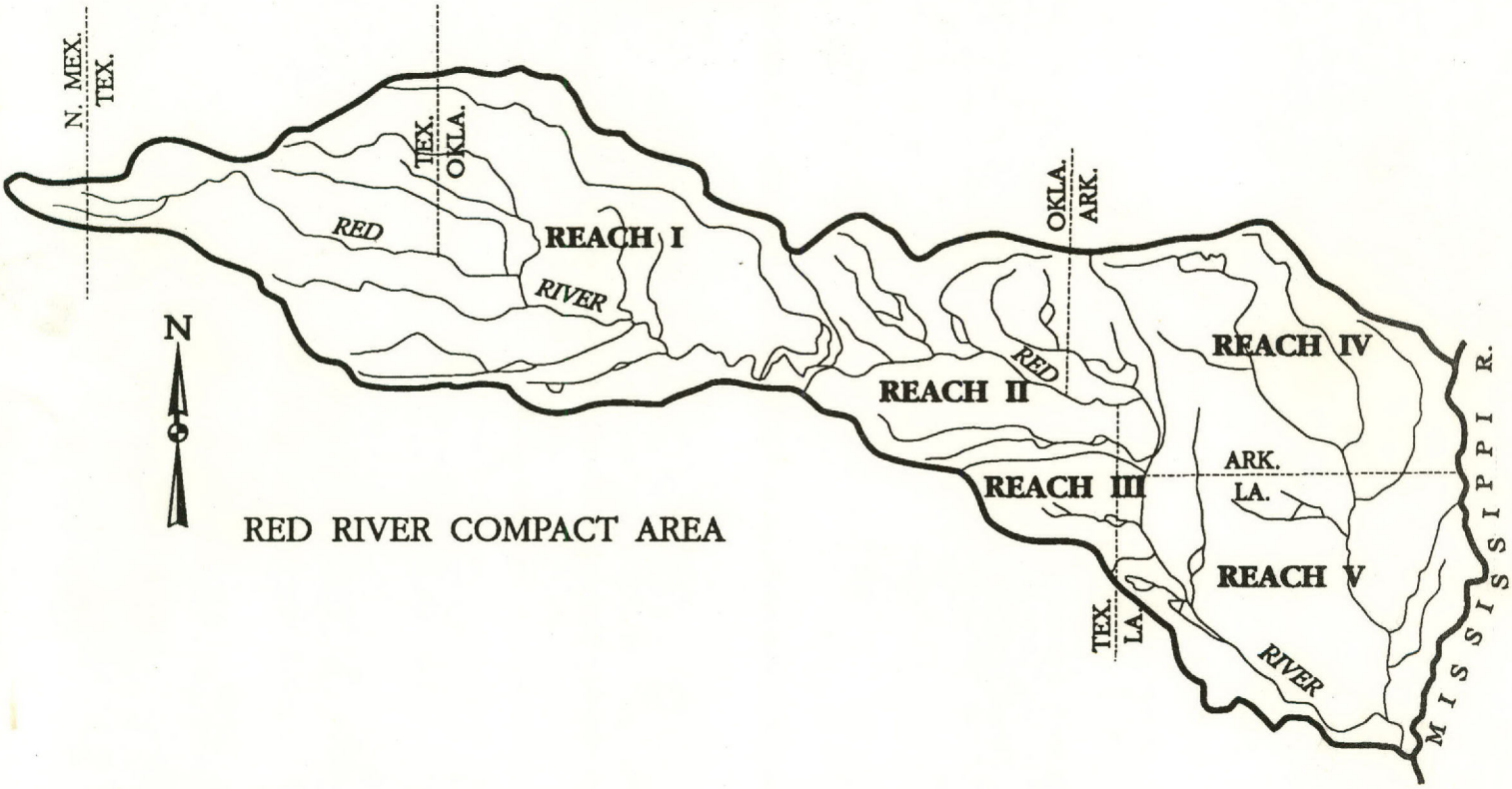
REPORT

OF THE

RED RIVER COMPACT COMMISSION 1990



RED RIVER COMPACT AREA

MAY, 1991

RED RIVER COMPACT COMMISSION

April 7, 1992

The President
United States of America

The Honorable Bill Clinton, 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

Gentlemen:

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 eleventh annual meeting, submitted herewith 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 1990. A budget covering the anticipated expenses of the Commission for FY(s) 1991 through 1993 is also included in the report.

The eleventh annual meeting was hosted by the State of Oklahoma and held in Oklahoma City on April 30, 1991. The Commission welcomed Mrs. Patricia Eaton and Mr. Ken Fergeson, new Commissioners from Oklahoma. In the absence of the Federal Commissioner and Chairman and in accord with the Commission's policy that the Vice-Chairmanship follow rotation with the host state, Mrs. Eaton agreed to serve as Vice-Chairman. Resolutions of appreciation for former Oklahoma Commissioners Jim Barnett and L. L. "Red" Males were adopted. Reports of the committee chairmen were made and accepted and committee responsibilities assigned. Pursuant to a previously agreed to rotation of the Office of Vice-Chairman and Secretary in connection with the rotation of the annual meeting host state, the State of Texas accepted the responsibilities of both offices for FY 1991. The Office of Treasurer remained with the State of Arkansas.

Sincerely,

Patricia P. Eaton

Patricia P. Eaton, Vice-Chairperson
Oklahoma Commissioner

TABLE OF CONTENTS

RED RIVER COMPACT COMMISSION MEMBERS

Federal Commissioner

Major General T. A. Sands
1522 Short Street
New Orleans, Louisiana 70118
(504) 581-3234

Arkansas Commissioners

John R. Stroud, Jr.
State Line Plaza, Suite Six
Texarkana, Arkansas 75502
(501) 773-5651

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

Louisiana Commissioners

Arthur R. Theis, P.E.
9433 West Tampa Dr.
Baton Rouge, Louisiana 70815
Business: (504) 343-3812
Residence: (504) 927-0414

Neil L. Wagoner, P.E., Secretary
Department of Transportation and Development
P. O. Box 94245, Capitol Station
Baton Rouge, Louisiana 70804-9245
(504) 379-1200

Oklahoma Commissioners

Ken Fergeson
Box 598
Altus, Oklahoma 73522

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

Texas Commissioners

Colonel Nathan Reiter, Jr.
P. O. Box 6660
Texarkana, Texas 75505
(214) 792-1988

Allen P. Beinke, Jr., Executive Director
Texas Water Commission
P. O. Box 13087, Capitol Station
Austin, Texas 78711
(512) 463-7791

RED RIVER COMPACT COMMISSION OFFICERS and COMMITTEE CHAIRMEN

CHAIRMAN/FEDERAL COMMISSIONER
Major General T. A. Sands
1522 Short Street
New Orleans, Louisiana 70188
(504) 581-3234

VICE CHAIRMAN/OKLAHOMA COMMISSIONER
Patricia Eaton, Executive Director
Oklahoma Water Resources Board
P. O. Box 150
Oklahoma City, Oklahoma 73101-0150
(405) 231-2551

SECRETARY
Mary Schooley
Oklahoma Water Resources Board
P. O. Box 150
Oklahoma City, Oklahoma 73101-0150
(405) 231-2551

TREASURER
Pris Houchens, Executive Assistant
Arkansas Soil and Water Conservation Commission
101 East Capitol Mall, Suite 350
Little Rock, Arkansas 72201
(501) 682-3986

BUDGET COMMITTEE - CHAIRMAN
Neil L. Wagoner, P.E., Secretary
Department of Transportation and Development
P. O. Box 94245, Capitol Station
Baton Rouge, Louisiana 70804-9245
(504) 379-1200

ENGINEERING COMMITTEE - CHAIRMAN
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

LEGAL COMMITTEE - CHAIRMAN
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

RED RIVER COMPACT COMMISSION
COMMITTEE MEMBERS

BUDGET COMMITTEE

Neil L. Wagoner, P.E., Secretary *(Committee Chairman)*
Department of Transportation and Development
P. O. Box 94245, Capitol Station
Baton Rouge, Louisiana 70804-9245
(504) 379-1200

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

Harold Springer, Chief
Oklahoma Water Resources Board
P. O. Box 150
Oklahoma City, Oklahoma 73101-0150
(405) 231-2503

Colonel Nathan Reiter, Jr.
P. O. Box 6660
Texarkana, Texas 75505
(214) 792-1988

ENGINEERING COMMITTEE

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

Earl T. Smith, Jr., Chief
Water Resources Management Division
Arkansas Soil and Water Conservation Commission
101 East Capitol, Suite 350
Little Rock, Arkansas 72201
(501) 682-3979

Harold Springer, Chief
Oklahoma Water Resources Board
P. O. Box 150
Oklahoma City, Oklahoma 73101-0150
(405) 231-2503

Bob Johnson, Engineer Advisor
Red River Compact
Texas Water Commission
P. O. Box 13087, Capitol Station
Austin, Texas 78711
(512) 371-6263

LEGAL COMMITTEE

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

John F. Gibson, Jr., Attorney
P. O. Box 573
Monticello, Arkansas 71655
(501) 367-9792

Dean A. Couch, General Counsel
Oklahoma Water Resources Board
P. O. Box 150
Oklahoma City, Oklahoma 73101-0150
(405) 231-2552

Mary Ruth Holder, Assistant Attorney General
Environmental Protection Division
P. O. Box 12548, Capitol Station
Austin, Texas 78711
(512) 463-2012

RED RIVER COMPACT COMMISSION

RED RIVER COMPACT COMMISSION
FY-91/92 BUDGET

(July 1, 1990 through June 30, 1992)
Approved: 3/30/90

Fund Balance (1/31/90)	$5,111.70	
Projected Cash Receipts by 6/30/90	$140.00	
Projected Expenditures through 6/30/90	$800.00	
Projected Fund Balance		$4,171.70

	FY-91	FY-92
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-91 assessments are ***$500.00*** per state and the FY-92 assessments are ***$500.00*** per state.

Pris Houchens

Pris Houchens
Secretary-Treasurer

RED RIVER COMPACT COMMISSION

FY-92/93 BUDGET

(July 1, 1991 through June 30, 1993)
Approved: 4/30/91

Fund Balance (4/25/91)	$5,747.93	
Projected Cash Receipts by 6/30/91	$72.00	
Projected Expenditures through 6/30/91	$145.73	
Projected Fund Balance		$5,674.20

	FY-92	FY-93
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-92 assessments are $400.00 per state and the FY-93 assessments are $400.00 per state.

Pris Houchens

Pris Houchens
Treasurer

RED RIVER COMPACT COMMISSION

STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS

JULY 1, 1989 THROUGH JUNE 30, 1990

BURT, HARRELL & COMPANY

CERTIFIED PUBLIC ACCOUNTANTS
A PROFESSIONAL CORPORATION

1004 BURMAN DRIVE
JACKSONVILLE, ARKANSAS 72076
(501) 982-4497

LITTLE ROCK, ARKANSAS
(501) 224-7900

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, 1989 THROUGH JUNE 30, 1990. 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 THE RELATED ASSETS ARE RECOGNIZED WHEN RECEIVED RATHER THAN WHEN EARNED, AND CERTAIN EXPENSES ARE RECOGNIZED WHEN PAID RATHER THAN WEN 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, 1990 ON THE BASIS OF ACCOUNTING DESCRIBED IN THE PRECEDING PARAGRAPH.

Burt, Harrell & Company
BURT, HARRELL & COMPANY, CPAs

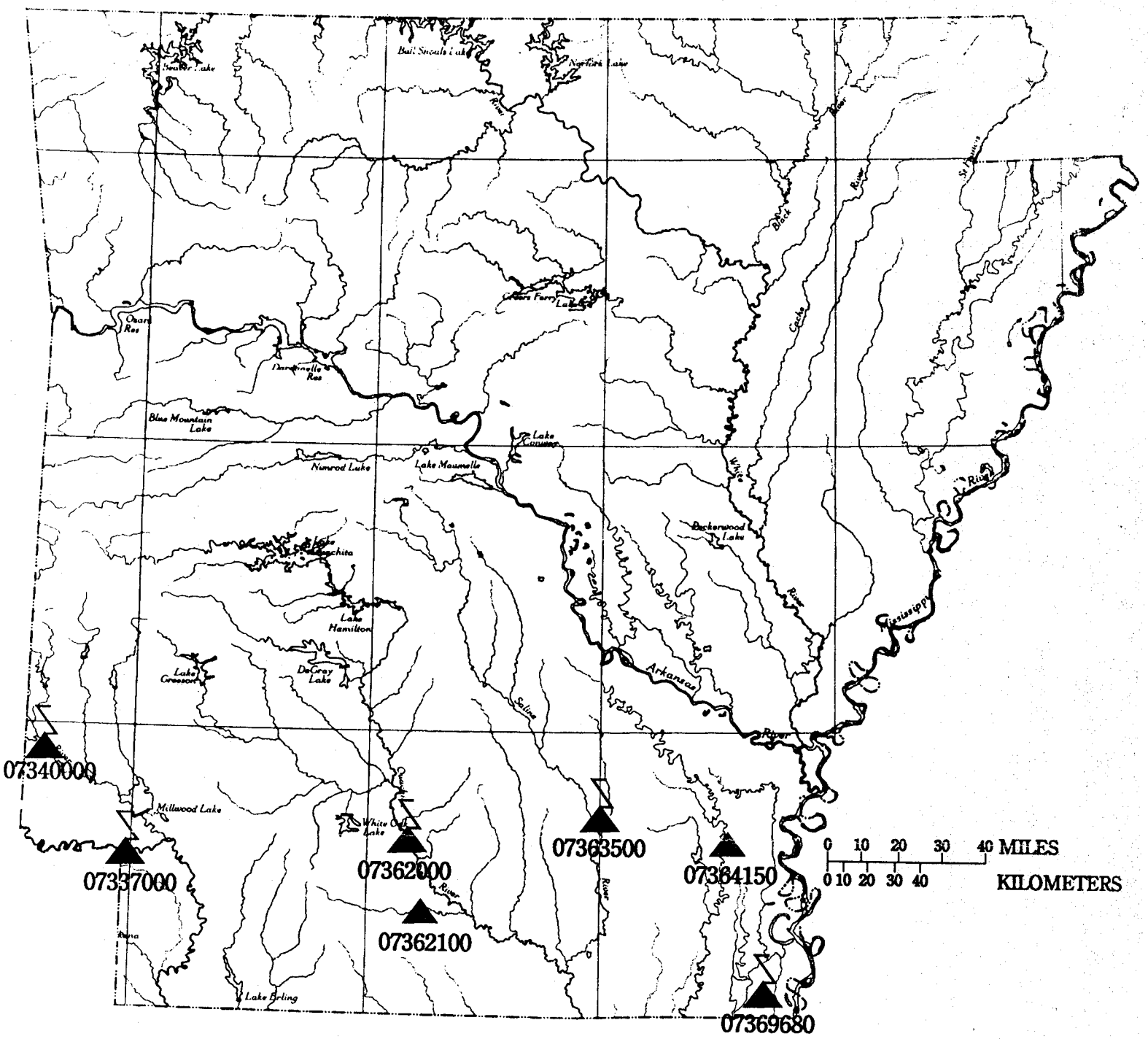
AUGUST 29, 1990
JACKSONVILLE, ARKANSAS

RED RIVER COMPACT COMMISSION
STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS
FOR THE PERIOD JULY 1, 1989 THROUGH JUNE 30, 1990

CASH BALANCE, SAVERS FEDERAL SAVINGS, JULY 1, 1989	$ 3,519
CASH RECEIPTS	
MEMBER ASSESSMENTS	2,000
INTEREST	298
TOTAL CASH RECEIPTS	2,298
CASH DISBURSEMENTS	
ACCOUNTING	225
PUBLIC OFFICIAL BOND	81
POSTAGE & SHIPPING	100
OFFICE EXPENSES	100
MEETINGS EXPENSE	55
TRANSCRIPT AND STENOGRAPHIC WORK	372
TOTAL CASH DISBURSEMENTS	933
CASH BALANCE, SAVERS FEDERAL SAVINGS, JUNE 30, 1990	$ 4,884

THE ACCOUNTANTS REPORT IS AN INTEGRAL PART OF THIS STATEMENT

SELECTED CONTINUOUS-RECORD GAGING STATIONS IN ARKANSAS



EXPLANATION

07364150 — CONTINUOUS-RECORD GAGING STATION

07363500 — GAGING STATION EQUIPPED WITH A TELEPHONE OR SATELLITE TELEMETER. NUMERAL BELOW SYMBOL IS STATION NUMBER.

