 mm (70331)
10-20-2010	1045	.00134	.37	.049	.0158	.0083	.0233	.43	46
12-10-2010	0930	<.0010	<.25	<.012	<.004	.0045	.0131	.27	92
03-07-2011	1050	<.0010	<.15	.014	.0046	.0044	.0134	.21	94
04-12-2011	0930	.0013	.19	.017	.00562	.0053	.0204	.24	84
06-06-2011	1430	<.0010	.19	<.012	<.004	.0077	.0175	.24	95
08-15-2011	1200	.00105	.35	<.012	<.004	.0068	.0167	.39	91

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 4 of 4

[%, percent; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; <, less than; E, estimated]

Date	Sample start time	Suspended sediment concentration, mg/L (80154)	Suspended sediment discharge, tons per day (80155)
10-20-2010	1045	12	.01
12-10-2010	0930	3	.11
03-07-2011	1050	4	.68
04-12-2011	0930	9	7.9
06-06-2011	1430	5	.50
08-15-2011	1200	3	E.00

07247500 FOURCHE MALINE NEAR RED OAK, OK

Robert S. Kerr Reservoir Basin

Poteau Subbasin

LOCATION.--Lat 34°54'45", long 95°09'20" referenced to North American Datum of 1927, in NW 1/4 NW 1/4 sec.13, T.5 N., R.20 E., Latimer County, OK, 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 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--October 1938 to April 1991, October 1991 to current year. Monthly discharges only October 1938 to February 1939. REVISED RECORDS.--WSP 1117: Drainage area. WSP 1631: 1940.

GAGE.--Water-stage recorder. Datum of gage is 540.80 ft above NGVD of 1929. Prior to April 25, 1939, nonrecording gage at same site and datum.

REMARKS.-- Records poor due to occasional debris buildups on control. Some regulation by several flood-retarding structures. U.S. Army Corps of Engineers satellite telemeter at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1935 reached a stage of 25.4 ft, from floodmarks.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011, DAILY MEAN VALUES, [e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	2.0	13	0.04	26	3.9	6.9	0.15	1,110	48	6.2	4.8	e0.32
2	1.3	12	0.00	18	4.4	15	0.17	3,170	41	5.1	0.99	e0.22
3	0.55	12	0.00	11	4.3	10	0.13	2,220	36	4.6	0.30	e0.18
4	0.31	11	0.01	7.6	5.2	7.5	0.05	1,180	32	4.3	0.18	e0.18
5	0.20	9.8	0.15	5.4	5.6	5.5	0.05	998	27	4.2	0.12	e0.19
6	0.13	8.6	0.25	3.6	6.3	3.1	0.19	899	22	3.9	0.07	e0.16
7	0.08	7.5	0.35	2.6	11	1.9	0.33	802	18	3.5	0.03	e0.14
8	0.06	6.1	1.5	2.7	19	0.82	0.58	691	15	3.6	0.01	e0.13
9	0.05	4.2	2.8	2.3	22	0.59	0.94	573	12	3.5	0.03	e0.11
10	0.06	2.7	1.8	2.9	17	0.75	0.88	489	10	4.0	0.06	e0.09
11	0.12	2.0	1.9	3.1	15	0.46	106	336	8.8	5.9	0.12	e0.08
12	0.14	1.9	1.8	2.5	12	0.52	124	186	8.2	6.1	0.20	e0.08
13	0.13	2.1	1.8	2.7	10	0.43	49	156	7.0	5.6	0.88	e0.06
14	0.11	1.8	2.1	2.9	11	0.99	51	108	5.4	5.7	3.1	e0.04
15	0.10	1.6	6.0	2.5	12	1.8	1,080	51	4.2	5.7	3.2	e0.05
16	0.11	1.6	13	2.2	12	13	652	41	3.8	4.7	2.4	e0.07
17	0.12	1.4	9.1	2.3	11	0.63	357	35	3.0	3.8	1.8	e0.05
18	0.14	1.1	6.6	4.5	9.0	0.36	224	31	2.7	3.1	1.2	e0.14
19	0.15	0.86	9.3	5.9	7.0	0.25	92	27	2.9	2.3	0.85	e0.28
20	0.14	0.80	18	3.4	6.2	0.23	52	417	3.7	1.7	e0.74	e1.1
21	0.13	0.90	15	2.8	5.1	0.20	128	1,390	3.4	1.3	e1.0	e2.7
22	0.12	1.5	13	3.0	4.1	0.18	317	895	3.2	0.81	e0.96	e2.2
23	0.18	3.3	11	3.0	2.7	0.08	221	752	3.5	0.57	e1.0	e1.9
24	0.33	6.7	14	3.1	2.1	0.06	411	866	3.0	0.44	e0.82	e1.4
25	8.7	38	20	1.2	2.4	0.11	3,980	984	2.9	0.35	e0.57	e0.85
26	30	57	20	1.0	2.2	0.14	2,780	756	3.9	0.32	e0.55	e0.51
27	34	3.2	19	1.2	1.8	0.16	1,590	436	4.8	0.33	e0.46	e0.45
28	27	0.32	20	1.2	1.6	0.14	1,110	241	4.5	16	e0.41	e0.37
29	19	0.11	32	1.0	---	0.16	978	158	4.3	19	e0.56	e0.43
30	17	0.08	98	1.3	---	0.14	905	78	5.3	17	e0.47	e0.42
31	15	---	49	2.0	---	0.11	---	56	---	12	e0.42	---
Total	157.46	213.17	387.50	134.9	225.9	60.51	15,210.47	20,132	349.5	155.62	28.30	14.90
Mean	5.08	7.11	12.5	4.35	8.07	1.95	507	649	11.7	5.02	0.91	0.50
Max	34	57	98	26	22	15	3,980	3,170	48	19	4.8	2.7
Min	0.05	0.08	0.00	1.0	1.6	0.06	0.05	27	2.7	0.32	0.01	0.04
Ac-ft	312	423	769	268	448	120	30,170	39,930	693	309	56	30

07247650 FOURCHE MALINE NEAR LEFLORE, OK

Robert S. Kerr Reservoir Basin
Poteau Subbasin

LOCATION.--Lat 34°55'11", long 94°56'43" referenced to North American Datum of 1927, in NE 1/4 SE 1/4 sec.11, T.5 N., R.22 E., Le Flore County, OK, Hydrologic Unit 11110105, at county road bridge 1.6 mi east of Leflore, OK.

DRAINAGE AREA.--270 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--Discharge measurements only: 1992 to current year.

DISCHARGE MEASUREMENTS
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011

Date	Discharge, in ft³/s
Oct 27, 2010	0.007
Dec 15, 2010	0.17
Feb 23, 2011	11.9
Apr 11, 2011	43.8
Apr 15, 2011	2,230
Apr 20, 2011	167
Apr 26, 2011	5,690
May 2, 2011	5,310
May 23, 2011	1,450
Jun 7, 2011	36.7
Aug 16, 2011	0.34

WATER-QUALITY RECORDS

PERIOD OF RECORD.--December 1991 to current year.

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

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011

Part 1 of 4

[%, percent; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; –, no data; <, less than; E, estimated]

Date	Sample start time	Barometric pressure, mm Hg (00025)	Temperature, air, °C (00020)	Discharge, instantaneous, ft³/s (00061)	Dissolved oxygen, water, unfiltered, mg/L (00300)	Dissolved oxygen, water, unfiltered, % saturation (00301)	pH, water, unfiltered, field, standard units (00400)	Specific conductance, water, unfiltered, µS/cm at 25 °C (00095)	Temperature, water, °C (00010)
10-27-2010	0945	--	13.7	.01	3.8	--	7.0	291	16.2
12-15-2010	1030	740	5.1	.17	10.3	81	7.9	277	3.9
02-23-2011	1030	753	12.8	12	8.4	78	7.4	228	11.7
04-11-2011	1130	751	19.0	44	5.7	65	7.1	153	20.8
04-15-2011	1030	743	12.7	2,230	7.1	75	6.7	79	16.8
04-20-2011	0930	754	--	167	6.9	74	6.9	88	18.5
04-26-2011	1730	743	--	5,690	6.3	67	6.4	58	16.6
05-02-2011	1400	749	12.9	5,310	9.4	90	6.7	49	12.4
05-23-2011	1000	746	25.0	1,450	7.0	80	6.9	67	20.8
06-07-2011	0830	749	24.8	37	5.1	65	7.1	105	27.0
08-16-2011	1300	753	29.1	.34	5.0	65	7.5	121	29.2

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 2 of 4

[%, percent; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than; E, estimated]

Date	Sample start time	Turbidity, water, unfiltered, broad band light source (400-680 nm), detectors at multiple angles including 90 +/- 30 degrees, ratiometric correction, NTRU (63676)	Ammonia plus organic nitrogen, water, unfiltered, mg/L as N (00625)	Ammonia, water, filtered, mg/L as NH4 (71846)	Ammonia, water, filtered, mg/L as N (00608)	Nitrate plus nitrite, water, filtered, mg/L as N (00631)	Nitrate, water, filtered, mg/L (71851)	Nitrate, water, filtered, mg/L as N (00618)	Nitrite, water, filtered, mg/L (71856)
10-27-2010	0945	E 6.53	.517	.056	.0434	.0292	.120	.027	.007
12-15-2010	1030	E 14.2	.553	< .013	< .010	< .008	< .035	< .008	< .003
02-23-2011	1030	E 16.1	.401	< .013	< .010	.184	.795	.180	.013
04-11-2011	1130	23.5	.500	< .013	< .010	.015	.061	.014	.004
04-15-2011	1030	247	1.46	.077	.0600	.339	1.45	.327	.039
04-20-2011	0930	47.0	.652	.094	.0728	.211	.903	.204	.023
04-26-2011	1730	70.4	.891	.031	.0241	.150	.646	.146	.013
05-02-2011	1400	68.2	.779	.136	.106	.113	.477	.108	.017
05-23-2011	1000	73.1	.877	.072	.0560	.121	.495	.112	.030
06-07-2011	0830	25.1	.457	.035	.0274	.181	.788	.178	.010
08-16-2011	1300	E 8.02	.442	.037	.0286	.011	.049	.011	< .003

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 3 of 4

[%, percent; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than; E, estimated]

Date	Sample start time	Nitrite, water, filtered, mg/L as N (00613)	Organic nitrogen, water, unfiltered, mg/L (00605)	Orthophos-phate, water, filtered, mg/L (00660)	Orthophos-phate, water, filtered, mg/L as P (00671)	Phos-phorus, water, filtered, mg/L as P (00666)	Phosphorus, water, unfiltered, mg/L as P (00665)	Total nitrogen, water, unfiltered, mg/L (00600)	Suspended sediment, sieve diameter, percent smaller than 0.0625 mm (70331)
10-27-2010	0945	.00203	.47	.025	.00812	.0195	.0340	.55	83
12-15-2010	1030	< .0010	< .55	.018	.006	.0144	.0505	< .56	71
02-23-2011	1030	.00401	< .40	< .012	< .004	.0108	.0447	.58	81
04-11-2011	1130	.00127	< .50	.020	.00638	.0122	.0688	.52	96
04-15-2011	1030	.0119	1.4	.124	.0405	.0682	.330	1.8	86
04-20-2011	0930	.00705	.58	.036	.0116	.0228	.0750	.86	92
04-26-2011	1730	.00398	.87	.398	.130	.155	.287	1.0	91
05-02-2011	1400	.00528	.67	.116	.0380	.0588	.140	.89	98
05-23-2011	1000	.00917	.82	.067	.0218	.0479	.172	1.00	91
06-07-2011	0830	.00299	.43	.029	.00937	.0294	.0896	.64	92
08-16-2011	1300	< .0010	.41	.014	.00453	.0126	.0392	.45	--

07247650 Fourche Maline nr LeFlore, OK continued

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 4 of 4

[%, percent; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; ft^3/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than; E, estimated]

Date	Sample start time	Suspended sediment concentration, mg/L (80154)	Suspended sediment discharge, tons per day (80155)
10-27-2010	0945	23	.00
12-15-2010	1030	24	.01
02-23-2011	1030	28	.90
04-11-2011	1130	71	8.4
04-15-2011	1030	357	2,150
04-20-2011	0930	40	18
04-26-2011	1730	93	1,430
05-02-2011	1400	67	961
05-23-2011	1000	102	399
06-07-2011	0830	23	2.3
08-16-2011	1300	--	--

07249400 JAMES FORK NEAR HACKETT, AR

Robert S. Kerr Reservoir Basin

Poteau Subbasin

LOCATION.--Lat 35°09'45", long 94°24'25" referenced to North American Datum of 1983, in NW 1/4 NW 1/4 sec.34, T.6 N., R.32 W., Sebastian County, AR, Hydrologic Unit 11110105, near left bank on downstream side of bridge on State Hwy 45, 1.7 mi south of Hackett, 2.0 mi downstream from Elder Branch, and 3.6 mi upstream from Arkansas-Oklahoma State line.

DRAINAGE AREA.--147 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--Apr 1958 to current year.

REVISED RECORDS.--WDR Arkansas 1970: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 457.71 ft above NGVD of 1929. Prior to Oct 1, 1990, at datum 2.00 ft higher.

REMARKS.--Water-discharge records good except estimated daily discharges, which are poor. Water quality data available at the files of the USGS. Satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011, DAILY MEAN VALUES, [e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	1.9	1.9	3.5	1.4	1.4	31	3.4	585	62	4.8	1.5	2.3
2	1.8	2.0	3.5	1.1	5.9	30	3.2	4,700	52	5.3	1.3	2.0
3	1.7	1.9	3.5	0.92	e4.7	29	2.4	2,960	44	5.0	1.4	1.6
4	1.7	1.8	3.7	0.84	e4.2	29	2.2	746	37	4.8	1.4	1.5
5	1.6	e1.8	3.6	0.78	e4.1	29	2.1	442	31	4.7	1.5	1.1
6	1.4	1.8	3.7	0.70	4.3	28	1.9	318	27	4.5	1.4	1.1
7	1.4	1.8	3.6	0.63	26	28	1.6	254	24	4.1	1.6	1.2
8	1.4	1.7	3.6	0.55	32	28	1.7	205	21	3.8	1.6	1.2
9	1.5	1.8	3.6	0.53	27	e28	1.4	174	19	3.4	1.5	1.3
10	1.4	1.8	3.6	0.50	25	28	1.7	145	27	3.0	2.0	1.4
11	1.4	1.9	3.4	0.49	24	27	2.6	120	24	2.4	4.6	1.6
12	1.5	1.9	3.6	0.48	25	28	8.5	111	14	2.4	8.1	1.7
13	1.3	2.1	3.1	0.47	28	27	11	148	15	2.3	8.9	2.0
14	1.5	2.1	2.9	0.46	29	29	13	93	9.6	2.1	6.1	2.1
15	1.4	2.3	2.7	0.45	28	36	795	77	7.6	2.1	4.4	2.2
16	1.3	2.5	2.6	0.45	28	e27	185	66	5.8	2.3	3.6	2.3
17	1.3	2.6	2.4	0.44	29	18	92	57	4.6	2.3	4.2	2.7
18	1.2	2.8	2.4	0.43	28	13	61	49	8.2	2.6	5.0	4.9
19	1.6	2.8	2.3	0.42	28	11	45	43	8.6	2.4	4.0	437
20	e1.7	2.8	2.1	0.44	27	9.0	34	74	6.6	2.1	3.1	102
21	1.4	3.2	1.9	0.45	26	7.8	122	473	5.4	1.9	3.1	38
22	1.6	3.5	1.9	0.47	26	6.6	284	170	4.8	1.8	3.0	21
23	1.7	3.9	1.8	0.48	25	5.9	154	170	4.7	1.8	2.5	15
24	1.8	3.5	1.7	0.51	27	4.8	362	2,380	4.8	1.6	2.4	12
25	1.8	3.6	e1.3	0.56	37	4.3	7,470	1,410	4.8	1.7	2.1	9.6
26	1.9	4.1	0.85	0.61	35	e3.4	3,270	349	4.9	1.8	1.9	7.9
27	1.8	3.5	0.81	0.67	33	e4.8	1,780	223	4.9	1.8	1.7	6.2
28	1.7	3.3	0.77	0.75	32	3.5	746	167	4.9	1.8	1.7	4.8
29	1.8	3.5	1.1	0.81	---	e4.8	413	126	4.8	2.0	2.5	4.2
30	1.9	3.5	3.1	0.86	---	e3.4	289	95	4.6	1.9	2.4	3.2
31	1.9	---	1.9	0.89	---	3.9	---	74	---	1.8	2.4	---
Total	49.3	77.7	80.53	19.54	649.6	566.2	16,158.7	17,004	496.6	86.3	92.9	695.1
Mean	1.59	2.59	2.60	0.63	23.2	18.3	539	549	16.6	2.78	3.00	23.2
Max	1.9	4.1	3.7	1.4	37	36	7,470	4,700	62	5.3	8.9	437
Min	1.2	1.7	0.77	0.42	1.4	3.4	1.4	43	4.6	1.6	1.3	1.1
Ac-ft	98	154	160	39	1,290	1,120	32,050	33,730	985	171	184	1,380
Cfsm	0.01	0.02	0.02	0.00	0.16	0.12	3.66	3.73	0.11	0.02	0.02	0.16
In.	0.01	0.02	0.02	0.00	0.16	0.14	4.09	4.30	0.13	0.02	0.02	0.18

(07249455 ARKANSAS RIVER NEAR FORT SMITH, AR

Robert S. Kerr Reservoir Basin

Robert S. Kerr Reservoir Subbasin

LOCATION.--Lat 35°23'30", long 94°25'56" referenced to North American Datum of 1927, in NW 1/4 SW 1/4 sec.8, T.8 N., R.32 E., Sebastian County, AR, Hydrologic Unit 11110104, at U.S. Highway 64 bridge at Oklahoma and Arkansas state line, .7 mi downstream from Poteau River, 6.6 mi upstream from Lee Creek, 8.0 mi upstream from Arkansas River at Van Buren, and at mile 324.5.

DRAINAGE AREA.--149,977 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--May 1997 to current year. Some data collected prior to period of record and are available in the district office.

GAGE.--Water-stage recorder. Datum of gage is 380.24 ft above NGVD of 1929.

REMARKS.-Records fair, except for estimated dasily discharges and discharges less than 3,000 ft3/s which are rated poor. Flow regulated by W.D. Mayo Lock and Dam upstream and J.W. Trimble Lock and Dam downstream.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011, DAILY MEAN VALUES

(e, estimated)

Date	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	3,680	7,110	7,480	2,840	9,480	24,700	8,000	116,000	98,400	7,930	5,680	2,320
2	2,540	4,370	3,890	976	6,490	27,800	7,140	138,000	72,500	3,460	9,190	5,470
3	3,840	2,480	3,840	8,380	5,610	22,400	842	141,000	75,300	3,090	3,460	3,690
4	889	8,130	3,650	9,210	5,520	26,000	20,300	107,000	58,200	3,920	8,960	1,070
5	1,060	11,200	4,640	7,830	4,930	24,500	9,840	90,500	53,700	7,510	676	645
6	2,690	2,110	8,870	7,680	6,760	12,600	7,790	92,900	55,600	3,190	7,380	390
7	7,100	3,420	6,670	7,090	13,100	14,300	4,500	95,700	58,800	1,750	3,480	386
8	3,970	3,730	8,120	2,290	6,690	18,000	5,730	82,100	38,100	2,250	3,480	2,680
9	4,740	4,240	6,760	1,910	14,200	29,000	11,500	80,500	44,900	194	3,070	2,350
10	4,580	6,130	4,210	15,600	9,330	23,800	8,380	82,800	43,100	3,490	4,630	409
11	10,800	4,430	14,800	16,200	6,230	24,100	24,600	68,500	33,500	6,190	5,920	302
12	7,740	6,310	3,230	11,800	8,450	24,900	17,800	59,600	38,500	6,530	2,900	2,160
13	2,170	3,420	3,900	5,520	3,880	e29,100	10,500	82,900	37,600	3,870	7,610	3,100
14	7,490	2,930	4,320	8,990	13,400	e28,300	8,840	65,800	29,000	7,170	117	6,270
15	3,100	3,880	5,890	6,960	12,100	e26,000	14,800	65,900	20,000	605	1,670	410
16	3,460	11,500	10,700	2,450	7,670	e28,400	29,800	61,600	14,500	185	915	908
17	1,090	4,750	4,430	6,430	15,300	20,600	16,100	51,200	12,900	e-107	8,840	367
18	9,000	13,200	2,020	7,290	23,100	21,900	13,500	33,900	3,750	6,350	3,380	706
19	5,070	3,160	2,660	5,670	7,220	25,900	21,000	44,100	5,720	5,450	7,400	7,910
20	5,620	2,730	3,360	15,700	15,500	22,700	24,600	47,100	9,540	5,480	4,770	4,600
21	7,580	918	4,130	6,800	8,160	18,600	12,500	102,000	9,450	659	6,390	4,220
22	6,150	2,760	5,300	1,890	13,300	17,400	22,100	67,000	4,110	864	8,550	5,160
23	6,140	2,320	6,050	6,720	4,840	e29,300	29,000	63,600	4,180	4,170	6,520	3,740
24	1,060	3,610	3,920	10,500	22,400	e30,900	47,700	125,000	8,120	1,590	7,320	388
25	10,600	11,300	4,770	3,940	25,200	e25,800	180,000	106,000	4,680	1,930	6,580	1,270
26	10,300	13,100	4,270	4,340	34,200	e30,800	204,000	115,000	3,390	3,950	9,110	4,760
27	11,200	6,730	6,910	4,100	22,500	e26,200	161,000	106,000	7,910	4,820	6,810	5,330
28	8,410	5,620	12,100	6,990	32,600	23,100	145,000	114,000	7,660	3,410	4,510	5,220
29	3,410	16,700	12,900	3,840	---	22,300	124,000	114,000	4,320	5,510	4,690	3,400
30	5,820	4,180	5,270	5,480	---	9,960	107,000	103,000	3,810	432	3,830	1,390
31	1,290	---	11,700	5,940	---	16,700	---	97,300	---	6,720	5,460	---
Total	162,589	176,468	190,760	211,356	358,160	726,060	1,297,862	2,720,000	861,240	112,562	163,298	81,021
Mean	5,245	5,882	6,154	6,818	12,790	23,420	43,260	87,740	28,710	3,631	5,268	2,701
Max	11,200	16,700	14,800	16,200	34,200	30,900	204,000	141,000	98,400	7,930	9,190	7,910
Min	889	918	2,020	976	3,880	9,960	842	33,900	3,390	-107	117	302
Ac-ft	322,500	350,000	378,400	419,200	710,400	1,440,000	2,574,000	5,395,000	1,708,000	223,300	323,900	160,700

WATER-QUALITY RECORDS

PERIOD OF RECORD.--July 1996 to current year.

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

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011

Part 1 of 4

[%, percent; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than; E, estimated]

Date	Sample start time	Barometric pressure, mm Hg (00025)	Temperature, air, °C (00020)	Discharge, instantaneous, ft³/s (00061)	Dissolved oxygen, water, unfiltered, mg/L (00300)	Dissolved oxygen, water, unfiltered, % saturation (00301)	pH, water, unfiltered, field, standard units (00400)	Specific conductance, water, unfiltered, µS/cm at 25 °C (00095)	Temperature, water, °C (00010)
10-28-2010	1145	757	--	-4,820	9.9	108	7.9	500	19.1
12-21-2010	1115	751	18.0	-4,960	12.6	101	8.5	734	5.5
03-16-2011	1315	761	17.0	30,600	12.2	111	8.2	453	11.1
04-21-2011	1140	743	14.6	-704	8.1	89	7.5	215	18.7
06-22-2011	1300	--	--	2,040	--	--	7.7	375	29.1
08-24-2011	1300	762	--	-1,160	7.0	92	8.3	541	29.7

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011

Part 2 of 4

[%, percent; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than; E, estimated]

Date	Sample start time	Turbidity, water, unfiltered, broad band light source (400-680 nm), detectors at multiple angles including 90 +/- 30 degrees, ratiometric correction, NTRU (63676)	Chloride, water, filtered, mg/L (00940)	Sulfate, water, filtered, mg/L (00945)	Ammonia plus organic nitrogen, water, unfiltered, mg/L as N (00625)	Ammonia, water, filtered, mg/L as NH4 (71846)	Ammonia, water, filtered, mg/L as N (00608)	Nitrate plus nitrite, water, filtered, mg/L as N (00631)	Nitrate, water, filtered, mg/L (71851)
10-28-2010	1145	26.5	63.3	33.5	.489	<.013	<.010	.0972	.423
12-21-2010	1115	E 11.7	128	48.1	.359	.027	.0207	.261	1.15
03-16-2011	1315	26.3	51.6	34.5	.557	.016	.0123	.188	.807
04-21-2011	1140	69.8	--	--	.641	.070	.0546	.096	.411
06-22-2011	1300	E 16.6	36.0	30.5	.608	.016	.0126	.425	1.81
08-24-2011	1300	E 13.2	81.1	37.4	.483	<.013	<.010	.194	.809

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 3 of 4

[%, percent; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than; E, estimated]

Date	Sample start time	Nitrate, water, filtered, mg/L as N (00618)	Nitrite, water, filtered, mg/L (71856)	Nitrite, water, filtered, mg/L as N (00613)	Organic nitrogen, water, unfiltered, mg/L (00605)	Orthophosphate, water, filtered, mg/L (00660)	Orthophosphate, water, filtered, mg/L as P (00671)	Phosphorus, water, filtered, mg/L as P (00666)	Phosphorus, water, unfiltered, mg/L as P (00665)
10-28-2010	1145	.096	.005	.00166	< .49	.161	.0526	.0633	.115
12-21-2010	1115	.259	.006	.00178	.34	.126	.0412	.0537	.0767
03-16-2011	1315	.182	.019	.00579	.54	.136	.0445	.0535	.151
04-21-2011	1140	.093	.010	.00311	.59	.048	.0157	.0263	.128
06-22-2011	1300	.409	.052	.0160	.60	.132	.0431	.0504	.100
08-24-2011	1300	.183	.037	.0112	< .48	.287	.0936	.103	.142

WATER-QUALITY DATA
WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011
Part 4 of 4

[%, percent; N, nitrogen; NTRU, nephelometric turbidity ratio unit; P, phosphorus; ft³/s, cubic feet per second; mg/L, milligrams per liter; mm Hg, millimeters of mercury; mm, millimeters; nm, nanometers; °C, degrees Celsius; µS/cm, microsiemens per centimeter; --, no data; <, less than; E, estimated]

Date	Sample start time	Total nitrogen, water, unfiltered, mg/L (00600)	Suspended sediment, sieve diameter, percent smaller than 0.0625 mm (70331)	Suspended sediment concentration, mg/L (80154)	Suspended sediment discharge, tons per day (80155)
10-28-2010	1145	.59	--	--	--
12-21-2010	1115	.62	80	15	-201
03-16-2011	1315	.75	98	25	2,070
04-21-2011	1140	.74	94	40	-76
06-22-2011	1300	1.0	92	16	88
08-24-2011	1300	.68	94	13	-41

07249985 LEE CREEK NEAR SHORT, OK

Robert S. Kerr Reservoir Basin

Robert S. Kerr Reservoir Subbasin

LOCATION.--Lat 35°31'02", long 94°27'51" referenced to North American Datum of 1983, in NW 1/4 NE 1/4 sec.17, T.12 N., R.27 E., Sequoyah County, OK, Hydrologic Unit 11110104, on left bank 0.5 mi west of Arkansas-Oklahoma State line, 500 ft downstream from Webber Creek, 4.1 mi south of Short, Oklahoma, 7.5 mi southwest of Uniontown, Arkansas, and at river mile 11.0.

