BULLETIN 6104

CHEMICAL COMPOSITION OF TEXAS SURFACE WATERS, 1958

By
L. S. Hughes
and
Wanda Jones
U. S. Geological Survey

Prepared in cooperation with the Geological Survey
United States Department of the Interior
and other agencies

April 1961

Price $1.00
(To Those Not Entitled To Free Distribution)

Those entitled to free distribution are governmental agencies and officials

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont'd.)

TABLE OF CONTENTS (Cont'd.)

TABLE OF CONTENTS (Cont'd.)

TABLE OF CONTENTS (Cont'd)

TABLE

ILLUSTRATIONS

Figures

Plate

CHEMICAL COMPOSITION OF TEXAS SURFACE WATERS, 1958

INTRODUCTION

This report contains data on the chemical quality of the surface waters of Texas in the water year 1958. Results are presented for chemical analyses of water samples obtained daily from selected points throughout the State and also the results for other samples obtained at various points during the period of October 1, 1957, to September 30, 1958.

All natural water contains dissolved-mineral matter. Water in contact with rocks and soils, even for only short periods of time, will dissolve some of the mineral and organic substances. The chemical character of stream waters is dependent on several factors, such as type of soil and rock with which the water is in contact, length of time of the contact, and climatic conditions. In Texas, the chemical composition of waters varies widely from stream to stream and, often, from point to point on a particular stream.

The records of chemical analysis of surface waters in the report serve as a basis for determining the suitability of the waters for industrial, agricultural, and domestic uses insofar as such use is affected by the dissolved-mineral matter in the waters.

COOPERATION

This is the thirteenth in a series of annual reports covering the quality of surface waters of Texas prepared by the U. S. Geological Survey in cooperation with the Texas Board of Water Engineers. In addition to the annual reports, an earlier compilation was issued providing data for the period 1938 to 1945. Copies of most of these reports are available from the Board of Water Engineers, Austin, Texas.

Other agencies cooperating in the collection of these data were the city of Fort Worth, the Colorado River Municipal Water District, the Canadian River Municipal Water Authority, the West Central Texas Municipal Water District, the Lower Colorado River Authority, the Lower Neches River Authority, the Brazos River Authority, the Sabine River Authority, the Red Bluff Water Power Control District, the Chambers-Liberty Counties Navigation District, the Greenbelt Municipal and Industrial Water Association, the Tarrant County Water Control and Improvement District No. 1, the Texas Electric Service Company, and the U. S. Corps of Engineers.

Records for eight stations in the Rio Grande basin have been furnished by the U. S. Department of Agriculture, in cooperation with the International Boundary and Water Commission.

COLLECTION AND ANALYSIS OF SAMPLES

The samples for which data are given were collected from October 1, 1957, to September 30, 1958. Descriptive statements are given for each sampling station for which a regular series of chemical analyses have been made. These statements give the location of the stream-sampling station, drainage area of the stream above the station, length of time for which records are available, extremes of dissolved solids, hardness, and water temperature, and other pertinent data. Records of discharge of the stream at or near the sampling point for the sampling period are included in most tables of analyses.

Texas Board of Water Engineers-U. S. Geological Survey Sampling Program

During the period covered by this report samples were collected daily at 31 points on Texas streams and twice weekly at four sampling points in Trinity Bay near the mouth of the Trinity River. Samples were collected twice monthly at five points in a small area on Salt Croton and Haystack Creeks near Aspermont. In addition to the data on chemical quality included in this report, temperature data for streams at 26 of the sampling stations and sediment data for one of the sampling stations are available in the files of the U. S. Geological Survey, Austin, Texas. Records of chemical quality of streams at 54 additional sampling points for varying lengths of time have been published in previous reports of this series. The locations of the active and inactive stations are shown on the accompanying map, plate 1, and the periods of operation of all the stations are shown on the bar graph, figure 3. The five sampling points on Salt Croton and Haystack Creeks are indicated as a single location (39) on the map.

Water samples were usually obtained daily at or near a Geological Survey stream-gaging station. Specific conductance was determined on all samples. Composite samples were usually made for 10-day periods by using equal volumes of successive samples having similar conductances. For some streams that are subject to sudden and large changes in chemical composition or concentration, samples were composited for shorter periods on the basis of the concentration of the daily samples. At several sampling stations where changes in chemical composition occur gradually, daily samples for an entire month were composited.

International Boundary and Water Commission-U. S. Department of Agriculture Sampling Program

This report includes chemical-quality records for 8 stations in the Rio Grande basin where samples were collected by the International Boundary and Water Commission and analyses made by the U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, California. At 1 of the stations, samples were collected daily; at the others, from 1 to 16 samples were collected each month. A single monthly composite sample was made

for analysis by taking from each individual sample an amount of water proportional to the volume of river flow represented by the sample. Results of these analyses are also published in equivalents per million in Water Bulletin Number 28 of the International Boundary and Water Commission, together with stream flow and related data.

EXPRESSION OF RESULTS

The chemical constituents given in the tables of analyses are reported in parts per million. A part per million is a unit weight of a constituent in a million unit weights of water. Values for other characteristics are given in appropriate units.

Mean discharge is reported in cfs (cubic feet per second). A cubic foot per second is the rate of discharge of a stream whose channel is 1 square foot in cross-sectional area and whose average velocity is 1 foot per second.

Dissolved solids are reported in tons per day, tons per acre-foot, and parts per million. Values reported for dissolved solids less than 1,000 ppm (parts per million) are residues on evaporation and for more than 1,000 ppm are sums of determined constituents unless noted otherwise. In obtaining the sum, the bicarbonate is calculated as carbonate by dividing by 2.03.

For those analyses in which a calculated value as sodium is shown for sodium and potassium, this value, in equivalents per million, was used in computing the percent sodium and the SAR (sodium-adsorption-ratio). For those analyses in which a determined value for sodium is reported separately, this value is used in computing the percent sodium and the sodium-adsorption-ratio.

The sodium-adsorption-ratio is used to express the relative activity of sodium ions in exchange reactions with the soil.

$$SAR = \frac{Na^{+}}{\sqrt{\frac{Ca^{++} + Mg^{++}}{2}}}$$

where the concentrations of the constituents are expressed in equivalents per million. Waters are divided into four classes with respect to sodium hazard depending upon the SAR value and the specific conductance. At a conductance of 100 micromhos per centimeter the dividing points are at SAR values of 10, 18, and 26, but at 5,000 micromhos the corresponding dividing points are at SAR values of approximately 2.5, 6.5, and 11.

Specific conductance, a measure of a water's ability to conduct an electric current, is reported in micromhos per centimeter at 25°C.

A water having a pH of 7.0 is considered to be neutral; less than 7.0, increasingly acidic; and greater than 7.0, increasingly alkaline.

Sodium and potassium are reported as sodium unless listed separately in the tables.

Hardness due to calcium and magnesium and noncarbonate hardness are reported as calcium carbonate ($CaCO_3$).

The weighted averages of analyses are reported for daily sampling stations for which discharge records are available. The weighted average analysis represents the approximate composition of water that would be found in a reservoir containing all the water passing a given station during the year, after thorough mixing in the reservoir.

The samples were analyzed according to methods used by the U. S. Geological Survey. 1/

SURFACE-WATER RUNOFF AND CHEMICAL-QUALITY CONDITIONS

Rainfall and surface-water runoff were normal or above over much of Texas during the 1958 water year. However, in the areas drained by the upper Brazos, upper Colorado, and Pecos Rivers, runoff was deficient. Mean discharges for selected stations for the 1957 and 1958 water years, as well as for the period of record, are shown in figure 1.

On many streams changes in dissolved-solids concentration are closely related to the rate of discharge, and low flows are likely to be considerably more mineralized than are flood flows in the same stream. However, for streams whose discharge is controlled by reservoirs, the chemical composition of the water may remain relatively constant despite large fluctuations in discharge. Streams that are subject to pollution by oil fields or other sources of salts may show marked increases in dissolved solids at times when moderate storm runoff flushes oilfield wastes or salt residues from evaporation of water into the streams.

In table 1 are listed the mean discharges and the maximum, minimum and weighted average concentrations of dissolved solids for the 1958 water year for those stations operated under the Texas Board of Water Engineers-U. S. Geological Survey sampling program.

Arkansas River Basin

Runoff in the Arkansas River basin in Texas had continued deficient during the 1957 water year when long-time average flows were exceeded at a majority of the sampling stations in other basins of the State. Rainfall in 1958, largely during the period May to September, caused runoff of the Canadian River near Amarillo considerably in excess of the 21-year average. The weighted average of dissolved solids was 527 ppm in the 1958 water year as compared with 613 ppm for the 1957 water year.

1/ Rainwater, F. H., and Thatcher, L. L., 1960, Methods of collection and analysis of water samples: U. S. Geological Survey Water-Supply Paper 1454. American Public Health Association and others, 1955, Standard methods for the examination of water, sewage and industrial wastes.

Figure 1.--Mean discharge at selected stations for the 1957 and 1958 water years and for the period of record.

Table 1.--Mean discharge and maximum, minimum and weighted average concentration of dissolved solids for the 1958 water year for stations operated under the Texas Board of Water Engineers--U. S. Geological Survey sampling program.

Sampling station	Mean discharge (cfs)	Dissolved solids (ppm)		
		Maximum	Minimum	Weighted average
ARKANSAS RIVER BASIN				
Canadian River near Amarillo	633	1,790	302	527
RED RIVER BASIN				
Salt Fork Red River near Hedley	--	2,370	575	--
Red River near Gainesville	1,998	4,680	115	1,950
Red River at Denison Dam near Denison	4,320	981	733	837
SABINE RIVER BASIN				
Sabine River near Tatum	4,291	424	82	134
Sabine River near Ruliff	12,290	261	32	85
NECHES RIVER BASIN				
Angelina River near Lufkin	2,096	178	36	79
Neches River at Evadale	8,465	138	35	83
TRINITY RIVER BASIN				
Trinity River near Rosser	4,257	684	139	260
Richland Creek near Fairfield	--	6,960	180	--
Trinity River at Romayor	11,690	991	86	215
Trinity River near Moss Bluff	--	544	138	--
Old River near Cove	--	460	113	--
Trinity River at Anahuac	--	--	--	--
Trinity Bay near Anahuac	--	--	--	--
BRAZOS RIVER BASIN				
Double Mountain Fork Brazos River near Aspermont	130	6,350	636	1,390
Salt Fork Brazos River near Aspermont	71.4	59,200	2,670	8,500
Hubbard Creek near Breckenridge	204	3,100	143	332
Salt Creek near Olney (a)	2.74	19,300	120	458
Salt Creek near Newcastle (a)	14.7	4,350	142	255
Brazos River at Possum Kingdom Dam near Graford	1,226	1,470	951	1,180
Brazos River at Whitney Dam near Whitney	2,322	876	362	604
Brazos River at Richmond	11,870	645	142	303
COLORADO RIVER BASIN				
Colorado River at Colorado City	23.6	12,500	542	1,880
Colorado River near Silver	61.0	6,700	195	1,080
Colorado River near San Saba	1,503	1,050	148	304
Colorado River at Austin	4,353	238	192	216
Colorado River at Wharton	6,218	259	118	211
GUADALUPE RIVER BASIN				
Guadalupe River at Victoria	3,541	398	134	264
NUECES RIVER BASIN				
Nueces River near Mathis	1,538	415	186	233
RIO GRANDE BASIN				
Pecos River below Red Bluff Dam near Orla	b 73.0	8,800	4,660	5,900
Pecos River near Girvin	38.0	--	--	--

a Station records cover only the period April to September, 1958.
b Discharge values adjusted to exclude inflow from Salt (Screwbean) Draw which enters Pecos River between sampling point and gaging station.

Red River Basin

Runoff of the Red River near Gainesville in the 1958 water year was only about 60 percent of the 22-year average. The dissolved-solids concentration ranged from a maximum of 4,680 ppm to a minimum of 115 ppm. The latter concentration, a new minimum for the period of chemical-quality record, occurred following locally heavy rains. The weighted average of dissolved-solids concentrations was 1,950 ppm.

Floods during the spring and summer of 1957 had improved the quality of water stored in Lake Texoma, above Denison Dam. The dissolved-solids concentration of the water being released from the reservoir increased slowly during the 1958 water year, ranging from a minimum of 733 ppm for the October composite analysis to 981 ppm in September.

Sabine River Basin

The Sabine River drains an area of high rainfall in East Texas and Western Louisiana, and the water, except where polluted by oil-field or other industrial wastes, is almost always low in dissolved solids. Streamflow at the two Sabine River sampling stations during the 1958 water year was about 40 percent greater than the averages for the respective periods of record and the water was of excellent quality throughout the year. A duration curve for the Sabine River near Ruliff shows the percentage of time during which specified concentrations of dissolved solids were equaled or exceeded during the 1958 water year. (See figure 2). The curve shows that 200 ppm dissolved solids was exceeded only 2 percent of the time, and that for 50 percent of the time the concentration was 88 ppm or less.

Neches River Basin

The Neches River is similar to the Sabine River in that it also drains an area of high rainfall, and the water in the basin is usually of good quality except where polluted by oil-field or other industrial wastes. Runoff at Evadale in 1958 was thirty-five percent greater than the average for 37 years of record and almost double the discharge in 1957. The maximum dissolved-solids concentration recorded during 1958 was 138 ppm; the weighted average was 83 ppm.

Trinity River Basin

Runoff in the Trinity River basin in 1958, although less than in 1957, was approximately 60 percent greater than normal. Discharge of the Trinity River at Rosser exceeded 1,000 cfs during much of the year, and effects of sewage effluent from Fort Worth and Dallas on water quality were much less pronounced than in previous years. The maximum dissolved solids during the year was 684 ppm and the weighted average was 260 ppm.

Average discharge at Romayor during 1958 was 11,690 cfs, as compared to the 34-year average of 7,460 cfs. Except for two composite periods in October,

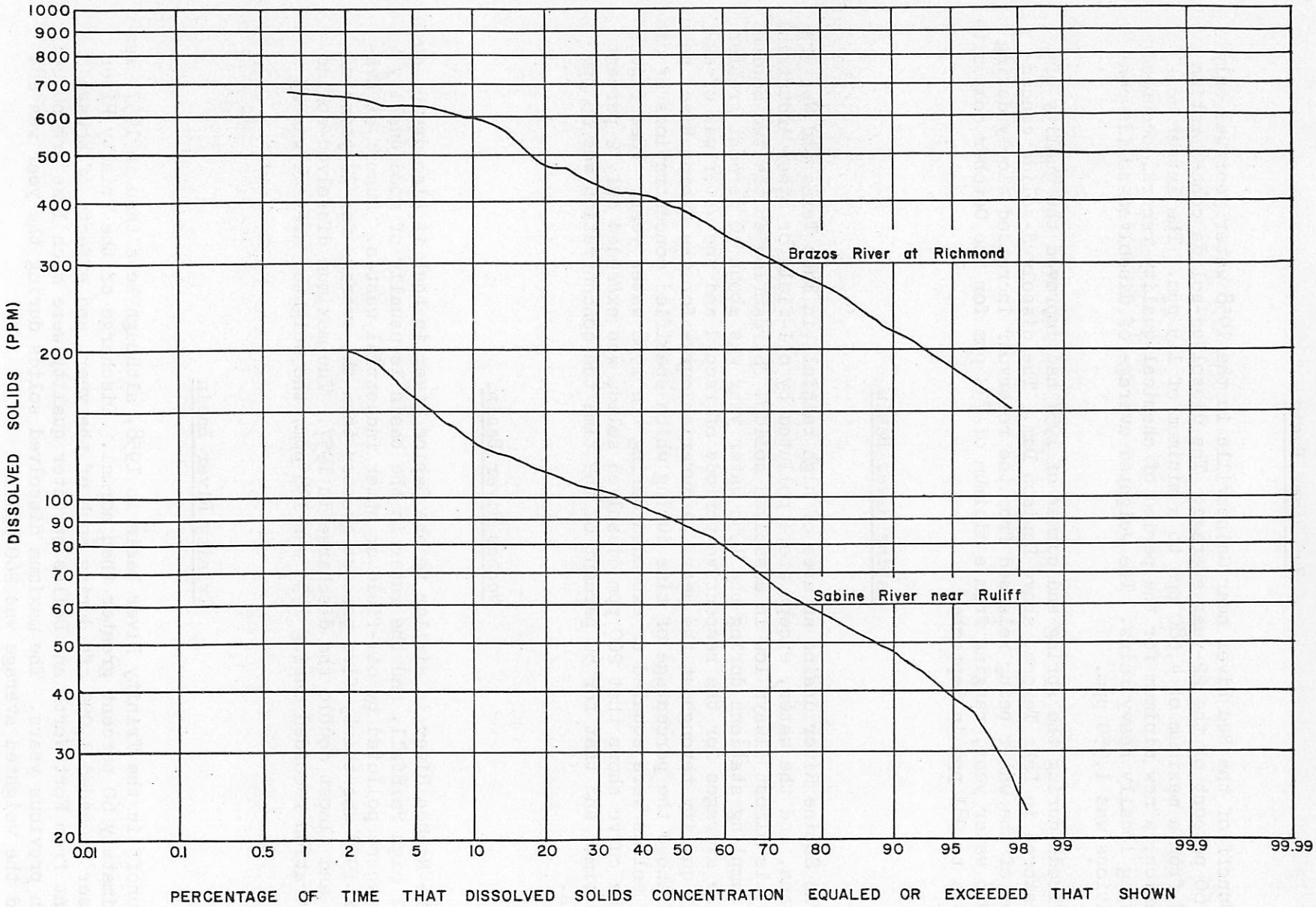


Figure 2.--Duration curves for dissolved solids, Sabine River near Ruliff and Brazos River at Richmond, 1958 water year.

no dissolved-solids determination during the year exceeded 400 ppm. The weighted average was 215 ppm.