07337000 RED RIVER AT INDEX, ARKANSAS
(National stream-quality accounting network station)

LOCATION.--Lat 33°33'07", long 94°02'28", in NW ¼ SW ¼ 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 mi², of which 5,936 mi² 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.--54 years, 12,470 ft³/s, 9,035,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 297,000 ft³/s Feb. 23, 1938, gage height, 34.25 ft; minimum, 378 ft³/s Nov. 28,
1956.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 270,000 ft³/s May 10, gage height, 32.30 ft, from graph based on gage readings; minimum daily, 1,380 ft³/s Jan. 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12200	3180	2240	2340	18600	15600	61400	63800	61100	30300	11000	3930
2	12300	3160	2250	2180	28900	13700	50100	65900	62100	26100	11300	4020
3	12100	3170	2350	1950	46100	13600	49000	76000	64600	24100	11300	4100
4	11900	3140	2790	1830	52100	13900	55100	95300	84900	23000	11200	4110
5	11400	3230	3130	1740	44600	15300	61000	121000	87000	20000	13200	4110
6	10800	3490	3210	1710	37200	16500	69900	160000	74000	13500	17900	4260
7	10700	3510	3240	1670	34600	17000	75400	197000	62500	10300	18000	4450
8	10500	3510	3200	1630	32400	33500	77500	229000	59900	7420	15300	4350
9	8980	3390	3260	1600	30000	57300	73600	264000	59500	6530	11600	4190
10	7110	2900	3170	1550	28200	57200	65300	268000	59100	5930	9150	4040
11	5740	2500	2680	1520	27400	46400	62600	264000	58700	5450	8420	4010
12	5170	2910	2260	1470	27100	37300	61900	245000	58200	5120	7890	3930
13	4040	3220	2070	1430	26800	40300	62000	212000	57800	4920	6780	4060
14	3720	3320	2030	1410	26500	51100	63500	174000	57600	5070	6280	4090
15	4490	3320	2020	1390	26000	54400	62800	145000	55400	5080	6480	3810
16	4660	3260	1990	1380	24800	58900	60700	123000	53800	5320	7390	3660
17	4690	2910	2010	1460	28900	63900	54900	101000	56200	5250	7810	3460
18	4690	2610	2200	1760	32200	61900	52100	77700	57000	5740	8030	3300
19	4440	2770	2560	3380	31300	58400	53800	73200	56600	5970	8750	3400
20	4450	3120	2530	11300	28300	56800	54400	72300	56200	5850	8280	4070
21	4510	3250	3440	25500	24800	57500	52600	70300	56000	5750	6650	3850
22	4660	3370	4140	31700	23200	58700	54300	67300	55500	4910	6020	3510
23	4780	3430	3850	32800	24700	59400	59400	65700	53500	4740	5530	4640
24	4580	3250	2960	28600	27200	59000	59100	64000	50800	4710	4890	8000
25	4430	2920	2790	26800	28800	58300	57200	63800	47400	4740	4660	12000
26	4070	2630	3190	28100	27800	58300	59300	63500	46700	5310	4650	16200
27	3270	2420	4830	28200	24900	59900	61000	64400	47100	6670	4570	17300
28	3130	2560	5820	25200	20000	63400	65600	67000	47300	8410	4480	16100
29	3590	2710	4530	23400	---	71600	74400	68600	43900	7940	4300	13800
30	3690	2500	3270	21800	---	82500	73800	65600	37600	8300	4010	11000
31	3290	---	2550	19300	---	80100	---	62300	---	10000	3850	---
TOTAL	198080	91660	92560	336100	833400	1491700	1843700	3749700	1728000	292430	259670	185750
MEAN	6390	3055	2986	10840	29760	48120	61460	121000	57600	9433	8376	6192
MAX	12300	3510	5820	32800	52100	82500	77500	268000	87000	30300	18000	17300
MIN	3130	2420	1990	1380	18600	13600	49000	62300	37600	4710	3850	3300
AC-FT	392900	181800	183600	666700	1653000	2959000	3657000	7438000	3427000	580000	515100	368400

CAL YR 1989 TOTAL 6095880 MEAN 16700 MAX 66900 MIN 1990 AC-FT 12090000
WTR YR 1990 TOTAL 11102750 MEAN 30420 MAX 268000 MIN 1380 AC-FT 22020000

RED RIVER BASIN

07337000 RED RIVER AT INDEX, ARKANSAS

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 1989 TO SEPTEMBER 1990

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 (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	TURBIDITY (NTU) (00076)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)	BAROMETRIC PRESSURE (MM OF HG) (00025)
OCT											
03...	1215	80513	80513	12100	1200	8.0	23.0	27	7.2	85	759
DEC											
05...	1005	80513	80513	3010	1120	8.1	8.0	8.7	10.8	92	754
FEB											
20...	1230	80513	80513	25600	370	7.9	10.0	27	10.7	95	764
APR											
10...	1330	80513	80020	63700	647	7.8	15.0	150	8.2	82	758
JUN											
19...	0915	80513	80020	57400	498	7.6	26.5	--	6.9	87	755
AUG											
29...	0815	80513	80020	4570	982	7.8	32.0	4.7	5.2	72	755

DATE	TIME	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	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)
OCT											
03...	1215	K12	K52	300	110	79	25	130	48	3	5.3
DEC											
05...	1005	K76	92	320	120	87	26	120	44	3	5.1
FEB											
20...	1230	K180	K1200	100	0	29	7.0	32	40	1	2.5
APR											
10...	1330	520	1100	170	63	46	12	58	43	2	2.9
JUN											
19...	0915	640	1300	--	--	--	--	--	--	--	--
AUG											
29...	0815	740	1400	270	66	74	21	98	44	3	4.4

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)
OCT										
03...	1215	187	0	231	189	200	190	0.30	5.6	697
DEC										
05...	1005	203	0	250	205	170	150	0.30	5.5	724
FEB										
20...	1230	102	0	124	102	40	43	0.10	5.8	222
APR										
10...	1330	104	0	124	102	88	88	0.10	6.6	387
JUN										
19...	0915	177	0	216	177	--	--	--	--	--
AUG										
29...	0815	203	0	250	205	130	150	0.50	7.4	602

07337000 RED RIVER AT INDEX, ARKANSAS--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

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 TOTAL (MG/L AS N) (00610)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N) (00605)
OCT										
03...	1215	750	22800	0.95	--	<0.010	<0.100	0.020	0.010	0.68
DEC										
05...	1005	687	5880	0.98	--	0.020	<0.100	0.030	0.030	0.97
FEB										
20...	1230	222	15300	0.30	--	<0.010	0.180	0.060	0.020	0.74
APR										
10...	1330	365	66600	0.53	0.290	0.010	0.300	0.060	0.030	0.74
JUN										
19...	0915	--	--	--	--	<0.010	0.300	0.030	0.020	0.97
AUG										
29...	0815	608	7430	0.82	--	<0.010	<0.100	0.020	0.010	0.58

DATE	TIME	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	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)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	ALUM-INUM, DIS-SOLVED (UG/L AS AL) (01106)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)
OCT										
03...	1215	0.70	0.100	<0.010	<0.010	150	30	1	<0.5	<1.0
DEC										
05...	1005	1.0	0.120	<0.010	0.010	--	--	--	--	--
FEB										
20...	1230	0.80	0.170	<0.010	0.010	62	70	1	<0.5	<1.0
APR										
10...	1330	0.80	0.100	0.020	0.020	300	70	1	<0.5	<1.0
JUN										
19...	0915	1.0	0.290	0.030	0.020	--	--	--	--	--
AUG										
29...	0815	0.60	0.060	<0.010	0.010	--	--	--	--	--

DATE	TIME	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)
OCT										
03...	1215	<1	<3	3	59	2	17	16	<0.1	<10
FEB										
20...	1230	<5	<3	<10	73	20	<4	5	0.2	<10
APR										
10...	1330	<1	<3	3	74	<1	7	4	<0.1	<10

DATE	TIME	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)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)	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)
OCT										
03...	1215	2	<1	<1.0	880	<6	23	108	3530	78
DEC										
05...	1005	--	--	--	--	--	--	30	244	82
FEB										
20...	1230	<10	<1	1.0	250	<6	18	1120	77400	43
APR										
10...	1330	2	<1	<1.0	430	<6	140	450	77400	59
JUN										
19...	0915	--	--	--	--	--	--	879	136000	77
AUG										
29...	0815	--	--	--	--	--	--	19	234	74

RED RIVER BASIN

07340000 LITTLE RIVER NEAR HORATIO, ARKANSAS

LOCATION.--Lat 33°55'10", long 94°23'15", in NE ¼ 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 mi².

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.--No estimated daily discharges. 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.--60 years, 3,836 ft³/s, 2,779,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 120,000 ft³/s Mar. 30, 1945, gage height, 37.70 ft, from rating curve extended above 93,000 ft³/s; minimum, 1.0 ft³/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 ft³/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 32,700 ft³/s May 6, gage height, 29.00 ft; minimum daily, 194 ft³/s Dec. 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	612	329	210	304	10600	6110	10200	13500	15600	2230	3380	1380
2	524	316	205	288	16300	5790	7690	15600	18000	1320	2220	721
3	403	274	208	288	16800	3510	10400	24400	24300	1430	2590	552
4	361	258	206	435	15400	2430	12800	30200	26100	1190	3560	525
5	343	264	202	563	12200	1970	13000	31100	21600	1310	3560	767
6	353	245	202	487	12400	2380	16800	31900	15600	1330	3220	1970
7	383	238	209	391	13500	3760	16200	27000	10700	1280	2460	1630
8	365	252	228	358	14200	25900	9320	19200	10600	613	2690	1180
9	351	373	241	354	12900	30000	7800	9690	12800	459	2990	616
10	342	326	253	428	11600	22000	10300	10300	14500	1020	2410	422
11	337	252	253	438	11200	13900	12700	12500	15300	708	1620	705
12	334	295	238	363	12400	7360	10700	13900	15800	1130	967	517
13	337	271	228	407	11800	10200	8020	16000	15900	673	805	422
14	337	231	241	336	11100	11400	7840	16200	16000	506	974	662
15	336	233	227	312	7840	14700	11300	16300	16100	495	1110	676
16	332	233	328	303	6300	13700	8080	14700	16100	499	1420	487
17	323	209	243	369	7410	12900	8090	13400	16300	788	937	398
18	312	205	259	812	8800	13500	9750	10700	16700	609	1340	420
19	305	217	215	6690	8310	12200	10100	16600	16500	552	808	448
20	303	211	215	16700	8150	13600	10500	19500	16200	1190	623	887
21	301	204	214	15400	7610	14900	12300	17200	16200	1200	714	605
22	302	226	209	10900	9340	15400	12000	14200	15300	712	633	553
23	305	265	388	7180	10300	15100	11800	11800	12900	637	568	1040
24	310	246	335	7260	10800	14500	14100	9840	9840	583	1190	2040
25	313	248	202	8370	8500	13700	13500	11500	7570	610	645	2870
26	311	254	196	9650	4380	13700	13000	13000	8510	707	566	3500
27	308	232	194	9190	5010	13400	12900	15000	8720	2500	533	3640
28	325	217	308	8180	6370	12300	13400	17600	7050	3070	1800	4150
29	329	209	285	8400	---	17200	13200	17000	5090	1400	1630	3990
30	333	211	287	9090	---	18000	13300	15600	3420	962	1570	1820
31	333	---	325	7750	---	14700	---	15000	---	2930	1670	---
TOTAL	10763	7544	7554	131996	291520	390210	341090	520430	425300	34643	51203	39593
MEAN	347	251	244	4258	10410	12590	11370	16790	14180	1118	1652	1320
MAX	612	373	388	16700	16800	30000	16800	31900	26100	3070	3560	4150
MIN	301	204	194	288	4380	1970	7690	9690	3420	459	533	398
AC-FT	21350	14960	14980	261800	578200	774000	676600	1032000	843600	68710	101600	78530

CAL YR 1989 TOTAL 1606132 MEAN 4400 MAX 21500 MIN 194 AC-FT 3186000
WTR YR 1990 TOTAL 2251846 MEAN 6169 MAX 31900 MIN 194 AC-FT 4467000

07340000 LITTLE RIVER NEAR HORATIO, ARKANSAS

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, Ark.

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	AGENCY COLLECTING SAMPLE (CODE NUMBER) (00027)	AGENCY ANALYZING SAMPLE (CODE NUMBER) (00028)	DISCHARGE, INST. CUBIC FEET PER SECOND (00061)	PH (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	TURBIDITY (NTU) (00076)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN DEMAND, BIOCHEMICAL, 5 DAY (MG/L) (00310)
OCT									
17.	1115	9827	9827	326	7.4	21.0	6.5	8.7	1.7
NOV									
14.	1200	9827	9827	231	7.4	16.0	3.8	8.9	1.2
JAN									
09.	1000	9827	9827	352	7.3	7.0	10	11.8	1.2
23.	1040	9827	9827	7350	7.1	9.0	40	9.7	1.2
FEB									
06.	1345	9827	9827	12800	7.7	11.0	35	10.4	1.1
MAR									
06.	1207	9827	9827	2590	--	12.0	20	9.9	1.7
APR									
10.	1210	9827	9827	9690	7.7	17.0	20	10.0	1.9
MAY									
08.	1300	9827	9827	19200	7.3	18.0	35	5.8	1.4
JUN									
05.	1241	9827	9827	21500	7.4	22.0	--	6.2	--
JUL									
10.	1310	9827	9827	1420	7.3	28.0	--	8.1	4.3
AUG									
07.	1245	9827	9827	2420	7.0	26.0	--	8.1	3.1
SEP									
04.	1149	9827	9827	525	7.3	27.0	--	7.2	4.9

DATE	TIME	HARDNESS TOTAL (MG/L AS CACO3) (00900)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)	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)
OCT								
17.	1115	--	7.0	19	70	7	<0.020	0.090
NOV								
14.	1200	28	4.0	--	62	4	0.040	<0.050
JAN								
09.	1000	32	8.0	25	100	8	0.330	0.180
23.	1040	18	7.0	--	59	39	0.270	0.080
FEB								
06.	1345	18	5.0	1.8	41	28	0.160	<0.050
MAR								
06.	1207	16	8.0	5.4	69	11	0.180	<0.050
APR								
10.	1210	12	6.0	3.2	44	9	0.390	0.080
MAY								
08.	1300	18	8.0	3.1	64	32	0.170	0.080
JUN								
05.	1241	16	9.0	2.5	55	32	0.130	0.090
JUL								
10.	1310	18	6.0	13	25	5	0.130	<0.050
AUG								
07.	1245	22	5.0	12	39	12	0.200	--
SEP								
04.	1149	24	6.0	11	56	5	0.090	--

07340000 LITTLE RIVER NEAR HORATIO, ARKANSAS--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P) (70507)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD) (01027)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)
OCT								
17.	1115	0.080	0.050	<1	--	<15	--	4.3
NOV								
14.	1200	0.090	0.060	1	<1	<15	<10	3.2
JAN								
09.	1000	0.140	0.070	--	--	--	--	5.4
23.	1040	0.090	--	--	--	--	--	7.5
FEB								
06.	1345	0.080	<0.030	--	--	--	--	4.9
MAR								
06.	1207	0.060	0.040	--	--	--	--	3.8
APR								
10.	1210	0.120	<0.030	--	--	--	--	5.7
MAY								
08.	1300	0.130	<0.030	--	--	--	--	10
JUN								
05.	1241	0.140	0.050	--	--	--	--	9.6
JUL								
10.	1310	0.050	<0.030	--	--	--	--	4.6
AUG								
07.	1245	0.070	0.030	--	--	--	--	5.8
SEP								
04.	1149	0.040	0.100	--	--	--	--	4.1

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

LOCATION.--Lat 33°35'47", long 92°49'05", in SE ¼ 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 mi².