DRAINAGE AREA.--420 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--Oct 1930 to Jun 1937 and Oct 1950 to current year. Prior to Oct 1992, published as "07250000 Lee Creek near Van Buren". REVISED RECORDS.--WSP 1211: 1931 (M). WSP 1441: 1935 (M). WDR Arkansas 1970: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 429.44 ft above NGVD of 1929. Prior to Oct 1992 recording gage 3.2 mi downstream at datum 21.40 ft lower. Sep 1930 to Jun 1937, nonrecording gage at former site and datum.

REMARKS.--Water-discharge records good except estimated daily discharges, which are poor. Water quality data available at the files of the USGS. Satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011, AILY MEAN VALUES, [e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	82	51	326	1,170	86	1,180	388	3,810	557	18	0.89	9.2
2	71	48	272	716	100	896	393	9,280	455	16	0.82	7.4
3	61	47	231	527	105	736	357	6,470	376	14	0.74	6.4
4	54	52	201	416	117	640	335	3,470	312	13	0.62	5.7
5	48	48	175	343	125	628	306	2,370	259	14	0.49	4.5
6	45	44	154	289	135	670	271	1,810	219	11	0.38	3.6
7	41	41	138	251	206	564	246	1,430	185	9.2	0.29	3.1
8	39	39	126	219	382	492	229	1,130	159	8.0	0.23	2.8
9	36	37	116	193	489	434	209	894	136	6.8	0.24	2.5
10	33	34	107	173	e457	375	187	714	117	5.9	0.31	2.3
11	30	33	98	154	e417	323	2,320	581	194	5.1	0.51	2.1
12	28	34	86	136	399	288	2,370	574	201	4.4	1.1	2.0
13	27	34	80	120	582	264	1,440	3,230	114	3.8	2.2	1.9
14	25	35	74	110	1,090	1,010	1,020	1,750	90	3.9	17	1.7
15	24	35	70	103	1,270	1,540	3,450	1,180	77	3.6	27	1.5
16	22	36	66	98	1,060	1,010	2,270	873	113	3.1	16	1.6
17	21	34	63	94	835	779	1,500	677	123	2.7	12	2.0
18	21	32	60	93	674	654	1,110	541	101	2.4	8.8	3.4
19	29	31	57	88	558	556	876	437	84	2.2	6.7	5.5
20	36	30	55	90	474	471	690	1,250	72	2.1	6.0	4.8
21	38	30	52	87	421	412	667	7,600	62	2.0	10	3.6
22	44	29	50	82	367	367	1,460	2,920	54	1.9	11	4.9
23	46	29	48	80	318	330	1,560	2,780	48	1.8	11	6.5
24	62	33	50	78	409	289	18,100	18,900	44	1.6	11	23
25	83	59	49	76	1,300	253	37,400	6,330	40	1.6	12	27
26	112	284	47	76	1,050	316	24,500	3,260	35	1.5	9.9	21
27	95	446	45	75	814	455	6,940	2,150	30	1.4	5.4	25
28	80	315	44	73	1,390	384	5,220	1,580	26	1.3	4.8	26
29	70	280	165	71	---	344	3,270	1,180	23	1.2	15	22
30	63	325	336	69	---	363	2,350	875	21	1.1	15	17
31	56	---	934	67	---	379	---	680	---	0.98	11	---
Total	1,522	2,605	4,375	6,217	15,630	17,402	121,434	90,726	4,327	165.58	218.42	250.0
Mean	49.1	86.8	141	201	558	561	4,048	2,927	144	5.34	7.05	8.33
Max	112	446	934	1,170	1,390	1,540	37,400	18,900	557	18	27	27
Min	21	29	44	67	86	253	187	437	21	0.98	0.23	1.5
Ac-ft	3,020	5,170	8,680	12,330	31,000	34,520	240,900	180,000	8,580	328	433	496
Cfsm	0.12	0.21	0.34	0.48	1.33	1.34	9.64	6.97	0.34	0.01	0.02	0.02
In.	0.13	0.23	0.39	0.55	1.38	1.54	10.76	8.04	0.38	0.01	0.02	0.02

07250550 ARKANSAS RIVER AT JAMES W. TRIMBLE LOCK AND DAM NEAR VAN BUREN, AR

Robert S. Kerr Reservoir Basin

Robert S. Kerr Reservoir Subbasin

LOCATION.--Lat 35°20'56", long 94°17'54" referenced to North American Datum of 1983, in NE 1/4 NE 1/4 sec.28, T.8 N., R.31 W., Sebastian County, AR, Hydrologic Unit 11110104, on dam, and at river mile 308.9.

DRAINAGE AREA.--151,000 mi², of which 22,200 mi² is probably noncontributing.

SURFACE-WATER RECORDS

PERIOD OF RECORD.--Oct 1927 to current year. Prior to Oct 1969, published as "07250500 Arkansas River at Van Buren", and Oct 1969 to Sep 1988, published as "at Dam No. 13", near Van Buren. Gage height records collected from 1879 to Dec 1955 at Fort Smith, 16.3 mi upstream, are contained in reports of National Weather Service.

REVISED RECORDS.--WSP 1211: 1934-36. WSP 1561: 1554. WDR Arkansas 1970: Drainage area.

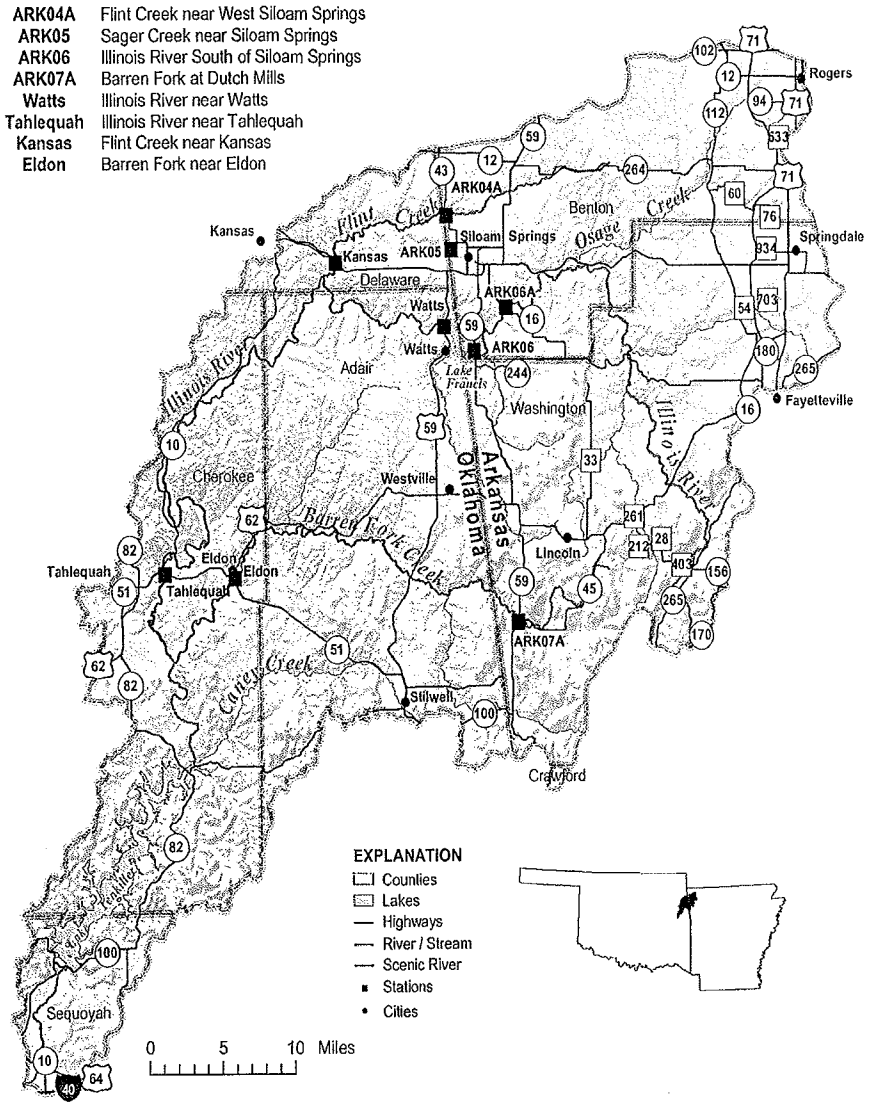
GAGE.--Water-stage and gate position recorder. Datum of gage is at NGVD of 1929 (levels by U.S. Army Corps of Engineers). Prior to Oct 1, 1934, nonrecording gage, and Oct 1, 1934 to Dec 20, 1969, recording gage at site 7.9 mi upstream at datum 372.36 ft higher.

REMARKS.--Water-discharge records good except estimated daily discharges, which are poor. Beginning Apr 26, 1970, daily discharge computed from relation between discharge, head, and gate openings. Flow regulated upstream by many locks, dams, and reservoirs. On Oct 19, 1988, the Arkansas Electric Cooperative Corporation hydroplant began operation, and discharges at the hydroplant are added to flows from the lock and dam. Water quality data available at the files of the USGS. Satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011, DAILY MEAN VALUES, [e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	3,680	6,800	7,330	5,460	8,790	25,500	8,440	120,000	99,500	7,550	5,590	2,530
2	2,380	3,990	3,740	e365	7,430	27,900	7,500	134,000	72,400	1,990	9,360	5,330
3	4,050	1,810	3,110	10,000	5,250	22,200	e365	143,000	72,100	2,770	3,280	3,210
4	e515	7,810	3,760	6,860	5,430	27,400	19,400	114,000	57,400	4,010	9,380	e1,360
5	2,040	11,200	5,140	9,260	4,250	23,600	9,900	90,700	51,700	6,870	e864	e365
6	2,430	1,300	8,060	8,750	7,800	13,000	8,840	90,600	53,800	3,530	6,160	e365
7	7,470	3,580	6,850	5,480	12,900	14,900	3,730	94,800	57,200	1,060	2,990	e1,110
8	3,730	4,430	7,390	2,100	6,910	15,900	6,850	79,900	35,100	1,890	3,530	3,300
9	4,100	3,180	6,200	1,670	14,200	29,500	8,820	76,700	42,300	e365	2,660	1,660
10	4,170	6,030	4,110	12,500	10,800	22,000	10,000	83,600	41,900	3,990	4,490	e365
11	10,900	5,320	12,600	17,500	5,650	26,200	25,500	66,800	32,100	6,440	6,720	e365
12	6,520	5,130	6,290	12,500	8,610	21,800	20,500	58,400	38,700	5,180	2,580	2,000
13	3,360	3,400	2,640	5,770	3,770	29,000	11,100	90,000	37,200	3,890	8,100	3,330
14	6,620	3,410	4,610	7,540	14,100	29,900	10,200	63,500	27,200	6,530	e365	5,260
15	3,500	4,000	5,420	6,970	11,300	26,300	20,400	62,100	19,900	e1,240	2,490	e437
16	2,780	10,400	9,640	2,410	9,170	29,600	29,400	59,200	15,500	e490	e1,030	e1,050
17	e864	4,960	3,800	6,040	14,300	20,800	17,500	49,600	11,600	e365	8,910	e1,180
18	8,540	11,900	1,500	5,610	24,000	19,900	14,900	33,600	3,970	7,140	3,580	e698
19	5,730	3,880	2,160	6,760	9,050	27,100	21,000	43,600	5,780	4,560	7,360	8,670
20	5,790	1,650	3,470	14,200	14,600	21,000	23,900	48,400	9,180	5,690	4,000	4,330
21	6,890	e365	3,570	7,480	7,300	19,300	12,500	113,000	8,790	e429	5,150	3,340
22	5,780	3,800	4,970	1,180	15,100	22,800	22,000	66,800	5,730	e365	8,490	5,120
23	6,930	1,290	6,500	6,360	2,550	30,000	5,140	63,700	3,630	5,260	6,100	3,150
24	e502	4,370	3,160	11,000	22,900	31,300	40,700	134,000	9,020	1,260	6,670	e365
25	10,000	10,900	4,740	3,650	23,600	26,900	170,000	116,000	4,680	1,390	5,190	1,330
26	9,990	11,900	3,890	3,990	34,600	30,100	217,000	121,000	3,200	4,490	8,610	4,290
27	10,500	7,360	7,340	2,730	19,900	27,300	169,000	110,000	8,380	4,790	6,060	4,390
28	8,300	7,070	9,370	6,710	32,800	22,900	147,000	118,000	9,000	3,780	3,900	5,800
29	3,880	13,900	13,700	3,990	---	21,000	126,000	120,000	3,080	5,850	5,340	3,660
30	5,340	5,390	6,000	3,790	---	10,400	110,000	108,000	4,150	e619	2,440	e1,300
31	e1,360	---	10,700	6,980	---	17,200	---	98,300	---	6,770	6,230	---
Total	158,641	170,525	181,760	205,605	357,060	732,700	1,297,585	2,771,300	844,190	110,553	157,619	79,660
Mean	5,117	5,684	5,863	6,632	12,750	23,640	43,250	89,400	28,140	3,566	5,084	2,655
Max	10,900	13,900	13,700	17,500	34,600	31,300	217,000	143,000	99,500	7,550	9,380	8,670
Min	502	365	1,500	365	2,550	10,400	365	33,600	3,080	365	365	365
Ac-ft	314,700	338,200	360,500	407,800	708,200	1,453,000	2,574,000	5,497,000	1,674,000	219,300	312,600	158,000

Water Quality Monitoring Report
Illinois River Basin
Arkansas-Oklahoma Compact



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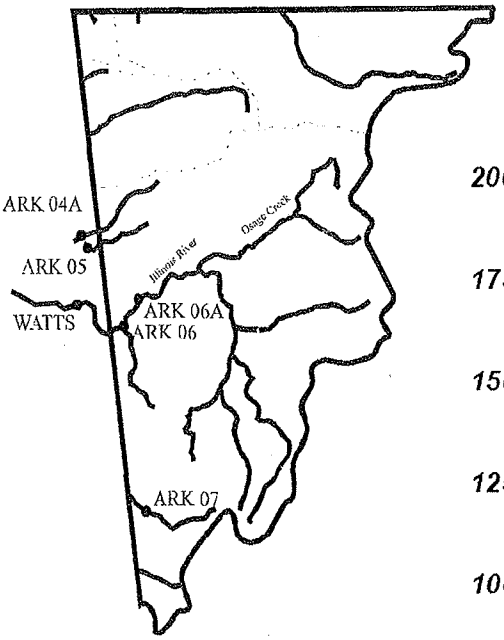
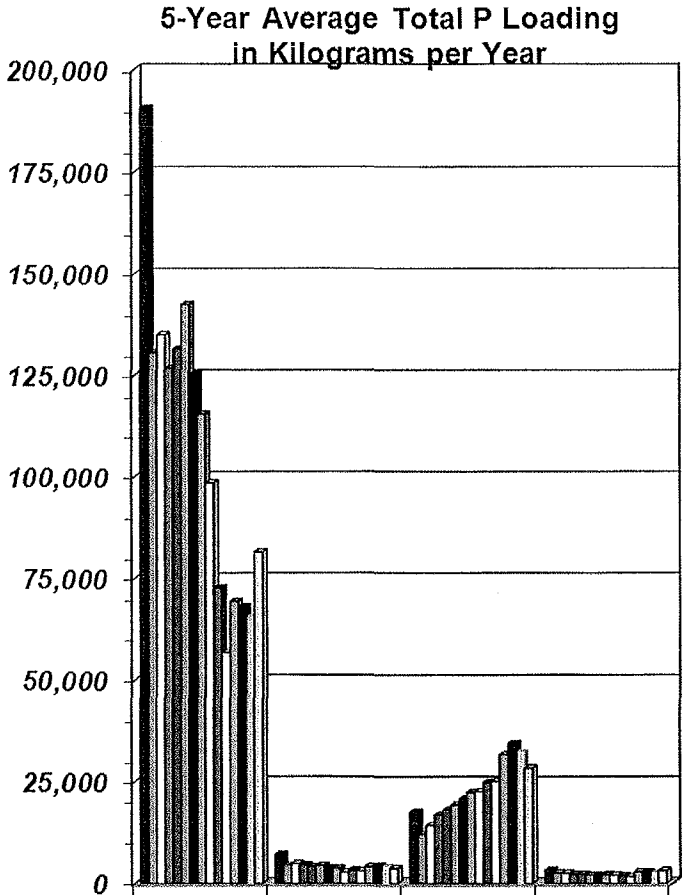




	Illinois River ARK06	Baron Fork ARK07A	Sager Creek ARK05	Flint Creek ARK04A
Total P 80-93	190,577	7,160	17,566	3,267
Total P 94-98	130,567	4,519	12,133	2,488
Total P 95-99	134,951	4,874	14,284	2,555
Total P 96-00	126,713	4,571	16,796	2,187
Total P 97-01	131,495	4,002	18,008	2,213
Total P 98-02	142,446	4,354	19,332	2,043
Total P 99-03	125,156	3,792	20,798	2,019
Total P 00-04	115,417	3,661	22,418	2,106
Total P 01-05	98,479	2,777	22,616	2,049
Total P 02-06	72,654	3,274	24,905	1,855
Total P 03-07	56,817	3,062	25,113	1,707
Total P 04-08	69,349	4,145	31,649	2,848
Total P 05-09	67,883	4,237	34,345	2,723
Total P 06-10	65,668	4,267	32,462	2,762
Total P 07-11	81,467	3,678	28,313	3,102

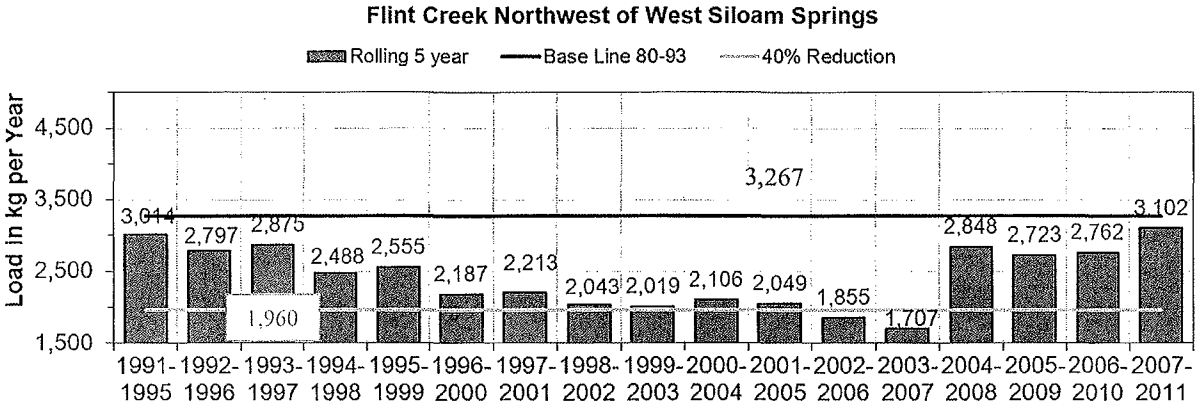
Five-Year Average Values by Station

Flint Creek NW of W Siloam Springs				
Year	Pt (mg/l)	Flow (cfs)	Pt (kg/yr)	% Decrease
80-93	0.079	50.7	3,267	0.0%
91-95	0.054	62.0	3,014	7.7%
92-96	0.054	58.4	2,797	14.4%
93-97	0.059	54.7	2,875	12.0%
94-98	0.061	45.6	2,488	23.9%
95-99	0.060	47.7	2,555	21.8%
96-00	0.053	46.6	2,187	33.1%
97-01	0.052	47.7	2,213	32.3%
98-02	0.046	49.2	2,043	37.5%
99-03	0.050	44.9	2,019	38.2%
00-04	0.052	45.1	2,106	35.5%
00-05	0.054	42.6	2,049	37.3%
02-06	0.056	37.2	1,855	43.2%
03-07	0.058	32.8	1,707	47.7%
04-08	0.073	43.9	2,848	12.8%
05-09	0.072	42.1	2,723	16.6%
06-10	0.073	42.4	2,762	15.5%
07-11	0.070	49.5	3,102	5.1%

Illinois River South of Siloam Springs				
Year	Pt (mg/l)	Flow (cfs)	Pt (kg/yr)	% Decrease
80-93	0.311	680	190,577	0.0%
91-95	0.210	821	153,942	19.2%
92-96	0.211	809	152,527	20.0%
93-97	0.209	757	141,386	25.8%
94-98	0.222	658	130,567	31.5%
95-99	0.225	670	134,951	29.2%
96-00	0.224	633	126,713	33.5%
97-01	0.238	619	131,495	31.0%
98-02	0.252	634	142,446	25.3%
99-03	0.246	569	125,156	34.3%
00-04	0.236	548	115,417	39.4%
00-05	0.214	516	98,479	48.3%
02-06	0.179	455	72,654	61.9%
03-07	0.149	428	56,817	70.2%
04-08	0.136	569	69,349	63.6%
05-09	0.122	624	67,883	64.4%
06-10	0.110	668	65,668	65.5%
07-11	0.110	830	81,467	57.3%

Sager Creek near W Siloam Springs				
Year	Pt (mg/l)	Flow (cfs)	Pt (kg/yr)	% Decrease
80-93	1.363	14.7	17,566	0.0%
91-95	0.851	18.0	13,689	22.1%
92-96	0.852	17.1	13,021	25.9%
93-97	0.801	17.4	12,426	29.3%
94-98	0.845	16.1	12,133	30.9%
95-99	0.896	17.8	14,284	18.7%
96-00	0.921	20.4	16,796	4.4%
97-01	0.898	22.5	18,008	-2.5%
98-02	0.930	23.3	19,332	-10.1%
99-03	1.059	22.0	20,798	-18.4%
00-04	1.047	24.0	22,418	-27.6%
00-05	1.175	21.6	22,616	-28.7%
02-06	1.374	20.3	24,905	-41.8%
03-07	1.397	20.1	25,113	-43.0%
04-08	1.285	27.6	31,649	-80.2%
05-09	1.359	28.3	34,345	-95.5%
06-10	1.247	29.2	32,462	-84.8%
07-11	1.001	31.7	28,313	-61.2%

Baron Fork at Dutch Mills				
Year	Pt (mg/l)	Flow (cfs)	Pt (kg/yr)	% Decrease
80-93	0.153	52.6)	7,160	0.0%
91-95	0.108	58.5	5,632	21.3%
92-96	0.107	61.5	5,899	17.6%
93-97	0.095	59.1	5,036	29.7%
94-98	0.100	50.5	4,519	36.9%
95-99	0.104	52.3	4,874	31.9%
96-00	0.099	52.0	4,571	36.2%
97-01	0.095	47.4	4,002	44.1%
98-02	0.102	47.8	4,354	39.2%
99-03	0.107	39.6	3,792	47.0%
00-04	0.104	39.3	3,661	48.9%
00-05	0.091	34.0	2,777	61.2%
02-06	0.096	38.1	3,274	54.3%
03-07	0.093	37.0	3,062	57.2%
04-08	0.093	50.2	4,145	42.1%
05-09	0.088	53.7	4,237	40.8%
06-10	0.085	55.9	4,267	40.4%
07-11	0.080	51.6	3,678	48.6%