Brazos River Basin

Chemical quality of surface waters in the Brazos River basin varies through extreme ranges. Minor tributaries, principally to the Salt Fork Brazos River, contribute water that is at times virtually saturated with dissolved solids. Flood flows, particularly in the tributaries in the lower Brazos basin, may be very low in dissolved material.

Rainfall in the upper Brazos River basin (above Possum Kingdom Reservoir) was below normal during the 1958 water year and the weighted averages of dissolved-solids concentrations in the water passing the Double Mountain Fork and Salt Fork stations near Aspermont showed considerable increase over those of the previous year.

Two new stream-gaging and sampling stations were placed in operation during April 1958 on Salt Creek at Olney and near Newcastle in Young County. The stations are being used to measure progress in a program for the abatement of oil-field pollution.

Inflow to Possum Kingdom Reservoir was below normal for the year, and the dissolved-solids concentrations of the water released exceeded 1,000 ppm during most of the year. The monthly composites ranged from 951 to 1,470 ppm dissolved solids.

Above-normal runoff occurred in the drainage area between Possum Kingdom and Whitney Dams. This water is generally of better quality than that stored in Possum Kingdom Reservoir and improves the quality of water available from Lake Whitney. The dissolved-solids concentrations of the water released from Lake Whitney ranged from 362 to 876 ppm.

Runoff of the Brazos River at Richmond during the 1958 water year exceeded by 60 percent the average for the 38-year period of record, and the dissolved-solids concentration was less than 500 ppm for 85 percent of the time. A duration curve for the station is given in figure 2 showing the percentage of time during which specified concentrations of dissolved solids were equaled or exceeded during the 1958 water year.

Colorado River Basin

Flow at the sampling stations on the Colorado River at Colorado City and near Silver was much less in 1958 than in 1957 and the water was saline much of the time. The Colorado City station had flow less than 35 percent of the average for 12 years of record, and the weighted average of dissolved solids was 1,880 ppm. At Silver, no long-time average is available for comparison. Dissolved-solids concentration here ranged from a maximum of 6,700 ppm to a minimum of 195 ppm, with weighted average of 1,080 ppm.

Flow slightly in excess of the 40-year average was recorded for the Colorado River near San Saba during the 1958 water year. Eleven years of chemical-quality records are available for this station, and during this period the

annual weighted average of dissolved solids has ranged from 184 to 380 ppm. During 1958 the weighted average was 304 ppm.

The station at Austin measures the chemical quality of water that has been thoroughly mixed by passage through the six Highland Lakes, and only gradual changes in composition occur. Water of high quality which had been stored during the 1957 high-flow year continued to be available for release in 1958 and the weighted average of dissolved solids was only 216 ppm.

Considerable inflow to the Colorado River below Austin occurred in 1958, but this water is similar in quality to that released from the lakes. The weighted average of dissolved solids at Wharton was 211 ppm.

Guadalupe River Basin

Water in the Guadalupe River is of the calcium bicarbonate type and rarely exceeds 400 ppm dissolved solids. In the 1958 water year, runoff at Victoria was more than twice the 23-year average for the station and the weighted average of dissolved solids was 264 ppm.

Nueces River Basin

The sampling station, Nueces River near Mathis, measures the quality of the water released from Lake Corpus Christi. Past records indicate that considerable variation in chemical quality occurs at upstream points in the Nueces basin, but mixing of flood flows in the lake results in water that is always of good quality. The weighted average of dissolved solids for the 1958 water year was 233 ppm. In April 1958, the new Wesley E. Seale Dam, about 1,000 feet downstream from the old Mathis Dam, was placed in operation, increasing the lake capacity from about 40,000 acre-feet to 185,000 acre-feet. The lake filled during the year to its new capacity.

Rio Grande Basin

Rainfall and runoff in the upper Rio Grande and Pecos River basins continued deficient during the 1958 water year. However, storage in Red Bluff Reservoir increased from 17,400 acre-feet to 72,300 acre-feet during the year, and the stored water was less saline than during 1957. The weighted average of dissolved solids for 1958 was 5,900 ppm as compared with 8,050 ppm in 1957.

Heavy runoff from the Rio Conchos, Devils River and other tributaries produced floods in the lower Rio Grande basin during September, with reduced dissolved-solids concentrations at Laredo and below Falcon Dam.

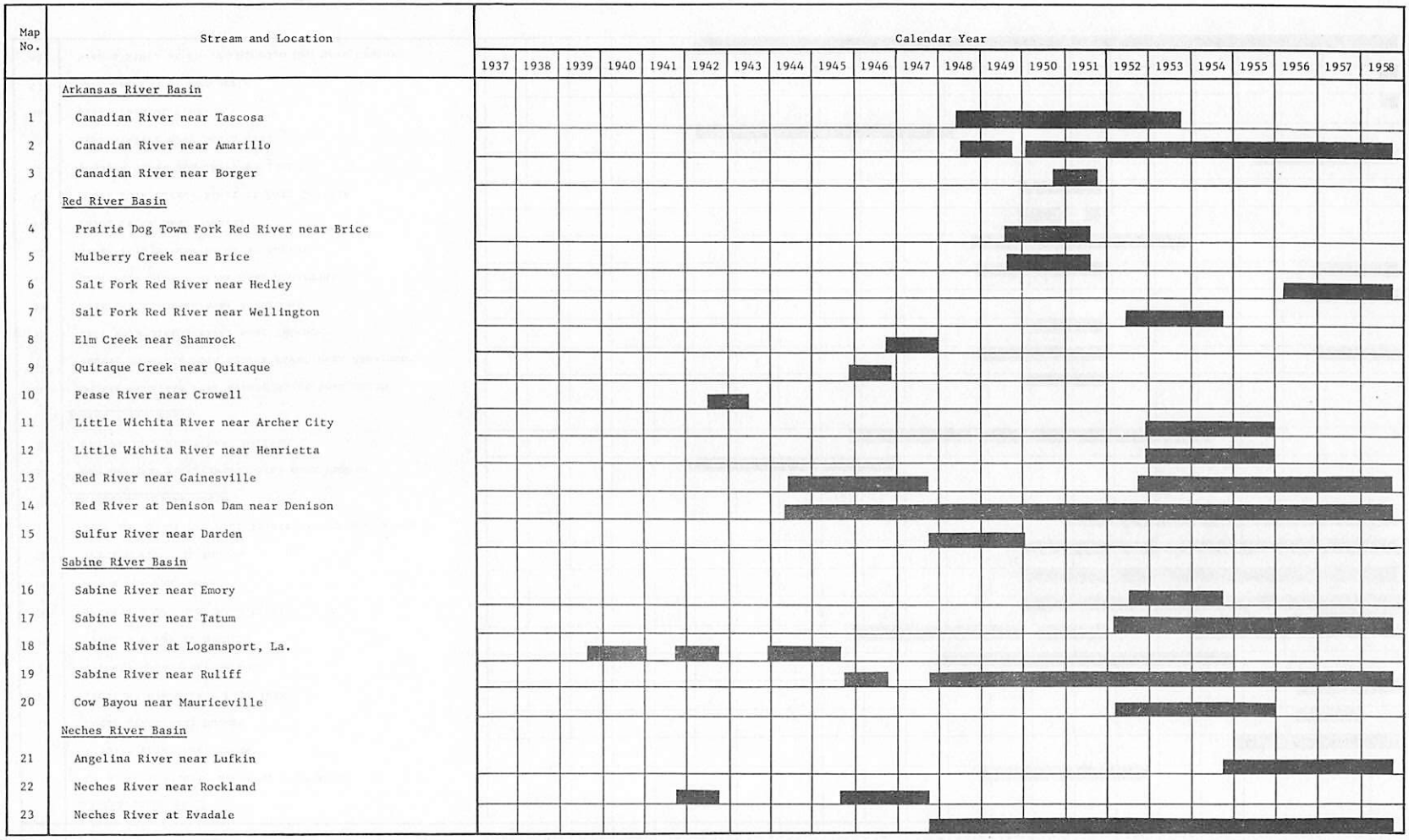


Figure 3. – Periods of operation of quality-of-water sampling stations in Texas

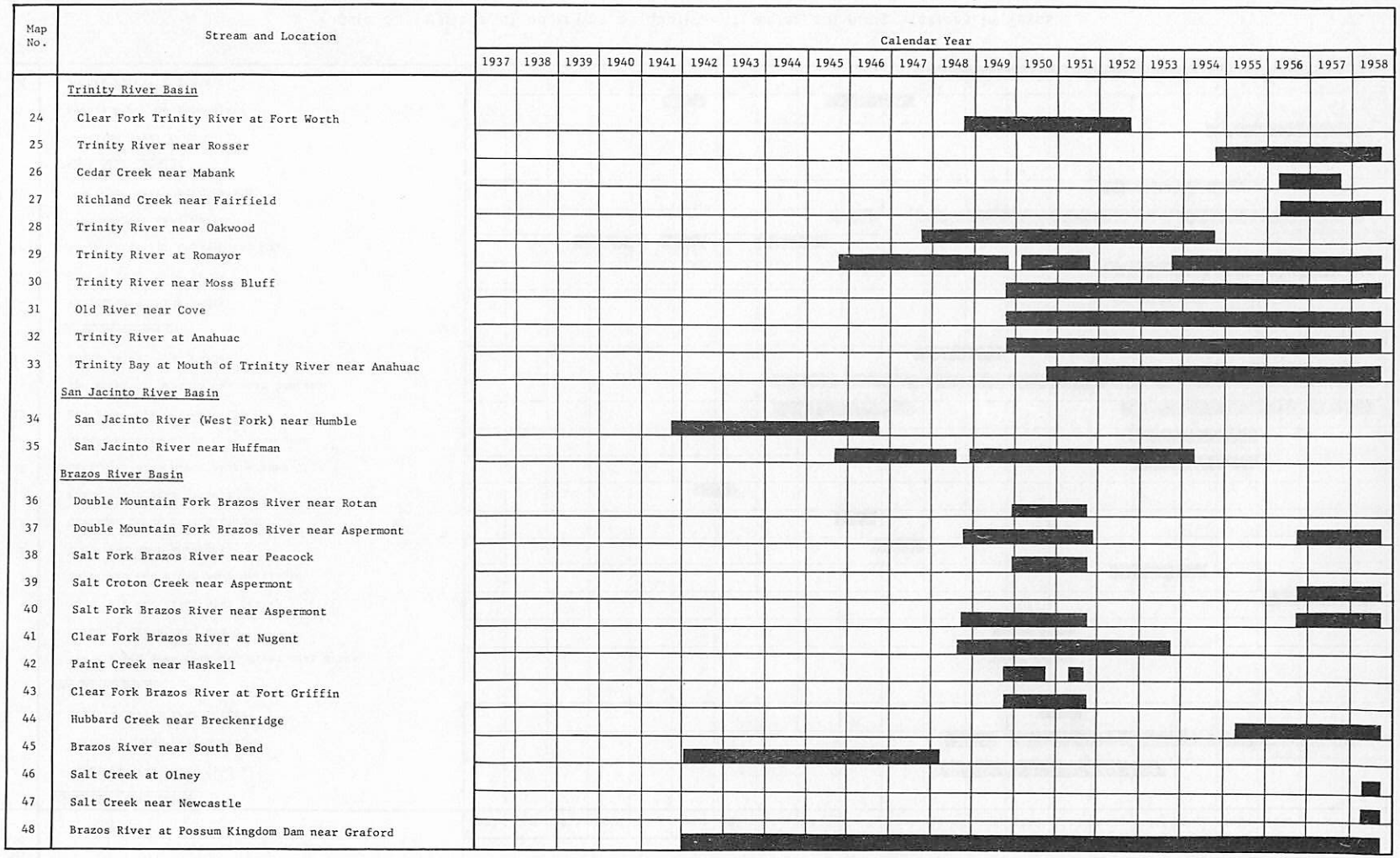


Figure 3.– Periods of operation of quality–of–water sampling stations in Texas — Continued

