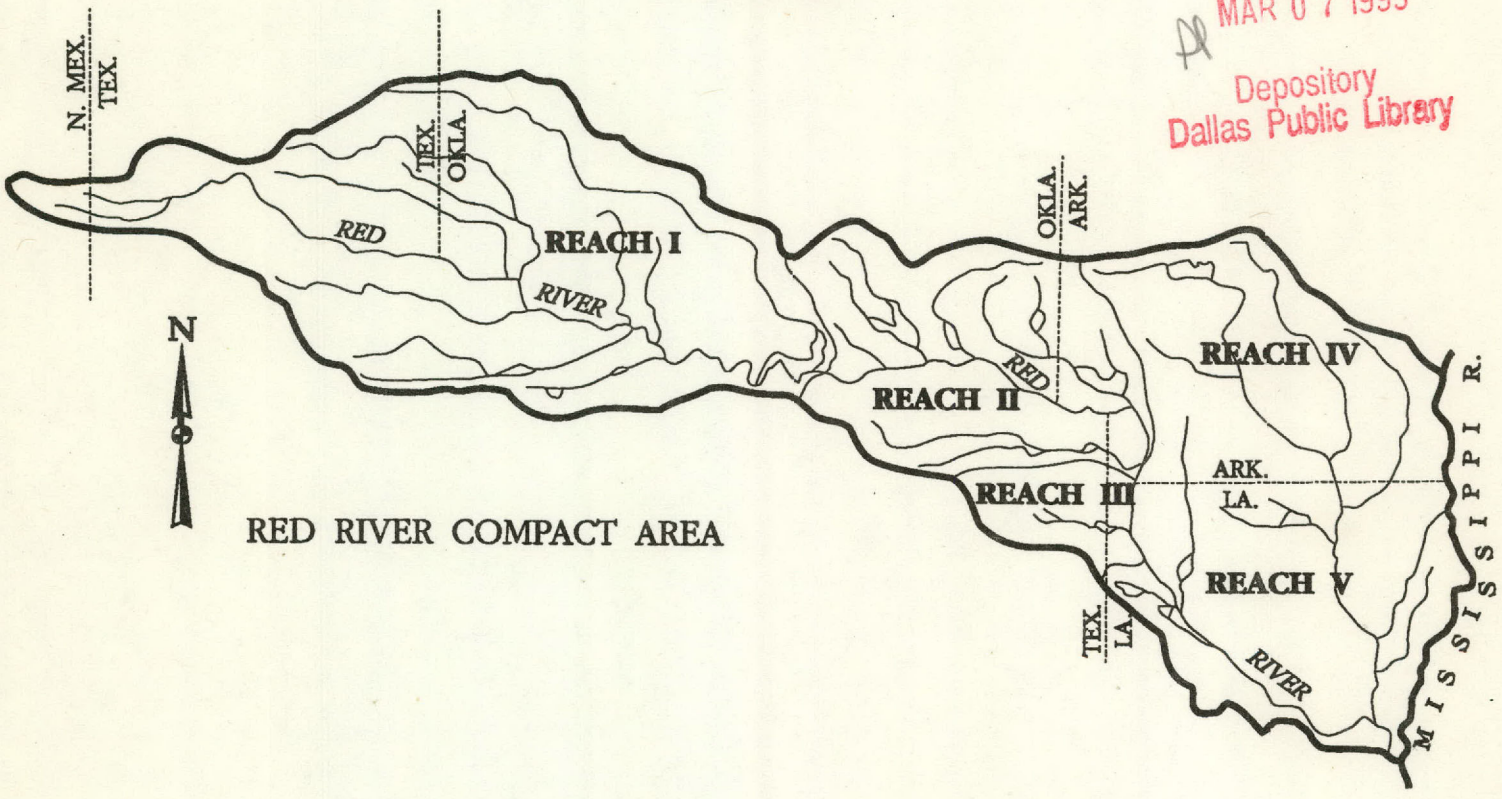
REPORT

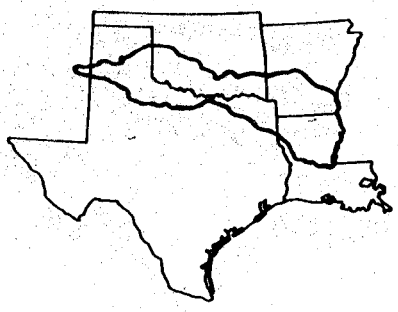
OF THE

RED RIVER COMPACT COMMISSION 1993



RED RIVER COMPACT AREA

MAY, 1994



RED RIVER COMPACT COMMISSION

May 31, 1994

The President
United States of America

The Honorable Jim Guy Tucker, Governor
State of Arkansas

The Honorable Edwin W. Edwards, Governor
State of Louisiana

The Honorable David Walters, Governor
State of Oklahoma

The Honorable Ann Richards, Governor
State of Texas

Commissioners

John F. Stroud, Jr.
Box 3080 State Line Plaza
Texarkana, AR 75502

J. Randy Young, P.E.
101 East Capitol, Suite 350
Little Rock, AR 72201

Arthur R. Theis, P.E.
9433 West Tampa Dr.
Baton Rouge, LA 70815

Brig. Gen. Ret. Jude Patin
P. O. Box 94245
Capitol Station
Baton Rouge, LA 70804-9245

Ken Fergeson
P. O. Box 598
Altus, OK 73522

Patricia P. Eaton
P. O. Box 150
Oklahoma City, OK 73101-0150

Lowell Cable
858 Gilmer
Sulphur Springs, TX 75482

Anthony C. Grigsby
P. O. Box 13087
Capitol Station
Austin, TX 78711-3087

Dear Mr. President and Governors:

Pursuant to Section 10.02 paragraphs (d) and (e) of the Red River Compact, Arkansas-Louisiana-Oklahoma-Texas, and as directed by the Red River Compact Commission (RRCC) at its fourteenth annual meeting, submitted is a copy of the report of the RRCC, together with an accounting of all funds received and expended by it in the conduct of its work for FY 1993. A budget covering the anticipated expenses of the Commission for Fiscal Years 1994 through 1996 is also included in the report.

The fourteenth annual meeting was hosted by the State of Arkansas and held in Hot Springs on March 24, 1993. In the absence of the Federal Commissioner and Chairman and in accord with the Commission's Rules for the Internal Organization, the meeting was called to order by the Vice-Chairman. Significant action taken by the Commission included the creation of a new standing committee to be called the Environmental and Natural Resources Committee. The Commissioners from the respective member states were asked to appoint one member of the committee and were encouraged, but not required, to make the appointment a representative from each state's environmental agency.

Pursuant to a previous agreement to rotate the Office of Vice-Chairman and Secretary in connection with the rotation of the annual meeting host state, the State of Oklahoma accepted the responsibilities of both offices for FY 1994. The Office of Treasurer remained with the State of Arkansas.

Sincerely,

J. Randy Young, P.E.
Vice-Chairman and Arkansas Commissioner

TABLE OF CONTENTS

RED RIVER COMPACT COMMISSION MEMBERS
1993

Federal Commissioner

Brig General Pat M. Stevens, IV
US Army Corps of Engineers
Director of Military Programs
20 Massachusetts Ave., NW
Washington, DC 20314-1000
(202) 272-0379

Arkansas Commissioners

John F. Stroud, Jr.
State Line Plaza
Box 8030
Texarkana, Arkansas 75502
(501) 773-5651 (501) 772-2037 (FAX)

J. Randy Young, P.E., Executive Director
Arkansas Soil and Water Conservation Commission
101 East Capitol, Suite 350
Little Rock, Arkansas 72201-3823
(501) 682-3986 (501) 682-3991 (FAX)

Louisiana Commissioners

Arthur R. Theis, P.E.
9433 West Tampa Dr.
Baton Rouge, Louisiana 70815
Business: (504) 927-5588
Residence: (504) 927-0414

Brig. Gen. (Ret.) Jude W.P. Patin, Secretary
Department of Transportation and Development
P. O. Box 94245, Capitol Station
Baton Rouge, Louisiana 70804-9245
(504) 379-1200 (504) 379-1394 (FAX)

Oklahoma Commissioners

Ken Fergeson
Box 598
Altus, Oklahoma 73522
(405) 477-1100 (405) 477-1634 (FAX)

Patricia Eaton, Executive Director
Oklahoma Water Resources Board
P. O. Box 150
Oklahoma City, Oklahoma 73101-0150
(405) 231-2551 (405) 231-2600 (FAX)

Texas Commissioners

Colonel Nathan Reiter, Jr.
P. O. Box 660
Texarkana, Texas 75505
(903) 792-1988

Anthony C. Grigsby, Executive Director
Texas Natural Resource Conservation Commission
P. O. Box 13087, Capitol Station
Austin, Texas 78711
(512) 463-7791 (512) 475-2454 (FAX)

RED RIVER COMPACT COMMISSION OFFICERS and COMMITTEE CHAIRMEN 1993

CHAIRMAN/FEDERAL COMMISSIONER
Brig. General Pat M. Stevens, IV
US Army Corps of Engineers
Director of Military Programs
20 Massachusetts Ave., NW
Washington, DC 20314-1000
(202) 272-0379

VICE CHAIRMAN/ARKANSAS COMMISSIONER
Randy Young, P.E., Executive Director
Arkansas Soil and Water Conservation Commission
101 East Capitol, Suite 350
Little Rock, Arkansas 72201-3823
(501) 682-3986 (501) 682-3991 (FAX)

SECRETARY-TREASURER and BUDGET COMMITTEE CHAIR
Pris Houchens, Executive Assistant
Arkansas Soil and Water Conservation Commission
101 East Capitol Mall, Suite 350
Little Rock, Arkansas 72201-3823
(501) 682-3986 (501) 682-3991 (FAX)

ENGINEERING COMMITTEE - CHAIRMAN
Earl T Smith, Jr., P.E., Chief
Water Resources Management Division
Arkansas Soil and Water Conservation Commission
101 East Capitol Mall, Suite 350
Little Rock, Arkansas 72201-3823
(501) 682-3979 (501) 682-3991 (FAX)

LEGAL COMMITTEE - CHAIRMAN
John F. Gibson, Jr., Attorney at Law
P. O. Box 573
Monticello, Arkansas 71655
(501) 367-9792 (501) 367-9793 (FAX)

RED RIVER COMPACT COMMISSION
COMMITTEE MEMBERS
1993

BUDGET COMMITTEE

Pris Houchens, Executive Assistant *(Committee Chair)*
Arkansas Soil and Water Conservation Commission
101 East Capitol, Suite 350
Little Rock, Arkansas 72201-3823
(501) 682-3986 (501) 682-3991 (FAX)

Brig. Gen. (Ret.) Jude W. P. Patin, Secretary
Department of Transportation and Development
P. O. Box 94245, Capitol Station
Baton Rouge, Louisiana 70804-9245
(504) 379-1200 (504) 379-1394 (FAX)

Harold Springer, P.E., Chief Engineer
Oklahoma Water Resources Board
P. O. Box 150
Oklahoma City, Oklahoma 73101-0150
(405) 231-2530 (405) 231-2600 (FAX)

Colonel Nathan Reiter, Jr.
P. O. Box 6660
Texarkana, Texas 75505
(903) 792-1988

ENGINEERING COMMITTEE

Earl T. Smith, Jr., P.E., Chief (*Committee Chairman*)
Water Resources Management Division
Arkansas Soil and Water Conservation Commission
101 East Capitol, Suite 350
Little Rock, Arkansas 72201-3823
(501) 682-3979 (501) 682-3991 (FAX)

Zahir "Bo" Bolourchi, P.E., Chief
Water Resources Section
Department of Transportation and Development
P. O. Box 94245, Capitol Station
Baton Rouge, Louisiana 70804-9245
(504) 379-1434 (504) 379-1857 (FAX)

Harold Springer, P.E., Chief Engineer
Oklahoma Water Resources Board
P. O. Box 150
Oklahoma City, Oklahoma 73101-0150
(405) 231-2530 (405) 231-2600 (FAX)

Herman R. Settemeyer, Engineer Advisor
Red River Compact
Texas Water Commission
P. O. Box 13087, Capitol Station
Austin, Texas 78711-3087
(512) 475-4617 (512) 463-8317 (FAX)

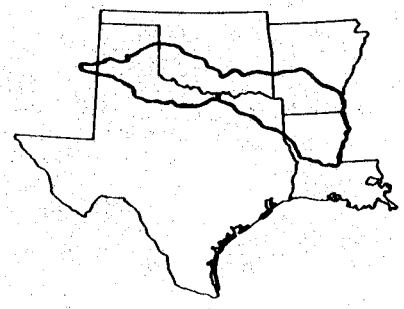
LEGAL COMMITTEE

John F. Gibson, Jr., Attorney at Law (*Committee Chairman*)
P. O. Box 573
Monticello, Arkansas 71655
(501) 367-9792 (501) 367-9793 (FAX)

James B. Frederick, Jr.
Senior Assistant General Counsel
Department of Transportation and Development
P. O. Box 94245, Capitol Station
Baton Rouge, Louisiana 70804-9245
(504) 379-1056 (504) 379-1012 (FAX)

Jerry Barnett, Attorney
Oklahoma Water Resources Board
P. O. Box 150
Oklahoma City, Oklahoma 73101-0150
(405) 231-2552 (405) 231-2600 (FAX)

Paul Elliott, Assistant Attorney General
Office of the Attorney General
Environmental Protection Division
P. O. Box 12548, Capitol Station
Austin, Texas 78711
(512) 463-2012 (512) 320-0052 (FAX)



RED RIVER COMPACT COMMISSION

FY-94/95 BUDGET

(July 1, 1993 through June 30, 1996)

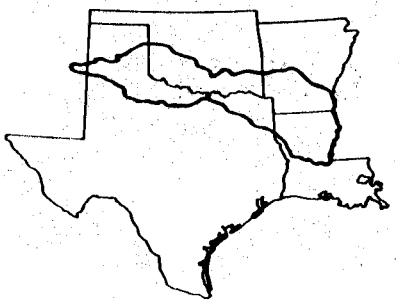
Adopted: 5/4/93

Fund Balance (4/30/93)	$6,877.12
Projected Cash Receipts by 6/30/93	
Interest Earned (Money Market Savings Account)	$36.00
Projected Expenditures through 6/30/93	
FY 92 Annual Report Printing (estimated)	$950.00
Mailing FY 91 & 92 Annual Reports (estimated)	$100.00
1993 Annual Meeting Expenses (estimated)	$375.00
Total	$1,425.00
Projected Fund Balance	$5,488.12

	FY-94	FY-95
Personnel Services, Office Expenses, Rent, & Travel	$600.00	$600.00
Audit	350.00	350.00
Treasurer's Bond	100.00	100.00
Postage, Stationery, & Office Supplies	225.00	225.00
Printing & Reports	1,350.00	1,350.00
Contingency	1,375.00	1,375.00
TOTAL	$4,000.00	$4,000.00

STATE ASSESSMENTS

In accordance with Article IX, Section 9.04.C, of the Compact, the amount of such budget shall be borne equally by the signatory states in an equal amount. Therefore, the FY-94 assessments are *$500.00* per state and the FY-95 assessments are *$500.00* per state.



RED RIVER COMPACT COMMISSION

FY-95/96 BUDGET

(July 1, 1994 through June 30, 1997)

Approved: 3/24/94

Fund Balance (3/1/94)	$7,428.32
Projected Cash Receipts by 6/30/94	
Estimated Interest Earned by 6/30/94 (Money Market Savings Account)	$44.00
Projected Expenditures through 6/30/94	
FY 93 Annual Report Printing (estimated)	$950.00
Mailing FY 93 Annual Report (estimated)	$50.00
1994 Annual Meeting Expenses (estimated)	$200.00
Total	$1,200.00
Projected Fund Balance	$6,272.32

	FY-95	FY-96
Personnel Services, Office Expenses, Rent, & Travel	$600.00	$600.00
Audit	350.00	350.00
Treasurer's Bond	100.00	100.00
Postage, Stationery, & Office Supplies	225.00	225.00
Printing & Reports	1,350.00	1,350.00
Contingency	1,375.00	1,375.00
TOTAL	$4,000.00	$4,000.00

STATE ASSESSMENTS

In accordance with Article IX, Section 9.04.C, of the Compact, the amount of such budget shall be borne equally by the signatory states in an equal amount. Therefore, the FY-95 assessments are *$500.00* per state and the FY-96 assessments are *$500.00* per state.

Red River Compact Commission

Statement of

Cash Receipts and Disbursements

July 1, 1992 through June 30, 1993

BOB JOHNSON
CERTIFIED PUBLIC ACCOUNTANT

Red River Compact Commission
Little Rock, Arkansas

We have audited the accompanying statement of cash receipts and disbursements of the Red River Compact Commission for the period July 1, 1992 through June 30, 1993. The financial statement is the responsibility of the commission's management. Our responsibility is to express an opinion on this financial statement based on our audit.

We conducted our audit in accordance with generally accepted auditing standards for cash basis statements. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

The commission's policy is to prepare its financial statements on the basis of cash receipts and disbursements; consequently, certain revenue and related assets are recognized when received rather than when earned, and certain expenses are recognized when paid rather than when the obligation is incurred. Accordingly, the accompanying financial statement is not intended to present results of operations in conformity with generally accepted accounting principles.

In our opinion, the financial statement referred to above presents fairly, in all material respects, the recorded cash transactions of the Red River Compact Commission for the period ended June 30, 1993 on the basis of accounting described in the preceding paragraph.

Bob Johnson, CPA

December 10, 1993
Jacksonville, Arkansas

2227 WEST MAIN STREET • SUITE 5 • JACKSONVILLE, ARKANSAS 72076
TELEPHONE (501) 982-9461 • FAX (501) 982-1975

Red River Compact Commission
Statements of Cash Receipts and Disbursements
For the Period July 1, 1992 through June 30, 1993

Cash Balance, Citizens First Bank, July 1 1992	$ 6054.51
Cash Receipts	
Member Assessments	1600.00
Interest	210.04
Total Cash Receipts	$ 1810.04
Cash Disbursements	
Accounting	200.00
Public Official Bond	100.00
Postage & Shipping	68.55
Annual Report Printing	707.01
Conference Expense	419.65
Total Cash Disbursements	$1495.21
Cash Balance, Savers Federal Savings, June 30, 1993	$6369.34

MINUTES OF THE THIRTEENTH ANNUAL MEETING
of the
RED RIVER COMPACT COMMISSION
Metairie, Louisiana
May 4, 1993

I. CALL TO ORDER

The 13th Annual Meeting of the Red River Compact Commission was called to order by Mr. Curtis Patterson, who substituted for Vice Chairman and Louisiana Red River Compact Commissioner Brigadier General Jude W. P. Patin, at 9:00 a.m. on May 4, 1993, at the Landmark Hotel, 2601 Severn Avenue, Metairie, Louisiana.

II. WELCOME

Mr. Curtis Patterson representing the host State of Louisiana welcomed the members of the Red River Compact Commission, staff and guests to the meeting in Metairie, Louisiana. Absent from the Commission meeting was Oklahoma Commissioner Patricia Eaton.

Those present at the meeting were:

Red River Compact Commissioners
John F. Stroud, Red River Compact Commissioner from Arkansas
J. Randy Young, P.E., Red River Compact Commissioner from Arkansas and Executive Director of Arkansas Soil and Water Conservation Commission
Tony Grigsby, Red River Compact Commissioner from Texas and Executive Director of Texas Water Commission
Colonel Nathan Reiter, Red River Compact Commissioner from Texas
Ken Fergeson, Red River Compact Commissioner from Oklahoma
Arthur R. Theis, P.E., Red River Compact Commissioner from Louisiana
Curtis G. Patterson, substituted for Red River Compact Vice-Chairman Brigadier General (Ret.) Jude W. P. Patin from Louisiana

Representatives, Federal Agencies and Guests from Louisiana
George Arcement, U.S. Geological Survey, LA District
James Frederick, LA Department of Transportation and Development
Zahir "Bo" Bolourchi, LA Department of Transportation and Development
Kimberlee McEacharn, LA Department of Transportation and Development

Representatives, Federal Agencies and Guests from Arkansas
John F. Gibson, Jr., Legal Advisor, Arkansas Soil and Water Conservation Commission
Dennis Hackbart, USDA Soil Conservation Service, Arkansas
Pris Houchens, Treasurer, Red River Compact Commission, Arkansas Soil and Water Conservation Commission
Earl Smith, Engineer Advisor, Arkansas Soil and Water Conservation Commission

Representatives, Federal Agencies and Guests from Oklahoma
Jerry Barnett, Oklahoma Water Resources Board
Donna Kirby, Lugert-Altus Irrigation District, Oklahoma
Bert Marshall, Attorney, Lugert-Altus Irrigation District, Oklahoma

Wayne Morgan, U.S. Army Corps of Engineers, Oklahoma
Duane Smith, Assistant Director, Oklahoma Water Resources Board
Harold L. Springer, Engineer Advisor, Oklahoma Water Resources Board

Representatives, Federal Agencies and Guests from Texas
Paul Elliott, Texas Attorney General's Office
Bernie Massey, USGS Texas District, Austin, Texas
Herman Settemeyer, Engineer Advisor, Texas Water Commission

Federal Agencies from Mississippi
Thomas C. Hill, U.S. Army Corps of Engineers, Lower Mississippi Valley Division, Vicksburg, Mississippi

III. ACT ON SUBSTITUTE SECRETARY FOR MEETING

Mr. Curtis Patterson of Louisiana moved that Ms. Kimberlee McEacharn be approved as the substitute secretary. The motion was seconded and carried by voice vote, seven ayes, zero nays.

IV. APPROVAL OF THE AGENDA

Arkansas Commissioner, Mr. John Stroud, moved that the proposed agenda for the May 4, 1993, Red River Compact Commission be approved. The motion to approve the agenda was seconded and carried by voice vote, zero nays.

Seven ayes ?

V. APPROVAL OF THE MINUTES OF THE MAY 5, 1992 MEETING

Mr. Curtis Patterson pointed out the name Neil L. Wagoner should be changed to Brigadier General (Ret.) Jude W. P. Patin on page 1 of the May 5, 1992, meeting minutes. Louisiana Commissioner, Mr. Arthur Theis said that on page 11, paragraph 3, Damonville should be changed to Daingerfield. Mr. John Stroud moved that the minutes be approved subject to the corrections mentioned. The motion to approve the minutes was seconded and carried by voice vote, seven ayes, zero nays.

VI. REPORT OF THE CHAIRMAN

Mr. Curtis Patterson stated that the next item for consideration on the Commission's agenda was the REPORT OF THE CHAIRMAN. Mr. Patterson reported that there would be no report from the Chairman, since the Chairman and Federal Commissioner, Brigadier General Pat M. Stevens, IV, was absent from the meeting.

VII. REPORT OF THE SECRETARY

There was no report given.

VIII. REPORT OF THE TREASURER

Mr. Curtis Patterson called for the REPORT OF THE TREASURER which was given by Treasurer Pris Houchens. Ms. Houchens presented financial reports and discussed the Commission's income and expenses for FY-92 and FY-93. She also presented a copy of the proposed FY-94/95 budget to each of the commissioners.

It was moved that the report of the Treasurer be accepted. The motion to accept the Treasurer's report was seconded and carried by voice vote, seven ayes, zero nays. A copy of report of the Treasurer is attached to the minutes. (See Attachment No. 1)

IX. REPORT OF THE COMMISSIONERS

A. Arkansas. Commissioner Randy Young reported on ground water activities: a) Vulnerability Study - The Arkansas Soil and Water Conservation Commission has utilized grant funds from Section 106 of the Clean Water Act in an effort to identify areas of the state which may be particularly vulnerable or susceptible to contamination for surface activities, especially the use of pesticides. A statewide sensitivity map was produced using a geographic information system at the University of Arkansas/National Center for Resource Innovations. A detailed sensitivity map has also been developed for Woodruff County, in eastern Arkansas, where a large volume of agricultural chemicals are used. However, it should be stressed that probably the best output of this program is the development of the data coverages themselves, not the various modeling and mapping activities; and b) Arkansas Soil and Water Conservation Commission has received funds to develop a comprehensive ground water program and is in the process of forming an advisory committee to assist in the development of the program.

As implementation of the Section 319 non-point source pollution program continues, four additional technicians have been contracted by the Arkansas Soil and Water Conservation Commission, which totals fifteen in the state. These technicians will provide assistance to local conservation district offices in writing "long-term agreements" with landowners for incorporation of Best Management Practices. Included in that program is assistance to farmers wanting to assess effects of land use on individual domestic wells.

The Arkansas/Oklahoma Environmental Task Force has been established on joint environmental concerns of both states. Initial work has centered on two major river systems, the Arkansas and Red, and nine watersheds within these two large river basins which form the boundary waters of the two states. Over the last few years, as industry, agri-business, recreation and tourism in western Arkansas and eastern Oklahoma has developed and expanded, concern about protecting the high quality scenic streams, rivers and lakes in the region have correspondingly increased. Many of these waters have interstate significance, and regulations relating to the use and protection of these waters impact citizens of both states. One of the recommendations of the Task Force was to request the creation of a standing committee on the environment for both the Red River and Arkansas/Oklahoma Arkansas River Compact.

Illinois River Monitoring - Monitoring is underway in Illinois Basin. Plans are to expand into Poteau and Little River Basins during this fiscal year.

The Governor's Animal Waste Task Force produced its final report in January. Two broad areas of waste were studied: 1) liquid waste from swine, dairy, and laying hen operations, and 2) dry waste, which is chiefly from broiler farms. Regulations for control of liquid waste were investigated and a recommendation was submitted to the Arkansas Pollution Control and Ecology Commission which led to adoption of Regulation No. 5. This regulation requires all producers of liquid animal waste to acquire permits and that all permit holders receive

annual training in management of animal waste.

The Task Force has recommended that management of dry animal waste continue as a voluntary program. An effective voluntary program should include education, technical assistance, research and development, financial assistance, program management, and industry involvement. The Task Force recommended that the program be evaluated over the next five years. Recommendations of the Task Force included legislative initiatives.

1993 Legislative Session initiatives were:
a. to eliminate the use of phosphorous in detergents for domestic use
b. to eliminate pit disposal of fowl carcasses
c. to increase fees for dam permits
d. to give authority to charge fees for certain Commission activities such as non-riparian permits

B. Oklahoma. In the absence of Commissioner Patricia Eaton, the Oklahoma Commissioner's report was given by Mr. Duane Smith of the Oklahoma Water Resources Board. He presented information on climate and streamflow information for 1992, legislative activities, water resources financing, water use reports, groundwater studies, and some litigation in Oklahoma. (See Attachment No. 2)

C. Texas. Commissioner Tony Grigsby of Texas presented a lengthy report to the Commission that included information on the TransTexas Water Program, Little Cypress Reservoir, Watermaster, Water Conservation Rules, and The Edwards Aquifer. (See Attachment No. 3)

D. Louisiana. Mr. Curtis Patterson reported on activities in Louisiana. The Department of Transportation and Development, in which Mr. Patterson is one of six directors under the DOTD Secretary, is still being reorganized. Mr. Patterson is the Director of the Public Works and Flood Control Directorate and Mr. Ed Preau is the Assistant Director.

The amount of $52 million dollars has been committed through the Port Construction and Development Priority Program since it was created by Act 452 of 1989 funding forty projects.

To date, the Statewide Flood Control Program has provided funding of over $100 million dollars for projects designed to bring about flood damage reduction. The recommended construction program for FY 93 contains 39 projects which will require $133 million dollars in state funds. The legislative appropriation is $10 million dollars.

The Department of Transportation and Development is the assuring agency for the deepening of the Mississippi River to 45 feet. Dredging of Phase I is complete to river mile 181 near Donaldsonville. The Local Cooperation Agreement for mitigation of saltwater intrusion into the water supply of Plaquemines Parish is awaiting final approval from the Assistant Secretary of the Army for Civil Works. The General Design Memorandum for Phase II of the project, deepening the river from mile 181 to Baton Rouge, is under review at the Washington level. It was hoped to have Phase II underway by later this year, but it does not look promising.

Mr. Patterson also reported that the Handbook for Construction of Boreholes and Groundwater Monitoring Systems, prepared jointly by the Louisiana Department of Transportation and Development and the Louisiana Department of Environmental Quality, has just been completed and is in the final review process by each Department's Technical Advisory Committee. The handbook will be used to regulate drilling and plugging of all geotechnical boreholes and monitoring wells throughout the State of Louisiana. The handbook will be used as a supplement to the existing Water Well Rules, Regulations and Standards, State of Louisiana.

X. REPORT OF COMMITTEES

A. Legal Advisory Committee. Mr. James Frederick, Jr., Chairman, State of Louisiana, distributed a copy of the Legal Committee report. The report primarily addressed two significant aspects of the appointment process for the Federal Commissioner: 1) The personal appointment of Brigadier General Pat M. Stevens, IV, to succeed Major General Thomas A. Sands; and 2) The ex-officio appointment of the Lower Mississippi Valley Division Commander as the permanent United States Commissioner. On motion duly made, seconded, and unanimously carried, the Commission approved the Legal Committee's recommendation to direct the Vice Chairman to request President Clinton to appoint Brigadier General Eugene S. Witherspoon as the United States Commissioner to the Red River Compact Commission to succeed Brigadier General Pat M. Stevens, IV. The Commission waived the requirement under Article VI No. 6.1 of the Internal Rules and Regulations that requires thirty days notice of a rule change. A motion was made by Commissioner John Stroud to accept the recommendations for Internal Rule changes for 2.7, 2.2, 2.3, 1.4, 2.4, and 2.5 as recommended by the Legal Committee. The motion was seconded and carried by voice vote, seven ayes, zero nays. The Committee's recommendation to modify 4.11 concerning unanimous consent resolution was not accepted and was withdrawn. It was moved that the Legal Advisory Committee report be approved. (See Attachment No. 4)

B. Engineering Advisory Committee. Mr. Zahir Bolourchi presented the report of the Engineering Advisory Committee. The Committee was given the assignment at last year's compact meeting to work on unfinished Rules and Regulations of the Compact. Specifically, Oklahoma and Texas were assigned to work on the rules for Sub-basins 1 and 4 of Reach 1. These sub-basins include Lake Texoma and the main stem of the Red River above Denison Dam (Sub-basin 4) and the North Fork of the Red River Basin (Sub-basin 1) which includes Sweetwater Creek. The Commission requested that the engineer advisors from each state work together and meet with the Corps of Engineers concerning Lake Texoma.

The Committee concluded that the waters released from Lake Texoma for hydroelectric or navigation purposes were not part of either state's 200,000 acre-foot limitation imposed by Reach 1 Sub-basin 4. It was recognized that these releases would go toward satisfying water use in the downstream states. The Committee concluded that the limitation imposed is restricted to the diversion of waters from Lake Texoma and the Red River upstream to the Texas-Oklahoma boundary at 100 degrees west.

The Engineering Advisory Committee has drafted a set of Interim Rules for Reach 1, Sub-basin 4 for review and comment by the Commission. The intent of

the Committee is to bring a final draft before the Commission for consideration at its next meeting. (See Attachment No. 5)

The second part of the assignment was the Sweetwater Creek/North Fork Red River issue. The area which has been at an impasse between Texas and Oklahoma for over 25 years. The solution to this controversy remains unresolved. Oklahoma indicates that the Oklahoma Water Resources Board has completed some work in the area of a compromise for the Sweetwater problem, however, the proposal is not complete and has not been presented to Texas. It is anticipated a proposal may be ready by the next meeting.

The Committee also made the recommendation that certain gage data be included in the 1992 Annual Report. It was then moved that the Engineering Advisory Committee report be approved. (See Attachment No. 6)

C. Budget Committee. The Budget Committee report was presented to the Commission as the Red River Compact Commission FY-94/95 Budget. The projected Commission fund balance at the end of June 1993 is $5,488.12. In prior years, the Commission tried to maintain at least a $5,000.00 reserve with which to pay Commission expenses and have a surplus to expend in the event the Commission needed to implement some program during the year and prior to each state being able to budget additional funds. The Budget Committee recommended to the Commission that the States be assessed $500.00 each for FY-94 and $500.00 each for FY-95.

It was moved that the proposed budget for FY-94/95 be approved. The motion to approve the budget was seconded and carried by a seven member vote without opposition. (See Attachment No. 7)

XI. FEDERAL AGENCY REPORTS

A. United States Bureau of Reclamation. Because no representative from the United States Bureau of Reclamation was present, Mr. Harold Springer, with the Oklahoma Water Resources Board, distributed a prepared report entitled ACTIVITY REPORT RED RIVER COMPACT COMMISSION MEETING. The report gives information regarding the general investigation of the Northwest Oklahoma Water Supply; the Arbuckle Project; the Kiamichi Project; the High Plain Groundwater Recharge Demonstration Program, which includes the Blaine Gypsum Project in Oklahoma; the Texas High Plains Project; and wetland areas. (See Attachment No. 8)

B.(1) Corps of Engineers, Tulsa District. Mr. Wayne Morgan addressed the Commission on the activities being performed by the Corps of Engineers. Mr. Morgan reported on seven projects:

1. Lake Wichita-Holliday Creek Texas
2. McGrath Creek, Texas
3. Plum Creek, Texas
4. Red River Waterway (Index Arkansas to Denison Dam)
5. Bowie County Levee, Texas
6. Red River Basin Chloride Control, Oklahoma and Texas
7. Pecan Bayou, Texas

(See Attachment No. 9)

B.(2) Corps of Engineers, Vicksburg District. Mr. Tom Hill reported General Eugene Witherspoon was recovering from a serious accident and sends his regrets that he could not be in attendance. Mr. Hill then addressed the Commission on the activities being performed by the Corps.

The Red River Waterway Project - This project from the Mississippi River through Old River to Shreveport, continues to be constructed. Locks and Dams 1 and 2 were open to navigation during December 1987. Lock Dam 3 was open to navigation during April 1992. Locks and Dams 4 and 5 are about 40 percent complete. The construction on Locks and Dams 4 and 5 will continue, provided funding is appropriated by Congress. There is continued construction on other project features including revetments, dikes, maintenance facilities, relocations, and repair of flood damages in pools of dams 1, 2 and 3.

The draft Local Cooperation Agreement (LCA) for purchase of 5,000 acres of land in the Loggy Bayou area is in the Office of the Assistant Secretary of the Army (Civil Works) for approval. This draft LCA is for the acquisition of the first segment of lands authorized for mitigation associated with the Red River Waterway Project. When approved, the Local Cooperation Agreement should be signed by the project Local Sponsor and the Assistant Secretary of the Army (Civil Works). When this is accomplished, acquisition of the land can begin.

The Red River Waterway Project, Shreveport to Daingerfield Reach Reevaluation Report - A Washington level review of the report of the District and Division Commanders, Lower Mississippi Valley Division, is currently being conducted. The purpose of this effort is to carefully review what has been done by the field and to insure that the criteria used in the study have been applied correctly. This is a common procedure applied to all Corps of Engineers projects. Consideration will be given to environmental concerns, engineering feasibility and economic viability in accordance with the "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies", the National Environmental Policy Act and other applicable laws. There have been no agreements or decisions made at the Washington level regarding completion of this project. Once this review is completed, a final decision will be reached on this project.

The Mississippi River Ship Channel, Phase I, 45-Foot Channel from Gulf of Mexico to Mile 181 - The third supplement for mitigation of this reach is in the office of the Assistant Secretary of the Army (Civil Works) for approval.

The first two Cost Sharing Agreements for the Corps of Engineers Constructed, which are referred to as the Breaux Bill projects, the LaBranch project and the Vermillion River project, were signed by the Local Sponsor and the Corps on April 15, 1993.

In addition, the Local Cooperation Agreement for the Davis Pond Freshwater Diversion Structures was also signed by the Local Sponsor and the Corps on April 15, 1993. This should allow construction of this structure to be initiated in the near future. The Caernarvon Freshwater structure construction is completed. These projects represent two such structures for the Mississippi River and Tributaries project.

C. Soil Conservation Service. Mr. Dennis Hackbart of the Soil

Conservation Service of Little Rock, Arkansas reported that the Soil Conservation Service is undergoing a period of uncertainty with the change of administration and are awaiting appointment of a new chief. There are several proposals concerning the future of the Soil Conservation Service, from including it into a new farm services agency (one stop shopping for farmers), or adding and/or subtracting programs, or keeping agency as it (a stand alone agency). The problem is that several Soil Conservation Service programs serve non-farmers, as well as farmers. There is also the possibility that the structure will stay in tact. The 1990 Farm Bill amended the "Small Watershed Act", or Public Law 83-566, to authorize cost sharing on wetland enhancement or floodplain easements. Legislation is being proposed to authorize Public Law 83-566 funding of rural water supply developments.

D.(1) U.S. Geological Survey. Mr. Bernie Massey of the U.S. Geological Survey office located in Austin, Texas presented a 12 page report to the Commission. The report showed the maximum peak discharge for the period of record and WY 92 and the average discharge for the period of record and WY 92 together with hydrograph plots for the following five gaging stations:

Red River near Burkburnett, Texas; Red River near Terral, Oklahoma; Red River near Gainesville, Texas; Red River at Arthur City, Texas; Red River near Dekalb, Texas

D.(2) U.S. Geological Survey. Mr. George Arcement from the U.S. Geological Survey office located in Baton Rouge, Louisiana gave a brief report. He said there may be a reduction in the Federal Funding Program for the United States Geological Survey. If this happens, there may be an impact on the gaging stations that are operated on the Red River.

XII. UNFINISHED BUSINESS

There was no unfinished business to report.

XIII. NEW BUSINESS

A. Annual Report. Arkansas Commissioner Randy Young made a motion that the Commission include the approved minutes in the annual report. The motion was seconded, and carried by voice vote, seven ayes, zero nays.

B. Assignments to Committees.

1. Legal Committee - Mr. James Frederick, Jr., stated that the Committee would continue to study the proposed new section numbered 4.11 of the Article IV of the Internal Rules. Also, further consideration will be given to initiating congressional legislation amending 94 Stat. 3305 so as to add a new Subsection "c" to Section 5 which would authorize the Federal Commissioner to designate a representative to serve in his absence at the Commission meetings. The recommendation of the Legal Committee on these two assignments will be given at the next meeting.

2. Engineering Committee - Mr. Zahir Bolourchi said the Engineering Committee will ask the United States Geological Survey to study and analyze the gaging system and its funding. Also, further refinement will be done for the set of Interim Rules for Reach 1, Sub-basin 4 and a final copy will be

brought before the Commission at its next meeting.

3. Budget Committee - No assignments were given pending the outcome of the Engineering Committee's review of the gaging system and its funding.

C. Resolution of Appreciation for Past Commissioner. A motion for approval of a Resolution for Mr. Jesus Garza in appreciation for service and accomplishments as Compact Commissioner from the State of Texas was moved and seconded, and carried by voice vote, seven ayes, zero nays. It was also moved, seconded and carried by voice vote, seven ayes, zero nays, to accept new Texas Commissioner, Mr. Tony Grigsby. (See Attachment No. 10)

D. Election of Officers. Commissioner John Stroud moved that Commissioner Randy Young be elected as the Vice-Chairman for the Red River Compact Commission meeting scheduled for the spring of 1994 in the State of Arkansas. The motion was seconded and carried by voice vote, seven ayes, zero nays. Commissioner John Stroud also moved that Ms. Pris Houchens be elected Secretary and re-elected Treasurer. This motion was seconded and carried by voice vote, seven ayes, zero nays.

E. Appointments to Committees. Legal Committee - Oklahoma Commissioner Ken Fergeson moved that Mr. Jerry Barnett replace Mr. Dean Couch on the Legal Committee. This motion was seconded and carried by voice vote, seven ayes, zero nays. Texas Commissioner Tony Grigsby moved that Mr. Paul Elliot replace Mr. Philip Poplin, also on the Legal Committee. This motion was seconded and carried by voice vote, seven ayes, zero nays.

Texas Commissioner Tony Grigsby also motioned that the Chairman of each Committee, Legal, Engineering, and Budget, change as the host state is alternated and that committee membership remain the same with the exception of the change previously modified by Oklahoma and Texas. This motion was seconded and accepted by voice vote, seven ayes, zero nays.

F. Fourteenth Annual Meeting. The Red River Compact agreed to have the Fourteenth Annual Meeting in Hot Springs, Arkansas. Arkansas Commissioner Randy Young motioned that the date of the meeting be the first week of April, 1994. The motion was seconded and accepted by voice vote, seven ayes, zero nays.

G. Other Business. Commissioner Randy Young said President Bill Clinton, when serving as Arkansas Governor, formed an Arkansas/Oklahoma Environmental Task Force. The Task Force has recommended that the Red River Compact Commission appoint a new Standing Committee, an Environmental Committee, to carry on the work of this Task Force. Texas and Louisiana were asked if they were interested in being added. The Legal Committee was instructed to look at the rules for creating a new Standing Committee and to define its duties. The recommendation of the Legal Committee will be heard at the next meeting. It was motioned by Commissioner Young to consider the Environmental Committee, motion was seconded, and carried by voice vote, seven ayes, zero nays.