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 vicinity 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.--No estimated daily discharges. Water-discharge records good. 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.

AVERAGE DISCHARGE.--62 years, 7,658 ft³/s, 5,548,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 243,000 ft³/s Apr. 3, 1945, gage height, 44.82 ft; minimum, 125 ft³/s Sept. 16, 24-26, 1943.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 113,000 ft³/s Mar. 12; maximum gage height, 39.42 ft Mar. 12; minimum daily discharge, 896 ft³/s Dec. 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2920	2450	1510	1770	11700	6360	40500	16000	25700	6670	3560	3590
2	2690	3210	1230	1920	13000	7790	42600	15700	26400	6470	3000	2490
3	3140	4870	1130	1800	19300	8000	37500	18800	25200	5990	2460	1550
4	3680	3990	1120	2080	26200	7170	29100	24900	27600	5970	2550	1850
5	3450	3630	1110	2460	32000	5840	21400	30100	31900	5310	2890	1850
6	3230	2230	1060	2630	33300	5710	20400	32400	33700	2660	2670	1810
7	3600	1480	1100	2360	30900	6070	25900	32700	34200	2070	2360	2570
8	3610	2320	1120	2010	24700	15200	31800	29600	32500	2050	2050	2160
9	2820	2790	1180	1630	17800	30200	35700	24700	27600	2210	2140	1880
10	2070	2890	1200	1560	15800	55100	36900	21600	22000	2040	2330	1220
11	2980	2440	1190	1220	18200	98900	33400	19000	17000	3210	2280	1100
12	2600	2280	1190	1240	18200	104000	27700	16600	15700	3090	2460	1150
13	2540	1570	1210	1310	16900	78700	23700	16100	15000	2810	2140	1180
14	2750	1350	1050	1100	14800	56300	20100	16800	14000	2130	1500	1160
15	3140	2150	933	1070	13100	41800	20400	16200	11600	1600	1420	1140
16	2370	2500	912	1040	11600	35900	22500	15900	11300	1290	1810	2130
17	1770	2860	925	1080	11200	33800	22300	14600	10500	1240	1970	2060
18	2280	3230	943	1960	10700	32700	22000	14400	10500	1140	2620	2140
19	3540	3540	906	5390	9590	29900	20300	14200	10000	1240	3370	2680
20	3050	1760	903	10500	9160	25100	17600	14600	9970	1640	2500	2950
21	2970	1320	1080	17400	8970	21600	15700	20400	9870	2210	2040	4140
22	2470	1240	1140	20100	9310	19400	14200	29500	9320	2990	3180	3750
23	1650	1540	1230	18000	10900	17100	15100	41700	9200	2920	2990	2650
24	1340	1830	1330	14900	12400	15000	17300	57800	8460	2040	2240	1590
25	1520	1430	2430	9830	11100	13000	17700	57300	7490	1710	2070	1240
26	2610	1330	1220	6890	9050	10400	16500	44300	8510	2070	2760	1170
27	1940	1310	1210	5850	6920	10500	14600	33400	8410	3120	2830	1130
28	1590	1190	1020	4700	6200	13000	14100	28400	8250	4070	3100	1270
29	1440	1420	896	4860	---	16900	16500	26900	7930	4500	4250	2270
30	1430	2080	1010	11200	---	23900	17500	26800	7900	4040	4460	1930
31	1800	---	1280	13000	---	32200	---	25800	---	2890	3130	---
TOTAL	78990	68230	35768	172860	433000	877540	711000	797200	497710	93390	81130	59800
MEAN	2548	2274	1154	5576	15460	28310	23700	25720	16590	3013	2617	1993
MAX	3680	4870	2430	20100	33300	104000	42600	57800	34200	6670	4460	4140
MIN	1340	1190	896	1040	6200	5710	14100	14200	7490	1140	1420	1100
AC-FT	156700	135300	70950	342900	858900	1741000	1410000	1581000	987200	185200	160900	118600

CAL YR 1989 TOTAL 3766488 MEAN 10320 MAX 75600 MIN 896 AC-FT 7471000
WTR YR 1990 TOTAL 3906618 MEAN 10700 MAX 104000 MIN 896 AC-FT 7749000

07362000 OUACHITA RIVER AT CAMDEN, ARKANSAS

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 1989 TO SEPTEMBER 1990

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 (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	TURBIDITY (NTU) (00076)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)	BAROMETRIC PRESSURE (MM OF HG) (00025)
OCT											
02...	1030	80513	80020	2810	95	7.0	19.0	3.3	8.9	96	760
FEB											
21...	0800	80513	80020	11300	73	6.9	10.0	12	10.8	96	763
APR											
11...	0900	80513	80020	34000	56	7.8	14.0	16	10.7	103	769
AUG											
28...	0830	80513	80020	2570	79	7.1	27.0	5.6	6.4	81	761

DATE	TIME	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	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)
OCT											
02...	1030	15	53	24	10	6.8	1.6	10	45	0.9	2.0
FEB											
21...	0800	42	32	24	9	7.5	1.3	3.5	23	0.3	1.2
APR											
11...	0900	66	130	20	5	6.3	0.99	3.4	26	0.3	0.60
AUG											
28...	0830	83	150	21	8	6.2	1.4	8.1	44	0.8	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)
OCT										
02...	1030	13	0	17	14	13	11	0.10	5.3	71
FEB										
21...	0800	14	0	18	15	7.0	8.0	0.10	6.4	55
APR										
11...	0900	14	0	18	14	4.8	3.8	<0.10	5.8	42
AUG										
28...	0830	13	0	16	14	12	8.8	<0.10	4.8	61

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 TOTAL (MG/L AS N) (00610)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	NITROGEN, ORGANIC TOTAL (MG/L AS N) (00605)
OCT										
02...	1030	59	539	0.10	0.100	0.020	0.120	0.020	0.020	0.38
FEB										
21...	0800	45	1680	0.08	--	<0.010	0.180	0.020	0.020	0.28
APR										
11...	0900	35	3860	0.06	--	0.010	<0.100	0.020	0.010	0.48
AUG										
28...	0830	54	423	0.08	0.680	0.020	0.700	0.040	0.030	0.16

07362000 OUACHITA RIVER AT CAMDEN, ARKANSAS--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

DATE	TIME	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS DISSOLVED (MG/L AS P) (00666)	PHOSPHORUS ORTHO, DISSOLVED (MG/L AS P) (00671)	BARIUM, DISSOLVED (UG/L AS BA) (01005)	ALUMINUM, DISSOLVED (UG/L AS AL) (01106)	ARSENIC DISSOLVED (UG/L AS AS) (01000)	BERYLLIUM, DISSOLVED (UG/L AS BE) (01010)	CADMIUM DISSOLVED (UG/L AS CD) (01025)
OCT										
02...	1030	0.40	0.020	<0.010	<0.010	23	20	<1	<0.5	<1.0
FEB										
21...	0800	0.30	0.030	<0.010	<0.010	25	80	<1	<0.5	<1.0
APR										
11...	0900	0.50	0.060	0.020	0.020	120	150	<1	<0.5	<1.0
AUG										
28...	0830	0.20	0.040	0.020	<0.010	120	40	<1	<0.5	1.0

DATE	TIME	CHROMIUM, DISSOLVED (UG/L AS CR) (01030)	COBALT, DISSOLVED (UG/L AS CO) (01035)	COPPER, DISSOLVED (UG/L AS CU) (01040)	IRON, DISSOLVED (UG/L AS FE) (01046)	LEAD, DISSOLVED (UG/L AS PB) (01049)	LITHIUM DISSOLVED (UG/L AS LI) (01130)	MANGANESE, DISSOLVED (UG/L AS MN) (01056)	MERCURY DISSOLVED (UG/L AS HG) (71890)	MOLYBDENUM, DISSOLVED (UG/L AS MO) (01060)
OCT										
02...	1030	<1	<3	3	77	1	5	23	<0.1	30
FEB										
21...	0800	<5	<3	<10	160	10	<4	60	<0.1	<10
APR										
11...	0900	<1	<3	3	320	<1	<4	21	<0.1	<10
AUG										
28...	0830	<1	<3	4	73	1	<4	36	<0.1	20

DATE	TIME	NICKEL, DISSOLVED (UG/L AS NI) (01065)	SELENIUM, DISSOLVED (UG/L AS SE) (01145)	SILVER, DISSOLVED (UG/L AS AG) (01075)	STRONTIUM, DISSOLVED (UG/L AS SR) (01080)	VANADIUM, DISSOLVED (UG/L AS V) (01085)	ZINC, DISSOLVED (UG/L AS ZN) (01090)	SEDIMENT, SUSPENDED (MG/L) (80154)	SEDIMENT, DISCHARGE, SUSPENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT										
02...	1030	1	<1	<1.0	44	26	5	15	114	72
FEB										
21...	0800	<10	<1	2.0	44	6	26	27	824	66
APR										
11...	0900	2	<1	<1.0	46	<6	95	39	3580	83
AUG										
28...	0830	1	<1	<1.0	35	28	100	19	132	89

07362100 SMACKOVER CREEK NEAR SMACKOVER, ARKANSAS

LOCATION.--Lat 33°22'33", long 92°46'37", in NW ¼ SE ¼ 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 mi².

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.--Non-recording gage read once daily. 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.

REMARKS.--Records good.

AVERAGE DISCHARGE.--29 years, 425 ft³/s, 14.99 in/yr, 307,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 52,700 ft³/s June 8, 1974, gage height, 24.97 ft, from rating curve extended above 31,000 ft³/s; no flow for part of Aug. 9, 1964.

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

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,400 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage Height (ft)	Date	Time	Discharge (ft³/s)	Gage Height (ft)
Feb. 04	2200	20,600	a20.70	May 18	1800	4,270	a15.07
Mar. 09	1400	23,700	a21.28	May 22	1200	3,520	a14.38
Mar. 30	2200	12,400	a18.84	June 04	1000	*33,000	*a23.18
Apr. 08	1200	4,430	a15.43				

a from graph based on gage readings

Minimum discharge observed, 4.2 ft³/s Sept. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24	31	44	403	1100	317	3710	260	293	51	32	4.8
2	25	47	38	367	2090	413	2120	186	1250	43	20	7.4
3	25	47	33	298	4980	495	1710	182	14400	37	18	6.8
4	25	36	30	446	15800	450	1320	225	27800	32	21	7.2
5	21	29	28	563	15700	343	1080	252	11500	31	18	7.4
6	20	26	26	509	3210	654	1380	211	3600	28	18	7.6
7	21	26	29	420	2240	727	2790	165	1810	25	21	8.5
8	26	38	32	273	1650	3610	4100	138	1240	24	47	8.3
9	26	75	51	200	1340	18700	2510	130	808	23	26	13
10	29	96	55	170	1610	12300	1850	119	550	35	19	14
11	28	76	59	144	1910	4500	1630	125	303	60	16	14
12	23	54	57	125	1930	2360	1460	175	180	35	12	17
13	20	42	52	112	1560	1730	1210	1140	152	24	12	23
14	18	38	50	102	1160	1340	1090	2060	136	25	12	26
15	18	54	46	107	857	1310	1210	1910	124	23	12	21
16	17	58	46	101	869	1320	1300	1490	115	21	12	18
17	16	62	52	133	852	1290	1230	2130	104	20	12	16
18	22	60	51	779	644	1150	1060	3840	89	20	11	15
19	23	49	42	1080	463	1020	773	3370	78	19	11	14
20	25	41	39	1410	361	724	457	2710	69	19	11	31
21	25	40	40	1530	367	425	331	2750	63	18	10	28
22	20	48	41	1520	911	326	309	3400	60	18	11	69
23	21	101	41	1460	1360	292	480	2850	57	18	13	56
24	22	124	41	1280	1230	268	346	2130	55	18	17	29
25	21	117	39	822	876	265	254	1340	54	19	23	24
26	20	86	40	418	536	458	216	636	79	22	18	20
27	19	98	45	242	336	744	214	356	105	20	15	18
28	20	59	51	221	292	923	377	362	88	18	14	16
29	19	52	57	722	---	1640	581	456	88	17	14	15
30	22	47	70	1350	---	7760	466	475	64	18	10	14
31	29	---	227	1340	---	8630	---	370	---	32	7.4	---
TOTAL	690	1757	1552	18647	66234	76484	37564	35943	65314	813	513.4	569.0
MEAN	22.3	58.6	50.1	602	2365	2467	1252	1159	2177	26.2	16.6	19.0
MAX	29	124	227	1530	15800	18700	4100	3840	27800	60	47	69
MIN	16	26	26	101	292	265	214	119	54	17	7.4	4.8
AC-FT	1370	3490	3080	36990	131400	151700	74510	71290	129600	1610	1020	1130
CFSM	.06	.15	.13	1.56	6.14	6.41	3.25	3.01	5.65	.07	.04	.05
IN.	.07	.17	.15	1.80	6.40	7.39	3.63	3.47	6.31	.08	.05	.05

CAL YR 1989 TOTAL 279155 MEAN 765 MAX 6980 MIN 14 AC-FT 553700 CFSM 1.99 IN. 26.97
WTR YR 1990 TOTAL 306080.4 MEAN 839 MAX 27800 MIN 4.8 AC-FT 607100 CFSM 2.18 IN. 29.57

RED RIVER BASIN

07363500 SALINE RIVER NEAR RYE, ARKANSAS

LOCATION.--Lat 33°42'03", long 92°01'33", in SW ¼ NW ¼ 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.--No estimated daily discharges. Records good.

AVERAGE DISCHARGE.--53 years, 2,663 ft^3/s, 17.21 in/yr, 1,929,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 74,500 ft^3/s May 18, 1968, gage height, 31.40 ft; minimum, 3.5 ft^3/s Sept. 27, 28, 1954, gage height, 3.84 ft.