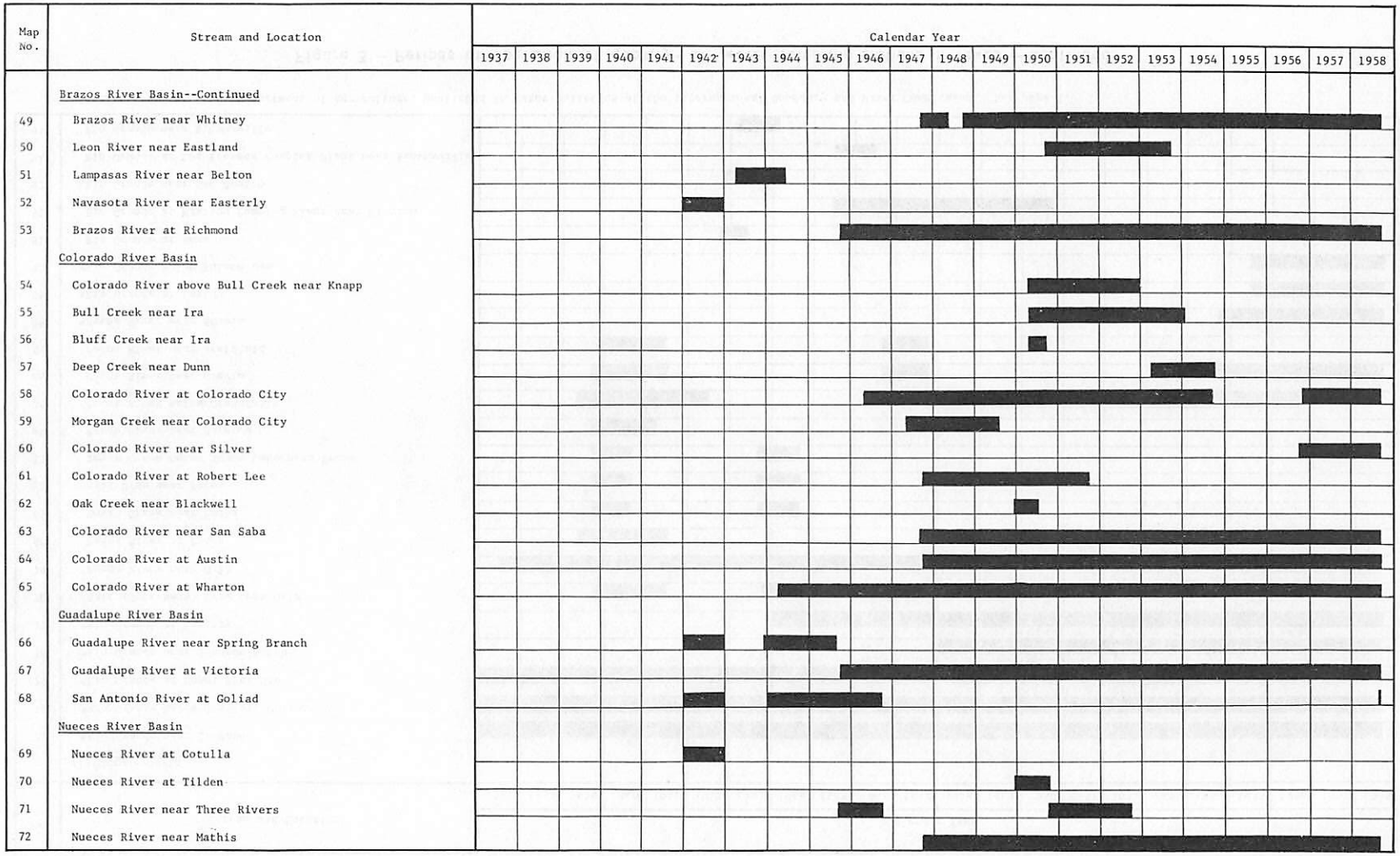
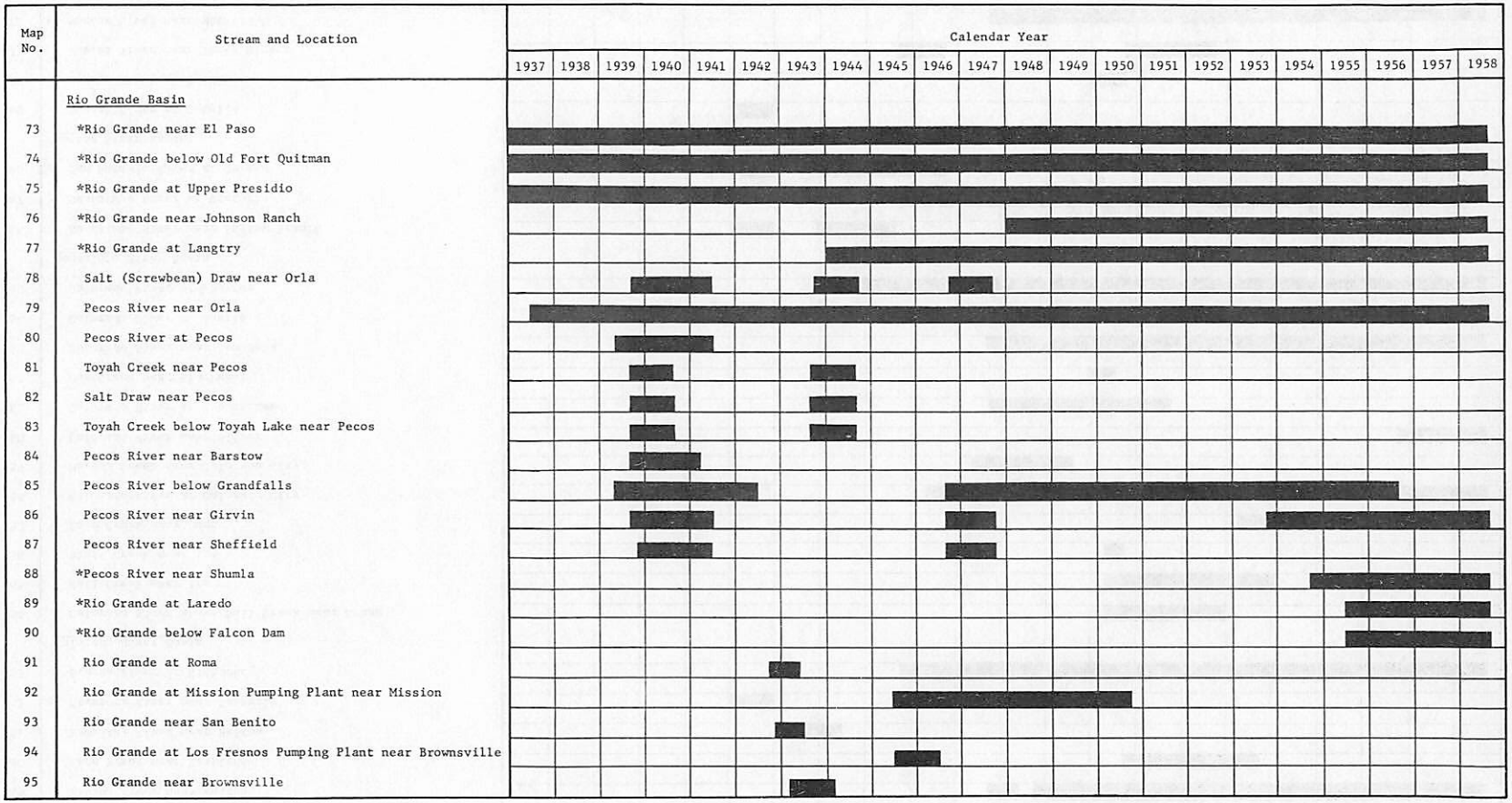


Figure 3.- Periods of operation of quality-of-water sampling stations in Texas — Continued



*Analyses by the U. S. Department of Agriculture, published in Water Bulletins of the International Boundary and Water Commission. See page 1.

Figure 3.– Periods of operation of quality-of-water sampling stations in Texas — Continued

TABLES OF ANALYSES

In the following tables the heading "Chemical analyses, in parts per million, water year October 1957 to September 1958" has been used throughout. These tables have been prepared by the U. S. Geological Survey, utilizing prepared forms with this heading appearing thereon.

The reader's attention is called to the fact that certain columns of these tables contain values that are not given in parts per million. A listing of these excepted columns follows:

Date of collection

Mean discharge (cfs)

Dissolved solids - Tons per acre-foot

Dissolved solids - Tons per day

Percent sodium

Specific conductance (micromhos at 25°C)

pH

Density at 20°C

ARKANSAS RIVER BASIN

CANADIAN RIVER NEAR AMARILLO, TEX.

LOCATION.--At gaging station at bridge on U. S. Highways 87 and 287, 1,500 feet downstream from Pitcher Creek, 1.7 miles downstream from Panhandle & Santa Fe Railway bridge, and 19 miles north of Amarillo, Potter County.
DRAINAGE AREA.--19,445 square miles, of which 4,069 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: July 1948 to October 1949, February 1950 to September 1958.
Water temperatures: August 1949 to September 1958.
Sediment records: August 1949 to September 1952.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 1,790 ppm Jan. 21-23; minimum, 302 ppm Oct. 1-11.
Hardness: Maximum, 571 ppm Dec. 21-31; minimum, 110 ppm Sept. 5-10.
Specific conductance: Maximum observed, 3,780 micromhos Jan. 21; minimum observed, 359 micromhos July 6.
Water temperatures: Maximum, 75°F July 31, Sept. 15; minimum, freezing point on many days during winter months.
EXTREMES, 1948-58.--Dissolved solids: Maximum, 3,000 ppm Mar. 21, 1957; minimum, 252 ppm Sept. 21-30, 1957.
Hardness: Maximum, 974 ppm Mar. 21,1957: minimum, 69 ppm Sept. 6, 1957.
Specific conductance: Maximum observed, 4,490 micromhos Mar. 21, 1957; minimum observed, 359 micromhos July 6, 1958.
Water temperatures (1949-58): Maximum, 95°F June 29, 1951; minimum, freezing point on many days during winter months.
REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in Water Supply Paper 1561.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
Oct. 1-11, 1957 -----	10.8	27		50	11	40		222	28	29	0.8	3.0		302	0.41	8.81	170	0	34	1.3	487	8.0
Oct. 12-20 ----------	676	21		48	15	137		210	110	132	.8	7.0		612	.83	1,120	182	10	62	4.4	966	8.0
Oct. 21-28 ----------	398	17		45	15	152		192	131	143	.8	8.7		639	.87	687	174	16	66	5.0	1,010	8.1
Oct. 29-31, Nov. 1-10	53.1	25		91	30	273		238	272	318	1.2	17		1,140	1.55	163	350	156	63	6.3	1,870	7.8
Nov. 11-20 ----------	23.5	37		115	42	323		254	333	408	2.0	33		1,420	1.93	90.1	460	252	60	6.6	2,290	8.1
Nov. 21-30 ----------	40.6	29		116	42	351		262	349	440	2.0	27		1,480	2.01	162	462	248	62	7.1	2,390	8.1
Dec. 1-10 ----------	25.0	36		125	45	368		264	373	462	2.0	43		1,580	2.15	107	497	280	62	7.2	2,530	7.2
Dec. 11-20 ----------	15.9	41		149	48	360		266	424	460	1.6	51		1,670	2.27	71.7	570	352	58	6.6	2,590	7.6
Dec. 21-31 ----------	10.9	43		148	49	319		249	402	415	1.8	64		1,560	2.12	45.9	571	361	55	5.8	2,410	7.9
Jan. 1-10, 1958 -----	23.2	38		138	46	334		260	392	420	1.6	53		1,550	2.11	97.1	534	320	58	6.3	2,440	7.6
Jan. 11-20 ----------	35.9	30		130	45	395		274	392	495	1.2	42		1,670	2.27	162	510	285	63	7.6	2,630	7.5
Jan. 21-23 ----------	35.0	20		125	43	456		a259	432	570	1.0	14		1,790	2.43	169	489	276	67	9.0	2,880	8.3
Jan. 24-29 ----------	57.7	28		114	39	348		b266	336	425	2.2	35		1,460	1.99	227	445	226	63	7.2	2,370	8.5
Jan. 30-31, Feb. 1-2	70.0	26		84	35	299		260	258	350	2.4	28		1,210	1.65	229	354	140	65	6.9	2,000	8.0
Feb. 3-10 ----------	47.1	31		127	47	397		254	410	500	2.2	33		1,670	2.27	212	510	302	63	7.6	2,690	7.6
Feb. 11-20 ----------	46.5	27		118	41	342		262	342	425	2.2	38		1,460	1.99	183	463	248	62	6.9	2,390	7.6
Feb. 21-28 ----------	62.6	28		111	43	390		245	372	480	2.4	38		1,580	2.15	267	454	253	65	8.0	2,570	7.9
Mar. 1-7 ----------	43.3	33		134	46	347		262	398	445	2.0	19		1,550	2.11	181	524	309	59	6.6	2,540	7.7
Mar. 8, 11-20 -------	212	18		79	29	309		256	262	350	1.0	11		1,180	1.60	675	316	106	68	7.6	1,980	8.1
Mar. 9-10 ----------	350	16		47	17	166		c215	132	160	1.2	7.8		d653	.89	617	188	11	66	5.3	1,120	8.4
Mar. 21-31 ----------	126	20		92	37	351		263	312	415	1.2	20		1,380	1.88	469	382	166	67	7.8	2,260	7.8
Apr. 1-8, 11-12, 16-19	162	30		82	36	277		267	267	305	2.6	25		1,160	1.58	507	352	134	63	6.4	1,940	7.1
Apr. 9-10, 13 -------	168	28		134	45	399		225	470	485	2.2	27		1,700	2.31	771	520	335	63	7.6	2,690	7.2
Apr. 14-15, 20 ------	285	13		45	19	181		216	160	165	1.0	6.8		704	.96	542	190	14	67	5.7	1,180	7.6
Apr. 21-30 ----------	46.3	30		89	31	303		258	313	312	1.2	34		1,240	1.69	155	350	138	65	7.0	1,970	7.4

a Includes equivalent of 5 parts per million carbonate (CO_3).
b Includes equivalent of 12 parts per million carbonate (CO_3).
c Includes equivalent of 6 parts per million carbonate (CO_3).
d Calculated from determined constituents.

CANADIAN RIVER NEAR AMARILLO, TEX.--Continued

Chemical analyses, in parts per million, water year October 1957 to September 1958--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
May 1-3, 6, 14-17 --	789	25		66	29	239		230	241	242	0.8	25		d981	1.33	2,090	284	95	65	6.1	1,590	7.5
May 4-5, 18-20 -----	535	5.6		46	17	150		203	149	128	.8	7.4		632	.86	913	185	18	64	4.8	1,030	7.4
May 7-13 ----------	215	20		89	34	401		224	356	472	.8	14		1,500	2.04	871	362	178	71	9.2	2,460	7.2
May 21-26 ----------	1,444	24		55	21	182		218	200	160	1.4	3.5		802	1.09	3,130	224	45	64	5.3	1,230	7.8
May 27-31 ----------	2,436	18		40	12	104		198	111	67	.9	1.2		494	.67	3,250	150	0	60	3.7	732	7.8
June 1-12 ----------	599	15		62	22	115		166	224	87	.9	2.5		672	.91	1,090	245	109	51	3.2	949	7.8
June 13-20 ---------	1,326	14		52	18	114		169	188	80	1.0	1.8		608	.83	2,180	204	65	55	3.5	869	7.7
June 21-22, July 2-8	3,979	16		33	10	64		168	61	42	.8	.5		313	.43	3,360	124	0	53	2.5	512	7.8
June 23-30, July 1--	494	16		56	18	130		178	200	97	.9	3.5		627	.85	836	214	68	57	3.9	968	7.7
July 9-15 ----------	395	16		49	15	140		176	162	120	.9	5.0		603	.82	643	184	40	62	4.5	976	7.1
July 16-31 ---------	3,074	20		41	12	86		184	89	64	.7	3.0		409	.56	3,390	152	1	55	3.0	668	8.1
Aug. 1-11 ----------	588	20		44	13	122		186	128	97	.7	5.1		d521	.71	827	164	11	62	4.1	856	8.1
Aug. 12-17 ---------	48.3	34		92	31	261		232	286	302	1.0	11		1,130	1.54	147	357	167	61	6.0	1,850	7.8
Aug. 18-31 ---------	1,822	16		37	11	94		183	105	56	.6	2.5		420	.57	2,070	138	0	60	3.5	682	8.2
Sept. 1-4 ----------	368	13		63	19	104		165	203	79	.6	3.0		596	.81	592	235	100	49	3.0	900	7.8
Sept. 5-10 ---------	3,768	12		29	9.0	78		159	75	47	.5	2.8		346	.47	3,520	110	0	61	3.2	563	8.0
Sept. 11-22 --------	822	14		38	10	118		183	112	86	.6	4.2		486	.66	1,080	136	0	65	4.4	786	8.0
Sept. 23-30 --------	88.4	22		71	24	232		222	218	252	1.0	15		981	1.33	234	276	94	65	6.1	1,570	7.5
Weighted average -	633	18		45	15	116		186	125	96	0.8	4.7		527	0.72	901	174	22	59	3.8	838	--

d Calculated from determined constituents.

MISCELLANEOUS ANALYSES OF STREAMS IN ARKANSAS RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
EAST AMARILLO CREEK NEAR AMARILLO																						
Jan. 8, 1958	10.9	44		56	31	167		476	86	103	2.4	1.0		268	0.98		724	0	58	4.4	1,210	7.6
Mar. 12	14.0	48		48	26	101		a220	72	89	2.4	73		567	.77		227	46	49	2.9	985	8.4
Apr. 17	15.2	53		52	29	111		250	87	97	2.4	63		617	.84		248	44	49	3.1	1,090	7.8
May 3	16.8	64		54	30	113		254	76	93	3.6	95		654	.89		258	50	49	3.1	1,100	7.6
June 2	13.1	60		44	33	130		b302	94	103	2.0	40		684	.93		246	0	54	3.6	1,100	8.8
July 14	12.5	79		50	29	134		c284	94	102	1.6	70		700	.95		244	10	54	3.7	1,050	8.4
Aug. 5	21.1	66		58	28	112		d264	88	101	1.8	60		645	.88		260	43	48	3.0	988	8.5
Sept. 3	15.0	67		50	30	139		290	86	113	3.5	69		707	.96		248	11	55	3.8	1,180	8.2
BONITA CREEK NEAR AMARILLO																						
Jan. 8, 1958	2.43	20		53	14	22		252	14	10		0.8		258	0.35		189	0	20	0.7	423	8.1
CHICKEN CREEK NEAR AMARILLO																						
Jan. 8, 1958	3.41	20		46	9.0	12		194	9.2	5.8		2.5		200	0.27		152	0	15	0.4	327	7.9
COETAS CREEK NEAR AMARILLO																						
Jan. 8, 1958	1.20	21		51	9.0	16		200	15	12		3.0		225	0.31		165	1	17	0.5	372	8.1

a Includes equivalent of 6 parts per million carbonate (CO_3).
b Includes equivalent of 39 parts per million carbonate (CO_3).
c Includes equivalent of 14 parts per million carbonate (CO_3).
d Includes equivalent of 16 parts per million carbonate (CO_3).