Oklahoma Commissioner Ken Fergeson then asked Mr. Bert Marshall, an attorney with the Lugert-Altus Irrigation District in Oklahoma, to present a paper regarding their statement on prior appropriation of water within Reach 1,

Sub-basin 1 of the Red River Compact. A motion was made that Texas and Oklahoma make a response to the Legal Committee by March 1, 1994, regarding the statement. This motion was seconded, and carried by voice vote, seven ayes, zero nays. (See Attachment No. 11)

XIV. PUBLIC COMMENT

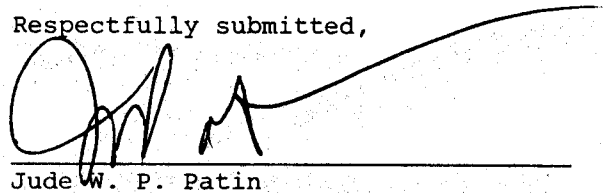
No comments from the public were presented at the meeting.

XV. ADJOURN

There being no further business, Commissioner John Stroud moved that the Red River Compact meeting adjourn. The motion was seconded and carried by a voice vote of seven ayes, zero nays. The Thirteenth Annual Meeting of the Red River Compact Commission was adjourned at 12:30 p.m. on May 4, 1993, in Metairie, Louisiana.

ATTACHMENTS:
1. Treasurer Report
2. Oklahoma Commissioner's Report
3. Texas Commissioner's Report
4. Legal Advisory Committee Report
5. Draft Interim Rules for Reach 1, Sub-basin 4
6. Engineering Advisory Committee Report
7. Proposed Budget for FY 94/95
8. United States Bureau of Reclamation Report
9. Corps of Engineers', Tulsa District, Report
10. Resolution of Appreciation
11. Lugert-Altus Irrigation District Statement

Respectfully submitted,



Jude W. P. Patin
Vice-Chairman

Date 4 April 94

07337000 RED RIVER AT INDEX

(National stream-quality accounting network station)

LOCATION.--Lat 33°33'07", long 94°02'28", in NW1/4SW1/4 sec.7, T.14 S., R.28 W., Miller County, Hydrologic Unit 11140106, near right bank on downstream side of southbound bridge on U.S. Highway 71 at Index, 2.2 mi south of Ogden, 20.6 mi upstream from Little River, and at mile 485.3.

DRAINAGE AREA.--48,030 mi^2, of which 5,936 mi^2 is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1936 to current year. Gage-height records collected at same site since 1917 are contained in reports of National Weather Service.

REVISED RECORDS.--WSP 1211: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 246.87 ft above National Geodetic Vertical Datum of 1929. Prior to Dec. 12, 1939, nonrecording gage, and Dec. 12, 1939, to July 19, 1979, water-stage recorder, at site 500 ft downstream at present datum.

REMARKS.--No estimated daily discharges. Water-discharge records good. Some regulation since Oct. 31, 1943, by Lake Texoma (Texas), 241 mi upstream, capacity, 5,392,900 acre-ft, since Sept. 28, 1967, by Pat Mayse Lake (Texas), capacity, 352,700 acre-ft, and since Jan. 18, 1974, by Hugo Lake (Oklahoma) capacity, 966,700 acre-ft. Satellite telemeter at station.

AVERAGE DISCHARGE.--57 years, 13,000 ft^3/s, 9,418,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 297,000 ft^3/s Feb. 23, 1938, gage height, 34.25 ft; minimum, 378 ft^3/s Nov. 28, 1956.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 109,000 ft^3/s May 12, gage height, 19.15 ft; minimum daily, 2,180 ft^3/s Oct. 11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4350	2880	24500	39500	13900	47900	15600	25700	64000	11300	7000	4670
2	3430	2960	23200	32700	13300	54200	15000	31100	63200	9450	7030	4510
3	3400	2990	20700	28200	12800	67700	21600	31700	62700	8720	7060	4470
4	3150	2960	19400	25700	12500	66300	29800	27100	60800	9390	7310	4380
5	2730	2960	18700	34900	13400	57500	31500	22100	61100	9400	8830	4070
6	2420	2880	17000	36400	15100	58800	31900	19800	61500	7920	12800	3980
7	2360	2700	15000	31300	16400	62900	34900	26300	60300	7560	11500	4080
8	2480	2610	13400	29200	17000	63400	37900	33000	58900	7360	8600	3800
9	2420	2740	12500	27400	15500	61900	37900	38600	56000	7220	8040	3780
10	2190	3040	12500	23800	13700	54400	36700	52000	55200	6660	7830	3710
11	2180	3100	13300	21300	12500	45700	32800	84900	55900	5820	7490	3610
12	2550	2950	16200	20400	12100	40400	28200	105000	54500	5450	6880	3650
13	2980	2740	20000	20600	15200	39100	21700	87000	54300	5250	6570	3690
14	3160	2560	22100	21200	19000	36200	19000	63600	56000	5020	6310	3440
15	3080	2630	36800	20900	19800	31300	19900	58300	50500	4800	5880	3450
16	2650	2870	61000	20400	22000	28900	25100	62000	47500	4640	5250	4100
17	2470	3200	67300	18600	34100	29700	34700	66500	45100	4640	5190	4560
18	2950	3900	65700	17200	43200	35600	41200	70700	39800	4690	5220	5180
19	3110	4050	62200	16900	40000	36800	45200	73300	34800	4660	5340	7290
20	4580	3530	64000	16800	40700	36300	48700	70400	28900	4590	5350	8710
21	4300	4400	70000	17600	42000	40500	49200	67100	25300	4560	5170	8770
22	3330	6130	73200	22600	45000	44400	43700	65800	22300	4640	5060	8420
23	2620	8610	71000	31900	46600	40800	38200	65200	19000	4630	4950	7070
24	2320	10600	68600	33000	44700	34500	31800	65500	16400	4530	4890	7060
25	2500	12200	67600	32700	45400	34000	23700	65200	14500	4530	4860	8570
26	2800	19600	65200	30800	50500	37800	19500	62400	13500	4780	4770	9210
27	2870	25000	57700	26900	51400	35500	17700	62600	12900	5770	5050	7570
28	2840	29500	52500	21700	49700	30700	20900	64000	13000	6350	5230	6300
29	2950	28800	50500	17900	---	28700	26000	63200	14000	6730	4910	5960
30	3360	26500	49100	15800	---	25400	25700	64200	13300	6880	4810	6010
31	2990	---	45700	14500	---	19400	---	65300	---	6990	4890	---
TOTAL	91520	231590	1276600	768800	777500	1326700	905700	1759600	1235200	194930	200070	164070
MEAN	2952	7720	41180	24800	27770	42800	30190	56760	41170	6288	6454	5469
MAX	4580	29500	73200	39500	51400	67700	49200	105000	64000	11300	12800	9210
MIN	2180	2560	12500	14500	12100	19400	15000	19800	12900	4530	4770	3440
AC-FT	181500	459400	2532000	1525000	1542000	2632000	1796000	3490000	2450000	386600	396800	325400

CAL YR 1992 TOTAL 8743140 MEAN 23890 MAX 73200 MIN 2180 AC-FT 17340000
WTR YR 1993 TOTAL 8932280 MEAN 24470 MAX 105000 MIN 2180 AC-FT 17720000

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1947-1956, April 1980 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: January to September 1981.

WATER TEMPERATURE: January to September 1981.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	AGENCY COLLECTING SAMPLE (CODE NUMBER) (00027)	AGENCY ANALYZING SAMPLE (CODE NUMBER) (00028)	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	TURBIDITY (NTU) (00076)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)
NOV											
17.	1440	80513	80020	3050	955	8.4	14.5	16	12.7	125	K80
JAN											
20.	1445	80513	80020	18000	900	8.0	7.0	47	11.9	99	180
MAR											
17.	1435	80513	80020	30400	870	8.0	10.5	96	11.2	101	140
APR											
29.	0700	80513	80020	22600	725	8.0	17.0	99	8.5	89	37
JUN											
10.	1400	80513	80020	52100	725	7.7	24.5	120	7.4	90	36
JUL											
13.	1505	80513	80020	6420	865	8.5	32.0	130	5.8	81	K5

DATE	TIME	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	HARDNESS NONCARB DISSOLV FLD. AS CACO3 (MG/L) (00904)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	SODIUM ADSORPTION RATIO (00931)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)
NOV										
17.	1440	K39	250	73	68	19	95	45	3	5.0
JAN										
20.	1445	520	230	120	59	19	99	48	3	4.3
MAR										
17.	1435	K330	220	110	57	19	81	44	2	3.4
APR										
29.	0700	K270	180	87	47	15	62	42	2	3.0
JUN										
10.	1400	130	210	110	58	17	64	39	2	3.5
JUL										
13.	1505	K4	270	120	73	22	81	39	2	4.6

DATE	TIME	ALKALINITY WAT DIS TOT FET FIELD MG/L AS CACO3 (00418)	CARBONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	BICARBONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	ALKALINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)
NOV										
17.	1440	174	0	215	176	110	120	0.30	5.6	554
JAN										
20.	1445	102	0	124	102	140	150	0.30	5.5	549
MAR										
17.	1435	111	0	137	112	120	130	0.10	6.6	533
APR										
29.	0700	93	0	113	93	95	91	0.20	5.9	394
JUN										
10.	1400	100	0	124	102	110	110	0.20	6.6	445
JUL										
13.	1505	152	1	183	152	130	110	0.20	1.4	543

07337000 RED RIVER AT INDEX--CONTINUED

8WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)
NOV 17.	1440	530	4560	0.75	--	0.030	<0.050	0.020	0.68	0.70
JAN 20.	1445	541	26700	0.75	0.320	0.040	0.360	0.060	0.44	0.50
MAR 17.	1435	487	43700	0.72	0.420	0.020	0.440	0.040	0.56	0.60
APR 29.	0700	377	24000	0.54	--	<0.010	0.280	0.030	0.57	0.60
JUN 10.	1400	432	62600	0.61	--	<0.010	0.380	0.040	0.26	0.30
JUL 13.	1505	514	9410	0.74	--	<0.010	<0.050	0.030	0.17	0.20

DATE	TIME	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ALUM-INUM, DIS-SOLVED (UG/L AS AL) (01106)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)
NOV 17.	1440	0.120	<0.010	0.010	20	150	<3	29	13	10
JAN 20.	1445	0.110	0.030	0.040	<10	120	<3	36	10	13
MAR 17.	1435	0.230	0.020	0.020	--	--	--	--	--	--
APR 29.	0700	0.150	0.030	0.010	30	95	<3	39	6	6
JUN 10.	1400	0.040	0.030	0.020	--	--	--	--	--	--
JUL 13.	1505	0.600	0.010	<0.010	50	170	<3	41	10	160

DATE	TIME	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)	VANA-DIUM, DIS-SOLVED (UG/L AS V) (01085)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 17.	1440	<10	1	<1	<1.0	660	<6	300	2470	84
JAN 20.	1445	<10	<1	<1	<1.0	640	<6	178	8650	68
MAR 17.	1435	--	--	--	--	--	--	528	43300	69
APR 29.	0700	<10	1	<1	<1.0	460	<6	673	41100	54
JUN 10.	1400	--	--	--	--	--	--	1140	160000	48
JUL 13.	1505	<10	<1	<1	<1.0	680	<6	1640	28400	44

07340000 LITTLE RIVER NEAR HORATIO

LOCATION.--Lat 33°55'10", long 94°23'15", in NE¼ sec.10, T.10 S., R.32 W., Sevier County, Hydrologic Unit 11140109, near left bank on downstream side of bridge on State Highway 41, 0.9 mi downstream from Rolling Fork, 2.0 mi southwest of Horatio, 28.5 mi upstream from Cossatot River, and at mile 72.0.

DRAINAGE AREA.--2,662 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1930 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 858: 1932, 1935-36. WSP 1211: 1931, drainage area. WSP 1561: 1932. WRD Ark. 1978: drainage area.

GAGE.--Water-stage recorder. Datum of gage is 272.89 ft above National Geodetic Vertical Datum of 1929. Prior to Feb. 5, 1935, nonrecording gage, and Feb. 5, 1934, to Sept. 13, 1961, water-stage recorder, at site 50 ft upstream at present datum.

REMARKS.--Water-discharge records good. Some regulation since Oct. 3, 1968, by Broken Bow Lake (Oklahoma), 31.4 mi upstream, capacity, 1,368,000 acre-ft, and since June 1, 1969, by Pine Creek Lake (Oklahoma), 73.3 mi upstream, capacity, 465,800 acre-ft. Satellite telemeter at station.

AVERAGE DISCHARGE.--63 years, 3,932 ft^3/s, 2,849,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 120,000 ft^3/s Mar. 30, 1945, gage height, 37.70 ft, from rating curve extended above 93,000 ft^3/s; minimum, 1.0 ft^3/s Aug. 18 to Sept. 1, 1934.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in August 1915, reached a stage of 38.0 ft, discharge, 124,000 ft^3/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge,30,900 ft^3/s Dec. 16, gage height, 28.63 ft; minimum daily, 287 ft^3/s Oct. 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6510	432	7870	13500	3740	9540	5790	11200	1940	2040	1750	610
2	8930	332	7710	9260	3490	14200	3340	10400	5080	1600	638	396
3	8970	1140	6120	8370	2360	13100	2300	9290	e4800	1480	799	457
4	6000	924	5510	13800	2380	11600	1790	8850	e3500	956	927	642
5	6050	793	4730	23400	2370	11300	2570	8500	e1100	541	1150	756
6	5760	775	2670	19100	2000	10600	3890	8520	e860	565	1180	982
7	3420	1180	2860	13400	1700	9590	2410	8460	636	504	802	872
8	2730	486	2810	13700	1350	9020	2360	8180	1560	585	741	611
9	1330	302	5170	14200	1540	7980	2130	4640	760	522	532	343
10	869	309	10900	15000	2120	6710	2390	12900	743	955	1050	598
11	497	403	10500	15400	3120	e6600	1480	16100	653	905	1510	618
12	387	786	8890	15400	4480	e6200	1180	15500	558	511	1320	489
13	560	1490	6580	16000	4910	4600	1560	16700	568	595	1110	301
14	828	1270	6240	16000	3070	1740	2820	14000	560	688	1110	485
15	1030	1010	21500	15600	3310	1360	9070	13600	1060	1120	808	324
16	468	726	30000	11900	10400	9490	11400	14200	806	1520	482	380
17	474	790	25800	8440	12200	18400	11000	14600	1320	1370	1470	439
18	356	873	21600	8500	12100	13600	9460	15500	1090	791	1610	513
19	335	755	16700	8780	12000	10800	7760	15600	1380	451	1600	571
20	779	3910	16500	8670	10300	16100	9860	13100	1310	706	1640	585
21	522	7030	17800	10300	10100	17100	9840	12400	975	1050	759	871
22	332	10300	17400	10300	10100	12900	8230	11700	1110	992	579	1200
23	300	16600	17100	9250	10000	9970	5710	7870	2390	948	412	779
24	414	13300	16700	8620	7320	10400	3670	8600	1710	1000	583	1300
25	347	10400	16300	8100	11400	13500	1910	11700	1350	1060	610	960
26	292	10600	16000	8430	16500	15000	2710	11500	1090	1080	409	796
27	288	9370	15700	8370	12400	14100	9440	10800	964	1330	665	614
28	287	8630	15700	6980	10100	10900	10300	8610	601	1260	763	1320
29	549	8340	15800	6220	---	9860	10900	6990	1110	1640	553	2610
30	486	8080	15800	5700	---	10300	11000	2820	1680	1430	387	1210
31	649	---	15800	4030	---	8010	---	1930	---	1690	541	---
TOTAL	60749	121336	400760	354720	186860	324570	168270	334760	43264	31885	28490	22632
MEAN	1960	4045	12930	11440	6674	10470	5609	10800	1442	1029	919	754
MAX	8970	16600	30000	23400	16500	18400	11400	16700	5080	2040	1750	2610
MIN	287	302	2670	4030	1350	1360	1180	1930	558	451	387	301
AC-FT	120500	240700	794900	703600	370600	643800	333800	664000	85810	63240	56510	44890

CAL YR 1992 TOTAL 2069618 MEAN 5655 MAX 30000 MIN 287 AC-FT 4105000
WTR YR 1993 TOTAL 2078296 MEAN 5694 MAX 30000 MIN 287 AC-FT 4122000

e Estimated

07340000 LITTLE RIVER NEAR HORATIO--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1954-59, 1969-78, October 1979 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1953 to September 1959.

WATER TEMPERATURES: October 1953 to September 1959.

COOPERATION.--Records were furnished by Arkansas Department of Pollution Control and Ecology, Little Rock, Arkansas.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	AGENCY COLLECTING SAMPLE (CODE NUMBER) (00027)	AGENCY ANALYZING SAMPLE (CODE NUMBER) (00028)	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	PH WATER WHOLE FIELD (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN DEMAND, BIOCHEMICAL, 5 DAY (MG/L) (00310)	HARDNESS TOTAL (MG/L AS CACO3) (00900)
OCT 06.	1505	9827	9827	6090	7.6	21.0	7.8	0.9	10
NOV 17.	1310	9827	9827	964	7.3	14.0	8.8	1.9	32
DEC 01.	1230	9827	9827	7870	7.0	10.0	11.0	0.7	11
FEB 02.	1320	9827	9827	3500	6.9	9.0	8.6	0.5	10
MAY 03.	1330	9827	9827	9250	7.4	17.0	6.6	0.9	11
JUN 28.	1410	9827	9827	574	7.1	27.0	--	1.0	25
JUL 12.	1425	9827	9827	473	6.5	29.0	6.0	1.0	7
AUG 10.	1400	9827	9827	1300	7.2	28.0	5.1	0.8	18
SEP 14.	1355	9827	9827	670	7.2	24.0	6.1	1.0	12

DATE	TIME	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)	TURBIDITY LAB (NTU) (82079)	RESIDUE TOTAL AT 105 DEG. C, SUSPENDED (MG/L) (00530)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	PHOSPHORUS TOTAL (MG/L AS P) (00665)
OCT 06.	1505	2.0	2.7	34	10	13	0.050	0.057	0.042
NOV 17.	1310	4.0	12	76	8.2	4	0.130	0.076	0.059
DEC 01.	1230	5.6	2.8	33	11	10	0.100	<0.050	0.035
FEB 02.	1320	8.4	4.1	42	10	6	0.190	0.053	<0.030
MAY 03.	1330	6.3	2.4	37	19	11	0.120	0.073	0.044
JUN 28.	1410	4.0	9.1	52	7.2	5	0.210	0.077	0.052
JUL 12.	1425	4.1	7.1	42	6.1	4	0.050	0.085	0.038
AUG 10.	1400	5.1	21	81	6.2	10	<0.020	<0.050	0.073
SEP 14.	1355	4.5	9.9	51	4.4	6	0.030	<0.050	<0.030

DATE	TIME	PHOSPHORUS ORTHO TOTAL (MG/L AS P) (70507)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CADMIUM DISSOLVED (UG/L AS CD) (01025)	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COPPER, DISSOLVED (UG/L AS CU) (01040)	LEAD, DISSOLVED (UG/L AS PB) (01049)	ZINC, DISSOLVED (UG/L AS ZN) (01090)
OCT 06.	1505	<0.030	4.7	<0.5	<1	--	<2	<8
NOV 17.	1310	<0.030	4.7	<0.5	<1	<25	<2	<8
DEC 01.	1230	<0.030	3.6	<0.5	<1	<25	<2	<8
FEB 02.	1320	<0.030	3.8	--	--	--	--	--
MAY 03.	1330	<0.030	4.4	--	--	--	--	--
JUN 28.	1410	<0.030	4.0	--	--	--	--	--
JUL 12.	1425	<0.030	4.2	--	--	--	--	--
AUG 10.	1400	<0.030	3.6	--	--	--	--	--
SEP 14.	1355	<0.030	3.1	--	--	--	--	--

07362000 OUACHITA RIVER AT CAMDEN
(National stream-quality accounting network station)

LOCATION.--Lat 33°35'47", long 92°49'05", in SE1/4 sec.14, T.13 S., R.17 W., Ouachita County, Hydrologic Unit 08040102, at bridge on U.S. Highway 79 at Camden, 3.4 mi downstream from Ecore Fabre Bayou, 6.2 mi upstream from Two Bayou Creek, and at mile 354.1.

DRAINAGE AREA.--5,357 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1928 to September 1960 and October 1965 to current year in reports of Geological Survey. October 1929 to date in reports of U.S. Army Corps of Engineers. Monthly discharge only, October 1929 to September 1960 published in WSP 1311 and WSP 1731. Gage heights collected since 1885 in this vicin- ity are contained in reports of National Weather Service.

GAGE.--Water-stage recorder. Datum of gage is 71.69 ft above National Geodetic Vertical Datum of 1929. Aug. 8, 1928, to July 10, 1935, and July 11, 1935, to Jan. 4, 1945, nonrecording gage at present site and datum. Jan. 5, 1945, to Oct. 27, 1947, nonrecording gage at site 0.4 mi downstream at present datum. Aug. 10, 1938, to May 31, 1949, supplementary nonrecording gage, 4.5 mi upstream. Since Jan. 1, 1957, auxiliary water-stage recorder, 3.2 mi downstream.

REMARKS.--Water-discharge records good, except for estimated daily discharges, which are fair. Flow regulated since 1925 by Lake Catherine, 102 mi upstream, capacity, 35,250 acre-ft, since 1932 by Lake Hamilton, capacity, 190,100 acre-ft, since 1949 by Lake Greeson, capacity, 407,900 acre-ft, since 1952 by Lake Ouachita, capacity, 2,768,400 acre-ft, and since August 1969 by DeGray Lake, capacity, 881,900 acre-ft. Satellite telemeter at station.

AVERAGE DISCHARGE.--65 years, 7,712 ft^3/s, 5,587,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 243,000 ft^3/s Apr. 3, 1945, gage height, 44.82 ft; minimum, 125 ft^3/s Sept. 16, 24-26, 1943.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 28,700 ft^3/s Dec. 18; maximum gage height, 28.89 ft Dec. 20; minimum daily discharge, 893 ft^3/s Oct. 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5370	e1070	e2200	8210	7980	18000	8720	12200	4560	3920	3500	e900
2	3000	e1540	2010	6750	7780	16000	7480	12700	2050	4270	4560	e950
3	1740	e1200	2330	5820	7490	17100	8140	16100	1070	4040	e1600	e1000
4	2060	e1020	2550	5460	7090	18600	6740	14800	1310	4390	e1800	e950
5	3110	e1210	2290	9390	6040	19200	6010	14200	2160	4120	e1600	e950
6	2730	e1400	2010	17700	6410	18500	7840	15000	2160	3220	1310	e900
7	2360	e1590	1820	21400	5620	16600	8690	14600	1260	3440	5530	e900
8	2030	e1720	2340	22600	5930	13400	10700	13700	1880	3860	6660	e900
9	2390	e1450	3210	22200	4360	11100	12400	11000	3810	3860	e2900	e900
10	3370	e1300	5060	19600	4410	9280	12000	13100	3950	3400	e2000	e900
11	3270	e1390	8210	18900	6120	7560	9520	19300	3470	2970	e2000	e900
12	1600	e1650	8290	18500	6580	7710	7590	22100	3950	1510	e1700	e900
13	1250	e1590	7050	16700	5410	9530	6070	21400	3970	1670	e1700	e900
14	2080	e2550	4770	13800	4860	10400	5830	19800	3350	2520	e2000	e900
15	1340	e1850	5020	12300	4760	8190	11200	17400	3530	3130	e1800	e900
16	2290	e1730	15900	11600	5360	7380	19000	15700	5640	3380	e2000	e900
17	3340	e2030	24200	9670	11200	10300	20600	14100	6620	3330	e2000	e900
18	2030	e2290	28100	7570	13900	15800	19200	11600	6320	3640	e2100	e900
19	1340	e1740	27900	9720	14600	17000	14400	9670	5160	4280	e2200	e900
20	1280	e2110	28200	12800	13800	15900	10700	9300	4100	3230	e1600	e900
21	1210	e3800	26200	14000	10800	14600	12000	9590	2930	3670	e1300	e950
22	983	e9260	22900	15100	9100	16200	11800	8550	2570	3780	e1500	e1000
23	978	e10100	21300	15000	7930	16700	9220	6440	2870	3340	e1700	e1200
24	1050	e9340	19300	14200	8100	16600	7140	5640	3700	2730	e1500	1700
25	981	e6390	16300	16000	8390	15600	6560	5470	4260	2700	e2400	1850
26	893	e5340	12700	17300	12000	13300	9170	5170	4710	2320	e2400	1920
27	1050	e4110	10400	16300	15900	11700	11900	5200	4710	e1800	e1400	1210
28	1050	e3190	8600	14300	17800	10400	11100	5240	3510	e2200	e1300	1120
29	1060	e2580	7380	12800	---	8250	9850	5790	3640	e2000	e1400	1040
30	1070	e2440	7180	11400	---	7900	10400	5420	3530	e1900	e1100	1070
31	946	---	7890	8560	---	9160	---	5040	---	3490	e1000	---
TOTAL	59251	88980	343610	425650	239720	407960	311970	365320	106750	98110	67560	31310
MEAN	1911	2966	11080	13730	8561	13160	10400	11780	3558	3165	2179	1044
MAX	5370	10100	28200	22600	17800	19200	20600	22100	6620	4390	6660	1920
MIN	893	1020	1820	5460	4360	7380	5830	5040	1070	1510	1000	900
AC-FT	117500	176500	681600	844300	475500	809200	618800	724600	211700	194600	134000	62100

CAL YR 1992 TOTAL 2494811 MEAN 6816 MAX 46900 MIN 893 AC-FT 4948000
WTR YR 1993 TOTAL 2546191 MEAN 6976 MAX 28200 MIN 893 AC-FT 5050000

e Estimated

07362000 OUACHITA RIVER AT CAMDEN--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1947-52, October 1974 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 1976 to September 1981.

WATER TEMPERATURES: July 1976 to September 1981.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	AGENCY COLLECTING SAMPLE (CODE NUMBER) (00027)	AGENCY ANALYZING SAMPLE (CODE NUMBER) (00028)	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	TURBIDITY (NTU) (00076)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)
NOV 17.	1100	80513	80020	1930	87	7.6	12.5	8.7	9.9	92	K20
JAN 20.	0945	80513	80020	10500	67	8.4	6.5	26	11.0	89	>600
JUN 09.	1045	80513	80020	3800	79	7.4	26.0	8.0	7.0	86	23
JUL 12.	1225	80513	80020	1550	51	7.5	29.0	5.2	6.9	90	K2

DATE	TIME	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARDNESS TOTAL (MG/L AS CACO3) (00900)	HARDNESS NONCARB DISSOLV FLD. AS CACO3 (MG/L) (00904)	CALCIUM DISSOLVED (MG/L AS CA) (00915)	MAGNESIUM, DISSOLVED (MG/L AS MG) (00925)	SODIUM, DISSOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	SODIUM ADSORPTION RATIO (00931)	POTASSIUM, DISSOLVED (MG/L AS K) (00935)
NOV 17.	1100	31	25	2	7.7	1.3	5.0	29	0.4	2.0
JAN 20.	0945	1000	22	7	6.7	1.3	3.7	25	0.3	1.2
JUN 09.	1045	27	22	3	6.0	1.6	4.9	32	0.5	1.1
JUL 12.	1225	39	22	8	6.3	1.6	3.8	26	0.4	1.0

DATE	TIME	ALKALINITY WAT DIS TOT FET FIELD MG/L AS CACO3 (00418)	CARBONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	BICARBONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	ALKALINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	FLUORIDE, DISSOLVED (MG/L AS F) (00950)	SILICA, DISSOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)
NOV 17.	1100	22	0	28	23	7.3	5.5	<0.10	5.8	51
JAN 20.	0945	16	0	18	15	6.9	4.8	<0.10	7.4	44
JUN 09.	1045	19	0	23	19	6.0	5.7	<0.10	4.0	42
JUL 12.	1225	15	0	18	15	5.2	3.3	<0.10	4.6	45

DATE	TIME	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L) (70301)	SOLIDS, DISSOLVED (TONS PER DAY) (70302)	SOLIDS, DISSOLVED (TONS PER AC-FT) (70303)	NITROGEN, NITRATE DISSOLVED (MG/L AS N) (00618)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	NITROGEN, ORGANIC TOTAL (MG/L AS N) (00605)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)
NOV 17.	1100	49	266	0.07	0.140	0.020	0.160	<0.010	0.20	0.20
JAN 20.	0945	42	1250	0.06	0.130	0.020	0.150	0.040	0.26	0.30
JUN 09.	1045	42	431	0.06	--	<0.010	0.150	0.050	--	<0.20
JUL 12.	1225	35	188	0.06	--	<0.010	0.088	0.020	--	<0.20

07362000 OUACHITA RIVER AT CAMDEN--CONTINUED

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ALUM-INUM, DIS-SOLVED (UG/L AS AL) (01106)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)
NOV 17.	1100	0.050	0.040	0.020	30	24	<3	220	<4	23
JAN 20.	0945	0.030	0.010	<0.010	70	21	<3	180	<4	58
JUN 09.	1045	0.030	0.020	<0.010	10	24	<3	190	<4	47
JUL 12.	1225	0.020	<0.010	<0.010	<10	24	<3	130	<4	96

DATE	TIME	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)	VANA-DIUM, DIS-SOLVED (UG/L AS V) (01085)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 17.	1100	<10	1	<1	<1.0	53	8	33	172	70
JAN 20.	0945	<10	2	<1	<1.0	51	<6	49	1390	98
JUN 09.	1045	<10	1	<1	<1.0	50	<6	42	431	73
JUL 12.	1225	<10	<1	<1	<1.0	42	11	442	1850	78

07362100 SMACKOVER CREEK NEAR SMACKOVER

LOCATION.--Lat 33°22'33", long 92°46'37", in NW1/4SE1/4 sec.32, T.15 S., R.16 W., Union County, Hydrologic Unit 08040201, near right bank on downstream side of bridge on State Highway 7, 0.1 mi downstream from Camp Creek, 3.3 mi northwest of Smackover, and at mile 22.0.

DRAINAGE AREA.--385 mi^2.

PERIOD OF RECORD.--October 1961 to current year. Gage-height records collected and occasional discharge measurements made by U.S. Army Corps of Engineers at this site since September 1938. Daily stages 1940 to date and results of discharge measurements 1947 to 1960 are published in reports of U.S. Army Corps of Engineers.

REVISED RECORDS.--WRD Ark. 1967: 1965. WRD Ark. 1979: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 97.56 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers.) Prior to Mar. 1, 1989, water-stage recorder at site 100 ft downstream at same datum. Mar. 1, 1989 to Sept. 4, 1991, non-recording gage at same site and datum.

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

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1938, that of June 8, 1974.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	39	63	149	217	e1000	307	163	59	96	14	7.8
2	8.9	70	56	142	202	e1300	285	166	51	78	14	8.8
3	8.0	68	53	137	190	e1600	238	324	46	63	18	5.9
4	7.9	79	57	187	e180	e1900	218	217	39	53	60	5.6
5	7.0	70	57	549	e170	e550	262	158	34	45	102	4.7
6	6.3	54	54	736	e160	332	347	126	30	39	75	4.4
7	6.1	35	69	649	e150	245	441	106	26	33	77	4.1
8	6.2	31	77	610	e140	205	1960	92	25	29	68	4.0
9	6.3	25	107	516	e140	181	2760	80	23	26	73	3.9
10	5.7	21	196	587	e150	161	2690	245	25	23	43	3.6
11	5.6	20	249	710	e170	144	2020	594	20	21	32	3.6
12	5.9	30	218	651	e140	136	1530	712	19	19	25	3.6
13	5.9	49	153	533	e200	141	977	838	20	20	21	3.5
14	5.7	67	116	402	e260	146	587	867	40	21	19	3.8
15	5.5	72	417	302	e340	139	1710	596	38	21	16	4.7
16	5.9	52	1010	243	e500	355	2080	220	33	20	13	5.4
17	6.9	36	1230	214	e800	1060	1810	149	29	17	12	5.2
18	8.4	27	1150	511	e1200	1410	1300	124	24	15	11	4.9
19	7.9	23	980	1280	e1100	1320	927	174	21	14	9.3	4.9
20	7.6	147	876	1780	e680	1210	527	177	83	13	8.2	4.7
21	7.7	538	725	1980	e400	1350	356	120	2140	12	7.3	4.5
22	7.6	653	604	1840	e340	1440	323	88	4340	11	6.6	4.3
23	7.3	560	564	1510	e350	1290	259	73	3480	10	5.9	4.4
24	7.1	456	510	1330	e370	1110	202	83	2570	9.7	5.1	4.5
25	6.8	308	365	1240	e400	948	202	348	1950	9.3	4.5	4.4
26	6.4	177	262	1080	e450	943	355	420	1440	8.7	4.5	19
27	7.8	129	214	838	e550	955	399	261	689	8.2	4.4	44
28	10	101	186	540	e800	782	316	147	261	7.8	4.1	26
29	10	83	168	359	---	584	213	104	166	8.6	3.9	21
30	17	71	157	291	---	388	174	85	123	18	3.9	16
31	29	---	153	246	---	317	---	71	---	25	4.8	---
TOTAL	254.4	4091	11096	22142	10749	23642	25775	7928	17844	794.3	765.5	245.2
MEAN	8.21	136	358	714	384	763	859	256	595	25.6	24.7	8.17
MAX	29	653	1230	1980	1200	1900	2760	867	4340	96	102	44
MIN	5.5	20	53	137	140	136	174	71	19	7.8	3.9	3.5
AC-FT	505	8110	22010	43920	21320	46890	51120	15730	35390	1580	1520	486
CFSM	.02	.35	.93	1.86	1.00	1.98	2.23	.66	1.54	.07	.06	.02
IN.	.02	.40	1.07	2.14	1.04	2.28	2.49	.77	1.72	.08	.07	.02

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 1993, BY WATER YEAR (WY)

MEAN	117	269	569	605	822	812	748	551	465	135	46.2	106
MAX	1784	1143	1998	1980	2365	2467	4078	1701	2864	1949	346	2174
(WY)	1985	1975	1983	1962	1990	1990	1991	1966	1974	1989	1971	1974
MIN	1.66	11.1	33.5	55.9	80.4	112	90.6	58.2	8.91	1.81	1.78	1.58
(WY)	1984	1968	1982	1981	1964	1967	1971	1988	1972	1964	1969	1969

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1962 - 1993	
ANNUAL TOTAL	138215.0		125326.4			
ANNUAL MEAN	378		343		434	
HIGHEST ANNUAL MEAN					1074	1974
LOWEST ANNUAL MEAN					94.4	1963
HIGHEST DAILY MEAN	6970	Mar 11	4340	Jun 22	33100	Jun 9 1974
LOWEST DAILY MEAN	5.5	Oct 15	3.5	Sep 13	.00	Aug 24 1978
ANNUAL SEVEN-DAY MINIMUM	5.7	Oct 10	3.7	Sep 8	.05	Aug 22 1978
INSTANTANEOUS PEAK FLOW			4470	Jun 22	[a]52700	Jun 8 1974
INSTANTANEOUS PEAK STAGE			15.16	Jun 22	24.97	Jun 8 1974
INSTANTANEOUS LOW FLOW			3.3	Sep 14	.00	[b]Aug 9 1964
ANNUAL RUNOFF (AC-FT)	274100		248600		314800	
ANNUAL RUNOFF (CFSM)	.98		.89		1.13	
ANNUAL RUNOFF (INCHES)	13.35		12.11		15.33	
10 PERCENT EXCEEDS	972		1090		1220	
50 PERCENT EXCEEDS	116		107		95	
90 PERCENT EXCEEDS	11		5.9		6.0	

[a] From rating curve extended above 31,000 ft^3/s.
[b] No flow part of day. Also Aug. 24-27, 1978.
[e] Estimated

07363500 SALINE RIVER NEAR RYE

LOCATION.--Lat 33°42'03", long 92°01'33", in SW1/4NW1/4 sec.3, T.12 S., R.9 W., Bradley County, Hydrologic Unit 08040204, near left bank on downstream side of bridge on State Highway 15, 3.6 mi southwest of Rye, 5.8 mi upstream from Hudgin Creek, and at mile 71.0.

DRAINAGE AREA.--2,102 mi^2.

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

REVISED RECORDS.--WRD Ark. 1979: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 97.06 ft above National Geodetic Vertical datum of 1929. Prior to May 30, 1939, nonrecording gage at present site and datum.

REMARKS.--Records fair. Satellite telemeter at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of April 1927 reached a stage of 30.5 ft, discharge, about 73,000 ft^3/s.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	184	76	989	1280	4280	2620	1800	3840	678	457	80	64
2	160	74	812	1120	4180	3180	1550	4260	622	385	74	52
3	142	74	689	1050	3460	3890	1390	4790	548	332	69	49
4	129	89	601	1040	2210	4280	1290	5250	502	289	71	45
5	116	86	541	1280	1520	4530	1380	5630	462	254	69	46
6	109	82	499	1490	1270	4630	1570	5930	430	224	111	46
7	102	90	468	1850	1120	4650	1590	6110	395	199	128	49
8	95	93	428	2350	1030	4610	4610	6150	362	182	135	45
9	89	102	425	2780	970	4580	6890	6130	335	166	189	44
10	86	101	431	3160	918	4550	7320	6090	311	152	598	40
11	79	93	445	3540	979	4300	6830	5880	287	145	882	38
12	75	98	464	3910	1030	3470	6070	5410	268	140	787	42
13	73	97	747	4260	1030	2220	5210	4560	254	125	515	e42
14	70	94	1200	4560	1370	1490	4360	3830	453	117	319	42
15	69	94	1320	4610	1860	1230	5220	3550	1220	113	238	41
16	71	117	1180	4270	2620	1160	5840	3630	1650	109	182	39
17	76	249	1130	3510	3370	1440	5680	3890	1640	105	152	39
18	71	305	1520	2620	2910	1530	5550	4290	1210	98	131	39
19	62	276	1930	2420	2670	1810	5270	4780	e910	94	121	37
20	58	238	2010	2630	2660	2380	5060	4960	e917	92	116	37
21	57	206	3140	2960	2710	3180	5030	4150	e812	91	107	36
22	57	195	3590	3190	2550	3360	5390	3080	636	87	88	34
23	57	189	4360	3240	2090	3550	5980	2380	543	87	80	43
24	58	620	5290	3520	1740	3710	6420	2320	482	85	69	104
25	58	1320	6000	4120	1650	3510	6600	2040	530	80	80	125
26	58	e1640	6410	4180	1770	3340	6580	1510	549	77	74	145
27	72	e1910	6360	4120	1850	3230	6070	1150	839	78	74	143
28	70	e1950	5910	4060	2180	3110	5040	982	867	84	73	137
29	66	1770	5030	4040	---	2900	4080	885	665	108	65	133
30	64	1350	3360	4040	---	2370	3780	797	545	106	59	137
31	64	---	1780	4160	---	1950	---	721	---	91	62	---
TOTAL	2597	13678	69059	95360	57997	96760	139450	118975	19922	4752	5798	1913
MEAN	83.8	456	2228	3076	2071	3121	4648	3838	664	153	187	63.8
MAX	184	1950	6410	4610	4280	4650	7320	6150	1650	457	882	145
MIN	57	74	425	1040	918	1160	1290	721	254	77	59	34
AC-FT	5150	27130	137000	189100	115000	191900	276600	236000	39520	9430	11500	3790
CFSM	.04	.22	1.06	1.46	.99	1.48	2.21	1.83	.32	.07	.09	.03
IN.	.05	.24	1.22	1.69	1.03	1.71	2.47	2.11	.35	.08	.10	.03

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 1993, BY WATER YEAR (WY)

MEAN	513	1218	2881	3865	5179	5301	5453	4935	1539	600	289	362
MAX	10570	9690	13280	14830	16710	13920	16340	21470	11950	8191	1573	4511
(WY)	1985	1958	1974	1946	1950	1945	1973	1958	1974	1989	1971	1950
MIN	15.4	50.7	111	143	553	706	640	352	80.5	32.5	10.6	4.95
(WY)	1939	1940	1940	1956	1963	1940	1972	1992	1972	1954	1954	1954

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1938 - 1993	
ANNUAL TOTAL	572069		626261			
ANNUAL MEAN	1563		1716		2665	
HIGHEST ANNUAL MEAN					5436	1973
LOWEST ANNUAL MEAN					704	1972
HIGHEST DAILY MEAN	11600	Mar 19	7320	Apr 10	72500	May 18 1968
LOWEST DAILY MEAN	57	Oct 21	34	Sep 22	3.8	Sep 16 1954
ANNUAL SEVEN-DAY MINIMUM	58	Oct 20	37	Sep 16	4.0	Sep 15 1954
INSTANTANEOUS PEAK FLOW			7390	Apr 10	74500	May 18 1968
INSTANTANEOUS PEAK STAGE			[a]19.30	Apr 10	31.40	May 18 1968
INSTANTANEOUS LOW FLOW			33	[b]Sep 22	3.5	[c]Sep 27 1954
ANNUAL RUNOFF (AC-FT)	1135000		1242000		1931000	
ANNUAL RUNOFF (CFSM)	.74		.82		1.27	
ANNUAL RUNOFF (INCHES)	10.12		11.08		17.22	
10 PERCENT EXCEEDS	4800		4780		7550	
50 PERCENT EXCEEDS	697		839		668	
90 PERCENT EXCEEDS	94		66		65	

[a] From graph based on partial gage-height record.
[b] Also Sept. 23.
[c] Also Sept. 28, 1954.
[e] Estimated

07369680 BAYOU MACON AT EUDORA

LOCATION.--Lat 33°06'09", long 91°15'08", in SE1/4SE1/4 sec.25, T.18 S., R.2 W., Chicot County, Hydrologic Unit 08030100, near left bank on downstream side of bridge on U.S. Highway 65, 0.6 mi south of Eudora.