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

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

Date	Time	Discharge (ft^3/s)	Gage Height (ft)	Date	Time	Discharge (ft^3/s)	Gage Height (ft)
Feb. 05	0515	18,600	24.56	May 11	1215	11,600	22.56
Mar. 14	0200	*43,400	*28.16	May 27	1500	21,900	25.23
Apr. 07	0400	14,600	23.56				

Minimum discharge, 20 ft^3/s Sept. 8, gage height, 4.61 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	179	119	240	736	8590	3470	9440	7130	9680	213	133	54
2	172	122	221	884	9940	3280	9760	7230	8360	230	120	50
3	172	124	200	898	13200	3060	9850	7230	7290	220	116	50
4	181	128	187	1280	17500	2850	10400	7280	7170	202	117	48
5	193	136	178	1850	18300	2830	11700	7370	7150	190	131	44
6	197	168	175	1840	18000	2890	13700	7530	7060	177	144	39
7	228	404	172	1590	17100	3210	14500	7630	6710	166	130	35
8	224	705	168	1270	17000	6500	13700	7840	5730	153	145	21
9	203	724	171	1140	16400	10300	12400	8690	4370	143	228	29
10	186	468	168	1020	16700	13000	11300	10300	2800	140	253	42
11	183	396	169	836	16000	14300	10200	11500	1560	140	225	40
12	187	407	172	692	14700	21600	9280	11400	1090	120	198	37
13	181	359	179	592	13200	39400	8850	11200	884	116	169	40
14	176	311	179	514	11900	41600	9030	10100	778	118	145	46
15	168	275	176	456	10800	33500	9410	8610	707	116	133	45
16	164	244	171	417	9890	23800	9240	6580	620	108	132	47
17	158	226	169	412	9200	17600	8800	4460	539	133	114	48
18	147	213	168	1420	8650	14100	8180	3150	479	130	129	60
19	139	207	206	2780	8030	11400	7430	2480	435	110	174	88
20	131	204	240	3410	7140	10000	6680	1980	395	113	177	95
21	126	197	251	3940	5900	8770	6070	2530	372	116	168	88
22	125	198	251	4330	4890	7710	5710	4000	363	108	153	79
23	125	203	251	4560	4480	6810	5610	4670	332	104	131	72
24	126	210	251	4590	4300	5900	5550	5400	302	105	115	87
25	127	239	229	4720	4110	4640	5290	7400	277	110	107	154
26	129	270	186	5060	3860	3080	4980	12900	258	117	99	197
27	125	297	167	5660	3670	2480	4790	21200	256	132	92	190
28	120	299	153	6320	3560	2540	5080	19900	245	183	85	179
29	115	274	150	7420	---	3910	5930	16200	233	186	79	152
30	114	262	170	8270	---	6400	6670	13100	223	165	71	125
31	117	---	302	8520	---	8610	---	11100	---	150	62	---
TOTAL	4918	8389	6070	87427	297010	339540	259530	268090	76668	4514	4275	2281
MEAN	159	280	196	2820	10610	10950	8651	8648	2556	146	138	76.0
MAX	228	724	302	8520	18300	41600	14500	21200	9680	230	253	197
MIN	114	119	150	412	3560	2480	4790	1980	223	104	62	21
AC-FT	9750	16640	12040	173400	589100	673500	514800	531800	152100	8950	8480	4520
CFSM	.08	.13	.09	1.34	5.05	5.21	4.12	4.11	1.22	.07	.07	.04
IN.	.09	.15	.11	1.55	5.26	6.01	4.59	4.74	1.36	.08	.08	.04

CAL YR 1989 TOTAL 1522790 MEAN 4172 MAX 34400 MIN 114 AC-FT 3020000 CFSM 1.98 IN. 26.95
WTR YR 1990 TOTAL 1358712 MEAN 3722 MAX 41600 MIN 21 AC-FT 2695000 CFSM 1.77 IN. 24.05

07364150 BAYOU BARTHOLOMEW NEAR MCGEHEE, ARKANSAS

LOCATION.--Lat 33°37'40", long 91°26'45", in NE ¼ SW ¼ 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 mi².

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.

AVERAGE DISCHARGE.--49 years (1939-42, 1946-90), 699 ft³/s, 16.48 in/yr, 506,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,870 ft³/s May 11, 1958, gage height, 25.49 ft, present datum; minimum, 0.20 ft³/s Aug. 15-23, 1956.

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.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,740 ft³/s Feb. 11; maximum gage height, 24.35 ft Feb. 12; minimum discharge, 10.0 ft³/s Nov. 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	54	12	80	323	1890	e2100	2050	1440	1110	77	64	28
2	49	11	72	426	2280	e1800	2160	1400	1140	63	112	27
3	46	11	65	479	3110	e1600	2310	1370	1320	50	123	26
4	44	11	59	620	4440	e1500	2450	1330	1520	41	109	26
5	42	10	55	745	5460	e1300	2570	1300	1580	34	89	26
6	39	15	52	863	6040	e1200	2890	1270	1580	27	73	26
7	37	37	51	970	6300	e1100	3060	1250	1580	22	59	25
8	36	73	60	1070	6380	e1300	3130	1220	1570	19	49	23
9	39	91	89	1140	6420	e1800	3190	1180	1550	16	44	22
10	43	114	122	1160	6680	e2300	3240	1140	1510	14	42	22
11	45	189	147	1140	6730	e2700	3240	1090	1440	13	43	23
12	45	324	162	1090	6720	e3000	3170	1060	1360	14	43	25
13	42	552	171	1020	6670	e3300	3060	1080	e1300	15	47	32
14	37	710	174	947	6560	e3600	2930	1120	e1200	15	44	35
15	32	818	173	875	e6400	e4200	2780	1180	e1100	14	38	36
16	29	873	171	806	e6300	e4600	2610	1250	e1000	17	33	39
17	27	878	167	757	e6200	e4800	2450	1280	e920	22	31	45
18	25	852	164	836	e6000	e4800	2290	1260	e820	26	30	58
19	23	799	160	949	e5700	e4800	2110	1200	e720	29	29	82
20	22	730	157	1250	e5400	e4700	1920	1130	e620	33	28	104
21	21	646	152	1510	e5100	e4600	1750	1130	e520	39	26	116
22	20	558	151	1630	e4800	e4400	1650	1180	e410	42	25	117
23	20	470	151	1690	e4500	e4200	1630	1210	320	43	25	111
24	19	385	151	1720	e4100	e3900	1550	1240	243	40	29	100
25	18	316	150	1690	e3700	e3600	1500	1250	186	35	35	91
26	17	243	137	1630	e3200	e3200	1460	1220	143	30	41	86
27	16	187	124	1550	e2900	e2900	1460	1160	115	26	42	103
28	15	143	120	1450	e2400	2130	1470	1100	101	26	39	134
29	14	112	116	1600	---	2000	1470	1020	94	29	33	151
30	13	92	127	1710	---	2010	1460	966	87	30	28	154
31	12	---	215	1790	---	2010	---	1070	---	31	27	---
TOTAL	941	10262	3945	35436	142380	91450	69010	37096	27159	932	1480	1893
MEAN	30.4	342	127	1143	5085	2950	2300	1197	905	30.1	47.7	63.1
MAX	54	878	215	1790	6730	4800	3240	1440	1580	77	123	154
MIN	12	10	51	323	1890	1100	1460	966	87	13	25	22
AC-FT	1870	20350	7820	70290	282400	181400	136900	73580	53870	1850	2940	3750
CFSM	.05	.59	.22	1.98	8.83	5.12	3.99	2.08	1.57	.05	.08	.11
IN.	.06	.66	.25	2.29	9.20	5.91	4.46	2.40	1.75	.06	.10	.12

CAL YR 1989 TOTAL 469087 MEAN 1285 MAX 4540 MIN 10 AC-FT 930400 CFSM 2.23 IN. 30.30
WTR YR 1990 TOTAL 421984 MEAN 1156 MAX 6730 MIN 10 AC-FT 837000 CFSM 2.01 IN. 27.25

e Estimated

07369680 BAYOU MACON AT EUDORA, ARKANSAS

LOCATION.--Lat 33°06'09", long 91°15'08", in SE ¼ SE ¼ 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 mi².

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.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,890 ft³/s Jan. 20, 1990, gage height, 17.00 ft; maximum gage height, 19.85 ft July 2, 1988 (from backwater); minimum discharge, 53 ft³/s Oct. 15-18, 1989, Sept. 30, 1990.

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

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,890 ft³/s Jan. 20, gage height, 17.00 ft; minimum discharge, 53 ft³/s Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	77	73	75	1490	404	110	637	99	157	73	166	118
2	76	75	75	789	1510	642	760	107	146	81	166	108
3	75	76	75	396	1870	572	427	95	314	83	144	105
4	73	77	74	428	2040	338	298	90	647	75	118	100
5	73	77	74	454	1590	233	223	98	330	71	106	93
6	73	106	74	814	1110	174	258	100	219	82	96	94
7	76	329	75	699	721	147	376	96	159	86	91	93
8	73	257	76	678	819	1160	269	86	133	81	97	94
9	71	185	85	399	1300	2440	208	86	116	83	98	104
10	70	156	81	253	2290	1840	207	85	115	76	87	134
11	70	137	78	183	1920	1110	216	89	104	78	86	126
12	70	120	75	143	1190	660	171	268	103	91	77	128
13	70	109	78	119	731	479	142	928	97	115	73	134
14	69	103	79	103	565	378	355	622	88	128	86	133
15	70	99	77	94	495	1650	544	414	85	124	108	118
16	72	95	75	89	653	1740	300	311	85	117	118	108
17	81	89	75	142	454	1100	205	255	87	97	111	101
18	69	82	76	1070	363	679	171	213	94	100	114	96
19	68	77	77	1380	335	509	140	194	92	99	98	95
20	70	74	76	2400	302	397	117	218	89	92	103	99
21	70	73	75	2660	151	311	104	505	87	89	100	98
22	71	100	104	1820	1260	246	98	596	88	94	113	77
23	71	136	127	1020	955	209	94	311	96	107	125	68
24	70	110	127	1080	437	186	87	235	111	121	133	67
25	70	93	101	1190	269	162	83	199	97	114	119	67
26	71	86	71	812	193	144	80	179	85	114	116	64
27	71	83	69	605	149	138	79	173	84	105	112	62
28	71	80	70	514	124	140	85	170	81	100	106	61
29	71	76	79	692	---	198	85	168	78	108	119	59
30	72	76	317	563	---	711	80	159	76	103	115	55
31	73	---	1650	437	---	587	---	159	---	111	117	---
TOTAL	2227	3309	4320	23516	24200	19390	6899	7308	4143	2998	3418	2859
MEAN	71.8	110	139	759	864	625	230	236	138	96.7	110	95.3
MAX	81	329	1650	2660	2290	2440	760	928	647	128	166	134
MIN	68	73	69	89	124	110	79	85	76	71	73	55
AC-FT	4420	6560	8570	46640	48000	38460	13680	14500	8220	5950	6780	5670

CAL YR 1989 TOTAL 103472 MEAN 283 MAX 2680 MIN 63 AC-FT 205200
WTR YR 1990 TOTAL 104587 MEAN 287 MAX 2660 MIN 55 AC-FT 207400

35285 RED RIVER AT SHREVEPORT, LA.

COMPUTED DAILY DISCHARGE IN CUBIC FEET PER SECOND

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	4966	43239	44379	114700	106220	131700	68350	23343	14146	21392	9090	16583
2	4269	48996	38180	108200	104510	129240	62780	24983	13479	19292	8936	16253
3	3368	56680	32900	90715	101180	122530	57030	27675	13421	16121	8606	15989
4	3334	71290	28944	81120	---	121870	46602	28474	13421	13508	8584	15791
5	3385	80400	25844	87655	109370	128910	40765	28615	10180	11300	8738	17738
6	3212	78870	24327	93180	118100	137600	38785	28850	---	10432	8386	26295
7	3014	72480	21392	108470	125500	141330	35250	29179	9368	9676	8078	28944
8	2838	67520	26820	118640	134100	138000	31050	33150	9200	8802	7660	27675
9	---	66740	49376	123707	152105	132700	27910	34800	9200	8386	8474	25721
10	2519	68210	82920	127612	161450	124070	24860	33000	9228	8408	8672	24778
11	2376	67880	99810	125500	176430	118000	23343	29555	9156	8408	10684	24204
12	2266	66200	101360	118400	---	114200	22274	26418	9068	---	12116	22148
13	2184	64400	100320	112000	212800	109910	21392	24573	9424	---	13392	16814
14	2124	61930	89695	108020	226800	106760	20678	23917	9480	---	13682	13972
15	2104	57730	90970	108110	234160	104780	20132	22646	10320	---	12783	12696
16	2096	58640	96835	107849	229860	103340	19838	20762	10768	38290	13160	12725
17	2080	56890	100235	104753	221940	97855	19712	20174	9256	37905	13798	11916
18	3334	50896	103700	99410	205920	93265	20048	20468	8496	38565	13827	9872
19	3334	50212	104600	91990	185070	94115	20132	20972	8276	38455	12812	10236
20	---	54392	103888	86890	166755	95985	20216	21182	8056	36200	12087	11692
21	---	54316	96240	85955	156725	96070	20552	21476	7836	30683	11720	21644
22	---	56470	94795	86125	149910	96155	20426	21980	8166	25639	12348	27487
23	25106	53708	95390	85615	144080	94880	---	20846	8694	22892	14349	---
24	38620	49224	95645	85768	141440	92160	---	19124	8474	20300	13972	32600
25	45975	50668	95220	91259	138000	86125	---	18068	8122	16550	13856	37355
26	45747	51884	95475	93775	135500	82560	19880	17144	9002	13914	14378	37355
27	45405	53404	98365	91565	135200	79410	20132	16319	12609	11860	13827	37135
28	45576	49300	91820	95390	135600	76890	20174	15824	17672	10824	15725	37520
29	46545	---	94795	98620	135500	75360	20972	15494	22106	9480	16220	37080
30	46374	---	105860	100235	133800	74020	22810	15032	22564	9256	16682	38950
31	45006	---	112300	---	133000	---	23548	14523	---	9228	---	38840
MEAN	---	59377	78787	101041	---	106690	---	23180	---	---	11888	---
MAX	---	80400	112300	127612	---	141330	---	34800	---	---	16682	---
MIN	---	43239	21392	81120	---	74020	---	14523	---	---	7660	---

TOTAL DISCHARGE FOR THE YEAR --- MEAN DISCHARGE FOR THE YEAR WAS ---

MAXIMUM DISCHARGE WAS 234160 15 MAY 1990
MINIMUM DISCHARGE WAS 2080 17 JAN 1990

EOT..
E>

UNPUBLISHED RECORDS SUBJECT TO REVISION

35285

RED RIVER AT SHREVEPORT, LA.

COMPUTED DAILY DISCHARGE IN CUBIC FEET PER SECOND

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	24983	40325	64960	120860	15494	67864	97000	41315	10040	11132	4184	2354
2	25475	44721	62232	123100	15362	64784	96125	39390	9200	11132	4337	2486
3	26295	49169	59950	122400	14552	60700	94000	35800	7880	11216	4014	2574
4	27017	57775	56125	110220	15197	58150	95000	30260	7660	11244	3844	2464
5	26254	61088	54400	101875	26295	59050	94000	27910	7440	11216	3776	2420
6	26735	61000	53317	97625	33050	57400	93000	27440	7000	11216	3725	2442
7	26829	56650	56200	94375	34200	62848	93500	26970	6800	11160	3640	2618
8	25475	54025	58300	86600	35700	91000	86490	27910	6800	10768	3657	2860
9	22022	54175	56350	74900	36310	110500	80990	27440	7440	10320	3844	3003
10	20132	54400	53950	69184	38235	114700	77042	26500	7836	10124	3878	2970
11	19040	50877	54025	61440	38345	107700	74288	23630	10124	9788	3827	2860
12	17441	47461	51853	53256	34650	103250	68216	21980	10880	8628	3504	2904
13	16055	46716	49840	44265	30918	101125	59875	20300	10488	7374	3113	2904
14	15857	45063	50389	38730	29085	97000	54400	19460	10824	6660	2750	2706
15	19082	44607	51365	35850	25311	91875	52158	18200	9480	6140	2761	2376
16	21392	43695	50572	33250	23015	94125	50694	17210	9134	5520	2948	2160
17	22106	48071	48925	30401	27769	101000	49779	16220	8980	5340	3003	2112
18	21266	60250	46260	28521	30730	99750	49474	15560	9134	5660	3014	2088
19	20678	78062	42669	26923	50450	92250	54550	15230	13131	5560	3003	2088
20	19754	95625	39005	27064	87700	87700	65048	17540	18578	5440	2871	2080
21	18914	104900	34750	29602	101500	88580	71840	19460	20972	5280	2640	2092
22	17177	110220	32200	32000	93750	89130	72044	17870	20888	4966	2651	2040
23	14059	107560	30260	29649	73880	89240	63464	16220	19418	4745	2871	2196
24	12609	90340	28521	28051	69712	87700	61792	16550	17276	4745	2959	2530
25	12261	82530	26295	28380	72452	86600	63288	16550	14465	4864	3036	2750
26	12145	75002	25434	26500	75002	87700	59500	16550	12812	4966	3091	2332
27	12232	69800	25639	23835	76532	87260	51792	15890	12029	4915	3036	2860
28	12522	66896	25680	20594	75410	93000	43296	13160	11664	4813	2838	3058
29	15857	---	32400	18368	74186	93250	37960	12000	11440	4558	2596	3223
30	22769	---	57775	16649	71840	94250	39335	10880	11216	4048	2387	4150
31	32250	---	86600	---	70004	---	42783	10880	---	3997	---	5280
MEAN	20216	64322	47298	54482	48279	87316	67507	21364	11368	7340	3260	2677
MAX	32250	110220	86600	123100	101500	114700	97000	41315	20972	11244	4337	5280
MIN	12145	40325	25434	16649	14552	57400	37960	10880	6800	3997	2387	2040

TOTAL DISCHARGE FOR THE YEAR 13244390

MEAN DISCHARGE FOR THE YEAR WAS 36286

MAXIMUM DISCHARGE WAS 123100 02 APR 1989
MINIMUM DISCHARGE WAS 2040 22 DEC 1989

UNPUBLISHED RECORDS SUBJECT TO REVISION

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 mi², of which 5,936 mi² 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 ft³/s only).