SALT FORK RED RIVER NEAR HEDLEY, TEX.

LOCATION.--Half a mile downstream from Whitefish Creek, 2½ miles upstream from Jesse Arroyo and about 9 miles northeast of Hedley, Donley County.
DRAINAGE AREA.--868 square miles, of which 209 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: March 1956 to September 1958.
Water temperatures: March 1956 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 2,370 ppm Jan. 1,3; minimum, 575 ppm Oct. 15, 17-18.
Hardness: Maximum 1,460 ppm Jan. 1,3; minimum, 238 ppm Oct 15, 17-18.
Specific conductance: Maximum observed, 2,980 micromhos Jan. 1; minimum observed, 638 micromhos July 7.
Water temperatures: Maximum 91°F Aug. 12; minimum observed, freezing point Feb. 17.
EXTREMES, March 1956 to September 1958.--Dissolved solids: Maximum, 2,600 ppm Apr. 30, 1956; minimum, 231 ppm Aug. 29, 1957.
Hardness: Maximum, 1,640 ppm Apr. 30, 1956; minimum, 126 ppm Aug. 29, 1957.
Specific conductance: Maximum observed, 3,530 micromhos Jan. 25, 1957; minimum observed, 382 micromhos Aug. 29, 1957.
Water temperatures: Maximum, 95°F June 30, 1957; minimum, freezing point Jan. 16-18, 1957, Feb. 17, 1958.
REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available. No flow during much of the period.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
Oct. 9-14, 16, 19-20, 1957		22		97	31	140		194	250	178	0.8	1.5		866	1.18		370	210	45	3.2	1,320	8.0
Oct. 15, 17-18		17		64	19	104		136	166	125	.8	1.0		575	.78		238	126	49	2.9	925	7.9
Oct. 21-31		24		113	37	166		176	334	212	1.8	1.8		992	1.35		434	290	45	3.5	1,520	7.9
Nov. 1-12		30		105	32	141		200	262	184	1.0	1.8		889	1.21		394	230	44	3.1	1,370	7.9
Nov. 13-24		25		109	33	152		210	275	195	1.0	1.8		924	1.26		408	236	45	3.3	1,430	8.0
Nov. 25-30		34		122	34	157		210	328	190	.8	2.0		a 971	1.32		444	272	43	3.2	1,490	7.9
Dec. 1-5, 7-13		33		122	38	175		209	370	200	.8	2.5		1,040	1.41		461	290	45	3.6	1,560	7.9
Dec. 14-18, 27-30		30		380	96	181		212	1,180	235	.6	1.0		2,210	3.01		1,340	1,170	23	2.1	2,670	7.9
Dec. 19-26, 31		32		120	34	174		219	318	215	.8	3.0		1,000	1.36		440	260	46	3.6	1,540	8.0
Jan. 1, 3, 1958		28		408	108	185		217	1,280	250	.6	.5		2,370	3.22		1,460	1,280	22	2.1	2,860	7.9
Jan. 2, 4-10		30		120	33	150		220	290	195	.6	3.0		a 930	1.26		435	254	43	3.1	1,450	8.0
Jan. 11-23		28		116	35	154		224	294	195	.8	2.5		974	1.32		434	250	44	3.2	1,450	8.0
Jan. 24-31		27		112	35	162		208	306	200	1.0	3.0		990	1.35		424	253	45	3.4	1,490	8.2
Feb. 1-14		28		107	36	159		b 197	300	200	1.0	3.0		984	1.34		415	254	45	3.4	1,460	8.4
Feb. 15-28		26		107	34	161		200	294	200	1.0	3.0		984	1.34		407	243	46	3.5	1,460	8.2
Mar. 1-10		26		98	31	143		198	264	170	1.2	3.0		870	1.18		372	210	45	3.2	1,310	8.2
Mar. 11-21, 23-31		28		98	33	142		196	262	178	.8	2.4		862	1.17		380	220	45	3.2	1,330	8.1
Apr. 2, 9-21		28		92	33	154		188	280	177	.9	2.2		a 859	1.17		365	211	48	3.5	1,310	7.9
Apr. 3-8		30		149	54	185		160	548	205	.9	4.0		1,250	1.70		594	463	40	3.3	1,800	7.9
Apr. 22-29		26		116	40	152		186	356	182	.9	2.2		970	1.32		454	302	42	3.1	1,470	7.9
May 1-12		28		102	37	140		160	374	132	1.0	1.2		972	1.32		406	276	43	3.0	1,470	7.9
May 13-19		22		110	28	120		196	306	118	.9	2.0		a 803	1.09		390	229	40	2.6	1,180	8.0
July 7-10		42		77	20	98		136	209	109	.7	2.2		640	.87		274	162	44	2.6	966	7.8
July 11-20		46		114	42	132		96	446	140	.7	1.2		a 969	1.32		457	378	39	2.7	1,390	7.6
July 23, 30-31		53		113	36	143		136	387	158	.7	1.5		991	1.35		430	318	42	3.0	1,400	7.7
July 21-22, 24-28, 29		36		80	19	88		155	193	97	.7	2.2		607	.83		278	150	41	2.3	921	7.7
Aug. 1-22		24		115	39	144		141	396	162	.7	1.8		999	1.36		448	332	41	3.9	1,450	7.8
Aug. 23-31, Sept. 1-2		42		167	61	175		92	678	187	.8	.5		1,360	1.85		668	592	36	2.9	1,890	7.5

a Calculated from determined constituents
b Includes equivalent of 16 parts per million of carbonate (CO_3)

RED RIVER NEAR GAINESVILLE, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 77, a quarter of a mile downstream from Gulf, Colorado and Santa Fe Railway bridge, 5 miles downstream from Fish Creek, and 7 miles north of Gainesville, Cooke County, and at mile 791.5.
DRAINAGE AREA.--30,782 square miles, of which 5,936 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: May 1944 to April 1946, October 1952 to September 1958.
Water temperatures: October 1952 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 4,680 ppm Nov. 1-3; minimum, 115 ppm Nov. 4.
Hardness: Maximum, 1,180 ppm Nov. 1-3; minimum, 83 ppm Nov. 4
Specific conductance: Maximum observed, 8,150 micromhos Nov. 3; minimum observed, 176 micromhos Nov. 4
Water temperatures: Maximum, 90°F Aug. 15; minimum, 34°F Feb. 13.
EXTREMES, 1944-46, 1952-58.--Dissolved solids: Maximum, 6,480 ppm Apr. 11, 1953; minimum, 115 ppm Nov. 4, 1957.
Hardness: Maximum, 1,510 ppm Apr. 11, 1953; minimum, 83 ppm Nov. 4, 1957.
Specific conductance: Maximum observed, 9,890 micromhos Apr. 11, 1953; minimum observed, 176 micromhos Nov. 4, 1957.
Water temperatures (1952-58): Maximum, 95°F July 13, 1954; minimum, freezing point Dec. 23, 1953, Jan. 21, 1954, Jan. 16-17, 1957.
REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples for period May 1944 to April 1946 available in district office at Austin, Tex. Record of specific conductance of daily samples for period October 1952 to September 1958 available in district office at Oklahoma City, Okla.
Records of discharge for water year October 1957 to September 1958 given in Water-Supply Paper 1561.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (Residue at 180°C) Parts per million	Dissolved solids (Residue at 180°C) Tons per acre-foot	Dissolved solids (Residue at 180°C) Tons per day	Hardness as $CaCO_3$ Calcium, magnesium	Hardness as $CaCO_3$ Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
Oct. 1-5, 1957	601	--	--	184	59		399	130	453	700	--	1.7		2,080	2.83	3,380	700	594	55	6.6	3,410	7.7
Oct. 6-10	370	--	--	208	78		604	172	498	1,060	--	--		2,640	3.59	2,640	840	699	61	9.1	4,300	7.8
Oct. 11-12	1,720	--	--	234	67		592	180	540	1,020	--	--		2,630	3.58	12,210	860	712	60	8.8	4,210	8.0
Oct. 13	3,900	--	--	174	45		341	126	365	620	--	5.5		1,710	2.33	18,010	620	516	54	6.0	2,800	7.7
Oct. 14-20	3,116	--	--	226	60		610	124	573	1,020	--	--		2,630	3.58	22,130	810	708	62	9.3	4,280	7.7
Oct. 21-31	1,311	18	0.00	288	59	790		152	712	1,200	0.5	--		3,390	4.61	12,000	960	836	64	11	5,240	8.1
Nov. 1-3	683	--	--	344	78		1,110	196	793	1,850	--	--		4,680	6.36	8,630	1,180	1,020	67	14	7,460	8.1
Nov. 4	1,110	--	--	28	3.2		6.4	84	14	7.0	--	4.6		115	.16	345	83	14	14	.3	176	7.7
Nov. 5-8	8,425	--	--	102	28		271	140	204	445	--	5.1		1,200	1.63	27,300	370	256	61	6.1	2,100	7.9
Nov. 9	13,800	--	--	63	15		125	120	99	202	--	3.9		610	.83	22,730	218	120	55	3.7	1,050	7.7
Nov. 10	10,200	--	--	57	13		112	118	85	178	--	3.1		536	.73	14,760	194	98	56	3.5	941	7.9
Nov. 11-12	7,025	--	--	62	15		119	122	91	198	--	2.5		618	.84	11,720	216	116	55	3.5	1,060	7.8
Nov. 13-17	6,698	--	--	85	18		217	124	147	355	--	2.3		959	1.30	17,340	285	184	62	5.6	1,670	7.7
Nov. 18-19	3,030	--	--	146	40		419	166	290	710	--	2.2		1,790	2.43	14,640	530	394	63	7.9	3,090	7.8
Nov. 20	2,040	--	--	200	44		546	196	418	900	--	1.8		2,400	3.26	13,220	680	520	64	9.1	4,010	8.1
Nov. 21-22	1,670	--	--	160	39		373	244	303	605	--	2.2		1,680	2.28	7,580	560	360	59	6.9	2,840	8.2
Nov. 23-30	1,168	--	--	236	61		624	224	497	1,060	--	--		2,880	3.92	9,080	840	656	62	9.4	4,770	8.0
Dec. 1-10	687	--	--	280	68		780	252	611	1,300	--	--		3,520	4.79	6,530	980	774	63	11	5,600	7.8
Dec. 11-20	537	--	--	280	88		756	244	643	1,300	--	--		3,580	4.87	5,190	1,060	860	61	10	5,690	7.9
Dec. 21-31	514	--	--	272	88		694	252	598	1,220	--	--		3,310	4.50	4,590	1,040	834	59	9.4	5,210	7.9
Jan. 1-11, 1958	442	14	.00	280	93	819		296	639	1,420	.2	--		3,450	4.69	4,120	1,080	838	62	11	5,480	8.2
Jan. 12	430	--	--	102	23		199	204	169	310	--	3.1		934	1.27	1,080	350	183	55	4.6	1,580	8.2
Jan. 13-14	1,225	--	--	158	43		334	228	277	580	--	1.9		1,690	2.30	5,590	570	383	56	6.1	2,800	8.2
Jan. 15-17	820	--	--	220	63		531	268	455	900	--	2.4		2,690	3.66	5,960	810	590	59	8.1	4,120	8.2
Jan. 18	775	--	--	70	8.6		54	180	89	60	--	2.6		391	.53	818	210	62	36	1.6	660	8.2
Jan. 19-21	2,107	--	--	120	34		299	188	214	505	--	2.3		1,360	1.85	7,740	440	286	60	6.2	2,210	8.0
Jan. 22	2,540	--	--	72	9.8		51	188	88	60	--	1.8		390	.53	2,670	220	66	34	1.5	640	8.2
Jan. 23-24	2,085	--	--	136	38		355	198	272	580	--	3.1		1,560	2.12	8,780	495	332	61	6.9	2,570	8.1
Jan. 25-31	1,223	--	--	190	53		469	246	375	790	--	4.0		2,360	3.21	7,790	690	488	60	7.8	3,700	8.1
Feb. 1-10	998	--	--	208	68		629	220	487	1,050	--	--		2,860	3.89	7,710	800	620	63	9.7	4,490	8.1
Feb. 11-20	694	--	--	248	93		769	256	604	1,300	--	--		3,400	4.62	6,370	1,000	790	63	11	5,520	7.6
Feb. 21-28	928	--	--	232	88		705	196	596	1,200	--	--		3,280	4.46	8,220	1,020	780	62	10	5,280	8.0
Mar. 1-6	784	--	--	220	76		704	164	609	1,150	--	--		3,160	4.30	6,690	860	726	64	10	5,000	7.9
Mar. 7	900	--	--	104	22		201	a204	188	300	--	1.0		1,010	1.37	2,450	375	182	56	4.7	1,700	8.4

a Includes the equivalent of 12 parts per million carbonate (CO_3).