DRAINAGE AREA.--500 mi^2.

PERIOD OF RECORD.--October 1988 to current year. Gage-height record and results of discharge measurements since January 1938, are contained in reports of the U.S. Army Corps of Engineers.

GAGE.--Water-stage recorder. Datum of gage is 80.92 ft above National Geodetic Vertical Datum of 1929. Satellite telemeter at station.

REMARKS.--No estimated daily discharges. Records good. Satellite telemeter at station.

COOPERATION.--Gage-height record provided by the U.S. Army Corps of Engineers.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1938, 27.43 ft May 10, 22, 1958.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	57	85	59	99	89	76	163	931	124	157	135	85
2	56	88	55	93	86	247	123	1030	118	119	141	97
3	56	53	52	87	83	232	113	817	114	100	143	102
4	56	53	59	96	81	162	98	515	103	85	125	96
5	56	54	69	162	78	140	94	244	99	83	130	92
6	55	58	73	114	76	113	80	180	85	84	165	91
7	55	53	69	103	76	101	215	151	85	86	266	88
8	55	49	62	175	76	94	1830	125	85	84	205	87
9	55	48	123	148	75	87	2510	107	84	81	174	83
10	55	46	209	130	79	82	2040	201	83	72	155	82
11	55	44	151	215	93	72	1210	200	90	64	131	81
12	54	52	112	220	94	75	663	174	108	137	112	83
13	54	57	95	171	96	75	473	253	106	311	98	84
14	54	52	86	150	95	68	387	199	101	420	96	88
15	53	50	141	124	135	64	748	122	99	288	96	89
16	53	49	248	109	519	63	552	86	108	361	98	73
17	53	49	162	99	320	61	357	73	108	154	108	71
18	52	48	114	121	177	59	251	82	99	118	122	70
19	52	47	99	409	133	57	188	115	96	117	112	68
20	50	116	582	578	109	57	243	60	128	107	104	67
21	48	227	485	718	101	56	297	44	511	112	99	64
22	46	303	279	487	92	55	183	42	1470	339	99	63
23	45	302	334	302	86	67	143	41	1790	357	100	61
24	47	354	438	230	88	76	126	41	1310	239	96	59
25	47	337	272	181	90	90	142	58	762	173	100	58
26	49	180	213	144	88	74	328	61	504	136	103	56
27	52	112	171	124	81	60	233	75	352	112	105	54
28	46	85	138	115	77	54	164	70	280	109	98	53
29	44	71	120	108	---	49	138	134	229	109	93	51
30	46	64	113	100	---	74	203	166	185	121	91	50
31	45	---	107	94	---	400	---	141	---	121	87	---
TOTAL	1601	3186	5290	6006	3273	3040	14295	6538	9416	4956	3787	2246
MEAN	51.6	106	171	194	117	98.1	476	211	314	160	122	74.9
MAX	57	354	582	718	519	400	2510	1030	1790	420	266	102
MIN	44	44	52	87	75	49	80	41	83	64	87	50
AC-FT	3180	6320	10490	11910	6490	6030	28350	12970	18680	9830	7510	4450

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 1993, BY WATER YEAR (WY)

MEAN	91.1	130	327	439	574	346	405	465	217	261	156	85.6
MAX	166	218	651	759	1173	625	1053	1510	330	782	368	95.3
(WY)	1992	1992	1991	1990	1991	1990	1991	1991	1989	1989	1992	1990
MIN	51.6	89.3	139	165	117	98.1	91.1	72.0	135	96.7	89.3	74.9
(WY)	1993	1991	1990	1992	1993	1993	1992	1992	1992	1990	1989	1993

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1989 - 1993	
ANNUAL TOTAL	58522		63634			
ANNUAL MEAN	160		174		290	
HIGHEST ANNUAL MEAN					493	1991
LOWEST ANNUAL MEAN					174	1993
HIGHEST DAILY MEAN	1450	Feb 15	2510	Apr 9	3200	Apr 30 1991
LOWEST DAILY MEAN	44	Oct 29	41	May 23	1.7	Sep 23 1988
ANNUAL SEVEN-DAY MINIMUM	47	Oct 25	47	Oct 25	34	Sep 28 1988
INSTANTANEOUS PEAK FLOW			2580	Apr 9	3200	Apr 29 1991
INSTANTANEOUS PEAK STAGE			16.08	Apr 9	24.41	Apr 29 1991
INSTANTANEOUS LOW FLOW			41	[a]May 22	41	[a]May 22 1993
ANNUAL RUNOFF (AC-FT)	116100		126200		210100	
10 PERCENT EXCEEDS	324		335		643	
50 PERCENT EXCEEDS	108		99		111	
90 PERCENT EXCEEDS	53		53		64	

[a] Also May 23, 24.

07364150 BAYOU BARTHOLOMEW NEAR MCGEHEE

LOCATION.--Lat 33°37'40", long 91°26'45", in NE1/4SW1/4 sec.30, T.12 S., R.3 W., Desha County, Hydrologic Unit 08050001, near center of stream on downstream side of bridge on State Highway 4, 2.7 mi west of McGehee, 17.5 mi downstream from Ables Creek, at mile 200.5.

DRAINAGE AREA.--576 mi^2.

PERIOD OF RECORD.--October 1938 to September 1942, October 1945 to current year. Gage-height records collected and occasional discharge measurements made by U.S. Army Corps of Engineers at this site since August 1938. Daily stages 1940 to date and results of discharge measurements 1938, 1947 to date are published in reports of U.S. Army Corps of Engineers.

REVISED RECORDS.--WRD Ark. 1979: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 120.48 ft above National Geodetic Vertical Datum of 1929, supplementary adjustment of 1941. Prior to Sept. 7, 1949, nonrecording gage at same site. October 1938 to June 6, 1972, at datum 1.00 ft higher. Since Jan. 20, 1971, auxiliary water-stage recorder 14 mi upstream.

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

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1930, that of May 11, 1958. Flood in 1932 reached a stage of 23.4 ft, present datum, from floodmarks.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	26	15	22	482	e1000	387	391	1180	206	115	55	74
2	27	15	18	441	e990	372	401	1230	205	100	49	70
3	27	16	15	402	878	406	400	1290	187	87	48	71
4	26	18	14	361	821	431	392	1320	164	76	52	73
5	26	18	13	336	762	468	379	1350	146	66	63	74
6	25	17	12	308	700	472	361	1380	133	59	110	73
7	24	16	13	279	638	474	347	1380	125	53	183	70
8	23	15	14	251	584	476	e500	1350	119	45	250	68
9	22	15	18	238	557	475	e750	1300	112	39	307	69
10	21	15	25	250	472	469	e1000	1250	108	32	357	70
11	21	15	34	293	417	460	e1400	1170	107	28	439	70
12	20	15	41	355	377	449	e1800	1090	105	50	528	69
13	19	15	47	390	335	438	e2400	1000	102	60	600	67
14	18	15	55	401	302	424	2530	918	95	67	651	72
15	18	15	74	403	282	407	2720	841	87	55	671	87
16	18	15	109	402	307	386	2760	773	79	42	658	107
17	18	14	137	398	383	374	2740	715	76	33	617	121
18	17	14	148	425	461	356	2720	666	73	27	559	129
19	17	13	145	545	495	346	2700	618	67	30	488	133
20	16	13	200	e600	517	342	2650	571	64	46	417	135
21	16	14	283	e650	529	347	2560	524	69	59	364	135
22	15	18	356	e700	534	357	2450	475	74	63	305	133
23	15	30	417	e750	519	388	2290	422	77	58	e250	128
24	15	58	479	e800	494	411	2120	384	82	55	e220	122
25	15	71	516	e850	460	430	1960	361	87	59	e200	115
26	15	68	565	e900	434	436	1810	298	87	63	e180	132
27	16	58	619	e950	420	425	1670	259	91	62	e160	140
28	16	45	509	e1000	407	412	1520	229	102	62	e140	127
29	16	36	512	e1100	---	401	1380	205	124	64	e120	119
30	15	27	509	e1100	---	389	1270	188	126	63	e100	111
31	15	---	501	e1000	---	382	---	192	---	59	80	---
TOTAL	598	729	6420	17360	15075	12790	48371	24929	3279	1777	9221	2964
MEAN	19.3	24.3	207	560	538	413	1612	804	109	57.3	297	98.8
MAX	27	71	619	1100	1000	476	2760	1380	206	115	671	140
MIN	15	13	12	238	282	342	347	188	64	27	48	67
AC-FT	1190	1450	12730	34430	29900	25370	95940	49450	6500	3520	18290	5880
CFSM	.03	.04	.36	.97	.93	.72	2.80	1.40	.19	.10	.52	.17
IN.	.04	.05	.41	1.12	.97	.83	3.12	1.61	.21	.11	.60	.19

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 1993, BY WATER YEAR (WY)

MEAN	183	366	741	1034	1417	1356	1241	1119	485	221	158	164
MAX	1491	2240	2835	3900	5085	3099	3127	5972	2575	3688	1032	1792
(WY)	1985	1958	1973	1946	1990	1948	1991	1958	1974	1989	1989	1974
MIN	12.5	13.9	31.9	39.3	98.6	189	82.8	73.0	22.1	6.03	.44	18.7
(WY)	1989	1968	1982	1966	1963	1954	1966	1965	1972	1954	1956	1956

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1939 - 1993	
ANNUAL TOTAL	194175		143513			
ANNUAL MEAN	531		393		703	
HIGHEST ANNUAL MEAN					1488	1973
LOWEST ANNUAL MEAN					149	1972
HIGHEST DAILY MEAN	3730	Mar 14	2760	Apr 16	6870	May 11 1958
LOWEST DAILY MEAN	12	Dec 6	12	Dec 6	.20	Aug 15 1956
ANNUAL SEVEN-DAY MINIMUM	14	Dec 2	14	Dec 2	.20	Aug 15 1956
INSTANTANEOUS PEAK FLOW			2760	Apr 16	6870	May 11 1958
INSTANTANEOUS PEAK STAGE			16.19	Apr 16	25.49	May 11 1958
INSTANTANEOUS LOW FLOW			12	[a]Dec 6	.20	[b]Aug 15 1956
ANNUAL RUNOFF (AC-FT)	385100		284700		509500	
ANNUAL RUNOFF (CFSM)	.92		.68		1.22	
ANNUAL RUNOFF (INCHES)	12.54		9.27		16.59	
10 PERCENT EXCEEDS	1520		1000		2040	
50 PERCENT EXCEEDS	282		188		253	
90 PERCENT EXCEEDS	17		17		32	

[a] Also Dec. 7.
[b] Also Aug. 16-23, 1956.
[e] Estimated

DAILY STAGES FOR 1993

35285 RED RIVER AT SHREVEPORT, LA STATION NO. R- 4

LOCATION. LAT. 32-30-55, LONG. 93-44-25. ILLINOIS CENTRAL RAILROAD BRIDGE AT MILE 277.4.

GAGE. SATELLITE.

DISCHARGE RANGE. U. S. HIGHWAY 80 BRIDGE AT MILE 277.7.

GENERAL INFORMATION
DRAINAGE AREA, 70,613 SQUARE MILES (54,677, SURFACE RUNOFF).
BANKFULL STAGE 30 FEET. MEAN HIGH WATER STAGE, 25.0 FEET, AND MEAN LOW WATER STAGE, 4.6 FEET (1938-1970). FLOW PARTLY REGULATED BY DENSION, TEXARKANA, AND FERRELLS BRIDGE DAMS.

RECORDS AVAILABLE. STAGE, MAY 1873 TO DADE. ZERO GAGE PRIOR TO 1926 WAS TEN FEET HIGHER THAN PRESENT DATUM. DISCHARGE, 1872 INTERMITTENTLY TO 1905 AND AUG. 1929 TO DATE. COMPUTED DAILY SINCE JULY 31, 1928. ALSO IN REPORTS OF U. S. GEOLOGICAL SURVEY.

EXTREMES. HIGHEST, 45.9 FEET (PRESENT DATUM) FROM WATERMARK IN AUG. 1849 (AFFECTED BY HUGHE LOG RAFT). LOWEST, 0.2 FOOT ON NOV. 8 AND 9, 1939. MAXIMUM, 303,000 CFS OBSERVED ON APR. 5, 1945 MINIMUM, 690 CFS COMPUTED FOR OCT. 30, 1956 (STAGE, 2.72).

DAILY EIGHT A.M. STAGE IN FEET GAGE ZERO, 131.48 FEET, NVGD (1929-41 ADJ.)

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	16.50	11.00	16.30	13.30	10.00	15.80	8.10	5.00	3.50	4.50	11.20	8.00
2	16.30	10.80	16.30	11.80	11.90	15.90	8.00	5.20	3.50	4.60	10.40	8.00
3	16.20	10.60	16.30	11.20	12.80	15.80	8.00	5.20	3.70	4.70	10.10	8.30
4	14.80	10.40	16.40	11.40	13.10	15.00	7.80	5.40	3.60	4.70	9.30	13.10
5	14.60	9.80	15.60	11.50	12.10	14.90	7.40	5.70	3.50	4.60	9.30	16.00
6	14.00	9.80	15.00	11.60	11.80	14.80	7.00	5.70	3.40	4.70	9.20	18.00
7	14.40	9.80	15.60	11.90	11.30	14.80	6.50	6.30	3.30	5.00	9.20	18.50
8	14.40	10.20	17.30	12.80	11.30	14.00	5.00	6.30	3.30	5.20	9.00	17.80
9	14.40	10.10	19.70	9.80	12.90	14.70	6.10	6.00	3.40	5.30	8.80	17.70
10	14.70	9.50	18.00	13.00	13.30	14.00	5.80	5.60	3.50	5.30	8.20	17.20
11	14.40	9.40	17.60	13.40	14.80	14.00	5.40	5.30	3.20	5.00	8.00	17.70
12	13.70	9.00	15.60	13.70	16.40	14.00	5.40	5.20	3.10	5.00	7.50	18.00
13	13.50	9.70	15.30	13.90	19.60	14.10	5.00	5.20	3.20	5.40	7.70	18.00
14	13.60	9.20	15.40	15.20	18.60	13.90	4.70	5.20	3.20	5.70	7.60	17.10
15	13.60	9.60	15.00	15.40	17.00	13.80	8.80	5.10	3.20	5.90	7.60	16.10
16	13.60	10.00	14.20	14.00	16.00	13.80	3.80	4.80	3.20	6.20	7.70	15.60
17	13.30	11.00	13.00	13.10	16.00	12.60	3.50	4.60	3.20	6.40	8.30	15.20
18	13.30	15.00	13.60	13.10	16.90	11.00	3.80	4.40	3.30	6.70	9.00	15.40
19	13.50	15.40	13.70	13.50	17.40	11.50	4.00	4.20	3.50	7.30	10.20	15.00
20	13.60	15.00	16.00	14.20	18.70	13.30	4.30	4.00	3.80	8.90	11.50	14.00
21	13.70	15.10	16.30	14.50	18.00	13.40	4.50	4.00	4.40	12.80	11.30	13.20
22	13.40	15.40	16.70	14.60	17.60	10.20	4.40	3.90	5.10	15.40	11.20	12.90
23	13.40	15.20	16.90	15.90	17.60	10.30	4.20	3.80	5.10	17.00	10.80	12.10
24	14.50	15.20	16.90	14.30	17.00	10.20	4.00	3.70	5.10	16.40	10.50	11.00
25	14.30	15.20	17.00	15.80	16.90	9.30	3.60	3.70	4.80	15.30	9.60	10.10
26	14.20	15.40	15.80	14.20	16.60	9.40	3.50	3.60	5.40	15.30	9.20	9.70
27	14.60	16.00	15.00	13.00	16.00	8.10	3.40	3.50	5.40	14.50	8.90	9.30
28	13.90	16.20	15.00	12.80	15.90	8.20	3.80	3.40	5.60	14.20	8.50	9.00
29	13.50	---	14.80	10.80	16.00	8.10	4.70	3.50	5.00	13.90	8.20	9.00
30	12.80	---	14.40	10.80	15.70	8.10	4.70	3.70	4.60	12.10	8.20	9.20
31	11.60	---	14.30	---	15.90	---	4.80	3.60	---	11.90	---	8.60
THE FOLLOWING REFER TO READINGS IN THE TABLE ABOVE												
MAX	16.50	16.20	19.70	15.90	19.60	15.90	8.10	6.30	5.60	17.00	11.50	18.50
MIN	11.60	9.00	13.00	9.80	10.00	8.10	3.40	3.40	3.10	4.50	7.50	8.00

HIGHEST STAGE WAS 18.50 07 DEC 1993
LOWEST STAGE WAS 3.10 12 SEP 1993

DAILY STAGES FOR 1993

35325 RED RIVER AT ALEXANDRIA, LA.

LOCATION. LAT. 31-18-46, LONG. 92-26-34. U. S. HIGHWAY 165 BRIDGE AT MILE 104.9.

GAGE. AUTOMATIC RECORDER AND WIRE WEIGHT.

GENERAL INFORMATION. DRAINAGE AREA, 67,500 SQUARE MILES (61,564, SURFACE RUNOFF). BANKFULL STAGE, 34 FEET. MEAN HIGH WATER STAGE, 32.6 FEET, AND MEAN LOW WATER STAGE, 0.2 FOOT (1938-1970).

RECORDS AVAILABLE. STAGE, 1872 TO DATE. DISCHARGE, 1858 AND 1879 INTERMITTENTLY TO DATE. COMPUTED DAILY, 1928 TO DATE. OCT. 1928 TO DATE IN REPORTS OF U.S. GEOLOGICAL SURVEY.

EXTREMES. HIGHEST, 45.2 FEET FROM APR. 16 TO 18, 1945. LOWEST, MINUS 3.7 FEET ON SEP. 29, 1881. MAXIMUM, 233,000 CFS OBSERVED ON APR. 17, 1945. MINIMUM, 873 CFS COMPUTED FOR OCT. 30, 1956 (MINUS 3.01). DISCHARGE NOT DETERMINED FOR LOW STAGE.

DAILY EIGHT A.M. STAGE IN FEET GAGE ZERO, 44.26 FEET, NGVD

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	25.30	23.50	24.40	24.60	21.30	23.40	22.00	20.10	20.10	20.30	21.90	20.70
2	25.30	23.30	24.60	24.50	21.40	23.40	21.60	20.00	20.10	20.20	21.90	20.60
3	24.30	22.60	24.70	24.40	21.40	23.30	21.40	20.10	20.20	20.10	21.80	20.50
4	24.30	22.40	24.80	23.60	21.60	23.20	21.30	20.10	20.10	20.10	21.70	20.40
5	24.30	22.30	25.00	23.30	21.80	23.20	21.00	20.20	19.80	20.00	21.60	20.60
6	23.90	22.00	25.60	23.30	22.40	23.00	20.70	20.10	19.70	20.10	20.90	20.90
7	23.70	21.80	25.80	22.80	22.60	22.80	20.60	20.40	19.80	20.20	20.70	22.30
8	23.60	21.70	25.80	22.70	22.30	22.70	20.50	20.40	19.70	20.40	20.70	22.80
9	23.50	21.70	25.70	23.80	22.10	22.70	20.40	20.50	19.70	20.50	20.60	23.50
10	23.30	21.60	25.70	25.10	22.00	22.90	20.30	20.40	19.80	20.90	20.60	23.60
11	23.20	21.70	25.70	25.40	22.20	23.10	20.30	20.30	20.20	20.90	20.50	24.50
12	23.50	21.70	25.70	25.30	22.30	22.80	20.30	20.30	20.10	20.80	20.40	24.50
13	23.60	21.60	25.50	25.20	22.70	22.70	20.20	20.20	20.20	20.80	20.40	24.40
14	23.70	21.60	25.50	24.90	23.90	22.60	20.20	20.40	20.20	20.60	20.40	24.40
15	23.70	21.50	25.40	24.30	25.10	22.60	20.30	20.40	20.10	20.40	20.60	24.70
16	23.60	21.40	25.40	24.00	25.10	22.50	20.30	20.40	20.20	20.30	20.50	24.60
17	23.50	21.60	25.20	23.30	24.70	22.50	20.10	20.30	20.20	20.40	20.60	24.40
18	23.40	21.80	24.90	23.30	23.90	22.40	20.10	20.30	20.20	20.40	20.70	24.10
19	23.40	22.40	24.60	22.70	23.90	21.90	20.10	20.20	20.20	20.40	20.80	23.90
20	23.40	23.90	24.50	22.90	24.10	21.80	20.10	20.20	20.20	20.30	21.00	23.70
21	24.20	24.20	24.40	23.30	24.30	21.80	20.10	20.20	20.20	20.40	21.20	23.50
22	24.30	24.40	24.40	23.40	24.30	22.10	20.00	20.10	20.20	20.40	21.40	23.10
23	24.30	24.40	24.60	24.30	24.50	22.50	20.10	20.10	20.30	21.20	21.40	22.80
24	24.30	24.30	24.90	24.30	24.40	22.90	20.20	20.10	20.30	21.20	21.50	22.70
25	24.40	24.10	25.30	24.30	24.40	23.10	20.10	20.10	20.30	22.30	21.40	22.60
26	24.30	24.20	25.60	23.90	24.30	22.40	20.20	20.10	20.40	22.80	21.40	22.40
27	24.30	24.30	25.60	23.60	24.60	22.40	20.20	20.10	20.40	23.20	21.30	22.10
28	24.20	24.40	25.20	22.80	24.60	22.30	20.20	20.10	20.40	23.10	21.30	21.80
29	24.20	---	25.20	22.50	23.80	22.20	20.20	19.80	20.40	22.80	21.20	21.70
30	24.10	---	25.20	22.30	23.60	22.20	20.10	19.70	20.40	22.60	20.80	21.50
31	23.80	---	24.80	---	23.50	---	20.10	20.10	---	22.40	---	21.30
MAX	25.30	24.40	25.80	25.40	25.10	23.40	22.00	20.50	20.40	23.20	21.90	24.70
MIN	23.20	21.40	24.40	22.30	21.30	21.80	20.00	19.70	19.70	20.00	20.40	20.40

HIGHEST STAGE WAS 25.80 07-08 MAR 1993
LOWEST STAGE WAS 19.70 30 AUG; 06, 08-09 SEP 1993

07348000 TWELVEMILE BAYOU NEAR DIXIE, LA

LOCATION.--Lat 32°38'45", long 93°52'40", in NW 1/4 NW 1/4 sec.14, T.19 N., R.15 W., Caddo Parish, Hydrologic Unit 11140304, near right bank on downstream side of pier of bridge on State Highway 173, 0.1 mi downstream from Cottonwood Bayou, 4.2 mi southwest of Dixie, 5.5 mi downstream from Caddo Lake, and 17.3 mi upstream from mouth.

DRAINAGE AREA.--3,137 mi^2.

PERIOD OF RECORD.--August 1942 to current year.

REVISED RECORDS.--WSP 1211: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 136.12 ft above sea level. Prior to Sept. 5, 1947, nonrecording gage and Sept. 5, 1947 to June 26, 1978, water-stage recorder at present site. Oct. 1, 1950, to June 26, 1978, at datum 3.88 ft higher and prior to Oct. 1, 1950, at datum 5.88 ft higher.
Nonrecording gage for Twelvemile Bayou near Mooringsport (station 07347950) used as supplementary gage June 27, 1978, to May 7, 1981. Datum of supplementary gage, 140.00 ft above sea level (levels by Corps of Engineers).
Water-stage recorder for Twelvemile Bayou below Dixie (station 07348010) used as auxiliary gage for this station. Prior to May 7, 1981, nonrecording gage for Red River at Shreveport (station 07348500) used as auxiliary gage.

REMARKS.--Estimated daily discharges. Indefinite stage-discharge relationship: Sept. 8-16. No base gage height: July 17 to Aug. 4. Records fair. Flow regulated by three reservoirs (combined usable capacity, 1,033,700 acre-ft of which 587,0200 acre-ft are available for storage) since August 1957. Several measurements of water temperature were made during the year.

AVERAGE DISCHARGE.--51 years, 3,310 ft^3/s, 1,914,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 38,400 ft^3/s, May 5, 1958; maximum daily reverse flow, 50 ft^3/s, Aug. 5, 1975 (backwater from Red River); maximum gage height, 41.53 ft, Apr. 5, 1945, and May 5, 1958, present datum; minimum discharge (unaffected by backwater), 0.08 ft^3/s, Aug. 24, 1972.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 10,800 ft^3/s, Jan. 21; minimum daily discharge, 11 ft^3/s, Sept. 12, 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1630	487	3150	6220	7800	6760	7340	2130	899	5080	e60	21
2	1710	652	3250	5940	7260	8240	6260	2070	890	4470	e85	17
3	1680	605	3100	5720	6990	8290	5410	1990	847	3840	e117	14
4	1680	684	3300	6500	6740	8070	5090	1600	843	3290	e250	13
5	1590	616	3140	7390	6470	7880	4810	1530	804	2850	186	15
6	1380	531	3420	7040	6270	7660	4060	1560	802	2410	152	14
7	1160	538	3300	6770	5980	7520	3500	1560	800	2050	230	e14
8	1120	540	2990	6940	5760	7190	4840	1400	803	1720	520	e13
9	823	537	2910	7200	5550	7020	4890	1300	777	1400	612	e13
10	688	584	2830	8560	5440	6850	4290	1590	743	1120	571	e12
11	598	609	2430	8840	5680	6460	4090	1330	718	1020	509	e12
12	520	926	2040	9350	5830	6630	3860	1320	734	858	467	e11
13	431	852	1790	9670	5420	7590	3710	1340	709	687	422	e12
14	336	817	1750	9600	5300	6810	3760	1370	680	564	373	e13
15	268	773	5130	9510	5250	5950	4830	1280	673	454	333	e12
16	389	749	7540	9370	7220	6880	4450	1150	660	399	287	e11
17	280	741	7460	9110	7350	9370	4120	1110	596	e350	240	12
18	299	757	7520	9200	7120	8890	3930	1130	581	e300	187	14
19	258	755	8150	10100	6860	8370	3720	1160	553	e250	159	15
20	239	930	9060	10600	6980	8520	3730	1150	1070	e200	137	14
21	219	1080	9890	10800	7270	9630	3560	1160	2700	e150	94	13
22	191	1940	10400	10800	6750	9940	3360	1140	3610	e110	69	17
23	163	1800	10600	10600	6440	9880	3310	1110	4190	e90	59	22
24	156	1840	10300	10400	6030	9380	3310	1100	4750	e80	45	19
25	143	2320	9750	9960	6420	9270	3330	1090	5460	e70	36	15
26	130	2380	9030	9680	7430	9120	3310	1060	6950	e65	32	48
27	119	2490	8400	9370	7120	8670	3050	1030	7180	e60	26	43
28	86	2620	7810	9050	7010	8380	2840	970	6810	e55	22	44
29	75	2780	7310	8740	—	8050	2650	962	6250	e50	20	38
30	279	3120	6910	8440	—	7570	2450	936	5690	e45	20	29
31	328	—	6660	8190	—	7770	—	917	—	e45	19	—
TOTAL	18968	36053	181320	269660	181740	248610	121860	40545	68772	34132	6339	560
MEAN	612	1202	5849	8699	6491	8020	4062	1308	2292	1101	204	18.7
MAX	1710	3120	10600	10800	7800	9940	7340	2130	7180	5080	612	48
MIN	75	487	1750	5720	5250	5950	2450	917	553	45	19	11
AC-FT	37620	71510	359600	534900	360500	493100	241700	80420	136400	67700	12570	1110

CAL YR 1992 TOTAL 1176466 MEAN 3214 MAX 10600 MIN 75 AC-FT 2334000
WTR YR 1993 TOTAL 1208559 MEAN 3311 MAX 10800 MIN 11 AC-FT 2397000

e Estimated

RED RIVER BASIN

07348000 TWELVEMILE BAYOU NEAR DIXIE, LA--Continued

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10.11	6.31	13.81	20.06	19.78	20.76	19.91	12.03	13.96	15.61	---	4.65
2	10.07	6.87	13.80	19.61	18.98	22.62	18.38	12.24	13.83	14.70	---	4.63
3	9.97	6.68	13.52	19.13	18.58	22.87	17.01	12.32	13.49	13.78	---	4.62
4	9.84	6.96	13.71	19.54	18.19	23.10	16.24	12.41	13.32	12.86	---	4.61
5	9.48	6.73	13.37	20.56	17.78	22.98	16.00	12.52	13.08	12.02	5.22	4.62
6	8.96	6.44	13.54	20.00	17.47	22.38	15.43	12.09	12.87	11.24	5.09	4.61
7	8.38	6.45	13.28	19.96	17.07	22.03	15.19	11.50	12.97	10.55	5.40	4.54
8	8.28	6.46	12.68	20.11	16.77	21.93	17.34	11.06	13.01	9.82	6.39	4.18
9	7.41	6.45	12.40	20.13	16.54	21.91	17.57	11.19	12.80	9.03	6.73	3.85
10	6.96	6.60	12.12	21.96	16.42	21.51	17.05	12.54	12.35	8.31	6.60	3.83
11	6.67	6.69	11.32	22.08	16.73	20.50	16.19	13.31	12.08	8.01	6.39	3.98
12	6.40	7.68	10.66	22.77	16.82	20.60	15.50	15.70	12.11	7.53	6.25	4.10
13	6.13	7.51	10.29	23.12	16.19	21.02	14.89	17.24	12.06	6.94	6.11	4.23
14	5.81	7.39	10.29	22.98	16.02	19.78	14.57	17.37	11.87	6.50	5.95	4.38
15	5.58	7.25	15.90	22.86	16.34	18.85	15.96	15.53	11.92	6.14	5.81	4.52
16	5.98	7.17	19.86	22.70	19.28	20.42	15.13	14.62	11.75	5.94	5.66	4.58
17	5.62	7.14	21.09	22.22	19.25	23.02	14.85	14.62	10.97	---	5.49	4.60
18	5.68	7.19	21.95	22.31	19.60	22.18	15.48	15.06	10.72	---	5.30	4.61
19	5.54	7.19	22.93	23.81	19.98	21.82	16.19	15.70	10.29	---	5.19	4.62
20	5.47	7.72	24.08	24.62	20.19	22.49	16.78	16.10	11.03	---	5.09	4.62
21	5.40	8.14	24.93	24.90	20.34	23.93	16.98	16.22	14.96	---	4.95	4.61
22	5.30	10.26	25.64	24.78	19.65	24.38	17.06	15.96	16.07	---	4.85	4.64
23	5.19	9.99	26.13	24.47	19.33	24.45	16.80	15.47	16.06	---	4.81	4.66
24	5.15	10.05	25.84	24.31	19.00	24.01	16.13	15.32	16.14	---	4.75	4.66
25	5.09	11.01	25.23	23.73	19.68	23.64	15.21	15.25	16.61	---	4.72	4.64
26	5.03	11.24	24.40	23.31	20.71	23.10	14.26	15.07	18.48	---	4.70	4.78
27	5.00	11.84	23.58	22.72	20.63	22.55	13.20	14.59	18.81	---	4.68	4.76
28	4.91	12.62	22.69	22.20	20.75	22.07	12.42	14.20	18.17	---	4.66	4.77
29	4.86	13.22	21.79	21.68	---	21.43	11.93	14.19	17.34	---	4.65	4.75
30	5.61	13.86	21.08	21.07	---	20.88	11.81	14.10	16.51	---	4.65	4.72
31	5.78	---	20.66	20.48	---	20.87	---	13.95	---	---	4.64	---
MAX	10.11	13.86	26.13	24.90	20.75	24.45	19.91	17.37	18.81	---	---	4.78
MIN	4.86	6.31	10.29	19.13	16.02	18.85	11.81	11.06	10.29	---	---	3.83

RED RIVER BASIN

07348000 TWELVEMILE BAYOU NEAR DIXIE, LA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1944, 1953-55, 1958-60, 1969-70, 1978 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: April 1978 to September 1981.
WATER TEMPERATURES: April 1978 to September 1981.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 3,970 micromhos Oct. 20, 1980; minimum daily, 76 micromhos Feb. 12, 1980.
WATER TEMPERATURES: Maximum daily, 36.0 °C June 27, 1978; minimum daily, 4.0 °C Jan. 14, Feb. 7, 1979.

EXTREMES OUTSIDE PERIOD OF DAILY RECORD.--A water temperature of 1.5 °C was observed Jan. 19, 1984.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	DISCHARGE, IN CUBIC FEET PER SECOND	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (NTU)	OXYGEN, DISSOLVED (MG/L)	OXYGEN DEMAND, BIOCHEMICAL, 5 DAY (MG/L)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS TOTAL (MG/L AS CACO3)
OCT 1992 29...	0655	75	333	7.38	20.0	5	3.3	8.5	2.1	K14	220	79
JAN 1993 15...	0830	9510	110	6.66	8.5	50	13	11.0	3.1	K33	K48	21
APR 14...	0900	3760	139	7.19	19.0	40	12	9.1	2.1	K40	K200	31
JUL 22...	1445	e 110	501	7.01	33.0	5	4.8	7.0	0.6	K3	K160	130

DATE	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	POTASSIUM, DISSOLVED (MG/L AS K)	ALKALINITY WAT WH TOT FET FIELD MG/L AS CACO3	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	NITROGEN, NITRITE TOTAL (MG/L AS N)
OCT 1992 29...	16	9.5	32	3.1	51	28	57	<0.1	8.0	196	185	0.01
JAN 1993 15...	4.2	2.5	9.9	3.0	12	14	15	<0.1	11	80	65	--
APR 14...	7.1	3.3	13	2.1	19	13	21	<0.1	4.2	95	75	--
JUL 22...	27	15	46	2.7	65	50	75	0.1	11	293	265	--

DATE	NITROGEN, NITRITE DISSOLVED (MG/L AS N)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N)	NITROGEN,AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS TOTAL (MG/L AS P)	PHOSPHORUS DISSOLVED (MG/L AS P)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P)	ALUMINUM, DISSOLVED (UG/L AS AL)	BARIUM, DISSOLVED (UG/L AS BA)	COBALT, DISSOLVED (UG/L AS CO)
OCT 1992 29...	<0.01	<0.05	<0.05	0.03	0.02	0.7	0.05	<0.01	<0.01	<10	73	<3
JAN 1993 15...	<0.01	--	0.06	--	0.03	0.5	0.05	0.02	<0.01	40	41	<3
APR 14...	<0.01	--	<0.05	--	0.03	0.5	0.03	0.01	<0.01	60	54	<3
JUL 22...	0.01	--	<0.05	--	0.02	0.8	0.03	<0.01	<0.01	10	96	<3

< Actual value is known to be less than the value shown.
K Results based on colony count outside the acceptable range (non-ideal colony count).
e Estimated

RED RIVER BASIN

07348000 TWELVEMILE BAYOU NEAR DIXIE, LA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	IRON, DIS-SOLVED (UG/L AS FE)	LITHIUM DIS-SOLVED (UG/L AS LI)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO)	NICKEL, DIS-SOLVED (UG/L AS NI)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	STRON-TIUM, DIS-SOLVED (UG/L AS SR)	VANA-DIUM, DIS-SOLVED (UG/L AS V)	SEDI-MENT, SUS-PENDED (MG/L)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
OCT 1992												
29...	4	7	60	<10	1	<1	<1	260	<6	22	4.5	83
JAN 1993												
15...	280	5	24	<10	2	<1	<1	69	<6	42	1100	54
APR												
14...	570	6	17	<10	2	<1	<1	110	<6	22	220	92
JUL												
22...	43	8	93	<10	<1	<1	<1	360	<6	--	--	--

< Actual value is known to be less than the value shown.

RED RIVER BASIN

07344410 RED RIVER ABOVE SHREVEPORT, LA (CE 04225)

LOCATION.--Lat 32°32'57", long 93°45'51", in lot 14, T. 18 N., R. 14 W., Caddo Parish, Hydrologic Unit 11140202, near right bank, 2.7 mi northeast of Shreveport Courthouse, 4.9 mi upstream from mouth of Cross Bayou, 5.4 mi upstream from gaging station at Illinois Central Railroad bridge at Shreveport (Station 07348500), and at mile 282.5.

DRAINAGE AREA.--57,100 mi^2, approximately, of which 5,936 mi^2 above Denison Dam is noncontributing.

PERIOD OF RECORD.--Water years 1974-84, 1986 to current year.

REMARKS.--Water-quality samples are non-integrated.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1974 to September 1975, October 1976 to September 1977.
WATER TEMPERATURES: October 1974 to September 1975, October 1976 to September 1977.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 1,880 micromhos June 5, 6, 1977; minimum daily, 163 micromhos Mar. 17, 1977.
WATER TEMPERATURES: Maximum daily, 32.0 °C July 25, 1977; minimum daily, 4.5 °C Jan. 19, 1977.

EXTREMES OUTSIDE PERIOD OF DAILY RECORD.--A water temperature of 2.5 °C was observed Jan. 15, 1976.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN DEMAND, CHEM-ICAL (HIGH LEVEL) (MG/L)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)
OCT 1992 28...	1630	884	7.90	20.5	15	4.9	10.2	29	3.1	440
NOV 19...	1245	690	8.14	15.0	20	18	10.4	27	3.2	--
DEC 18...	1110	355	8.12	8.5	40	140	10.0	25	3.5	7600
JAN 1993 14...	1220	430	7.49	8.5	40	55	11.6	27	3.5	5000
FEB 17...	1155	645	7.81	9.5	15	40	12.0	25	--	2600
MAR 16...	1200	782	7.91	12.0	40	120	10.8	15	1.6	2600
APR 14...	0705	644	7.90	17.0	30	85	9.1	24	1.9	K1300
MAY 11...	1050	877	7.91	21.0	5	85	8.5	22	1.3	K230
JUN 24...	1100	628	7.67	28.0	10	110	7.0	22	1.1	2300
JUL 22...	1330	866	8.00	32.0	10	2.0	8.4	59	3.5	K25
AUG 18...	1300	885	8.32	33.0	5	7.0	7.6	20	2.1	K40
SEP 16...	1145	951	8.22	21.5	10	9.0	7.0	20	1.5	K150

K Results based on colony count outside the acceptable range (non-ideal colony count).

RED RIVER BASIN

07344410 RED RIVER ABOVE SHREVEPORT, LA (CE.04225)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
OCT 1992										
28...	K62	K34	260	71	20	84	4.3	166	100	120
NOV										
19...	120	K25	200	55	15	63	4.0	144	73	85
DEC										
18...	1400	2100	91	26	6.4	30	3.1	62	40	43
JAN 1993										
14...	K120	K110	100	29	7.8	42	2.8	61	56	58
FEB										
17...	K220	K150	160	45	12	60	3.3	93	79	87
MAR										
16...	K100	K86	200	52	16	75	3.1	106	110	110
APR										
14...	K330	<20	180	48	14	61	3.2	107	89	89
MAY										
11...	--	K160	230	61	20	84	3.3	120	130	130
JUN										
24...	--	K60	180	49	14	52	3.5	115	86	78
JUL										
22...	K10	K16	260	78	16	71	4.1	191	110	92
AUG										
18...	K5	K10	270	71	23	78	3.9	165	130	100
SEP										
16...	K10	420	290	75	24	80	4.3	192	120	110

DATE	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)
OCT 1992									
28...	510	34	<0.01	<0.02	0.80	0.80	0.09	0.04	8.0
NOV									
19...	406	106	0.01	<0.02	0.74	0.74	0.06	0.04	--
DEC									
18...	202	290	0.03	0.17	0.88	1.0	0.27	0.19	6.9
JAN 1993									
14...	254	62	0.01	0.24	0.46	0.70	0.16	0.06	6.1
FEB									
17...	372	122	0.02	0.34	0.58	0.92	0.05	0.04	7.0
MAR									
16...	444	88	0.02	0.41	0.85	1.3	0.26	0.06	7.8
APR									
14...	390	114	0.01	0.33	0.35	0.68	0.12	0.05	7.8
MAY									
11...	528	270	0.01	0.39	0.57	0.96	0.10	0.05	6.7
JUN									
24...	382	240	0.03	0.40	0.73	1.1	0.22	0.22	8.0
JUL									
22...	510	4	<0.01	<0.02	0.80	0.80	0.05	0.03	8.3
AUG									
18...	534	44	<0.01	<0.02	0.80	0.80	0.07	0.02	5.9
SEP									
16...	566	36	0.01	<0.02	0.92	0.92	0.06	0.04	9.3

K Results based on colony count outside the acceptable range (non-ideal colony count).
< Actual value is known to be less than the value shown.