GAGE.--Nonrecording gage read once daily. Datum of gage is 161.56 ft above National Geodetic Vertical Datum of 1929 (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 ft³/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 ft³/s, 12,980,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 214,000 ft³/s, May 7, 1958; maximum gage height, 30.70 ft, May 15, 1990; minimum daily, 803 ft³/s, Sept. 16, 17, 1972.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 30.70 ft, May 15; minimum daily discharge, 2,500 ft³/s, Jan. 13.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1			3820									
2			3840	4410								
3			3450	4080								
4			3410	3740								
5			3670	3630								
6			3820	3340								
7			4080	3120								
8			4350	2870								
9			4350	2840								
10			4160	2650								
11			4310	2630								
12		4800	4270	2590								
13		4350	3700	2500								
14		4270	3410	2530								
15		4470	3340	2530								
16		4510	3200	2560								
17		4550	3170	2950								
18		4510	3000	4350								
19		4470	2970									
20		4160	3070									
21		4030	3040									
22		4270	3100									
23		4430	3740									
24		4550	3560									
25		4550	3450									
26		4510	4120									
27		4270	4510									
28		3930	4470									
29		3670			---							
30		3670			---							
31		---			---		---		---			---
TOTAL	---	---	---	---	---	---	---	---	---	---	---	---
MEAN	---	---	---	---	---	---	---	---	---	---	---	---
MAX	---	---	---	---	---	---	---	---	---	---	---	---
MIN	---	---	---	---	---	---	---	---	---	---	---	---
AC-FT	---	---	---	---	---	---	---	---	---	---	---	---

07344400 RED RIVER NEAR HOSSTON, LA--Continued

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.10	2.70	1.64	2.32	11.00	10.50	19.48	18.45	20.56	13.73	7.44	4.24
2	5.11	2.46	1.65	1.95	11.50	9.56	18.00	18.30	20.20	12.90	7.89	3.88
3	5.08	2.34	1.44	1.78	13.08	8.88	16.62	18.05	19.80	11.88	8.18	3.58
4	5.10	2.34	1.42	1.60	14.92	8.18	16.22	18.55	20.50	11.10	8.24	3.32
5	5.07	2.35	1.56	1.54	15.60	7.92	16.96	19.60	21.56	10.40	8.21	3.10
6	4.98	2.36	1.64	1.38	15.30	7.56	18.50	20.55	22.25	9.72	8.30	2.94
7	4.90	2.40	1.78	1.25	14.30	7.58	19.97	21.76	22.20	9.09	8.70	2.88
8	4.81	2.44	1.92	1.10	13.90	10.20	20.75	23.00	21.50	8.45	9.00	2.90
9	4.76	2.54	1.92	1.08	13.82	14.82	21.10	24.45	20.54	7.86	9.14	2.94
10	4.68	2.48	1.82	.96	13.86	17.40	20.89	25.80	19.70	7.42	8.65	2.95
11	4.20	2.40	1.90	.95	13.76	18.37	20.40	27.30	19.30	7.20	8.00	2.95
12	3.90	2.15	1.88	.92	13.62	17.78	19.50	28.75	18.90	6.97	7.57	2.95
13	3.68	1.92	1.58	.86	13.48	16.28	18.90	29.96	18.55	6.72	7.41	2.96
14	3.44	1.88	1.42	.88	13.40	16.10	18.60	30.58	18.32	6.62	7.18	3.20
15	3.18	1.98	1.38	.88	13.38	17.58	18.48	30.60	18.20	6.59	6.72	3.11
16	3.10	2.00	1.30	.90	12.96	17.40	18.30	29.87	17.78	6.54	6.59	2.88
17	3.10	2.02	1.28	1.15	12.45	17.85	18.00	28.65	17.00	6.49	6.56	2.65
18	3.12	2.00	1.18	1.92	11.90	18.26	17.34	26.90	16.81	6.57	6.60	2.50
19	3.05	1.98	1.16	3.00	12.35	18.05	16.34	24.90	17.10	6.56	6.72	2.46
20	2.90	1.82	1.22	3.70	12.70	17.58	16.05	23.80	17.38	6.65	6.80	2.48
21	2.95	1.75	1.20	4.62	12.34	17.46	16.07	23.20	17.36	6.63	6.90	2.45
22	2.88	1.88	1.24	7.28	12.10	17.52	16.15	22.75	17.28	6.64	6.62	2.66
23	2.80	1.96	1.60	9.46	11.95	17.72	16.30	22.45	17.18	6.57	6.35	2.56
24	2.82	2.02	1.50	10.42	12.08	17.86	16.68	22.10	16.50	6.45	6.08	2.48
25	2.80	2.02	1.44	11.15	12.30	17.76	16.82	21.95	15.90	6.48	5.82	3.02
26	2.78	2.00	1.80	11.12	12.40	17.72	17.18	21.80	15.50	6.52	5.58	3.99
27	2.80	1.88	2.00	11.16	11.92	17.70	17.36	21.80	15.26	6.49	5.38	5.40
28	2.82	1.70	1.98	11.26	11.38	17.84	17.55	21.82	15.10	6.65	5.29	6.80
29	2.68	1.56	2.26	11.20	---	18.40	17.85	21.60	14.98	6.86	5.11	6.86
30	2.52	1.56	2.46	11.08	---	19.28	18.45	21.25	14.53	7.13	4.89	6.80
31	2.65	---	2.58	11.00	---	19.85	---	20.90	---	7.19	4.59	---
MAX	5.11	2.70	2.58	11.26	15.60	19.85	21.10	30.60	22.25	13.73	9.14	6.86
MIN	2.52	1.56	1.16	.86	11.00	7.56	16.05	18.05	14.53	6.45	4.59	2.45

07348000 TWELVEMILE BAYOU NEAR DIXIE, LA
(National stream-quality accounting network station)

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 mi².

WATER-DISCHARGE RECORDS

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 National Geodetic Vertical Datum of 1929. 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 National Geodetic Vertical Datum of 1929 (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. No base gage height: Feb. 16-27, Apr. 7-23; no auxiliary gage height: Jan. 18-21, Mar. 3, 4, 18, Apr. 28, 29, May 5, 6, 12, 13, 19, 20, 26, 27, June 2, 3, 8-10, 15-17, 22-24, June 29 to July 1; July 4, 5, 7, 8, 14, 15, 20-22, 28, 29, Aug. 4-13, and Aug. 30 to Sept. 13. 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.--48 years, 2,564 ft³/s, 1,858,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 38,400 ft³/s, May 5, 1958; maximum daily reverse flow, 50 ft³/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 ft³/s, Aug. 24, 1972.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 17,700 ft³/s, Mar. 13, gage height, 32.20 ft; minimum daily discharge, 12 ft³/s, Sept. 8-9, 23-27.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	282	28	68	578	6030	3780	10200	5950	3960	e1600	670	e17
2	292	27	67	575	8800	3450	9750	3880	e4000	1460	837	e15
3	326	27	59	604	10900	e3200	9040	1690	e4200	1150	900	e15
4	282	30	59	933	11800	e3000	8550	2350	5450	e900	e1000	e13
5	328	35	64	950	11200	2910	8430	e3500	5450	e750	e1100	e13
6	380	33	62	973	10700	2560	10000	e4500	6320	822	e1200	e13
7	331	30	34	975	9120	e2400	e10500	4650	5620	e860	e1250	e13
8	353	27	74	929	8280	2710	e1100	4580	e5300	e840	e1300	e12
9	315	23	99	924	8380	9270	e11400	4270	e5000	838	e1350	e12
10	273	17	92	869	10100	13100	e11500	4480	e4500	508	e1200	e17
11	232	19	85	832	9910	15200	e11400	4180	3840	463	e1000	e23
12	190	22	107	828	8810	16800	e11200	e8000	4560	437	e900	e23
13	157	25	122	681	7810	17600	e11000	e7600	4390	432	e750	e23
14	134	25	98	639	7400	17500	e10800	7000	3770	e380	647	25
15	99	101	79	616	7010	17200	e10400	6870	e3700	e320	513	30
16	102	57	54	560	e6800	15800	e10200	5670	e3400	289	311	28
17	141	22	43	670	e6200	14800	e1000	5360	e3200	326	222	25
18	72	16	52	e1700	e5800	e13500	e9800	5270	3280	418	264	23
19	114	15	84	e2900	e5500	12400	e9600	e5000	3010	401	235	23
20	57	18	85	e4300	e5200	9940	e9400	e4500	2730	e410	316	20
21	39	18	79	e5000	e5000	7320	e9200	3830	2590	e415	395	23
22	37	41	54	5470	e6000	5970	e9000	2470	e1800	e410	436	17
23	33	51	110	5390	e5500	5900	e8600	2180	e1700	408	324	12
24	29	34	105	5000	e5000	6290	8250	2170	e1900	394	238	12
25	27	47	113	5520	e4600	6470	7680	1890	2080	398	218	12
26	26	59	137	4820	e4200	7150	7170	e1700	2590	402	189	12
27	25	100	131	5010	e3900	7990	6610	e1500	2570	391	139	12
28	24	91	133	5030	3640	8220	e6400	2190	2250	e390	94	266
29	25	50	140	6660	---	6850	e6500	2430	e2200	e450	66	589
30	47	55	253	6730	---	8790	6580	2070	e1900	617	e340	608
31	50	---	569	6170	---	9370	---	3600	---	658	e18	---
TOTAL	4822	1143	3311	82836	203590	277440	261260	125330	107260	18537	18422	1946
MEAN	156	38.1	107	2672	7271	8950	8709	4043	3575	598	594	64.9
MAX	380	101	569	6730	11800	17600	11500	8000	6320	1600	1350	608
MIN	24	15	34	560	3640	2400	1000	1500	1700	289	18	12
AC-FT	9560	2270	6570	164300	403800	550300	518200	248600	212800	36770	36540	3860

CAL YR 1989	TOTAL 1581987	MEAN 4334	MAX 26800	MIN 15	AC-FT 3138000
WTR YR 1990	TOTAL 1105897	MEAN 3030	MAX 17600	MIN 12	AC-FT 2194000

e Estimated.

07348000 TWELVEMILE BAYOU NEAR DIXIE, LA--Continued

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.63	4.61	4.77	6.57	17.98	14.69	26.25	22.97	24.15	15.53	6.97	4.63
2	5.66	4.61	4.77	6.56	21.82	14.26	25.79	22.47	24.39	14.51	7.42	4.62
3	5.77	4.61	4.74	6.65	24.46	13.58	24.82	21.98	23.87	13.46	8.17	4.62
4	5.62	4.62	4.74	7.71	26.09	12.87	23.90	22.52	24.04	11.95	8.21	4.61
5	5.78	4.64	4.75	7.79	26.15	12.20	23.45	22.91	24.67	10.96	8.17	4.61
6	5.95	4.63	4.74	7.85	25.44	11.63	24.49	23.35	25.30	10.54	8.44	4.61
7	5.78	4.62	4.64	7.83	24.10	12.04	---	23.76	25.48	9.78	8.49	4.61
8	5.85	4.61	4.79	7.73	22.90	16.94	---	24.33	25.19	8.95	9.21	4.60
9	5.72	4.59	4.88	7.73	22.22	22.18	---	25.28	24.55	8.20	9.39	4.60
10	5.57	4.56	4.86	7.56	23.32	28.06	---	26.46	23.81	7.55	8.98	4.63
11	5.41	4.57	4.84	7.45	23.20	30.78	---	27.67	23.06	7.12	8.28	4.66
12	5.25	4.59	4.90	7.40	22.35	31.81	---	29.23	22.54	6.84	7.63	4.66
13	5.11	4.60	4.95	6.98	21.39	32.15	---	30.76	22.02	6.67	7.22	4.66
14	4.99	4.60	4.88	6.83	20.39	32.02	---	31.70	21.58	6.33	7.03	4.67
15	4.89	4.90	4.81	6.73	19.95	31.81	---	31.98	21.29	6.18	6.66	4.69
16	4.89	4.73	4.71	6.53	---	31.17	---	31.65	20.95	6.07	6.26	4.68
17	5.03	4.59	4.67	6.93	---	30.27	---	31.00	20.30	6.12	6.12	4.67
18	4.79	4.56	4.71	9.67	---	29.04	---	29.81	19.74	6.30	6.22	4.66
19	4.93	4.55	4.83	11.99	---	27.41	---	28.14	19.65	6.29	6.32	4.66
20	4.73	4.57	4.84	14.53	---	25.61	---	26.42	19.67	6.29	6.37	4.65
21	4.65	4.57	4.81	15.51	---	24.23	---	25.15	19.57	6.34	6.46	4.66
22	4.65	4.66	4.72	16.04	---	23.46	---	24.38	19.46	6.31	6.51	4.63
23	4.63	4.70	4.93	16.57	---	23.08	---	23.87	19.20	6.34	6.20	4.60
24	4.62	4.63	4.92	17.24	---	22.89	23.40	23.48	18.78	6.29	5.84	4.60
25	4.61	4.68	4.93	18.05	---	22.52	23.01	23.22	18.08	6.27	5.58	4.60
26	4.60	4.73	5.00	17.50	---	22.19	22.65	23.01	18.17	6.29	5.30	4.60
27	4.60	4.89	4.97	17.32	---	21.82	22.37	22.97	17.83	6.28	5.07	4.60
28	4.60	4.86	4.98	17.55	15.05	21.57	22.81	23.23	17.33	6.27	4.94	5.57
29	4.60	4.70	5.01	19.06	---	22.05	22.91	23.41	16.89	6.44	4.83	6.59
30	4.69	4.72	5.48	19.07	---	25.09	22.95	23.33	16.45	6.82	4.70	6.65
31	4.70	---	6.55	18.35	---	26.07	---	23.91	---	6.94	4.64	---
MAX	5.95	4.90	6.55	19.07	---	32.15	---	31.98	25.48	15.53	9.39	6.65
MIN	4.60	4.55	4.64	6.53	---	11.63	---	21.98	16.45	6.07	4.64	4.60