Chemical analyses, in parts per million, water year October 1957 to September 1958--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (Residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Mar. 8, 1958	783	--		108	61		288	b198	293	480		1.1		1,520	2.07	3,210	520	358	55	5.5	2,540	8.4
Mar. 9-10	764	--		192	66		542	224	456	900		.7		2,520	3.43	5,200	750	566	61	8.6	4,080	8.1
Mar. 11-20	1,281	--		208	76		618	228	485	1,050		--		2,800	3.81	9,680	830	643	62	9.3	4,480	8.1
Mar. 21-29	1,203	--		248	78		989	168	602	1,650		--		3,800	5.17	12,340	940	802	70	14	6,060	8.0
Mar. 30-31	2,560	--		176	59		613	168	393	1,040		--		2,440	3.32	16,870	680	542	66	10	4,020	8.1
Apr. 1-2	3,950	--		123	37		363	c158	246	610		4.5		1,620	2.20	17,280	460	330	63	7.4	2,550	8.4
Apr. 3-4	2,635	--		95	30		253	b150	177	425		3.2		1,170	1.59	8,320	360	237	60	5.8	1,900	8.5
Apr. 5-6	2,230	--		166	50		487	d166	384	810		2.2		2,270	3.09	13,670	620	484	63	8.5	3,610	8.3
Apr. 7-10	1,139	--		208	68		734	e180	493	1,230		--		3,000	4.08	9,230	800	652	67	11	4,730	8.4
Apr. 11-19	776	11		208	63		757	178	496	1,250		--		3,000	4.08	6,290	780	634	68	12	4,720	8.1
Apr. 20	2,630	--		78	11		111	146	102	180		2.9		618	.84	4,390	240	120	50	3.1	1,010	8.1
Apr. 21-27	3,866	11		160	51		493	154	355	840		3.3		2,120	2.88	22,130	610	484	64	8.7	3,400	8.1
Apr. 28	3,840	--		88	15		191	120	163	300		4.5		873	1.19	9,050	280	182	60	5.0	1,440	8.2
Apr. 29-30	4,795	--		144	29		376	188	285	600		1.8		1,650	2.24	21,360	480	326	63	7.5	2,590	8.1
May 1	4,940	--		144	33		398	a164	302	645		2.5		1,700	2.31	22,670	495	360	64	7.8	2,780	8.5
May 2	13,800	--		50	7.5		46	122	53	71		2.0		328	.45	12,220	156	56	39	1.6	518	8.1
May 3-5	18,870	--		79	20		182	d132	154	285		3.3		851	1.16	43,360	278	170	59	4.7	1,380	8.3
May 6-8	13,900	--		59	16		107	126	85	178		2.6		575	.78	21,580	212	108	52	3.2	928	8.2
May 9-11	4,997	--		95	27		186	e144	182	315		2.2		1,000	1.36	13,490	350	232	54	4.3	1,570	8.4
May 12-16	5,398	--		154	38		411	148	350	670		2.6		1,770	2.41	25,800	540	418	62	7.7	2,780	8.2
May 17-20	4,530	--		312	95		794	152	928	1,280		--		3,520	4.79	43,050	1,170	1,050	60	10	5,430	8.2
May 21-31	3,427	16	0.02	280	54	686		144	711	1,080	0.5	2.0		3,130	4.26	28,960	920	802	62	9.8	4,580	7.9
June 1-7	1,252	--		208	78		639	160	607	1,040		--		2,760	3.75	9,330	840	709	62	9.6	4,290	7.8
June 8-19	539	--		220	115		874	162	713	1,450		--		3,590	4.88	5,220	1,020	887	65	12	5,580	8.2
June 20	594	--		60	9.8		82	118	76	135		2.0		454	.62	728	190	94	48	2.6	752	8.2
June 21-22	1,995	--		168	68		502	d146	412	880		2.0		2,230	3.03	12,010	700	580	61	8.2	3,540	8.3
June 23-25	5,597	--		92	32		232	d134	194	390		3.5		1,100	1.50	16,620	360	250	58	5.3	1,780	8.4
June 26-29	4,332	--		168	39		448	126	441	700		4.4		1,960	2.67	22,920	580	476	63	8.1	3,050	8.1
June 30	1,860	--		240	117		822	116	876	1,320		--		3,720	5.06	18,680	1,080	985	62	11	6,440	8.1
July 1-8	1,025	--		312	54		690	146	769	1,120		--		3,210	4.37	8,880	1,000	880	60	9.5	4,830	8.2
July 9-15	5,257	--		200	37		458	120	503	725		3.1		2,100	2.86	29,810	650	552	61	7.8	3,220	7.8
July 16-20	1,008	--		260	47		650	136	636	1,050		--		2,860	3.89	7,780	840	728	63	9.8	4,430	8.2
July 21-24	858	--		236	56		629	138	570	1,050		--		2,750	3.74	6,370	820	707	63	9.5	4,300	8.0
July 25-27	1,317	--		172	51		479	138	388	825		1.2		2,080	2.83	7,400	640	527	62	8.2	3,320	8.0
July 28-29	2,675	--		264	59		699	122	671	1,150		--		3,080	4.19	22,250	900	800	63	10	4,740	8.1
July 30-31	2,490	--		148	32		356	108	351	580		3.7		1,600	2.18	10,760	500	412	61	6.9	2,520	8.0

a Includes the equivalent of 12 parts per million carbonate (CO_3).
b Includes the equivalent of 10 parts per million carbonate (CO_3).
c Includes the equivalent of 8 parts per million carbonate (CO_3).
d Includes the equivalent of 4 parts per million carbonate (CO_3).
e Includes the equivalent of 6 parts per million carbonate (CO_3).

RED RIVER NEAR GAINESVILLE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1957 to September 1958--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (Residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Aug. 1-5, 1958	1,558			204	46	437		110	546	700		4.2		2,080	2.83	8,750	700	610	58	7.2	3,220	7.1
Aug. 6-10	790			268	56	704		134	671	1,150		--		3,110	4.23	6,630	900	790	63	10	4,850	8.0
Aug. 11-20	507			224	59	601		112	580	1,000		--		2,640	3.59	3,610	800	708	62	9.2	4,180	7.8
Aug. 21-31	383			196	66	610		104	542	1,020		--		2,620	3.56	2,710	760	675	64	9.6	4,180	7.2
Sept. 1	402			156	59	520		90	452	860		4.8		2,200	2.99	2,390	630	556	64	9.0	3,490	7.9
Sept. 2-9	260			220	76	646		124	587	1,100		--		2,850	3.88	2,000	860	758	62	9.6	4,490	7.9
Sept. 10	345			172	56	428		114	433	740		4.4		2,000	2.72	1,860	660	566	59	7.3	3,130	8.0
Sept. 11-22	267			200	78	575		138	511	1,010		2.4		2,600	3.54	1,870	820	707	60	8.7	4,110	7.9
Sept. 23-27	355			264	83	891		112	702	1,500		--		3,680	5.00	3,530	1,000	908	66	12	5,820	7.9
Sept. 28-30	229			216	63	662		136	554	1,100		--		2,800	3.81	1,730	800	688	64	10	4,510	7.9
Weighted average	1,998			164	44	434		151	383	717		--		1,950	2.65	10,520	590	466	62	7.8	3,100	--

RED RIVER AT DENISON DAM NEAR DENISON, TEX.

LOCATION.--Immediately below dam on Red River, 1.7 miles upstream from Sand Creek, 4 miles northwest of Denison, Grayson County, and 3 miles upstream from gaging station near Colbert, Bryan County, Okla.
DRAINAGE AREA.--39,719 square miles above dam, 39,777 square miles above gaging station of which 5,936 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: May 1944 to September 1958.
Water temperatures: October 1945 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 981 ppm Sept. 1-30; minimum, 733 ppm Oct. 1-31.
Hardness: Maximum, 348, ppm Sept. 1-30; minimum, 294 ppm Oct. 1-31, Feb. 1-28.
Specific conductance: Maximum observed, 2,030 micromhos Aug. 21; minimum observed, 1,230 micromhos Oct. 9, Nov. 6.
EXTREMES, 1944-58.--Dissolved solids: Maximum, 1,430 ppm Aug. 11-20, Sept. 1-10, 1944; minimum, 464 ppm Oct. 21-31, 1945.
Hardness: Maximum, 522 ppm Aug. 11-20, Sept. 1-10, 1944; minimum, 233 ppm Dec. 21-31, 1945, Jan. 11-20, 1946.
Specific conductance: Maximum observed, 3,520 micromhos Aug. 14, 1944; minimum observed, 156 micromhos Oct. 16, 1945.
REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for gaging station near Colbert, Okla. for water year October 1957 to September 1958 given in Water-Supply Paper 1561. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1957	5,720	15		85	20	144		132	173	225		1.2		733	1.00	11,320	294	186	51	3.6	1,240	8.2
Nov. 1-30	9,243	11		92	20	157		133	184	250		.8		790	1.07	19,720	312	202	52	3.9	1,330	8.2
Dec. 1-31	5,260	10		91	21	157		133	185	250		1.0		852	1.16	12,100	314	204	52	3.8	1,320	7.9
Jan. 1-31, 1958	1,669	8.8		91	19	174		134	205	255		.8		845	1.15	3,810	305	195	55	4.3	1,370	8.1
Feb. 1-28	4,397	9.6		88	18	158		137	176	242		.8		815	1.11	9,680	294	181	54	4.0	1,330	7.9
Mar. 1-31	1,610	7.6		91	21	165		142	175	265		.9		813	1.11	3,530	314	197	53	4.0	1,360	8.2
Apr. 1-30	3,095	9.2		91	21	167		144	184	260		1.5		839	1.14	7,010	314	196	54	4.1	1,380	7.5
May 1-31	11,520	11		90	19	181		131	186	280		.8		a832	1.13	25,880	302	195	57	4.5	1,440	7.7
June 1-30	2,344	8.8		93	24	187		148	187	298		1.5		914	1.24	5,780	330	209	55	4.5	1,510	7.8
July 1-31	2,856	9.0		95	21	197		145	189	308		1.2		966	1.31	7,450	324	204	57	4.7	1,550	7.6
Aug. 1-31	2,485	8.8		96	24	224		144	202	348		.8		a975	1.33	6,540	338	220	59	5.3	1,670	7.8
Sept. 1-30	1,614	9.4		100	24	220		148	209	345		.5		a981	1.33	4,280	348	226	58	5.1	1,700	8.0
Weighted average	4,320	11		91	20	171		136	185	268		1.0		837	1.14	9,760	309	198	55	4.2	1,400	--

a Calculated from determined constituents.

MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
NORTH GROESBECK CREEK NEAR NORTH GROESBECK																						
Aug. 20, 1958	2.33	27		660	130	530		192	1,920	830		8.8		4,200	5.71		2,180	2,020	35	4.9	5,360	8.1
SOUTH GROESBECK CREEK NEAR ACME																						
Aug. 20, 1958	4.66	20		595	97	151		93	1,730	235		3.8		2,880	3.92		1,880	1,810	15	1.5	3,300	8.0
GROESBECK CREEK NEAR QUANAH																						
Aug. 20, 1958	4.72	26		585	109	320		75	1,830	450		2.5		3,360	4.57		1,910	1,850	27	3.2	4,020	7.5
WANDERERS CREEK AT ODELL																						
Oct. 21, 1957	6.5	32		186	64	131	5.6	368	493	138		12		1,240	1.69		727	425	28	2.1	1,720	--
Jan. 10, 1958	6.02	15		263	103	248		418	906	230	0.7	10		1,980	2.69		1,080	738	33	3.3	2,620	8.0
Aug. 20	1.22	37		46	38	91		165	199	81		15		a616	.84		272	136	42	2.4	928	8.2
LELIA LAKE CREEK NEAR HEDLEY																						
Nov. 27, 1957	6.31	32		87	25	79		199	231	57		8.9		a649	0.88		320	157	35	1.9	956	7.9
Feb. 13, 1958	11.7	43		66	25	56	2.9	114	199	56		9.3		513	.70		268	174	31	1.5	806	8.2
NORTH FORK RED RIVER NEAR SHAMROCK																						
Jan. 9, 1958	15.2	20		189	36	202		178	390	360		0.5		1,290	1.75		620	474	42	3.5	2,050	7.5
Feb. 13	5.89	42		205	45	252		89	530	438		1.8		1,560	2.12		696	624	44	4.1	2,550	8.0
SWEETWATER CREEK NEAR WHEELER																						
Oct. 1, 1957	0.14	40		37	11	33		200	25	13		0.5		258	0.35		138	0	34	1.2	385	8.2
Jan. 9, 1958	7.15	24		64	13	36		285	25	23		.5		326	.44		214	0	27	1.1	530	8.0
Feb. 13	6.14	42		--	15	42	2.9	--	28	24		1.2		--	--		--	--	--	--	526	--
ELM CREEK NEAR SHAMROCK																						
Jan. 9, 1958	1.41	23		197	25	89		248	425	100		1.5		982	1.34		594	391	25	1.6	1,400	7.6
ROARING SPRINGS NEAR ROARING SPRINGS																						
Jan. 28, 1958	1.34	64			28	79	8.0		74	85		28									869	
Apr. 16	1.57							180		73							205	58			919	8.2

a Residue on evaporation at 180°C.

MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN TEXAS--Continued

Chemical analyses, in parts per million, water year October 1957 to September 1958--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
NORTH FORK WICHITA RIVER AT FM ROAD 1038 NEAR HACKBERRY																						
July 30, 1958		14		275	56	201		111	766	328		2.5		1,700	2.31		916	826	32	2.9	2,450	7.7
NORTH FORK WICHITA RIVER ABOVE MOUTH OF SALT CREEK																						
July 30, 1958								128		1,980							1,280	1,180			7,660	7.9
SALT CREEK ABOVE SALT CREEK SPRING NEAR PADUCAH																						
July 30, 1958		13		92	15	332		92	196	520		1.0		1,210	1.65		291	216	71	8.5	2,190	7.6
SALT CREEK AT MOUTH 10 MILES SOUTHEAST OF PADUCAH																						
July 30, 1958								57		7,240							1,730	1,680			21,400	7.9
NORTH FORK WICHITA RIVER BELOW MOUTH OF SALT CREEK																						
July 30, 1958								108		4,490							1,580	1,490			14,300	7.9
NORTH FORK WICHITA RIVER AT BRIDGE NEAR FOARD-COTTLE COUNTY LINE																						
July 30, 1958		10		444	94	2,310		106	1,310	3,590				7,810	10.6		1,490	1,410	77	26	12,200	7.6
SOUTH WICHITA RIVER AT GUTHRIE																						
July 30, 1958		8.8		570	227	1,450		103	2,020	2,350				6,680	9.08		2,360	2,270	57	13	9,530	7.5
SOUTH FORK WICHITA RIVER AT BATEMAN RANCH SIX MILES EAST OF GUTHRIE																						
July 30, 1958		15		833	178	4,830		121	2,220	7,730				15,900	21.6		2,810	2,710	79	40	23,000	7.5
WICHITA RIVER AT FM ROAD 1919 ABOVE LAKE KEMP																						
July 30, 1958		14		500	88	1,230		75	1,190	2,120				5,180	7.04		1,610	1,550	62	13	8,020	7.4
WICHITA RIVER AT FM ROAD 810, 5 MILES NORTHWEST OF PETROLIA																						
July 29, 1958		11		162	40	391		117	400	640		3.0		1,700	2.31		568	472	60	7.1	2,870	7.6

MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN TEXAS--Continued

Chemical analyses, in parts per million, water year October 1957 to September 1958--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
WICHITA RIVER AT FM ROAD 171 NEAR BYERS																						
July 29, 1958----------								116		610							545	450			2,750	7.8
LAKE TEXOMA NEAR DENISON																						
Nov. 20, 1957----------		5.2	0.05	81	17	149		104	170	235	0.5	0.8		a776	1.06		272	187	54	3.9	1,250	8.0
NORTH SULPHUR RIVER NEAR COOPER																						
Sept. 26, 1958----------	0.8	13		70	8.1	73		81	210	57		0.5		472	0.64		208	142	43	2.2	751	7.8
LAKE TEXARKANA AT TEXARKANA DAM																						
Dec. 20, 1957----------		6.4	0.17	20	1.6	7.4	3.6	66	12	7.5	0.2	0.2	0.05	91	0.12		56	0	21	0.4	160	7.3
CADDO LAKE NEAR KARNACK																						
June 23, 1958----------		6.4	0.40	4.9	2.4	4.0	2.1	16	7.6	6.5	0.4	0.5		43	0.06		22	9	26	0.4	71.0	5.6

a Residue on evaporation at 180°C.

SABINE RIVER NEAR TATUM, TEX.