RED RIVER BASIN

07344410 RED RIVER ABOVE SHREVEPORT, LA (CE 04225)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	ARSENIC TOTAL (UG/L AS AS)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)	COPPER, TOTAL RECOVERABLE (UG/L AS CU)	IRON, TOTAL RECOVERABLE (UG/L AS FE)	LEAD, TOTAL RECOVERABLE (UG/L AS PB)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN)
OCT 1992 28...	1	<1	<1	2	6	720	1	140
JAN 1993 14...	1	2	<1	4	9	1900	2	61
APR 14...	4	<1	<1	5	6	3900	3	160
JUL 22...	1	<10	<1	<1	1	230	2	150

DATE	MERCURY TOTAL RECOVERABLE (UG/L AS HG)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI)	SELENIUM, TOTAL (UG/L AS SE)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)	CYANIDE TOTAL (MG/L AS CN)	PHENOLS TOTAL (UG/L)	OIL AND GREASE, TOTAL RECOV. GRAVIMETRIC (MG/L)
OCT 1992 28...	0.1	3	<1	10	0.01	<1	<1
JAN 1993 14...	<0.1	3	<1	10	<0.01	4	<1
APR 14...	<0.1	7	<1	20	<0.01	<1	<1
JUL 22...	<0.1	<1	<1	<10	<0.01	<1	2

DATE	PCB, TOTAL (UG/L)	NAPHTHALENES, POLYCHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLORDANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DIAZINON, TOTAL (UG/L)	DIELDRIN TOTAL (UG/L)	ENDOSULFAN, TOTAL (UG/L)
OCT 1992 28...	<0.1	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
DEC 18...	<0.1	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
FEB 17...	<0.1	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
APR 14...	<0.1	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
JUN 24...	<0.1	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

DATE	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTACHLOR, TOTAL (UG/L)	HEPTACHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALATHION, TOTAL (UG/L)	METHOXYCHLOR, TOTAL (UG/L)	METHYL PARATHION, TOTAL (UG/L)	METHYL TRITHION, TOTAL (UG/L)
OCT 1992 28...	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
DEC 18...	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
FEB 17...	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
APR 14...	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
JUN 24...	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

< Actual value is known to be less than the value shown.

RED RIVER BASIN

07344410 RED RIVER ABOVE SHREVEPORT, LA (CE 04225)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
OCT 1992									
28...	<0.01	<0.01	<0.01	<0.5	<0.01	<0.5	<0.5	<0.5	<0.5
DEC									
18...	<0.01	<0.01	<0.01	<0.5	<0.01	<0.5	<0.5	<0.5	<0.5
FEB									
17...	<0.01	<0.01	<0.01	<0.5	<0.01	<0.5	<0.5	<0.5	<0.5
APR									
14...	<0.01	<0.01	<0.01	<0.0	<0.01	<0.5	<0.5	<0.5	<0.5
JUN									
24...	<0.01	<0.01	<0.01	<0.5	<0.01	1.0	<0.5	<0.5	1.0

< Actual value is known to be less than the value shown.

RED RIVER BASIN

07350500 RED RIVER AT COUSHATTA, LA

LOCATION.--Lat 32°00'45", long 93°21'10", in lot 23, T. 12 N., R. 10 W., Red River Parish, Hydrologic Unit 08040301 at bridge on U.S. Highway 84 at Coushatta, 11.0 mi downstream from Coushatta Bayou, and at mile 242.4.

DRAINAGE AREA.--63,362 mi^2.

PERIOD OF RECORD.--Water years 1970-1976, 1987 to current year.

REMARKS.--Water-quality samples are non-integrated and collected from center span of bridge.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (NTU)	OXYGEN, DISSOLVED (MG/L)	OXYGEN DEMAND, CHEMICAL (HIGH LEVEL) (MG/L)	OXYGEN DEMAND, BIOCHEMICAL, 5 DAY (MG/L)	COLIFORM, TOTAL, IMMED. (COLS. PER 100 ML)
OCT 1992 28...	1500	886	8.03	--	20	12	9.9	33	2.7	220
NOV 19...	1100	547	8.14	15.0	20	12	10.3	29	3.1	--
DEC 18...	0955	388	8.03	8.0	50	150	10.0	31	3.2	4500
JAN 1993 14...	1045	343	7.47	8.0	40	100	11.3	29	3.4	2200
FEB 17...	1020	496	7.67	10.0	65	30	11.5	35	--	6600
MAR 16...	1010	697	8.06	12.0	30	100	10.8	15	1.6	K1600
APR 13...	1450	575	7.92	19.5	50	100	8.6	29	1.2	1200
MAY 11...	0855	747	7.74	21.0	20	70	8.3	36	1.2	K2200
JUN 24...	0910	446	7.65	26.0	5	80	6.9	24	1.7	K1900
JUL 22...	1100	843	8.05	32.0	5	2.5	7.6	31	3.6	K45
AUG 18...	1030	800	7.99	32.5	10	6.0	6.9	25	1.1	K10
SEP 16...	1000	902	8.17	22.5	5	11	6.5	<10	1.5	K110

DATE	COLIFORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS TOTAL (MG/L AS CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	POTASSIUM, DISSOLVED (MG/L AS K)	ALKALINITY WAT WH TOT FET FIELD MG/L AS CACO3	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)
OCT 1992 28...	K75	K74	270	73	21	82	4.3	186	95	110
NOV 19...	K160	100	160	43	13	44	3.6	136	46	57
DEC 18...	920	2200	94	26	7.1	34	3.2	70	44	48
JAN 1993 14...	K220	K75	83	23	6.2	31	2.6	50	42	44
FEB 17...	880	980	120	34	9.5	46	3.0	71	60	67
MAR 16...	--	K190	170	46	14	67	3.1	97	96	96
APR 13...	1000	K20	150	42	12	55	3.0	93	79	81
MAY 11...	--	K20	200	54	16	70	3.1	110	110	110
JUN 24...	--	420	130	35	10	37	3.0	84	57	56
JUL 22...	K30	K15	290	79	23	67	4.2	201	98	88
AUG 18...	K27	K55	240	65	20	67	3.6	153	110	90
SEP 16...	K160	340	290	75	24	78	4.2	187	120	100

< Actual value is known to be less than the value shown.
K Results based on colony count outside the acceptable range (non-ideal colony count).

RED RIVER BASIN

07350500 RED RIVER AT COUSHATTA, LA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)
OCT 1992									
28...	520	22	<0.01	0.02	0.70	0.72	0.10	0.04	8.7
NOV									
19...	300	52	0.01	<0.02	0.79	0.79	0.09	0.05	8.3
DEC									
18...	222	606	0.03	0.18	0.85	1.0	0.35	0.19	7.1
JAN 1993									
14...	196	142	0.01	0.19	0.40	0.59	0.06	0.07	7.3
FEB									
17...	284	138	0.02	0.25	0.70	0.95	0.05	0.05	8.2
MAR									
16...	396	312	0.02	0.34	0.84	1.2	0.22	0.07	8.4
APR									
13...	346	232	<0.01	0.14	0.45	0.59	0.10	0.02	8.9
MAY									
11...	446	186	0.01	0.34	0.51	0.85	0.16	0.06	8.1
JUN									
24...	270	156	0.02	0.36	1.2	1.6	0.07	0.09	9.6
JUL									
22...	490	16	0.01	<0.02	0.83	0.83	0.06	0.04	7.8
AUG									
18...	486	20	<0.01	<0.02	0.67	0.67	0.08	0.03	7.4
SEP									
16...	566	<1	0.01	0.07	0.94	1.0	0.06	0.04	8.8

DATE	ARSENIC TOTAL (UG/L AS AS)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)
OCT 1992								
28...	1	<1	<1	2	7	530	2	170
JAN 1993								
14...	2	3	<1	5	5	2500	10	82
APR								
13...	3	<1	<1	<1	6	3900	4	160
JUL								
22...	1	<10	<1	<1	2	280	1	170

DATE	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI)	SELE-NIUM, TOTAL (UG/L AS SE)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN)	CYANIDE TOTAL (MG/L AS CN)	PHENOLS TOTAL (UG/L)	OIL AND GREASE, TOTAL RECOV. GRAVI-METRIC (MG/L)
OCT 1992							
28...	<0.1	3	<1	8	0.01	<1	<1
JAN 1993							
14...	<0.1	3	<1	30	<0.01	3	<1
APR							
13...	<0.1	6	<1	20	<0.01	<1	<1
JUL							
22...	<0.1	2	<1	<10	<0.01	1	<1

< Actual value is known to be less than the value shown.

RED RIVER BASIN

07351930 RED RIVER AT GRAND ECORE, LA

LOCATION.--Lat 31°49'05", long 93°05'05" in NE 1/4 sec.51, T. 10 N., R.7 W., Natchitoches Parish, Hydrologic Unit 1114027, at bridge on State Highway 6 at Grand Ecore, and 4.0 mi north of Natchitoches.

DRAINAGE AREA.--64,575 mi^2, of which 5,936 mi^2 above Denison Dam is noncontributing.

PERIOD OF RECORD.--Water years 1988 to current year.

REMARKS.--Water-quality samples are non-integrated and collected from center span of bridge.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN DEMAND, CHEM-ICAL (HIGH LEVEL) (MG/L)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)
OCT 1992 28...	1400	908	7.99	--	15	15	9.6	33	2.8	K81
NOV 19...	0950	599	8.17	14.5	20	26	9.8	29	3.0	--
DEC 18...	0855	423	7.90	7.0	60	140	9.9	35	3.4	4500
JAN 1993 14...	0945	309	7.51	8.0	40	65	11.0	33	3.3	3900
FEB 17...	0925	478	7.62	10.0	20	55	10.4	29	--	3800
MAR 16...	0745	660	8.00	11.0	30	100	11.0	17	2.1	2200
APR 13...	1315	535	7.74	19.0	50	85	8.5	28	1.2	K700
MAY 11...	0725	600	7.71	20.0	10	70	8.3	20	1.3	K530
JUN 24...	0730	417	7.75	26.0	10	75	6.6	33	1.6	2300
JUL 22...	0940	835	7.89	32.0	5	4.0	7.4	30	2.7	--
AUG 18...	0915	788	7.89	32.0	5	5.0	8.9	28	2.9	<3
SEP 16...	0810	954	8.20	22.5	10	10	6.2	19	1.4	44

DATE	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
OCT 1992 28...	K10	K50	280	76	22	84	4.3	203	94	110
NOV 19...	120	160	180	49	14	51	4.2	150	53	66
DEC 18...	1100	2800	100	28	8.0	39	3.2	69	50	55
JAN 1993 14...	K260	K200	76	21	5.8	28	2.6	49	37	39
FEB 17...	700	1200	120	33	9.4	44	3.0	75	57	61
MAR 16...	K230	K57	160	44	13	62	3.0	93	91	90
APR 13...	K130	<20	140	37	11	52	2.9	86	74	74
MAY 11...	--	K300	160	45	12	55	2.9	98	82	80
JUN 24...	--	480	120	33	9.5	33	3.2	78	52	50
JUL 22...	K58	K25	280	76	23	68	4.1	202	94	88
AUG 18...	K10	K15	240	64	20	67	3.6	156	110	88
SEP 16...	<10	K100	300	77	25	80	4.4	208	120	110

< Actual value is known to be less than the value shown.
K Results based on colony count outside the acceptable range (non-ideal colony count).

07351930 RED RIVER AT GRAND ECORE, LA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)
OCT 1992									
28...	528	54	<0.01	<0.02	0.75	0.75	0.13	0.04	8.1
NOV									
19...	340	68	0.01	0.06	0.93	0.99	0.13	0.07	8.4
DEC									
18...	238	336	0.03	0.18	0.67	0.85	0.34	0.19	8.7
JAN 1993									
14...	191	98	0.02	0.19	0.45	0.64	0.07	0.08	7.5
FEB									
17...	274	214	0.02	0.23	0.72	0.95	0.06	0.05	4.4
MAR									
16...	382	240	0.01	0.33	0.85	1.2	0.19	0.06	7.0
APR									
13...	328	144	0.01	0.28	0.55	0.83	0.12	0.04	8.9
MAY									
11...	374	142	0.01	0.32	0.53	0.85	0.09	0.06	7.3
JUN									
24...	252	188	0.02	0.38	0.92	1.3	0.11	0.10	8.4
JUL									
22...	484	20	<0.01	<0.02	0.72	0.72	0.09	0.03	8.7
AUG									
18...	478	10	<0.01	<0.02	0.75	0.75	0.07	0.03	7.5
SEP									
16...	570	12	0.01	0.02	1.0	1.0	0.06	0.04	8.9

DATE	ARSENIC TOTAL (UG/L AS AS)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)
OCT 1992								
28...	2	<1	<1	2	5	710	4	230
JAN 1993								
14...	2	3	<1	4	4	2200	6	71
APR								
13...	2	<1	<1	4	6	2400	4	89
JUL								
22...	1	<10	<1	<1	2	290	2	180

DATE	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI)	SELE-NIUM, TOTAL (UG/L AS SE)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN)	CYANIDE TOTAL (MG/L AS CN)	PHENOLS TOTAL (UG/L)	OIL AND GREASE, TOTAL RECOV. GRAVI-METRIC (MG/L)
OCT 1992							
28...	<0.1	2	<1	9	0.01	4	<1
JAN 1993							
14...	<0.1	3	<1	20	<0.01	2	<1
APR							
13...	<0.1	4	<1	10	<0.01	<1	<1
JUL							
22...	<0.1	<1	<1	<10	<0.01	<1	2

< Actual value is known to be less than the value shown.

07355130 RED RIVER AT BOYCE, LA

LOCATION.--Lat 31°23'38", long 92°40'02", T. 5 N., R. 3 W., Grant-Rapides Parish line, Hydrologic Unit 11140207, near center of span on downstream side of bridge on State Highway 8, 0.2 mi east of Boyce, and at mile 135.0.

DRAINAGE AREA.--66,998 mi^2, of which 5,936 mi^2, above Denison Dam is noncontributing.

PERIOD OF RECORD.--Water years 1973-84, 1986 to current year.

REMARKS.--Water-quality samples are non-integrated.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN DEMAND, CHEM-ICAL (HIGH LEVEL) (MG/L)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)
OCT 1992 27...	1500	676	8.14	21.0	15	4.4	8.4	29	1.6	K27
NOV 18...	1030	728	8.24	10.0	10	16	7.4	27	0.2	--
DEC 17...	1015	414	7.71	9.5	40	100	9.8	29	2.6	3000
JAN 1993 14...	0720	312	7.37	8.5	50	65	10.8	37	3.2	K6500
FEB 16...	1015	497	7.56	11.0	20	40	10.4	23	--	K430
MAR 15...	1540	558	7.96	11.0	30	100	11.2	16	--	2100
APR 12...	1100	469	7.71	16.0	50	95	9.2	20	--	2500
MAY 10...	1630	352	7.54	23.0	15	60	7.8	19	0.9	K1000
JUN 23...	1500	427	7.39	26.0	10	120	6.0	26	1.1	3300
JUL 22...	0730	754	7.90	31.0	5	4.5	6.5	--	1.0	K80
AUG 18...	0730	545	7.62	32.0	5	6.0	5.9	14	1.2	K15
SEP 15...	1425	982	8.31	27.0	5	4.0	6.0	15	1.5	K20

DATE	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
OCT 1992 27...	K6	150	260	71	19	47	3.8	220	48	58
NOV 18...	170	92	230	61	18	70	4.5	167	74	91
DEC 17...	980	1800	98	26	8.0	39	3.3	60	49	55
JAN 1993 14...	K210	K180	79	22	5.8	28	2.5	48	37	40
FEB 16...	<20	K20	130	35	9.6	44	3.2	79	60	62
MAR 15...	K1000	--	140	38	11	51	2.8	82	74	73
APR 12...	K130	K71	120	34	9.7	45	2.8	78	65	65
MAY 10...	--	K20	100	28	7.4	29	2.3	75	43	40
JUN 23...	--	1000	130	35	10	33	3.0	82	51	49
JUL 22...	K30	250	250	67	20	62	3.8	171	88	83
AUG 18...	K7	K10	160	44	13	44	2.9	111	70	58
SEP 15...	<10	K10	300	77	25	81	4.8	205	130	110

< Actual value is known to be less than the value shown.
K Results based on colony count outside the acceptable range (non-ideal colony count).

RED RIVER BASIN

07355130 RED RIVER AT BOYCE, LA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	RESIDUE NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO-NITRO-GEN, TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)
OCT 1992									
27...	394	4	<0.01	0.10	0.62	0.72	0.08	0.03	7.5
NOV									
18...	430	14	0.01	0.03	0.60	0.63	0.14	0.05	7.2
DEC									
17...	228	176	0.02	0.23	0.58	0.81	0.22	0.14	5.9
JAN 1993									
14...	172	72	0.02	0.17	0.41	0.58	0.15	0.07	7.5
FEB									
16...	286	60	0.01	0.24	0.46	0.70	0.09	0.10	7.2
MAR									
15...	316	164	0.02	0.27	0.82	1.1	0.18	0.08	7.4
APR									
12...	290	116	0.02	0.25	0.80	1.0	0.20	0.05	8.2
MAY									
10...	218	60	0.02	0.25	0.71	0.96	0.13	0.10	7.2
JUN									
23...	256	264	0.03	0.41	0.87	1.3	0.27	0.27	9.3
JUL									
22...	432	10	<0.01	0.02	0.48	0.50	0.04	0.03	6.5
AUG									
18...	320	16	0.02	0.05	0.40	0.45	0.05	0.04	6.3
SEP									
15...	529	8	0.01	0.06	0.80	0.86	0.04	0.03	6.5

DATE	ARSENIC TOTAL (UG/L AS AS)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)
OCT 1992								
27...	1	<1	<1	1	4	270	2	120
JAN 1993								
14...	2	3	<1	3	4	2500	3	77
APR								
12...	<1	<1	<1	<1	4	90	<1	7
JUL								
22...	1	<10	<1	<1	2	290	1	100

DATE	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI)	SELE-NIUM, TOTAL (UG/L AS SE)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN)	CYANIDE TOTAL (MG/L AS CN)	PHENOLS TOTAL (UG/L)	OIL AND GREASE, TOTAL RECOV. GRAVI-METRIC (MG/L)
OCT 1992							
27...	<0.1	3	<1	10	0.01	2	<1
JAN 1993							
14...	<0.1	3	<1	10	<0.01	3	<1
APR							
12...	<0.1	4	<1	5	<0.01	--	<1
JUL							
22...	<0.1	2	<1	<10	<0.01	<1	3

< Actual value is known to be less than the value shown.

07355500 RED RIVER AT ALEXANDRIA, LA

LOCATION.--Lat 31°18'46", long 92°26'34", in SE 1/4 sec. 10, T. 4 N., R. 1 W., Rapides Parish, Hydrologic Unit 08040301, near center of span on downstream side of Murray Street bridge between Alexandria and Pineville, and 1.7 mi downstream from Bayou Rigolette. Water-quality sampling site at center of channel 0.3 mi downstream.

DRAINAGE AREA.--67,500 mi^2, of which 5,936 mi^2 above Denison Dam is noncontributing.

PERIOD OF RECORD.--Water years 1947, 1952-62, 1969, 1973 to current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1952 to September 1963, June 1973 to September 1981.
WATER TEMPERATURES: October 1952 to September 1963, June 1973 to September 1984.
CHLORIDE: October 1974 to September 1984.
SUSPENDED-SEDIMENT DISCHARGE: October 1972 to September 1982.

REMARKS.--Discharge data will be entered into the water-quality file when made available by the Army Corps of Engineers. Water-quality samples are non-integrated on all dates except Oct. 27, Jan. 13, April 13, and July 21.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 2,020 micromhos Oct.8, 1956; minimum daily, 133 micromhos June 24, 1953.
WATER TEMPERATURES: Maximum daily, 34.0 °C Aug. 2, 8, 10, 1956; minimum daily, 0.0 °C Dec. 24, 25, 1983.
CHLORIDE: Maximum daily, 420 mg/L Oct. 12, 1978; minimum daily, 8.6 mg/L Apr. 7, 1977.
SUSPENDED-SEDIMENT DISCHARGE: Maximum daily, 1,495,000 tons Dec. 9, 1973; minimum daily, 1,000 tons Oct. 10-22, 1972, Oct. 1 to Nov. 7, 1978, Sept. 27-30, Oct. 1-4, 1980, Jan. 30-31, Apr. 24-25, Oct. 1-6, 1981.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)	OXYGEN DEMAND, CHEM-ICAL (HIGH LEVEL) (MG/L)	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)
OCT 1992										
27...	1300	548	8.30	21.0	15	2.1	8.7	2.0	27	250
NOV										
19...	0730	753	8.25	14.5	15	7.7	9.4	2.0	25	--
DEC										
17...	1110	444	7.97	9.5	30	120	10.2	2.9	25	2900
JAN 1993										
13...	1545	319	7.48	11.0	30	91	11.2	3.3	31	4400
FEB										
16...	1150	489	8.06	12.0	50	50	10.8	--	35	K830
MAR										
15...	1400	551	7.80	11.0	40	100	11.2	--	18	1800
APR										
13...	0730	455	7.84	18.0	60	89	8.2	1.1	25	1000
MAY										
10...	1115	350	7.53	22.5	15	60	7.7	0.7	22	K1200
JUN										
23...	1330	471	7.49	26.0	15	120	6.4	1.0	30	2200
JUL										
21...	1345	661	7.89	33.5	5	2.5	6.9	1.0	19	220
AUG										
17...	1500	678	7.99	27.5	5	6.0	6.3	0.7	19	K30
SEP										
15...	1250	953	8.43	27.5	5	3.0	6.4	1.1	15	K60

K Results based on colony count outside the acceptable range (non-ideal colony count).

RED RIVER BASIN

07355500 RED RIVER AT ALEXANDRIA, LA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
OCT 1992										
27...	K40	350	190	51	14	35	2.9	183	36	42
NOV										
19...	K50	140	220	59	18	68	4.5	165	74	92
DEC										
17...	1300	1500	100	27	8.1	42	3.4	64	53	60
JAN 1993										
13...	K380	420	80	22	6.1	28	2.5	51	39	41
FEB										
16...	K20	K40	130	36	9.6	44	3.2	82	59	61
MAR										
15...	K470	--	140	37	11	50	2.8	83	73	72
APR										
13...	K290	K40	130	35	9.8	40	2.5	75	60	65
MAY										
10...	--	K20	100	28	7.3	29	2.3	74	43	40
JUN										
23...	--	370	140	38	11	37	2.9	87	58	53
JUL										
21...	K65	K10	210	57	16	51	3.5	145	76	70
AUG										
17...	K13	K5	200	52	16	55	3.3	114	91	74
SEP										
15...	K80	<10	290	75	25	80	5.1	198	120	110

DATE	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)
OCT 1992									
27...	0.2	4.7	318	296	5	0.01	<0.01	0.06	<0.05
NOV									
19...	0.2	--	442	415	8	0.01	--	0.02	--
DEC									
17...	0.1	--	254	232	136	0.02	--	0.22	--
JAN 1993									
13...	0.1	6.9	197	177	205	--	0.02	--	0.20
FEB									
16...	0.1	--	288	262	82	0.02	--	0.28	--
MAR									
15...	0.1	--	308	296	184	0.02	--	0.34	--
APR									
13...	0.1	6.0	270	261	471	--	<0.01	--	0.26
MAY									
10...	0.1	--	222	194	104	0.02	--	0.29	--
JUN									
23...	0.1	--	282	252	378	0.03	--	0.37	--
JUL									
21...	0.3	0.56	372	358	16	--	0.01	--	<0.05
AUG									
17...	0.2	--	398	360	34	0.01	--	0.03	--
SEP									
15...	0.2	--	578	534	8	0.01	--	0.03	--

< Actual value is known to be less than the value shown.
K Results based on colony count outside the acceptable range (non-ideal colony count).

RED RIVER BASIN

07355500 RED RIVER AT ALEXANDRIA, LA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS TOTAL (MG/L AS P)	PHOSPHORUS DISSOLVED (MG/L AS P)	PHOSPHORUS ORTHO TOTAL (MG/L AS P)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)
OCT 1992 27...	0.01	<0.01	0.50	0.07	0.01	0.01	<0.01	6.8
NOV 19...	0.01	---	0.62	0.04	--	0.03	--	7.0
DEC 17...	0.05	--	0.61	0.19	--	0.13	--	7.0
JAN 1993 13...	--	0.04	0.50	0.13	0.04	--	0.03	7.8
FEB 16...	0.04	--	0.54	0.12	--	0.07	--	8.0
MAR 15...	0.02	--	0.84	0.17	--	0.09	--	8.8
APR 13...	--	0.04	0.70	0.18	0.03	--	0.02	8.1
MAY 10...	0.03	--	0.81	0.10	--	0.11	--	7.9
JUN 23...	0.05	--	0.85	0.28	--	0.23	--	8.6
JUL 21...	--	0.03	0.60	0.03	0.02	--	<0.01	6.8
AUG 17...	0.02	--	0.55	0.05	--	0.04	--	6.3
SEP 15...	0.05	--	0.74	0.04	--	0.03	--	6.9

DATE	ALUMINUM, DISSOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)	BARIUM, DISSOLVED (UG/L AS BA)	BERYLLIUM, TOTAL RECOVERABLE (UG/L AS BE)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)	COBALT, DISSOLVED (UG/L AS CO)	COPPER, TOTAL RECOVERABLE (UG/L AS CU)	IRON, TOTAL RECOVERABLE (UG/L AS FE)
OCT 1992 27...	<10	<1	110	1	<1	<1	<3	3	180
JAN 1993 13...	50	2	59	3	<1	6	<3	5	4600
APR 13...	50	3	80	<1	<1	--	<3	5	3400
JUL 21...	10	1	130	<10	<1	<1	<3	2	330

DATE	IRON, DISSOLVED (UG/L AS FE)	LEAD, TOTAL RECOVERABLE (UG/L AS PB)	LITHIUM DISSOLVED (UG/L AS LI)	MANGANESE, TOTAL RECOVERABLE (UG/L AS MN)	MANGANESE, DISSOLVED (UG/L AS MN)	MERCURY TOTAL RECOVERABLE (UG/L AS HG)	MOLYBDENUM, DISSOLVED (UG/L AS MO)	NICKEL, TOTAL RECOVERABLE (UG/L AS NI)	NICKEL, DISSOLVED (UG/L AS NI)
OCT 1992 27...	4	4	6	80	<1	<0.1	<10	2	<1
JAN 1993 13...	91	5	4	140	10	<0.1	10	7	1
APR 13...	97	4	7	150	5	<0.1	<10	5	1
JUL 21...	10	3	7	90	2	<0.1	<10	1	<1

< Actual value is known to be less than the value shown.

07355500 RED RIVER AT ALEXANDRIA, LA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	SELENIUM, TOTAL (UG/L AS SE)	SELENIUM, DISSOLVED (UG/L AS SE)	SILVER, DISSOLVED (UG/L AS AG)	STRONTIUM, DISSOLVED (UG/L AS SR)	VANADIUM, DISSOLVED (UG/L AS V)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)	CYANIDE TOTAL (MG/L AS CN)	PHENOLS TOTAL (UG/L)	OIL AND GREASE, TOTAL RECOV. GRAVIMETRIC (MG/L)
OCT 1992									
27...	<1	<1	<1	430	<6	10	0.02	<1	<1
JAN 1993									
13...	--	<1	<1	190	<6	30	<0.01	1	<1
APR									
13...	<1	<1	<1	300	<6	20	<0.01	<1	<1
JUL									
21...	<1	<1	<1	470	<6	20	<0.01	<1	<1

DATE	ALPHA, COUNT, 2 SIGMA WAT DIS AS NAT U (UG/L)	ALPHA COUNT, 2 SIGMA WAT DIS AS TH-230 (PCI/L)	BETA, 2 SIGMA WATER, DISS, AS SR90 /Y90 (PCI/L	BETA, 2 SIGMA WATER, DISS, AS CS-137 (PCI/L)	URANIUM NATURAL 2 SIGMA WATER, DISS, (UG/L)	RA-226 2 SIGMA WATER, DISS, (PCI/L)	ALPHA, 2 SIGMA SED SUS TOT DRY AS TH-230 (PCI/L)	BETA, 2 SIGMA SED, SUSP, TOT DRY SR90Y90 (PCI/L)
OCT 1992								
27...	1.7	1.1	0.96	1.3	<1.0	0.02	0.44	0.61
JAN 1993								
13...	0.62	0.46	0.68	1.0	<1.0	0.14	5.9	2.1
APR								
13...	1.7	1.0	1.0	1.1	<1.0	0.03	5.9	2.0

DATE	GROSS ALPHA, DISSOLVED (UG/L AS U-NAT)	GROSS ALPHA, SUSP. TOTAL (UG/L AS U-NAT)	GROSS BETA, DISSOLVED (PCI/L AS CS-137)	GROSS BETA, SUSP. TOTAL (PCI/L AS CS-137)	GROSS BETA, DISSOLVED (PCI/L AS SR/YT-90)	GROSS BETA, SUSP. TOTAL (PCI/L AS SR/YT-90)	RADIUM 226, DISSOLVED, RADON METHOD (PCI/L)	URANIUM NATURAL DISSOLVED (UG/L AS U)
OCT 1992								
27...	1.5	0.6	5.5	0.9	4.2	0.8	0.09	0.93
JAN 1993								
13...	<0.6	12	3.2	7.9	2.4	7.1	0.80	0.43
APR								
13...	2.1	13	3.3	8.8	2.4	8.0	0.16	1.0

DATE	PCB, TOTAL (UG/L)	NAPHTHALENES, POLYCHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLORDANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DIAZINON, TOTAL (UG/L)	DIELDRIN TOTAL (UG/L)	ENDOSULFAN, TOTAL (UG/L)
OCT 1992										
27...	<0.1	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
DEC										
17...	<0.1	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
FEB										
16...	<0.1	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
JUN										
23...	<0.1	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

< Actual value is known to be less than the value shown.

RED RIVER BASIN

07355500 RED RIVER AT ALEXANDRIA, LA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)	MALA-THION, TOTAL (UG/L)	METH-OXY-CHLOR, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)	METHYL TRI-THION, TOTAL (UG/L)
OCT 1992 27...	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
DEC 17...	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
FEB 16...	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
JUN 23...	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

DATE	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)	2,4-D, TOTAL (UG/L)	2, 4-DP TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
OCT 1992 27...	<0.01	<0.01	<0.01	<0.5	<0.01	<0.5	<0.5	<0.5	<0.5
DEC 17...	<0.01	<0.01	<0.01	<0.5	<0.01	<0.5	<0.5	<0.5	<0.5
FEB 16...	<0.01	<0.01	<0.01	<0.5	<0.01	<0.5	<0.5	<0.5	<0.5
JUN 23...	<0.01	<0.01	<0.01	<0.5	<0.01	<0.5	<0.5	<0.5	<0.5

DATE	SEDI-MENT, SUS-PENDED (MG/L)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM
OCT 1992 27...	16	80
JAN 1993 13...	458	64
APR 13...	364	76
JUL 21...	17	91

< Actual value is known to be less than the value shown.

07355600 RED RIVER AT MONCLA, LA (CE 04657)

LOCATION.--Lat 31°12'10", long 92°08'30", T.3 N., R.3 W., Avoyelles Parish, Hydrologic Unit 08040301, near center of span on downstream side of bridge on State Highway 115, 1.4 mi west of Moncla, and at mile 74.0.

DRAINAGE AREA.--67,625 mi^2, of which 5,936 mi^2 above Denison Dam is noncontributing.

PERIOD OF RECORD.--Water years 1971, 1973, 1984, 1986 to current year.

REMARKS.--Water-quality samples are non-integrated.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN DEMAND, CHEM-ICAL (HIGH LEVEL) (MG/L)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)
OCT 1992										
28...	0715	429	7.89	21.0	15	7.6	7.5	25	1.0	--
NOV										
18...	1440	657	8.10	16.0	15	7.2	7.3	21	0	--
DEC										
17...	1448	483	7.72	9.0	30	90	10.2	29	2.7	1300
JAN 1993										
13...	1140	324	7.41	9.5	70	65	11.0	23	3.7	2800
FEB										
16...	1415	494	8.11	12.0	30	50	11.0	23	--	K330
MAR										
15...	0930	561	8.10	10.0	30	100	10.8	<10	--	1700
APR										
12...	1550	528	7.85	17.0	50	80	9.1	24	--	1100
MAY										
10...	1450	342	7.53	22.5	20	50	7.7	35	0.8	K140
JUN										
23...	0850	508	7.66	26.0	10	120	6.8	24	0.9	1800
JUL										
21...	1215	626	7.78	32.0	5	15	6.0	24	0.4	K320
AUG										
17...	1230	755	7.93	31.5	5	5.0	6.7	33	0.8	80
SEP										
15...	0830	859	8.44	26.0	5	5.0	6.3	15	0.7	K33

DATE	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
OCT 1992										
28...	310	170	150	42	11	30	3.4	144	29	34
NOV										
18...	140	K35	200	52	16	60	4.5	149	63	79
DEC										
17...	720	880	110	29	9.4	47	3.6	64	60	66
JAN 1993										
13...	580	K440	83	23	6.2	29	2.6	52	39	42
FEB										
16...	K60	<20	130	36	9.6	44	3.2	80	60	62
MAR										
15...	K300	--	140	39	11	52	2.8	86	74	74
APR										
12...	K210	K150	130	36	10	48	2.8	83	69	70
MAY										
10...	--	<20	97	27	7.2	28	2.3	74	41	38
JUN										
23...	--	260	150	41	12	41	3.0	96	65	60
JUL										
21...	K17	5	200	52	16	50	3.4	130	73	68
AUG										
17...	K20	K7	230	59	19	64	3.5	130	100	85
SEP										
15...	250	<10	240	63	21	69	4.0	189	100	92

< Actual value is known to be less than the value shown.
K Results based on colony count outside the acceptable range (non-ideal colony count).

RED RIVER BASIN

07355600 RED RIVER AT MONCLA, LA (CE 04657)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)
OCT 1992 28...	252	8	<0.01	0.11	0.27	0.38	0.07	0.04	5.8
NOV 18...	378	4	0.01	0.07	0.48	0.55	0.05	0.05	6.9
DEC 17...	276	152	0.02	0.21	0.46	0.67	0.23	0.12	5.8
JAN 1993 13...	199	196	0.02	0.16	0.58	0.74	0.08	0.08	8.0
FEB 16...	282	74	0.02	0.27	0.49	0.76	0.09	0.10	7.5
MAR 15...	322	234	0.02	0.29	0.81	1.1	0.21	0.09	--
APR 12...	314	174	0.02	0.31	0.35	0.66	0.17	0.05	8.5
MAY 10...	218	126	0.03	0.32	0.81	1.1	0.14	0.13	8.0
JUN 23...	300	188	0.04	0.38	0.86	1.2	0.31	0.18	9.6
JUL 21...	354	<1	0.01	0.04	0.57	0.61	0.06	0.06	6.7
AUG 17...	444	24	0.01	0.05	0.43	0.48	0.05	0.04	6.3
SEP 15...	480	14	0.02	0.06	0.53	0.59	0.04	0.03	6.8

DATE	ARSENIC TOTAL (UG/L AS AS)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)
OCT 1992 28...	1	1	<1	1	7	180	52	50
JAN 1993 13...	2	3	<1	3	4	2900	5	87
APR 12...	3	<1	<1	6	5	3600	5	140
JUL 21...	1	<10	<1	<1	3	590	27	90

DATE	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI)	SELE-NIUM, TOTAL (UG/L AS SE)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN)	CYANIDE TOTAL (MG/L AS CN)	PHENOLS TOTAL (UG/L)	OIL AND GREASE, TOTAL RECOV. GRAVI-METRIC (MG/L)
OCT 1992 28...	<0.1	2	<1	10	0.01	1	<1
JAN 1993 13...	<0.1	4	<1	10	<0.01	1	<1
APR 12...	<0.1	7	<1	20	<0.01	--	<1
JUL 21...	<0.1	3	<1	10	<0.01	1	<1

< Actual value is known to be less than the value shown.

RED RIVER BASIN

07355603 RED RIVER (ABOVE LOCK AND DAM 1) NEAR VICK, LA

LOCATION.--Lat 31°15'01", long 91°56'17", in SW 1/4 sec. 11, T. 3 N., R. 5 E., Avoyelles Parish, Hydrologic Unit 08040301, near right bank, 10.1 mi east of Vick, and at mile 50.0.

DRAINAGE AREA.--67,700 mi^2, approximately, of which 5,936 mi^2 above Denison Dam is noncontributing.

PERIOD OF RECORD.--Water years 1988 to current year.

REMARKS.--Water-quality samples are non-integrated and collected from upstream side of lock.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	TIME	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN DEMAND, CHEM-ICAL (HIGH LEVEL) (MG/L)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L)	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)
OCT 1992										
28...	0820	383	7.85	21.0	15	5.4	7.6	21	1.1	K60
NOV										
18...	1340	623	8.02	18.0	20	9.5	6.7	23	--	--
DEC										
17...	1400	540	7.80	9.0	20	65	10.6	15	2.6	680
JAN 1993										
13...	1240	325	7.58	9.5	60	85	11.0	25	3.9	3100
FEB										
16...	1320	524	7.80	12.0	30	40	11.0	33	--	K600
MAR										
15...	1025	560	7.84	9.5	60	120	11.2	16	--	4500
APR										
12...	1420	517	7.76	16.0	50	80	9.0	27	--	2100
MAY										
10...	1315	346	7.66	23.0	20	75	7.6	24	0.6	K340
JUN										
23...	1130	508	7.43	26.0	10	140	6.9	24	1.0	1200
JUL										
21...	1345	624	7.74	33.0	5	7.5	6.4	24	0.1	210
AUG										
17...	1130	711	7.69	30.0	5	2.0	7.1	15	0.6	K50
SEP										
15...	1030	852	8.51	28.0	5	5.0	6.4	15	0.8	K400

DATE	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS TOTAL (MG/L AS CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY WAT WH TOT FET FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
OCT 1992										
28...	K32	130	130	36	9.2	28	3.4	120	28	32
NOV										
18...	92	K40	190	51	15	54	4.5	150	56	71
DEC										
17...	K180	380	120	32	9.9	53	3.7	68	67	75
JAN 1993										
13...	K400	400	83	23	6.2	28	2.5	51	39	42
FEB										
16...	K100	K30	140	38	10	48	3.2	80	65	68
MAR										
15...	K800	--	150	41	11	52	3.0	82	74	74
APR										
12...	K180	K88	140	37	11	48	2.8	80	69	70
MAY										
10...	--	K220	110	31	8.3	28	2.3	79	42	37
JUN										
23...	--	270	150	41	12	41	3.0	97	66	60
JUL										
21...	K15	<5	190	52	15	49	3.3	128	70	66
AUG										
17...	<3	<3	210	56	18	58	3.4	126	94	79
SEP										
15...	K60	<10	250	65	22	72	4.4	176	110	98

< Actual value is known to be less than the value shown.
K Results based on colony count outside the acceptable range (non-ideal colony count).

RED RIVER BASIN

07355603 RED RIVER (ABOVE LOCK AND DAM 1) NEAR VICK, LA--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN,AM-MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, TOTAL (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)
OCT 1992 28...	222	<1	<0.01	0.08	0.25	0.33	0.07	0.04	5.2
NOV 18...	348	4	0.01	0.12	0.54	0.66	0.06	0.07	7.0
DEC 17...	306	136	0.01	0.21	0.69	0.90	0.12	0.09	6.9
JAN 1993 13...	188	104	0.02	0.16	0.49	0.65	0.16	0.08	7.9
FEB 16...	302	58	0.01	0.27	0.45	0.72	0.08	0.09	7.4
MAR 15...	316	284	0.02	0.29	0.85	1.1	0.26	0.10	9.4
APR 12...	316	180	0.02	0.27	0.49	0.76	0.14	0.06	8.2
MAY 10...	202	136	0.03	0.34	0.58	0.92	0.14	0.12	7.7
JUN 23...	300	352	0.02	0.45	1.2	1.7	0.40	0.20	8.4
JUL 21...	344	<1	0.01	<0.02	0.43	0.43	0.04	0.05	6.6
AUG 17...	418	16	<0.01	0.04	0.52	0.56	0.24	0.03	5.6
SEP 15...	482	16	<0.01	<0.02	0.68	0.68	0.02	0.02	6.9

DATE	ARSENIC TOTAL (UG/L AS AS)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)
OCT 1992 28...	1	1	<1	<1	4	90	2	25
JAN 1993 13...	2	3	2	3	4	2900	3	93
APR 12...	2	<1	<1	3	6	2700	3	100
JUL 21...	1	<10	<1	<1	2	400	5	80

DATE	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI)	SELE-NIUM, TOTAL (UG/L AS SE)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN)	CYANIDE TOTAL (MG/L AS CN)	PHENOLS TOTAL (UG/L)	OIL AND GREASE, TOTAL RECOV. GRAVI-METRIC (MG/L)
OCT 1992 28...	<0.1	2	<1	<5	0.01	1	<1
JAN 1993 13...	<0.1	5	<1	10	<0.01	1	<1
APR 12...	<0.1	6	<1	10	<0.01	<1	<1
JUL 21...	<0.1	2	<1	<10	<0.01	1	1

< Actual value is known to be less than the value shown.

RED RIVER BASIN

07344400 RED RIVER NEAR HOSSTON, LA

LOCATION.--Lat 32°53'35", long 93°49'20", in SW 1/4 sec.16, T.22 N., R.14 W., Bossier-Caddo Parish line, Hydrologic Unit 11140202, near left bank on downstream side of bridge on State Highway 2, 1.8 mi downstream from Dry Bayou, and 3.2 mi east of Hosston.

DRAINAGE AREA.--57,041 mi^2, of which 5,936 mi^2 above Denison Dam is noncontributing.

PERIOD OF RECORD.--October 1957 to September 1968. October 1968 to current year (daily gage heights and discharges below 5,000 ft^3/s only).

GAGE.--Nonrecording gage read once daily. Datum of gage is 161.56 ft above sea level (levels by Corps of Engineers). Prior to Feb. 20, 1962, water-stage recorder at same site and datum.