1 UNITED STATES DEPARTMENT OF THE INTERIOR - GEOLOGICAL SURVEY - OKLAHOMA DISTRICT 04/04/91

STATION NUMBER 07316000 RED RIVER NEAR GAINESVILLE, TX STREAM SOURCE AGENCY USGS

LATITUDE 334340 LONGITUDE 0970935 DRAINAGE AREA 24846 DATUM 627.91 STATE 40 COUNTY 085

PROVISIONAL DATA SUBJECT TO REVISION

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e2900	e700	741	e950	e1600	e3000	11000	37300	4390	1600	2190	1070
2	3020	e1300	741	e970	1950	16600	8630	53100	5860	1530	1780	1010
3	2780	e2600	732	e950	e2100	14800	6540	91300	33700	1450	1660	908
4	2550	e2200	738	e900	e1500	11600	5300	122000	47000	1390	1660	789
5	2300	e1700	740	e800	e1400	7120	4900	131000	40000	1320	2410	725
6	2060	1270	750	e750	e1200	e6300	e6000	109000	31900	1270	4830	683
7	1850	1090	741	e700	1050	e5400	e5000	85800	15600	1210	3670	649
8	1680	960	743	e710	982	e4500	e5500	67000	9420	1170	2720	653
9	1520	884	752	e700	1010	3670	e5000	55800	7330	1130	2070	653
10	1400	845	756	e670	986	e3400	e5200	49800	6160	1100	1830	621
11	1300	822	740	e650	927	5330	13400	43000	5290	1070	1560	606
12	1200	807	705	e625	897	25600	13100	33500	4880	1140	1340	586
13	1140	788	738	e600	882	46400	9550	25800	4700	1360	1210	558
14	1060	789	742	e600	874	45500	e6800	22200	4370	1120	1240	539
15	1000	806	713	e625	1020	41000	e4500	17800	4230	1240	1360	523
16	955	787	659	e625	1040	36100	e4800	13800	4150	1200	1140	504
17	908	767	688	e650	1020	27800	e4400	12500	4020	1100	1030	e550
18	859	763	709	e625	948	19100	4000	11900	3870	1020	919	663
19	793	763	683	1500	910	12100	9270	11100	3740	1120	908	883
20	e750	759	651	e2200	910	8620	38900	10400	3580	1130	855	2520
21	e710	765	599	e3000	977	7080	64300	10100	3390	1080	892	2130
22	e680	781	508	e2900	1080	6320	83500	9470	3080	1090	842	2920
23	647	770	490	e2700	1210	6380	71700	8060	2810	1110	1540	6320
24	602	765	e470	e2600	1430	7340	41700	6960	2870	1060	3700	3840
25	591	766	e450	e2200	1970	7740	35600	6440	2580	1060	2630	1860
26	577	760	e550	e1800	2150	7700	66500	5900	2270	1060	2120	1300
27	556	747	e700	e1400	2200	7120	97900	5280	2230	1250	1810	1090
28	535	733	e750	e1300	e2300	8630	86900	4880	1990	2930	1520	1220
29	503	736	e800	e1100	---	13900	56300	4630	1800	2430	1270	1360
30	491	741	e900	e1000	---	17300	45900	4440	1680	2850	1090	1210
31	e600	---	e900	e1200	---	14800	---	4400	---	2810	1100	---
TOTAL	38517	28964	21579	38000	36523	448250	822090	1074660	268890	43400	54896	38943
MEAN	1242	965	696	1226	1304	14460	27400	34670	8963	1400	1771	1298
MAX	3020	2600	900	3000	2300	46400	97900	131000	47000	2930	4830	6320
MIN	491	700	450	600	874	3000	4000	4400	1680	1020	842	504
AC-FT	76400	57450	42800	75370	72440	889100	1631000	2132000	533300	86080	108900	77240

CAL YR 1989 TOTAL 1642954 MEAN 4501 MAX 72900 MIN 367 AC-FT 3259000

WTR YR 1990 TOTAL 2914712 MEAN 7986 MAX 131000 MIN 450 AC-FT 5781000

e Estimated

STATION NUMBER 07300500 SALT FORK RED RIVER AT MANGUM, OK STREAM SOURCE AGENCY USGS
LATITUDE 345130 LONGITUDE 0993030 DRAINAGE AREA 1357 DATUM 1490.87 STATE 40 COUNTY 055
PROVISIONAL DATA SUBJECT TO REVISION

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e23	18	27	71	42	96	e93	84	3700	18	127	e1.2
2	e23	17	27	56	41	119	88	245	e175	18	67	e.93
3	e23	18	27	51	42	91	78	194	e120	16	36	e.64
4	e24	e19	28	46	42	74	69	220	e100	14	63	.45
5	24	e19	28	43	41	66	e62	179	e92	13	94	.31
6	28	e20	30	39	40	74	e59	122	e87	12	43	.13
7	25	e21	30	37	38	71	e66	94	e81	11	31	.49
8	24	e22	31	37	37	76	e63	79	e76	9.3	26	1.2
9	22	e22	31	36	40	73	e59	70	e70	8.4	22	.47
10	23	e23	33	36	43	77	e56	52	e65	7.3	19	.12
11	21	e24	e31	35	41	195	e54	e48	e59	6.9	18	.00
12	20	e25	e29	34	39	72	53	e45	e54	214	16	.00
13	19	e26	e27	34	36	71	55	e43	e48	150	15	.10
14	18	e27	e25	32	35	67	62	e41	e43	62	13	.08
15	18	26	e27	32	37	62	57	e37	e37	34	11	.00
16	16	27	e30	37	40	56	58	53	e35	26	9.5	.17
17	16	27	e26	59	41	53	61	57	e33	21	8.6	2.5
18	15	27	e27	46	49	50	77	51	e32	25	7.6	.82
19	15	27	e28	128	51	48	102	50	e30	21	25	7.8
20	16	28	e24	120	46	47	140	48	28	17	34	3.8
21	17	28	e20	124	50	48	124	44	27	14	32	3.2
22	17	29	e17	97	158	46	120	42	37	30	24	2.3
23	18	28	e15	78	176	46	105	40	32	61	19	2.9
24	18	27	e18	68	118	46	107	38	31	63	17	2.5
25	19	27	e20	65	87	48	163	37	28	31	16	1.7
26	19	27	e23	59	73	50	482	36	26	25	11	1.6
27	19	27	e25	54	65	52	376	36	24	18	e9.1	1.0
28	20	27	e28	49	84	e64	149	36	24	14	e7.2	.55
29	21	26	37	46	---	74	117	53	22	13	e5.3	3.9
30	21	26	67	44	---	110	97	5630	20	17	e3.4	11
31	19	---	86	42	---	101	---	408	---	102	e1.5	---
TOTAL	621	735	922	1735	1632	2223	3252	8212	5236	1091.9	831.2	51.86
MEAN	20.0	24.5	29.7	56.0	58.3	71.7	108	265	175	35.2	26.8	1.73
MAX	28	29	86	128	176	195	482	5630	3700	214	127	11
MIN	15	17	15	32	35	46	53	36	20	6.9	1.5	.00
AC-FT	1230	1460	1830	3440	3240	4410	6450	16290	10390	2170	1650	103

CAL YR 1989 TOTAL 29389.2 MEAN 80.5 MAX 5490 MIN 2.1 AC-FT 58290
WTR YR 1990 TOTAL 26542.96 MEAN 72.7 MAX 5630 MIN .00 AC-FT 52650

e Estimated

STATION NUMBER 07316500 WASHITA RIVER NEAR CHEYENNE, OK STREAM SOURCE AGENCY USGS
LATITUDE 353735 LONGITUDE 0994005 DRAINAGE AREA 794 DATUM 1900.98 STATE 40 COUNTY 129
PROVISIONAL DATA SUBJECT TO REVISION

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.7	4.1	13	30	21	38	34	68	71	7.7	1.8	.03
2	3.0	4.1	13	21	21	38	31	68	49	7.0	1.6	.00
3	2.5	4.6	14	20	21	36	30	83	40	6.3	5.0	.00
4	2.7	5.2	14	19	21	34	29	85	33	5.8	4.8	.00
5	3.6	8.0	12	18	21	33	28	75	29	5.1	2.4	.00
6	10	7.7	12	18	21	34	27	65	24	4.5	1.9	.00
7	6.8	8.1	12	19	20	35	25	60	23	4.1	1.8	.00
8	6.2	7.3	13	19	20	35	24	53	21	4.1	1.6	.08
9	6.8	7.2	15	20	20	35	24	45	18	3.6	1.5	.03
10	5.5	9.9	16	19	19	34	23	39	18	3.9	1.4	3.8
11	4.1	12	e15	18	20	35	22	36	17	3.9	1.2	35
12	5.3	10	e18	17	19	35	20	35	18	3.9	.85	5.7
13	6.2	11	e23	17	19	34	19	32	14	3.3	.79	3.4
14	5.3	11	e21	19	19	32	19	31	12	3.4	.82	3.1
15	6.0	11	e18	18	21	32	19	37	11	3.8	.66	3.0
16	4.5	8.0	e17	19	e20	30	20	33	71	3.5	.46	2.9
17	4.8	11	e16	21	e19	29	23	29	49	2.5	.25	3.0
18	4.0	9.2	e16	20	e20	28	20	27	33	2.8	.82	2.7
19	4.1	10	e15	29	e22	27	24	27	23	2.6	15	26
20	3.9	11	e15	31	24	27	21	25	18	2.0	6.2	41
21	6.4	11	e14	28	27	26	20	23	16	1.9	3.3	16
22	5.7	10	e12	27	34	25	1010	20	22	1.9	2.5	10
23	7.1	12	e10	26	38	24	1560	20	17	2.0	1.8	7.6
24	5.9	13	e12	25	36	25	219	17	16	1.8	1.6	6.4
25	5.6	12	e13	24	34	25	150	17	14	1.7	1.2	5.8
26	6.8	11	e14	23	33	25	114	17	13	1.6	.91	5.1
27	6.3	11	e15	23	31	24	105	16	12	1.5	.55	4.7
28	7.7	8.2	e16	22	35	25	99	15	11	1.4	.32	4.5
29	6.8	10	e18	22	---	31	93	78	9.6	1.5	.14	5.7
30	5.0	13	e20	22	---	38	79	281	8.8	2.0	.05	9.0
31	5.1	---	22	22	---	35	---	101	---	1.9	.04	---
TOTAL	168.4	281.6	474	676	676	964	3931	1558	731.4	103.0	63.26	204.54
MEAN	5.43	9.39	15.3	21.8	24.1	31.1	131	50.3	24.4	3.32	2.04	6.82
MAX	10	13	23	31	38	38	1560	281	71	7.7	15	41
MIN	2.5	4.1	10	17	19	24	19	15	8.8	1.4	.04	.00
AC-FT	334	559	940	1340	1340	1910	7800	3090	1450	204	125	406

CAL YR 1989 TOTAL 7695.6 MEAN 21.1 MAX 203 MIN 1.5 AC-FT 15260
WTR YR 1990 TOTAL 9831.20 MEAN 26.9 MAX 1560 MIN .00 AC-FT 19500

e Estimated

UNITED STATES DEPARTMENT OF THE INTERIOR - GEOLOGICAL SURVEY - OKLAHOMA DISTRICT 04/04/91

STATION NUMBER 07301420 SWEETWATER CREEK NEAR SWEETWATER, OK STREAM SOURCE AGENCY USGS
LATITUDE 352520 LONGITUDE 0995808 DRAINAGE AREA 0.00 DATUM 2087.76 STATE 40 COUNTY 009
PROVISIONAL DATA SUBJECT TO REVISION

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.2	14	18	25	27	61	35	41	51	11	3.2	.79
2	8.7	14	19	24	27	51	32	39	40	10	2.7	.77
3	8.5	15	19	24	27	44	29	64	33	e8.8	9.4	.70
4	8.6	15	19	24	27	39	28	79	29	e8.0	18	.70
5	8.9	15	20	24	27	37	27	59	26	e7.6	10	.66
6	13	15	20	25	26	39	25	50	23	e7.0	7.6	.62
7	15	15	20	24	26	50	25	44	21	e6.2	6.0	.62
8	15	15	21	25	26	47	25	39	19	e5.4	4.9	.62
9	14	15	22	24	26	40	25	35	19	e4.5	4.0	.61
10	13	15	22	24	26	37	24	32	18	e4.0	3.2	.64
11	13	15	22	24	26	37	24	30	18	e3.6	2.6	.85
12	12	15	22	24	26	39	24	29	18	e3.2	2.2	.79
13	11	15	24	24	26	38	24	28	17	e2.9	2.0	.73
14	11	15	26	23	25	35	24	28	16	e2.7	1.8	.67
15	11	16	e25	24	e24	32	23	32	16	e2.4	1.8	.61
16	11	16	e18	25	e23	31	24	27	16	2.2	1.7	.60
17	11	16	e17	33	e22	30	24	24	19	2.4	1.5	.89
18	11	16	e19	34	e24	29	24	22	18	2.2	1.2	.86
19	11	17	e18	37	e27	28	27	22	17	2.1	3.2	5.4
20	12	17	e19	48	31	28	32	21	16	1.9	4.9	5.0
21	12	18	e17	48	46	28	34	20	15	1.6	5.8	7.6
22	13	17	e16	43	65	28	32	19	14	1.4	4.3	5.8
23	13	17	e15	39	65	26	30	19	14	1.3	3.0	4.7
24	13	17	e16	34	55	26	38	18	14	1.3	2.1	4.0
25	13	18	e23	30	44	27	61	19	14	1.2	1.5	3.1
26	13	18	e28	29	38	27	93	19	13	1.2	1.3	2.2
27	13	18	e35	29	34	28	68	18	13	1.2	1.2	1.9
28	13	18	41	27	40	29	76	17	13	1.2	1.1	1.6
29	14	18	39	27	---	30	67	67	12	1.2	1.0	3.2
30	14	18	31	27	---	36	51	92	11	1.9	.94	4.9
31	14	---	29	27	---	39	---	74	---	3.7	.87	---
TOTAL	372.9	483	700	899	906	1096	1075	1127	583	115.3	115.01	62.13
MEAN	12.0	16.1	22.6	29.0	32.4	35.4	35.8	36.4	19.4	3.72	3.71	2.07
MAX	15	18	41	48	65	61	93	92	51	11	18	7.6
MIN	8.5	14	15	23	22	26	23	17	11	1.2	.87	.60
AC-FT	740	958	1390	1780	1800	2170	2130	2240	1160	229	228	123

CAL YR 1989 TOTAL 9425.1 MEAN 25.8 MAX 310 MIN 8.1 AC-FT 18690
WTR YR 1990 TOTAL 7534.34 MEAN 20.6 MAX 93 MIN .60 AC-FT 14940

e Estimated

1 UNITED STATES DEPARTMENT OF THE INTERIOR - GEOLOGICAL SURVEY - OKLAHOMA DISTRICT 04/04/91

STATION NUMBER 07301500 NORTH FORK RED RIVER NEAR CARTER, OK STREAM SOURCE AGENCY USGS
LATITUDE 351005 LONGITUDE 0993025 DRAINAGE AREA 1938 DATUM 1673.71 STATE 40 COUNTY 009
PROVISIONAL DATA SUBJECT TO REVISION

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35	46	66	139	110	256	265	209	494	39	16	3.7
2	33	46	67	124	110	210	213	190	358	37	14	3.0
3	32	47	68	119	110	223	177	264	e235	34	15	2.7
4	31	49	74	117	110	187	163	477	e195	31	29	2.5
5	32	50	74	111	109	170	148	330	e160	28	54	2.3
6	110	51	75	107	111	174	138	269	e130	25	46	2.1
7	120	51	76	103	106	201	128	210	126	22	33	3.7
8	111	53	81	101	108	254	124	177	137	20	26	2.7
9	95	53	84	101	117	216	123	155	143	18	22	2.3
10	78	53	90	100	116	193	117	134	140	16	19	4.0
11	67	53	90	100	117	193	109	119	125	15	18	7.8
12	60	53	e96	97	114	214	103	113	110	16	15	5.5
13	54	56	e100	94	111	233	101	105	96	15	14	3.9
14	49	59	e86	94	109	205	98	100	90	14	15	3.4
15	45	58	65	94	e106	210	96	94	82	14	13	2.8
16	42	56	e63	96	e102	202	105	90	81	13	13	2.7
17	41	55	e60	120	e99	159	422	99	134	20	14	4.1
18	41	58	e66	128	e103	151	229	82	108	22	12	5.2
19	40	58	e62	174	e112	142	198	77	88	17	24	33
20	41	58	e60	219	e127	131	218	72	75	15	30	181
21	41	63	e56	173	151	125	222	67	66	14	31	135
22	42	64	e52	174	274	124	210	62	62	23	24	54
23	43	62	e50	183	257	124	185	59	53	44	18	38
24	43	63	e56	169	222	123	171	57	54	25	13	31
25	43	65	e70	152	196	123	183	233	54	18	11	26
26	43	64	e90	132	169	123	403	441	49	15	8.9	22
27	45	65	e120	123	157	124	411	148	49	13	7.9	19
28	47	64	160	119	188	133	333	96	47	11	7.3	16
29	48	64	171	116	---	166	338	1790	44	14	6.6	29
30	47	64	195	113	---	284	252	10200	41	12	5.7	60
31	46	---	157	107	---	276	---	2460	---	17	4.5	---
TOTAL	1645	1701	2680	3899	3821	5649	5983	18979	3626	637	579.9	708.4
MEAN	53.1	56.7	86.5	126	136	182	199	612	121	20.5	18.7	23.6
MAX	120	65	195	219	274	284	422	10200	494	44	54	181
MIN	31	46	50	94	99	123	96	57	41	11	4.5	2.1
AC-FT	3260	3370	5320	7730	7580	11200	11870	37640	7190	1260	1150	1410

CAL YR 1989 TOTAL 70592 MEAN 193 MAX 5460 MIN 25 AC-FT 140000
WTR YR 1990 TOTAL 49908.3 MEAN 137 MAX 10200 MIN 2.1 AC-FT 98990

e Estimated

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 except those for estimated daily discharges, which are poor. There are several small diversions upstream from gage for irrigation. There is some regulation for municipal use by Greenbelt Lake (station 07299840), capacity 59,100 acre-ft, 42 mi upstream.