Flint Creek Northwest of West Siloam Springs
Rolling 5 year
Base Line 80-93
40% Reduction
Load in Kg per Year
4,500
3,500
2,500
1,500
3,267
1,960
3,044
2,797
2,875
2,488
2,555
2,187
2,213
2,043
2,019
2,106
2,049
1,855
1,707
2,848
2,723
2,762
3,102
1991-1995
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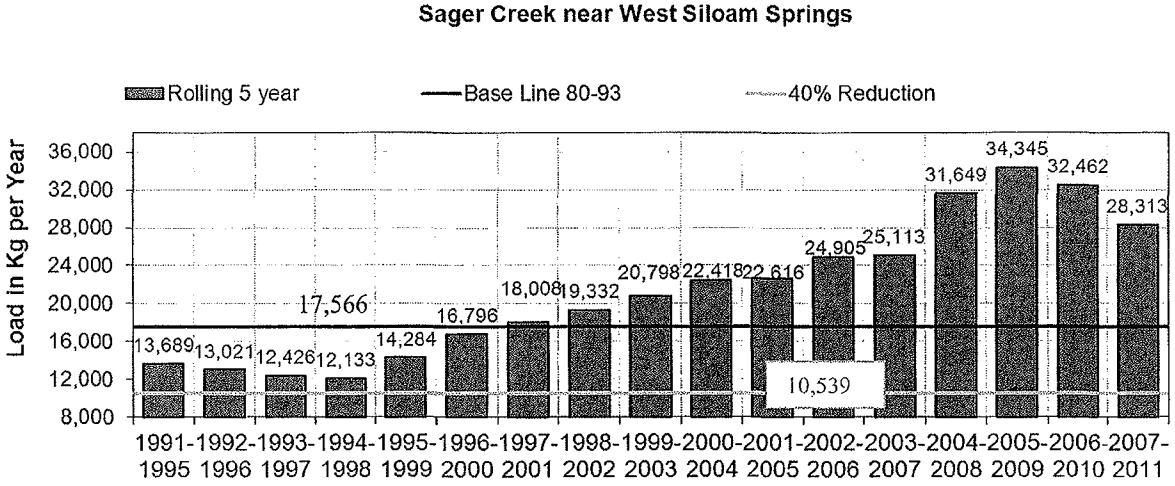
2006-2010
2007-2011


Sager Creek near West Siloam Springs
Rolling 5 year
Base Line 80-93
40% Reduction
Load in Kg per Year
36,000
32,000
28,000
24,000
20,000
16,000
12,000
8,000
17,566
10,539
13,689
13,021
12,426
12,133
14,284
16,796
18,008
19,332
20,798
22,418
22,616
24,905
25,113
31,649
34,345
32,462
28,313
1991-1995
1992-1996
1993-1997
1994-1998
1995-1999
1996-2000
1997-2001
1998-2002
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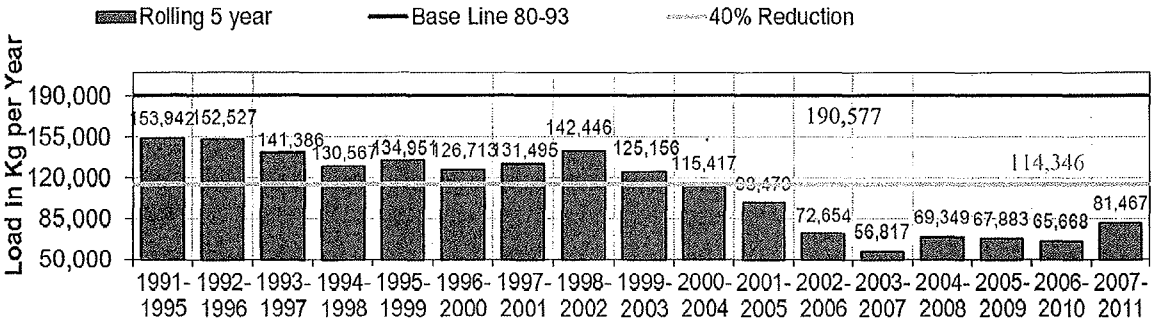
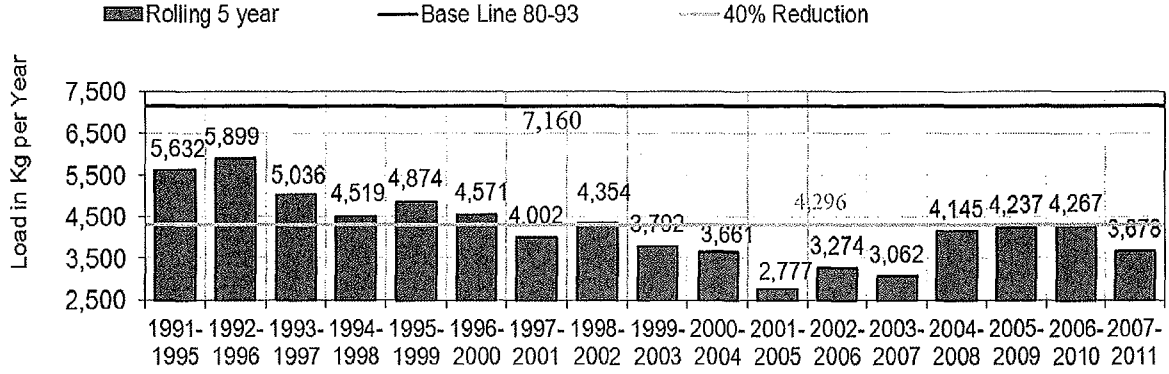
2000-2004
2001-2005
2002-2006
2003-2007
2004-2008
2005-2009
2006-2010
2007-2011

Illinois River South of Siloam Springs



Baron Fork at Dutch Mills



Average Yearly Average Values by Station

Flint Creek Northwest of West Siloam Springs - Loadings			
ARK04A Year	Flow (cfs)	Total P (mg/L)	Total P (kg/yr)
1981	19.8	0.149	2,635
1982	29.9	0.171	4,566
1983	19.0	0.073	1,239
1984	53.5	0.112	5,351
1985	91.3	0.063	5,137
1986	78.4	0.067	4,691
1987	58.3	0.049	2,551
1988	41.8	0.031	1,157
1989	38.0	0.050	1,697
1990	71.3	0.060	3,821
1991	51.6	0.054	2,489
1992	56.1	0.047	2,355
1993	88.2	0.045	3,545
1994	53.0	0.051	2,414
1995	61.3	0.075	4,106
1996	33.5	0.050	1,496
1997	37.3	0.074	2,448
1998	42.9	0.056	2,142
1999	63.5	0.045	2,578
2000	55.6	0.038	1,893
2001	39.4	0.047	1,636
2002	44.6	0.047	1,850
2003	21.4	0.075	1,438
2004	64.6	0.055	3,173
2005	43.0	0.046	1,772
2006	12.6	0.056	630
2007	22.4	0.059	1,180
2008	76.9	0.147	10,096
2009	55.6	0.054	2,681
2010	44.3	0.049	1,939
2011	48.5	0.042	1,798
Avg.	49.0	0.066	2,871

Sager Creek near West Siloam Springs - Loadings			
ARK05 Year	Flow (cfs)	Total P (mg/L)	Total P (kg/yr)
1981	6.5	2.125	12,336
1982	9.0	2.025	16,277
1983	6.3	1.964	11,050
1984	15.4	0.950	13,066
1985	24.8	1.736	38,450
1986	21.1	0.834	15,716
1987	16.7	0.948	14,136
1988	12.6	1.154	12,986
1989	11.7	1.227	12,821
1990	20.2	0.860	15,515
1991	15.5	0.914	12,653
1992	16.5	1.284	18,921
1993	24.6	0.637	13,995
1994	15.7	0.721	10,110
1995	17.8	0.697	11,080
1996	11.0	0.919	9,028
1997	17.8	1.029	16,354
1998	18.1	0.858	13,876
1999	24.5	0.979	21,429
2000	30.7	0.820	22,469
2001	21.2	0.803	15,201
2002	21.8	1.192	23,231
2003	11.7	1.503	15,700
2004	34.5	0.916	28,224
2005	18.5	1.461	24,200
2006	14.9	1.799	23,940
2007	21.0	1.306	24,494
2008	48.9	0.945	41,271
2009	38.1	1.286	43,759
2010	22.9	0.897	18,335
2011	27.4	0.573	14,027
Avg.	19.9	1.141	20,291

NOTES: 1) Flow data provided by USGS Arkansas & Oklahoma 2) P concentrations provided by the ADEQ Technical Services Division.

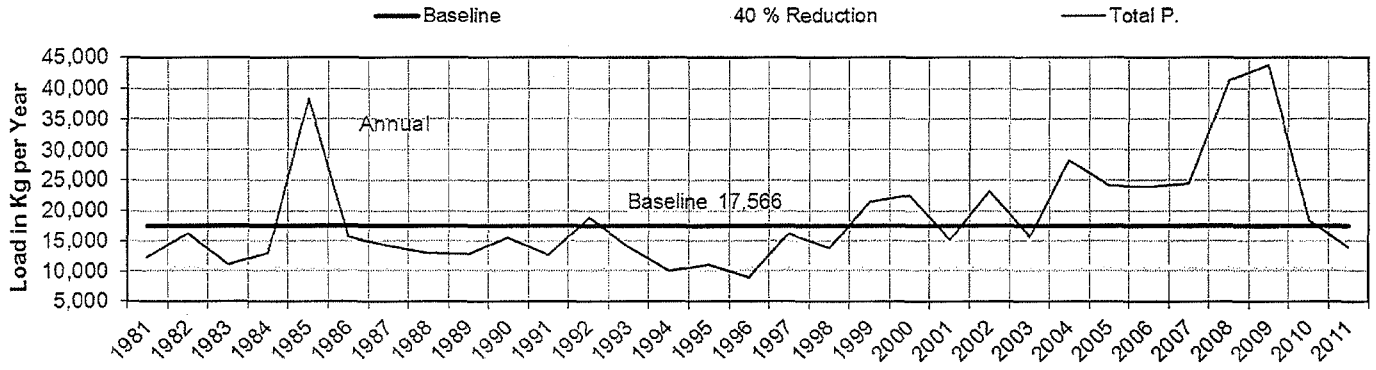
Average Yearly Average Values by Station

Illinois River South of Siloam Springs - Loadings			
ARK06 Year	Flow (cfs)	Total P (mg/L)	Total P (kg/yr)
1981	197	0.420	73,895
1982	591	0.370	195,294
1983	352	0.386	121,347
1984	706	0.442	278,693
1985	947	0.289	244,426
1986	879	0.305	239,436
1987	815	0.294	213,996
1988	531	0.253	119,982
1989	558	0.291	145,020
1990	1127	0.204	205,331
1991	724	0.220	142,253
1992	760	0.222	150,684
1993	1163	0.181	188,000
1994	674	0.190	114,370
1995	783	0.237	165,733
1996	667	0.225	134,032
1997	497	0.213	94,504
1998	668	0.246	146,960
1999	737	0.206	135,413
2000	597	0.230	122,831
2001	598	0.293	156,581
2002	570.4	0.282	143,700
2003	344	0.219	67,422
2004	633	0.153	86,496
2005	436	0.120	46,785
2006	290	0.120	31,048
2007	436	0.131	51,022
2008	1,051	0.158	148,306
2009	907	0.080	64,782
2010	659	0.061	35,885
2011	1,097	0.120	117,154
Avg.	677	0.231	139,728

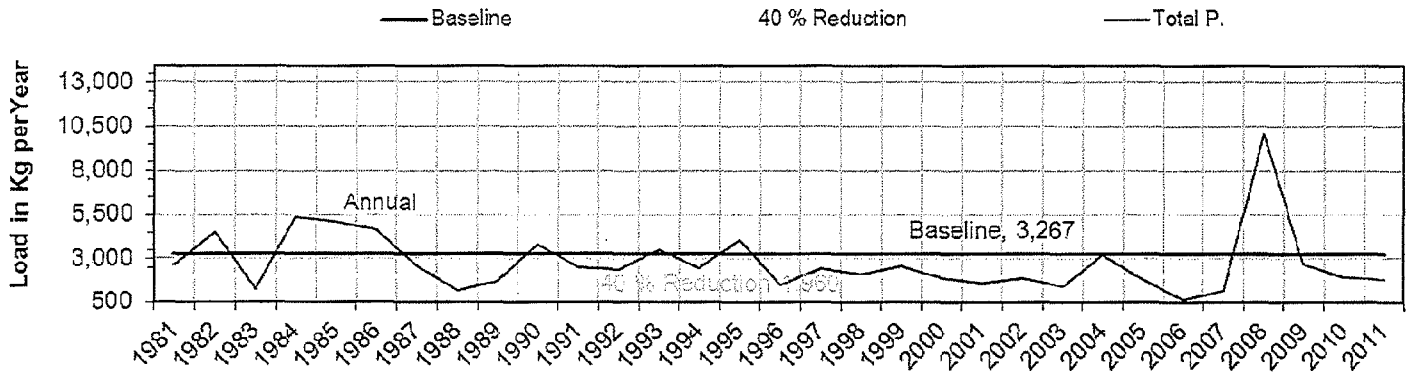
Baron Fork at Dutch Mills - Loadings			
ARK07A Year	Flow (cfs)	Total P (mg/L)	Total P (kg/yr)
1981	18.4	0.135	2,218
1982	37.4	0.484	16,167
1983	27.2	0.125	3,037
1984	51.8	0.183	8,466
1985	79.4	0.211	14,962
1986	64.0	0.147	8,402
1987	63.2	0.134	7,563
1988	31.8	0.097	2,755
1989	50.2	0.124	5,559
1990	102.0	0.109	9,929
1991	49.4	0.086	3,794
1992	47.9	0.127	5,433
1993	104.0	0.083	7,709
1994	37.0	0.081	2,677
1995	54.2	0.162	7,842
1996	64.4	0.084	4,831
1997	35.9	0.067	2,151
1998	61.1	0.107	5,822
1999	45.8	0.102	4,176
2000	52.6	0.133	6,230
2001	41.4	0.065	2,387
2002	38.0	0.104	3,536
2003	20.1	0.133	2,386
2004	44.5	0.087	3,458
2005	26.1	0.069	1,595
2006	62.0	0.088	4,873
2007	32.3	0.087	2,510
2008	86.0	0.132	10,138
2009	62.3	0.066	3,672
2010	37.1	0.054	1,789
2011	40.2	0.060	2,161
Avg.	50.6	0.120	5,427

NOTES: 1) Flow data provided by USGS Arkansas & Oklahoma 2) P concentrations provided by the ADEQ Technical Services Division.

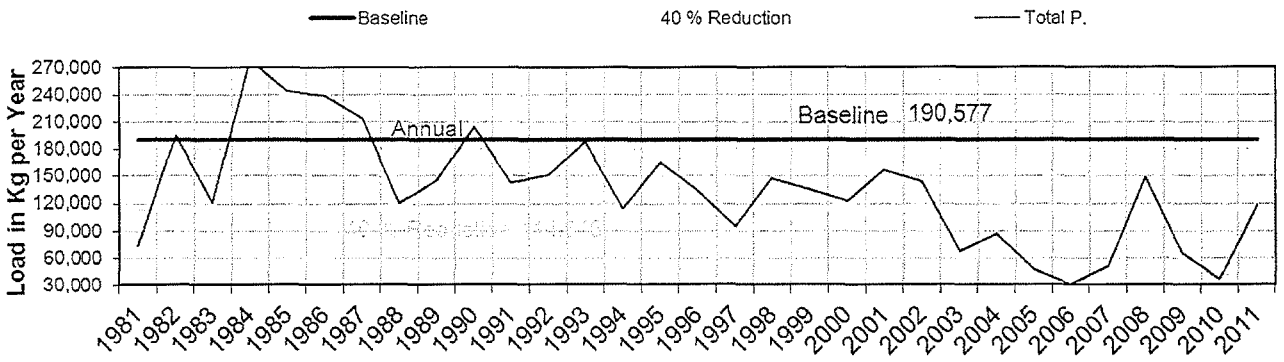
Sager Creek near W. Siloam Springs - Total P Loading



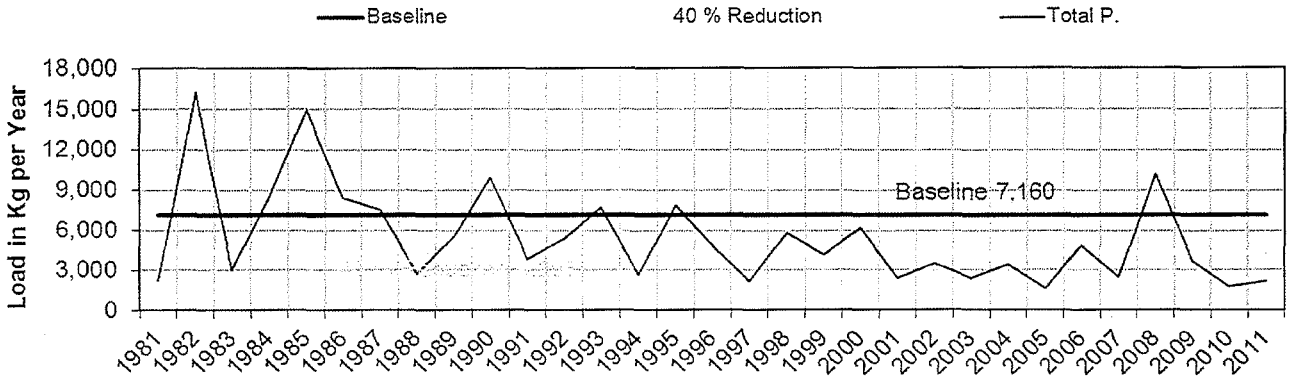
Flint Creek Northwest of W. Siloam Springs - Total P Loading



Illinois River South of Siloam Springs - Total P Loading



Baron Fork at Dutch Mills - Total P Loading

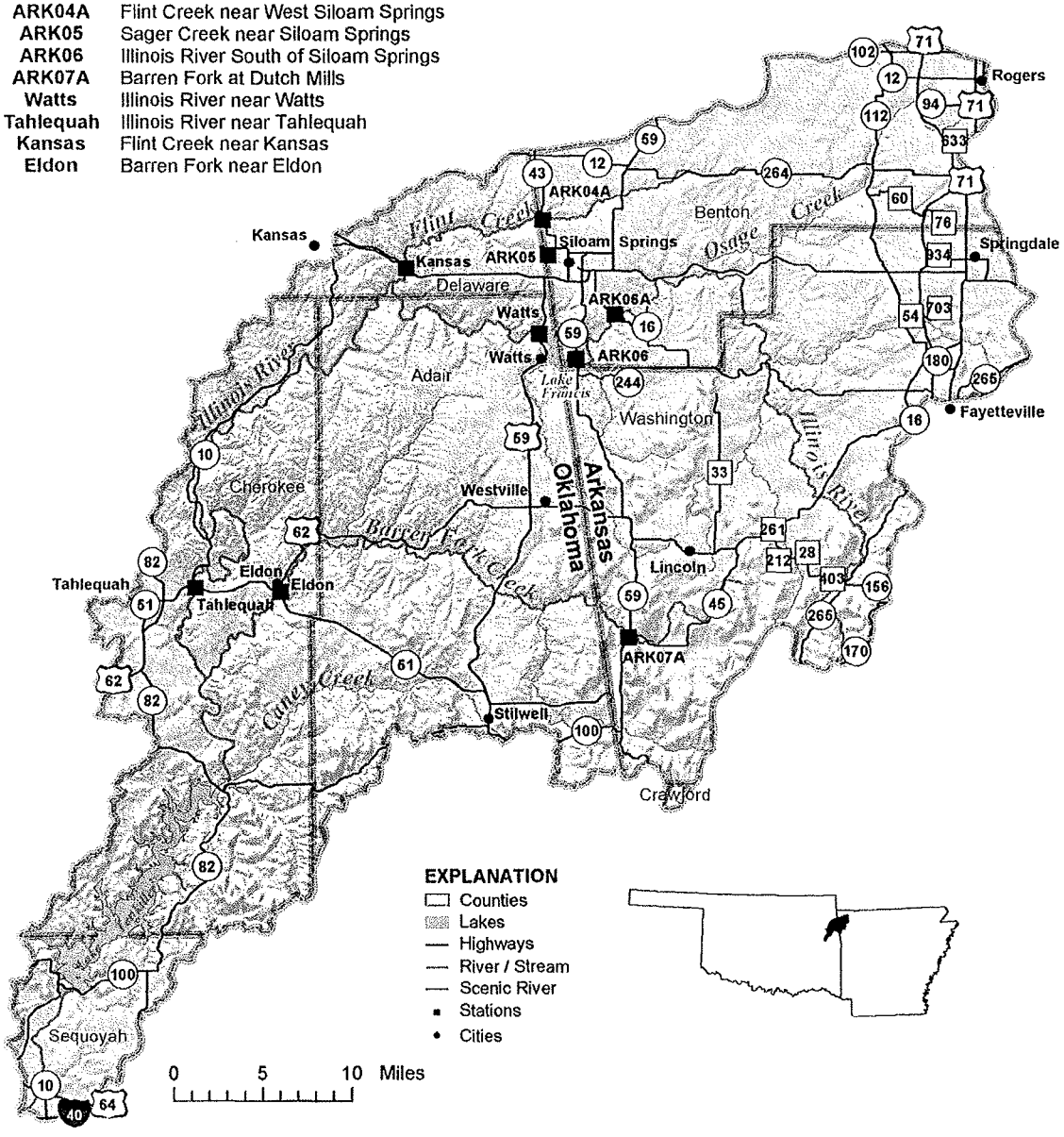


DRAFT

Oklahoma's 5-year Rolling Average Phosphorus Report for the Illinois River Basin

Illinois River Basin
Arkansas – Oklahoma Compact

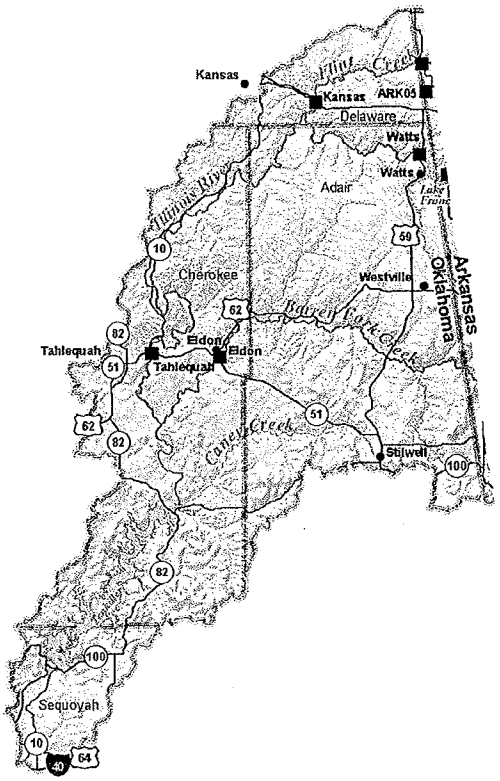
ARK04A	Flint Creek near West Siloam Springs
ARK05	Sager Creek near Siloam Springs
ARK06	Illinois River South of Siloam Springs
ARK07A	Barren Fork at Dutch Mills
Watts	Illinois River near Watts
Tahlequah	Illinois River near Tahlequah
Kansas	Flint Creek near Kansas
Eldon	Barren Fork near Eldon