REMARKS.--No daily discharges published above 5,000 ft^3/s. No estimated daily discharges. Regulation since July 1942 by Lake Texoma (capacity, 5,392,000 acre-ft), since July 1953 by Texarkana Reservoir (capacity, 2,654,300 acre-ft), and since August 1966 by Millwood Lake (capacity, 1,854,900 acre-ft). Several measurements of water temperature were made during the year.

AVERAGE DISCHARGE.--11 years (water years 1958-68), 17,920 ft^3/s, 12,980,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 214,000 ft^3/s, May 7, 1958; maximum gage height, 30.70 ft, May 15, 1990; minimum daily, 803 ft^3/s, Sept. 16, 17, 1972.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 17.80 ft, June 13; minimum daily discharge, 3,220 ft^3/s, Sept. 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1												
2												
3												
4												
5		4550										
6		4340										
7		4260										3840
8		4220										3220
9		4030										3460
10		3870										3540
11		3870										3780
12		4260										3840
13		4930										4010
14												3650
15												3970
16												4010
17												4290
18												4550
19												
20												
21												
22												
23												
24												
25												
26	4630											
27	4680											
28	4880											
29	4860				---							
30					---							
31		---			---		---		---			---
TOTAL	---	---	---	---	---	---	---	---	---	---	---	---
MEAN	---	---	---	---	---	---	---	---	---	---	---	---
MAX	---	---	---	---	---	---	---	---	---	---	---	---
MIN	---	---	---	---	---	---	---	---	---	---	---	---
AC-FT	---	---	---	---	---	---	---	---	---	---	---	---

60

RED RIVER BASIN

07344400 RED RIVER NEAR HOSSTON, LA--Continued

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.28	1.56	10.58	15.20	9.50	14.88	11.20	10.10	14.32	4.20	1.94	.10
2	7.10	1.62	10.35	14.75	9.40	14.65	10.59	10.59	14.19	4.06	2.04	.15
3	6.00	1.30	10.20	13.98	9.08	15.30	9.60	11.15	13.90	4.09	2.28	.20
4	4.90	1.29	10.05	13.42	8.59	16.64	8.92	11.41	13.60	3.88	2.67	.50
5	4.54	1.05	9.55	13.42	8.20	17.00	9.20	11.32	13.35	3.64	2.99	.40
6	4.58	.94	9.02	13.50	8.05	16.70	10.30	10.80	13.41	3.65	3.20	.18
7	4.80	.90	8.58	13.40	8.10	16.25	11.20	10.30	13.50	3.52	3.40	-.52
8	4.85	.88	8.28	13.18	8.35	16.50	11.80	10.40	13.36	3.10	3.42	-.85
9	3.80	.78	7.60	13.05	8.48	16.82	12.55	11.02	13.08	2.73	3.29	-.72
10	2.75	.70	7.38	12.95	8.45	16.30	12.20	12.00	12.60	2.60	2.85	-.68
11	2.10	.70	7.65	12.80	8.28	15.00	11.86	13.85	12.36	2.45	2.50	-.55
12	1.71	.90	7.92	12.35	7.91	14.35	11.22	15.50	12.40	2.20	2.26	-.52
13	1.65	1.25	8.20	12.15	7.70	13.45	10.44	17.44	12.35	1.76	2.00	-.43
14	1.59	1.55	9.10	12.12	7.78	13.10	9.43	16.70	12.44	1.47	1.71	-.62
15	1.51	1.75	11.60	12.10	8.00	12.68	8.65	15.00	12.37	1.33	1.40	-.45
16	1.58	1.38	13.65	12.15	8.90	12.22	8.90	14.97	11.90	1.10	1.20	-.43
17	1.45	1.48	15.55	12.10	11.15	11.72	9.80	15.02	11.20	.99	1.00	-.28
18	1.36	1.55	16.25	12.10	13.00	12.28	12.00	15.50	10.78	.82	.90	-.14
19	1.28	1.65	16.82	12.18	14.20	13.58	13.00	16.12	10.20	.80	.68	.13
20	1.50	1.75	16.72	12.32	14.05	14.65	13.65	16.52	9.35	.78	.54	.78
21	1.78	1.80	16.85	12.22	13.70	15.09	14.09	16.61	9.08	.72	.69	1.58
22	2.12	1.98	17.32	12.00	13.60	15.00	14.40	16.29	8.60	.64	.97	2.20
23	1.98	2.68	17.55	11.85	13.50	15.30	13.80	15.96	7.71	.61	1.05	2.42
24	1.66	4.00	17.65	12.18	13.45	15.00	12.20	15.61	6.90	.64	.80	2.25
25	1.30	7.15	17.49	12.68	13.50	14.38	11.30	15.39	6.35	.58	.58	2.00
26	1.09	8.40	17.30	12.90	14.08	14.15	9.98	14.90	5.88	.53	.25	2.20
27	1.12	9.40	16.90	12.88	14.70	14.30	8.70	14.60	5.50	.47	.15	2.60
28	1.22	10.40	16.48	12.60	15.00	13.90	8.31	14.54	5.22	.42	.12	3.00
29	1.21	10.90	16.02	12.05	---	13.20	8.31	14.45	5.00	1.00	.28	2.42
30	1.38	10.80	15.50	11.28	---	12.42	9.30	14.33	4.70	1.42	.33	1.95
31	1.42	---	15.35	10.05	---	11.65	---	14.32	---	1.71	.20	---
MAX	8.28	10.90	17.65	15.20	15.00	17.00	14.40	17.44	14.32	4.20	3.42	3.00
MIN	1.09	.70	7.38	10.05	7.70	11.65	8.31	10.10	4.70	.42	.12	-.85

46 RED RIVER BASIN

07300500 SALT FORK RED RIVER AT MANGUM, OK

LOCATION.--Lat 34°51'30", long 99°30'30", in SW 1/4 SE 1/4 sec.34. T.5 N, R.22 W., Greer County, Hydrologic Unit 11120202, near left bank on downstream side of pier of bridge on State Highway 34, 0.5 mi south of Mangum, 13.0 mi downstream from Fish Creek, and at mile 35.5.

DRAINAGE AREA.--1,566 mi^2, of which 209 mi^2 is probably noncontributing.

PERIOD OF RECORD.--April 1905 to June 1906, October 1937 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1211: Drainage area. WSP 1241: 1938.

GAGE.--Water-stage recorder. Datum of gage is 1,490.87 ft above sea level (levels by U.S. Bureau of Reclamation). Apr. 11, 1905 to June 30, 1906, nonrecording gage at site 0.2 mi upstream at different datum. Oct. 1, 1937 to Nov. 8, 1938, nonrecording gage at present site and datum.

REMARKS.--Records fair.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft^3/s:

Date	Time	Discharge (ft^3/s)	Gage Height (ft)	Date	Time	Discharge (ft^3/s)	Gage Height (ft)
Apr. 28	2330	11,700	11.61	July 7	1700	17,300	13.53
May 9	0400	11,500	11.52				

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.2	9.5	64	82	82	92	119	95	94	70	30	47
2	1.1	9.8	60	97	86	108	91	425	84	185	29	43
3	1.2	11	57	134	89	132	83	477	77	131	106	56
4	1.1	11	55	167	90	118	159	366	75	105	87	33
5	1.1	11	58	138	90	101	94	239	70	89	67	27
6	1.1	11	60	110	88	91	73	191	68	77	52	23
7	1.1	11	66	102	87	89	68	169	65	8710	46	23
8	.98	12	69	101	85	86	72	2500	63	1640	45	26
9	1.0	13	93	123	82	84	62	3210	58	419	40	25
10	1.2	13	92	126	112	84	56	e350	56	143	35	23
11	1.2	25	86	132	110	83	52	e240	55	99	31	22
12	1.2	23	81	105	105	78	50	e190	53	77	26	20
13	1.3	17	82	99	99	79	47	e170	51	66	23	23
14	1.2	16	101	101	101	81	129	e150	48	508	20	23
15	1.4	16	103	111	152	83	132	e140	45	679	15	22
16	1.6	16	109	99	166	85	125	e250	43	293	14	19
17	1.8	16	103	100	169	84	119	e200	40	136	16	18
18	2.1	19	109	90	167	82	94	e170	39	86	16	17
19	2.6	39	119	100	146	89	78	148	60	69	13	18
20	3.2	38	119	112	126	84	66	137	94	58	12	16
21	4.1	139	114	115	120	84	61	122	123	57	11	20
22	4.8	188	107	112	116	100	55	111	118	59	8.7	19
23	5.4	180	88	131	94	92	50	116	96	55	7.5	15
24	5.9	201	86	119	84	98	49	415	83	50	7.8	14
25	6.6	185	81	104	84	94	47	302	76	40	8.4	14
26	7.0	108	75	96	83	83	45	190	73	37	8.0	14
27	7.8	82	74	87	83	76	42	140	74	32	7.0	14
28	8.1	76	74	87	86	72	769	122	80	30	6.5	13
29	8.2	73	74	93	---	77	1300	112	71	31	6.3	12
30	8.7	68	77	93	---	111	203	104	67	40	8.3	12
31	9.3	---	76	85	---	105	---	103	---	39	29	---
TOTAL	104.58	1637.3	2612	3351	2982	2805	4390	11654	2099	14110	831.5	671
MEAN	3.37	54.6	84.3	108	106	90.5	146	376	70.0	455	26.8	22.4
MAX	9.3	201	119	167	169	132	1300	3210	123	8710	106	56
MIN	.98	9.5	55	82	82	72	42	95	39	30	6.3	12
AC-FT	207	3250	5180	6650	5910	5560	8710	23120	4160	27990	1650	1330

e Estimated

RED RIVER BASIN

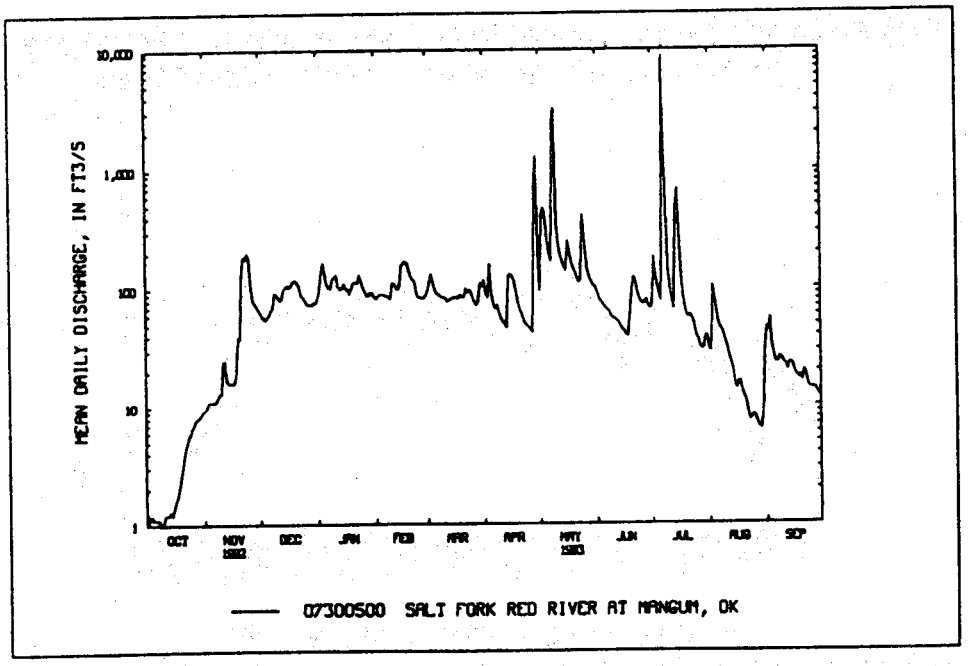
07300500 SALT FORK RED RIVER AT MANGUM, OK--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 1993, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	80.4	28.2	35.4	45.6	51.9	48.3	86.4	277	238	64.1	31.8	45.2
MAX	919	196	148	199	196	183	490	1389	1602	575	301	315
(WY)	1961	1987	1992	1960	1949	1969	1973	1957	1941	1953	1968	1986
MIN	.000	.000	.000	.000	.000	.12	.000	.000	.000	.000	.000	.000
(WY)	1941	1940	1940	1940	1953	1971	1955	1953	1952	1963	1943	1939

SUMMARY STATISTICS	1992 CALENDAR YEAR		1993 WATER YEAR		WATER YEARS 1938-93	
ANNUAL TOTAL	33181.28		47247.38			
ANNUAL MEAN	90.7		129		86.1	
HIGHEST ANNUAL MEAN					277	1941
LOWEST ANNUAL MEAN					12.3	1940
HIGHEST DAILY MEAN	2530	Jun 6	8710	Jul 7	22600	May 28 1978
LOWEST DAILY MEAN	.98	Oct 8	.98	Oct 8	[a].00	Oct 2 1937
ANNUAL SEVEN-DAY MINIMUM	1.1	Oct 3	1.1	Oct 3	.00	Aug 14 1938
INSTANTANEOUS PEAK FLOW			17300	Jul 7	72000	May 16 1957
INSTANTANEOUS PEAK STAGE			13.53	Jul 7	14.70	Jun 16 1938
ANNUAL RUNOFF (AC-FT)	65820		93720		62350	
10 PERCENT EXCEEDS	171		162		120	
50 PERCENT EXCEEDS	63		77		16	
90 PERCENT EXCEEDS	3.6		8.4		.00	

[a]No flow at times in most years.



54 RED RIVER BASIN

07301420 SWEETWATER CREEK NEAR SWEETWATER, OK

LOCATION.--Lat 35°25'20", long 99°58'08", in NW 1/4 NE 1/4 sec.20, T.11 N, R.26 W., Roger Mills-Beckham County line, Hydrologic Unit 11120302, on right bank downstream bridge piling of State Highway 152, 0.4 mi downstream from Freezeout Creek, 3.3 mi west of Sweetwater, and at mile 16.0.

DRAINAGE AREA.--424 mi^2, of which 20 mi^2 is probably noncontributing.

PERIOD OF RECORD.--April 1986 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,087.76 ft above sea level.

REMARKS.--Records good, except for ice effected winter periods, which are poor. U.S. Bureau of Reclamations' satellite telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.24	4.4	18	20	24	31	36	41	18	19	1.3	.57
2	.25	5.4	18	21	24	39	32	62	17	14	1.4	.49
3	.26	5.6	18	24	24	45	30	107	16	12	38	.34
4	.23	6.2	17	28	23	37	33	79	16	11	11	.25
5	.24	6.4	16	25	23	32	37	59	15	9.6	e8.3	.16
6	.30	6.4	19	23	23	30	35	50	15	8.7	e7.0	.12
7	.30	7.2	19	23	23	29	34	43	15	11	e6.0	.34
8	.25	7.3	21	23	23	28	33	48	14	11	e5.2	1.7
9	.29	7.0	21	25	23	27	30	55	13	9.5	e4.7	2.3
10	.45	6.8	22	e21	27	26	29	51	13	8.5	4.0	1.9
11	.67	7.6	20	e25	32	25	27	44	15	7.7	2.9	1.3
12	.84	7.7	19	26	29	24	26	41	14	8.2	2.0	1.1
13	.89	8.0	20	e23	31	25	25	39	13	7.7	1.5	.86
14	.89	8.5	23	e27	33	25	29	35	12	7.9	1.2	.73
15	.97	8.4	22	27	36	26	42	32	12	9.0	.99	.75
16	1.0	8.4	24	25	e35	25	39	29	12	9.1	.77	.71
17	1.1	8.5	23	26	e27	24	33	31	11	8.3	.59	.65
18	1.2	9.1	23	26	e31	24	30	72	10	7.0	.48	.59
19	1.6	11	23	25	e35	34	28	64	20	6.1	.40	1.2
20	2.0	13	23	26	44	49	26	46	39	5.7	.31	.68
21	2.2	14	22	27	51	41	24	38	33	5.7	.26	.64
22	2.3	18	21	32	40	46	24	34	24	6.0	.20	.57
23	2.3	19	21	32	33	62	24	34	20	5.5	.21	.46
24	2.4	18	20	29	30	51	23	31	17	5.0	.25	.54
25	2.5	e17	20	27	30	43	23	28	15	4.0	.19	.69
26	2.5	e16	20	26	28	37	22	26	18	3.3	.17	.63
27	2.6	e15	20	26	28	34	22	24	16	2.8	.13	.71
28	3.1	e17	20	25	29	32	22	23	15	2.3	.12	.85
29	3.5	e19	20	24	---	31	31	21	13	2.2	.11	.69
30	4.0	18	20	24	---	40	48	20	12	2.0	.08	.52
31	4.4	---	20	24	---	43	---	19	---	1.7	.33	---
TOTAL	45.77	323.9	633	785	839	1065	897	1326	493	231.5	100.09	23.04
MEAN	1.48	10.8	20.4	25.3	30.0	34.4	29.9	42.8	16.4	7.47	3.23	.77
MAX	4.4	19	24	32	51	62	48	107	39	19	38	2.3
MIN	.23	4.4	16	20	23	24	22	19	10	1.7	.08	.12
AC-FT	91	642	1260	1560	1660	2110	1780	2630	978	459	199	46

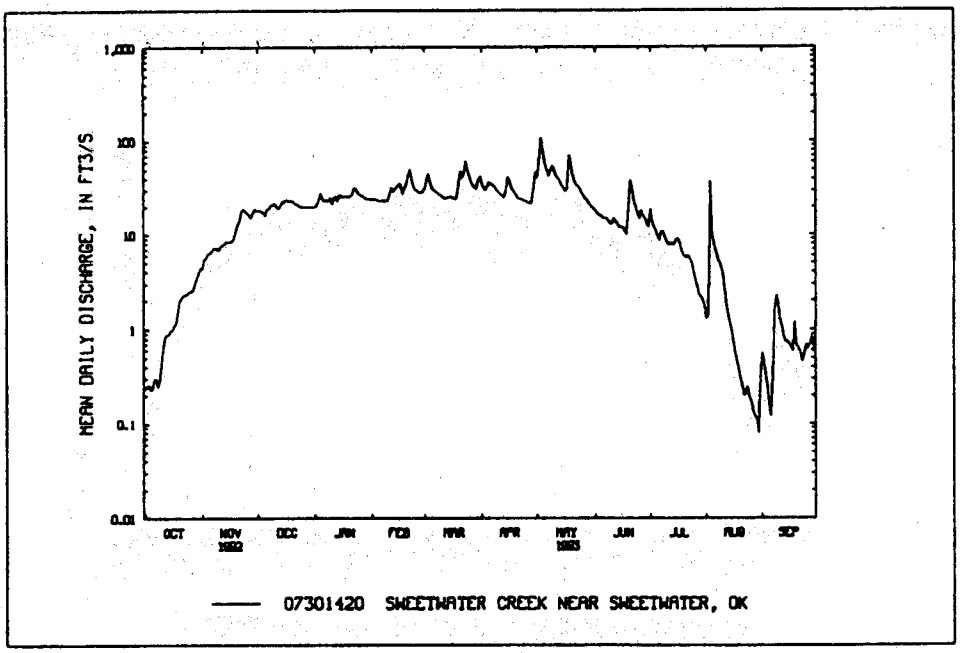
e Estimated

07301420 SWEETWATER CREEK NEAR SWEETWATER, OK--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1986 - 1993, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	18.2	22.9	25.8	29.9	31.9	39.0	32.0	33.1	31.2	10.7	4.61	12.0
MAX	72.2	61.1	37.9	41.1	51.3	73.0	45.0	47.9	65.6	17.4	18.2	51.6
(WY)	1987	1987	1987	1987	1987	1987	1988	1987	1989	1989	1989	1988
MIN	1.48	10.8	15.2	19.9	18.6	17.9	16.2	18.1	16.4	3.72	.61	.77
(WY)	1993	1993	1991	1991	1991	1991	1991	1991	1993	1990	1986	1993

SUMMARY STATISTICS	1992 CALENDAR YEAR		1993 WATER YEAR		WATER YEARS 1986-93	
ANNUAL TOTAL	7092.37		6762.30			
ANNUAL MEAN	19.4		18.5		24.5	
HIGHEST ANNUAL MEAN					41.4	1987
LOWEST ANNUAL MEAN					14.5	1991
HIGHEST DAILY MEAN	83	May 29	107	May 3	310	Jun 14 1989
LOWEST DAILY MEAN	.23	Sep 26	.08	Aug 30	.08	Aug 30 1993
ANNUAL SEVEN-DAY MINIMUM	.24	Sep 26	.15	Aug 24	.15	Aug 24 1993
INSTANTANEOUS PEAK FLOW			118	May 3	545	Jun 14 1989
INSTANTANEOUS PEAK STAGE			9.83	May 3	12.80	Jun 14 1989
ANNUAL RUNOFF (AC-FT)	14070		13410		17730	
10 PERCENT EXCEEDS	37		37		45	
50 PERCENT EXCEEDS	19		19		20	
90 PERCENT EXCEEDS	1.0		.59		2.5	



56

RED RIVER BASIN

07301500 NORTH FORK RED RIVER NEAR CARTER, OK

LOCATION.--Lat 35°10'05", long 99°30'25", in NW 1/4 SE 1/4 sec.15, T.8 N., R.22 W., Beckham County, Hydrologic Unit 11120302, on left bank on downstream side of roadway on State Highway 34, 3.0 mi south of Carter, 10.8 mi downstream from Timber Creek, and at mile 110.5.
DRAINAGE AREA.--2,337 mi^2, of which 399 mi^2 is probably noncontributing.
PERIOD OF RECORD.--October 1944 to September 1962. Annual maximum and occasional low-flow measurements, water years 1963-64. August 1964 to current year.
REVISED RECORDS.--WSP 1211: Drainage area.
GAGE.--Water-stage recorder. Datum of gage is 1,673.71 ft above sea level.
REMARKS.--Records fair. U.S. Army Corps of Engineers' satellite telemeter at station.
PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,200 ft^3/s:

Date	Time	Discharge (ft^3/s)	Gage Height (ft)	Date	Time	Discharge (ft^3/s)	Gage Height (ft)
May 8	2000	3,960	8.48	No other peak greater than base discharge.			

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.2	7.3	81	87	102	139	325	289	216	81	20	18
2	2.4	7.5	79	89	104	161	261	957	e150	123	28	13
3	2.0	7.5	74	95	107	206	233	992	e134	111	465	10
4	1.8	7.7	71	131	104	211	221	612	e120	81	312	8.4
5	1.7	8.0	66	133	101	183	207	491	e111	66	211	6.9
6	1.7	8.5	65	114	99	161	218	387	e105	58	146	5.7
7	1.5	9.1	64	103	94	159	223	334	e102	178	e103	5.8
8	1.5	9.8	71	103	94	152	214	1850	e99	90	e75	11
9	1.7	11	96	115	93	145	198	2920	e93	63	e62	11
10	2.0	12	102	127	115	137	185	1230	e84	60	e48	9.0
11	1.9	14	96	121	131	126	169	543	e80	50	38	7.1
12	1.9	15	88	102	127	117	158	377	e78	46	30	5.4
13	2.0	15	90	100	122	114	147	294	e76	51	25	5.4
14	2.0	14	98	102	127	115	161	286	e73	57	21	5.0
15	2.0	15	110	98	158	116	180	285	e71	70	18	4.2
16	2.0	16	114	111	e180	118	225	294	69	171	15	4.1
17	2.3	16	106	112	e150	118	224	282	65	152	13	3.9
18	2.9	19	117	121	e100	118	210	283	64	127	11	3.6
19	3.6	33	132	132	113	147	196	286	91	100	9.6	3.0
20	4.6	34	123	122	157	186	175	320	359	79	9.6	2.9
21	4.9	53	115	121	258	249	153	295	294	70	7.8	2.9
22	5.0	90	104	135	197	244	135	260	270	63	7.0	2.5
23	5.0	99	100	170	160	304	124	533	201	53	6.2	2.7
24	5.1	106	94	144	134	379	118	599	150	46	5.4	2.3
25	5.2	145	94	129	129	282	109	454	124	42	4.8	2.6
26	5.3	122	90	124	125	239	106	348	123	38	4.2	2.2
27	5.5	92	88	121	129	208	105	288	154	32	3.9	2.5
28	5.9	82	85	119	134	192	120	255	121	28	3.4	2.1
29	6.1	76	84	114	---	182	357	230	96	26	2.9	1.8
30	6.1	74	85	109	---	405	313	263	79	24	25	1.2
31	6.7	---	84	103	---	390	---	313	---	21	38	---
TOTAL	104.5	1218.4	2866	3607	3644	6003	5770	17150	3852	2257	1768.8	166.2
MEAN	3.37	40.6	92.5	116	130	194	192	553	128	72.8	57.1	5.54
MAX	6.7	145	132	170	258	405	357	2920	359	178	465	18
MIN	1.5	7.3	64	87	93	114	105	230	64	21	2.9	1.2
AC-FT	207	2420	5680	7150	7230	11910	11440	34020	7640	4480	3510	330

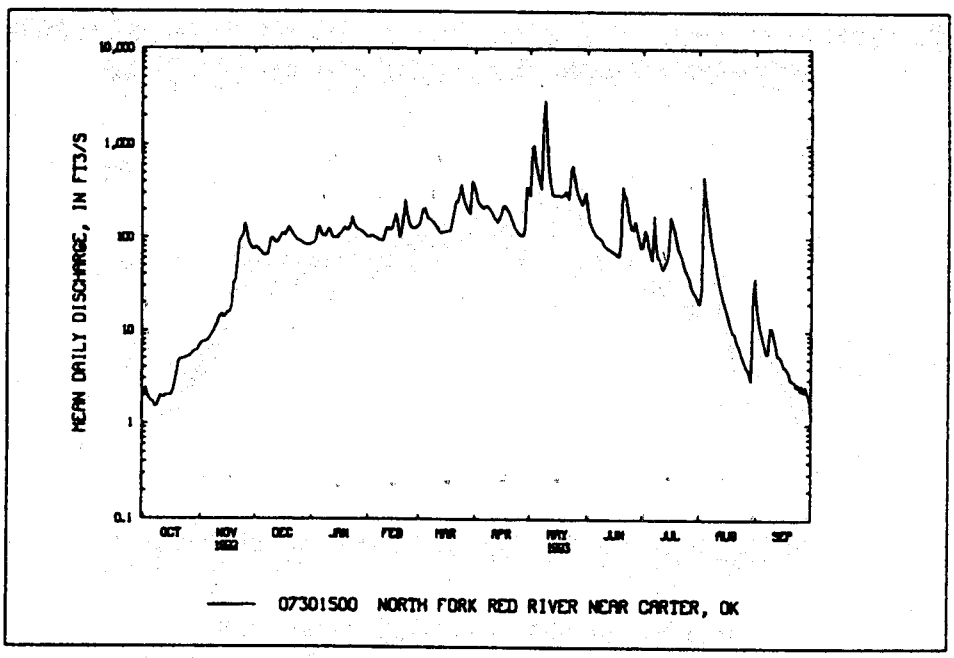
e Estimated

07301500 NORTH FORK RED RIVER NEAR CARTER, OK--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1993, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	94.8	51.8	58.5	71.3	94.3	101	127	423	268	73.2	37.5	49.7
MAX	1195	360	271	319	365	465	683	2713	1246	828	431	368
(WY)	1987	1987	1960	1960	1960	1987	1973	1977	1951	1950	1950	1962
MIN	.000	.000	.000	.000	.000	.000	.079	.000	.60	.000	.000	.000
(WY)	1946	1946	1953	1953	1953	1955	1971	1971	1966	1954	1952	1945

SUMMARY STATISTICS	1992 CALENDAR YEAR		1993 WATER YEAR		WATER YEARS 1945-93	
ANNUAL TOTAL	34535.6		48406.9			
ANNUAL MEAN	94.4		133		121	
HIGHEST ANNUAL MEAN					356	1987
LOWEST ANNUAL MEAN					12.9	1981
HIGHEST DAILY MEAN	583	Jul 15	2920	May 9	20700	May 26 1959
LOWEST DAILY MEAN	1.5	Oct 7	1.2	Sep 30	.00	most years
ANNUAL SEVEN-DAY MINIMUM	1.7	Oct 3	1.7	Oct 3	.00	most years
INSTANTANEOUS PEAK FLOW			3960	May 8	53400	May 26 1959
INSTANTANEOUS PEAK STAGE			8.48	May 8	14.98	May 17 1977
ANNUAL RUNOFF (AC-FT)	68500		96020		87790	
10 PERCENT EXCEEDS	206		284		204	
50 PERCENT EXCEEDS	84		100		33	
90 PERCENT EXCEEDS	5.0		4.0		.00	



104

RED RIVER BASIN

07316500 WASHITA RIVER NEAR CHEYENNE, OK

LOCATION.--Lat 35°37'35", long 99°40'05", in SE 1/4 sec.5, T.13 N., R.23 W., Roger Mills County, Hydrologic Unit 11130301, on left bank on downstream side of bridge on U.S. Highway 283, 0.5 mi downstream from Sergeant Major Creek, 1.0 mi north of Cheyenne, 5.2 mi upstream from Dead Indian Creek, and at mile 543.9.

DRAINAGE AREA.--794 mi^2.

PERIOD OF RECORD.--October 1937 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1211: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,900.98 ft above sea level. May 1, 1938, to Nov. 16, 1946, and Oct. 1, 1947, to Jan. 11, 1948, nonrecording gage at site 50 ft upstream and datum 5.00 ft higher. Jan. 12, 1948 to Dec. 31, 1976, at site 50 ft upstream and datum 5.00 ft higher. Jan. 1, 1977, to Dec. 20, 1979, at site 50 ft upstream at same datum.

REMARKS.--Records fair. Flow regulated since 1961 by numerous flood-retarding structures. U.S. Army Corps of Engineers' satellite telemeter at site.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 3, 1934, reached a stage of 1.0 ft lower than that in 1954, at site on upstream side of highway fill (at old bridge site).

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.02	6.4	14	20	34	43	61	31	71	2.8	2.2
2	.00	.04	6.7	15	20	39	40	159	31	42	2.8	1.8
3	.00	.04	6.6	18	20	40	40	121	27	30	4.3	1.3
4	.00	.02	6.4	18	20	39	43	115	25	22	3.9	1.1
5	.00	.02	6.0	17	19	36	46	100	23	17	3.5	.70
6	.00	.02	7.0	17	19	34	42	84	24	14	3.7	.56
7	.00	.04	6.8	16	19	34	42	70	24	14	3.6	.74
8	.00	.07	7.1	17	19	33	41	85	21	12	3.5	1.2
9	.00	.12	9.0	21	19	33	42	80	19	11	3.3	1.2
10	.00	.13	8.2	e15	20	31	40	74	19	8.8	3.2	1.0
11	.00	.13	7.6	e14	22	31	39	71	42	7.4	2.6	.62
12	.00	.15	8.2	e15	22	31	38	69	25	22	2.4	.43
13	.00	.17	11	e13	24	31	38	67	21	17	2.2	.31
14	.00	.28	13	e13	24	31	45	61	18	21	2.0	.37
15	.00	.34	11	e15	30	31	49	56	17	20	1.8	.49
16	.00	.29	11	23	e26	31	46	52	16	16	1.4	.46
17	.00	.42	14	22	e20	30	43	59	15	13	.91	.37
18	.00	.71	15	21	e21	30	41	198	15	11	.47	.30
19	.00	2.4	15	20	e28	35	40	118	101	9.1	.12	.35
20	.00	2.0	15	21	38	35	39	82	77	8.0	.00	.16
21	.00	4.1	15	23	39	35	36	74	50	7.6	.00	.16
22	.00	6.2	15	26	38	44	36	65	98	7.4	.02	.10
23	.00	5.4	15	24	36	45	36	59	48	6.5	.10	.00
24	.00	6.4	14	23	35	46	36	53	32	5.8	.14	.03
25	.01	7.5	14	23	35	44	35	47	23	5.2	.00	.59
26	.02	6.7	14	22	33	43	34	44	36	4.7	.00	.45
27	.02	5.6	14	22	32	41	34	41	43	4.0	.00	.52
28	.02	6.0	15	22	32	40	37	37	28	3.6	.00	.34
29	.02	6.5	15	21	---	42	74	34	21	3.4	.00	.25
30	.02	6.4	15	20	---	49	55	32	19	3.2	.00	.23
31	.02	---	14	20	---	46	---	30	---	2.9	1.1	---
TOTAL	0.13	68.21	351.0	591	730	1144	1250	2298	989	440.6	49.86	18.33
MEAN	.004	2.27	11.3	19.1	26.1	36.9	41.7	74.1	33.0	14.2	1.61	.61
MAX	.02	7.5	15	26	39	49	74	198	101	71	4.3	2.2
MIN	.00	.02	6.0	13	19	30	34	30	15	2.9	.00	.00
AC-FT	.3	135	696	1170	1450	2270	2480	4560	1960	874	99	36

e Estimated

07316500 WASHITA RIVER NEAR CHEYENNE, OK--Continued

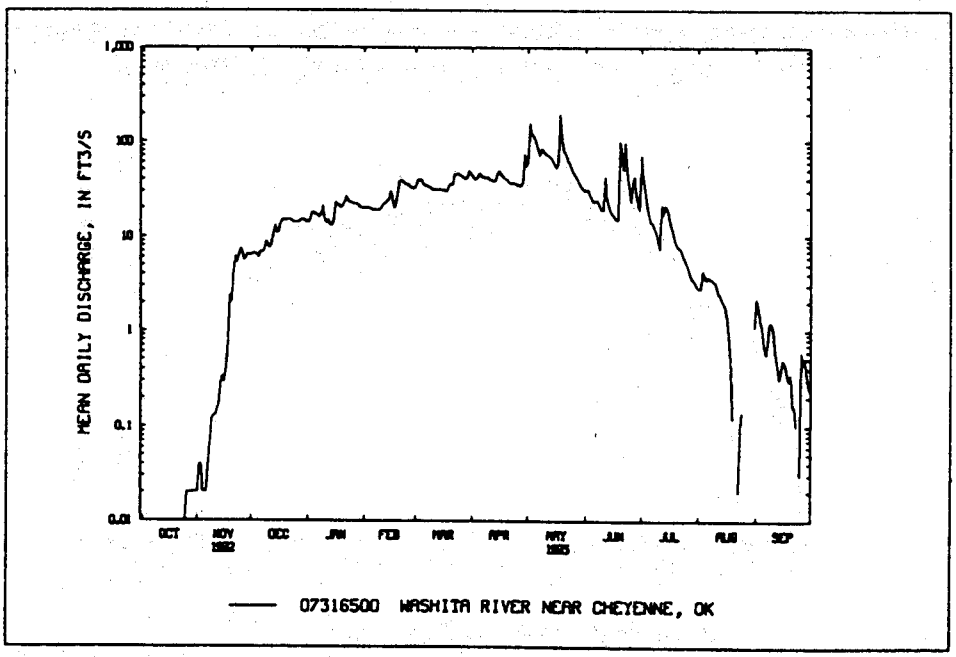
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 1993, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	7.41	7.76	9.29	12.4	16.7	22.1	27.5	46.5	36.5	6.97	2.82	4.08
MAX	72.9	64.3	33.8	46.8	46.5	74.8	131	348	203	61.7	14.8	35.3
(WY)	1987	1987	1987	1987	1987	1987	1990	1977	1982	1982	1977	1962
MIN	.000	.000	.000	.026	1.50	2.22	1.08	.000	.005	.000	.000	.000
(WY)	1964	1964	1964	1973	1973	1967	1971	1971	1970	1964	1963	1964

SUMMARY STATISTICS	1992 CALENDAR YEAR		1993 WATER YEAR		WATER YEARS 1962-93	
ANNUAL TOTAL	4231.77		7930.13			
ANNUAL MEAN	11.6		21.7		[a]16.6	
HIGHEST ANNUAL MEAN					57.1	1982
LOWEST ANNUAL MEAN					2.60	1972
HIGHEST DAILY MEAN	82	May 23	198	May 18	1560	Apr 23 1990
LOWEST DAILY MEAN	.00	Sep 15	.00	at times	.00	most years
ANNUAL SEVEN-DAY MINIMUM	.00	Sep 15	.00	Oct 1	.00	Oct 1 1961
INSTANTANEOUS PEAK FLOW			263	Jun 22	[b]7250	Apr 22 1990
INSTANTANEOUS PEAK STAGE			9.08	Jun 22	16.60	Apr 22 1990
ANNUAL RUNOFF (AC-FT)	8390		15730		12050	
10 PERCENT EXCEEDS	23		46		34	
50 PERCENT EXCEEDS	11		15		5.8	
90 PERCENT EXCEEDS	.00		.02		.00	

[a]Prior to regulation, water years 1938-60, 41.7 ft^3/s.

[b]Maximum discharge for period of record 69,800 ft^3/s, Apr. 29, 1954, from rating curve extended above 27,000 ft^3/s on basis of contracted opening.



07316000 RED RIVER NEAR GAINESVILLE, TX

LOCATION.--Lat 33°43'40", long 97°09'35", in SW 1/4 sec.36, T.9 S., R.1 E., Love County, OK, Hydrologic Unit 11130201, on downstream right bank at end of bridge on Interstate 35, 0.2 mi downstream from Gulf, Colorado, and Santa Fe Railway Co. bridge, 5.0 mi downstream from Fish Creek, 4.5 mi southwest of Thackerville, OK, 7.0 mi north of Gainesville, and at mile 791.5.

DRAINAGE AREA.--30,782 mi² of which 5,936 mi² probably is noncontributing.

PERIOD OF RECORD.--May 1936 to current year. Monthly discharge only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1211: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 627.91 ft above National Geodetic Vertical Datum of 1929. Prior to Jan. 17, 1939, and Feb. 13, 1965 to Nov. 14, 1966, nonrecording gage at same site and datum.

REMARKS.--Records poor. Flow slightly regulated by Lake Kemp (station 07312000 in Texas), since 1943 by Lake Altus (station 07302500 in Oklahoma), since 1946 by Lake Kickapoo (station 07314000 in Texas), since 1967 by Lake Arrowhead (station 07314800 in Texas), and since 1968 by Moss Lake (station 07315950 in Texas). U.S. Army Corps of Engineers satellite telemeter at station.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 24,000 ft³/s:

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Nov. 23	1800	24,300	18.21	Apr. 1	0900	33,400	20.09
Dec. 16	1100	29,600	19.35	May 4	0400	24,400	18.27
Feb. 17	1600	33,100	20.03	May 11	1100	117,000	30.99
Mar. 3	0800	25,000	18.41				

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	563	390	e5300	2920	2430	11600	29100	11000	6590	4080	e1040	740
2	536	613	e5000	2930	2330	20300	14200	15900	6050	3320	e968	718
3	524	623	e4600	2860	2280	23900	10200	19100	6000	e2440	e961	744
4	512	456	e4050	2720	e2260	17100	e9000	23100	5850	e2200	e968	731
5	500	423	e3700	2740	e2400	12000	e8000	18500	5170	e2030	1030	728
6	486	408	e3100	2590	e2380	8430	e7200	15700	4790	e1950	e1060	771
7	472	391	e2800	2340	e2350	8020	e6600	15200	4270	e1920	e1210	948
8	504	377	2060	e2000	e2300	8340	e6300	14600	4260	e1920	e1740	920
9	491	377	2110	2520	e2050	7870	e6000	43700	4900	e1940	e2570	984
10	475	375	2730	3000	e2080	7110	e5600	87700	8120	e1980	1780	1050
11	461	387	2860	2900	e2200	6760	e5300	114000	8140	e2220	2200	1010
12	449	460	7750	2880	e2400	6420	e5000	102000	9130	2750	1750	887
13	435	484	9350	3180	e2700	6100	4760	79100	7130	4430	1460	864
14	412	8010	13100	3640	e3500	5410	4920	62800	6100	3370	1280	1890
15	410	7420	21300	4000	4780	4850	5010	32100	4680	e2350	1150	3620
16	402	4310	28100	4020	19600	4620	9640	24600	4020	e2080	1030	5810
17	400	2770	20800	3460	31300	4420	16200	20200	3450	e2040	958	4250
18	394	2160	13900	2870	22700	4290	14700	17400	2910	e2300	904	2650
19	379	2080	8500	2600	14300	4180	11000	14900	2650	3520	855	1460
20	373	2140	6660	2950	8780	3800	8960	12300	e2400	5320	826	1070
21	374	4320	6030	3830	7450	3560	7960	11300	e2240	3460	810	1760
22	375	13900	5790	4400	7260	4070	7070	10100	e2160	e2400	790	2020
23	377	20400	5670	7360	6810	5210	5860	8340	3060	e2050	767	1500
24	376	21100	5060	6260	6830	6460	4880	10700	7360	e1790	877	1020
25	377	14200	4380	5340	8510	5570	4300	13700	7110	e1650	782	821
26	375	10200	3760	4880	11000	5610	4230	10700	4370	e1570	773	762
27	375	11100	3440	4220	12200	5920	4210	12400	3370	e1420	746	735
28	375	10900	3290	3770	10200	5110	4250	13600	4020	e1180	718	876
29	371	e7200	3170	3390	---	4450	5060	9500	7120	e1190	697	881
30	371	e6100	3080	2870	---	4060	6020	8210	5800	e1160	716	653
31	371	---	2980	2580	---	19200	---	7500	---	e1100	798	---
TOTAL	13295	154074	214420	108020	205380	244740	241530	859950	153220	73130	34214	42873
MEAN	429	5136	6917	3485	7335	7895	8051	27740	5107	2359	1104	1429
MAX	563	21100	28100	7360	31300	23900	29100	114000	9130	5320	2570	5810
MIN	371	375	2060	2000	2050	3560	4210	7500	2160	1100	697	653
AC-FT	26370	305600	425300	214300	407400	485400	479100	1706000	303900	145100	67860	85040

e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 1993, BY WATER YEAR (WY)

MEAN	3979	1964	1590	1200	1687	2598	3440	8291	8178	2129	1290	2337
MAX	31080	14020	14990	7152	9984	14690	27400	47780	43510	9857	12940	12880
(WY)	1942	1942	1992	1985	1987	1987	1990	1957	1941	1950	1950	1986
MIN	119	137	125	82.4	151	90.5	153	204	640	166	163	108
(WY)	1953	1955	1940	1940	1953	1940	1971	1971	1966	1964	1970	1956

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1937 - 1993	
ANNUAL TOTAL	2139979		2344846			
ANNUAL MEAN	5847		6424		3227	
HIGHEST ANNUAL MEAN					11890	1987
LOWEST ANNUAL MEAN					651	1953
HIGHEST DAILY MEAN	63400	Jun 10	114000	May 11	232000	May 31 1987
LOWEST DAILY MEAN	371	Oct 29	371	Oct 29	48	Jan 18 1940
ANNUAL SEVEN-DAY MINIMUM	374	Oct 25	374	Oct 25	48	Jan 18 1940
INSTANTANEOUS PEAK FLOW			117000	May 11	265000	May 31 1987
INSTANTANEOUS PEAK STAGE			30.99	May 11	40.08	May 31 1987
ANNUAL RUNOFF (AC-FT)	4245000		4651000		2338000	
10 PERCENT EXCEEDS	14000		14000		7120	
50 PERCENT EXCEEDS	3730		3450		797	
90 PERCENT EXCEEDS	497		496		210	

07331500 LAKE TEXOMA NEAR DENISON, TX

LOCATION.--Lat 33°49'05", long 96°34'20", in NE1/4 sec.33, T.8 S., R.7 E., Bryan County, OK, Hydrologic Unit 11130210, in control tower of Denison Dam on Red River, 1.2 mi upstream from Shawnee Creek, 1.8 mi upstream from Sand Creek, 4.0 mi northwest of Denison, 6.0 mi southwest of Colbert, and at mile 725.9.