AVERAGE DISCHARGE.--14 years (water years 1953-66) prior to completion of Greenbelt Lake, 72.6 ft³/s (52,600 acre-ft/yr); 24 years (water years 1967-90) regulated, 48.9 ft³/s (35,430 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--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.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 19,400 ft³/s May 29 time unknown (gage height, 9.56 ft from HWM); minimum, 2.0 ft³/s July 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17	19	21	e25	25	98	49	39	328	7.4	7.9	7.2
2	15	19	23	e24	23	64	40	73	162	7.2	6.9	6.9
3	13	20	23	e24	24	50	35	239	80	7.1	238	6.6
4	13	21	23	e24	24	45	37	119	52	7.0	16	6.4
5	16	22	25	e24	21	47	34	70	42	7.1	10	6.2
6	17	22	25	e23	22	79	31	53	33	7.0	8.8	6.0
7	17	21	25	e23	22	68	30	41	27	6.5	8.3	5.9
8	15	18	23	e23	22	47	31	37	22	6.2	8.3	5.9
9	12	22	23	e23	21	39	32	30	41	6.1	8.5	6.0
10	11	24	23	e23	22	40	30	27	39	5.1	21	5.5
11	9.5	24	20	e23	26	53	27	27	20	261	11	6.2
12	10	25	11	e23	31	48	27	26	14	206	9.4	5.7
13	9.3	26	e12	e23	33	e45	30	26	13	7.9	7.1	5.7
14	9.7	25	e13	e24	33	43	30	44	12	6.2	5.1	5.3
15	8.9	21	e11	e25	51	39	27	60	11	4.7	5.1	5.0
16	10	21	e11	38	63	40	25	29	36	16	5.0	4.7
17	10	21	e11	43	55	38	37	17	33	7.7	4.9	5.3
18	11	23	e12	65	45	35	46	15	20	7.0	4.1	6.9
19	13	25	e12	92	33	31	46	13	14	6.9	15	13
20	15	25	e12	73	46	32	59	11	12	6.7	13	12
21	18	26	e12	69	182	30	53	9.2	11	7.6	12	11
22	18	24	e12	59	140	29	38	8.4	16	156	12	11
23	15	22	e13	46	92	27	29	7.9	12	4.9	11	10
24	13	23	e15	33	62	30	158	7.0	11	3.1	11	9.3
25	12	24	17	26	49	32	582	22	10	3.3	9.7	9.3
26	14	24	18	23	42	35	170	13	10	3.0	8.2	8.5
27	18	25	25	22	42	37	81	9.4	10	3.0	7.7	7.7
28	22	21	29	19	112	37	88	7.8	8.9	3.0	7.4	7.1
29	20	20	25	21	---	47	53	4900	8.0	3.7	7.3	21
30	20	21	25	23	---	72	42	3680	7.6	6.6	7.1	15
31	20	---	e25	21	---	58	---	306	---	43	7.1	---
TOTAL	442.4	674	575	1027	1363	1415	1997	9966.7	1115.5	834.0	513.9	242.3
MEAN	14.3	22.5	18.5	33.1	48.7	45.6	66.6	322	37.2	26.9	16.6	8.08
MAX	22	26	29	92	182	98	582	4900	328	261	238	21
MIN	8.9	18	11	19	21	27	25	7.0	7.6	3.0	4.1	4.7
AC-FT	878	1340	1140	2040	2700	2810	3960	19770	2210	1650	1020	481

CAL YR 1989 TOTAL 41932.5 MEAN 115 MAX 14200 MIN 2.2 AC-FT 83170
WTR YR 1990 TOTAL 20165.8 MEAN 55.2 MAX 4900 MIN 3.0 AC-FT 40000

e Estimated

07301300 NORTH FORK RED RIVER NEAR SHAMROCK, TX

LOCATION.--Lat 35°15'51", long 100°14'29", Wheeler County, Hydrologic Unit 11120302, on left bank at downstream side of bridge on U.S. Highway 83, 2.5 mi north of Shamrock, 16 mi upstream from Texas-Oklahoma State line, and 23 mi downstream from McClellan Creek.

DRAINAGE AREA.--1,082 mi², of which 379 mi² probably is noncontributing.

PERIOD OF RECORD.--1951-63 (occasional low-flow measurements), February 1964 to current year.
Water-quality records.--Chemical analyses: October 1964 to September 1981.

Gage.--Water-stage recorder. Datum of gage is 2,165.55 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. There is some regulation by Lake McClellan (capacity, 5,000 acre-ft) 41 miles upstream. Flow affected at times by discharge from the flood-detention pools of 11 floodwater-retarding structures with a combined detention capacity of 18,290 acre-ft. These structures control runoff from 165 mi². Gage-height telemeter at station.

AVERAGE DISCHARGE.--26 years, 33.1 ft³/s (23,980 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,400 ft³/s May 29, 1975 (gage height, 7.47 ft), from rating curve extended above 3,800 ft³/s on basis of slope-area measurement of peak flow; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1915, 16.1 ft in May 1957, from information by State Department of Highways and Public Transportation and by local residents.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,390 ft³/s May 29 at 1900 hours (gage height, 3.31 ft); no flow for many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.17	1.2	17	45	21	89	22	48	120	.00	.00	.00
2	.04	1.6	18	49	17	75	12	213	81	.00	.00	.00
3	.01	2.8	17	50	19	58	11	220	39	.00	5.2	.00
4	.01	3.9	16	50	18	51	11	132	20	.00	26	.00
5	1.3	3.2	19	46	17	57	8.7	96	13	.00	1.4	.00
6	85	3.7	19	44	20	158	4.0	57	5.6	.00	.01	.00
7	25	4.1	22	46	21	104	2.7	51	3.7	.00	.00	.00
8	6.1	4.5	28	46	20	36	2.0	42	.40	.00	.00	.00
9	4.2	4.3	31	45	18	21	2.6	29	.09	.00	.00	.00
10	3.5	4.7	28	44	15	68	1.7	20	.00	.00	.00	3.0
11	2.4	5.4	16	42	16	196	1.3	30	.00	.00	.00	.01
12	1.6	5.2	e15	40	19	137	2.1	27	.00	.00	.00	.00
13	1.1	5.8	18	39	14	69	3.5	20	.00	.00	.00	.00
14	.91	6.5	20	39	11	122	3.3	30	.00	.00	.00	.00
15	.47	5.8	e16	42	22	68	2.3	17	.00	.03	.00	.00
16	.13	3.7	e14	60	83	63	1.7	4.5	24	.00	.00	.00
17	.01	5.5	e15	53	124	60	7.3	1.1	35	.00	.00	.00
18	.01	8.5	e16	49	72	58	17	.83	7.8	.00	.05	.29
19	.01	9.8	e16	168	53	43	68	1.7	.32	.00	.07	.03
20	.01	8.6	e14	117	123	42	106	2.5	.00	.00	.00	.00
21	.10	9.2	e15	93	249	28	54	.94	.00	.00	.00	.00
22	1.0	10	e12	59	248	18	33	.39	.00	.00	.00	.00
23	1.9	10	e10	70	168	19	37	.18	.00	.00	.00	.00
24	2.0	13	e18	52	104	27	234	.06	.00	.00	.00	.00
25	2.4	15	44	34	96	42	385	1.4	.00	.00	.00	.00
26	2.1	13	48	39	78	52	187	1.5	.00	.00	.00	.00
27	2.3	13	97	44	93	46	218	1.5	.00	.00	.00	.00
28	3.0	9.7	109	24	198	52	144	.40	.00	.00	.00	.00
29	3.9	8.8	69	26	---	89	96	326	.00	.00	.00	13
30	2.1	14	40	19	---	156	40	211	.00	1.6	.00	5.4
31	1.1	---	43	18	---	71	---	131	---	.01	.00	---
TOTAL	153.88	214.5	880	1592	1957	2175	1718.2	1717.00	349.91	1.64	32.73	21.73
MEAN	4.96	7.15	28.4	51.4	69.9	70.2	57.3	55.4	11.7	.053	1.06	.72
MAX	85	15	109	168	249	196	385	326	120	1.6	26	13
MIN	.01	1.2	10	18	11	18	1.3	.06	.00	.00	.00	.00
AC-FT	305	425	1750	3160	3880	4310	3410	3410	694	3.3	65	43

CAL YR 1989 TOTAL 21375.30 MEAN 58.6 MAX 1640 MIN .00 AC-FT 42400
WTR YR 1990 TOTAL 10813.59 MEAN 29.6 MAX 385 MIN .00 AC-FT 21450

e Estimated

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.

AVERAGE DISCHARGE.--28 years (water years 1963-90), 13.7 ft³/s (0.70 in/yr), 9,930 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,890 ft³/s May 20, 1977 (gage height, 15.73 ft); no flow at times.

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

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 500 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Apr. 25	2100	*143	*9.32				

Minimum discharge, 0.70 ft³/s Sept. 6, 7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.8	9.2	11	17	19	34	23	28	23	3.2	2.6	.80
2	6.6	9.4	11	17	18	28	21	36	20	2.9	1.9	.79
3	6.7	9.6	11	17	18	26	20	68	16	2.6	9.6	.77
4	6.8	9.7	12	17	19	24	20	44	14	2.4	8.4	.76
5	7.2	9.8	12	16	19	24	20	33	13	2.2	4.9	.75
6	12	9.3	12	16	19	27	19	30	12	2.1	3.2	.73
7	9.8	9.0	12	17	18	28	19	28	10	1.9	2.6	.76
8	8.8	8.9	13	17	18	26	19	26	9.9	1.8	2.3	.84
9	8.4	9.1	13	17	18	24	18	24	9.3	1.7	2.0	.81
10	8.0	9.2	13	17	18	23	18	23	9.1	1.6	1.8	.80
11	7.8	9.3	12	16	18	25	18	23	8.4	1.6	1.7	.96
12	7.7	9.4	e10	16	19	25	18	23	7.9	1.9	1.6	.94
13	7.7	9.5	13	16	18	23	18	23	7.5	1.8	1.5	.97
14	7.7	9.5	12	16	18	22	18	22	7.3	1.8	1.5	.95
15	7.6	9.5	12	17	20	21	18	22	7.0	1.8	1.5	.93
16	7.6	9.4	e10	21	22	20	18	19	19	1.9	1.5	.93
17	7.8	9.7	e9.0	24	23	20	18	17	12	2.0	1.4	1.0
18	8.0	9.9	e8.0	21	22	20	19	17	8.9	1.9	1.4	1.2
19	8.2	10	e10	27	21	19	21	17	7.6	1.7	2.4	1.5
20	8.4	11	e9.0	31	22	20	22	16	7.1	1.5	2.0	1.8
21	8.7	11	e10	29	39	19	22	15	6.9	1.4	1.8	1.6
22	8.7	11	e9.0	26	39	19	20	15	6.9	1.3	1.6	1.6
23	8.7	10	e8.0	24	36	19	19	14	6.9	1.3	1.5	1.4
24	8.6	11	e10	22	29	19	33	13	6.5	1.3	1.3	1.5
25	8.7	11	12	21	25	20	83	16	5.9	1.2	1.2	1.4
26	8.7	11	12	20	23	20	64	14	5.5	1.1	1.1	1.2
27	8.3	11	12	19	22	20	48	13	5.1	.99	.97	1.1
28	8.3	11	13	18	35	21	63	12	4.6	.94	.93	1.1
29	8.5	10	18	18	---	22	36	19	4.0	1.1	.92	1.7
30	9.2	10	18	18	---	26	30	65	3.5	1.6	.89	3.2
31	9.2	---	17	18	---	24	---	32	---	4.3	.87	---
TOTAL	255.2	297.4	364.0	606	635	708	803	767	284.8	56.83	68.88	34.79
MEAN	8.23	9.91	11.7	19.5	22.7	22.8	26.8	24.7	9.49	1.83	2.22	1.16
MAX	12	11	18	31	39	34	83	68	23	4.3	9.6	3.2
MIN	6.6	8.9	8.0	16	18	19	18	12	3.5	.94	.87	.73
AC-FT	506	590	722	1200	1260	1400	1590	1520	565	113	137	69
CFSM	.03	.03	.04	.07	.08	.08	.09	.09	.03	.01	.01	.00
IN.	.03	.04	.05	.08	.08	.09	.10	.10	.04	.01	.01	.00

CAL YR 1989	TOTAL	6728.5	MEAN	18.4	MAX	490	MIN	6.3	AC-FT	13350	CFSM	.06	IN.	.87
WTR YR 1990	TOTAL	4880.90	MEAN	13.4	MAX	83	MIN	.73	AC-FT	9680	CFSM	.05	IN.	.63

e Estimated

07308500 RED RIVER NEAR BURKBURNETT, TX

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

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.--Records fair except for estimated daily discharges, which are poor. There are many small diversions upstream from station for irrigation, but total amounts are unknown.

AVERAGE DISCHARGE.--30 years (water years 1961-90), 1,029 ft³/s (745,500 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 166,000 ft³/s Oct. 21, 1983 (gage height, 16.90 ft); no flow at times.