LOCATION.--At gaging station at bridge on State Highway 43, 5 miles upstream from Potter Creek, 5.2 miles northeast of Tatum, Rusk County, 7 miles downstream from Cherokee Bayou, and at mile 339.
DRAINAGE AREA.--3,586 square miles.
RECORDS AVAILABLE.--Chemical analyses: February 1952 to September 1958.
Water Temperatures: February 1952 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 424 ppm Sept. 1-15; minimum, 82 ppm May 1-13.
Hardness: Maximum, 72 ppm Mar. 1-14; minimum, 27 ppm Oct. 1-6, 14-18, Oct. 22-31, Nov. 11-19.
Specific conductance: Maximum observed, 1,260 micromhos Sept. 13, 14; minimum observed, 111 micromhos May 7.
Water temperatures: Maximum, 90°F on several days during July and August; minimum, 42°F Feb. 18.
EXTREMES, 1952-58.--Dissolved solids: Maximum, 936 ppm Aug. 21-31, 1956; minimum, 74 ppm Apr. 24-30, 1957.
Hardness: Maximum, 106 ppm Sept. 1-10, 1954; minimum, 22 ppm Apr. 24-30, 1957.
Specific conductance: Maximum observed, 1,850 micromhos Oct. 25, 1954, Aug. 31, 1956; minimum observed, 98.3 micromhos Apr. 29, 1957.
Water temperatures: Maximum, 98°F Aug. 13, 1956; minimum, 42°F Feb. 10, 1956, Feb. 18, 1958.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in Water-Supply Paper 1562.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-6, 14-18, 1957---	2,798	8.8		7.7	2.0	26		25	13	34		2.0		106	0.14	801	27	7	67	2.1	188	7.1
Oct. 7-13, 19-21--------	1,382	11		12	2.8	43		33	18	63		1.0		167	.23	623	41	14	69	2.9	311	7.2
Oct. 22-31--------------	5,633	9.4		8.2	1.6	21		28	12	26		.2		92	.13	1,400	27	4	63	1.7	159	6.9
Nov. 1-10---------------	4,100	13		11	3.6	39		29	20	58		.5		159	.22	1,760	42	18	67	2.6	288	6.8
Nov. 11-19--------------	8,492	8.8		7.1	2.2	22		21	13	31		.5		95	.13	2,180	27	10	64	1.9	166	6.9
Nov. 20-30--------------	11,800	11		10	3.0	29		31	18	40		.5		126	.17	4,010	37	12	63	2.1	229	6.8
Dec. 1-10---------------	3,947	12		15	4.4	41		30	25	66		.8		179	.24	1,910	56	31	62	2.4	328	6.7
Dec. 11-20--------------	1,891	15		18	5.6	49		30	33	82		.5		218	.30	1,110	68	43	61	2.6	395	7.1
Dec. 21-31--------------	1,868	16		16	5.3	59		22	30	100		.5		238	.32	1,200	62	44	68	3.3	434	6.9
Jan. 1-10, 1958---------	2,395	14		16	4.8	47		27	38	70		1.5		204	.28	1,320	60	38	63	2.6	393	6.7
Jan. 11-17--------------	2,247	14		14	4.7	59		18	34	93		1.0		229	.31	1,390	54	40	70	3.5	424	6.5
Jan. 18-31--------------	5,814	9.0		10	2.8	28		18	23	41		1.0		124	.17	1,950	36	22	63	2.0	225	6.8
Feb. 1-10---------------	4,522	13		14	4.0	41		28	29	62		.5		178	.24	2,170	51	28	64	2.5	317	7.1
Feb. 11-20--------------	2,285	14		13	5.2	46		18	34	74		.5		196	.27	1,210	54	39	65	2.8	359	6.9
Feb. 21-28--------------	1,779	15		17	6.6	59		18	44	97		.5		248	.34	1,190	70	55	65	3.1	481	7.0
Mar. 1-14---------------	1,728	16		18	6.5	66		24	43	107		.2		269	.37	1,260	72	52	67	3.4	502	7.5
Mar. 15-22--------------	4,694	11		17	3.7	31		42	28	42		1.5		155	.21	1,960	58	23	54	1.8	274	7.1
Mar. 23-31--------------	4,016	14		16	5.0	47		32	33	72		1.0		204	.28	2,210	60	34	63	2.6	366	7.0
Apr. 1-5, 8-------------	2,957	12		18	5.2	53		34	38	81		1.0		225	.31	1,800	66	38	64	2.8	409	7.2
Apr. 6-7, 9-10----------	3,455	9.6		16	3.7	28		44	26	37		1.5		144	.20	1,340	55	19	53	1.7	248	6.8
Apr. 11-25--------------	2,623	13		18	5.4	51		38	34	79		.5		220	.30	1,560	67	36	62	2.7	400	7.0
Apr. 26-30--------------	6,010	8.8		10	3.0	30		20	19	46		1.0		128	.17	2,077	37	21	63	2.1	228	6.8
May 1-13----------------	38,130	7.8		9.0	1.9	16		30	12	19		.8		82	.11	8,440	30	6	53	1.3	139	6.5
May 14-21---------------	13,190	8.6		17	3.9	17		59	12	24		1.5		113	.15	4,020	58	10	39	1.0	211	6.9
May 22-31---------------	2,135	15		16	3.0	54		41	22	80		1.5		212	.29	1,220	52	19	69	3.3	391	7.2
June 1-17---------------	526	21		18	5.6	81		40	22	133		1.5		302	.41	429	68	35	72	4.3	563	7.6
June 18-30--------------	2,459	11		14	3.4	38		33	20	59		1.5		163	.22	1,080	49	22	63	2.4	302	6.9
July 1-9----------------	1,236	18		18	4.5	45		54	19	69		.5		201	.27	671	63	19	61	2.5	364	8.0
July 10-22--------------	2,236	14		14	3.2	34		40	17	50		.5		153	.21	924	48	15	60	2.1	273	6.7
July 23-31--------------	325	20		18	5.1	66		64	18	97		.8		256	.35	225	66	13	68	3.5	463	7.3
Aug. 1-13---------------	128	21		17	5.6	76		71	16	110		.2		281	.38	97.1	65	7	72	4.1	517	7.4
Aug. 14-23--------------	116	20		18	6.1	119		83	17	172		.2		393	.53	123	70	2	79	6.2	725	7.1
Aug. 24-31--------------	420	12		13	4.0	92		27	14	150		.0		298	.41	338	49	27	80	5.7	574	6.6
Sept. 1-15--------------	165	17		18	5.5	131		42	18	212		1.5		424	.58	189	68	33	81	6.9	815	7.4
Sept. 16-21, 26---------	746	11		13	3.7	99		26	16	158		1.5		315	.43	634	48	26	82	6.2	609	7.0
Sept. 22-25, 27-30------	2,039	12		10	2.5	54		20	16	84		1.0		190	.26	1,050	35	19	77	4.0	361	6.7
Weighted average------	4,291	10		12	3.1	30		31	19	43		0.8		134	0.18	1,550	43	17	60	2.0	241	--

SABINE RIVER NEAR RULIFF, TEX.

LOCATION.--At gaging station at bridge on State Highway 235, 2.4 miles north of Ruliff, Newton County, 4.2 miles upstream from Kansas City Southern Railway bridge, 4.5 miles downstream from Cypress Creek and at mile 40.
DRAINAGE AREA.--9,440 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1947 to September 1958.
Water temperatures: October 1947 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 261 ppm Oct. 7-15; minimum, 32 ppm Sept. 23-26, 28-30.
Hardness: Maximum, 50 ppm June 7-18, 23-24; minimum, 9 ppm Sept. 23-26, 28-30.
Specific conductance: Maximum observed, 579 micromhos Oct. 14; minimum observed, 43.4 micromhos Sept. 23.
Water temperatures: Maximum observed, 90°F July 29-31; minimum observed, 42°F Feb 19.
EXTREMES, 1945-46, 1947-58.-- Dissolved solids: Maximum, 411 ppm Dec. 26-27, 1948; minimum, 32 ppm Sept. 23-26, 28-30, 1958.
Hardness: Maximum, 65 ppm Dec. 21-22, 1954; minimum, 8 ppm May 20-24, 1953.
Specific conductance: Maximum observed, 774 micromhos Dec. 26, 1948; minimum observed, 32.9 micromhos May 22, 1953.
Water temperatures (1947-58): Maximum observed, 95°F Aug. 12, 1953; minimum observed, 34°F Jan. 28, 1948.
REMARKS.--Values reported for dissolved solids are sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin Tex. Records of discharge for water year October 1957 to September 1958 given in Water-Supply Paper 1562.

Chemical analyses, in parts per million, October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-6, 1957 --------	2,512	13		6.5	1.7	27		28	8.0	35		0.5		106	0.14	719	23	0	72	2.4	178	7.4
Oct. 7-15 ------------	2,108	13		12	2.7	74		40	14	109		.5		a261	.35	1,490	41	8	80	5.0	457	7.4
Oct. 16-21 ------------	4,292	8.8		3.5	.3	17		14	6.8	20		1.0		64	.09	742	10	0	80	2.5	117	6.8
Oct. 22-31 ------------	9,204	8.8		5.2	.6	24		14	12	31		1.0		90	.12	2,240	16	4	77	2.7	153	6.8
Nov. 1-8 --------------	10,880	8.8		6.8	1.6	20		20	12	26		.8		86	.12	2,530	24	7	64	1.8	149	6.5
Nov. 9-20 -------------	22,410	8.8		4.8	1.4	14		13	9.8	20		.5		65	.09	3,930	18	8	63	1.5	107	6.2
Nov. 21-30 ------------	34,280	7.2		3.5	1.5	10		10	9.4	13		.5		50	.07	4,630	14	6	61	1.2	83.2	6.1
Dec. 1-6 --------------	27,000	8.8		6.0	1.6	14		17	11	19		.2		69	.09	5,030	22	8	59	1.3	120	6.6
Dec. 7-18 -------------	23,280	11		9.0	2.4	21		22	16	31		.5		102	.14	6,410	32	14	59	1.6	175	6.7
Dec. 19-31 ------------	9,812	13		7.8	2.5	21		20	15	30		.8		100	.14	2,650	30	14	60	1.6	169	6.6
Jan. 1-12, 1958--------	12,040	14		8.0	2.8	26		18	18	38		.5		116	.16	3,770	32	16	64	2.0	199	6.9
Jan. 13-22 ------------	11,750	12		7.0	2.2	20		17	17	27		.8		94	.13	2,980	26	12	62	1.7	159	6.2
Jan. 23-31 ------------	22,990	8.8		4.3	1.6	14		12	11	18		.5		64	.09	3,970	17	7	64	1.5	108	6.8
Feb. 1-10 -------------	15,930	9.6		7.7	2.5	21		17	18	30		.5		97	.13	4,170	30	16	61	1.7	168	6.5
Feb. 11-21 ------------	11,840	12		8.3	2.7	23		20	19	31		.5		106	.14	3,390	32	15	61	1.7	179	6.5
Feb. 22-28 ------------	13,730	7.6		6.0	2.2	18		14	15	25		.5		81	.11	3,000	24	12	62	1.6	141	6.3
Mar. 1-10 -------------	10,730	13		8.0	2.6	23		16	18	34		1.5		108	.15	3,130	30	18	62	1.8	180	6.9
Mar. 11-17, 26-31 -----	10,980	12		9.6	3.0	20		22	18	30		1.0		105	.14	3,110	36	18	54	1.4	177	7.0
Mar. 18-25 ------------	9,132	8.4		10	3.9	28		b24	25	40		.2		128	.17	3,160	41	21	60	1.9	231	8.8
Apr. 1-15 -------------	10,310	12		10	3.2	25	2.0	--	20	--		.5		--	--	--	38	--	57	1.8	206	--
Apr. 16-22 ------------	10,880	11		8.5	2.3	18	2.0	--	13	--		1.0		--	--	--	30	--	54	1.4	153	--
Apr. 23-30 ------------	7,188	14		12	3.3	39	2.2	--	22	--		.2		--	--	--	44	--	65	2.6	282	--
May 1-11 --------------	14,120	9.2		6.5	1.5	17		16	14	22		.8		79	.11	3,010	22	9	63	1.6	136	6.3
May 12-25 -------------	25,930	7.0		5.5	1.7	12		17	10	16		.5		61	.08	4,270	20	6	57	1.2	103	6.5
May 26-31 ------------	38,420	8.0		10	2.1	14		38	9.2	16		1.5		80	.11	8,300	34	2	48	1.1	143	6.4
June 1-6 --------------	22,830	11		12	3.2	17		43	10	23		1.2		98	.13	6,040	43	8	46	1.1	172	7.9
June 7-18, 23-24 ------	4,070	17		14	3.6	36		46	16	52		1.0		163	.22	1,790	50	12	61	2.2	285	7.2
June 19-22, 25-30 -----	6,920	10		7.0	1.9	21		21	11	30		1.0		92	.13	1,720	26	8	65	1.8	159	6.7
July 1-10 -------------	6,209	14		10	3.3	24		34	16	32		1.0		117	.16	1,960	38	10	57	1.7	202	6.9
July 11-20 ------------	3,817	15		10	3.2	31		38	14	41		1.0		134	.18	1,380	38	7	64	2.2	230	6.8
July 21-31 ------------	3,488	14		10	3.3	27		38	14	36		.5		124	.17	1,170	38	8	60	1.9	213	6.4
Aug. 1-10 -------------	1,653	18		14	3.3	28		59	12	34		1.0		a150	.20	669	48	0	56	1.8	238	7.6
Aug. 11-21 ------------	1,198	19		14	3.1	29		57	12	36		1.0		a153	.21	495	48	1	57	1.8	246	6.9
Aug. 22-31 ------------	5,163	9.2		5.2	1.4	17		16	9.2	24		.8		75	.10	1,050	19	6	67	1.7	135	6.4
Sept. 1-11 ------------	2,765	12		5.6	1.8	20		28	9.2	22		.8		85	.12	635	22	0	66	1.8	139	7.0
Sept. 12-17 -----------	2,177	14		8.0	2.7	34		32	9.8	48		1.2		134	.18	788	31	5	70	2.6	234	6.8
Sept. 18-22, 27 -------	13,940	4.0		13	1.0	2.9	1.6	42	5.6	3.5		1.2		54	.07	2,030	36	2	14	.2	93.3	7.0
Sept. 23-26, 28-30 ----	34,700	4.6		2.2	.8	5.3	2.0	10	3.4	7.5		.8		32	.04	3,000	9	1	50	.8	52.5	6.8
Weighted average ----	12,290	9.7		7.2	2.1	18		21	13	24		0.7		85	0.12	2,820	26	10	60	1.5	146	--

a Residue on evaporation at 180°C.
b Includes equivalent of 2 parts per million carbonate (CO_3)

ANGELINA RIVER NEAR LUFKIN, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59,.400 feet upstream from Procella Creek, half a mile downstream from Little Loco Bayou, 1.5 miles upstream from Texas & New Orleans Railroad bridge, and 8 miles north of Lufkin, Angelina County.
DRAINAGE AREA.--1,630 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1958.
Water temperatures: October 1954 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 178 ppm Apr. 11-13, 20-22; minimum, 36 ppm Oct. 16-18.
Hardness: Maximum, 55 ppm Apr. 11-13, 20-22; minimum, 11 ppm Oct. 16-18.
Specific conductance: Maximum observed, 375 micromhos Sept. 6; minimum observed, 38.5 micromhos Sept. 21.
Water temperatures: Maximum, 86°F on several days during July and August; minimum, 39°F Dec. 12, Jan. 8-9, Feb. 13.
EXTREMES, 1954-58.--Dissolved solids: Maximum, 412 ppm Nov. 4-18, 26-30, 1954; minimum, 36 ppm Oct. 16-18, 1957.
Hardness: Maximum, 76 ppm Nov. 4-18, 26-30, 1954; minimum, 11 ppm Oct. 16-18, 1957.
Specific conductance: Maximum observed, 895 micromhos Nov. 10, 1954; minimum observed, 38.5 micromhos Sept. 21, 1958.
Water temperatures: Maximum, 89°F July 9, 1957; minimum, 39°F Dec. 12, 1957, Jan. 8-9, 1958, Feb. 13, 1958.
REMARKS.--Values reported for dissolved solids are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in Water Supply Paper 1562.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-13, 1957 -----	55.4	14	0.38	5.0	3.1	18		32	11	18		0.5		86	0.12	12.9	25	0	60	1.5	137	7.2
Oct. 14-15 ----------	1,064	8.8	.80	2.8	2.2	13		17	14	10		1.5		61	.08	175	16	2	63	1.4	92.7	6.7
Oct. 16-18 ----------	3,470	8.2	.88	1.6	1.8	3.6	3.0	13	6.6	3.5		.5		36	.05	337	11	0	34	.5	47.8	6.5
Oct. 19 ------------	3,200	--	--	--	--	--		11	--	64		--		--	--	--	36	27	--	--	283	6.6
Oct. 20, 22-25 ------	6,856	11	.65	2.6	1.5	4.9	2.9	9	9.6	6.2		.8		44	.06	814	13	5	39	.6	64.7	6.8
Oct. 21, 26-31, Nov. 1-7 ----------	3,716	14	1.0	4.9	2.8	13		16	12	18		.5		74	.10	742	24	11	54	1.1	112	6.9
Nov. 8-9, 11-13, 15-17 ----------	4,231	14	1.2	3.4	2.2	5.2	2.7	15	8.0	7.8		1.0		52	.07	594	18	5	35	.5	73.0	6.8
Nov. 10, 14, 18-20 --	6,422	14	1.2	4.3	2.5	13		17	11	16		.8		71	.10	1,230	21	7	57	1.2	107	6.7
Nov. 21-27, 29-30 ---	7,790	13	.17	4.9	2.3	7.4	2.5	16	12	11		.2		61	.08	1,280	22	9	39	.7	93.5	6.6
Nov. 28, Dec. 4, 9, 13 ----------	3,875	14	.27	6.9	3.5	26		18	16	39		.8		115	.16	1,200	32	17	64	2.0	198	6.6
Dec. 1-3, 5-8, 10-12, 14 ----------	3,527	14	.28	6.2	3.0	11		20	14	14		.5		73	.10	695	28	11	46	.9	110	6.7
Dec. 15-20 ----------	1,488	15	.19	7.8	3.8	15		20	20	21		.5		93	.13	374	35	19	48	1.1	151	6.6
Dec. 21-27 ----------	1,277	15	.54	8.0	4.4	18		21	22	26		.5		104	.14	359	38	21	51	1.3	171	6.7
Dec. 28-31 ----------	1,762	11	.43	5.5	3.0	11		19	13	14		1.0		68	.09	324	26	10	48	.9	106	6.9
Jan. 1-7, 1958 ------	1,673	16	.30	6.0	3.3	14		18	16	19		1.0		85	.12	384	28	14	52	1.1	127	6.3
Jan. 8-13 ----------	1,403	17	.24	7.0	4.0	17		17	25	22		1.0		101	.14	383	34	20	53	1.3	153	6.3
Jan. 14-20 ----------	2,153	15	.32	5.0	2.1	7.3	1.7	16	11	10		1.5		62	.08	360	21	8	41	.7	89.8	6.3
Jan. 21-25 ----------	3,650	13	.38	3.8	1.9	5.3	1.7	16	8.6	6		1.0		50	.07	493	17	4	37	.6	69.8	6.6
Jan. 26-31, Feb. 1-3, 5-7 ----------	3,678	15	.28	5.6	2.9	16		15	18	20		1.0		86	.12	854	26	14	57	1.3	132	6.4
Feb. 4, 8-13 --------	1,781	13	.46	7.0	3.4	19		18	19	26		1.0		98	.13	471	31	17	56	1.4	161	7.3
Feb. 14-20 ----------	1,940	6.4	.25	5.8	2.7	10		18	14	12		1.5		62	.08	325	26	11	46	.9	102	7.1
Feb. 21-28 ----------	2,430	13	.28	6.5	2.8	13		18	15	18		1.5		79	.11	518	28	13	51	1.1	123	7.2