DRAINAGE AREA.--39,719 mi², of which 5,936 mi² is probably noncontributing.

PERIOD OF RECORD.--July 1942 to current year. Monthend contents only for some periods, published in WSP 1311.

REVISED RECORDS.--WSP 1211: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929. Prior to Mar. 30, 1944, non-recording gage at same site and datum. Prior to Oct. 1, 1948, supplementary nonrecording gage in Cumberland pool at the same datum.

REMARKS.--The lake is formed by a rolled earthfill dam. The controlled outlet consists of eight 20-foot-diameter conduits and the uncontrolled outlet is a concrete, ogee-type weir spillway. Flow was diverted through conduits July 27, 1942; regulated storage began Oct. 31, 1943; power pool was first filled March 15, 1945. Capacity, based on 1969 survey, 5,312,000 acre-ft at elevation 640.0 ft, crest of spillway, 2,643,000 acre-ft at elevation 617.0 ft maximum power pool; 1,031,000 acre-ft at elevation 590.0 ft, minimum power pool, in Denison pool. Dead storage 11,000 acre-ft at elevation 610.0 ft in Cumberland pool. When contents are below 2,105,000 acre-ft, the reservoir is divided into two pools by protective levees around the Cumberland oil field on the Washita River arm with bottom outlet channel for the upper pool (known as Cumberland pool) at elevation 610 ft. At higher elevations the two pools are considered as being at a common level, contents being computed from gage in Denison pool. Figures given herein represent total contents of both pools. Lake is used principally for flood control and power development. Revised capacity table, based on survey in 1969, used since Oct. 1, 1977. U.S. Army Corps of Engineers' satellite telemeter at station.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 6,028,000 acre-ft May 6, 1990 (elevation, 644.76 ft); minimum since power pool was first filled, 1,565,100 acre-ft Sept. 16, 1964; minimum elevation, 599.96 ft Mar. 1, 2, 1957.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 4,427,000 acre-ft, May 16 (elevation, 633.49 ft); minimum, 2,496,000 acre-ft Nov. 8 (elevation, 615.24 ft).

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

614.0	2,399,000	626.0	3,538,000	638.0	5,029,000
620.0	2,920,000	632.0	4,240,000	645.0	6,066,000

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2569000	2510000	2816000	2828000	2637000	2903000	2679000	2623000	3484000	2831000	2720000	2539000
2	2569000	2505000	2797000	2817000	2624000	2959000	2704000	2649000	3428000	2828000	2715000	2538000
3	2571000	2513000	2783000	2810000	2618000	3015000	2700000	2659000	3366000	2822000	2700000	2539000
4	2572000	2504000	2775000	2802000	2615000	3033000	2703000	2679000	3307000	2817000	2689000	2536000
5	2573000	2501000	2763000	2790000	2606000	3016000	2694000	2692000	3240000	2813000	2685000	2533000
6	2570000	2498000	2757000	2778000	2597000	2975000	2672000	2706000	3175000	2805000	2668000	2532000
7	2576000	2499000	2759000	2767000	2591000	2925000	2668000	2704000	3109000	2802000	2657000	2525000
8	2565000	2500000	2752000	2751000	2585000	2879000	2653000	2711000	3065000	2797000	2648000	2531000
9	2562000	2501000	2757000	2753000	2577000	2842000	2647000	3040000	3017000	2797000	2643000	2531000
10	2561000	2499000	2754000	2736000	2574000	2804000	2646000	3315000	3008000	2798000	2640000	2527000
11	2560000	2506000	2747000	2730000	2570000	2767000	2641000	3656000	3020000	2799000	2639000	2520000
12	2556000	2512000	2742000	2728000	2558000	2749000	2636000	3986000	3008000	2799000	2636000	2515000
13	2553000	2520000	2771000	2721000	2550000	2724000	2631000	4219000	2991000	2799000	2633000	2525000
14	2550000	2533000	2903000	2711000	2547000	2703000	2657000	4374000	2971000	2804000	2626000	2564000
15	2538000	2552000	2992000	2708000	2603000	2688000	2660000	4421000	2943000	2807000	2619000	2593000
16	2533000	2565000	3095000	2700000	2669000	2682000	2650000	4421000	2921000	2807000	2614000	2616000
17	2533000	2577000	3167000	2694000	2758000	2666000	2655000	4399000	2903000	2806000	2607000	2635000
18	2533000	2584000	3202000	2687000	2840000	2646000	2655000	4361000	2888000	2805000	2601000	2646000
19	2528000	2602000	3205000	2681000	2879000	2643000	2659000	4300000	2875000	2806000	2595000	2653000
20	2527000	2608000	3186000	2690000	2884000	2642000	2646000	4232000	2860000	2813000	2589000	2664000
21	2525000	2631000	3160000	2689000	2877000	2639000	2639000	4158000	2848000	2815000	2582000	2665000
22	2524000	2650000	3123000	2687000	2859000	2647000	2638000	4085000	2838000	2814000	2573000	2665000
23	2522000	2693000	3083000	2696000	2835000	2641000	2636000	4030000	2827000	2809000	2562000	2667000
24	2517000	2771000	3043000	2689000	2826000	2643000	2635000	3967000	2823000	2800000	2577000	2666000
25	2516000	2814000	3013000	2690000	2872000	2642000	2630000	3912000	2823000	2790000	2564000	2669000
26	2517000	2824000	2978000	2686000	2885000	2638000	2623000	3852000	2829000	2782000	2562000	2670000
27	2513000	2830000	2943000	2682000	2877000	2635000	2614000	3789000	2828000	2772000	2559000	2664000
28	2510000	2840000	2905000	2678000	2862000	2634000	2610000	3738000	2830000	2763000	2554000	2659000
29	2509000	2844000	2879000	2669000	---	2631000	2618000	3684000	2834000	2748000	2551000	2657000
30	2507000	2828000	2854000	2660000	---	2625000	2616000	3621000	2834000	2738000	2549000	2652000
31	2504000	---	2840000	2649000	---	2635000	---	3556000	---	2728000	2543000	---
MAX	2576000	2844000	3205000	2828000	2885000	3033000	2704000	4421000	3484000	2831000	2720000	2670000
MIN	2504000	2498000	2742000	2649000	2547000	2625000	2610000	2623000	2823000	2728000	2543000	2515000
(↑)	615.34	619.03	619.15	617.06	619.38	616.91	616.68	626.16	619.09	617.94	615.83	617.10
(Φ)	-65000	+324000	+12000	-191000	+213000	-227000	-19000	+940000	-722000	-106000	-185000	+109000

CAL YR 1992 MAX 3820000 MIN 2498000 (Φ) +1041
WTR YR 1993 MAX 4421000 MIN 2498000 (Φ) +83000

(↑) Elevation, in feet, at end of month.
(Φ) Change in contents, in acre-feet.

RED RIVER BASIN

07335500 RED RIVER AT ARTHUR CITY, TX

LOCATION.--Lat 33°52'30", long 95°30'06", in NW 1/4 sec.11.T.8 S., R.17 E., Choctaw County, OK, Hydrologic Unit 11140101, on right downstream bank of bridge on U.S. Highway 271 at Arthur City, 10.6 mi downstream from Muddy Boggy River, 26.0 mi upstream from Kiamichi River, and at mile 633.1.

DRAINAGE AREA.--44,531 mi², of which 5,936 mi² probably is noncontributing.

PERIOD OF RECORD.-- January to September 1905 (gage heights and discharge measurements only), October 1905 to December 1911, July 1936 to current year. Monthly discharge only for some periods, published in WSP 1311. Gage-height records collected at same site since 1891 are contained in reports of the National Weather Service.

REVISED RECORDS.-- WSP 1241: Drainage area. WSP 1311: 1906-11.

GAGE.-- Water-stage recorder. Datum of gage is 380.07 ft above National Geodetic Vertical Datum of 1929. From 1905-11 nonrecording gage at St. Louis-San Francisco Railway Co. bridge 200 ft upstream at same datum. July 1, 1936, to Mar. 24, 1940, nonrecording gage at present site and datum.

REMARKS.--Records fair. Flow regulated since October 1943 by Lake Texoma (station 07331500), 92.8 mi upstream from station. U.S. Army Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE FOR PERIOD PRIOR TO REGULATION.--13 years (water years 1906-11, 1937-43) prior to regulation by Lake Texoma, 9,266 ft³/s (6,713,000 acre-ft/yr).

EXTREMES FOR PERIOD PRIOR TO REGULATION (WATER YEARS, 1906-11, 1937-43).--Maximum discharge, 400,000 ft³/s May 28, 1908 (gage height, 43.2 ft), on basis of records for later years.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2030	2150	15200	20900	11800	37900	21700	24000	48900	10200	7100	3970
2	1830	2170	15400	15100	11600	48200	30400	19800	47900	11400	7150	3500
3	1740	2000	15400	13500	11500	41200	29700	16400	44300	9900	7200	3730
4	2040	1680	13900	13300	12000	38600	29100	16100	44100	9150	7410	3640
5	2040	1870	11900	13200	14900	40500	32300	27200	43600	8910	7370	3410
6	1660	2080	10700	13200	14900	42400	34700	32900	43100	8790	7350	3400
7	1490	2560	9430	13000	13200	43900	33700	36100	42700	8190	7150	3260
8	1970	1970	8080	12800	12100	42500	e32900	41100	42500	7390	7120	3230
9	2390	1700	6790	12900	10600	39100	31700	48500	43000	6800	6590	3480
10	2720	1060	8560	13000	10600	35800	28000	87600	44900	6400	6220	3150
11	2740	1040	12600	13300	14700	33800	19100	65300	46300	e6220	5900	2800
12	2270	1610	15400	13800	18700	31800	16900	46400	51400	e6050	5720	3040
13	1640	2040	16000	13900	18000	27100	15800	43500	44800	e5870	4770	4170
14	2190	2670	16900	14000	16500	22300	15600	48300	37100	e5700	4860	3920
15	2630	3920	29100	13900	16800	21300	24200	51600	32900	e5520	4900	4910
16	2440	3160	35100	13200	33800	25400	27800	57700	28200	e5460	4970	7010
17	5250	1540	36000	12600	33700	29800	33100	60800	25800	e5390	5070	8260
18	3560	1090	34600	12300	30200	23900	38100	59400	21400	e5330	4830	7970
19	2070	1730	33400	12100	31300	20200	39400	57200	20400	e5270	4680	8010
20	1440	1930	38300	13600	32700	28000	38100	56700	17900	5250	4600	6620
21	1430	2050	38000	20600	36400	32800	32700	55700	17000	5080	4580	5940
22	2150	2970	37400	22800	35400	25100	27200	53500	15900	5060	4580	7500
23	2200	5300	37700	20600	34100	22500	18700	53500	14100	5200	4230	8630
24	2180	8370	36700	20200	32100	28500	15500	54100	13600	6260	4790	7020
25	2170	11300	33200	17300	33700	26300	14400	56900	13300	6660	4900	5230
26	2680	15100	28700	14300	37500	20800	14600	58200	14000	6960	4430	4640
27	2670	19600	27900	13200	34700	19800	16200	56300	15000	7120	4790	4910
28	1910	19800	27700	12700	34500	16300	16100	54200	12900	6840	4580	5160
29	2080	17100	27800	12500	---	14900	16900	52800	11200	e7060	4180	5370
30	2080	15600	26600	12200	---	14500	24600	49400	10200	7190	4070	4910
31	2080	---	23200	11900	---	14700	---	49600	---	7140	4040	---
TOTAL	69770	157160	727660	451900	648000	909900	769200	1490800	908400	213760	170130	150790
MEAN	2251	5239	23470	14580	23140	29350	25640	48090	30280	6895	5488	5026
MAX	5250	19800	38300	22800	37500	48200	39400	87600	51400	11400	7410	8630
MIN	1430	1040	6790	11900	10600	14500	14400	16100	10200	5060	4040	2800
AC-FT	138400	311700	1443000	896300	1285000	1805000	1526000	2957000	1802000	424000	337500	299100

e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1993#, BY WATER YEAR (WY)

MEAN	7122	7091	6859	6507	8252	10060	11420	17010	18600	7777	4589	4687
MAX	40240	37170	32340	39930	24200	38610	55500	103900	83820	27700	34840	19010
(WY)	1982	1975	1992	1992	1946	1987	1990	1990	1957	1989	1950	1950
MIN	263	242	894	1126	1138	1118	1343	2837	2074	1586	1108	859
(WY)	1957	1957	1957	1964	1959	1967	1956	1980	1956	1956	1972	1988

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1945 - 1993#	
ANNUAL TOTAL	6721680		6667470			
ANNUAL MEAN	18370		18270		9158	
HIGHEST ANNUAL MEAN					23290	1990
LOWEST ANNUAL MEAN					2754	1964
HIGHEST DAILY MEAN	62800	Jun 9	87600	May 10	269000	May 4 1990
LOWEST DAILY MEAN	1040	Nov 11	1040	Nov 11	134	a/Dec 11 1956
ANNUAL SEVEN-DAY MINIMUM	1710	Nov 7	1710	Nov 7	134	Dec 11 1956
INSTANTANEOUS PEAK FLOW			95100	May 10	275000	May 4 1990
INSTANTANEOUS PEAK STAGE			22.53	May 10	34.21	May 4 1990
ANNUAL RUNOFF (AC-FT)	13330000		13220000		6635000	
10 PERCENT EXCEEDS	39700		42800		23900	
50 PERCENT EXCEEDS	15100		13300		4120	
90 PERCENT EXCEEDS	2190		2190		1310	

Period of regulated streamflow.
a/ Also occurred Dec. 12, 1956.

07336820 RED RIVER NEAR DE KALB, TX

LOCATION.--lat 33°40'59", long 94°41'39", Bowie County, Hydrologic Unit 11140106, on right bank at downstream side of bridge on U.S. Highway 259, 4.8 mi upstream from North Mill Creek, 13 mi north of De Kalb, and at mile 556.9.

DRAINAGE AREA.--47,348 mi², of which 5,936 mi² probably is noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--December 1967 to current year.

GAGE.--Water-stage recorder. Datum of gage is 302.92 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--No estimated daily discharges. Records good. At times, flood peaks may be affected by Lake Texoma (station 07331500) located approximately 169 mi upstream, and low flows may be affected by releases for the generation of electric power. Storage and/or releases from Lake Hugo on the Kiamichi River, a tributary to the Red River about 45 mi upstream, may also affect flows. Gage-height telemeter at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge since 1957, 205,000 ft³/s June 1957 (gage height, 32.2 ft), from rating curve extended above 186,500 ft³/s. The greatest flood since 1936 occurred in February 1938, stage unknown.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3520	2820	24000	28900	15500	45100	14300	27600	57000	10600	7410	3870
2	3550	2850	21200	25700	15200	60700	19500	28700	56700	10100	7440	3860
3	3100	2860	20100	21300	14900	65000	26100	23900	55300	11200	7500	3660
4	2690	2820	19400	23500	16400	52400	27500	19600	55100	10500	9860	3320
5	2530	2640	17300	25100	17800	52100	27700	17700	56800	9160	12300	3620
6	2750	2490	15000	24600	19100	59000	31100	22800	56800	8860	9390	3280
7	2710	2600	13400	26000	19400	61100	35800	26900	56100	8680	6930	3240
8	2430	2870	11700	25600	17600	60700	36700	30800	53000	8520	6650	3170
9	2370	2990	11400	22100	16000	53000	36400	37100	51800	7730	6580	3080
10	2750	2700	12700	20200	14800	42800	31500	81200	52700	6770	6190	3050
11	3140	2550	16800	19700	15100	35400	26800	113000	52200	6500	5700	3290
12	3350	2270	21300	20400	18600	33800	19900	82400	51000	6220	5550	2810
13	3330	2380	23800	21400	22000	32000	17000	53200	53700	5950	5280	2550
14	2850	2670	29400	21400	22000	26800	16100	48100	49500	5650	4790	3130
15	2500	2940	49700	21200	21300	22800	19300	52100	45600	5470	4390	4110
16	3020	3490	64100	19600	28900	21500	28500	57000	44200	5560	4480	4010
17	3200	4030	66600	17900	43300	27700	37500	60800	39400	5530	4560	5680
18	3890	3200	64100	17200	41600	31800	44000	63400	34700	5470	4670	7370
19	4950	2450	62800	16900	39600	26900	48700	61700	28700	5320	4560	7880
20	3570	3060	66800	17600	42000	26900	51400	58400	25800	5350	4400	7780
21	2720	3800	71100	22100	44400	33800	45700	57100	23000	5370	4320	7270
22	2320	7720	68300	30800	47100	35500	37600	58100	19700	5270	4240	5880
23	2330	8560	64800	32700	45600	29000	30100	57200	17100	5170	4220	6580
24	2760	11400	61900	32300	42900	28700	20500	58200	15100	5200	4160	8040
25	2810	19400	57200	31500	42700	33300	17000	56600	14200	5850	4210	7790
26	2800	24400	48600	28500	46700	31800	15800	56700	13900	6820	4560	6180
27	2830	29100	41800	23400	48100	26600	19100	59000	14300	7100	4490	4860
28	3330	29500	40900	19400	46100	24800	23100	57900	15400	7350	4100	4780
29	3090	27600	40800	17500	---	22200	22400	57800	14400	7400	4250	4930
30	2760	25300	39200	16500	---	17400	22300	59000	12400	7430	4170	5240
31	2740	---	34900	16000	---	14800	---	57600	---	7420	3880	---
TOTAL	92690	243460	1201100	707000	824700	1135400	849400	1601600	1135600	219520	175230	144310
MEAN	2990	8115	38750	22810	29450	36630	28310	51660	37850	7081	5653	4810
MAX	4950	29500	71100	32700	48100	65000	51400	113000	57000	11200	12300	8040
MIN	2320	2270	11400	16000	14800	14800	14300	17700	12400	5170	3880	2550
AC-FT	183900	482900	2382000	1402000	1636000	2252000	1685000	3177000	2252000	435400	347600	286200

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1968 - 1993, BY WATER YEAR (WY)

MEAN	9195	13990	13830	11470	14780	19800	18970	25200	27200	9416	5072	5612
MAX	39980	53170	45440	49500	31000	48590	62330	125500	67360	35030	14250	24010
(WY)	1982	1975	1972	1992	1969	1987	1990	1990	1987	1982	1992	1974
MIN	1783	2105	1608	1699	2876	2492	3005	4707	2909	2598	1418	1368
(WY)	1979	1980	1978	1981	1976	1980	1981	1972	1988	1972	1972	1988

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1968 - 1993	
ANNUAL TOTAL	8962520		8330010		14460	
ANNUAL MEAN	24490		22820		30100	1990
HIGHEST ANNUAL MEAN					4690	1980
LOWEST ANNUAL MEAN					278000	May 7 1990
HIGHEST DAILY MEAN	73600	Jun 10	113000	May 11	254	Nov 29 1979
LOWEST DAILY MEAN	2270	Nov 12	2270	Nov 12	529	Aug 31 1972
ANNUAL SEVEN-DAY MINIMUM	2600	Oct 4	2600	Oct 4	279000	May 6 1990
INSTANTANEOUS PEAK FLOW			114000	May 11	34.42	May 6 1990
INSTANTANEOUS PEAK STAGE			27.94	May 11	213	Nov 30 1979
INSTANTANEOUS LOW FLOW			2150	Oct 23		
ANNUAL RUNOFF (AC-FT)	17780000		16520000		10470000	
10 PERCENT EXCEEDS	52300		56700		40100	
50 PERCENT EXCEEDS	21000		17600		6740	
90 PERCENT EXCEEDS	3080		3010		2100	

RED RIVER BASIN

07300000 SALT FORK RED RIVER NEAR WELLINGTON, TX

LOCATION.--Lat 34°57'27", long 100°13'14", Collingsworth County, Hydrologic Unit 11120202, near center of stream at downstream side of bridge on U.S. Highway 83, 4 mi downstream from Fort Worth and Denver (Burlington) Railway Co. bridge, 4.5 mi south of Lutie, and 7.2 mi north of Wellington.

DRAINAGE AREA.--1,222 mi², of which 209 mi² probably is noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1952 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,941.41 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair. There are several small diversions upstream from gage for irrigation. There is some regulation for municipal use by Greenbelt Lake (station 07299840) capacity 59,10 acre-ft, 42 mi upstream.

AVERAGE DISCHARGE FOR PERIOD PRIOR TO REGULATION.--14 years (water years 1953-66) prior to completion of Greenbelt Lake, 72.6 ft³/s (52,600 acre-ft/yr).

EXTREMES FOR PERIOD PRIOR TO REGULATION (WATER YEARS 1953-66).--Maximum discharge, 146,000 ft³/s May 16, 1957 (gage height, 19.00 ft), from rating curve extended above 11,000 ft³/s on basis of slope-area measurement of 63,400 ft³/s; minimum, 0.1 ft³/s June 19, 1952.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.1	14	28	63	53	77	33	27	18	151	4.5	10
2	9.1	14	28	119	53	115	23	167	15	48	5.1	7.0
3	9.4	15	28	173	51	56	23	120	12	68	13	5.8
4	9.1	15	25	113	44	30	23	54	9.9	33	11	6.0
5	9.0	15	22	86	42	25	22	32	9.0	20	11	6.0
6	9.4	15	21	87	42	25	28	23	11	1020	12	6.2
7	9.3	13	47	95	44	29	33	64	8.2	3030	11	6.3
8	9.3	13	44	93	43	31	29	1210	6.2	87	9.8	6.9
9	9.4	13	52	139	43	29	27	486	5.9	21	9.8	7.4
10	8.5	13	42	72	59	31	26	246	7.5	8.2	9.8	7.1
11	8.1	14	34	59	61	30	23	130	7.5	6.2	8.2	6.6
12	8.4	14	35	84	49	31	22	86	6.8	5.6	6.7	6.3
13	8.5	14	41	80	47	34	20	62	6.2	5.6	6.3	6.7
14	8.8	15	62	77	43	38	64	45	6.2	155	5.6	6.4
15	9.9	15	63	93	93	42	138	37	6.8	30	5.4	6.4
16	9.9	14	65	81	92	42	56	28	6.8	13	5.3	6.2
17	10	13	71	82	29	37	40	35	7.5	9.1	4.6	6.2
18	12	15	79	83	17	39	30	60	8.3	8.6	4.6	6.6
19	12	26	70	79	47	51	19	49	46	8.2	5.0	16
20	12	18	59	86	90	58	12	41	44	6.1	5.2	6.6
21	11	83	53	157	52	50	9.6	45	23	7.3	5.5	5.1
22	12	91	57	115	45	66	9.9	36	20	6.3	6.8	4.5
23	11	50	53	83	38	75	11	549	25	5.7	8.0	4.3
24	11	59	48	68	34	51	13	164	11	6.1	6.8	4.7
25	12	45	50	58	33	41	13	54	6.2	5.6	6.1	5.2
26	12	37	51	52	30	34	13	33	8.8	5.0	5.5	5.2
27	13	32	52	54	28	34	13	17	21	4.6	5.6	5.1
28	14	31	55	61	41	38	24	11	8.8	11	6.2	5.1
29	14	30	57	61	---	39	139	12	4.8	13	6.7	5.2
30	14	31	60	56	---	108	37	17	153	5.6	13	5.1
31	15	---	52	56	---	66	---	13	---	4.8	15	---
TOTAL	330.2	787	1504	2665	1343	1452	973.5	3953	530.4	4808.6	239.1	192.2
MEAN	10.7	26.2	48.5	86.0	48.0	46.8	32.4	128	17.7	155	7.71	6.41
MAX	15	91	79	173	93	115	139	1210	153	3030	15	16
MIN	8.1	13	21	52	17	25	9.6	11	4.8	4.6	4.5	4.3
AC-FT	655	1560	2980	5290	2660	2880	1930	7840	1050	9540	474	381

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 1993#, BY WATER YEAR (WY)

MEAN	33.1	28.6	26.2	30.2	34.4	40.7	61.3	121	131	28.3	28.1	31.4
MAX	279	213	92.4	86.0	64.5	127	505	468	962	155	301	113
(WY)	1987	1987	1992	1993	1988	1979	1977	1977	1989	1993	1968	1981
MIN	4.28	8.03	3.59	10.5	10.9	8.15	6.10	2.61	8.17	2.65	1.68	2.22
(WY)	1981	1981	1984	1971	1967	1972	1971	1971	1970	1970	1970	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1967 - 1993#	
ANNUAL TOTAL	22415.9		18778.0			
ANNUAL MEAN	61.2		51.4		49.5	
HIGHEST ANNUAL MEAN					115	1989
LOWEST ANNUAL MEAN					10.5	1971
HIGHEST DAILY MEAN	1420	Jun 5	3030	Jul 7	14200	Jun 13 1989
LOWEST DAILY MEAN	6.8	Aug 10	4.3	Sep 23	.40	Jun 2 1985
ANNUAL SEVEN-DAY MINIMUM	7.9	Sep 4	4.9	Sep 21	.73	May 27 1985
INSTANTANEOUS PEAK FLOW			16600	Jul 7	62100	Apr 20 1977
INSTANTANEOUS PEAK STAGE			9.17	Jul 7	13.80	Apr 20 1977
INSTANTANEOUS LOW FLOW			3.4	Aug 16	.33	Sep 22 1980
ANNUAL RUNOFF (AC-FT)	44460		37250		35870	
10 PERCENT EXCEEDS	91		83		65	
50 PERCENT EXCEEDS	30		23		16	
90 PERCENT EXCEEDS	9.0		6.1		4.3	

Period of regulated streamflow.

07301410 SWEETWATER CREEK NEAR KELTON, TX

LOCATION.--Lat 35°28'23", long 100°07'14", Wheeler County, Hydrologic Unit 11120302, near center of stream at downstream side of bridge on Farm Road 592, 5 mi north of Kelton, 8 mi upstream from Texas-Oklahoma State line, and 8.5 mi northeast of Wheeler.

DRAINAGE AREA.--287 mi², of which 20 mi² probably is noncontributing.

PERIOD OF RECORD.--November 1961 to current year.
Water-quality records.--Chemical analyses: October 1969 to June 1985.

GAGE.--Water-stage recorder. Elevation of gage is 2,230 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are fair. There are many small diversions upstream from station for ranch use. Gage-height telemeter at station via Sutron data collection platform.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1882, about 20 ft May 16, 1957.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft³/s:

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
May 2	2100	110	8.74	No peak greater than base discharge.			

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.85	2.5	10	11	14	21	21	25	9.5	5.8	2.2	1.4
2	.85	2.6	11	13	13	29	20	65	9.1	5.4	2.3	1.4
3	.85	3.1	10	16	13	27	20	73	8.8	4.9	3.5	1.2
4	.84	3.1	10	15	12	23	23	39	8.8	4.5	3.0	1.2
5	.85	3.2	10	14	12	20	23	32	8.8	4.0	2.7	1.1
6	.87	3.3	11	13	13	19	22	27	9.1	4.3	2.5	1.0
7	.88	3.4	11	13	13	19	22	23	8.5	5.4	2.4	1.0
8	.94	3.6	12	13	13	18	21	29	8.0	4.2	2.2	2.0
9	1.0	3.7	13	17	13	17	19	29	7.9	3.6	2.1	1.5
10	1.1	3.8	12	17	18	17	18	25	7.9	3.6	1.8	1.2
11	1.1	4.0	11	16	18	17	17	22	8.0	3.4	1.6	1.0
12	1.1	4.0	11	16	18	17	17	21	7.6	3.4	1.4	.92
13	1.2	4.2	12	15	20	17	16	18	7.2	3.5	1.2	.92
14	1.2	4.3	14	15	19	18	21	17	6.9	3.7	1.1	.88
15	1.2	4.5	15	15	23	18	25	15	7.1	4.2	.99	.92
16	1.2	4.6	14	14	24	17	21	14	6.7	4.1	.94	.92
17	1.3	5.1	14	14	22	16	19	18	6.4	3.6	.86	.83
18	1.4	5.3	14	14	22	17	18	32	6.6	3.5	.77	.83
19	1.6	6.7	14	14	24	28	17	19	17	3.3	.72	.79
20	1.7	6.9	14	14	33	28	15	16	24	3.2	.64	.74
21	1.7	7.6	14	16	27	23	14	15	14	3.0	.57	.66
22	1.7	8.9	13	17	21	34	14	14	10	3.0	.50	.62
23	1.7	8.3	13	17	19	35	14	15	8.5	3.5	.47	.58
24	1.8	8.9	13	15	18	27	14	13	7.5	3.2	.88	.62
25	1.9	8.4	13	14	19	23	13	12	7.2	3.0	1.6	.62
26	2.0	7.7	12	14	18	21	12	12	7.4	2.8	1.6	.58
27	2.0	10	12	14	18	20	12	11	7.3	2.7	1.5	.58
28	2.1	10	12	14	18	20	14	10	6.5	2.6	1.4	.50
29	2.2	10	11	14	---	21	31	e9.8	5.7	2.5	1.4	.45
30	2.5	10	11	14	---	27	33	e9.7	5.4	2.4	1.3	.39
31	2.5	---	11	14	---	24	---	e9.6	---	2.3	1.7	---
TOTAL	44.13	171.7	378	452	515	678	566	690.1	263.4	112.6	47.84	27.35
MEAN	1.42	5.72	12.2	14.6	18.4	21.9	18.9	22.3	8.78	3.63	1.54	.91
MAX	2.5	10	15	17	33	35	33	73	24	5.8	3.5	2.0
MIN	.84	2.5	10	11	12	16	12	9.6	5.4	2.3	.47	.39
AC-FT	88	341	750	897	1020	1340	1120	1370	522	223	95	54
IN.	.01	.02	.05	.06	.07	.09	.08	.10	.04	.02	.01	.00

e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 1993, BY WATER YEAR (WY)

MEAN	8.57	10.7	11.8	13.0	16.1	18.3	20.6	25.4	20.1	5.22	4.87	7.00
MAX	42.1	34.5	19.3	24.3	29.6	35.3	74.6	196	86.3	32.3	42.7	40.9
(WY)	1987	1975	1992	1987	1987	1988	1970	1977	1965	1967	1963	1988
MIN	.30	1.05	3.11	5.87	7.25	9.09	8.72	3.38	2.80	.44	.000	.027
(WY)	1985	1985	1984	1984	1981	1977	1971	1971	1966	1974	1964	1984

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1963 - 1993	
ANNUAL TOTAL	4168.48		3946.12			
ANNUAL MEAN	11.4		10.8		13.4	
HIGHEST ANNUAL MEAN					26.8	1977
LOWEST ANNUAL MEAN					4.89	1984
HIGHEST DAILY MEAN	74	May 23	73	May 3	1820	May 21 1977
LOWEST DAILY MEAN	.84	Oct 4	.39	Sep 30	.00	Jul 29 1964
ANNUAL SEVEN-DAY MINIMUM	.86	Oct 1	.53	Sep 24	.00	Jul 29 1964
INSTANTANEOUS PEAK FLOW			110	May 2	2890	May 20 1977
INSTANTANEOUS PEAK STAGE			8.74	May 2	15.73	May 20 1977
INSTANTANEOUS LOW FLOW			.34	Sep 30	.00	Jul 29 1964
ANNUAL RUNOFF (AC-FT)	8270		7830		9730	
ANNUAL RUNOFF (INCHES)	.58		.55		.68	
10 PERCENT EXCEEDS	22		22		21	
50 PERCENT EXCEEDS	10		10		10	
90 PERCENT EXCEEDS	1.2		.97		.88	

07308500 RED RIVER NEAR BURKBURNETT, TX

LOCATION.--Lat 34°06'36", long 98°31'53", Cotton County, Okla., Hydrologic Unit 11130102, on left bank at downstream side of bridge on U.S. Highways 277 and 281, 2.5 mi northeast of Burkburnett, and at mile 933.

DRAINAGE AREA.--20,570 mi², of which 5,936 mi² probably is noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1924 to August 1925 (monthly discharge only), December 1959 to current year.

GAGE.--Water-stage recorder. Datum of gage is 952.57 ft above National Geodetic Vertical Datum of 1929. July 11, 1924, to Aug. 31, 1925, nonrecording gage at site 1,000 ft downstream at same datum. Dec. 16, 1959, to Jan. 11, 1960, nonrecording gage at present site and datum.

REMARKS.--No estimated daily discharges. Records fair. There are many small diversions upstream from station for irrigation, but total amounts are unknown.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 3, 1957, reached a stage of 13.54 ft, from levels to floodmarks. According to local residents, higher stages occurred in 1891 and June 1941.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 9,000 ft³/s:

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Nov. 22	1400	17,100	9.46	May 1	0200	10,300	8.54
Dec. 15	0400	12,700	8.99	May 3	0200	19,500	9.39
Feb. 16	0300	12,500	8.97	May 12	1230	55,000	11.57
Mar. 30	1600	19,600	9.72	July 10	0530	9,960	7.83
Apr. 29	1500	13,000	8.82	July 17	0600	11,600	8.09

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	245	245	1500	1490	1120	3760	3280	8500	3120	912	483	470
2	252	249	1310	1380	1130	4760	2660	9790	2320	889	506	827
3	251	245	1170	1270	1110	2940	2490	15100	2100	745	588	790
4	248	249	998	1190	1070	2300	2540	9630	1950	672	796	615
5	247	254	912	1440	1010	2440	1920	4800	1890	620	2160	742
6	250	256	880	1810	977	2620	1710	3610	1740	676	5750	581
7	242	252	919	1870	967	2380	2180	2800	1710	626	2780	437
8	237	268	897	1600	970	2190	1880	2630	1790	587	1730	392
9	225	279	1110	1520	974	2200	1560	17700	3310	1310	1230	392
10	218	289	1860	1420	1020	2130	1370	40200	1780	8370	1020	403
11	212	2230	2550	1500	1080	2040	1050	41600	1550	3720	850	564
12	217	3100	2170	1990	1500	1940	940	51100	1370	2590	712	675
13	220	1500	1930	1830	1670	1900	965	26200	1310	2070	618	528
14	213	911	4920	1640	1550	1830	3250	6440	1280	1790	611	524
15	203	786	10200	1520	5650	1790	6620	3530	1060	2200	599	416
16	189	632	5830	1430	11000	1770	4990	2570	904	5190	610	409
17	189	440	3710	1410	5330	1600	4330	2070	715	8280	611	385
18	195	383	2480	1340	3190	1500	2620	1760	633	3790	603	357
19	205	3740	1960	1300	2170	1510	2470	3160	576	2470	571	303
20	224	2790	1710	1740	1810	1520	2060	2510	623	1670	537	290
21	232	1410	1710	1860	1740	1580	1800	1850	3730	1300	520	284
22	251	13900	1800	2230	1860	1740	1680	1480	2950	1070	494	248
23	250	14000	1760	2480	1870	2400	1520	1500	1800	939	461	225
24	254	6130	1620	2220	1970	2530	1320	1550	1260	838	477	213
25	252	5230	1560	1810	2620	2760	1070	3380	993	761	451	195
26	246	7930	1590	1590	2630	3110	948	4890	3740	737	581	183
27	246	4980	2780	1500	2250	2880	843	3460	4170	689	482	257
28	257	3400	1630	1420	2180	2630	937	3030	2670	610	440	304
29	240	2670	1660	1280	---	2650	8350	2380	1440	564	421	240
30	244	1980	1730	1230	---	13500	8680	2010	962	548	402	203
31	258	---	1620	1170	---	6800	---	2580	---	508	415	---
TOTAL	7212	80728	68476	49480	62418	87700	78033	283810	55446	57741	28509	12452
MEAN	233	2691	2209	1596	2229	2829	2601	9155	1848	1863	920	415
MAX	258	14000	10200	2480	11000	13500	8680	51100	4170	8370	5750	827
MIN	189	245	880	1170	967	1500	843	1480	576	508	402	183
AC-FT	14310	160100	135800	98140	123800	174000	154800	562900	110000	114500	56550	24700

07308500 RED RIVER NEAR BURKBURNETT, TX--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 1993, BY WATER YEAR (WY)

MEAN	1667	692	526	454	522	716	829	2385	3091	817	544	1213
MAX	14900	4960	4435	2040	3024	3552	5987	12470	13480	5947	2107	4244
(WY)	1987	1987	1992	1992	1987	1987	1973	1977	1991	1975	1979	1965
MIN	21.9	.96	2.98	5.53	8.37	7.97	.15	11.4	148	.058	1.29	32.2
(WY)	1971	1971	1971	1971	1971	1971	1971	1971	1970	1970	1964	1983

SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1961 - 1993	
ANNUAL TOTAL	631616		872005			
ANNUAL MEAN	1726		2389		1122	
HIGHEST ANNUAL MEAN					4424	1987
LOWEST ANNUAL MEAN					178	1964
HIGHEST DAILY MEAN	23000	Jun 8	51100	May 12	121000	Oct 22 1983
LOWEST DAILY MEAN	189	Oct 16	183	Sep 26	.00	Jul 19 1964
ANNUAL SEVEN-DAY MINIMUM	202	Oct 13	202	Oct 13	.00	Jul 19 1964
INSTANTANEOUS PEAK FLOW			55000	May 12	166000	Oct 21 1983
INSTANTANEOUS PEAK STAGE			11.57	May 12	16.90	Oct 21 1983
INSTANTANEOUS LOW FLOW			169	Sep 26	.00	Jul 19 1964
ANNUAL RUNOFF (AC-FT)	1253000		1730000		813000	
10 PERCENT EXCEEDS	3530		4230		2220	
50 PERCENT EXCEEDS	1190		1500		278	
90 PERCENT EXCEEDS	251		251		47	

07315500 RED RIVER NEAR TERRAL, OK

LOCATION.--Lat 33°52'43", long 97°56'03", Jefferson County, Hydrologic Unit 11130201, on left bank at downstream side of bridge abutment on U.S. Highway 81, 0.5 mi downstream from Chicago, Rock Island, and Railroad Co. bridge, 1.2 mi south of Terral, 3.6 mi downstream from Little Wichita River, and at mile 872.

DRAINAGE AREA.--28,723 mi², of which 5,936 mi² probably is noncontributing.

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 1211: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 770.31 ft above National Geodetic Vertical Datum of 1929. Prior to Jan. 12, 1939, nonrecording gage at same site and datum.

REMARKS.--No estimated daily discharges. Records good. There are many small diversions upstream from station for irrigation, oil field operations, and for municipal uses. Gage-height telemeter at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 19, 1935, reached a stage of 27.2 ft, although floods in 1891 and on May 1, 1908, are reported to have reached about the same stage.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 21,000 ft³/s.