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

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 9,000 ft³s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Mar. 11	2400	19,500	9.80	June 2	0600	*29,900	*10.26
Apr. 20	2330	21,200	9.95	Aug. 20	1500	10,300	8.69
May 3	1900	25,600	10.21				

Minimum discharge, 122 ft³/s July 20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	545	2520	257	376	326	3800	905	1200	15000	217	1040	377
2	507	1430	257	363	315	1170	1230	3060	25800	216	1590	360
3	472	754	268	350	317	1450	1430	20200	21700	214	1390	322
4	436	488	273	338	293	785	1380	15700	15000	215	1340	301
5	403	347	273	331	291	708	1190	5320	7610	221	916	298
6	388	302	268	325	274	690	1140	2820	4930	217	881	287
7	370	270	e262	325	264	675	915	1720	3780	213	675	279
8	358	251	257	331	248	646	718	1060	1850	204	550	258
9	365	273	262	313	235	611	683	903	1240	199	433	240
10	368	273	262	284	234	614	1430	774	1040	199	476	219
11	426	266	262	284	225	7250	1670	735	888	190	353	206
12	445	267	257	252	221	15700	781	718	795	206	290	221
13	395	264	247	273	213	7950	608	663	790	199	283	214
14	349	258	242	273	223	3430	570	573	761	211	216	207
15	338	238	237	270	269	2690	608	520	635	241	198	192
16	325	237	e232	273	305	1700	651	468	519	261	166	183
17	321	227	e232	369	313	1590	630	432	359	241	152	227
18	344	237	227	358	299	1100	857	412	292	181	145	241
19	331	257	222	402	289	820	9740	417	276	142	143	229
20	344	262	e210	866	285	813	17000	427	218	135	3930	262
21	393	268	e210	961	420	711	13500	419	197	156	e4360	246
22	405	257	e210	1620	548	751	5930	319	195	220	3360	238
23	405	257	e200	1060	448	716	2440	279	197	291	e2720	271
24	396	262	e270	818	451	600	1200	268	199	3430	2110	753
25	387	257	426	624	710	626	953	227	208	3230	1330	1010
26	384	252	e488	510	630	673	978	182	213	1170	819	614
27	395	257	699	431	551	765	1300	162	213	814	565	397
28	443	252	e565	388	2880	858	1560	154	215	609	472	323
29	403	252	411	367	---	884	1540	150	213	429	357	284
30	2250	257	e404	342	---	894	1890	222	215	316	344	255
31	3400	---	397	317	---	908	---	509	---	306	362	---
TOTAL	17091	11992	9287	14394	12077	62578	75427	61013	105548	15093	31966	9514
MEAN	551	400	300	464	431	2019	2514	1968	3518	487	1031	317
MAX	3400	2520	699	1620	2880	15700	17000	20200	25800	3430	4360	1010
MIN	321	227	200	252	213	600	570	150	195	135	143	183
AC-FT	33900	23790	18420	28550	23950	124100	149600	121000	209400	29940	63400	18870

CAL YR 1989 TOTAL 478595 MEAN 1311 MAX 35000 MIN 158 AC-FT 949300
WTR YR 1990 TOTAL 425980 MEAN 1167 MAX 25800 MIN 135 AC-FT 844900

e Estimated

07316000 RED RIVER NEAR GAINESVILLE, TX

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

DRAINAGE AREA.--30,782 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, including those days of estimated daily discharges. Flow slightly regulated by Lake Kemp (station 07312000) since 1943, by Lake Altus (station 07302500 in Oklahoma) since 1946, by Lake Kickapoo (station 07314000) since 1967, by Lake Arrowhead (station 07314800), and by Moss Lake (station 07315950). A U.S. Army Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--54 years, 3,098 ft³/s (2,245,000 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 265,000 ft³/s May 31, 1987 (gage height, 40.08 ft); minimum, 48 ft³/s Jan. 27, 1940.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 24,000 ft³/s and maximum (*):

Date	Time	Discharge (ft³/s)	Gage height (ft)	Date	Time	Discharge (ft³/s)	Gage height (ft)
Mar. 13	2130	48,300	20.82	May 5	0500	*134,000	*33.13
Apr. 22	1600	86,800	26.70	June 4	1000	47,800	20.38
Apr. 27	1500	102,000	28.85				

Minimum daily dischargre, 450 ft³/s Dec. 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e2900	e700	741	e950	e1600	e3000	11000	37300	4390	1600	2190	1070
2	3020	e1300	741	e970	1950	16600	8630	53100	5860	1530	1780	1010
3	2780	e2600	732	e950	e2100	14800	6540	91300	33700	1450	1660	908
4	2550	e2200	738	e900	e1500	11600	5300	122000	47000	1390	1660	789
5	2300	e1700	740	e800	e1400	7120	4900	131000	40000	1320	2410	725
6	2060	1270	750	e750	e1200	e6300	e6000	109000	31900	1270	4830	683
7	1850	1090	741	e700	1050	e5400	e5000	85800	15600	1210	3670	649
8	1680	960	743	e710	982	e4500	e5500	67000	9420	1170	2720	653
9	1520	884	752	e700	1010	3670	e5000	55800	7330	1130	2070	653
10	1400	845	756	e670	986	e3400	e5200	49800	6160	1100	1830	621
11	1300	822	740	e650	927	5330	13400	43000	5290	1070	1560	606
12	1200	807	705	e625	897	25600	13100	33500	4880	1140	1340	586
13	1140	788	738	e600	882	46400	9550	25800	4700	1360	1210	558
14	1060	789	742	e600	874	45500	e6800	22200	4370	1120	1240	539
15	1000	806	713	e625	1020	41000	e4500	17800	4230	1240	1360	523
16	955	787	659	e625	1040	36100	e4800	13800	4150	1200	1140	504
17	908	767	688	e650	1020	27800	e4400	12500	4020	1100	1030	e550
18	859	763	709	e625	948	19100	4000	11900	3870	1020	919	663
19	793	763	683	1500	910	12100	9270	11100	3740	1120	908	883
20	e750	759	651	e2200	910	8620	38900	10400	3580	1130	855	2520
21	e710	765	599	e3000	977	7080	64300	10100	3390	1080	892	2130
22	e680	781	508	e2900	1080	6320	83500	9470	3080	1090	842	2920
23	647	770	490	e2700	1210	6380	71700	8060	2810	1110	1540	6320
24	602	765	e470	e2600	1430	7340	41700	6960	2870	1060	3700	3840
25	591	766	e450	e2200	1970	7740	35600	6440	2580	1060	2630	1860
26	577	760	e550	e1800	2150	7700	66500	5900	2270	1060	2120	1300
27	556	747	e700	e1400	2200	7120	97900	5280	2230	1250	1810	1090
28	535	733	e750	e1300	e2300	8630	86900	4880	1990	2930	1520	1220
29	503	736	e800	e1100	---	13900	56300	4630	1800	2430	1270	1360
30	491	741	e900	e1000	---	17300	45900	4440	1680	2850	1090	1210
31	e600	---	e900	e1200	---	14800	---	4400	---	2810	1100	---
TOTAL	38517	28964	21579	38000	36523	448250	822090	1074660	268890	43400	54896	38943
MEAN	1242	965	696	1226	1304	14460	27400	34670	8963	1400	1771	1298
MAX	3020	2600	900	3000	2300	46400	97900	131000	47000	2930	4830	6320
MIN	491	700	450	600	874	3000	4000	4400	1680	1020	842	504
AC-FT	76400	57450	42800	75370	72440	889100	1631000	2132000	533300	86080	108900	77240

CAL YR 1989 TOTAL 1642954 MEAN 4501 MAX 72900 MIN 367 AC-FT 3259000
WTR YR 1990 TOTAL 2914712 MEAN 7986 MAX 131000 MIN 450 AC-FT 5781000

e Estimated

RED RIVER BASIN

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, nonrecording 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, 6,028,000 acre-ft May 6 (elevation, 644.76 ft); minimum, 2,426,000 acre-ft Dec. 24 (elevation, 614.35 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 1989 TO SEPTEMBER 1990
OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2660000	2549000	2509000	2448000	2601000	2529000	3364000	5033000	4119000	2844000	2723000	2572000
2	2647000	2542000	2506000	2449000	2601000	2556000	3324000	5307000	4084000	2842000	2709000	2567000
3	2635000	2543000	2501000	2456000	2599000	2597000	3267000	5555000	4060000	2842000	2701000	2562000
4	2619000	2546000	2498000	2460000	2593000	2625000	3207000	5822000	4054000	2840000	2698000	2557000
5	2612000	2554000	2498000	2463000	2586000	2642000	3154000	5997000	4042000	2838000	2693000	2554000
6	2611000	2555000	2500000	2465000	2583000	2661000	3130000	6011000	4015000	2835000	2689000	2550000
7	2606000	2554000	2502000	2467000	2576000	2670000	3082000	5906000	3977000	2833000	2692000	2550000
8	2608000	2553000	2499000	2471000	2570000	2708000	3024000	5781000	3926000	2833000	2690000	2541000
9	2605000	2550000	2497000	2474000	2568000	2713000	2963000	5672000	3872000	2829000	2687000	2538000
10	2602000	2548000	2504000	2476000	2560000	2710000	2935000	5561000	3815000	2827000	2681000	2533000
11	2598000	2547000	2501000	2478000	2554000	2815000	2897000	5458000	3758000	2825000	2671000	2534000
12	2596000	2546000	2494000	2479000	2542000	2899000	2850000	5364000	3707000	2828000	2659000	2534000
13	2592000	2544000	2493000	2478000	2538000	3014000	2818000	5281000	3658000	2821000	2649000	2534000
14	2589000	2542000	2492000	2480000	2533000	3213000	2800000	5228000	3591000	2812000	2634000	2531000
15	2586000	2545000	2490000	2484000	2531000	3351000	2790000	5178000	3525000	2806000	2623000	2531000
16	2589000	2533000	2474000	2497000	2525000	3475000	2779000	5133000	3456000	2799000	2619000	2532000
17	2580000	2527000	2471000	2502000	2524000	3558000	2751000	5073000	3388000	2799000	2614000	2538000
18	2573000	2525000	2465000	2511000	2525000	3601000	2765000	5013000	3320000	2803000	2615000	2539000
19	2565000	2525000	2460000	2565000	2519000	3600000	2825000	4955000	3250000	2800000	2605000	2546000
20	2557000	2525000	2456000	2595000	2508000	3572000	2950000	4889000	3194000	2798000	2601000	2550000
21	2554000	2524000	2452000	2611000	2511000	3528000	3125000	4825000	3155000	2790000	2595000	2562000
22	2553000	2530000	2439000	2616000	2509000	3482000	3361000	4759000	3107000	2794000	2590000	2583000
23	2551000	2524000	2428000	2618000	2505000	3433000	3565000	4700000	3063000	2787000	2587000	2596000
24	2547000	2522000	2428000	2618000	2503000	3379000	3663000	4635000	3029000	2783000	2585000	2611000
25	2546000	2525000	2429000	2608000	2509000	3318000	3799000	4568000	2983000	2779000	2590000	2621000
26	2543000	2524000	2429000	2596000	2514000	3255000	4173000	4498000	2945000	2771000	2590000	2628000
27	2543000	2526000	2431000	2598000	2519000	3199000	4490000	4424000	2916000	2764000	2591000	2631000
28	2540000	2521000	2431000	2594000	2528000	3220000	4794000	4360000	2895000	2755000	2589000	2627000
29	2550000	2516000	2438000	2583000	---	3317000	4948000	4295000	2879000	2751000	2587000	2626000
30	2549000	2513000	2444000	2579000	---	3368000	4999000	4238000	2861000	2741000	2584000	2623000
31	2545000	---	2445000	2575000	---	3383000	---	4173000	---	2729000	2579000	---
MAX	2660000	2555000	2509000	2618000	2601000	3601000	499[illegible]000	6011000	4119000	2844000	2723000	2631000
MIN	2540000	2513000	2428000	2448000	2503000	2529000	27[illegible]1000	4173000	2861000	2729000	2579000	2531000
(†)	615.85	615.45	614.60	616.21	615.64	624.57	637.78	631.46	619.38	617.95	616.26	616.77
(ϕ)	-129000	-32000	-68000	+130000	-47000	+855000	+1616000	-826000	-1312000	-132000	-150000	+44000

CAL YR 1989 MAX 4185000 MIN 2321000 (ϕ) +68000
WTR YR 1990 MAX 6011000 MIN 2428000 (ϕ) -51000

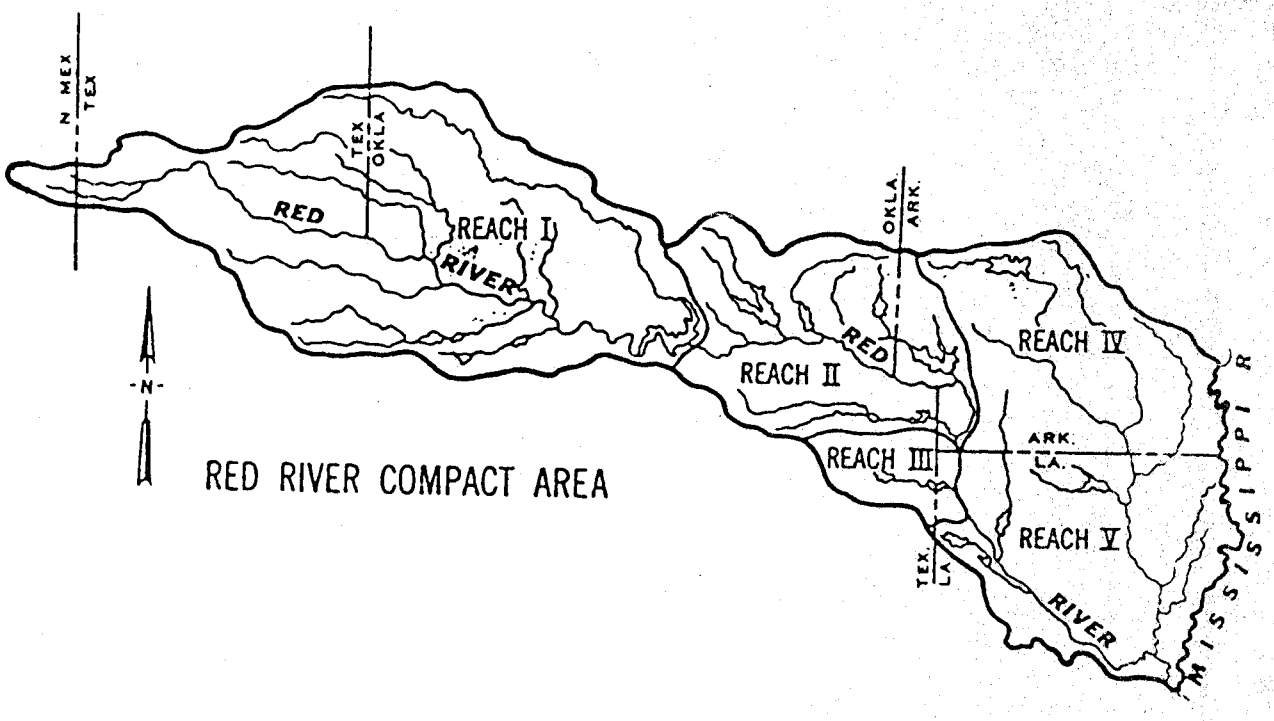
(†) Elevation, in feet, at end of month.
(ϕ) Change in contents, in acre-feet.

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	Location 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	Location 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	Location 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 COMMMISSION

(as amended April 25, 1984)

RULES FOR THE INTERNAL ORGANIZATION OF THE RED RIVER COMPACT COMMISSION
(as amended April 25, 1984)

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.

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 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 from among the Commissioners. He shall hold office for a term of one year, but shall continue to serve until his 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.

2.4 The secretary shall be selected by the Commission. He shall serve for the term 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. 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.

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.

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 oridinary mail at least ten days in advance of each meeting and the 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 action is not expressly provided for in the Compact, eight concurring votes shall be required. Any other action 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 excutive 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.

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 on 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 the Commission shall begin July 1, of each year and end June 30 of the next succeeding year.

ARTICLE VIII
ANNUAL REPORT

8.1 The Commission shall 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, among 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.

RULES AND REGULATIONS TO COMPUTE AND ENFORCE COMPACT COMPLIANCE

A. REACH II, SUBBASIN 5

B. REACH I, SUBBASIN 1

C. REACH III, SUBBASIN 3

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 Subsections 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 <u>not</u> 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. <u>Buck Creek Watershed in Texas</u>

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 <u>not</u> economically justified <u>at this time</u>. 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. <u>Management of Compact Compliance Computations</u>

   a. <u>Management Using State Centers</u>

      (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 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 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).