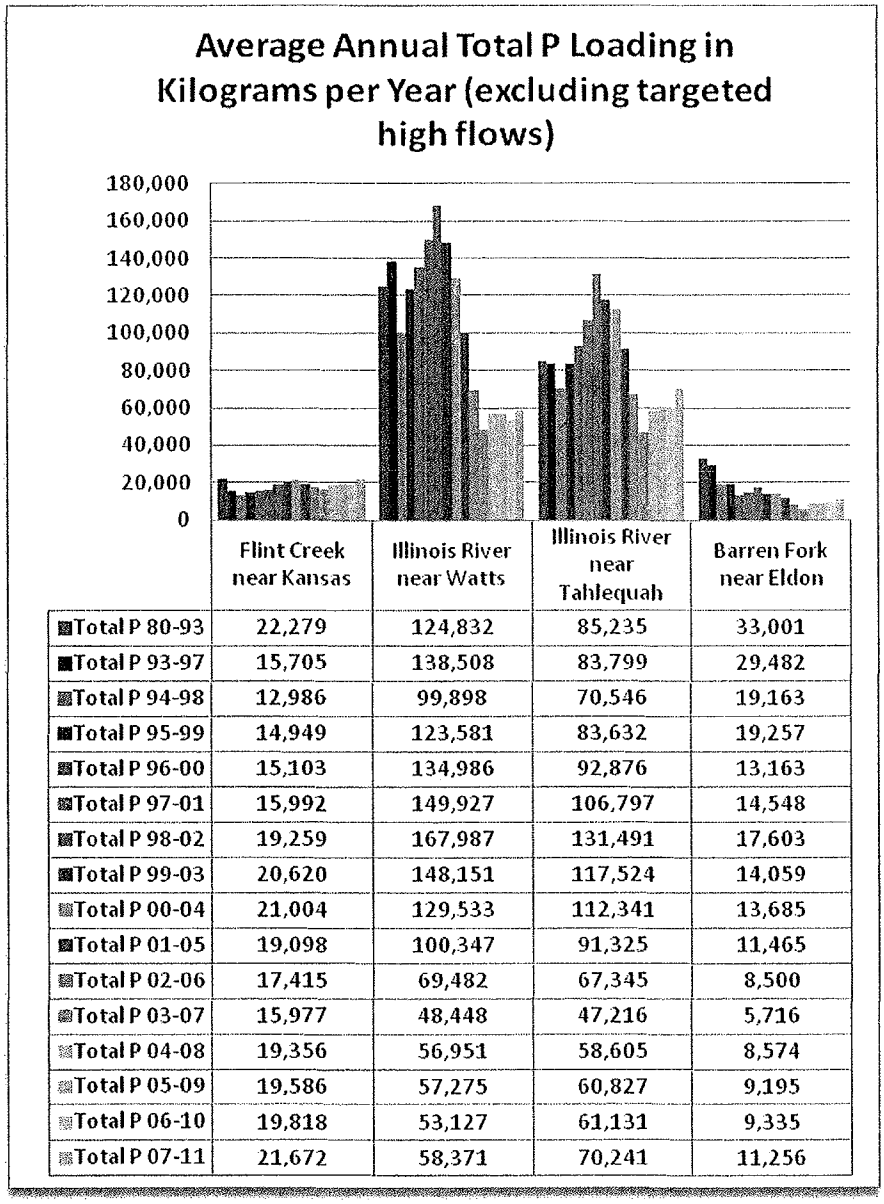


OKLAHOMA'S PHOSPHORUS LOADING REPORT FOR THE ILLINOIS RIVER BASIN

CY 2011

OKLAHOMA

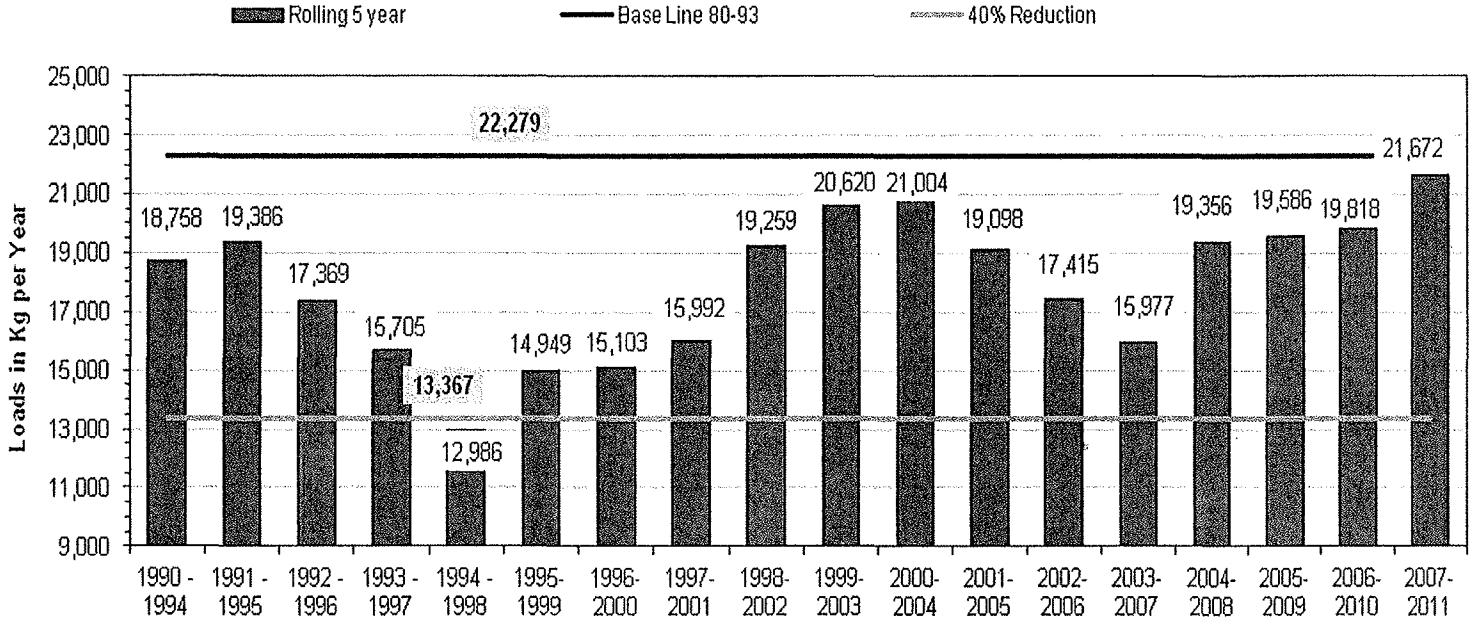




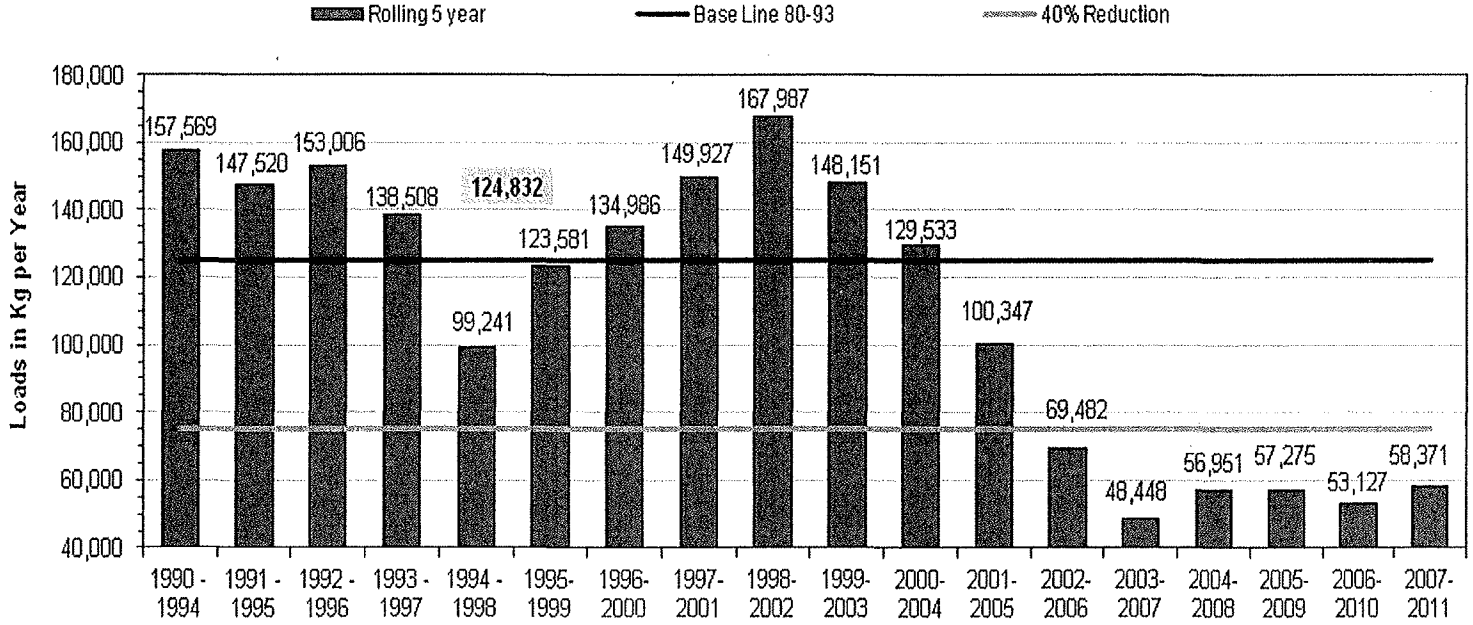
	Flint Creek near Kansas	Illinois River near Watts	Illinois River near Tahlequah	Barren Fork near Eldon
Total P 80-93	22,279	124,832	85,235	33,001
Total P 93-97	15,705	138,508	83,799	29,482
Total P 94-98	12,986	99,898	70,546	19,163
Total P 95-99	14,949	123,581	83,632	19,257
Total P 96-00	15,103	134,986	92,876	13,163
Total P 97-01	15,992	149,927	106,797	14,548
Total P 98-02	19,259	167,987	131,491	17,603
Total P 99-03	20,620	148,151	117,524	14,059
Total P 00-04	21,004	129,533	112,341	13,685
Total P 01-05	19,098	100,347	91,325	11,465
Total P 02-06	17,415	69,482	67,345	8,500
Total P 03-07	15,977	48,448	47,216	5,716
Total P 04-08	19,356	56,951	58,605	8,574
Total P 05-09	19,586	57,275	60,827	9,195
Total P 06-10	19,818	53,127	61,131	9,335
Total P 07-11	21,672	58,371	70,241	11,256

Values represent all available data, which is routinely collected and excludes targeted high flow events.

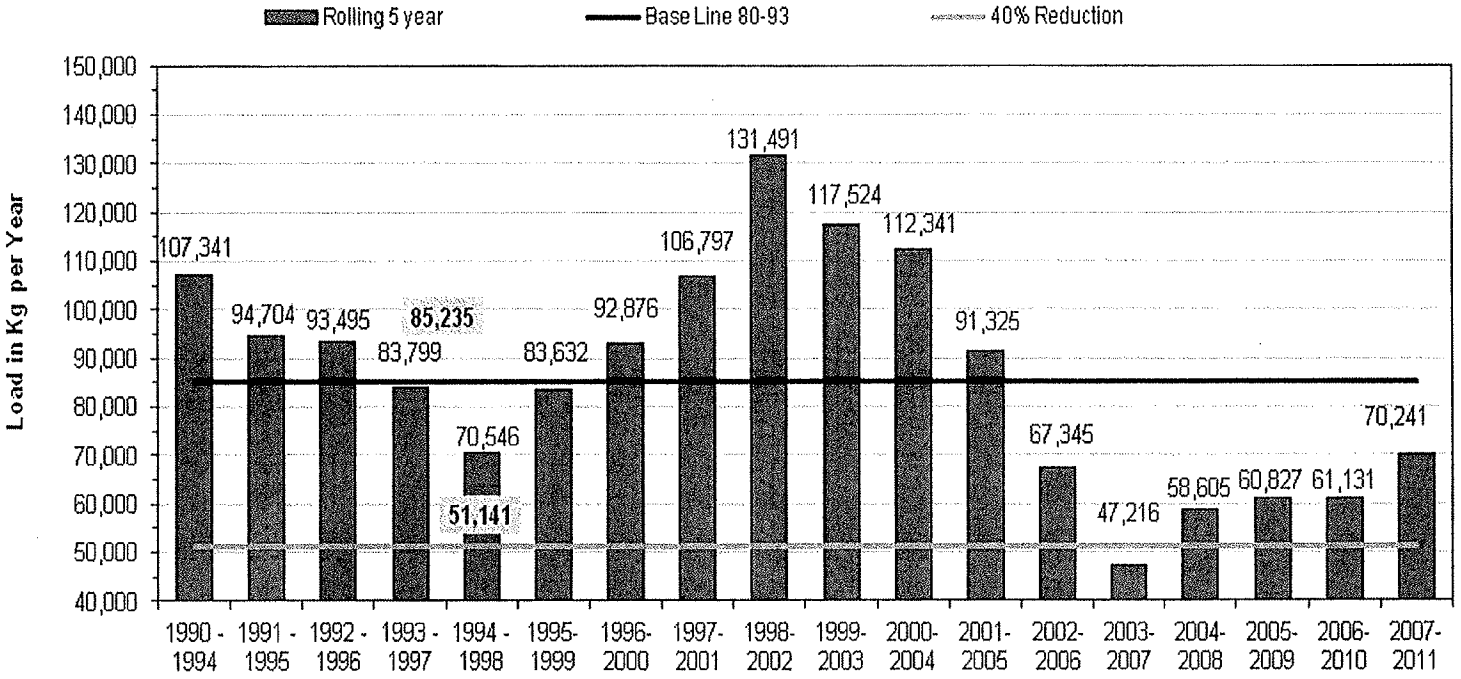
Flint Creek near Kansas (excluding targeted high flows)



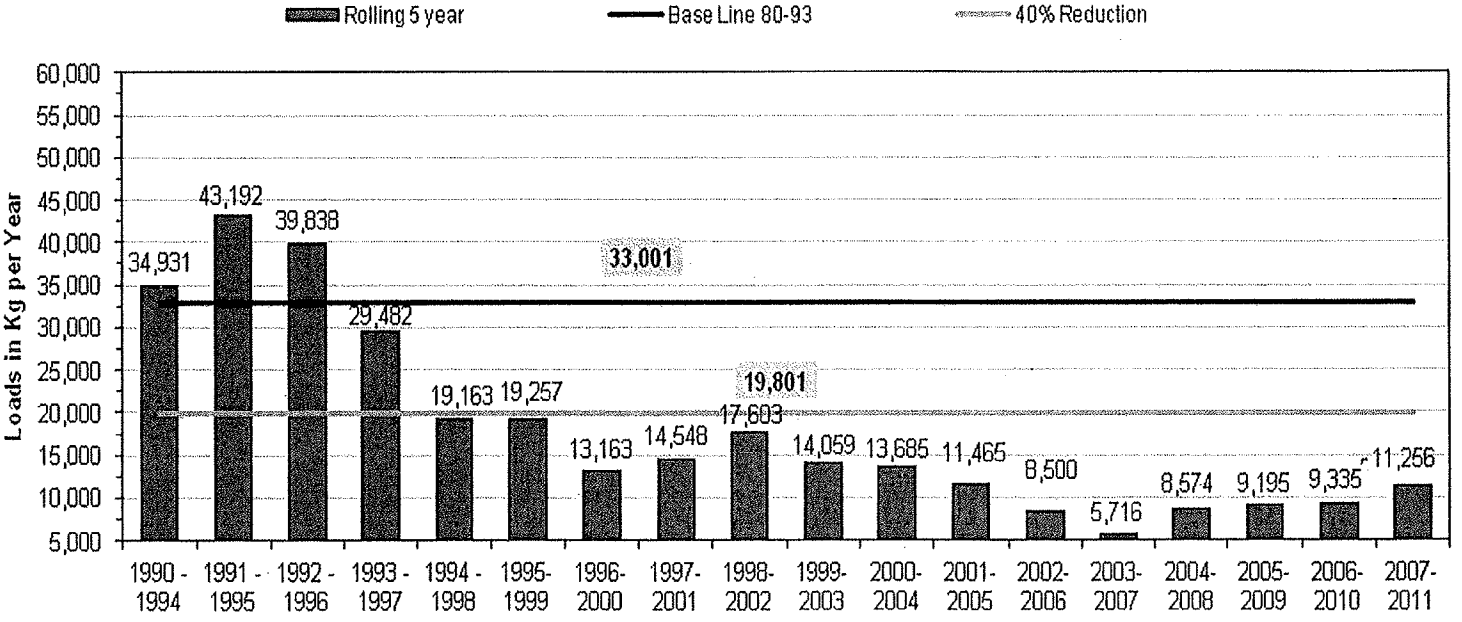
Illinois River near Watts (excluding targeted high flows)



Illinois River near Tahlequah (excluding targeted high flows)



Barren Fork at Eldon (excluding targeted high flows)



Illinois River near Watts			Loadings
Year	Flow (cfs)	Total P (mg/L)	Total P kg/year
1980	173	0.423	65,279
1981	260	0.190	44,119
1982	591		
1983	352		
1984	706		
1985	947		
1986	879		
1987	815		
1988	531		
1989	558	0.210	104,653
1990	1,127	0.181	182,432
1991	724	0.162	104,534
1992	760	0.161	109,571
1993	1,163	0.277	287,317
1994	674	0.168	101,127
1995	783	0.143	100,233
1996	693	0.188	116,542
1997	573	0.163	83,415
1998	713	0.138	87,876
1999	793	0.250	177,057
2000	648	0.309	178,827
2001	649	0.346	200,549
2002	619	0.316	174,694
2003	347	0.155	48,035
2004	688	0.104	63,903
2005	459	0.106	43,453
2006	349	0.116	36,156
2007	464	0.106	43,926
2008	1177	0.068	71,480
2009	915	0.069	56,386
2010	587	0.057	29,882
2011	1101	0.081	79,648
Average	682	0.179	109,293

Illinois River Near Tahlequah			Loadings
Year	Flow (cfs)	Total P (mg/L)	Total P kg/year
1980	249		
1981	384		
1982	812		
1983	537		
1984	1,157		
1985	1,651		
1986	1,452		
1987	1,218		
1988	820		
1989	808		
1990	1,695	0.098	147,579
1991	1,094	0.079	76,796
1992	1,207	0.080	86,205
1993	1,751	0.099	154,647
1994	1,071	0.084	80,223
1995	1,123	0.080	80,229
1996	938	0.085	71,207
1997	812	0.069	49,797
1998	1,044	0.081	75,524
1999	1,143	0.121	123,518
2000	1,083	0.136	131,543
2001	1,033	0.158	145,766
2002	851	0.211	160,366
2003	478	0.100	42,690
2004	1,157	0.075	77,499
2005	712	0.060	38,148
2006	426	0.074	28,154
2007	736	0.066	43,383
2008	1,839	0.062	101,829
2009	1,407	0.072	90,475
2010	820	0.050	36,617
2011	1,541	0.058	79,813
Average	1,033	0.091	83,706

NOTES : Flow & Water quality data provided by USGS Oklahoma District

* WQ data from 1999 to the present also includes data routinely collected by the OWRB

ᵏ Values represent data that is routinely collected and excludes targeted high flow events.

Flint Creek Near Kansas			Loadings
Year	Flow (cfs)	Total P (mg/L)	Total P kg/year
1980	32	0.189	5,454
1981	57	0.178	9,077
1982	69	0.186	11,537
1983	49	0.284	12,415
1984	143	0.240	30,532
1985	237	0.224	47,591
1986	183	0.223	36,430
1987	141	0.157	19,840
1988	97	0.265	22,946
1989	90	0.557	44,981
1990		0.114	
1991		0.120	
1992		0.118	
1993	182	0.156	25,359
1994	136	0.127	15,418
1995	140	0.185	23,207
1996	76	0.152	10,294
1997	94.8	0.117	9,871
1998	96.5	0.127	10,945
1999	137	0.186	22,758
2000	133	0.178	21,143
2001	101	0.164	14,793
2002	82	0.310	22,703
2003	49.8	0.316	14,055
2004	149.0	0.165	21,957
2005	91.8	0.168	13,774
2006	36.8	0.226	7,428
2007	70.3	0.240	15,068
2008	218.0	0.157	30,567
2009	141.6	0.187	23,649
2010	91.7	0.171	14,004
2011	137.8	0.152	18,707
Average	113	0.198	19,917

Baron Fork at Eldon			Loadings
Year	Flow (cfs)	Total Phos. (mg/L)	Total P kg/year
1980	77		
1981	201		
1982	296		
1983	184		
1984	364		
1985	593		
1986	536		
1987	491		
1988	269		
1989	320		
1990	666		
1991	451	0.060	24,145
1992	440	0.095	37,315
1993	700	0.108	67,234
1994	328	0.037	10,878
1995	422	0.263	98,819
1996	432	0.025	9,645
1997	332	0.023	6,671
1998	409	0.033	12,054
1999	361	0.048	15,476
2000	376	0.043	14,440
2001	343	0.064	19,605
2002	262	0.088	20,591
2003	145	0.025	3,237
2004	403	0.029	10,438
2005	228	0.027	5,498
2006	169	0.027	4,075
2007	254	0.026	5,898
2008	559	0.045	22,466
2009	460	0.033	13,557
2010	225	0.027	5,426
2011	471	0.028	11,783
Average	368	0.055	18,026

*1999 TP was modified to include less than detect values (1/2 LTD, n=5)

*2002 TP was modified to include less than detect values (1/2 LTD, n=2)

NOTES : Flow & Water quality data provided by USGS Oklahoma District

* WQ data from 1999 to the present also includes data routinely collected by the OWRB

* Values represent data that is routinely collected and excludes targeted high flow events.

Five-Year Average Values by Station

Illinois River at Watts				
Year	Pt (mg/l)	Flow (cfs)	Pt (kg/yr)	% Decrease
80-93	0.204	685	124,832	0.0%
90-94	0.198	890	157,569	-26.2%
91-95	0.201	821	147,520	-18.2%
92-96	0.210	815	153,006	-22.6%
93-97	0.200	777	138,508	-11.0%
94-98	0.162	687	99,241	20.5%
95-99	0.195	711	123,581	1.0%
96-00	0.221	684	134,986	-8.1%
97-01	0.249	675	149,927	-20.1%
98-02	0.275	684	167,987	-34.6%
99-03	0.271	611	148,151	-18.7%
00-04	0.246	590	129,533	-3.8%
2001-2005	0.203	552	100,347	19.6%
2002-2006	0.158	492	69,482	44.3%
2003-2007	0.118	461	48,448	61.2%
2004-2008	0.102	627	56,951	54.4%
2005-2009	0.095	673	57,272	54.1%
2006-2010	0.085	698	53,127	57.4%
2007-2011	0.077	849	58,371	53.2%

Flint Creek near Kansas				
Year	Pt (mg/l)	Flow (cfs)	Pt (kg/yr)	% Decrease
80-93	0.214	117	22,279	0.0%
90-94	0.132	159	18,758	15.8%
91-95	0.142	153	19,386	13.0%
92-96	0.146	134	17,369	22.0%
93-97	0.140	126	15,705	29.5%
94-98	0.133	109	12,986	41.7%
95-99	0.154	109	14,949	32.9%
96-00	0.157	107	15,103	32.2%
97-01	0.159	112	15,992	28.2%
98-02	0.196	110	19,259	13.6%
99-03	0.230	101	20,620	7.4%
00-04	0.228	103	21,004	5.7%
2001-2005	0.226	95	19,098	14.3%
2002-2006	0.238	82	17,415	21.8%
2003-2007	0.225	80	15,977	28.3%
2004-2008	0.191	113	19,356	13.1%
2005-2009	0.196	112	19,586	12.1%
2006-2010	0.199	112	19,818	11.0%
2007-2011	0.184	132	21,672	2.7%

Illinois River near Tahlequah				
Year	Pt (mg/l)	Flow (cfs)	Pt (kg/yr)	% Decrease
80-93	0.090	1060	85,235	0.0%
90-94	0.088	1364	107,341	-25.9%
91-95	0.085	1249	94,704	-11.1%
92-96	0.086	1218	93,495	-9.7%
93-97	0.082	1139	83,799	1.7%
94-98	0.079	998	70,546	17.2%
95-99	0.093	1012	83,632	1.9%
96-00	0.104	1004	92,876	-9.0%
97-01	0.117	1023	106,797	-25.3%
98-02	0.143	1031	131,491	-54.3%
99-03	0.143	918	117,524	-37.9%
00-04	0.137	920	112,341	-31.8%
2001-2005	0.121	846	91,323	-7.1%
2002-2006	0.104	725	67,345	21.0%
2003-2007	0.075	702	47,216	44.6%
2004-2008	0.067	974	58,605	31.2%
2005-2009	0.067	1024	60,827	28.6%
2006-2010	0.065	1046	61,131	28.3%
2007-2011	0.062	12169	70,241	17.6%

Barren Fork at Eldon				
Year	Pt (mg/l)	Flow (cfs)	Pt (kg/yr)	% Decrease
80-93	0.093	399	33,001	0.0%
90-94	0.076	517	34,931	-5.8%
91-95	0.103	468	43,192	-30.9%
92-96	0.096	464	39,838	-20.7%
93-97	0.075	443	29,482	10.7%
94-98	0.056	384	19,163	41.9%
95-99	0.055	391	19,257	41.6%
96-00	0.039	382	13,163	60.1%
97-01	0.045	364	14,548	55.9%
98-02	0.056	350	17,603	46.7%
99-03	0.053	297	14,059	57.4%
00-04	0.050	306	13,865	58.0%
2001-2005	0.046	276	11,465	65.3%
2002-2006	0.039	241	8,500	74.2%
2003-2007	0.027	24	5,716	82.7%
2004-2008	0.030	323	8,574	74.0%
2005-2009	0.031	334	9,197	72.1%
2006-2010	0.031	333	9,335	71.7%
2007-2011	0.032	394	11,256	65.9%

RECLAMATION

Managing Water in the West

Reclamation Fiscal Year 2011 Accomplishments Report and Current Activities

Planning and Construction Assistance Programs

Oklahoma-Texas Area Office

U.S. Department of the Interior
Bureau of Reclamation
Great Plains Region

September 2012

Mission Statements

The mission of the *Department of the Interior* is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the *Bureau of Reclamation* is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

TABLE OF CONTENTS

Introduction

The Bureau of Reclamation (Reclamation) is a Department of the Interior agency with a primary mission designated to manage, develop, and protect water and related resources in an environmentally and economically sound manner within the 17 western states. The Oklahoma-Texas Area Office (OTAO) is responsible for administering 11 reservoir projects and associated water distribution systems in southern Kansas, Oklahoma, and Texas. The combined water delivery is more than 680,000 acre-feet of Municipal and Industrial (M&I) annually to approximately three million customers, and which also provide fish and wildlife, recreation, and flood control benefits. The area supports two Irrigation Districts, one in Oklahoma and one in Texas.

Reclamation works in conjunction with other federal and state agencies, Indian tribes, and local entities in performing these responsibilities. Significant areas of activity include providing oversight of operations and maintenance of existing facilities and water resources planning along with construction assistance.

The purpose of this activity report is to provide a summary of current and recently completed activities under the planning and construction assistance programs.

Planning Investigations Program

Two projects that were initiated in previous Fiscal Years (FY) were completed in FY 11:

- Oklahoma Comprehensive Water Plan Special Study, OK.
- Arbuckle-Simpson Aquifer Hydrology Special Study, OK.

Three projects that were initiated in previous FY were still ongoing in FY 12:

- South-Central Regional Assessment Special Study, OK.
- Fort Cobb Water Supply/Demand Special Study, OK.
- Innovative Water Technologies, TX.
- An Evaluation of Emergency Water Supplies as a Drought Response, TX.