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Nov. 23	0200	33,700	16.47	Apr. 16	0600	29,700	15.59
Dec. 15	1500	33,600	16.46	May 3	0900	35,000	16.82
Feb. 16	2400	37,700	16.52	May 10	2300	84,100	21.14
Mar. 2	1400	27,300	15.31	May 13	0800	71,700	20.00
Mar. 31	0700	46,200	17.43				

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	572	506	3560	2840	2290	10800	14600	12900	5630	3080	743	514
2	561	509	3070	2600	2200	26100	11200	16400	5880	2290	736	519
3	554	497	2890	2600	2120	21600	9950	28500	5390	1870	707	556
4	553	465	2600	2450	2200	15000	8610	23700	5090	1590	737	742
5	544	442	2230	2220	2380	10600	7900	17800	4730	1390	800	824
6	535	446	1940	1950	2310	9920	7200	10400	4450	1270	966	759
7	516	446	1750	2300	2020	9790	6450	7270	4370	1150	3400	874
8	505	445	1660	2920	1930	8110	5970	5970	4200	1100	3270	927
9	497	440	1730	2740	1790	6770	5610	38800	4200	1010	2440	836
10	484	451	3280	2580	1690	6230	4420	74500	5300	949	1800	706
11	464	447	7920	2850	2000	5840	3890	76600	6130	4920	1350	673
12	458	3760	7500	3410	2170	5160	3690	68000	5950	4080	1100	628
13	460	11500	5340	3780	2350	4730	3330	65100	4970	2860	914	747
14	462	6050	10400	4060	2850	4450	2800	30800	4310	2430	801	3310
15	459	3030	30500	3530	8770	4390	13700	22100	3900	2170	727	2980
16	435	2310	23700	2910	32000	4280	27700	15400	3330	2000	689	1920
17	427	2150	13700	2500	32100	4050	23800	12600	2930	2970	653	1060
18	427	2010	8690	2350	20600	3760	11500	10600	2720	6160	613	758
19	439	2000	6180	2300	11400	3440	6820	8820	2420	3910	605	602
20	452	7890	5360	2550	10200	3520	5610	8770	2040	2990	592	552
21	449	12400	5060	4730	9120	3620	4600	7390	2410	2310	570	580
22	442	18300	4670	6470	7250	4200	3930	6410	6190	1850	559	593
23	438	29800	4110	5050	6730	4420	3440	6720	8090	1570	548	586
24	446	20000	3560	4950	6640	5020	3080	7760	5100	1290	543	496
25	447	14100	3200	4350	7920	5870	2830	7150	3520	1090	547	445
26	438	14000	3020	3930	10600	5360	2640	9170	3510	964	540	470
27	437	15200	2970	3630	8100	4760	2550	10200	6090	900	532	566
28	446	7220	2930	3070	6780	4320	2310	7760	7120	867	610	431
29	434	4480	2840	2600	---	4160	2340	7490	4480	839	578	417
30	430	3730	2760	2470	---	20900	11200	6680	3880	816	530	412
31	491	---	2790	2360	---	39300	---	6270	---	771	522	---
TOTAL	14702	185024	181910	99050	208510	270470	223670	638030	138330	63456	29722	25483
MEAN	474	6167	5868	3195	7447	8725	7456	20580	4611	2047	959	849
MAX	572	29800	30500	6470	32100	39300	27700	76600	8090	6160	3400	3310
MIN	427	440	1660	1950	1690	3440	2310	5970	2040	771	522	412
AC-FT	29160	367000	360800	196500	413600	536500	443600	1266000	274400	125900	58950	50550

07315500 RED RIVER NEAR TERRAL, OK--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 1993, BY WATER YEAR (WY)

MEAN	3186	1508	1127	902	1258	1809	2519	6760	6071	1687	1110	2020
MAX	23900	9713	11810	5306	9320	12560	18080	43580	37460	8077	9267	9653
(WY)	1987	1987	1992	1992	1987	1990	1990	1957	1941	1950	1950	1986
MIN	108	102	91.2	76.5	136	66.1	142	134	517	158	155	109
(WY)	1953	1940	1939	1940	1953	1940	1971	1971	1966	1964	1970	1956

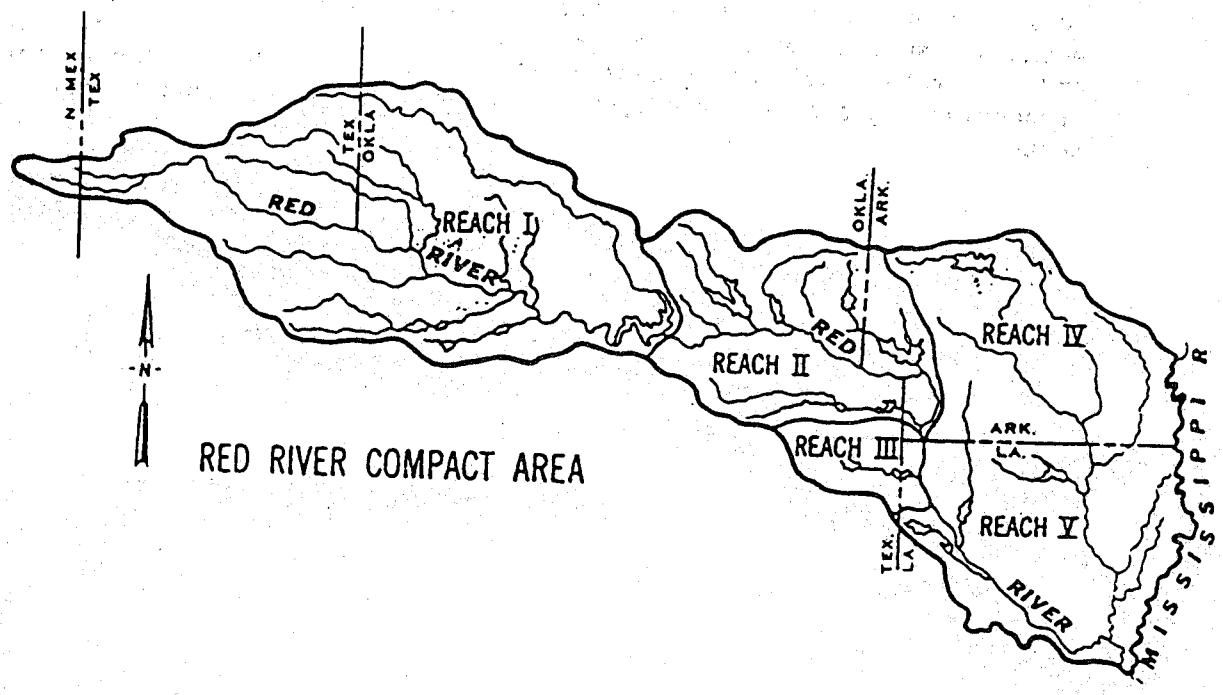
SUMMARY STATISTICS	FOR 1992 CALENDAR YEAR		FOR 1993 WATER YEAR		WATER YEARS 1939 - 1993	
ANNUAL TOTAL	1854921		2078357			
ANNUAL MEAN	5068		5694		2500	
HIGHEST ANNUAL MEAN					8925	1987
LOWEST ANNUAL MEAN					523	1953
HIGHEST DAILY MEAN	65500	Jun 9	76600	May 11	211000	May 30 1987
LOWEST DAILY MEAN	427	Oct 17	412	Sep 30	46	Mar 20 1940
ANNUAL SEVEN-DAY MINIMUM	439	Oct 16	439	Oct 16	47	Mar 18 1940
INSTANTANEOUS PEAK FLOW			84100	May 10	225000	May 30 1987
INSTANTANEOUS PEAK STAGE			21.14	May 10	33.60	Oct 22 1983
INSTANTANEOUS LOW FLOW			412	Sep 30	43	Mar 15 1939
ANNUAL RUNOFF (AC-FT)	3679000		4122000		1811000	
10 PERCENT EXCEEDS	10900		11900		5390	
50 PERCENT EXCEEDS	3000		2970		572	
90 PERCENT EXCEEDS	529		497		170	

RED RIVER COMPACT

ARKANSAS - LOUISIANA - OKLAHOMA - TEXAS

APPROVED BY THE

RED RIVER COMPACT COMMISSION



MAY 12, 1978

PREAMBLE

The States of Arkansas, Louisiana, Oklahoma, and Texas, pursuant to the acts of their respective Governors or legislatures, or both, being moved by considerations of interstate comity, have resolved to compact with respect to the water of the Red River and its tributaries. By Act of Congress, Public Law No. 346 (84th Congress, First Session), the consent of the United States has been granted for said states to negotiate and enter into a compact providing for an equitable apportionment of such water; and pursuant to that Act the President has designated the representative of the United States.

Further, the consent of Congress has been given for two or more states to negotiate and enter into agreements relating to water pollution control by the provisions of the Federal Water Pollution Control Act (P. L. 92-500, 33 U.S.C. § 1251 et seq.).

The Signatory States acting through their duly authorized Compact Commissioners, after several years of negotiations, have agreed to an equitable apportionment of the water of the Red River and its tributaries and do hereby submit and recommend that this compact be adopted by the respective legislatures and approved by Congress as hereinafter set forth:

ARTICLE I

PURPOSES

SECTION 1.01. The principal purposes of this Compact are:

(a) To promote interstate comity and remove causes of controversy between each of the affected states by governing the use, control and distribution of the interstate water of the Red River and its tributaries;

(b) To provide an equitable apportionment among the Signatory States of the water of the Red River and its tributaries;

(c) To promote an active program for the control and alleviation of natural deterioration and pollution of the water of the Red River Basin and to provide for enforcement of the laws related thereto;

(d) To provide the means for an active program for the conservation of water, protection of lives and property from floods, improvement of water quality, development of navigation and regulation of flows in the Red River Basin; and

(e) To provide a basis for state or joint state planning and action by ascertaining and identifying each state's share in the interstate water of the Red River Basin and the apportionment thereof.

ARTICLE II

GENERAL PROVISIONS

SECTION 2.01. Each Signatory State may use the water allocated to it by this Compact in any manner deemed beneficial by that state. Each state may freely administer water rights and uses in accordance with the laws of that state, but such uses shall be subject to the availability of water in accordance with the apportionments made by this Compact.

SECTION 2.02. The use of water by the United States in connection with any individual Federal project shall be in accordance with the Act of Congress authorizing the project and the water shall be charged to the state or states receiving the benefit therefrom.

SECTION 2.03. Any Signatory State using the channel of Red River or its tributaries to convey stored water shall be subject to an appropriate reduction in the amount which may be withdrawn at the point of removal to account for transmission losses.

SECTION 2.04. The failure of any state to use any portion of the water allocated to it shall not constitute relinquishment or forfeiture of the right to such use.

SECTION 2.05. Each Signatory State shall have the right to:

(a) Construct conservation storage capacity for the impoundment of water allocated by this Compact;

(b) Replace within the same area any storage capacity recognized or authorized by this Compact made unusable by any cause, including losses due to sediment storage;

(c) Construct reservoir storage capacity for the purposes of flood and sediment control as well as storage of water which is either imported or is to be exported if such storage does not adversely affect the delivery of water apportioned to any other Signatory State; and

(d) Use the bed and banks of the Red River and its tributaries to convey stored water, imported or exported water, and water apportioned according to this Compact.

SECTION 2.06. Signatory States may cooperate to obtain construction of facilities of joint benefits to such states.

SECTION 2.07. Nothing in this Compact shall be deemed to impair or affect the powers, rights, or obligations of the United States, or those claiming under its authority, in, over and to water of the Red River Basin.

SECTION 2.08. Nothing in this Compact shall be construed to include within the water apportioned by this Compact any water consumed in each state by livestock or for domestic purposes; provided, however, the storage of such water is in accordance with the laws of the respective states but any such impoundment shall not exceed 200 acre-feet, or such smaller quantity as may be provided for by the laws of each state.

SECTION 2.09. In the event any state shall import water into the Red River Basin from any other river basin, the Signatory State making the importation shall have the use of such imported water.

SECTION 2.10. Nothing in this Compact shall be deemed to:

(a) Interfere with or impair the right or power of any Signatory State to regulate within its boundaries the appropriation, use, and control of water, or quality of water, not inconsistent with its obligations under this Compact;

(b) Repeal or prevent the enactment of any legislation or the enforcement of any requirement by any Signatory State imposing any additional conditions or restrictions to further lessen or prevent the pollution or natural deterioration of water within its jurisdiction; provided nothing contained in this paragraph shall alter any provision of this Compact dealing with the apportionment of water or the rights thereto; or

(c) Waive any state's immunity under the Eleventh Amendment of the Constitution of the United States, or as constituting the consent of any state to be sued by its own citizens.

SECTION 2.11. Accounting for apportionment purposes on interstate streams shall not be mandatory under the terms of the Compact until one or more affected states deem the accounting necessary.

SECTION 2.12. For the purposes of apportionment of the water among the Signatory States, the Red River is hereby divided into the following major subdivisions:

(a) Reach I - the Red River and tributaries from the New Mexico-Texas State boundary to Denison Dam;

(b) Reach II - the Red River from Denison Dam to the point where it crosses the Arkansas-Louisiana state boundary and all tributaries which contribute to the flow of the River within this reach;

(c) Reach III - the tributaries west of the Red River which cross the Texas-Louisiana state boundary, the Arkansas-Louisiana state boundary, and those which cross both the Texas-Arkansas state boundary and the Arkansas-Louisiana state boundary.

(d) Reach IV - the tributaries east of the Red River in Arkansas which cross the Arkansas-Louisiana state boundary; and

(e) Reach V - that portion of the Red River and tributaries in Louisiana not included in Reach III or in Reach IV.

SECTION 2.13. If any part or application of this Compact shall be declared invalid by a court of competent jurisdiction, all other severable provisions and applications of this Compact shall remain in full force and effect.

SECTION 2.14. Subject to the availability of water in accordance with this Compact, nothing in this Compact shall be held or construed to alter, impair, or increase, validate, or prejudice any existing water right or right of water use that is legally recognized on the effective date of this Compact by either statutes or courts of the Signatory State within which it is located.

ARTICLE III

DEFINITIONS

SECTION 3.01. In this Compact:

(a) The States of Arkansas, Louisiana, Oklahoma, and Texas are referred to as "Arkansas," "Louisiana," "Oklahoma," and "Texas," respectively, or individually as "State" or "Signatory State," or collectively as "States" or "Signatory States."

(b) The term "Red River" means the stream below the crossing of the Texas-Oklahoma state boundary at longitude 100 degrees west.

(c) The term "Red River Basin" means all of the natural drainage area of the Red River and its tributaries east of the New Mexico-Texas state boundary and above its junction with Atchafalaya and Old Rivers.

(d) The term "water of the Red River Basin" means the water originating in any part of the Red River Basin and flowing to or in the Red River or any of its tributaries.

(e) The term "tributary" means any stream which contributes to the flow of the Red River.

(f) The term "interstate tributary" means a tributary of the Red River, the drainage area of which includes portions of two or more Signatory States.

(g) The term "intrastate tributary" means a tributary of the Red River, the drainage area of which is entirely within a single Signatory State.

(h) The term "Commission" means the agency created by Article IX of this Compact for the administration thereof.

(i) The term "pollution" means the alteration of the physical, chemical, or biological characteristics of water by the acts or instrumentalities of man which create or are likely to result in a material and adverse effect upon human beings, domestic or wild animals, fish and other aquatic life, or adversely affect any other lawful use of such water; provided, that for the purposes of this Compact,

"pollution" shall not mean or include "natural deterioration."

(j) The term "natural deterioration" means the material reduction in the quality of water resulting from the leaching of solubles from the soils and rocks through or over which the water flows naturally.

(k) The term "designated water" means water released from storage, paid for by non-Federal interests, for delivery to a specific point of use or diversion.

(l) The term "undesignated water" means all water released from storage other than "designated water."

(m) The term "conservation storage capacity" means that portion of the active capacity of reservoirs available for the storage of water for subsequent beneficial use, and it excludes any portion of the capacity of reservoirs allocated solely to flood control and sediment control, or either of them.

(n) The term "runoff" means both the portion of precipitation which runs off the surface of a drainage area and that portion of the precipitation that enters the streams after passing through the portions of the earth.

ARTICLE IV

APPORTIONMENT OF WATER - REACH I

OKLAHOMA - TEXAS

Subdivison of Reach I and apportionment of water therein.

Reach I of the Red River is divided into topographical subbasins, with the water therein allocated as follows:

SECTION 4.01. Subbasin 1 - Interstate streams - Texas.

(a) This includes the Texas portion of Buck Creek, Sand (Lebos) Creek, Salt Fork Red River, Elm Creek, North Fork Red River, Sweetwater Creek, and Washita River, together with all their tributaries in Texas which lie west of the 100th Meridian.

(b) The annual flow within this subbasin is hereby apportioned sixty (60) percent to Texas and forty (40) percent to Oklahoma.

SECTION 4.02. Subbasin 2 - Intrastate and Interstate streams - Oklahoma.

(a) This subbasin is composed of all tributaries of the Red River in Oklahoma and portions thereof upstream to the Texas-Oklahoma state boundary at longitude 100 degrees west, beginning from Denison Dam and upstream to and including Buck Creek.

(b) The State of Oklahoma shall have free and unrestricted use of the water of this subbasin.

SECTION 4.03. Subbasin 3 - Intrastate streams - Texas.

(a) This includes the tributaries of the Red River in Texas, beginning from Denison Dam and upstream to and including Prairie Dog Town Fork Red River.

(b) The State of Texas shall have free and unrestricted use of the water in this subbasin.

SECTION 4.04. Subbasin 4 - Mainstem of the Red River and Lake Texoma.

(a) This subbasin includes all of Lake Texoma and the Red River beginning at Denison Dam and

continuing upstream to the Texas-Oklahoma state boundary at longitude 100 degrees west.

(b) The storage of Lake Texoma and flow from the mainstem of the Red River into Lake Texoma is apportioned as follows:

(1) Oklahoma 200,000 acre-feet and Texas 200,000 acre-feet, which quantities shall include existing allocations and uses; and

(2) Additional quantities in a ratio of fifty (50) percent to Oklahoma and fifty (50) percent to Texas.

SECTION 4.05. Special Provisions.

(a) Texas and Oklahoma may construct, jointly or in cooperation with the United States, storage or other facilities for the conservation and use of water; provided that any facilities constructed on the Red River boundary between the two states shall not be inconsistent with the Federal legislation authorizing Denison Dam and Reservoir project.

(b) Texas shall not accept for filing, or grant a permit, for the construction of a dam to impound water solely for irrigation, flood control, soil conservation, mining and recovery of minerals, hydroelectric power, navigation, recreation and pleasure, or for any other purpose other than for domestic, municipal, and industrial water supply, on the mainstem of the North Fork Red River or any of its tributaries within Texas above Lugert-Altus Reservoir until the date that imported water, sufficient to meet the municipal and irrigation needs of Western Oklahoma is provided, or until January 1, 2000, which ever occurs first.

ARTICLE V

APPORTIONMENT OF WATER - REACH II

ARKANSAS, OKLAHOMA, TEXAS AND LOUISIANA

Subdivision of Reach II and allocation of water therein.

Reach II of the Red River is divided into topographic subbasins, and the water therein is allocated as follows:

SECTION 5.01. Subbasin 1 - Intrastate streams - Oklahoma.

(a) This subbasin includes those streams and their tributaries above existing, authorized or proposed last downstream major damsites, wholly in Oklahoma and flowing into Red River below Denison Dam and above the Oklahoma-Arkansas state boundary. These streams and their tributaries with existing, authorized or proposed last downstream major damsites are as follows:

Stream	Site	Ac-ft	Location	
			Latitude	Longitude
Island-Bayou	Albany	85,200	33°51.5'N	96°11.4'W
Blue River	Durant	147,000	33°55.5'N	96°04.2'W
Boggy River	Boswell	1,243,800	34°01.6'N	95°45.0'W
Kiamichi River	Hugo	240,700	34°01.0'N	95°22.6'W

(b) Oklahoma is apportioned the water of this subbasin and shall have unrestricted use thereof.

SECTION 5.02. Subbasin 2 - Intrastate streams - Texas.

(a) This subbasin includes those streams and their tributaries above existing authorized or proposed last downstream major damsites, wholly in Texas and flowing into Red River below Denison Dam and above the Texas-Arkansas state boundary. These streams and their tributaries with existing, authorized or proposed last downstream major damsites are as follows:

Stream	Site	Ac-ft	Location	
			Latitude	Longitude
Shawnee Creek	Randall Lake	5,400	33°48.1'N	96°34.8'W
Brushy Creek	Valley Lake	15,000	33°38.7'N	96°21.5'W
Bois d'Arc Creek	New Bonham Reservoir	130,600	33°42.9'N	95°58.2'W
Coffee Mill Creek	Coffee Mill Lake	8,000	33°44.1'N	95°58.0'W
Sandy Creek	Lake Crockett	3,900	33°44.5'N	95°55.5'W
Sanders Creek	Pat Mayse	124,500	33°51.2'N	95°32.9'W
Pine Creek	Lake Crook	11,011	33°43.7'N	95°34.0'W
Big Pine Creek	Big Pine Lake	138,600	33°52.0'N	95°11.7'W
Pecan Bayou	Pecan Bayou	625,000	33°41.1'N	94°58.7'W
Mud Creek	Liberty Hill	97,700	33°33.0'N	94°29.3'W
Mud Creek	KVW Ranch Lakes (3)	3,440	33°34.8'N	94°27.3'W

(b) Texas is apportioned the water of this subbasin and shall have unrestricted use thereof.

SECTION 5.03. Subbasin 3 - Interstate Streams - Oklahoma and Arkansas.

(a) This subbasin includes Little River and its tributaries above Millwood Dam.

(b) The States of Oklahoma and Arkansas shall have free and unrestricted use of the water of this subbasin within their respective states, subject, however, to the limitation that Oklahoma shall allow a quantity of water equal to 40 percent of the total runoff originating below the following existing, authorized or proposed last downstream major damsites in Oklahoma to flow into Arkansas:

Stream	Site	Ac-ft	Location	
			Latitude	Longitude
Little River	Pine Creek	70,500	34°06.8'N	95°04.9'W
Glover Creek	Lukfata	258,600	34°08.5'N	94°55.4'W
Mountain Fork River	Broken Bow	470,100	34°08.9'N	94°41.2'W

(c) Accounting will be on an annual basis unless otherwise deemed necessary by the States of Arkansas and Oklahoma.

SECTION 5.04. Subbasin 4 - Interstate streams - Texas and Arkansas.

(a) This subbasin shall consist of those streams and their tributaries above existing, authorized or proposed last downstream major damsites, originating in Texas and crossing the Texas-Arkansas state boundary before flowing into the Red River in Arkansas. These streams and their tributaries with existing, authorized or proposed last downstream major damsites are as follows:

Stream	Site	Ac-ft	Location	
			Latitude	Longitude
McKinney Bayou Trib.	Bringle Lake	3,052	33°30.6'N	94°06.2'W
Barkman Creek	Barkman Reservoir	15,900	33°29.7'N	94°10.3'W
Sulphur River	Texarkana	386,900	33°18.3'N	94°09.6'W

(b) The State of Texas shall have the free and unrestricted use of the water of this subbasin.

SECTION 5.05. Subbasin 5 - Mainstem of the Red River and tributaries.

(a) This subbasin includes that portion of the Red River, together with its tributaries, from Denison Dam down to the Arkansas-Louisiana state boundary, excluding all tributaries included in the other four subbasins of Reach II.

(b) Water within this subbasin is allocated as follows:

(1) The Signatory States shall have equal rights to the use of runoff originating in subbasin 5 and undesignated water flowing into subbasin 5, so long as the flow of the Red River at the Arkansas-Louisiana state boundary is 3,000 cubic feet per second or more, provided no state is entitled to more than 25 percent of the water in excess of 3,000 cubic feet per second.

(2) Whenever the flow of the Red River at the Arkansas-Louisiana state boundary is less than 3,000 cubic feet per second, but more than 1,000 cubic feet per second, the States of Arkansas, Oklahoma, and Texas shall

allow to flow into the Red River for delivery to the State of Louisiana a quantity of water equal to 40 percent of the total weekly runoff originating in subbasin 5 and 40 percent of undesignated water flowing into subbasin 5; provided, however, that this requirement shall not be interpreted to require any state to release stored water.

(3) Whenever the flow of the Red River at the Arkansas-Louisiana state boundary falls below 1,000 cubic feet per second, the States of Arkansas, Oklahoma, and Texas shall allow a quantity of water equal to all the weekly runoff originating in subbasin 5 and all undesignated water flowing into subbasin 5 within their respective states to flow into the Red River as required to maintain a 1,000 cubic foot per second flow at the Arkansas-Louisiana state boundary.

(c) Whenever the flow at Index, Arkansas, is less than 526 c.f.s., the states of Oklahoma and Texas shall each allow a quantityof water equal to 40 percent of the total weekly runoff originating in subbasin 5 within their respective states to flow into the Red River; provided however, this provision shall be invoked only at the request of Arkansas, only after Arkansas has ceased all diversions from the Red River itself in Arkansas above Index, and only if the provisions of Sub-sections 5.05 (b) (2) and (3) have not caused a limitation of diversions in subbasin 5.

(d) No state guarantees to maintain a minimum low flow to a downstream state.

SECTION 5.06. Special Provisions.

(a) Reservoirs within the limits of Reach II, subbasin 5, with a conservation storage capacity of 1,000 acre feet or less in existence or authorized on the date of the Compact pursuant to the rights and privileges granted by a Signatory State authorizing such reservoirs, shall be exempt from the provisions of Section 5.05; provided, if any right to store water in, or use water from, an existing exempt reservoir expires or is cancelled after the effective date of the Compact the exemption for such rights provided by this section shall be lost.

(b) A Signatory State may authorize a change in the purpose or place of use of water from a reservoir exempted by subparagraph (a) of this section without losing that exemption, if the quantity of authorized use and storage is not increased.

(c) Additionally, exemptions from the provisions of Section 5.05 shall not apply to direct diversions from Red River to off-channel reservoirs or lands.

ARTICLE VI

APPORTIONMENT OF WATER - REACH III

ARKANSAS, LOUISIANA, AND TEXAS

Subdivision of Reach III and allocation of water therein.

Reach III of the Red River is divided into topographic subbasins, and the water therein allocated, as follows:

SECTION 6.01. Subbasin 1 - Interstate streams - Arkansas and Texas.

(a) This subbasin includes the Texas portion of those streams crossing the Arkansas-Texas state boundary one or more times and flowing through Arkansas into Cypress Creek-Twelve Mile Bayou watershed in Louisiana.

(b) Texas is apportioned sixty (60) percent of the runoff of this subbasin and shall have unrestricted use thereof; Arkansas is entitled to forty (40) percent of the runoff of this subbasin.

SECTION 6.02. Subbasin 2 - Interstate streams - Arkansas and Louisiana.

(a) This subbasin includes the Arkansas portion of those streams flowing from Subbasin 1 into Arkansas, as well as other streams in Arkansas which cross the Arkansas-Louisiana state boundary one or more times and flow into Cypress Creek-Twelve Mile Bayou watershed in Louisiana.

(b) Arkansas is apportioned sixty (60) percent of the runoff of this subbasin and shall have unrestricted use thereof; Louisiana is entitled to forty (40) percent of the runoff of this subbasin.

SECTION 6.03. Subbasin 3 - Interstate streams - Texas and Louisiana.

(a) This subbasin includes the Texas portion of all tributaries crossing the Texas-Louisiana state boundary one or more times and flowing into Caddo Lake, Cypress Creek-Twelve Mile Bayou or Cross Lake, as well as the Louisiana portion of such tributaries.

(b) Texas and Louisiana within their respective boundaries shall each have the unrestricted use

of the water of this subbasin subject to the following allocation:

(1) Texas shall have the unrestricted right to all water above Marshall, Lake O' the Pines, and Black Cypress damsites; however, Texas shall not cause runoff to be depleted to a quantity less than that which would have occurred with the full operation of Franklin County, Titus County, Ellison Creek, Johnson Creek, Lake O' the Pines, Marshall, and Black Cypress Reservoirs constructed, and those other impoundments and diversions existing on the effective date of this Compact. Any depletions of runoff in excess of the depletions described above shall be charged against Texas' apportionment of the water in Caddo Reservoir.

(2) Texas and Louisiana shall each have the unrestricted right to use fifty (50) percent of the conservation storage capacity in the present Caddo Lake for the impoundment of water for state use, subject to the provision that supplies for existing uses of water from Caddo Lake, on date of Compact, are not reduced.

(3) Texas and Louisiana shall each have the unrestricted right to fifty (50) percent of the conservation storage capacity of any future enlargement of Caddo Lake, provided, the two states may negotiate for the release of each state's share of the storage space on terms mutually agreed upon by the two states after the effective date of this Compact.

(4) Inflow to Caddo Lake from its drainage area downstream from Marshall, Lake O' the Pines, and Black Cypress damsites and downstream from other last downstream dams in existence on the date of the signing of the Compact document by the Compact Commissioners, will be allowed to continue flowing into Caddo Lake except that any manmade depletions to this inflow by Texas will be subtracted from the Texas share of the water in Caddo Lake.

(c) In regard to the water of interstate streams which do not contribute to the inflow to Cross Lake or Caddo Lake, Texas shall have the unrestricted right to divert and use this water on the basis of a division of runoff above the state boundary of sixty (60) percent to Texas and forty (40) percent to Louisiana.

(d) Texas and Louisiana will not construct improvements on the Cross Lake watershed in either state that will affect the yield of Cross Lake; provided, however, this subsection shall be subject to the provisions of Section 2.08.

SECTION 6.04. Subbasin 4 - Intrastate streams - Louisiana.

(a) This subbasin includes that area of Louisiana in Reach III not included within any other subbasin.

(b) Louisiana shall have free and unrestricted use of the water of this subbasin.

ARTICLE VII

APPORTIONMENT OF WATER - REACH IV

ARKANSAS AND LOUISIANA

Subdivision of Reach IV and allocation of water therein.

Reach IV of the Red River is divided into topographic subbasins, and the water therein allocated as follows:

SECTION 7.01. Subbasin 1 - Intrastate streams - Arkansas.

(a) This subbasin includes those streams and their tributaries above last downstream major damsites originating in Arkansas and crossing the Arkansas-Louisiana state boundary before flowing into the Red River in Louisiana. Those major last downstream damsites are as follows:

Stream	Site	Ac-ft	Location	
			Latitude	Longitude
Ouachita River	Lake Catherine	19,000	34°26.6'N	93°01.6'W
Caddo River	DeGray Lake	1,377,000	34°13.2'N	93°06.6'W
Little Missouri River	Lake Greeson	600,000	34°08.9'N	93°42.9'W
Alum Fork, Saline River	Lake Winona	63,264	32°47.8'N	92°51.0'W

(b) Arkansas is apportioned the waters of this subbasin and shall have unrestricted use thereof.

SECTION 7.02. Subbasin 2 - Interstate Streams - Arkansas and Louisiana.

(a) This subbasin shall consist of Reach IV less subbasin 1 as defined in Section 7.01 (a) above.

(b) The State of Arkansas shall have free and unrestricted use of the water of this reach subject to the limitation that Arkansas shall allow a quantity of water equal to forty (40) percent of the weekly runoff originating below or flowing from the last downstream major damsite to flow into Louisiana. Where there are no designated last downstream damsites, Arkansas shall allow a quantity of

water equal to forty (40) percent of the total weekly runoff originating above the state boundary to flow into Louisiana. Use of water in this subbasin is subject to low flow provisions of subparagraph 7.02(b).

SECTION 7.03. Special Provisions.

(a) Arkansas may use the beds and banks of segments of Reach IV for the purpose of conveying its share of water to designated downstream diversions.

(b) The State of Arkansas does not guarantee to maintain a minimum low flow for Louisiana in Reach IV. However, on the following streams when the use of water in Arkansas reduces the flow at the Arkansas-Louisiana state boundary to the following amounts:

(1) Ouachita - 780 cfs

(2) Bayou Bartholomew - 80 cfs

(3) Boeuf River - 40 cfs

(4) Bayou Macon - 40 cfs

the State of Arkansas pledges to take affirmative steps to regulate the diversions of runoff originating or flowing into Reach IV in such a manner as to permit an equitable apportionment of the runoff as set out herein to flow into the State of Louisiana. In its control and regulation of the water of Reach IV any adjudication or order rendered by the State of Arkansas or any of its instrumentalities or agencies affecting the terms of this Compact shall not be effective against the State of Louisiana nor any of its citizens or inhabitants until approved by the Commission.

ARTICLE VIII

APPORTIONMENT OF WATER - REACH V

SECTION 8.01. Reach V of the Red River consists of the mainstem Red River and all of its tributaries lying wholly within the State of Louisiana. The State of Louisiana shall have free and unrestricted use of the water of this subbasin.

ARTICLE IX

ADMINISTRATION OF THE COMPACT

SECTION 9.01. There is hereby created an interstate administrative agency to be known as the "Red River Compact Commission," hereinafter called the "Commission." The Commission shall be composed of two representatives from each Signatory State who shall be designated or appointed in accordance with the laws of each state, and one Commissioner representing the United States, who shall be appointed by the President. The Federal Commissioner shall be the Chairman of the Commission but shall not have the right to vote. The failure of the President to appoint a Federal Commissioner will not prevent the operation or effect of this Compact, and the eight representatives from the Signatory States will elect a Chairman for the Commission.

SECTION 9.02. The Commission shall meet and organize within 60 days after the effective date of this Compact. Thereafter, meetings shall be held at such times and places as the Commission shall decide.

SECTION 9.03. Each of the two Commissioners from each state shall have one vote; provided, however, that if only one representative from a state attends he is authorized to vote on behalf of the absent Commissioner from that state. Representatives from three states shall constitute a quorum. Any action concerned with administration of this Compact or any action requiring compliance with specific terms of this Compact shall require six concurring votes. If a proposed action of the Commission affects existing water rights in a state, and that action is not expressly provided for in this Compact, eight concurring votes shall be required.

SECTION 9.04.

(a) The salaries and personal expenses of each state's representative shall be paid by the government that it represents, and the salaries and personal expenses of the Federal Commissioner will be paid for by the United States.

(b) The Commission's expenses for any additional stream flow gauging stations shall be equitably apportioned among the states involved in the reach in which the stream flow gaging stations are located.

(c) All other expenses incurred by the Commission shall be borne equally by the Signatory States and shall be paid by the Commission out of the "Red River

Compact Commission Fund." Such Fund shall be initiated and maintained by equal payments of each state into the fund. Disbursement shall be made from the fund in such manner as may be authorized by the Commission. Such fund shall not be subject to audit and accounting procedures of the state; however, all receipts and disbursements of the fund by the Commission shall be audited by a qualified independent public accountant at regular intervals, and the report of such audits shall be included in and become a part of the annual report of the Commission. Each state shall have the right to make its own audit of the accounts of the Commission at any reasonable time.

ARTICLE X

POWERS AND DUTIES OF THE COMMISSION

SECTION 10.01. The Commission shall have the power to:

(a) Adopt rules and regulations governing its operation and enforcement of the terms of the Compact;

(b) Establish and maintain an office for the conduct of its affairs and, if desirable, from time to time, change its location;

(c) Employ or contract with such engineering, legal, clerical and other personnel as it may determine necessary for the exercise of its functions under this Compact without regard to the Civil Service Laws of any Signatory State; provided that such employees shall be paid by and be responsible to the Commission and shall not be considered employees of any Signatory State;

(d) Acquire, use and dispose of such real and personal property as it may consider necessary;

(e) 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;

(f) Secure from the head of any department or agency of the Federal or State government such information as it may need or deem 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; provided such information is not privileged and the department or agency is not precluded by law from releasing same.

(g) Make findings, recommendations or reports in connection with carrying out the purposes of this Compact, including, but not limited to, a finding that a Signatory State is or is not in violation of any of the provisions of this Compact. The Commission is authorized to make

such investigations and studies, and to hold such hearings as it may deem necessary for said purposes. It is authorized to make and file official certified copies of any of its findings, recommendations or reports with such officers or agencies of any Signatory State, or the United States, as may have any interest in or jurisdiction over the subject matter. The making of findings, recommendations, or reports by the Commission shall not be a condition precedent to the instituting or maintaining of any action or proceeding of any kind by a Signatory State in any court or tribunal, or before any agency or officer, for the protection of any right under this Compact or for the enforcement of any of its provisions; and

(h) Print or otherwise reproduce and distribute its proceedings and reports.

SECTION 10.02. The Commission shall:

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

(b) Cause to be collected, analyzed and reported such information on stream flows, water quality, water storage and such other data as are necessary for the proper administration of the Compact;

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

(d) Prepare and submit to the governor of each of the Signatory States a budget covering the anticipated expenses of the Commission for the following fiscal biennium;

(e) 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;

(f) Make available to the governor or to any official agency of a Signatory State or to any authorized representative of the United States, upon request, any information within its possession;

(g) Not incur any obligation in excess of the unencumbered balance of its funds, nor pledge the credit of any of the Signatory States; and

(h) Make available to a Signatory State or the United States in any action arising under this Compact, without subpoena, the testimony of any officer or employee of the Commission having knowledge of any relevant facts.

ARTICLE XI

POLLUTION

SECTION 11.01. The Signatory States recognize that the increase in population and the growth of industrial, agricultural, mining and other activities combined with natural pollution sources may lead to a diminution of the quality of water in the Red River Basin which may render the water harmful or injurious to the health and welfare of the people and impair the usefulness or public enjoyment of the water for beneficial purposes, thereby resulting in adverse social, economic, and environmental impacts.

SECTION 11.02. Although affirming the primary duty and responsibility of each Signatory State to take appropriate action under its own laws to prevent, diminish, and regulate all pollution sources within its boundaries which adversely affect the water of the Red River Basin, the states recognize that the control and abatement of the naturally-occurring salinity sources as well as, under certain circumstances, the maintenance and enhancement of the quality of water in the Red River Basin may require the cooperative action of all states.

SECTION 11.03. The Signatory States agree to cooperate with agencies of the United States to devise and effectuate means of alleviating the natural deterioration of the water of the Red River Basin.

SECTION 11.04. The Commission shall have the power to cooperate with the United States, the Signatory States and other entities in programs for abating and controlling pollution and natural deterioration of the water of the Red River Basin, and to recommend reasonable water quality objectives to the states.

SECTION 11.05. Each Signatory State agrees to maintain current records of waste discharges into the Red River Basin and the type and quality of such discharges, which records shall be furnished to the Commission upon request.

SECTION 11.06. Upon receipt of a complaint from the governor of a Signatory State that the interstate water of the Red River Basin in which it has an interest are being materially and adversely affected by pollution and that the state in which the pollution originates has failed after reasonable notice to take appropriate abatement measures, the Commission shall make such findings as are appropriate and thereafter provide such findings to the governor of the state in which such pollution originates and request appropriate corrective action. The Commission, however, shall not take any action with respect to pollution which adversely affects only the state in which such pollution originates.

SECTION 11.07. In addition to its other powers set forth under this Article, the Commission shall have the authority, upon receipt of six concurring votes, to utilize applicable Federal statutes to institute legal action in its own name against the person or entity responsible for interstate pollution problems; provided, however, sixty (60) days before initiating legal action the Commission shall notify the Governor of the state in which the pollution source is located to allow that state an opportunity to initiate action in its own name.

SECTION 11.08. Without prejudice to any other remedy available to the Commission, or any Signatory State, any state which is materially and adversely affected by the pollution of the water of the Red River Basin by pollution originating in another Signatory State may institute a suit against any individual, corporation, partnership, or association, or against any Signatory State or political or governmental subdivision thereof, or against any officer, agency, department, bureau, district or instrumentality of or in any Signatory State contributing to such pollution in accordance with applicable Federal statutes. Nothing herein shall be construed as depriving any persons of any rights of action relating to pollution which such person would have if this Compact had not been made.

ARTICLE XII

TERMINATION AND AMENDMENT OF COMPACT

SECTION 12.01. This Compact may be terminated at any time by appropriate action of the legislatures of all of the four Signatory States. In the event of such termination, all rights established under it shall continue unimpaired.

SECTION 12.02. This Compact may be amended at any time by appropriate action of the legislatures of all Signatory States that are affected by such amendment. The consent of the United States Congress must be obtained before any such amendment is effective.

ARTICLE XIII

RATIFICATION AND EFFECTIVE DATE OF COMPACT

SECTION 13.01. Notice of ratificaton of this Compact by the legislature of each Signatory State shall be given by the governor thereof to the governors of each of the other Signatory States and to the President of the United States. The President is hereby requested to give notice to the governors of each of the Signatory States of the consent to this Compact by the Congress of the United States.

SECTION 13.02. This Compact shall become effective, binding and obligatory when, and only when:

(a) It has been duly ratified by each of the Signatory States; and

(b) It has been consented to by an Act of the Congress of the United States, which Act provides that:

> Any other statute of the United States to the contrary notwithstanding, in any case or controversy:
>
> > which involves the construction or application of this Compact;
> >
> > in which one or more of the Signatory States to this Compact is a plaintiff or plaintiffs; and
> >
> > which is within the judicial power of the United States as set forth in the Constitution of the United States;
>
> and without any requirement, limitation or regard as to the sum or value of the matter in controversy, or of the place of residence or citizenship of, or of the nature, character or legal status of, any of the other proper parties plaintiff or defendant in such case or controversy:
>
> > The consent of Congress is given to name and join the United States as a party defendant or otherwise in any such case or controversy in the Supreme Court of the United States if the United States is an indispensable party thereto.

SECTION 13.03. The United States District Courts shall have original jurisdiction (concurrent with that of the Supreme Court of the United States, and concurrent with that of any other Federal or state court, in matters in which the Supreme Court, or other court has original jurisdiction) of any case or controversy involving the application or construction of this Compact; that said jurisdiction shall include, but not be limited to, suits between Signatory States; and that the venue of such case or controversy may be brought in any judicial district in which the acts complained of (or any portion thereof) occur.

SIGNED AND APPROVED on the 12th day of May 1978 at Denison Dam.