ANGELINA RIVER NEAR LUFKIN, TEX.--Continued

Chemical analyses, in parts per million, water year October 1957 to September 1958--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Mar. 1, 1958	2,160	--	--	--	--	--		22	--	75		--		--	--	--	36	18	--	--	328	7.5
Mar. 2-3, 6-10	2,051	14	0.87	6.0	3.4	11		19	14	16		1.2		75	0.10	415	29	13	46	0.9	119	6.8
Mar. 4-5, 11-13	1,820	14	.58	7.6	4.6	21		21	25	28		.8		112	.15	550	38	21	55	1.5	183	7.1
Mar. 14-20	1,921	14	.86	7.2	3.5	12		22	16	16		1.0		82	.11	425	32	14	44	.9	129	6.9
Mar. 21-31	1,329	14	.54	9.6	5.0	22		22	27	32		1.2		a131	.18	470	44	26	52	1.4	202	7.4
Apr. 1-10	1,232	14	.12	10	5.5	30		24	29	44		.5		a155	.21	516	48	28	58	1.9	246	7.2
Apr. 11-13, 20-22	810	8.6	.04	12	6.2	39		32	28	60		.0		a178	.24	389	55	29	60	2.3	303	7.2
Apr. 14-19, 23-26	797	16	.18	12	4.8	25		35	26	34		1.5		a149	.20	321	50	21	53	1.6	222	6.5
Apr. 27-30, May 1-5	2,569	12	.36	5.5	2.5	6.4	2.2	24	8.2	8.0		1.5		59	.08	409	24	4	34	.6	89.4	6.6
May 6-18	8,128	13	--	7.0	2.6	16		21	14	22		.5		85	.12	1,870	28	11	55	1.3	138	6.6
May 19-31	936	18	--	9.0	3.5	26		34	17	33		1.2		125	.17	316	37	9	60	1.8	202	7.2
June 1-11, 16-17	301	20	.30	8.8	4.6	25		34	19	32		2.0		129	.18	105	41	13	57	1.7	206	6.7
June 12-15	206	19	.46	8.5	4.3	18		35	17	21		1.2		106	.14	59.0	39	10	49	1.2	162	7.4
June 18-21	1,104	13	.46	5.0	3.1	10		14	18	12		1.0		70	.10	209	25	14	47	.9	108	6.6
June 22-30	1,228	14	.24	7.5	3.9	21		16	24	30		1.0		110	.15	365	35	22	57	1.6	182	6.3
July 1-10	545	18	.28	8.0	4.3	19		27	19	26		1.0		109	.15	160	38	16	53	1.4	179	6.9
July 11-20	265	18	.34	7.8	2.9	17		32	14	18		1.8		96	.13	68.7	31	5	54	1.3	154	7.0
July 21-31	110	19	.44	8.5	3.4	20		38	14	22		1.8		108	.15	32.1	35	4	55	1.5	174	7.2
Aug. 1-10	62.0	22	.44	9.2	4.4	20		45	13	23		1.0		115	.16	19.3	41	4	51	1.3	184	7.2
Aug. 11-23	49.4	19	.42	9.0	4.0	23		46	14	25		.5		118	.16	15.7	39	1	56	1.6	193	7.0
Aug. 24-31	270	15	.41	7.2	2.8	16		25	23	14		.8		91	.12	66.3	29	9	55	1.3	143	6.6
Sept. 1-2, 19-20, 29-30	2,862	14	.29	5.8	1.9	12		15	16	14		.8		72	.10	556	22	10	55	1.2	111	6.9
Sept. 3-12	137	17	.11	10	4.5	41		14	27	66		.5		173	.24	64.0	43	32	67	2.7	310	6.8
Sept. 13-18	103	19	.28	7.0	3.2	24		28	18	28		1.0		114	.16	31.7	31	8	63	1.9	185	7.2
Sept. 21-28	3,985	12	.39	3.5	1.5	4.3	2.1	14	7.0	5.2		.8		44	.06	473	15	3	35	.5	62.3	6.6
Weighted average	2,096	14	0.47	5.9	2.8	14		18	14	18		0.8		79	0.11	447	26	11	54	1.2	123	--

a Residue on evaporation at 180°C.

NECHES RIVER AT EVADALE, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 96, 200 feet upstream from Gulf, Colorado and Santa Fe Railway bridge at Evadale, Jasper County, 600 feet downstream from Mill Creek, 15 miles upstream from Village Creek and at mile 55.
DRAINAGE AREA.--7,908 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1958.
Water temperatures: October 1947 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 138 ppm Sept. 1-10; minimum, 35 ppm Sept. 21-22, 24.
Hardness: Maximum, 46 ppm Apr. 11-20; minimum, 14 ppm Oct. 27-31, Sept. 21-22, 24.
Specific conductance: Maximum observed, 274 micromhos July 21; minimum observed, 44.1 micromhos Sept.22.
Water temperatures: minimum, 44°F Jan. 9-10.
EXTREMES, 1947-58.--Dissolved solids: Maximum, 222 ppm Oct. 21-31, 1956; minimum, 35 ppm Sept. 21-22, 24, 1958.
Hardness: Maximum, 70 ppm Nov. 1-10, 1947; minimum, 14 ppm May 3-15, 1957, Oct. 27-31, 1957, Sept. 21-22, 24, 1958.
Specific conductance: Maximum observed, 422 micromhos Jan. 25, 1957; minimum observed, 44.1 micromhos Sept. 22, 1958.
Water temperatures: minimum, 37°F Jan. 30-31, 1948, Jan. 31, 1949.
REMARKS.--Values reported for dissolved solids are calculated from determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in Water-Supply Paper 1562.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-13, 1957 -------	588	16		11	3.4	25		52	12	27	0.5	0.5		121	0.16	192	42	0	56	1.7	195	7.5
Oct. 14-26 ------------	4,394	13		8.7	2.8	24		43	12	26	.5	.5		108	.15	1,280	33	0	62	1.8	185	7.3
Oct. 27-31 ------------	11,320	9.4		3.0	1.5	17		17	13	14	1.0	.5		67	.09	2,050	14	0	73	2.0	101	6.8
Nov. 1-10 -------------	11,440	8.6		4.5	1.5	14		12	12	16	.5	.8		64	.09	1,980	17	7	64	1.5	103	6.4
Nov. 11-20 ------------	14,910	9.8		5.0	1.7	14		13	11	18	.5	.8		67	.09	2,700	20	9	61	1.4	109	6.6
Nov. 21-30 ------------	23,400	7.2		4.4	1.5	10		14	10	11	.5	.5		52	.07	3,290	17	6	57	1.1	81.8	6.3
Dec. 1-8 --------------	30,940	12		4.6	1.8	11		16	11	12	.5	.2		61	.08	5,100	19	6	56	1.1	94.5	6.7
Dec. 9-17 -------------	16,790	14		6.2	2.2	13		18	14	16	.4	.2		75	.10	3,400	24	10	54	1.2	119	6.7
Dec. 18-31 ------------	8,922	17		8.5	3.2	16		23	19	21	.4	.2		96	.13	2,310	34	15	51	1.2	154	6.9
Jan. 1-10, 1958 -------	11,600	13		7.0	2.6	17		19	18	20	.5	.5		88	.12	2,760	28	12	56	1.4	139	6.4
Jan. 11-20 ------------	11,650	13		7.8	2.7	18		20	20	22	.3	.8		95	.13	2,990	30	14	56	1.4	149	6.4
Jan. 21-31 ------------	23,010	9.4		4.7	1.7	12		14	13	12	.4	.8		61	.08	3,790	18	7	57	1.2	91.4	6.3
Feb. 1-6 --------------	16,630	9.8		6.0	2.1	11		15	15	13	.5	.5		64	.09	2,870	24	11	50	1.0	104	6.6
Feb. 7-22 -------------	10,130	12		8.1	2.9	21		16	23	28	.5	.8		104	.14	2,840	32	19	59	1.6	170	6.4
Feb. 23-28 ------------	11,800	4.2		6.8	2.3	15		17	18	20	.5	.5		76	.10	2,420	26	12	57	1.3	131	7.4
Mar. 1-10 -------------	9,906	12		8.4	2.9	19		18	22	24	.4	1.0		99	.13	2,650	33	18	55	1.4	163	6.9
Mar. 11-20 ------------	7,880	12		9.6	3.6	20		22	25	26	.4	.8		108	.15	2,300	39	21	52	1.4	176	6.9
Mar. 21-31 ------------	5,615	12		10	3.8	22		24	26	28	.4	.8		115	.16	1,740	40	21	54	1.5	192	7.1
Apr. 1-10 -------------	4,079	14		11	4.2	23		26	28	31	.0	.5		125	.17	1,380	45	24	52	1.5	207	6.5
Apr. 11-20 ------------	5,430	14		11	4.5	26		26	27	38	.0	.5		134	.18	1,960	46	24	56	1.7	223	6.4
Apr. 21-30 ------------	4,906	13		10	3.9	24		28	24	32	.2	.5		122	.17	1,620	41	18	56	1.7	202	7.2
May 1-9 ---------------	8,042	14		9.0	2.8	23		26	24	26	.5	.5		113	.15	2,450	34	12	60	1.7	190	6.3
May 10-21 -------------	19,080	8.2		8.0	1.8	19		20	16	24	.3	.5		88	.12	4,530	28	11	60	1.6	145	6.3
May 22-31 -------------	14,500	11		12	2.1	12		25	14	20	.2	1.2		84	.11	3,290	38	18	40	.8	151	6.2
June 1-10 -------------	2,027	15		10	3.3	17		40	13	20	.4	.8		100	.14	547	38	6	49	1.2	161	6.8
June 11-20 ------------	1,164	18		11	3.3	19		44	14	21	.3	.8		109	.15	343	41	5	50	1.3	174	6.8
June 21-30 ------------	3,108	14		10	3.4	21		41	14	23	.9	1.0		107	.15	898	39	6	54	1.4	187	7.0
July 1-10 -------------	2,512	17		8.8	3.0	24		34	18	26	1.0	1.0		116	.16	787	34	6	60	1.8	183	6.7
July 11-20 ------------	1,586	17		9.5	3.3	22		32	20	24	.7	1.0		114	.16	488	37	11	56	1.5	180	6.6
July 21-31 ------------	1,800	15		9.8	3.4	23		30	20	28	.9	.8		116	.16	564	38	14	56	1.6	196	6.5
Aug. 1-10 -------------	1,928	18		9.5	3.5	23		36	19	26	.2	.5		118	.16	614	38	8	56	1.6	192	7.2
Aug. 11-20 ------------	1,429	18		10	3.6	22		41	18	24	.2	1.0		117	.16	451	40	6	54	1.5	189	6.8
Aug. 21-31 ------------	669	17		10	3.4	26		48	17	26	.2	.5		124	.17	224	39	0	59	1.8	201	7.0
Sept. 1-10 ------------	480	18		11	3.9	29		60	14	30	.2	1.5		138	.19	179	44	0	60	1.9	230	7.3
Sept. 11-20, 27 -------	1,787	15		9.0	3.0	26		48	14	26	.2	1.2		118	.16	569	35	0	62	1.9	192	7.2
Sept. 21-22, 24 -------	7,937	4.0		4.0	1.0	4.9	1.5	9	8.4	6.0	.1	1.0		35	.05	750	14	6	40	.6	53.2	6.9
Sept. 23, 25-26, 28-30	14,290	7.8		4.0	1.3	13		16	11	12	.2	1.0		58	.08	2,240	16	2	64	1.4	95.1	6.7
Weighted average --	8,465	11		7.0	2.3	16		20	16	19	0.4	0.6		83	0.11	1,900	27	10	56	1.3	134	--

TRINITY RIVER BASIN

TRINITY RIVER NEAR ROSSER, TEX.

LOCATION.--At gaging station at bridge on State Highway 34, 2.5 miles south of Rosser, Kaufman County, 8.5 miles downstream from East Fork and at mile 451.
DRAINAGE AREA.--8,162 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1958.
Water temperatures: October 1954 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 684 ppm Oct. 9-13; minimum, 139 ppm Nov. 5-6.
Hardness: Maximum, 202 ppm Feb. 21-28; minimum, 88 ppm Nov. 5-6.
Specific conductance: Maximum observed, 1,310 micromhos Oct. 11; minimum observed, 224 micromhos Nov. 6.
Water temperatures: Maximum, 87°F Sept. 1; minimum, 46°F Jan. 8, 9.
EXTREMES, 1954-58.--Dissolved solids: Maximum, 1,800 ppm Aug. 21-31, 1956; minimum, 139 ppm Nov. 5-6, 1957.
Hardness: Maximum, 310 ppm Oct. 11-20, 1956; minimum, 88 ppm Nov. 5-6, 1957.
Specific conductance: Maximum observed, 2,990 micromhos Oct. 13, 1956; minimum observed, 224 micromhos Nov. 6, 1957.
Water temperatures: Maximum, 97°F July 1, 1955; minimum, 34°F Jan. 20, 1956.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in Water-Supply Paper 1562.