Native American Affairs Program

Six projects that were initiated in previous FY were recently completed in FY 11:

- Cherokee Nation - Technical Assistance in Water Planning, OK
- Alabama Quassarte Tribal Town - Needs Assessment, OK
- Cherokee Nation Water System Infrastructure Study, OK
- Kickapoo Tribe of Oklahoma - Rural Water System, OK
- Chickasaw Nation - Beneficial use of Fracking Water, OK
- Seminole Nation Needs Assessment update - Mekusukey Mission, OK
- South Central Tribes - Sampling techniques and introductory GIS training, OK

Five projects that were initiated in previous FY were still ongoing in FY 12:

- Caddo Nation Rush Springs Aquifer Study, OK
- Caddo Nation Groundwater/Surface water interaction Rush Springs Aquifer, OK
- Delaware Nation - Water Supply Alternatives, OK

- Kickapoo Tribe of Oklahoma - Defining the extent of radionuclides and Trace Metals in Domestic Well water, OK
- Pawnee Nation - Chloride Concentration Investigation , OK

Three projects were initiated in FY 12, totaling $182,000 in Federal funds:

- Muscogee Creek Nation - Infrastructure Needs Assessment ($75,000)
- Citizen Potawatomi Nation - Data Gap Analysis for Tribal Water Plan ($26,000)
- Kickapoo Tribe of Oklahoma - Data Gap Analysis for Development of a Water Plan ($81,000)

Rural Water Supply Program

The City of Sulphur, OK was awarded $190,098 in FY 11 to complete an appraisal investigation on surface water supply alternatives to convey water from Lake of the Arbuckles to the City of Sulphur to alleviate a projected water supply deficit and long-term pumping on the Arbuckle-Simpson Aquifer. The study is being conducted by Reclamation and is expected to be completed by December 31, 2012.

Water Conservation Field Services (WCFS) Program

Water Conservation Plans

Three WCPs were completed in FY 11:

- Fort Cobb Reservoir Master Conservancy District, Fort Cobb Division, Washita Basin Project, Oklahoma
- McGee Creek Authority, McGee Creek Project, Oklahoma
- Lugert-Altus Irrigation District, W. C. Austin Project, Oklahoma

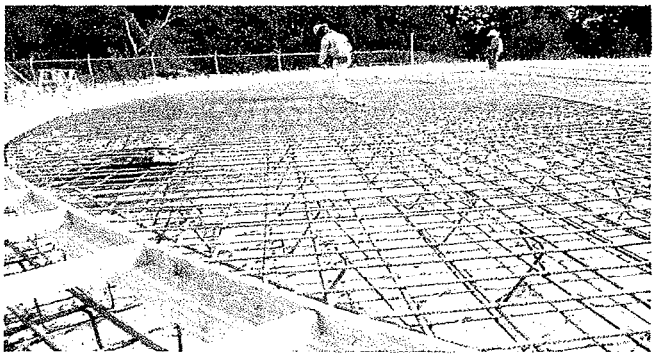
WCFS Grants

- One project was completed in FY 11: Tom Green County Water Control and Improvement District No. 1. San Angelo Project, Texas for Water Management and Conservation Plan Development and Implementation.
- Three projects were initiated in FY 11, totaling $347,911 in Federal funds:
    - Lugert-Altus Irrigation District, W. C. Austin Project, Oklahoma ($201,911): replacement and automation of main canal gates, improvements to the water accounting system, and future evaluation of additional water conservation methods and improvements.
    - Mountain Park Master Conservancy District, Mountain Park Project, Oklahoma ($100,000): automation and improvements of pumping plant equipment.
    - Fort Cobb Reservoir Master Conservancy District ($46,000): improvement of water delivery and efficiency.
- A funding opportunity announcement for FY 12 recently closed on April 4, 2012. Reclamation is currently reviewing proposals and anticipates announcement of funding awards by June, 2012.

WaterSMART Program

Title XVI Program

- Completed a feasibility plan of study in FY 11 on the Dallas Trinity River Recycled Water Project. The feasibility study is estimated to cost about $2 million. Reclamation is currently awaiting a decision from Dallas Water Utilities on whether it would like to proceed with the study.
- The City of Round Rock, Texas continued construction activities of Phase I of its water recycling project, including construction of treatment, storage, and pumping facilities at the Brushy Creek Wastewater Treatment Plant, along with installation of approximately 2.0 miles of pipeline to provide up to 2,500 acre-feet per year (af/yr) of reclaimed water to various customers in the City.



The foundation of a new clearwell that will be used to store treated wastewater effluent.

- Reclamation approved a Title XVI feasibility study for the San Antonio Water System, TX in FY 11 on a 25 mgd brackish groundwater desalination facility.
- Two FY 11 WaterSMART Title XVI feasibility study grants were awarded in OTAO, totaling $216,445:
    - Central Oklahoma Master Conservancy District, OK ($150,000): study evaluating using Lake Thunderbird to regulate effluent from the City of Norman, OK.
    - City of Kyle, TX ($66,145): study evaluating the market and infrastructure needs to convey treated effluent to customers for irrigation.

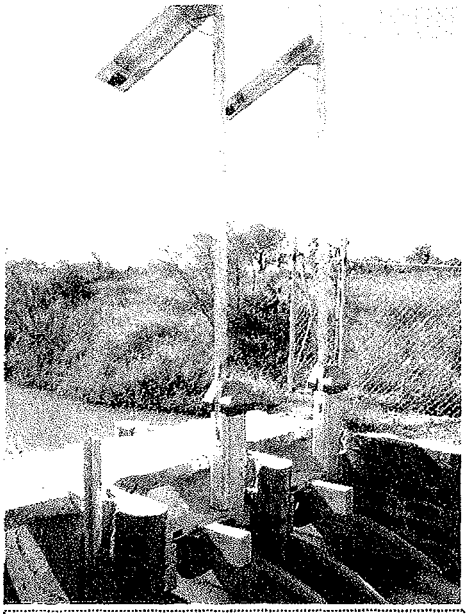
Basin Study Program

- A basin study on the Lower Rio Grande River was initiated and awarded $198,948 in FY 11 funds (matched by $213,850 in non-Federal Funds). The study will be conducted in partnership with the Rio Grande Regional Water Authority (RGRWA) and its 53 member entities. The expected completion date is December, 2014.
- A basin study on the Upper Washita Basin in Oklahoma was recently awarded $250,000 in FY 12 Federal funds to partner with the Oklahoma Water Resources Board and Fort Cobb and Foss Reservoir Master Conservancy Districts to identify sustainable solutions to infrastructure issues and existing and projected imbalances between water supply and demand. The study is estimated to cost $700,000 to complete.

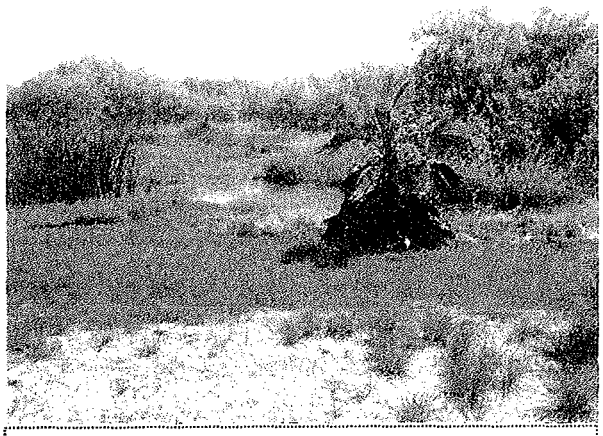
WaterSMART Grants

- Seven new projects were awarded in OTAO, totaling $2,069,505 in FY 11 funds.

No.	Recipient	Scope	Award Date (FY)	Federal Share ($)	Total Cost ($)	Water Saved (ac-ft/yr)	Energy Saved (kwh/yr)
1	Adams Garden ID, TX	Natural gas and wind powered pumps	2011	300,000	600,000	590	7,433
2	Edwards Aquifer Authority, TX	Replacement of plumbing fixtures, graywater and rainwater collection systems	2011	300,000	757,000	692	790,000
3	Hidalgo County ID #2, TX	Installation of flume gates and solar powered SCADA	2011	300,000	544,973	320	25,000
4	Hidalgo County ID #2, TX	Automated gates/solar powered SCADA	2011	300,000	1,319,594	895	128,000
5	Delta Lake ID, TX	Conversion of open canal to pipeline	2011	296,446	599,532	343	13,000
6	Hidalgo County ID #3, TX	Conversion of mortar joint to PVC pipe	2011	286,794	573,589	244	7,800
7	Cameron County ID #2, TX	Conversion of open canal to pipeline	2011	286,265	577,030	171	6,655
8	Hidalgo County ID #6, TX	Canal lining and rehabilitation	2010	300,000	653,525	905	164,428
9	Laguna Madre Water District, TX	Direct, nonpotable water reuse	2010	300,000	2,014,265	336	19,827
10	Lower Colorado River Authority, TX	Gulf Coast Irrigation Division gate rehabilitation	2010	256,296	557,166	2,560	132,368
11	Brownsville ID, TX	Conveyance system improvements	2010	300,000	678,026	160	5,248
12	Harlingen Water Works, TX	Direct, nonpotable water reuse	2010	142,425	284,251	1,120	0
13	Harlingen Irrigation District, TX	System Optimization Review - measuring past water conservation improvements to prioritize future projects.	2010	73,022	150,887	n/a	n/a
14	University of Texas at Austin	Climate analysis on drought in the High Plains Ogallala Aquifer	2010	199,999	399,999	n/a	n/a
15	Oklahoma Water Resources Board, OK	Climate analysis on water resources planning	2010	84,647	174,293	n/a	n/a
Total				**3,725,894**	**9,884,130**	**8,336**	**1,299,759**



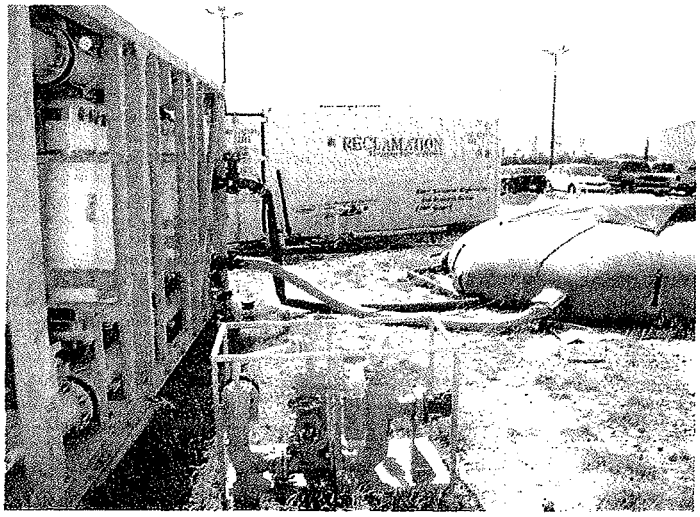
Rubicon gate and telemetry system, Cameron County Irrigation District No. 2



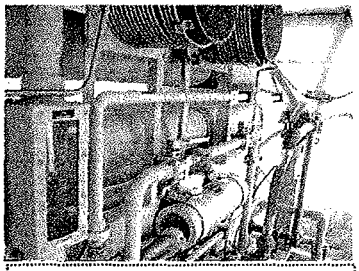
Wetland to be augmented with reclaimed water, Harlingen Water Works

Science and Technology Program

- Reclamation completed a FY 10 study titled, "*Methodology to Evaluate the Influence of Joint Changes in Climate and Land Cover on Water Availability*".
- Reclamation awarded $130,000 to continue pilot testing of the variable salinity project. This study aims to apply concepts being developed at Singapore PUB's state-of-the-art Variable Salinity Plant towards development of the first flexible desalination system in the U.S. along the Gulf Coast of Texas. Initial phases of this study were completed in FY 10 and FY 11, which included an evaluation of the composition of potential source waters; identification of piloting system features to treat various feed waters with the most flexibility and efficiency; and actual pilot testing of brackish groundwater at the Southmost Regional Desalination Plant. The next phase in FY 12 will pilot test seawater at South Padre Island.



Expeditionary Unit Water Purifier System used by Reclamation to pilot test treatment of variable saline water sources



Energy recovery device used to more efficiently treat seawater

- Reclamation was awarded $89,500 in FY 11 to initiate a new study titled, "*An Analysis of Nanofiltration Treatment Applications on Recycled and Potable Water Supplies*". The study will compare the cost-benefits of nanofiltration and reverse osmosis in treating potable and reclaimed water supplies for use in the production of thermoelectric power and commercial cooling applications.
- Reclamation was awarded $60,000 in FY 12 to initiate a study on an innovative wetlands treatment design to treat organic compounds and emerging contaminants in reclaimed wastewater.

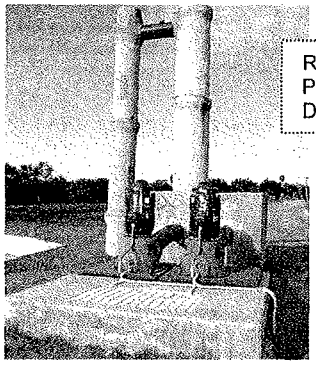
Drought Program

- The Texas Water Development Board (TWDB) was recently awarded $40,000 in FY 12 funding for drought contingency planning under Title II of the Reclamation States Emergency Drought Relief Act. This funding will be used by Reclamation to collaborate with TWDB on the development of screening criteria to select a representative sample of communities affected by the drought for an evaluation of potentially feasible emergency water supply options.

Special Authorizations

Lower Rio Grande Valley Water Conservation and Improvement Program

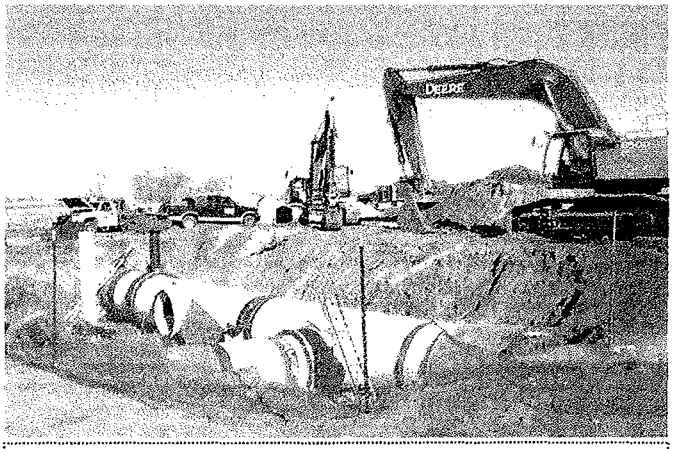
- Congress appropriated $50,000 in FY 11. OTAO made an additional $319,000 available for payments. Twelve projects have executed cost-share agreements, nine of which are complete and under operation. The remaining three projects are still under construction. At the end of FY 11, $23 million has been requested by the Districts and $19 million has been paid.



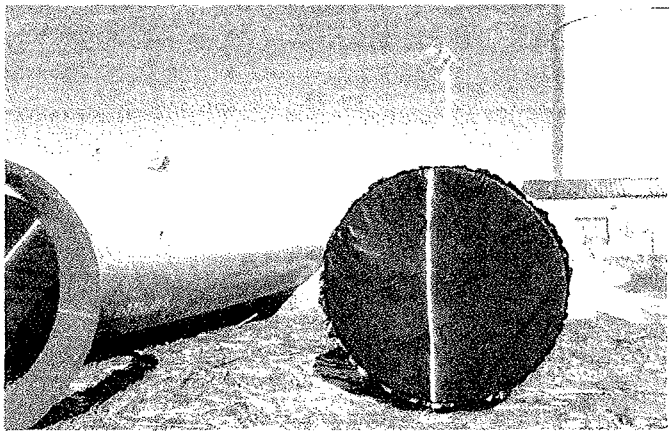
Rehabilitation of the Shary 3rd Pump station, United Irrigation District

Equus Beds Aquifer Storage and Recovery (ASR) Program

- Congress appropriated $50,000 in FY 11. The City of Wichita continues to construct Phase IIb of the project. At the end of FY 11, approximately $20 million had been requested, and $4.1 million had been paid to the City. The current unpaid reimbursement requests total approximately $20.7 million.



Pipeline tie-in to surge tank, Equus Beds ASR Project.



New 48 inch steel, polyurethane coated pipe laid out in preparation for installation. Recharge Surge Tank in background, Equus Beds ASR Project

Summary of Programs and Funding Opportunities

All Reclamation program Funding Opportunity Announcements (FOA) for Grants or Cooperative Agreements to utilize Reclamation funding are posted on the Grants.gov website: http://www.grants.gov/

The following is a list of specific weblinks for each of the Reclamation programs mentioned above:

Native American Affairs Program: http://www.usbr.gov/native/

Rural Water Supply Program: http://www.usbr.gov/ruralwater/

Water Conservation Field Services Program: http://www.usbr.gov/waterconservation/

WaterSMART Program: http://www.usbr.gov/WaterSMART/

WaterSMART Program - Title XVI: http://www.usbr.gov/WaterSMART/title/index.html

WaterSMART Program – Basin Studies: http://www.usbr.gov/WaterSMART/bsp/

Science and Technology Program: http://www.usbr.gov/research/science-and-tech/

Drought Program: http://www.usbr.gov/drought/

Contact Information

Collins K. Balcombe
Supervisory Program Coordinator
Bureau of Reclamation
Oklahoma-Texas Area Office
5316 Hwy 290 West, Ste 110
Austin, TX. 78735
Work: 512-899-4162; 899-4179 (fax)
Cell: 512-922-0525

RECLAMATION
Managing Water in the West

WaterSMART Basin Study Program

Through the WaterSMART Basin Study Program, the Bureau of Reclamation partners with basin stakeholders on a 50/50 cost-share basis to conduct comprehensive studies to define options for meeting future water demands in targeted river basins in the West where imbalances in supply and demand exist or are projected. Each basin study will include the basic four components:

1. Projections of water supply and demand within the basin, or improvements on existing projections, taking into consideration the impacts of climate change;
2. Analysis of how existing water and power infrastructure and operations will perform in the face of changing water realities such as population increases and climate change
3. Development of structural and nonstructural options to improve operations and infrastructure to supply adequate water in the future; and
4. A trade-off analysis of the options identified and findings and recommendations as appropriate. Such analysis simply examines all proposed alternatives in terms of their relative cost, environmental impact, risk, stakeholder response, or other attributes common to the alternatives. The analysis can be either quantitative or qualitative in measurement.

Who is eligible to participate in the Basin Study Program? States, tribes, water districts, cities, and other local governmental entities with water delivery or management authority are eligible non-Federal cost-share partners.

What is the funding cap? There is no Federal funding cap, but the cost-share amount is usually limited to $1 million.

When are funding opportunities available? Funding opportunities usually come out in the fall of each year.

How are projects selected for funding?

- Step 1 – ***Letters of Interest***: Once a funding announcement is made, non-federal entities must submit a letter of interest to Reclamation that is no longer than 3 pages that describes the study scope, objectives and needs, cost-share potential, and stakeholder involvement.
- Step 2 – ***Study Proposal***: If selected, Reclamation will invite participants to develop a short proposal that will be scored and ranked based on established criteria such as:
    - The extent and consequences of existing or anticipated imbalances in water supply and demand.
    - The extent to which Federal involvement is needed due to the nature and complexity of the issues involved.
    - The existence and quality of data and models available and applicable to the proposed study.
    - The strength of any nexus between the Basin Study and a Reclamation project or activity.
    - The level of Stakeholders interest in and support for the Basin Study.
    - Whether the non-federal cost-share contribution exceeds the required 50 percent.

How long do Basin Studies take to complete? Reclamation requires Basin Studies to be completed within two years, with some exceptions.

Contact: ***Oklahoma-Texas Area Office:*** Collins Balcombe, Program Manager, 512-899-4162, cbalcombe@usbr.gov, or you can visit http://www.usbr.gov/WaterSMART/bsp.

USGS Streamgaging and Water-Quality Monitoring Activities in the Arkansas and Oklahoma Arkansas River Compact Commission Watersheds in Arkansas

STATION ID	STATION NAME	STREAMGAGE	FREQUENCY SAMPLED / YR	CONSTITUENTS MEASURED	COOPERATOR
07250550	Arkansas River at L & D 13	X	6	Nutrients / majors / bacteria / sediment / chlorophyll	ANRC / USGS
07195000	Osage Creek near Elm Springs, AR	X	6	Nutrients / majors / bacteria / sediment	ANRC / USGS
07194800	Illinois River at Savoy, AR	X	6	Nutrients / majors / bacteria / sediment	ANRC / USGS
07247000	Poteau River at Cauthron, AR	X	6	Nutrients / majors / bacteria / sediment	ANRC / USGS
07195430	Illinois River at Hwy 59 South of Siloam Spgs, AR	X	6	Nutrients / majors / bacteria / sediment	ANRC / USGS
07196900	Baron Fork at Dutch Mills, AR	X	6	Nutrients / majors / bacteria / sediment	ANRC / USGS
07249400	James Fork near Hackett, AR	X	6	Nutrients / majors / bacteria / sediment	ANRC / USGS
07249985	Lee Creek near Short, OK	X	6	Nutrients / majors / bacteria / sediment / chlorophyll	ANRC / USGS
07194880	Osage Creek near Cave Springs, AR	X	Events Only	Continuous WQ Monitor Temp / Sp Conc / Turb ISCO installed (3 Events sampled + EWI)	Rogers Water Utilities
07195855	Flint Creek near West Siloam Springs, OK	X	6	Nutrients / Turb / Sediment	Sampled by USGS OK
07194906	Spring Creek at Sanders Ave at Springdale, AR	X	4 + 2 Events	ISCO Installed Nutrients / Sediment	City of Springdale
07194933	Spring Creek at Hwy 112 nr Springdale, AR	X	4 + 2 Events	ISCO Installed Nutrients / Sediment	City of Springdale
07194809	Niokaska Creek at Township St at Fayetteville, AR	X	N/A	Flow	City of Fayetteville
07195400	Illinois River at Hwy. 16 near Siloam Springs AR	X	N/A	Flow	USGS (NSIP)
07195800	Flint Creek at Springtown, AR	X	N/A	Flow	ANRC / ADEQ / USGS

USGS
science for a changing world

U.S. GEOLOGICAL SURVEY SUMMARY SHEET
ARKANSAS Water Science Center
OKLAHOMA Water Science Center

ANNUAL ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT COMMISSION MEETING

Embassy Suites Rogers, Arkansas
September 27, 2012

	PEAK DISCHARGE (ft^3/s) MAXIMUM	WY 11	AVERAGE DISCHARGE (ft^3/s) PERIOD OF RECORD	WY 11
ARKANSAS RIVER BASIN				
07165570 ARKANSAS RIVER NR HASKELL, OK	259,000 10-5-86	30,000 4-25-11	10,644 39 YRS	1,695
07176000 VERDRIGRIS R NR CLAREMORE, OK	182,000 5-21-43	11,400 4-26-11	*4,716 47 YRS	1,218
07178200 BIRD CREEK AT ST HWY 266 NR CATOOSA, OK	27,400 5-11-93	9,530 4-25-11	1,000 23 YRS	299
07193000 FT GIBSON LK NR FT GIBSON , OK	#223,000 5-26-57	73,925 5-28-11	**8,403 39 YRS	+7,138
07194500 ARKANSAS RIVER NR MUSKOGEE, OK	700,000 5-21-43	95,200 5-28-11	##19,520 45 YRS	++10,570
07245000 CANADIAN R NR WHITEFIELD, OK	281,000 5-10-43	20,200 5-12-11	*6,370 44 YRS	2,267
07250550 ARKANSAS RIVER AT J W TRIMBLE L&D NR VAN BUREN, AR	850,000 5-12-43	232,000 4-26-2011	*39,312 42 YRS	19,360

[e] Estimated discharge.

07193500, Neosho River blw Ft. Gibson Lake.

Average discharge for water years 1926-70.

* Average discharge since regulation by upstream lake(s).

** Average discharge thru 1989, 07193500, Neosho River blw Ft. Gibson Lake (discontinued).

+ Estimated from Corps of Engineers' records for current year.

++Determined by acoustic velocity meter gaging equipment installed July 2003.

Discharges for 1970-2003 estimated by combining 07165571, 07176000, 07178200, 07193000.