John P. Saxton, Commissioner
State of Arkansas

Arthur R. Theis, Commissioner
State of Louisiana

Orville B. Saunders, Commissioner
State of Oklahoma

Fred Parkey, Commissioner
State of Texas

R. C. MARSHALL, Major General
Representative
United States of America

RULES FOR THE INTERNAL ORGANIZATION of the RED RIVER COMPACT COMMISSION

(As Amended April 25, 1984, April 30, 1991, and May 4, 1993)

ARTICLE I
THE COMMISSION

1.1 The Commission is the "Red River Compact Commission," which is referred to in Article X of the Red River Compact.

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 each of the other Commissioners of the name and address of the new Commissioner.

1.3 Each Commissioner shall advise in writing the office of the Commission as to his address at which all official notices and other communications of the Commission shall be sent to him. Any change of address shall be promptly communicated in writing to the office of the Commission.

1.4 Persons designated to substitute for duly appointed Commissioners at meetings of the Compact Commission shall present the Commission with credentials of authority by letter, or other form of appointment acceptable to the Commission, which states the scope or limitations of the appointment, together with a copy of the state or federal law or Attorney General's opinion which authorizes the appointment.

ARTICLE II
OFFICERS

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

2.2 The Commissioner representing the United States shall be the Chairman of the Commission. The Chairman or the designated representative of 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 Vice-Chairman shall be elected at the annual meeting from the Commissioners of the host state for the coming year as reflected by the minutes, and shall hold office for a term of one year, beginning on July 1 following the election, or until a successor is elected. The Vice-Chairman shall serve as Chairman in the event the President of the United States fails to appoint a Federal Commissioner, or in the absence of the Federal Commissioner or the designated representative of the Federal Commissioner.

2.4 The Secretary shall be selected at the annual meeting by the Commission from the state designated to host the next annual meeting as reflected in the minutes. The Secretary shall serve for the term of one year, beginning on

July 1 following the selection, and 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.

2.5 The Treasurer shall be selected by the Commission for a term of one year, beginning on July 1 following the selection. The Treasurer shall furnish a fidelity bond, the cost of which shall be paid by the Commission. The Treasurer shall receive, hold and disburse all funds which come into the his hands of the Treasurer.

2.6 The Secretary and Treasurer may be members of the Commission, and their offices may be combined by the Commission. Any one person may hold both offices.

2.7 Whenever there is a permanent change in the Commander of the Lower Mississippi Valley Division, Department of the Army Corps of Engineers, or its counterpart in any future reorganization of the Corps, the Vice-Chairman shall immediately request the President to appoint the new Commander as the U.S. Commissioner to the Compact Commission.

ARTICLE III
PRINCIPAL OFFICE

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

3.2 Official books and records of the Commission shall be kept at the principal office.

ARTICLE IV
MEETINGS

4.1 The annual meeting of the Commission shall be held on the last Tuesday of April of each year.

4.2 Special meetings of the Commission may be called by the Chairman at any time. Upon the written request of each of the Commissioners of two states setting forth the matters to be considered at such meeting, the chairman shall call a special meeting.

4.3 Reasonable notice of all special meetings of the Commission shall be sent by the Chairman, to all members of the Commission by ordinary mail at least ten days in advance of each meeting and notice shall state the purpose thereof.

4.4 Emergency meetings of the Commission may be called by the Chairman at any time upon the concurrence of at least two states and such meetings may be conducted by long-distance telephone conference call or other electronic means. Any such long-distance telephone conference call or other electronic communication shall be recorded and made available for public inspection in accordance with the laws of the respective signatory states. Each of the signatory states shall be represented by at least one Commissioner during such an emergency conference and concur in the action.

An emergency is defined as a situation involving an eminent threat of injury to persons or damage to property or eminent financial loss when the time requirements for public notice and travel to a special meeting would make such procedure and travel impractical and increase the likelihood of injury or damage or eminent financial loss.

4.5 Notice to the public shall be given of all Commission meetings. Except as otherwise provided, the Chairman shall furnish notice of all meetings to the Commissioners of each signatory state, whose responsibility it shall be to give said notice to the public in accordance with the laws of their respective states. In the event of an emergency meeting held by telephone or other electronic communication, no advance notice is required.

All meetings of the Commission shall be held at the principal office unless another place shall be agreed upon by the Commissioners.

4.6 Minutes of the Commission shall be preserved in suitable manner. Minutes, until approved, shall not be official and shall be furnished only to members of the Commission, its employees and committees.

4.7 Commissioners from three of the signatory states shall constitute a quorum. However, if an emergency meeting is conducted as provided for in rule 4.4, or if a proposed action of the Commission affects existing water rights in a state, and that actions is not expressly provided for in the Compact, eight concurring votes shall be required. Any other actions concerned with the administration of the Compact or requiring compliance with specific terms of the Compact shall require six concurring votes.

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

Call to order;
Approval of Agenda;
Approval of the minutes;
Report of Chairman;
Report of Secretary;
Report of Treasurer;
Report of Commissioners;
Report of Committees;
Unfinished business;
New business;
Adjournment;

4.9 All meetings of the Commission, except executive sessions and except as otherwise provided, 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 such sessions.
The Commission may hold executive sessions only for the purposes of discussing;

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

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

(c) 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. At least one Commissioner from each of the signatory states must agree to the holding of an executive session.

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.

4.10 In the absence of a Chairman and Vice-Chairman, all of the Commissioners from any two (2) states may call an emergency or a special meeting of the Compact Commission.

ARTICLE V
COMMITTEES

5.1 There may be the following standing committees:

Engineering Committee;
Legal Committee; and
Budget Committee.

5.2 The committees shall have the following duties:

(a) The Engineering Committee shall advise the Commission all engineering matters that may be referred to it.

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

(c) The Budget Committee shall prepare the annual budget and shall advise the commission on all fiscal matters that may be referred to it.

5.3 Commissioners may be members of committees. The number of members of each committee shall be determined from time to time by the Commission. The Commissioners of each state shall designate the member or members on each committee representing the State, and each State shall have one vote.

5.4 The Chairman may appoint a non-voting member of each committee.

5.5 The Chairman of each committee shall be designated by the Commission from members of the committee; however, in the event a Chairman is unable to perform his duties, the committee shall appoint an Interim Chairman.

5.6 The Commission may from time to time create special committees and assign it tasks. The Commission may also determine the composition of the special committees.

5.7 Formal committee reports shall be made in writing and filed with the Commission.

ARTICLE VI
RULES AND REGULATIONS

6.1 So far as is consistent with the Compact, the Commission may adopt rules and regulations and amend them from time to time. Rules and regulations to be adopted shall be presented by resolution and approved by a quorum as set out in Rule 4.7. Copies of proposed resolutions for rule adoption shall be presented in writing to each of the Commissioners at least thirty days before the meeting upon which they are to be voted. However, at its meeting, by unanimous vote, the Commission may waive this notice requirement.

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 funds of the Commission shall be deposited in a depository or depositories designated by the Commission under the name of the "Red River Compact Commission Fund".

7.2 Disbursement of funds in the hands of the Treasurer, for items included in the approved budget, shall be made by check signed by him and the Vice-Chairman or by such person as may be designated by the Commission. Disbursement of funds for non-budgeted items shall be made by check signed by the Treasurer and Vice-Chairman upon voucher approved by at least six of the Commissioners, four of whom shall be from different signatory states.

7.3 At the annual meeting of each year, the Commission shall adopt a budget covering an estimate of its expenses for the following two fiscal years.

7.4 The payment of expenses of the Commission and of its employees shall not be subject to the audit and accounting procedures of the states.

7.5 All receipts and disbursements of the Commission shall be audited periodically as determined by the Commission by a qualified independent 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.

7.6 The fiscal year of 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 make an annual report and transmit it on or before the last day of May to the governors of the signatory states to the Red River Compact and to the President of the United States.

8.2 The annual report shall cover the activities of the Commission for the preceding year, and include, amount other things the following:

(a) The estimated budget;

(b) Report of the last audit of Red River Compact Fund;

(c) All hydrologic data which the Commission deems pertinent;

(d) Statements as to cooperative studies of water supplies made during the preceding year;

(e) Such other pertinent matters as the Commission may require.

RED RIVER COMPACT INTERIM RULES AND REGULATIONS
To Compute and Enforce Compact Compliance
REACH II, SUBBASIN 5

(Adopted 4/30/87)

1. These rules and regulations to be used to compute and enforce Compact compliance within Subbasin 5 of Reach II, Red River Compact, are adopted subject to the following conditions and assumptions.

   a. It is fully understood that these rules and regulations should be modified as new or improved gaging stations are constructed, whenever experience or detailed studies demonstrate the need for modification, and if the Commission should modify its interpretation of Compact provisions relating to this Subbasin.

   b. **Definitions:**

      (1) "Diversion" as used in these rules and regulations, is the net loss to a water source from use by a diverter, and is computed as the diversion from the water source minus the part of the diversion which is returned to the water source. Normally, return flows must be measured to be considered; however, the EAC may consider and recommend exceptions. As used herein, "diversion" is equivalent to "net diversion" from a water source and to "depletion" or "consumptive use" of a water source.

2. **Management of Compact Compliance Computations.**

   a. **Management Using State Centers:**

      (1) State EAC representatives will establish State Computation Control Centers

         (a) State representatives will gather data, exchange data and meet via conference call to check on computation results, if necessary.

         (b) EAC will determine compliance with Compact.

   b. **Management Period for Weekly Flow and Diversions:**

      (1) Next week's State diversions will be allocated based on last week's compliance computations.

      (2) It is each State's responsibility to limit its total State diversion allocation among its State diverters.

      (3) The weekly period for use and flow data will start and end at 8:00 a.m. on Tuesday of each week.

      (4) Data collection and dissemination will be completed on Tuesday of each week.

      (5) Computation of Compliance will be completed on Wednesday of each week.

      (6) Each State can request an update at any time.

   c. **Management Improvement Studies:** The EAC will monitor the effect on accounting management of the following factors and will report thereon to the Commission whenever procedure changes appears desirable.

      (1) Errors caused by travel time.

      (2) Future restrictions computed from past week's data.

      (3) Failure to consider channel loss.

(4) Failure to consider ungaged return flows.
(5) Failure to consider flow trends.
(6) Addition of needed gages.

3. **Enforcement of Compact Compliance Requirements.** Each State will be responsible for insuring that the sum of the diversions by State users does not exceed the total State diversion authorized by the Red River Compact. In this regard, each State will be responsible for establishing clear legal authority within its State for enforcing the restrictions imposed by the Red River Compact.

4. **Data Reporting Procedures.**
   a. **Streamflow Gaging Station Records:** The EAC will make arrangements with the Corps of Engineers, the U.S. Geological Survey and with States as required to collect daily and/or weekly data, as needed, and forward to the State Computation and Control Centers.
   b. **Diversion Records:** Each State will be responsible to collect daily and/or weekly data, as needed, and forward to the State Computation and Control Centers.
   c. **Archived Records:** Records will be archived by Commission Chairman.

5. **General Compliance Requirements of Section 5.05, Red River Compact.**
   a. **Section 5.05 (b)(1):**
      (1) **Compact prescribes:** "The Signatory States shall have equal rights to the use of the runoff originating in subbasin 5 and undesignated water flowing into subbasin 5, so long as the flow of the Red River at the Arkansas-Louisiana state boundary is 3,000 cubic feet per second or more, provided no state is entitled to more than 25 percent of the water in excess of 3,000 cubic feet per second."
      (2) In computing the Subbasin 5 water allocation, when the flow of the Red River at the Arkansas-Louisiana State Boundary is 3,000 cfs or more and the total runoff and undesignated flow of Subbasin 5 is greater than or equal to 7,500 cfs but less than or equal to 12,000 cfs, Louisiana's allocation shall be 3,000 cfs and each of the three upstream states will equally share the runoff and undesignated flow in excess of 3,000 cfs.
      (3) When the total runoff and undesignated flow of Subbasin 5 is 12,000 cfs or more, each of the signatory states shall be entitled to 25% of the total runoff and undesignated flow.
      (4) State compliance with Section 5.05 (b)(1) does not need to be determined except when specifically requested by a Compact State.

   b. **Section 5.05 (b)(2):**
      (1) **The Compact states:** "Whenever the flow of the Red River at the Arkansas-Louisiana state boundary is less than 3,000 cubic feet per second, but more than 1,000 cubic feet per second, the States of Arkansas, Oklahoma, and Texas shall allow to flow into the Red River for delivery to the State of Louisiana a quantity of water equal to 40 percent of the total weekly runoff originating in subbasin 5 and 40 percent

of undesignated water flowing into subbasin 5; provided, however, that this requirement shall not be interpreted to require any state to release stored water."

(2) In computing the Subbasin 5 water allocation to Louisiana when flow of Red River at the Arkansas-Louisiana State boundary is less than 3,000 cfs but more than 1,000 cfs, the Subbasin 5 runoff for each of the three upstream States and the undesignated water flowing into Subbasin 5 from each upstream State totalled, and the three upstream States should allow to pass to Louisiana 40 percent of the total, or 1,000 cfs, whichever is greater.

(3) When the Subbasin 5 runoff plus undesignated water totals at least 2,500 cfs and not more than 7,500 cfs, each of the three upstream States are allocated 60 percent of its runoff plus undesignated inflow and the other 40 percent is to be allowed to flow into the Red River for delivery to Louisiana.

(4) When the Subbasin 5 runoff plus undesignated water totals at least 1,000 cfs but less than 2,500 cfs, the allocation to Louisiana is 1,000 cfs because of Compact Section 5.05 (b)(3). The total Subbasin 5 runoff plus undesignated water is compared to the Louisiana allocation of 1,000 cfs and a percentage is established. Each of the three upstream States will be entitled to divert and use a quantity computed using (100 percent minus the established percentage) times (the total of runoff from its Subbasin 5 areas plus undesignated water flowing into its Subbasin 5 areas).

(5) This Compact compliance determination should be made whenever the flow of the Red River at the Arkansas-Louisiana State boundary falls below 3,000 cfs and is more than 1,000 cfs.

c. **Section 5.05 (b)(3):**

(1) **The Compact states:** "Whenever the flow of the Red River at the Arkansas-Louisiana state boundary falls below 1,000 cubic feet per second, the States of Arkansas, Oklahoma, and Texas shall allow a quantity of water equal to all the weekly runoff originating in subbasin 5 and all undesignated water flowing into subbasin 5 within their respective states to flow into the Red River as required to maintain a 1,000 cubic foot per second flow at the Arkansas-Louisiana state boundary."

(2) In computing the Subbasin 5 allocation when the flow of the Red River at the Arkansas-Louisiana State boundary falls below 1,000 cfs, and when the Subbasin 5 runoff and undesignated water flowing into Subbasin 5 total 1,000 cfs or less, all flow must be passed to Louisiana.

(3) When the Subbasin 5 runoff and undesignated water flowing into Subbasin 5 total more than 1,000 cfs but less than 2,500 cfs, Louisiana is allocated 1,000 cfs. This 1,000 cfs Louisiana entitlement is compared to the total runoff plus undesignated water and a percentage is established. Each of the three upstream States will be entitled to divert and use

a quantity computed using (100 percent minus the established percentage) times (its total State runoff and undesignated water inflow).

(4) See rules for Compact Section 5.05 (b)(2) when the Subbasin 5 runoff and undesignated water flowing into Subbasin 5 total 2,500 cfs or more up to 7,500 cfs.

(5) This Compact compliance determination should be made whenever the flow of the Red River at the Arkansas-Louisiana State boundary falls below 1,000 cfs.

d. **Section 5.05 (c):**

(1) **The Compact states:** "Whenever the flow at Index, Arkansas, is less than 526 c.f.s., the states of Oklahoma and Texas shall each allow a quantity of water equal to 40 percent of the total weekly runoff originating in subbasin 5 within their respective states to flow into the Red River; provided however, this provision shall be invoked only at the request of Arkansas, only after Arkansas has ceased all diversions from the Red River itself in Arkansas above Index, and only if the provisions of Sub-sections 5.05 (b)(2) and (3) have not caused a limitation of diversions in subbasin 5."

(2) In computing the Subbasin 5 allocation when flow of Red River at Index Arkansas is less than 256 cfs, the States of Oklahoma and Texas are to pass 40 percent of weekly runoff from respective Subbasin 5 areas.

(3) This Compact compliance determination will be made only when requested by Arkansas, only after Arkansas has ceased all diversions from the Red River, and only if the provisions of subsections 5.05 (b)(2) and (3) have not caused a limitation of diversions in Subbasin 5.

6. **Procedures (Disregarding Designated Flows) to Compute State Runoff, Runoff plus Undesignated Inflows, and Flow of Red River at Arkansas-Louisiana State Boundary.**

a. **Oklahoma.**

(1) **Runoff plus Undesignated Inflows of Denison Dam to DeKalb Gage:**

(a) Kiamichi River near Hugo, OK, Gage flow, plus Muddy Boggy Creek near Unger, OK, Gage flow plus Blue River near Blue, OK Gage flow, plus

(b) Fifty percent of (DeKalb Gage flow, plus Texas and Oklahoma diversions, minus gaged flows at Kiamichi River near Hugo, Ok, Muddy Boggy Creek near Unger, OK, Blue River near Blue, OK, and Sanders Creek near Chicota, Texas, streamflow Gages).

(2) **Runoff plus Undesignated Inflows, DeKalb Gage to Oklahoma-Arkansas State line:** Fifteen and one-half (15.5) percent of (Index Gage flow, minus DeKalb Gage flow, plus Oklahoma, Texas and Arkansas diversions downstream from DeKalb Gage).

(3) **Runoff only, Denison Dam to Oklahoma-Arkansas State line.**

(a) Fifty percent of (DeKalb Gage flow, minus Red River at Denison Dam Gage flow, plus Texas and Oklahoma diversions upstream from DeKalb Gage, minus Blue River near Blue, OK, Gage flow, minus Muddy Boggy Creek near

Unger-Okla. Gage flow, minus Kiamichi River near Hugo-Okla. Gage flow minus Gage flow), plus

(b) Fifteen and one-half (15.5) percent of (Index Gage flow, minus DeKalb Gage flow, plus Oklahoma, Texas and Arkansas diversions between DeKalb and Index Gages).

b. **Texas.**

(1) **Runoff plus Undesignated Inflows, DeKalb Gage to Index Gage:**

(a) Sanders Creek near Chicota Gage flow, plus

(b) Fifty percent of: (DeKalb Gage flow, plus Texas and Oklahoma diversions, minus gaged flows at Kiamichi River near Hugo, OK, Muddy Boggy Creek near Unger, OK, Blue River near Blue, OK, and Sanders Creek near Chicota, TX, streamflow Gages).

(2) **Runoff plus Undesignated Inflows, DeKalb Gage to Index Gage:** Fifty (50) percent of (Index Gage flow, minus DeKalb Gage flow, plus Oklahoma, Texas and Arkansas diversions downstream from DeKalb Gage).

(3) **Runoff plus Undesignated Inflows, Sulphur River Gage:** One hundred percent of (Sulphur River near Texarkana Gage flow) minus (Texas diversions from river below gage) plus (Texas diversions below Texarkana Dam).

(4) **Runoff Only, Denison Dam to Index Gage:** Fifty percent of (Index Gage flow, minus Red River at Denison Dam Gage flow, plus Oklahoma and Texas and Arkansas diversions upstream from the Index Gage, minus Blue River near Blue, OK, Gage flow, minus Muddy Boggy Creek near Unger-Okla. Gage flow, minus Kiamichi River near Hugo-Okla. flow, minus Sanders Creek near Chicota-Texas Gage flow).

c. **Arkansas Runoff plus Undesignated Inflows.**

(1) **Oklahoma-Arkansas State Line to Index Gage:** Thirty-four and one-half (34.5) percent of (Index Gage flow, minus DeKalb Gage flow, plus Oklahoma and Texas and Arkansas diversions between DeKalb and Index Gages).

(2) **Index Gage to Hosston Gage:**

(a) Hosston Gage flow, plus Louisiana diversions above Hosston Gage, minus Index Gage flow, minus (Sulphur River near Texarkana Gage flow less Texas diversions from river below gage), plus Arkansas diversions downstream from Index Gage.

d. **Louisiana Streamflow at Arkansas-Louisiana State Boundary.**

(1) **Red River flow at Arkansas-Louisiana State boundary** equals (Gage flow) plus (Louisiana diversions from Red River downstream from the State boundary and upstream from gage).

(2) **Data needed to make interim Louisiana calculations**

(a) **For Red River flows up to 5,000 cfs** - Hosston Gage flow, plus Louisiana diversions from Red River upstream from Hosston Gage.

(b) **For Red River flows of 5,000 cfs or larger** - Shreveport Gage flow, plus Louisiana diversions from Red River upstream from Shreveport Gage, minus Twelvemile Bayou near Dixie-La Gage flow, plus Louisiana diversions from Twelvemile Bayou below Twelvemile Bayou near Dixie-La Gage.

(3) **Effect of Flow Trends, Scheduled Change of Reservoir Releases, and Other Events Certain to Significantly Change Flow at Arkansas-Louisiana State Boundary During Coming Week.**
In addition to the Arkansas-Louisiana State boundary flow estimated based on subparagraph (2) (a) or (b) above, the EAC will also advise the Commission of probable significant changes in State boundary flow which should result from flow trends, scheduled change of reservoir releases, and other such known events.

7. **Procedures (Using Designated Flow Data) to Compute State Runoff plus Undesignated Inflows and Flow of Red River at Arkansas-Louisiana State boundary.** Procedures outlined in paragraph 6 above will be followed except that designated inflows, designated outflows and diversion of designated flows will be accounted for whenever appropriate.

RED RIVER COMPACT RULES AND REGULATIONS
To Compute and Enforce Compact Compliance
REACH I, SUBBASIN 1

(Adopted 4/30/87)

1. **General.** These rules and regulations to be used to compute and enforce Compact compliance within Subbasin I of Reach 1, Red River Compact, are adopted subject to the following conditions and assumptions.
   a. It is fully understood that these rules and regulations should be modified as new or improved gaging stations are constructed, whenever experience or detailed studies demonstrate the need for modification, and if the Commission should modify its interpretation of Compact provisions relating to this Subbasin.

2. **Management of Compact Compliance Computations.**
   a. **Management Using State Centers:**
      (1) Texas and Oklahoma representatives will establish State Computation and Control Centers.
         (a) State representatives will gather data, exchange data and meet prior to the annual Commission meeting to check on computation results.
         (b) The EAC will determine compliance with Compact.
   b. **Management Period for Compact Compliance Computations:**
      (1) Computation will be on the calendar year basis.
      (2) Water data for a calendar year should be exchanged prior to March 15 of the following year.
      (3) Compact Compliance Computation for a calendar year should be completed by April 15 of the following year.

3. **Enforcement of Compact Compliance Requirements.** Texas will be responsible for insuring that the sum of Texas uses does not exceed the total Texas water use authorized by the Red River Compact, and Texas will be responsible for establishing clear legal authority within Texas for enforcing the restrictions imposed by the Red River Compact.

4. **Data Reporting Procedures.**
   a. **Streamflow Gaging Station Records:** The EAC will make arrangements with federal and State agencies, as required, to collect calendar year data as needed, and forward to the Texas and Oklahoma Computation Control Centers.
   b. **Archived Records:** Records will be archived by the Commission Chairman.

5. **General Compliance Requirements of Section 4.01 Red River Compact.**
   a. **SECTION 4.01. Subbasin 1 - Interstate Streams - Texas:**
      (1) **The Compact prescribes:**
         "(a) This includes the Texas portion of Buck Creek, Sand (Lebos) Creek, Salt Fork Red River, Elm Creek, North Fork Red River, Sweetwater Creek and Washita River, together with all their tributaries in Texas which lie west of the 100th Meridian."

"(b) The annual flow within this subbasin is hereby apportioned sixty (60) percent to Texas and forty (40) percent to Oklahoma."

SECTION 4.01 is modified in part by SECTION 4.05. Special Provisions, as follows:

"(b) Texas shall not accept for filing, or grant a permit, for the construction of a dam to impound water solely for irrigation, flood control, soil conservation, mining and recovery of minerals, hydroelectric power, navigation, recreation and pleasure, or for any other purpose other than for domestic, municipal, and industrial water supply, on the mainstem of the North Fork Red River or any of its tributaries within Texas about Lugert-Altus Reservoir until the date that imported water, sufficient to meet the municipal and irrigation needs of Western Oklahoma is provided, or until January 1, 2000, which ever occurs first."

(2) Pertinent extracts from the Supplemental Interpretive Comments of Legal Advisory Committee, as approved by the Red River Compact Commission on the 19th day of September 1978, are as follows:

Pages 9 and 10 " * * * * * The flow of interstate tributaries is generally divided 60 percent to the upstream State and 40 percent to the downstream State. Because flows in Reach I are primarily from flood flows, an annual basis of accounting was adopted"

* * * * *

"Section 4.05(b) reflects the compromise of a long-standing dispute between Oklahoma and Texas over the water of the North Fork of the Red River and Sweetwater Creek. * * * * *"

"Under the Compromise Texas will limit development on North Fork and Sweetwater Creek to projects justified on the basis of municipal, industrial, and domestic needs until the year 2000. However, if sufficient imported water becomes available in Western Oklahoma before 2000, Texas will be free to pursue full development of its 60% of these interstate tributaries. * * * *".

(3) Until January 1, 2000 (assuming that imported water is **not** provided prior to that date in sufficient amounts to meet municipal and irrigation needs of Western Oklahoma) special restrictions apply to Texas water use in its North Fork Red River watershed upstream from the Lugert-Altus Reservoir. Therefore, some of the Compact compliance rules for the North Fork Red River watershed upstream from the Lugert-Altus Reservoir (para 5.f.(3) & (4) and g.(3) & (4) below) expire on January 1, 2000, if still in effect at that time.

b. **Buck Creek Watershed in Texas:** Buck Creek watershed covers about 300 square miles in Texas. There are no existing gaging stations on Buck Creek in Texas or in Oklahoma. Since neither the Texas nor Oklahoma use of flow from Buck Creek is significant at this time, it is not required to make an annual accounting of the flow in Buck Creek. It also appears that establishing gaging stations and channel loss values so that future annual accountings could be made is not economically justified at this time. Annual accounting procedures for this watershed should be developed to provide a 60:40 apportionment whenever requested by either Oklahoma or Texas.

c. **Sand (Lebos) Creek Watershed in Texas:** Sand Creek watershed covers about 65 square miles in Texas. There are no gaging stations on Sand Creek in Texas or in Oklahoma. Since neither Texas nor Oklahoma makes significant use of flow from Sand Creek, it is not necessary to make an annual accounting of the flow in Sand Creek, and it does not seem to be economically justified at this time to establish gaging stations and determine channel loss values so that future annual accountings could be made. Annual accounting procedures for this watershed should be developed to provide a 60:40 apportionment whenever requested by either Oklahoma or Texas.

d. **Salt Fork Red River Watershed in Texas:** Salt Fork Red River watershed in Texas covers about 1,380 square miles, of which 209 are non-contributing.

The USGS streamflow gage number 07300000, Salt Fork Red River near Wellington, Texas, is about 16 miles upstream from the Oklahoma-Texas State line and measures flow from a 1,222 sq. mi. drainage area, of which 209 is probably non-contributing. The average annual discharge (1953-1966) was 52,600 AF/yr, and the average annual discharge since Greenbelt Reservoir was completed (1967-1977) has been 33,250 AF/yr.

The USGS streamflow gage 07300500, Salt Fork Red River at Mangum, Oklahoma, is about 29 miles downstream from the Oklahoma-Texas State line and measures flow from a 1,566 sq. mile drainage area, of which 209 is probably non-contributing. The average annual discharge (1937-1977) has been 62,450 AF/yr.

(1) The actual annual delivery at the Oklahoma State line is computed as follows:
   (a) The annual flow at the Wellington gage,
   (b) Minus channel losses to Wellington gage flows between gage and State line (until this specific channel loss value is available, the Compact compliance calculations will be made ignoring this channel loss adjustment),
   (c) Plus Texas' flow between Wellington gage and the State line. (This flow will be computed based on intervening drainage area between Wellington and Mangum gages adjusted for both Texas and Oklahoma man-made depletions.), and

(d) Minus Texas' man-made depletions downstream from the Wellington gage.

(2) The scheduled annual delivery at the Oklahoma State line is 40 percent of the natural flow at State line without diversions or impoundments, and would be computed as 40 percent of the following:
(a) The actual annual delivery (para 5.d.(1) above),
(b) Plus all man-made depletions in Texas, and
(c) Minus the increased channel losses in Texas which would have incurred had Texas depletions not occurred (until this specific channel loss value is available, the Compact compliance calculations will be made ignoring this channel loss adjustment).

(3) Compact compliance is achieved as long as actual delivery exceeds scheduled delivery.

e. **Elm Creek Watershed in Texas:** Elm Creek watershed covers about 360 square miles in Texas which includes the North Elm Creek tributary. There is no streamflow gage on Elm Creek in Texas. The USGS gage number 07303400, Elm Fork of North Fork Red River near Carl, Oklahoma, is about 6 miles downstream from the Oklahoma-Texas State line, and was used to measure flow from a 416 square mile drainage area but discharge measurements at this site were discontinued in 1980. The average annual discharge (20 years) was 30,280 AF/yr. No Compact compliance accounts can be made until the Gage near Carl has been reestablished.

(1) The actual annual delivery at State line is computed as follows:
(a) Flow at the State line. (This flow will be computed based on the drainage area and on the flow measured at Carl gage, adjusted for both Texas and Oklahoma depletions.), and
(b) Minus Texas' man-made depletions.

(2) The scheduled annual delivery at State line is 40 percent of the natural flow at State line without diversions or impoundments and would be computed as 40 percent of the following:
(a) The actual annual delivery (para 5.e.(1) above),
(b) Plus man-made depletions in Texas, and
(c) Minus the increased channel losses in Texas which would have been incurred if Texas had not depleted the flow (until this specific channel loss value is available, the Compact compliance calculations will be made ignoring this channel loss adjustment).

(3) Compact compliance is achieved as long as the actual delivery exceeds the scheduled delivery.

h. **Washita River Watershed in Texas:** There is no streamflow gage on the Washita River in Texas. The USGS streamflow gage number 07316500, Washita River near Cheyenne, Oklahoma, is over 21 miles downstream from the Oklahoma-Texas State line, and measures flow from a 794 square mile drainage area, of which about 441 square miles are in Texas. The average annual discharge at the Cheyenne gage (44 years) has been 20,720 AF/yr.

(1) The actual annual delivery at Oklahoma State line is computed as follows:
   (a) The annual flow at the Cheyenne gage,
   (b) Plus channel losses to the State line flow between the State line and the gage (until this specific channel loss value is available, the Compact compliance calculations will be made ignoring this channel loss adjustment),
   (c) Minus Oklahoma's flow between the State line and Cheyenne gage. (This flow will be computed based on the drainage area upstream from the Cheyenne gage, adjusted for both Texas and Oklahoma man-made depletions.), and
   (d) Minus Texas' man-made depletions.

(2) The annual scheduled delivery at State line is 40 percent of the natural flow at State line without diversions or impoundments, and would be computed as 40 percent of the following:
   (a) The actual annual delivery at State line (para 5.h.(1) above),
   (b) Plus man-made depletions in Texas, and
   (c) Minus the increased channel losses which would have occurred if Texas had not made any diversions (until this specific channel loss value is available, the Compact compliance calculations will be made ignoring this channel loss adjustment).

(3) Compact compliance is achieved as long as the actual delivery exceeds the scheduled delivery.

RED RIVER COMPACT RULES AND REGULATIONS
To Compute and Enforce Compact Compliance
REACH III, SUBBASIN 3

(as amended 4/25/89)

1. These rules and regulations to be used to compute and enforce Compact compliance within Subbasin 3 of Reach III, Red River Compact, are adopted subject to the following conditions and assumptions.
   a. It is fully understood that these rules and regulations should be modified whenever experience or detailed studies demonstrate the need for modification, and if the Commission should modify its interpretation of Compact provisions relating to this Subbasin.
   b. **Definitions:**
      (1) "Diversion", as used in these rules and regulations, is the net loss to a water source from use by a diverter, and is computed as the diversion from the water source minus the part of the diversion which is returned to the water source. Normally, return flows must be measured to be considered; however, the Engineering Committee may consider and recommend exceptions. As used herein, "diversion" is equivalent to "net diversion" from a water source and to "depletion" or "consumptive use" of a water source.
      (2) "Drawdown", as used in these rules and regulations, means that period commencing on the first day water ceases spilling over the existing Caddo Lake spillway (or the raised spillway, if Caddo Lake is enlarged), and continuing so long as the Caddo Lake surface elevation continues to fall, until the day when appreciable inflow reaches Caddo Lake, causing the Caddo Lake surface elevation to rise leading to a spill from Caddo Lake.

2. **Management of Compact Compliance Computations.**
   a. **Management Using State Centers:**
      (1) State Engineering Committee representatives will establish State Computation Control Centers.
         (a) State representatives will gather data, exchange data and meet <u>via</u> conference call to check on computation results, if necessary.
         (b) The Engineering Committee will compute compliance with Compact.
   b. **Management Period for Compact Compliance Computations:**
      (1) Next week's State diversions will be allocated based on last week's compliance computations.
      (2) It is each State's responsibility to limit its total State diversion allocation among its State diverters.
      (3) The weekly period for use and flow data will start and end at 8:00 a.m. on Tuesday of each week.
      (4) Data collection and dissemination will be completed on Tuesday of each week.
      (5) Computation of Compliance will be completed on Wednesday of each week.
      (6) Each State can request an update at any time.

c. **Management Improvements Studies:** The Engineering Committee will monitor the effect on accounting management of the following factors and will report thereon to the Commission whenever procedure changes appear desirable.
   (1) Errors caused by travel time.
   (2) Future restrictions computed from past week's data.
   (3) Failure to consider channel loss.
   (4) Failure to consider ungaged return flows.
   (5) Failure to consider flow trends.
   (6) Addition of needed gages.

3. **Enforcement of Compact Compliance Requirements.** Each State will be responsible for insuring that the sum of the diversions by State users does not exceed the total State diversion authorized by the Red River Compact Commission. In this regard, each State will be responsible for establishing clear legal authority within its State for enforcing the restrictions imposed by the Red River Compact.

4. **Data Reporting Procedures.**
   a. **Streamflow Gaging Station Records:** The Engineering Committee will make arrangements with Corps of Engineers, the U.S. Geological Survey and with States as required to collect daily and/or weekly data, as needed, and forward to the State Computation and Control Centers.
   b. **Diversion Records:** Each State will be responsible to collect weekly data, as needed, and forward to the State Computation and Control Centers.
   c. **Archived Records:** Records will be archived by the Commission Chairman.

5. **General Compliance Requirements of Section 6.03 Red River Compact.**
   a. **Section 6.03 (b)(1):**
      (1) **The Compact states:** "Texas shall have the unrestricted right to all water above Marshall, Lake O' the Pines, and Black Cypress damsites; however, Texas shall not cause runoff to be depleted to a quantity less than that which would have occurred with the full operation of Franklin County, Titus County, Ellison Creek, Johnson Creek, Lake O' the Pines, Marshall, and Black Cypress Reservoirs constructed, and those other impoundments and diversions existing on the effective date of this Compact. Any depletions of runoff in excess of the depletions described above shall be charged against Texas' apportionment of the water in Caddo Reservoir."
      (2) Texas may use the bed and banks of the streams or tributaries available within this Subbasin to convey its developed water downstream from the aforesaid dam sites to specified authorized users. Such water would retain its identity and would not be subject to the Caddo Lake drawdown provisions of Section 5.b. of these rules until passing the designated point of diversion. Appropriate transportation losses will be approved by the Red River Compact Commission.
      (3) Until both Marshall Reservoir (with an estimated capacity of 782,300 acre-feet and yield of 325,000 acre-feet annually)

and Black Cypress Reservoir (with estimated capacity of 824,400 acre-feet and yield and 220,000 acre-feed annually) have been constructed, it will be virtually impossible for Texas to deplete runoff in excess of that authorized. In the future, whenever potential Texas depletions above Marshall, Lake O' the Pines, and Black Cypress damsites become a concern to Louisiana, procedures to compute Texas depletion of runoff in excess of that authorized by Section 6.03 (b)(1) of the Compact should be developed by the Engineering Committee and presented for Commission consideration.

b. **Section 6.03 (b)(2):**

(1) **The Compact states:** "Texas and Louisiana shall each have the unrestricted right to use fifty (50) percent of the conservation storage capacity in the present Caddo Lake for the impoundment of water for state use, subject to the provision that supplies for existing uses of water from Caddo Lake, on date of Compact, are not reduced."

(2) Whenever water is spilling over the existing spillway at 168.5 feet above mean sea level, each state may withdraw or divert water from Caddo Lake without restriction.

(3) Whenever Caddo Lake is not spilling over the existing spillway at 168.5 feet above mean sea level, the total consumptive use by each state shall not exceed 8,400 acre-feet during the drawdown period, provided that neither state shall divert more than 3,600 acre-feet during any one month or 4,800 acre-feet during any two consecutive months.

c. **Section 6.03 (b)(3):**

(1) **The Compact states:** "Texas and Louisiana shall each have the unrestricted right to fifty (50) percent of the conservation storage capacity of any future enlargement of Caddo Lake, provided the two states may negotiate for the release of each state's share of the storage space on terms mutually agreed upon by the two states after the effective date of this Compact."

(2) This Compact provision requires no separate computation procedures but other rules may be changed if enlargement of Caddo Lake occurs. If enlargement of Caddo Lake is authorized in the future, the Engineering Committee should review and modify as necessary Rule 5 (b) and Rule 6.

d. **Section 6.03 (b)(4):**

(1) **The Compact states:** "Inflow to Caddo Lake from its drainage area downstream from Marshall, Lake O' the Pines, and Black Cypress damsites and downstream from other last downstream dams in existence on the date of the signing of the Compact document by the Compact Commissioners, will be allowed to continue flowing into Caddo Lake except that any manmade depletions to this inflow by Texas will be subtracted from the Texas share of the water in Caddo Lake."

(2) As indicated in paragraph 5 a. (2) above, it is virtually impossible for Texas at the present time to reduce inflow to

Caddo Lake below that which would occur with both Marshall and Black Cypress Reservoirs constructed and operating. However potential Texas depletions become a concern to Louisiana, procedures to compute excess depletion by Texas of inflow to Caddo Lake should be develop by the Engineering Committee and presented for Commission Consideration.

e. **Section 6.03 (c):**

(1) **The Compact states:** "In regard to the water of interstate streams which do not contribute to the inflow to Cross Lake or Caddo Lake, Texas shall have the unrestricted right to Divert and use this water on the basis of a division of runoff above the state boundary of sixty (60) percent to Texas and forty (40) percent to Louisiana."

(2) The Engineering Committee will review known Texas diversion data for the previous year and report to the Commission any Texas non-compliance with Compact Section 6.03 (c).

f. **Section 6.03 (d):**

(1) **The Compact states:** "Texas and Louisiana will not construct improvements on the Cross Lake watershed in either state that will affect the yield of Cross Lake; provided, however, this subsection shall be subject to the provisions of Section 2.08."

(2) The Engineering Committee will renew any known improvements on the Cross Lake watershed and report to the Commission any non-compliance with Compact Section 6.03 (d).

6. **Caddo Lake Content Accounting Procedure During Drawdown Periods.**

a. Whenever water is spilled from Caddo Lake, both state's accounts are full and no accounting is necessary. Accounting shall start the first day of no-spill following each period of spilling and shall continue until the first day of spill in the next period of spilling. The accounting procedure for computing the quantity of water in Caddo Lake during periods of drawdown belonging to the States of Louisiana and Texas shall be as follows:

(1) At the beginning of the drawdown, the Caddo Lake contents belong 50 percent to each state. Otherwise, begin with water ownership on Caddo Lake as shown in the most recent previous report.

(2) Each State shall be credited with one-half of the inflow to Caddo Lake since the previous report.

(3) Each State's account shall be reduced by its share of Caddo Lake evaporation losses during the period since the previous report.

(4) Each State's account shall be reduced by its diversions from Caddo Lake since the previous report.

(5) A State's account shall not exceed 50 percent of the capacity of Caddo Lake. If these accounting procedures result in a greater State content than 50 percent of the total capacity of Caddo Lake, the excess computed quantity shall be "spilled" into the other State's account as needed to bring the other State's account up, but in no case shall

either State's account exceed 50 percent of the total capacity of Caddo Lake.

b. Using a stage-area-capacity relationship concurred in by both States, the content of Caddo Lake at the end of each accounting period shall be determined and inflow for that period shall be computed as follows:

(1) From the present content, as determined above, subtract the content determined at the end of the previous period.

(2) Add to the figure resulting from Step (1) the total Texas and Louisiana diversions since the end of the previous period.

(3) Add to the figure resulting from Step (2) the computed gross evaporation since the end of the previous period as determined in c. (2) below. This results in total inflow.

c. **Evaporation will be computed as follows:**

(1) The Weather Bureau's pan evaporation data shall be used to compute gross lake evaporation using a standard conversion coefficient agreed to by the engineer advisors of each State.

(2) The average lake surface area for the accounting period shall be determined from the stage-area-capacity relationship concurred in by both States and multiplied by the gross lake evaporation as determined in Step (1) to determine the volume of evaporation for the period.

7. **Availability of Diversion Records.** Arrangements shall be made for all Texas and Louisiana diverters, during "drawdown" of Caddo Lake, to maintain daily diversion records open for inspection, and to provide weekly use data as required by Rule 2 b. (3).