USGS
science for a changing world

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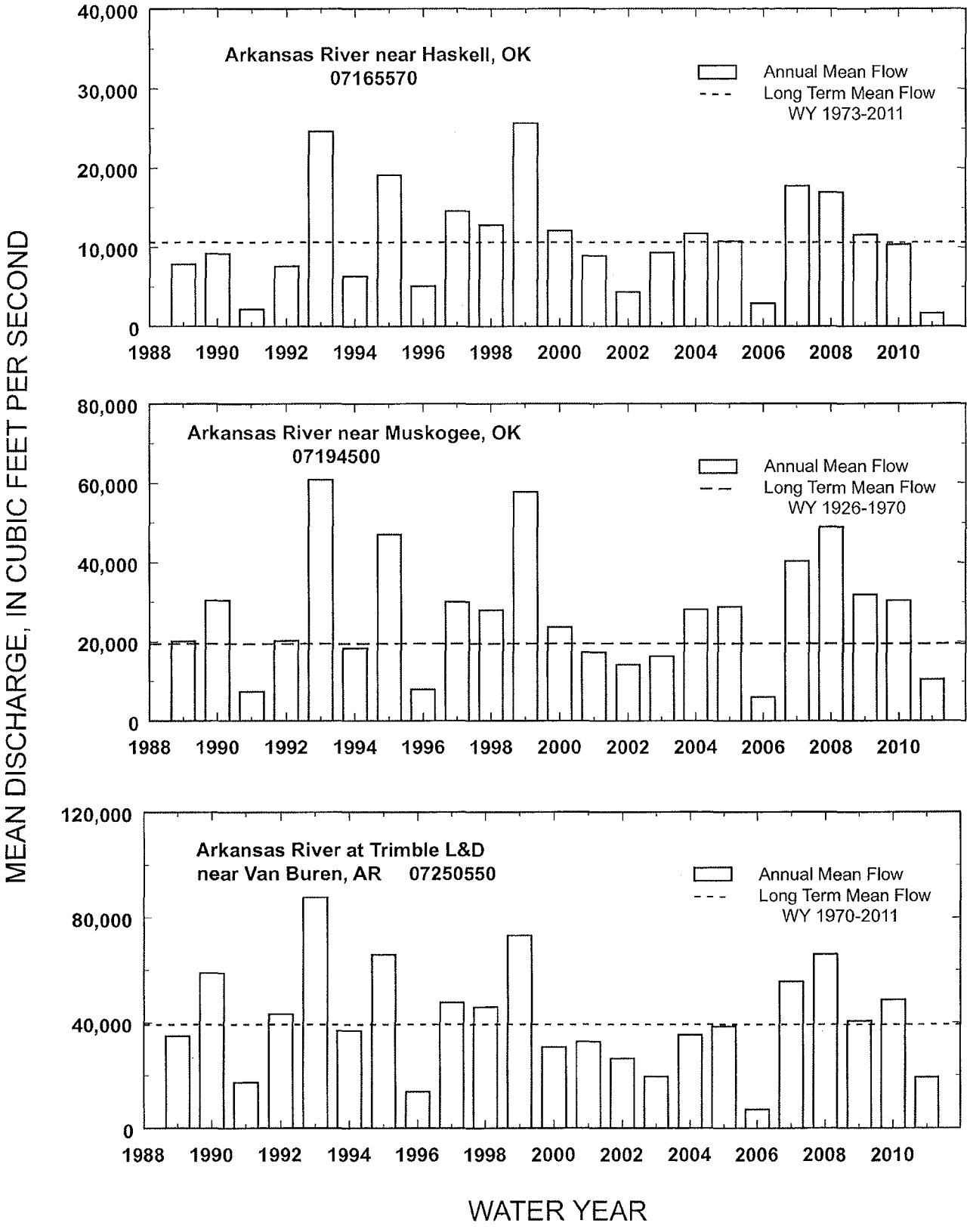
	PEAK DISCHARGE (ft^3/s) MAXIMUM	WY 11	AVERAGE DISCHARGE (ft^3/s) PERIOD OF RECORD	WY 11
SPAVINAW CREEK SUBBASIN				
07191220 SPAVINAW CREEK NR SYCAMORE,OK	39,800 7-27-75	9,920 4-25-11	114 50 YRS	128
ILLINOIS RIVER SUBBASIN				
07195500 ILLINOIS RIVER NR WATTS, OK	97,400 4-26-11	97,400 4-26-11	642 56 YRS	993
07195855 FLINT CK NR WEST SILOAM SPRINGS, OK	15,900 4-25-11	15,900 4-25-11	48.1 32 YRS	62.6
07196900 BARREN FORK AT DUTCH MILLS, AR	20,900 11-18-85	19,300 4-25-11	45.8 53 YRS	56.3
LEE CREEK SUBBASIN				
07249985 * LEE CREEK NR SHORT, OK	82,400 4-24-04	70,100 4-26-11	552 66 YRS	726
POTEAU RIVER SUBBASIN				
07247000 POTEAU RIVER AT CAUTHRON, AR	32,200 5-20-60	9,620 4-25-11	**244 37 YRS	145
07249400 JAMES FORK NR HACKETT, AR	30,000 5-14-68	11,500 4-25-11	147 53 YRS	98.6

* Formerly published as 07250000 Lee Creek nr Van Buren, AR.

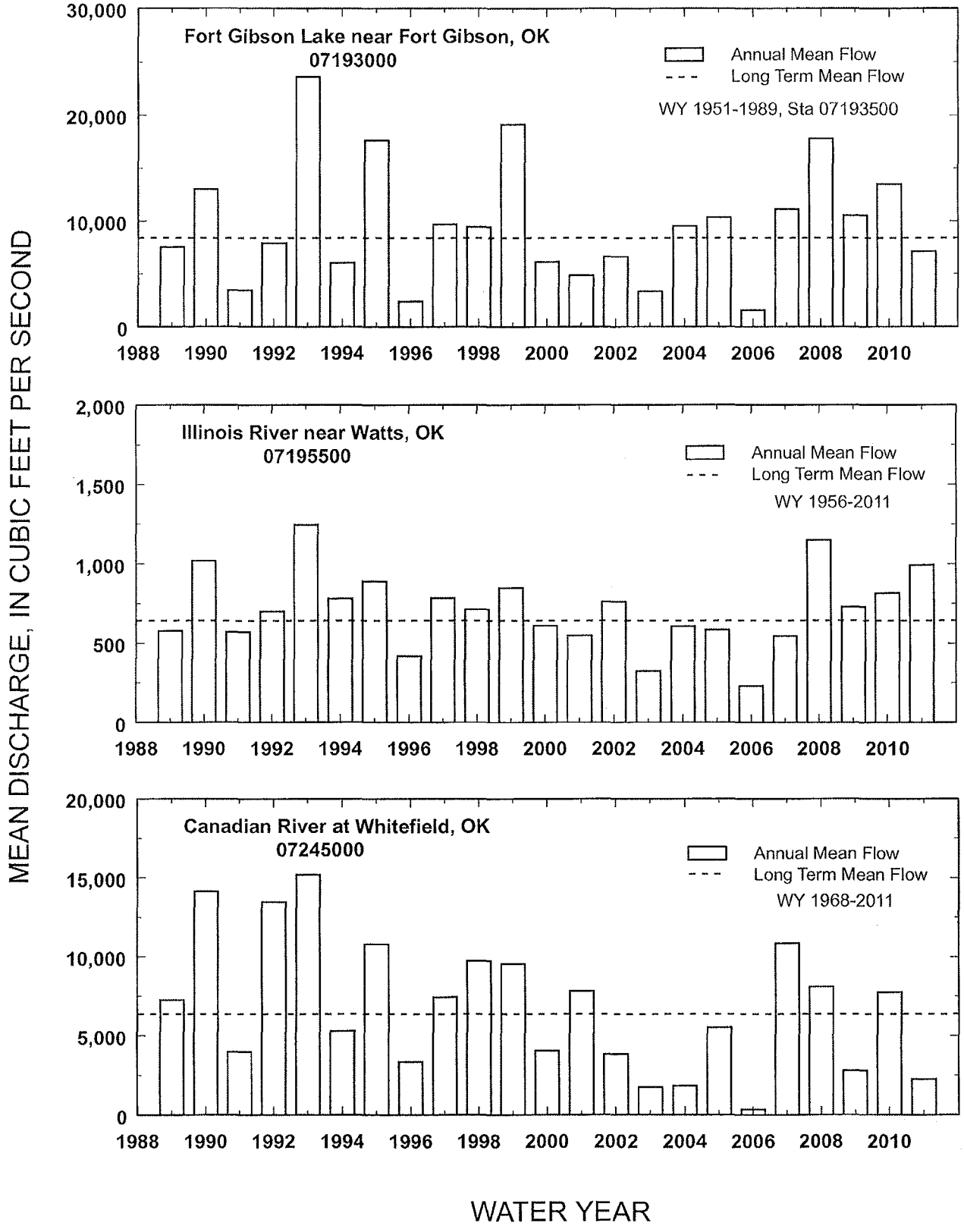
** Average discharge since regulation by upstream lake(s).

ARKANSAS RIVER BASIN TRENDS IN STEAMFLOW



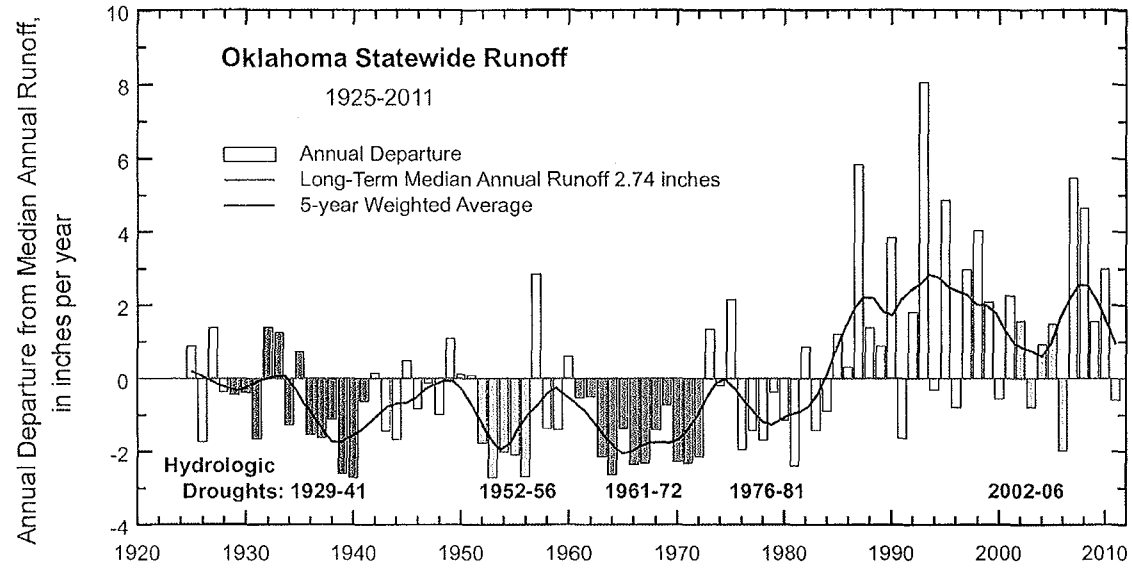
Prepared by US Geological Survey

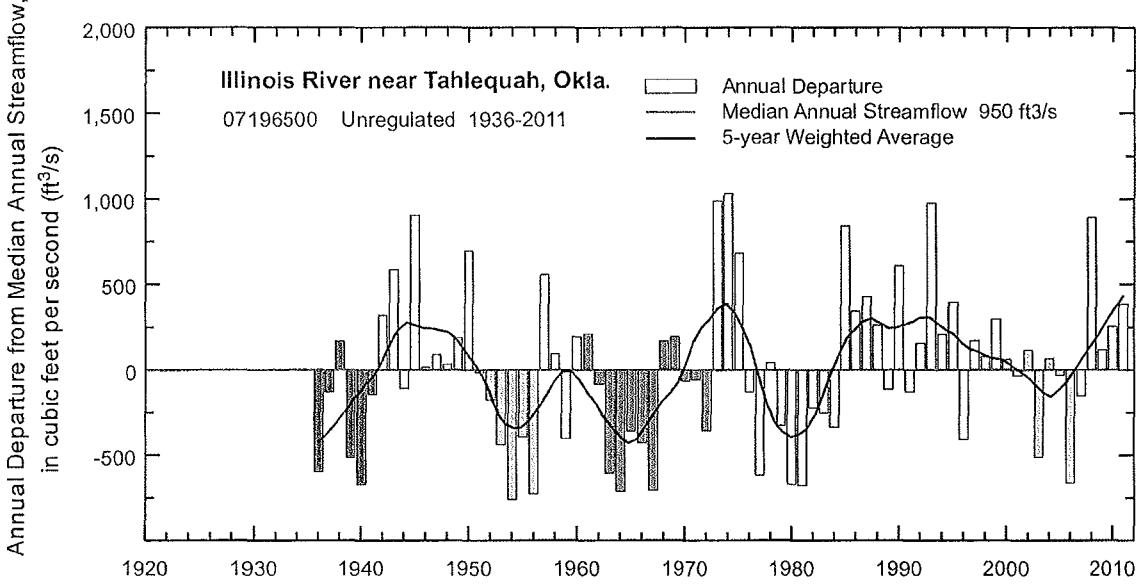
ARKANSAS RIVER BASIN TRENDS IN STEAMFLOW

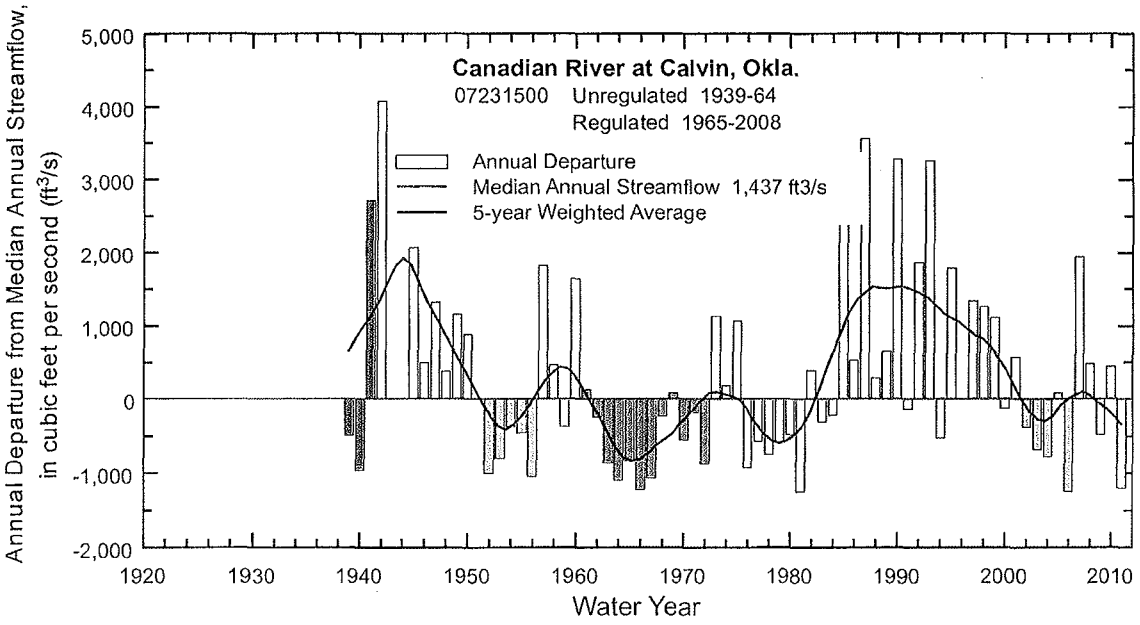


Prepared by US Geological Survey

LONG-TERM RED RIVER BASIN TRENDS IN STREAMFLOW







ARKANSAS - OKLAHOMA ARKANSAS RIVER COMPACT

1972

ARKANSAS RIVER BASIN COMPACT

ARKANSAS-OKLAHOMA, 1972

Approved

by the

ARKANSAS RIVER COMPACT COMMITTEE

FOR ARKANSAS:

S. Keith Jackson
Committee Member

John Luce
Committee Member
(alternate)

FOR OKLAHOMA:

Glade R. Kirkpatrick
Committee Member

Milton Craig
Committee Member
(alternate)

FOR UNITED STATES OF AMERICA:

Trigg Twichell
Federal Representative and Chairman of Committee

Attest:

Willard B. Mills
Secretary

March 16, 1970
Revised March 3, 1972

PREFACE

In 1955, the Congress of the United States by Public Law 97, 84th Congress, 1st Session, granted consent to the States of Arkansas and Oklahoma to negotiate and enter into a Compact for the apportionment of the waters of the Arkansas River and its tributaries between the two States. With this authorization and the appointment of a Federal Representative to act as Chairman, the States created the Arkansas-Oklahoma Arkansas River Compact Committee on March 14, 1956, for the purpose of drafting a proposed Compact for the apportionment of the waters of the Arkansas River and its tributaries as they affect those States.

From the beginning the Committee was deliberate in its operations. Two important subcommittees: engineering and legal, were appointed early for the purpose of assembling, analyzing, and interpreting essential engineering and legal data needed by the Compact Committee.

The engineering subcommittee made hydrologic studies which were utilized in determining that portion of the Arkansas River Basin that should be covered by the interstate Compact, analyzed the quantity, quality, and mode of occurrence of the water resources of the area in question and made long-range estimates of the quantities of water that would be needed by the States in future years, recognizing existing water rights and water uses.

The legal committee researched existing Interstate Water Compacts and continuously advised the Compact Committee on legal matters that related to Compact negotiations.

The work of these subcommittees and their reports were invaluable to the Compact committee in reaching its unanimous agreement of the proposed Compact.

The Federal Representative employed a consulting engineer in the field of interstate compacts, and received legal counsel from the U.S. Department of Justice on matters that were of concern to the Federal agencies.

The Arkansas River Compact Committee approved its first formal interstate Compact draft March 16, 1970.

The State of Arkansas ratified this Compact draft through its Act No. 16, 1971, as passed by the Arkansas General Assembly and signed by Governor Dale Bumpers, January 26, 1971.

The State of Oklahoma ratified the interstate Compact draft through H. B. No. 1326, as passed by the Oklahoma Legislature and signed by Governor David Hall, April 24, 1971. This ratification, however, carried the following amendment:

> "SECTION 2. This ratification is subject to the State of Oklahoma and the State of Arkansas, acting through their duly authorized compact representatives, amending said 'Arkansas River Basin Compact' in the particulars as set forth hereinafter, and further, that ratification of said amendment of said compact by the Legislature of the State of Arkansas. Said amendment being expressed as follows:
>
> "The following language shall be added to Article VI, Section A of said compact, to-wit: 'Provided however that nothing contained in this compact or its ratification by Arkansas or Oklahoma shall be interpreted as granting either State or the parties hereto the right or power of eminent domain in any manner whatsoever outside the borders of its own state.'"

The Arkansas River Compact Committee unanimously approved the Oklahoma amendment as an appropriate clarification statement in the Compact. The Federal member of the Committee was formally advised that the Federal agencies had no objections to this amendment.

The State of Arkansas adopted the State of Oklahoma's amendment to the Arkansas River Compact draft through Act No. 40, as passed by the Arkansas General Assembly and signed by Governor Dale Bumpers, February 17, 1972.

The Arkansas River Basin Compact, Arkansas-Oklahoma, 1972, as revised March 3, 1972, contains the amendment as approved by both States and corrections of typographical errors found in the March 16, 1970 draft.

ARKANSAS RIVER BASIN COMPACT
ARKANSAS-OKLAHOMA, 1972

with
SUPPLEMENTAL INTERPRETIVE COMMENTS
Prepared by the Compact Committee

Compact

The State of Arkansas and the State of Oklahoma, acting through their duly authorized Compact representatives, S. Keith Jackson of Arkansas and Glade R. Kirkpatrick of Oklahoma, after negotiations participated in by Trigg Twichell, appointed by the President as the representative of the United States of America, pursuant to and in accordance with the consent to such negotations granted by an Act of Congress of the United States of America (Public Law 97, 84th Congress, 1st session), approved June 28, 1955, have agreed as follows respecting the waters of the Arkansas River and its tributaries:

Comment

On November 25, 1969, the authorized representatives of the States of Arkansas and Oklahoma approved the language of a draft of a Compact relating to the apportionment of the waters of the Arkansas River Basin originating in the two States between Muskogee, Oklahoma, and Van Buren, Arkansas; including Spavinaw Creek, a tributary to the Grand River upstream from Muskogee; and except the Canadian River above Eufaula Dam, a tributary to the Arkansas River between Muskogee and Van Buren.

The Compact is the result of negotiations between the parties over a period of years. The Compact Committee had the cooperation and advice of all interested Federal agencies, including the counsel of representatives of the United States Department of Justice. Its activities were supported by the water resources agencies of the States. In addition, extensive studies were conducted for the benefit of the Committee by the engineering departments of the University of Arkansas and Oklahoma State University under the federal Water Resources Research program.

These interpretive comments on the approved draft of November 25, 1969, have been prepared so that members of the respective legislatures, congressional committees, Federal agencies, and subsequent Compact administrators might be fully appraised of the intent of the Compact negotiating Committee with regard to each Article of the Compact.

ARTICLE I

Compact

The major purposes of this Compact are:

A. To promote interstate comity between the States of Arkansas and Oklahoma;

B. To provide for an equitable apportionment of the waters of the Arkansas River between the States of Arkansas and Oklahoma and to promote the orderly development thereof;

C. To provide an agency for administering the water apportionment agreed to herein;

D. To encourage the maintenance of an active pollution abatement program in each of the two States and to seek the further reduction of both natural and man-made pollution in the waters of the Arkansas River Basin; and

E. To facilitate the cooperation of the water administration agencies of the States of Arkansas and Oklahoma in the total development and management of the water resources of the Arkansas River Basin.

Comment

Article I is self-explanatory.

ARTICLE II

Compact

As used in this Compact:

A. The term "State" means either State signatory hereto and shall be construed to include any person or

persons, entity or agency of either State who, by reason of official responsibility or by designation of the Governor of that State, is acting as an official representative of that State.

B. The term "Arkansas-Oklahoma Arkansas River Compact Commission," or the term "Commission" means the agency created by this Compact for the administration thereof.

C. The term "Arkansas River Basin" means all of the drainage basin of the Arkansas River and its tributaries from a point immediately below the confluence of the Grand-Neosho River with the Arkansas River near Muskogee, Oklahoma, to a point immediately below the confluence of Lee Creek with the Arkansas River near Van Buren, Arkansas, together with the drainage basin of Spavinaw Creek in Arkansas, but excluding that portion of the drainage basin of the Canadian River above Eufaula Dam.

D. The term "Spavinaw Creek Sub-basin" means the drainage area of Spavinaw Creek in the State of Arkansas.

E. The term "Illinois River Sub-basin" means the drainage area of Illinois River in the State of Arkansas.

F. The term "Lee Creek Sub-basin" means the drainage area of Lee Creek in the State of Arkansas and the State of Oklahoma.

G. The term "Poteau River Sub-basin" means the drainage area of Poteau River in the State of Arkansas.

H. The term "Arkansas River Sub-basin" means all areas of the Arkansas River Basin except the four sub-basins described above.

I. The term "water year" means a twelve-month period beginning on October 1, and ending September 30.

J. The term "annual yield" means the computed annual gross runoff from any specified sub-basin which would have passed any certain point on a stream and would have originated within any specified area under natural conditions, without any man-made depletion or accretion during the water year.

K. The term "pollution" means contaimination or other alterations of the physical, chemical, biological or radiological properties of water or the discharge of any liquid, gaseous, or solid substances into any waters which creates, or is likely to result in a nuisance, or which renders or

is likely to render the waters into which it is discharged harmful, detrimental or injurious to public health, safety, or welfare, or which is harmful, detrimental or injurious to beneficial uses of the water.

Comment

This is the Article of specific definition of terms as they apply to this Compact.

Subsections A and B are self-explanatory.

Subsection C defines the "Arkansas River Basin" as it pertains to this Compact. (See figure 1). It isolates that portion of the overall Arkansas River drainage basin in which the States of Arkansas and Oklahoma are primarily and mutually concerned. All of the area above the gaging station on the main stem of the Arkansas River near Muskogee, Oklahoma, and the Eufaula Dam in the Canadian River except the Spavinaw Creek Basin in the State of Arkansas, has been excluded from consideration.

The intent of the Committee has been to deal with the water originating within the area delineated by this definition and no attempt has been made to define the rights, if any, of either State in waters originating outside the defined area which might flow into and through the area in the main stem of the Arkansas River or the Canadian River.

Waters of the Arkansas River Basin originating above Muskogee and Eufaula Dam have been allocated in part by Compacts between the States of Kansas and Oklahoma, and in the upper reaches of the basin between the States of Colorado and Kansas. The State of Arkansas was not a party to either of those Compacts, and the State of Oklahoma was not a party to the Colorado-Kansas Compact. Waters originating above

Eufaula Dam have been allocated in part by Compact between the States of New Mexico, Oklahoma and Texas; and the State of Arkansas was not a party to that Compact.

Both States recognize that storage has been constructed in the State of Oklahoma above Muskogee for the impounding and release of water to aid navigation in both the States of Oklahoma and Arkansas; and that such waters will in whole or in part flow through the Compact area. It is recognized also that power releases from reservoirs upstream of Muskogee will flow through the Compact area in the main stem of the Arkansas River, and may be subject to diversions and/or impoundment and use in either State. Flood control releases from upstream reservoirs will fall in the same category as power releases.

The drainage area in the State of Arkansas of Spavinaw Creek, a tributary of the Neosho River, has been included in this Compact area. The portion of Spavinaw Creek Basin lying in the State of Oklahoma was included in the physical delineation of the Grand-Neosho River Basin in the Kansas-Oklahoma Arkansas River Basin Compact. In the Kansas-Oklahoma Compact, Spavinaw Creek was excluded from the conservation storage limitation provisions which were the basis of that Compact.

The Spavinaw Creek Sub-basin has been included in this Compact, even though it is not directly tributary to the rest of the Compact area, because (1) the headwaters are in the State of Arkansas and the stream flows into the State of Oklahoma as is the case with all the other tributaries under consideration; (2) the rights of the State of Arkansas were not considered in the Kansas-Oklahoma Compact; and (3) the State of Oklahoma already has substantial development and interest in water supply of the stream.

The lower cutoff point of the Compact area has been placed immediately below the confluence of Lee Creek with the Arkansas River near Van Buren, Arkansas. Lee Creek is the farthest downstream tributary having headwaters in the State of Arkansas and flowing into the State of Oklahoma. It re-enters the State of Arkansas and flows into the Arkansas River in that State. There is interest in the Van Buren-Fort Smith area in Lee Creek as a source of municipal water supply.

Subsections D through H define the various sub-basins which, for purposes of this Compact, have been designated on Spavinaw Creek, Illinois River, Lee Creek and Poteau River, as well as for the Arkansas River main stem. These sub-basins differ from the sub-basins outlined in the Report of the Engineering Advisory Committee, dated January 1969, except for Lee Creek Sub-basin which remains consistent with the original report. It also differs from the Engineering Committee's original recommendations to the Compact Committee concerning the delineation of sub-basins. (See figure 1).

Subsection I is self-explanatory.

Subsection J defines "annual yield," which is a term basic to the allocations of this Compact. It refers to the runoff originating within any area and which would occur under unaltered natural conditions, i.e., where there would be no artificial man-made depletions of, or additions to, the original supply and no regulation of that supply.

The only time this could be measured absolutely would be before any facilities to utilize, import or impound water were constructed. After the first such facility is introduced, the measurement becomes something of an approximation relative to how accurately depletions can be computed

and their ratio to water yield. An excellent opportunity exists in this Compact area to establish relationship of "annual yield" and run-off at key points or with precipitation, or a combination of runoff and precipitation. This is true since depletions are small in relation to the average yield of this basin.

Subsection K is self-explanatory.

ARTICLE III

Compact

A. The physical and other conditions peculiar to the Arkansas River Basin constitute the basis of this Compact, and neither of the States hereby, nor the Congress of the United States by its consent hereto, concedes that this Compact establishes any general principle with respect to any other interstate stream.

B. By this Compact, neither State signatory hereto is relinquishing any interest or right it may have with respect to any waters flowing between them which do not originate in the Arkansas River Basin as defined by this Compact.

Comment

Subsection A confirms the principle that each Compact area has its own special problems and solutions thereto, and cannot provide per se the solutions for other compacting areas.

Subsection B is an affirmation of the principle of equitable apportionment between States of the water of interstate streams (Kansas v. Colorado, 206 U.S. 46; Colorado v. Kansas, 320 U.S. 383).

ARTICLE IV

Compact

The States of Arkansas and Oklahoma hereby agree upon the following apportionment of the waters of the Arkansas River Basin:

A. The State of Arkansas shall have the right to develop and use the waters of the Spavinaw Creek Sub-basin subject to the limitation that the annual yield shall not be depleted by more than fifty percent (50%).

B. The State of Arkansas shall have the right to develop and use the waters of the Illinois River Sub-basin subject to the limitation that the annual yield shall not be depleted by more than sixty percent (60%).

C. The State of Arkansas shall have the right to develop and use all waters originating within the Lee Creek Sub-basin in the State of Arkansas, or the equivalent thereof.

D. The State of Oklahoma shall have the right to develop and use all waters originating within the Lee Creek Sub-basin in the State of Oklahoma, or the equivalent thereof.

E. The State of Arkansas shall have the right to develop and use the waters of the Poteau River Sub-basin subject to the limitation that the annual yield shall not be depleted by more than sixty percent (60%).

F. The State of Oklahoma shall have the right to develop and use the waters of the Arkansas River Sub-basin subject to the limitation that the annual yield shall not be depleted by more than sixty percent (60%).

Comment

This Article apportions the available water resources of the Basin between the two States. Although large quantities of good quality water are available in the Basin, flows fluctuate widely, and provisions for storage will be essential to any substantial development of water use.

The record of Compact negotiations will show that early consideration was given to the possibility of writing a compact based on allocation of conservation storage. Near the end of negotiations and after careful deliberation and study, the consideration of conservation storage allocations was dropped and it was agreed to make allocations on the basis of percentages of annual yield.

It is realized that problems of deficient low flows presently exist and will no doubt continue in the future. Base flows of tributary streams in the Basin are generally low and most streams recede to no flow during dry periods. It is anticipated that future developments of storage facilities will provide for low flow augmentation but it is considered infeasible to specify minimum flows for any stream system. Release of flows from the system of major reservoirs presently constructed and planned for flood control, hydroelectric power and navigation should assure the maintenance of adequate flows throughout the main stem of the Arkansas River in the Compact area.

The percentages of annual flows apportioned between the States are based on the assumptions that the "upstream" State should generally have first call on available waters. Engineering studies have shown it is generally infeasible to develop over sixty percent (60%) of the long-term yield of any Basin in this area.

The division of water is on the basis that forty percent (40%) of the annual yield would be delivered from the upstream State. Exceptions to this have been made in the cases of Spavinaw and Lee Creek Basins.

The City of Tulsa has developed 96,000 acre-feet of conservation storage on lower Spavinaw Creek in the State of Oklahoma for municipal water supply. These reservoirs collect flows from 386 square miles, of which 120 square miles are in the State of Arkansas. In recognition of these existing developments, it was agreed to limit the State of Arkansas allocation to fifty percent (50%) of the annual yield from the area in that State.

The Lee Creek Basin roughly parallels the Arkansas-Oklahoma stateline. The drainage area is approximately sixty percent (60%) in the State of Arkansas and forty percent (40%) in the State of Oklahoma. The main stem rises in the State of Arkansas, but some small tributaries in the upper reaches rise in the State of Oklahoma and flow into the State of Arkansas. The main stem first crosses the Arkansas-Oklahoma stateline at mile 24.6, and then flows back into the State of Arkansas at mile 9.0, crossing and recrossing the stateline until entering the State of Arkansas for the last time at mile 7.6. This watershed is an excellent source of water for the Fort Smith metropolitan area, including nearby areas in the State of Oklahoma, and for which there is a large potential need for future water supplies. In order to permit the full development of this Basin, it was agreed that waters of this Basin be allocated on the basis of origin. This will permit either State to fully develop, use and consume a quantity of water equal to the total annual yield of the Lee Creek Basin in each State.

Each State recognizes that waters are now being transported from one basin to another and that these transbasin diversions could increase in the future. It is also recognized that such transbasin diversion of water is a charge against the apportionment to the respective States.

ARTICLE V

Compact

A. On or before December 31 of each year, following the effective date of this Compact, the Commission shall determine the stateline yields of the Arkansas River Basin for the previous water year.

B. Any depletion of annual yield in excess of that allowed by the provisions of this Compact shall, subject to the control of the Commission, be delivered to the downstream State, and said delivery shall consist of not less than sixty percent (60%) of the current runoff of the basin.

C. Methods for determining the annual yield of each of the sub-basins shall be those developed and approved by the Commission.

Comments

Subsection A provides for the computation of "annual yield" before the end of the calendar year, while the computation itself is based on data available for the water year ending September 30 of that same calendar year. This means that necessary hydrologic data (such as stream flow, water quality, precipitation, etc.) will be required in less than three months after the end of the water year.

Subsection B provides for adjustment of annual depletions so that a depletion in excess of the allocation to either State during the previous water year shall be delivered (restored to the downstream State) as soon as practicable consistent with proper water management.

It is anticipated that each State should control its water management so that consumptive-use depletions will not exceed its allocation. Excess stream-flow depletions, which would be a withholding of water by any means (consumptive uses or storage) could possibly occur in low yield years, but could be made up in subsequent periods of high runoff.

No provisions are made in this Compact for credits for over-deliveries nor for continuing debits for under-deliveries. As a practical manner the water resources of the area are of such a magnitude, and the physical conditions limiting storage facilities are such that complete utilization of the allocated quantities might never be reached.

The allocations are of such magnitude in relation to these factors that the States essentially will be unrestricted in the control and use of the water resources of the Compact area. The Compact does, however, protect against the possibility of either State encroaching upon the rights of the other at some future time when maximum utilization could be approached. (There is a distinct possibility in this area that such a condition might never occur). Or, in a period of extreme drought, it would provide an equitable distribution of a limited water supply.

Subsection C is intended as a directive for determining annual yield. Appendix I attached to these comments outlines procedures for this purpose. Present depletions are small in relation to the original yield and an opportunity exists to establish correlations of yield at agreed-to points in both States. As developments occur in the future, it may be necessary to refine procedures and make arrangements for the collection of additional basic data. It is anticipated that a technical advisory group will be available to the Commission and will develop adequate procedures and make recommendations for the collection of necessary basic data as required for the proper administration of the Compact.

ARTICLE VI

Compact

A. Each State may construct, own and operate for its needs water storage reservoirs in the other State; provided, however, that nothing contained in this Compact or its ratification by Arkansas or Oklahoma shall be interpreted as granting either State or the parties hereto the right or power of eminent domain in any manner whatsoever outside the borders of its own State.

B. Depletion in annual yield of any sub-basin of the Arkansas River Basin caused by the operation of any water storage reservoir either heretofore or hereafter constructed by the United States or any of its agencies, instrumentalities or wards, or by a State, political sub-division thereof, or any person or persons shall be charged against the State in which the yield therefrom is utilized.

C. Each State shall have the free and unrestricted right to utilize the natural channel of any stream within the Arkansas River Basin for conveyance through the other State of waters released from any water storage reservoir for an intended downstream point of diversion or use without loss of ownership of such waters; provided, however, that a reduction shall be made in the amount of water which can be withdrawn at point of removal, equal to the transmission losses.

Comment

This Article recognizes the possibilities of special problems arising and sets forth general provisions for handling some of these problems.

In Subsection A, the Committee recognizes that storage capacity may be constructed by one State in the other and that the Compact creates no bar to such construction. Each State, either individually or the two States jointly, may construct, own and operate for their needs water storage reservoirs in either State.

Subsection B makes it quite clear that depletions resulting from storage constructed at any point in the Basin by the United States, the States or individuals shall be charged against the State in which the benefits of the depletion are realized. Although the Compact is silent as to what part the Commission might take in the event that storage is constructed in one State for the benefit of the other State, it is the view of the Committee that such matters would be worked out at State level so long as the provisions of the Compact are complied with.

Subsection C allows either State to use the channel as a conveyor to transport water from a structure in one State to a point in the other State where it can be used. The only restriction is that a carriage or transmission loss will be charged against the State utilizing the natural channel in the other State. The amount of such transmission loss will be determined by the Compact Commission whenever the need arises.

ARTICLE VII

Compact

The States of Arkansas and Oklahoma mutually agree to:

A. The principle of individual State effort to abate man-made pollution within each State's respective borders, and the continuing support of both States in an active pollution abatement program;

B. The cooperation of the appropriate State agencies in the States of Arkansas and Oklahoma to investigate and abate sources of alleged interstate pollution within the Arkansas River Basin;

C. Enter into joint programs for the identification and control of sources of pollution of the waters of the Arkansas River and its tributaries which are of interstate significance;

D. The principle that neither State may require the other to provide water for the purpose of water quality control as a substitute for adequate waste treatment;

E. Utilize the provisions of all Federal and State water pollution laws and to recognize such water quality standards as may be now or hereafter established under the Federal Water Pollution Control Act in the resolution of any pollution problems affecting the waters of the Arkansas River Basin.

Comment

The States recognize that there is no serious interstate pollution problem in the Basin at present; and that the States are obligated to maintain adequate water quality in the Arkansas River Basin through

whatever means is available to them. An important provision is that neither State may require the other to provide water for the purpose of water quality control as a substitute for adequate waste treatment.

Through active pollution abatement programs the States hope to avoid the conflict over future problems, but have provided that, if necessary, they may utilize the provisions of the Federal Water Pollution Control Act in cases which cannot be resolved within the provisions of the Compact.

ARTICLE VIII

Compact

A. There is hereby created an interstate administrative agency to be known as the "Arkansas-Oklahoma Arkansas River Compact Commission." The Commission shall be composed of three Commissioners representing the State of Arkansas and three Commissioners representing the State of Oklahoma, selected as provided below; and, if designated by the President or an authorized Federal agency, one Commissioner representing the United States. The President, or the Federal agency authorized to make such appointments, is hereby requested to designate a Commissioner and an alternate representing the United States. The Federal Commissioner, if one be designated, shall be the Chairman and presiding officer of the Commission, but shall not have the right to vote in any of the deliberations of the Commission.

B. One Arkansas Commissioner shall be the Director of the Arkansas Soil and Water Conservation Commission, or such other agency as may be hereafter responsible for administering water law in the State. The other two Commissioners shall reside in the Arkansas River drainage area in the State of Arkansas and shall be appointed by the Governor, by and with the advice and consent of the Senate, to four-year staggered terms with the first two Commissioners being appointed simultaneously to terms of two (2) and four (4) years, respectively.

C. One Oklahoma Commissioner shall be the Director of the Oklahoma Water Resources Board, or such other agency as may be hereafter responsible for administering water law in the State. The other two Commissioners shall reside within the Arkansas River drainage area in the State of Oklahoma and shall be appointed by the Governor, by and with the advice and consent of the Senate, to four-year staggered terms, with the first two Commissioners being appointed simultaneously to terms of two (2) and four (4) years, respectively.

D. A majority of the Commissioners of each State and the Commissioner or his alternate representing the United States, if they are so designated, must be present to constitute a quorum. In taking any Commission action, each signatory State shall have a single vote representing the majority opinion of the Commissioners of that State.

E. In the case of a tie vote on any of the Commission's determinations, orders, or other actions, a majority of the Commissioners of either State may, upon written request to the Chairman, submit the question to arbitration. Arbitration shall not be compulsory, but on the event of arbitration, there shall be three arbitrators:

(1) One named by resolution duly adopted by the Arkansas Soil and Water Conservation Commission, or such other State agency as may be hereafter responsible for administering water law in the State of Arkansas; and

(2) One named by resolution duly adopted by the Oklahoma Water Resources Board, or such other State agency as may be hereafter responsible for administering water law in the State of Oklahoma; and

(3) The third chosen by the two arbitrators who are selected as provided above.

If the arbitrators fail to select a third within sixty (60) days following their selection, then he shall be chosen by the Chairman of the Commission.

F. The salaries and personal expenses of each Commissioner shall be paid by the Government which he represents. All other expenses which are incurred by the Commission incident to the administration of this Compact shall be borne equally by the two States and shall be paid by the

Commission out of the "Arkansas-Oklahoma Arkansas River Compact Fund," initiated and maintained as provided in Article IX(B)(5) below. The States hereby mutually agree to appropriate sums sufficient to cover its share of the expenses incurred in the administration of this Compact, to be paid into said fund. Disbursements shall be made from said fund in such manner as may be authorized by the Commission. Such funds shall not be subject to the audit and accounting procedures of the States; however, all receipts and disbursements of funds handled by the Commission shall be audited by a qualified independent public accountant at regular intervals, and the report of such audit shall be included in and become a part of the annual report of the Commission, provided by Article IX(B)(6) below. The Commission shall not pledge the credit of either State and shall not incur any obligations prior to the availability of funds adequate to meet the same.

Comment

This Article creates the administrative agency which will administer the terms of this Compact after it becomes effective through ratification by the States and approval by the Congress. The provisions are similar to those adopted in a number of other interstate stream compacts.

The Article provides for three members for each of the signatory States as Commission members and staggers the terms of those members in order to insure some degree of continuity in its membership.

Subsection D defines a quorum and provides that each State shall have only one vote which represents the majority decision of each State in conducting the business affairs of the Commission.

Subsection E sets forth arbitration procedures for the Commission in the event of a tie vote on important matters. Arbitration is not to be compulsory but is provided in the event that some matter of extreme concern to one of the States requires such action.

Subsection F sets forth the procedure for paying the salaries and expenses of the Commissioners and costs incurred by the Commission in the administration of the Compact. This subsection together with Article IX(B)(5) creates a Compact fund which is essential to flexibility of operation. It also provides for auditing procedures and the report of such audit.

ARTICLE IX

Compact

A. The Commission shall have the power to:

(1) Employ such engineering, legal, clerical and other personnel as in its judgment may be necessary for the performance of its functions under this Compact;

(2) Enter into contracts with appropriate State or Federal agencies for the collection, correlation, and presentation of factual data, for the maintenance of records and for the preparation of reports;

(3) Establish and maintain an office for the conduct of its affairs;

(4) Adopt and procure a seal for its official use;

(5) Adopt rules and regulations governing its operations. The procedures employed for the administration of this Compact shall not be subject to any Administrative Procedures Act of either State, but shall be subject to the provisions hereof and to the rules and regulations of the Commission; provided, however, all rules and regulations of the Commission shall be filed with the Secretary of State of the signatory States;

(6) Cooperate with Federal and State agencies and political subdivisions of the signatory States in developing principles, consistent with the provisions of this Compact and with Federal and State policy, for the storage and release of

water from reservoirs, both existing and future within the Arkansas River Basin, for the purpose of assuring their operation in the best interests of the States and the United States;

(7) Hold hearings and compel the attendance of witnesses for the purpose of taking testimony and receiving other appropriate and proper evidence and issuing such appropriate orders as it deems necessary for the proper administration of this Compact, which orders shall be enforceable upon the request by the Commission or any other interested party in any court of competent jurisdiction within the county wherein the subject matter to which the order relates is in existence, subject to the right of review through the appellate courts of the State of situs. Any hearing held for the promulgation and issuance of orders shall be in the county and State of the subject matter of said hearing;

(8) Make and file official certified copies of any of its findings, recommendations or reports with such officers or agencies of either State, or the United States, as may have any interest in or jurisdiction over the subject matter. Findings of fact made by the Commission shall be admissible in evidence and shall constitute prima facie evidence of such fact in any court or before any agency of competent jurisdiction. The making of findings, recommendations, or reports by the Commission shall not be a condition precedent to instituting or maintaining any action or proceeding of any kind by a signatory State in any court, or before any tribunal, agency or officer, for the protection of any right under this Compact or for the enforcement of any of its provisions;

(9) Secure from the head of any department or agency of the Federal or State government such information, suggestions, estimates and statistics as it may need or believe to be useful for carrying out its functions and as may be available to or procurable by the department or agency to which the request is addressed;

(10) Print or otherwise reproduce and distribute all of its proceedings and reports; and

(11) Accept, for the purposes of this Compact, any and all private donations and gifts and Federal grants of money.

B. The Commission shall:

(1) Cause to be established, maintained and operated such stream, reservoir or other gaging stations as may be necessary for the proper administration of this Compact;

(2) Collect, analyze and report on data as to stream flows, water quality, annual yields and such other information as is necessary for the proper administration of this Compact;

(3) Continue research for developing methods of determining total basin yields;

(4) Perform all other functions required of it by the Compact and do all things necessary, proper or convenient in the performance of its duties thereunder;

(5) Establish and maintain the "Arkansas-Oklahoma Arkansas River Compact Fund," consisting of any and all funds received by the Commission under the authority of this Compact and deposited in one or more banks qualifying for the deposit of public funds of the signatory States;

(6) Prepare and submit an annual report to the Governor of each signatory State and to the President of the United States covering the activities of the Commission for the preceding fiscal year, together with an accounting of all funds received and expended by it in the conduct of its work;

(7) Prepare and submit to the Governor of each of the States of Arkansas and Oklahoma an annual budget covering the anticipated expenses of the Commission for the following fiscal year; and

(8) Make available to the Governor or any State agency of either State or to any authorized representative of the United States, upon request, any information within its possession.

Comment

Article IX sets forth the powers and duties of the administrative Commission. It provides the Commission with the necessary latitude and flexibility for carrying out the provisions and purposes of the Compact.

Subsection A enumerates the powers of the Commission while Subsection B sets out certain specific duties of the Commission. Other duties not specifically stated in Subsection B are implied in the inherent powers granted in Subsection A.

Subsection A(2) enables the Commission to obtain data which is important to the Commission's work and findings. Most of the data useful to the Commission will be gathered by other agencies. However, there could be times when necessary engineering or other data is not gathered by any other agency, and it might be desirable for the Commission to collect the data.

Subsection A(6) gives the Commission the power to cooperate directly and closely with Federal agencies in its administrative activities as they relate to interstate phases of project operation. This subsection deals with all types of storage and release of water whether it is under Federal or State control. Essentially it gives the Commission the power to manage the water resources of the Basin in the best possible manner.

In Subsection A(9) "secure" means that the Commission may obtain information, of whatever nature, by request or purchase if necessary, and is not intended to infer that the Commission will have the power to obtain such information by adverse means from any agency or such information as any agency is prevented by law from releasing. It is not the intent of the subsection that the Commission shall compete with other data collecting agencies of either State or Federal government, but rather that the Commission will utilize these available sources to the extent possible. It is necessary this Commission be given authority to do such work when it is not able to obtain needed information from other agencies due to budget or personnel limitations.

Subsections B(6) and (7) provide for annual reports and annual budgets to be submitted to the respective Governors of the signatory States and to the President of the United States, but sets no date for the submission of these reports. Therefore, it is incumbent upon the Compact Commission to set such a date in the rules and regulations of the Commission. This provides some flexibility in the preparation of the annual report permitting the date to be changed if and when it should become necessary.

All other subsections are self-explanatory.

ARTICLE X

Compact

A. The provisions hereof shall remain in full force and effect until changed or amended by unanimous action of the States acting through their Commissioners and until such changes are ratified by the legislatures of the respective States and consented to by the Congress of the United States in the same manner as this Compact is required to be ratified to become effective.

B. This Compact may be terminated at any time by the appropriate action of the legislature of both signatory States.

C. In the event of amendment or termination of the Compact, all rights established under the Compact shall continue unimpaired.

Comment

This Article affirms the rather obvious fact that no action can be taken to modify the provisions of the Compact without unanimous action of the States and until the changes are ratified by the legislatures and the Congress. It also recognizes the right to terminate by the appropriate action of the States, and the protection of vested rights in the case of such an event.

ARTICLE XI

Compact

Nothing in this Compact shall be deemed:

A. To impair or affect the powers, rights or obligations of the United States, or those claiming under its authority in, over and to the waters of the Arkansas River Basin;

B. To interfere with or impair the right or power of either signatory State to regulate within its boundaries the appropriation, use and control of waters within that State not inconsistent with its obligations under this Compact.

Comment

This Article is a general declaration whereby the States disclaim any intention of impairing or affecting the powers, rights, or obligations of the United States, as they apply to the Arkansas River Basin.

It clearly states that the Compact is not intended to interfere with or impair the rights or powers of either signatory State to regulate the waters within its own boundaries.

ARTICLE XII

Compact

If any part or application of this Compact should be declared invalid by a court of competent jurisdiction, all other provisions and applications of this Compact shall remain in full force and effect.

Comment

This Article is self-explanatory.

ARTICLE XIII

Compact

A. This Compact shall become binding and obligatory when it shall have been ratified by the legislature of each

State and consented to by the Congress of the United States, and when the Congressional Act consenting to this Compact includes the consent of Congress to name and join the United States as a party in any litigation in the United States Supreme Court, if the United States is an indispensable party, and if the litigation arises out of this Compact or its application, and if a signatory State is a party thereto.

B. The States of Arkansas and Oklahoma mutually agree and consent to be sued in the United States District Court under the provisions of Public Law 87-830 as enacted October 15, 1962, or as may be thereafter amended.

C. Notice of ratification by the legislature of each State shall be given by the Governor of that State to the Governor of the other State, and to the President of the United States, and the President is hereby requested to give notice to the Governor of each State of consent by the Congress of the United States.

IN WITNESS WHEREOF, the authorized representatives have executed three counterparts hereof each of which shall be and constitute an original, one of which shall be deposited with the Administrator of General Services of the United States, and one of which shall be forwarded to the Governor of each State.

DONE at the City of Tulsa, State of Oklahoma, this 3rd day of March, A.D., 19 72.

Comment

The Committee wishes to stress the importance of this Article. The utilization of the water resources of this Basin is in large part dependent upon storage facilities. Regulatory works are needed to control and to put the water to use. This area is a single unit within a larger area, the Arkansas-Red-White River Basins in which the pattern of development has been well established. It is now being and must in the future be achieved largely with the assistance and cooperation of the United States government. It is the hope of this Committee that there will be no need to exercise the consent authority which is sought in this Article. As a practical matter, however, should interstate litigation arise out of

the Compact or its application in which the United States is an indispensable party, no satisfactory solution can be reached unless the United States is made a party thereto.

The members of the Arkansas-Oklahoma Arkansas River Compact Committee agree March 3, 1972, that the foregoing statement expresses the intent of the Committee with regard to the draft of the Arkansas-Oklahoma Arkansas River Basin Compact dated November 25, 1969.

FOR ARKANSAS:

S. Keith Jackson
Committee Member

John Luce
Committee Member
(Alternate)

FOR OKLAHOMA:

Glade R. Kirkpatrick
Committee Member

Milton Craig
Committee Member
(Alternate)

Approved: Trigg Twichell
Trigg Twichell, Representative
United States of America

Attest: Willard B. Mills
Willard B. Mills, Secretary

ARKANSAS RIVER BASIN COMPACT

ARKANSAS-OKLAHOMA

APPENDIX I

Computation of Annual Yield

Article II J of the Arkansas River Compact - Arkansas-Oklahoma described "annual yield," which is a term basic to the allocations of this Compact. It refers to the runoff which would occur from any specified area under unaltered natural conditions - i.e., where there would be no artificial man-made depletions of or additions to the original supply and no regulation of that supply.

The only time this could be measured absolutely would be before any facilities to utilize, import or impound water were constructed; and before any of man's activities altered rainfall-runoff relations. Land management practices, while possibly significant for some areas, are difficult to evaluate and will be disregarded, at this time, in the computations to meet the requirements for the administration of this Compact. The accuracy of annual yield determinations will be dependent upon how accurately depletions, and their ratio to total water yield, can be computed. Fortunately, present depletions for most of the compact area are small in relation to the original yield and, until such time that additional developments are made, only reasonable estimates will suffice to assure that terms of the Compact are being met.

Basically, the determinations that are required are as follows: (1) the measurement or computation of the actual runoff from each of the several "sub-basins" as defined by the Compact for each water

year; (2) the computation of the corresponding total depletions and/or accretions in each of the respective sub-basins; (3) the sum of items (1) and (2) to obtain the "annual yield" for each basin; and (4) multiply item (3) by 100 minus the percent depletion allowed in Article IV of the Compact; and (5) compute deficiency, if any, by comparing item (4) with item (1). The following outlines procedures for computing each of these items:

Item 1. Reliable estimates to meet this requirement can be readily made for the several sub-basins on the basis of the existing (1970) stream-gaging stations. (See figure 1 for location of stations). All of the larger streams draining from the State of Arkansas into the State of Oklahoma are gaged in or near the stateline, and acceptable estimates for the total outflow from each sub-basin can be made on the basis of these records plus estimated flows from ungaged areas.

The computation of actual runoff from the Arkansas River Sub-basin will need to take into account both the inflow and outflow from the area. This computation can be made by application of the following equation:

$$Q_A = Q_V - [Q_M + Q_W + Q_2 + Q_3 + Q_4]$$

in which

Q_A = Total annual discharge originating from the Arkansas River Sub-Basin.

Q_V = Total annual discharge of the Arkansas River immediately below the mouth of Lee Creek presently measured at Van Buren gaging station.

Q_M = Total annual discharge of the Arkansas River immediately below the mouth of the Grand Neosho River, presently measured at the Muskogee gaging station.

Q_W = Total annual discharge of the Canadian River at Eufaula Dam, presently measured at Whitefield gaging station.

Q_2 = Total annual outflow from the Illinois River Sub-basin.

Q_3 = Total annual outflow from the Lee Creek Sub-basin.

Q_4 = Total annual outflow from the Poteau River Sub-basin.

Item 2. The total annual depletion in each sub-basin will be the sum of the following:

(a) Total stream diversions minus return flows.
(b) Depletions and/or accretions by major reservoirs.
(c) Evaporation losses from other than major reservoirs.
(d) Pumpage of ground water from alluvium aquifers.

The following comments relate to each of the above:

(a) Reliable data on this item are not generally available at this time but will need to be firmed up as development of the area's resources progresses. The principal items will be diversions for irrigation and for municipal and industrial water supplies. In the case of small irrigation uses, satisfactory estimates of consumption can be made on basis of acres and types of crops irrigated. Withdrawals for municipal and industrial uses are generally available but estimates of return flows may be necessary. So long as these diversions are small in relation to total runoff no high degree of accuracy will be required.

(b) Depletions caused by major reservoirs will probably be most significant. The depletion from such reservoirs for a given period will be the difference between inflow and outflow and can be determined from the following (all terms expressed in acre-feet):

The inflow, I, at damsite that would have occurred if reservoir had not been in place, can be computed by the following:

$$I = O \pm \Delta S + E + D - P + p,$$

in which

O = Outflow as measured at gaging station below dam, or from gate and spillway ratings.

ΔS = Change in storage volume at beginning and end of period.

P = Precipitation on reservoir surface.

p = Runoff that would have occurred from area covered by reservoir, computed by a derived rainfall-runoff factor, c times P, or cP.

E = Evaporation from reservoir surface.

D = Direct diversions from reservoir storage, not included in outflow; seepage from reservoir may also be a factor and, if not included in measured outflow as at gaging station below dam, should be estimated.

As the depletion is inflow minus outflow, this can be written:

$$I - O = -P + p \pm \Delta S + E + D.$$

(c) Evaporation from small lakes, such as those not designed for water supply, including flood-detention structures, farm ponds, and recreation lakes, may be estimated on basis of average water surface area and appropriate data from evaporation-pan records.

(d) Pumpage from stream alluviums may cause appreciable depletions in stream flow. This is not believed to be a factor at the present (1969) time, but could conceivably be in the future for some stream reaches.

CONCLUSION

The Arkansas River Compact Commission, with the assistance of a Technical Advisory Group, should include, as part of their annual

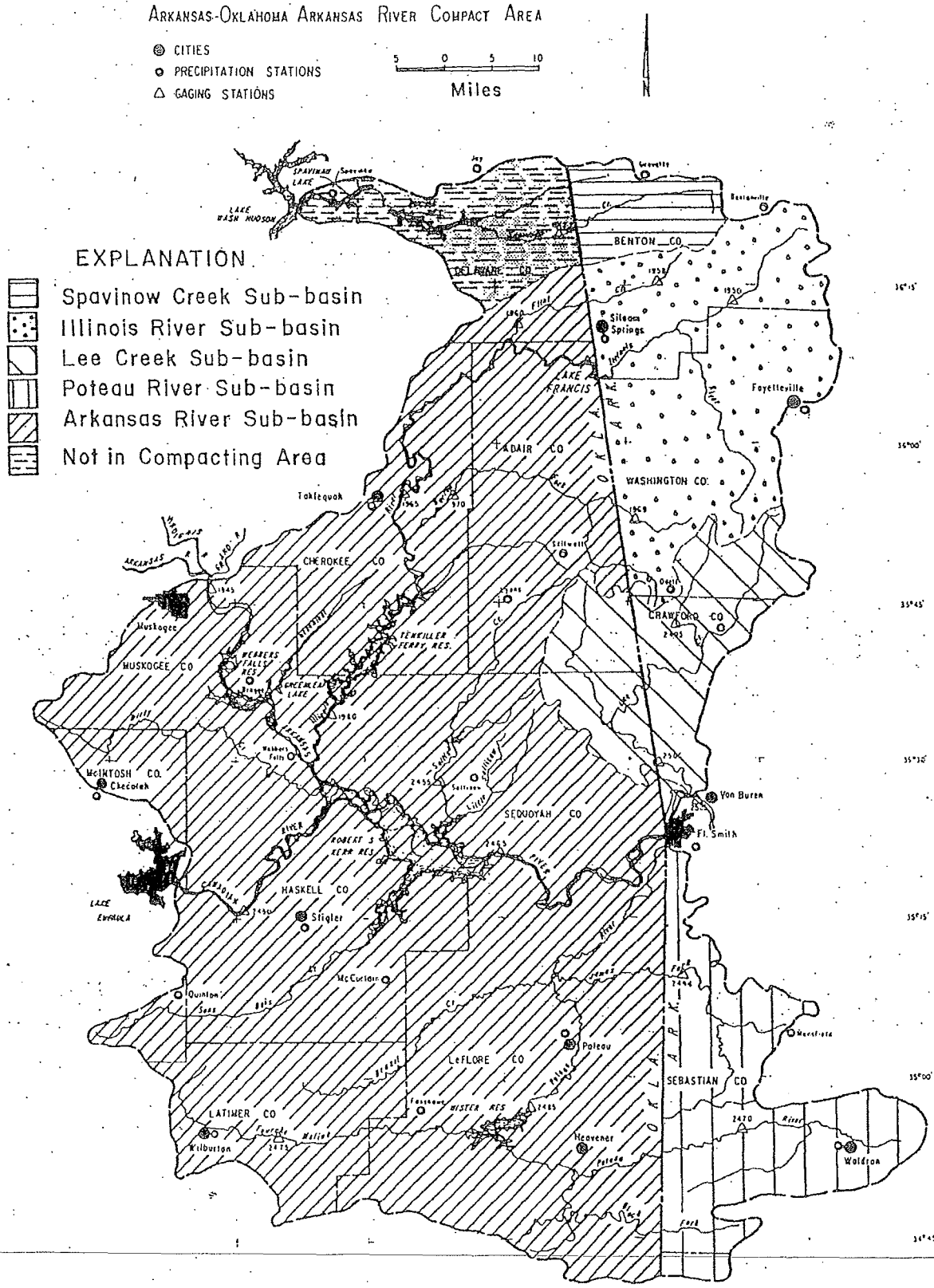
report, information on basin yields and depletions. Until such time as available data reveal that allocations between the States for any of the several sub-basins is in prospect of not being met, only generalized information will be adequate. As additional developments occur, the Commission should take steps to assure that the collection of basic data will be adequate to meet the needs of administration. As a minimum, the Commission should require the installation of instrumentation at such new reservoirs as will permit accurate determination of sub-basin inflow-outflow records.

Although allocations are to be based on annual yields, to be determined by December 31 of each year, current records will be required in the event provisions of Article V(B) need to be met, i.e., the delivery of sixty percent of current runoff to make up a deficiency.

The Commission should make continuing studies of the hydrology of the Basin for improvements or expansions in the collection of basic data as are needed to meet the changing needs for the administration of the Compact.

FIGURE 1

ARKANSAS-OKLAHOMA ARKANSAS RIVER COMPACT AREA



Revised March 3, 1972
NOVEMBER 25, 1969

ARKANSAS-OKLAHOMA
ARKANSAS RIVER COMPACT COMMISSION

RULES, REGULATIONS AND MODES OF PROCEDURE

(As Amended September 25, 1985, September 25, 1991, September 24, 1993, and September 27, 2012)

ARTICLE I
THE COMMISSION

1.1 The "Commission" is the "Arkansas-Oklahoma Arkansas River Compact Commission" referred to in Article VIII of the Arkansas River Basin Compact, Arkansas-Oklahoma.

1.2 The credentials of each Commissioner shall be filed with both the Chairman and the Secretary of the Commission. When the credentials of a new Commissioner are received, the Secretary shall promptly notify all other Commissioners of the name and address of the new Commissioner.

1.3 Each Commissioner shall advise the Commission in writing of the address to which all official notices and other Commission communications shall be sent for their receipt and shall further promptly advise in writing the office of the Commission of any changes in address.

ARTICLE II
COMMISSION OFFICERS

2.1 The officers of the Commission shall be a Chairman, a Secretary and a Treasurer.

2.2 The Commissioner (or "alternate") representing the United States shall be the Chairman of the Commission. The Chairman shall preside at meetings of the Commission. His duties shall be those usually imposed upon such officers and as may be assigned by these rules or by the Commission from time to time.

2.3 The Secretary shall be selected by the Commission. The Secretary shall serve for the term, and shall perform the duties, as the Commission shall direct. In case of a vacancy in the office of the Secretary, the Commission shall select a new Secretary as expeditiously as possible.

2.4 The Treasurer shall be selected by the Commission. The Treasurer shall receive, hold and disperse all funds of the Commission which shall come into his hands, and shall furnish a fidelity bond in an amount satisfactory to the Commission. The cost of the bond shall be paid by the Commission.

2.5 As the Commission may determine and direct, the various Commission officer positions may be joined and simultaneously held by the same person.

ARTICLE III
PRINCIPAL OFFICE

3.1 The principal office of the Commission shall be the office of the Chairman or the Secretary, as the Commission shall direct.

3.2 All official files, books and records of the Commission shall be kept and maintained in the principal office of the Commission. All such files, books and records shall be open to inspection by the public at the principal office of the Commission.

ARTICLE IV
COMMISSION MEETINGS

4.1 The annual meeting of the Commission shall be held on the fourth Thursday in September of each year. By prior agreement of all Commissioners, the Commission may select and designate a different date for holding the annual meeting.

4.2 Special meetings of the Commission may be called by the Chairman at any time. Upon written request of a majority of the Commissioners of either of the signatory states setting forth the matters to be considered at a special meeting, it shall be the duty of the Chairman to call a special meeting. Notice of all special meetings shall be sent by the Secretary to all members of the Commission by ordinary mail at least ten days in advance of the meeting and such notice shall state the purpose thereof.

4.3 Emergency meetings of the Commission may be called by the Chairman at any time upon request of either signatory state. For purposes of this rule, an "emergency" situation, for which an emergency meeting may be called, is understood to mean a situation involving an imminent threat of injury to persons or injury and damage to public or personal property or threat of imminent financial loss when time requirements make prior notice procedures impractical and, if adhered to, would increase the likelihood of injury, damage or financial loss.

4.4 Except as otherwise provided herein, prior notice of all Commission meetings shall be given by the Secretary to all Commissioners. Such notice shall advise of the date, time and place of the meeting and shall include an agenda for the meeting or, as may be applicable, a statement of the purpose of or matters to be considered at the meeting. Upon receipt of such notice, it shall be the responsibility of the signatory state to, in-turn, furnish notice to the public in its state such as may be required or provided under the laws of that state. Except as may be otherwise required under the laws of a signatory state, no advance public notice shall be required for the calling and conducting of emergency meetings. At the earliest possible time following any emergency meeting, the public will be notified of any Commission action taken at the meeting.

4.5 Meetings of the Commission shall be held at such places as shall be agreed upon by the Commissioners.

4.6 Minutes of Commission meetings shall be made and preserved in a suitable manner. Until approved by the Commission, minutes shall not be official and shall be furnished only to members of the Commission, its employees and committees.

4.7 A majority of the Commissioners of each state, and the Commissioner (or alternate) representing the United States, must be present to constitute a quorum.

4.8 In taking any Commission action, each signatory state shall have a single vote representing the majority opinion of the Commissioners of that State. The Commissioner (or alternate) representing the United States shall not have the right to vote in any of the deliberations or actions of the Commission.

4.9 In the case of a tie vote on any of the Commission's determinations, orders, or other actions, a majority of the Commissioners of either state may, upon written request to the Chairman, submit the question to arbitration. Arbitration shall not be compulsory, but, in the event of arbitration, there shall be three arbitrators chosen as follows:

(l) One named by resolution duly adopted by the Arkansas Soil and Water Conservation Commission, or such other State agency as may be hereafter responsible for administering water law in the State of Arkansas; and

(2) One named by resolution duly adopted by the Oklahoma Water Resources Board, or such other State agency as may be hereafter responsible for administering water law in the State of Oklahoma; and

(3) The third chosen by the two arbitrators who are selected as provided above.

If the two arbitrators fail to select a third within sixty (60) days following their selection, then the third arbitrator shall be chosen by the Chairman of the Commission.

4.10 At each annual meeting of the Commission, the order of business, unless agreed otherwise, shall be as follows:

Call to Order;
Introductions and Announcements;
Approval of Agenda;
Reading, Correction and Approval of the Last Meeting;
Report of the Chairman;
Report of Secretary;
Report of Treasurer;
Report of Commissioners;
Report of Committees;

Unfinished Business;
New Business;
Adjournment.

4.11 All meetings of the Commission, except executive sessions, shall be open to the public. Executive sessions shall be open only to members of the Commission and such advisers as may be designated by each member and employees as permitted by the Commission; provided, however, that the Commission may call witnesses before it when in executive session. The Commission may hold executive sessions only for the purposes of discussing:

(1) The employment, appointment, promotion, demotion, disciplining or resignation of a Commission employee or employees, members, advisers, or committee members.

(2) Pending or contemplated litigation or litigation settlement offers, and matters where the duty of the Commission's counsel to its client, pursuant to the Code of Professional Responsibility, clearly conflicts with the public's right to know.

(3) The report, development, or course of action regarding security, personnel, plans, or devices.

No executive session may be held except on a vote, taken in public, by a majority of a quorum of the members present. Any motion or other decision considered or arrived at in executive session shall be voidable unless, following the executive session, the Commission reconvenes in public session and presents and votes on such motion or other decision.

ARTICLE V
COMMITTEES

*** **5.1** There shall be the following standing committees:
(a) Budget Committee;
(b) Engineering Committee;
(c) Environmental and Natural Resources Committee;
(d) Legal Committee.

*** **5.2** The Committees shall have the following duties:
(a) The Budget Committee shall prepare the annual budget and advise the Commission on all fiscal matters that may be referred to it.
(b) The Engineering Committee shall advise the Commission on all engineering matters that may be referred to it.
(c) The Environmental and Natural Resources Committee shall advise the Commission on all environmental and natural resource matters including: (1) the identification of common areas of environmental concerns and potential solutions to shared environmental and natural resource problems; (2) the promotion of environmental awareness and sustainable economic development; and (3) other environmental and natural resource matters that may be referred to it.

(d) The Legal Committee shall advise the Commission on all legal matters that may be referred to it.

5.3 Members of the standing committees shall be appointed by the Commission. The number of members of each committee shall be determined by the Commission. Each state shall be represented by an equal number of members on each committee with the Chairmanship for each committee alternating annually between the States of Arkansas and Oklahoma. Each state shall nominate the member or members representing the state to serve on each committee.

5.4 Formal committee reports shall be made in writing by the Chairman thereof, and shall be filed with the Commission at least ten days prior to the meeting scheduled for its discussion.

ARTICLE VI
RULES AND REGULATIONS

6.1 So far as is consistent with the Arkansas-Oklahoma Arkansas River Basin Compact, the Commission may adopt rules and regulations and may amend them from time to time. Amendments and/or revisions to the rules, regulations and modes of procedure may be made at any meeting of the Commission.

6.2 Rules and regulations of the Commission may be compiled and copies may be prepared for distribution to the public under such terms and conditions as the Commission may prescribe.

ARTICLE VII
FISCAL

7.1 All Commission funds shall be deposited in a depository, or depositories, designated by the Commission under the name of the "Arkansas-Oklahoma Arkansas River Compact Fund." Such funds shall be initiated and maintained by equal payments of each state into the fund.

**** **7.2** Disbursements of funds in the hands of the Treasurer shall be made by check signed by the Treasurer and another authorized signatory upon voucher approved by and reported to the Commission. All Commissioners are authorized signatories.

7.3 At each annual meeting of the Commission, the Commission shall adopt and transmit to the Governors of the two states the budget covering an estimate of its expenses for the following fiscal year. For purposes of this rule and requirement, the signatory states may individually assume and carry-out the responsibility of transmitting the Commission's adopted budget to that state's respective Governor.

** **7.4** All Commission receipts and disbursements shall be audited at least once every two years by a qualified independent certified public accountant to be selected by the

Commission, and the report of the audit shall be included in, and become a part of, the annual report of the Commission.

7.5 An up-to-date inventory of all Commission property shall be kept at the principal office of the Commission.

7.6 The fiscal year of the Commission shall begin July 1 of each year and end June 30 of the next succeeding year.

ARTICLE VIII
ANNUAL REPORT

8.1 The Commission shall annually make and transmit as soon as available to the Governors of the signatory states, and to the President of the United States, a report covering the activities of the Commission for the preceding fiscal year.

*** **8.2** The annual report shall include the following:

(a) Minutes of all regular, special or emergency meetings held during the year;
(b) All findings of facts made by the Commission during the preceding year;
(c) Recommendations for actions by the signatory states;
(d) Statements as to any cooperative studies made during the preceding year;
(e) All data which the Commission deems pertinent;
(f) The budget for current and future years;
(g) The most recent audit or financial statement of the Arkansas-Oklahoma Arkansas River Compact Fund;
(h) Name, address and phone number each Commissioner and each member of all standing committees;
(i) Such other pertinent matters as the Commission may require.

ARTICLE IX
MISCELLANEOUS

9.1 The Commission shall on request make available to the Governor of each of the signatory states any information within its possession at any time.

9.2 All contracts or other instruments in writing to be signed for and on behalf of the Commission, except matters related to the receipt or disbursement of funds, shall be signed by the Chairman when authorized by the Commission and attested to by at least one Commissioner from each State.

9.3 The Commission shall have the power to employ such engineering, legal, clerical and other personnel as in its judgment may be necessary for the performance of its functions under the Compact.

ARTICLE X

HEARINGS BEFORE THE COMMISSION

* **10.1(A)** As the Commission may determine and direct, the Commission may hold hearings for the purpose of taking testimony and receiving evidence for the identification of interstate problems within the purposes of this Compact and issuing such appropriate orders as it deems necessary for the proper administration of the Arkansas-Oklahoma Arkansas River Basin Compact. Any interested person or entity may make application to the Commission requesting that a hearing be held on any matter arising under, or otherwise within the purview of, the Compact, provided, such applications must meet the following requirements:

(a) The application must be in writing and filed with the Chairman, with a copy thereof being simultaneously furnished, by the applicant, to all Commissioners.

(b) The application must state and describe the identity and address of the applicant(s) and, where appropriate, the applicant's representatives in pursuit of the application; the interest of the applicant(s) in presenting the application and requesting that a hearing be held; the purpose, subject matter, issues, concerns and/or allegations sought to be entertained and considered through the hearing applied for; and, as may be appropriate to the purposes of the hearing sought, the relief or other official Commission action being requested through the hearing.

Unless determined and directed otherwise by the Commission, applications for Commission hearings shall be placed, for Commission review and consideration, on the agenda for the next regularly scheduled annual meeting of the Commission following the filing of the application. Applicant(s) shall be notified, in advance by the Chairman, of the date, time and place of the meeting at which the application will be considered and acted upon by the Commission.

10.1(B) All hearings shall be open to the public and may be scheduled and conducted as part of an annual or special meeting of the Commission or as may be determined otherwise by the Commission. The presiding officers at such hearings shall be one Commissioner from each state designated and appointed to serve as presiding officer by the respective state.

10.2 Orders of the Commission shall be enforceable upon the request of the Commission or any other interested party in any court of competent jurisdiction within the county wherein the subject matter to which the order relates is in existence, subject to the right of review through the appellate courts of the state of situs.

10.3 Any hearing held for the promulgation and issuance of orders shall be in the county and state of the subject matter of said hearing.

10.4 In the event the Commission directs that a hearing be held, all interested parties shall be afforded an opportunity to be heard after reasonable notice. Such notice shall include, among other matters deemed appropriate:

(a) A statement of the date, time, place, and nature of the hearing;
(b) A statement of the legal authority and jurisdiction under which the hearing is to be held;
(c) A reference to any particular matter or any statute and/or rules involved; and
(d) A short and plain statement of the matters asserted or which are the subject or purpose of the hearing.

If the Commission, or any other interested party, is unable to state the matters in detail at the time the notice is served, the initial notice may be limited to a statement of the issues. Thereafter, and upon application, a more definite and detailed statement shall be furnished.

10.5 A record of the hearing shall be kept and maintained and shall include:
(a) All pleadings, motions and intermediate rulings;
(b) Evidence received or considered;
(c) A statement of matters officially noticed;
(d) Questions and offers of proof, objections, and rulings thereon;
(e) Proposed findings and exceptions thereto;
(f) Any decision, opinion or report by the officers presiding at the hearing; and
(g) All staff memoranda or data submitted to the Commission in connection with their consideration of the matter before such hearing.

10.6 Findings of facts shall be based exclusively on the evidence and on the matters officially noticed by the Commission.

10.7 Oral proceedings or any part thereof shall be transcribed on request of any party and the cost of transcription shall be paid by the requesting party.

10.8 At its hearings, the Commission may admit and give probative effect to evidence which possesses probative value commonly accepted by reasonably prudent men in the conduct of their affairs. It shall give effect to the rules of privileged communications recognized by law. No greater exclusionary effect shall be given any such rule or privilege than would be obtained in an action in court. The Commission may exclude incompetent, irrelevant, immaterial and unduly repetitious evidence. Objections to evidentiary offers may be made and shall be noted in the record. Subject to these requirements, when a hearing will be expedited and the interest of the parties will not be prejudiced substantially thereby, any part of the evidence may be received in written form.

* **10.9** Documentary evidence may be received in the form of copies or excerpts if the original is not readily available. Upon request, the parties shall be given an opportunity to compare the copy with the original. The record of hearings may be held open for a reasonable length of time to afford either party time to submit additional written statements and/or evidence. An original and two copies (or three copies) of each document sought to be introduced into

evidence by a party at a Commission hearing must be presented to the officers presiding over the hearing by the party desiring and moving its admission.

10.10 A party may conduct cross-examination required for a full and true disclosure of the facts.

10.11 Notice may be taken of judicially recognized facts. In addition, notice may be taken of generally recognized technical or scientific facts within the Commission's specialized knowledge. Parties shall be notified, either before or during the hearing or be referenced in preliminary reports or otherwise, of the material noticed, including any staff memoranda or data, and they shall be afforded an opportunity to contest the material so noticed. The Commission's experience, technical competence and specialized knowledge may be utilized in the evaluation of the evidence.

10.12 In the case of hearings involving alleged or apparent violations of the Compact, the following procedures shall apply:

(a) If there is an alleged or apparent violation of the Compact, it should be made known to the Commission;

(b) Alleged violators shall submit an explanation for, or response to, the alleged violation to the Commission within thirty days of receipt of written notification of said violation from the Commission;

(c) The Commission shall refer the alleged violation to the Engineering and/or Legal Committee for investigation and review;

(d) After due investigation has been made, the Engineering and/or Legal Committee shall refer the matter to the Commission with recommendations concerning the action to be taken.

10.13 Any party shall at all times have the right to counsel, provided that such counsel must be duly licensed to practice law in one of the signatory States, or associated with an attorney thereof.

ARTICLE XI
PUBLICITY

11.1 Prior to the close of each meeting, the Chairman may draft a press release as directed by the Commission and submit it to the Commission for approval. All approved releases may be made available to the press by any member of the Commission.

11.2 The Commissioners shall not be restricted from participation in a press conference or interview, conducted at the request of a member of the press or other news media, but may not speak on behalf of the Commission without the prior approval of the Commission.

ARTICLE XII
POLLUTION

12.1 The Commission may provide a forum for the identification and discussion of pollution occurring in the Arkansas River Basin to the end that the signatory states will cooperate with each other and jointly encourage the maintenance of an active pollution abatement program in each of the two states.

12.2 The Commission shall encourage each individual state to take positive steps in the abatement of pollution identified by the Commission to exist in the Arkansas River Basin; provided however, neither state may require the other to provide water for the purpose of water quality control as a substitute for adequate waste treatment.

12.3 The Commission shall collect, analyze and report on data pertaining to water quality within the basin. For this purpose the Commission may enter into contracts as provided by Article IX A(2) to be approved at a Commission meeting. Unless formally approved by the Commission, no such report shall be published or have any validity.

*As amended at the annual meeting, September 25, 1985.
**As amended at the annual meeting, September 25, 1991.
***As amended at the annual meeting, September 24, 1993.
****As amended at the annual meeting, September 27, 2012.

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