Chemical analysis, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-8, 1957	335	14		59	4.9	90		179	80	80		25		461	0.63	417	167	20	54	3.0	735	8.0
Oct. 9-13	276	17		64	4.9	159		195	151	124		42		684	.93	510	180	20	66	5.2	1,080	7.5
Oct. 14-22	2,131	12		53	3.5	45		150	60	34		13		312	.42	1,800	147	24	40	1.6	486	7.8
Oct. 23-31	503	13		67	4.4	91		180	113	71		23		505	.69	686	185	38	52	2.9	793	7.3
Nov. 1-4	393	17		63	5.0	107		197	104	80		34		529	.72	561	178	16	57	3.5	837	7.5
Nov. 5-6	6,465	13		33	1.6	12		101	23	2		4.8		a139	.19	2,430	88	5	22	.5	224	7.8
Nov. 7-18	7,840	11		50	4.1	29		145	37	31		5.6		245	.33	5,190	142	23	31	1.1	409	7.7
Nov. 19-30	6,567	7.8		50	4.0	30		146	33	34		4.7		249	.34	4,410	141	22	31	1.1	408	7.7
Dec. 1-10	2,379	5.4		64	4.4	39		175	58	34		13		324	.44	2,080	178	34	32	1.3	513	7.8
Dec. 11-20	1,829	4.6		61	3.7	31		169	48	26		11		289	.39	1,430	167	29	28	1.0	456	7.9
Dec. 21-31	2,476	5.2		62	4.2	39		168	64	31		12		327	.44	2,190	172	34	33	1.3	509	7.7
Jan. 1-10, 1958	1,855	7.0		60	3.7	34		168	54	28		5.4		292	.40	1,460	165	27	31	1.1	469	7.6
Jan. 11-20	2,099	8.8		66	4.1	45		171	71	42		8.0		364	.50	2,060	182	42	35	1.5	579	7.5
Jan. 21-30	3,670	6.0		60	4.1	35		162	56	34		4.8		296	.40	2,930	167	34	31	1.2	486	7.6
Feb. 1-10	1,684	8.8		63	4.8	39		b174	52	37		14		318	.43	1,684	176	34	32	1.3	511	8.4
Feb. 11-20	1,054	10		71	5.2	52		c175	71	55		19		396	.54	1,054	198	55	36	1.6	621	8.4
Feb. 21-28	879	9.6		72	5.5	50		b181	78	60		19		418	.57	992	202	54	33	1.5	661	8.4
Mar. 1-5	835	9.0		68	5.2	74		182	108	52		22		446	.61	1,010	191	42	46	2.3	695	7.9
Mar. 6-19	5,422	9.6		59	4.5	29		158	45	32		8.4		281	.38	4,110	166	36	27	1.0	449	8.0
Mar. 20-31	3,555	7.6		62	4.4	34		169	58	29		7.5		300	.41	2,880	173	34	30	1.1	477	7.9
Apr. 1-10	3,864	4.6		59	2.9	34		163	47	32		7.5		269	.37	2,810	159	26	32	1.2	460	7.9
Apr. 11-20	3,195	3.0		60	2.8	40		168	57	32		6.8		294	.40	2,540	161	24	35	1.4	484	7.8
Apr. 21-30	11,802	6.6		53	2.2	29		145	48	22		5.8		251	.34	8,000	141	22	31	1.1	398	7.4
May 1-10	26,090	11		49	2.4	17		141	32	13		2.5		206	.28	14,510	132	17	22	.6	329	7.8
May 11-20	15,410	8.4		50	3.7	24		151	29	25		2.5		224	.30	9,320	140	16	27	.9	374	7.7
May 21-31	9,657	7.0		52	3.0	27		152	34	27		4.2		235	.32	6,130	142	18	29	1.0	396	7.4
June 1-10	5,254	10		50	3.5	30		137	35	36		5.1		256	.35	3,630	139	27	32	1.1	416	7.7
June 11-20	4,348	10		52	3.7	30		145	40	33		5.2		262	.36	3,080	145	26	31	1.1	426	7.8
June 21-30	5,888	8.6		48	2.1	30		135	34	31		4.0		242	.33	3,850	128	18	33	1.1	396	7.5
July 1-10	4,849	11		52	3.8	25		142	42	25		4.2		251	.34	3,290	145	29	27	.9	400	7.7
July 11-20	2,825	12		55	3.7	26		152	40	28		4.5		264	.36	1,660	152	28	27	.9	415	7.7
July 21-31	1,175	12		54	3.8	45		161	60	34		6.6		316	.43	1,000	150	18	39	1.6	497	7.6
Aug. 1-10	1,065	13		52	3.6	49		166	59	34		6.4		331	.45	952	144	8	42	18	499	7.8
Aug. 11-21	1,131	12		48	3.4	50		162	62	29		6.6		317	.43	968	134	1	45	1.9	478	7.8
Aug. 22-31	819	11		51	4.1	70		166	78	49		12		394	.54	871	144	8	51	2.5	600	7.5
Sept. 1-19	540	14		54	5.2	127		186	127	90		26		574	.78	837	156	4	64	4.4	889	7.9
Sept. 20-30	3,752	9.0		50	3.2	37		148	54	24		9.1		281	.38	2,850	138	17	37	1.4	446	7.6
Weighted average	4,257	8.9		53	3.4	30		151	43	28		5.9		260	0.35	2,990	146	22	31	1.1	420	--

a Calculated from determined constituents.
b Includes equivalent of 5 parts per million carbonate (CO_3).
c Includes equivalent of 7 parts per million carbonate (CO_3).

RICHLAND CREEK NEAR FAIRFIELD, TEX.

LOCATION.--At bridge on State Farm Highway 488, 4 miles upstream from mouth, 4 miles downstream from Chambers Creek and 16 miles north of Fairfield, Freestone County.
RECORDS AVAILABLE.--Chemical analyses: April 1956 to September 1958.
Water temperatures: April 1956 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 6,960 ppm Aug. 11-16; minimum, 180 ppm Aug. 18-20, 24-27.
Hardness: Maximum, 326 ppm July 25, 27, Aug. 2-10; minimum, 97 ppm Aug. 18-20, 24-27.
Specific conductance: Maximum observed, 14,200 micromhos Aug. 14; minimum observed, 228 micromhos Aug. 24-25.
Water temperatures: Maximum, 94°F July 31, Aug. 4; minimum, 40°F Feb. 2, 17.
EXTREMES, April 1956-58.--Dissolved solids: Maximum, 13,500 ppm Aug. 11-31, 1956; minimum, 131 ppm Apr. 21-30, 1957.
Hardness: Maximum, 460 ppm Oct. 18, 1956; minimum, 79 ppm Nov. 5-8, 1956.
Specific conductance: Maximum observed, 22,000 micromhos Aug. 22, 1956; minimum observed, 157 micromhos Apr. 25, 1957.
Water temperatures: Maximum, 98°F Aug. 3, 1957; minimum, 40°F Jan. 19, 1957, Feb. 2, 17, 1958.
REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available.

Chemical analyses, in parts per million, October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
Oct. 1-5, 1957		12	0.03	48	6.6	452		207	39	650	0.6	1.8		1,310	1.78		147	0	87	16	2,410	8.2
Oct. 6-14		7.8	.02	67	13	1,350		285	27	2,050	.6	--		3,660	4.98		220	0	93	40	6,520	8.2
Oct. 15-18		11	.17	37	2.5	28		117	33	20	.7	3.8		205	.28		103	7	37	1.2	329	7.8
Oct. 27-28		14	.28	55	3.8	71		160	45	88	.5	3.0		379	.52		152	22	50	2.5	624	7.9
Oct. 29-31		15	.05	47	2.8	23		126	46	15	.5	4.3		227	.31		129	26	28	.9	344	7.8
Nov. 1-3,8		14	.03	75	5.1	148		205	62	205	.5	7.6		640	.87		208	40	61	4.4	1,100	8.0
Nov. 4-7		13	.04	56	3.8	62		155	56	69	.5	5.5		354	.48		155	28	46	2.2	589	7.8
Nov. 24-30, Dec. 1		14	.02	47	2.7	24		138	28	24	.5	2.8		222	.30		128	15	29	.9	350	8.2
Dec. 2-11		16	.01	82	5.1	124		201	78	170	.4	11		586	.80		226	61	54	3.6	983	8.2
Dec. 12-13		12		86	6.3	205		199	97	290	.4	14		820	1.12		240	78	65	5.7	1,410	8.2
Jan. 26-30, 1958		13	.02	86	5.0	90		196	89	118	.5	12		536	.73		235	74	45	2.6	858	8.1
Jan. 31, Feb. 1-7, 10-11		13	.01	98	5.6	181		250	79	255	.4	17		810	1.10		268	62	60	4.8	1,360	8.1
Feb. 8-9, 12-15		11	.01	88	5.2	66		176	114	78	1.0	11		490	.67		241	97	37	1.8	758	8.0
Feb. 17, 20-22		12	.02	95	4.8	96		a229	78	130	.8	14		582	.79		256	69	45	2.6	946	8.4
Feb. 18-19, 23-28		9.0	.01	94	5.9	173		b230	86	245	.8	12		768	1.04		259	70	59	4.7	1,320	8.3
Mar. 1-7		7.2	.01	102	7.5	200		236	123	275	.5	11		842	1.15		286	92	60	5.1	1,450	8.2
Mar. 8-10		7.4	.01	65	3.7	41		153	75	40	.5	5.9		320	.44		177	52	34	1.3	529	7.6
Mar. 11-21,23		13	.01	78	5.1	88		191	79	112	.5	11		490	.67		216	59	47	2.6	816	7.8
Mar. 22		--	--	--	--	--		125	--	410	--	--		--	--		176	74	--	--	1,830	8.2
Mar. 24-31		11	.01	78	5.6	82		194	82	100	.6	11		474	.64		218	58	45	2.4	783	7.8
Apr. 1,3,16-19		10	.02	78	5.9	89		178	101	109	.7	7.3		506	.69		312	240	47	2.6	826	7.6
Apr. 2, 4-15		9.8	.00	95	5.8	203		231	96	285	.6	11		844	1.15		261	72	63	5.5	1,450	7.7
Apr. 20-27		10	.04	56	2.6	42		155	46	43	.7	4.8		292	.40		150	23	38	1.5	479	7.7
Apr. 28-30, 1-2, 7-8		11	.04	47	2.2	25		136	35	19	.7	4.8		220	.30		126	15	30	1.0	345	7.8
May 9-10		15	.02	74	2.2	36		199	53	33	.5	6.5		328	.45		194	31	29	1.1	522	7.6
May 11-19		15	.00	95	5.6	75		232	85	95	.5	9.8		510	.69		260	70	38	2.0	837	7.7
May 20-24, 26-29		15	.02	84	4.8	124		187	93	170	.7	10		c594	.81		229	76	54	3.6	1,060	7.6
May 25		2.0	.01	68	8.1	489		181	94	720	.6	3.5		1,470	2.00		203	54	84	15	2,730	7.3
May 30-31		13	.21	54	1.9	29		139	51	24	.9	3.8		c246	.33		143	29	31	1.1	550	7.6

a Includes the equivalent of 7 parts per million carbonate (CO_3).
b Includes the equivalent of 4 parts per million carbonate (CO_3).
c Calculated from determined constituents.

RICHLAND CREEK NEAR FAIRFIELD, TEX.--Continued

Chemical analyses, in parts per million, October 1957 to September 1958--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
June 1-10, 1958		15	0.01	71	6.7	293		192	101	405	0.7	6.0		c992	1.35		204	47	76	8.9	1,770	7.9
June 11-18		8.2	.02	74	9.5	462		180	114	678	.7	3.8		1,440	1.96		224	76	82	13	2,620	7.6
June 19, 24-27		16	.02	70	5.0	195		187	75	270	.7	6.5		741	1.01		195	42	68	6.1	1,310	8.0
June 21-23, 28-30, July 1-7		10	.02	88	11	622		188	154	920	.9	3.5		1,900	2.58		264	110	84	17	3,420	7.8
July 8-10		12	.05	44	3.0	46		115	50	50	.9	3.5		276	.38		122	28	45	1.8	464	7.5
July 11-14		13	.03	55	3.8	148		132	72	204	.8	3.0		573	.78		152	144	68	5.2	1,010	7.8
July 15-19		13	.03	62	5.6	355		157	67	530	.7	1.5		1,110	1.51		178	49	81	12	2,040	7.7
July 20-23		13	.00	81	8.3	700		191	72	1,080	.6	1.5		2,050	2.79		236	80	87	20	3,670	8.2
July 26, 28-31, Aug. 1		14	.00	98	12	1,090		236	71	1,690	.6	2.0		3,090	4.20		294	100	89	27	5,540	8.1
July 25, 27, Aug. 2-10		10	.00	98	20	2,280		328	69	3,510	.6	--		6,150	8.36		326	58	94	55	10,600	8.0
Aug. 11-16		11	.02	81	22	2,620		222	70	4,000	.6	--		6,960	9.47		292	28	95	67	12,000	8.0
Aug. 18-20, 24-27		12	.08	35	2.4	24		101	35	18	.6	3.0		c180	.24		97	14	35	1.0	313	7.6
Aug. 17, 21-23, 28 - 31		14	.03	44	3.4	111		134	44	147	.5	1.5		433	.59		124	14	66	4.3	769	7.9
Sept. 1-5, 7, 11, 16, 30		14	.03	62	5.3	243		190	48	352	.4	2.5		843	1.15		176	20	75	8.0	1,520	8.2
Sept. 6, 8-10, 12-13, 15, 18-19, 26		14	.02	73	9.1	870		b239	46	1,320	.5	5.0		2,460	3.35		220	24	90	25	4,450	8.3
Sept. 17, 20, 27-29		13	.03	58	3.8	68		166	48	82	.3	5.7		371	.50		160	24	48	2.3	629	8.0
Sept. 21-25		13	.05	48	2.2	18		128	35	16	.3	3.5		205	.28		129	24	23	.7	328	7.9

b Includes the equivalent of 4 parts per million carbonate (CO_3).
c Calculated from determined constituents.

TRINITY RIVER AT ROMAYOR, TEX.

LOCATION.--At gaging station at bridge on State Highway 105, 1.9 miles south of Romayor, Liberty County, 2.0 miles downstream from Gulf, Colorado & Santa Fe Railway bridge and at mile 94.
DRAINAGE AREA.--17,192 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to November 1949, February 1950 to September 1951, April 1953 to September 1958.
Water temperatures: February 1950 to September 1951, April 1953 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 911 ppm Oct. 2, 4-5; minimum, 86 ppm Oct. 17-20.
Hardness: Maximum, 174 ppm Dec. 13-26; minimum, 44 ppm Oct. 17-20.
Specific conductance: Maximum observed, 1,970 micromhos Oct. 5; minimum observed, 127 micromhos Oct. 19.
Water temperatures: Maximum, 92°F on several days in August; minimum, 42°F Feb. 14.
EXTREMES, 1945-50, 1953-58.--Dissolved solids: Maximum, 1,900 ppm Nov. 7, 1953; minimum, 82 ppm July 31, 1954.
Hardness: Maximum, 258 ppm Oct. 21-31, 1956; minimum, 32 ppm Nov. 1-3, 1953.
Specific conductance: Maximum observed, 3,800 micromhos Oct. 30, 1956; minimum observed, 103 micromhos Nov. 9, 1946.
Water temperatures (1953-58): Maximum, 98°F July 18, 27, 1953; minimum, 38°F Jan. 18, 1956.
REMARKS.--Values reported for dissolved solids concentrations are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in Water-Supply Paper 1562.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1, 3, 6-7, 9-14, 1957	936	13		41	5.1	103		126	34	148		0.2		406	0.55	1,030	124	20	64	4.0	779	7.4
Oct. 2, 4-5	1,370	9.6		44	6.1	290		128	37	440		1.5		a911	1.24	3,370	135	30	82	11	1,590	8.1
Oct. 8, 15-16	15,220	12		30	2.6	26		101	20	26		1.5		168	.23	6,900	86	2	40	1.2	293	8.0
Oct. 17-20	44,000	7.2		15	1.5	13		52	8.4	14		.8		86	.12	10,220	44	1	39	.8	144	7.9
Oct. 21-26, 29-31	24,390	11		26	2.3	22		82	20	24		1.0		146	.20	9,610	74	8	39	1.1	251	8.2
Oct. 27-28	20,100	14		38	3.4	43		117	26	56		3.0		241	.33	13,080	110	14	46	1.8	422	7.9
Nov. 1-2, 4-10	8,312	14		38	3.6	35		110	32	44		1.5		222	.30	4,980	110	20	41	1.5	378	7.7
Nov. 3, 20	15,440	--		--	--	--		122	--	230		--		--	--	--	130	30	--	--	977	7.8
Nov. 11-19	20,580	10		34	3.2	27		96	27	34		1.8		184	.25	10,220	98	20	37	1.2	325	7.5
Nov. 21-30	35,760	10		33	2.9	19		93	22	26		1.2		160	.22	15,450	94	18	31	.9	276	7.4
Dec. 1-12	11,180	13		45	4.2	33		122	36	44		2.5		238	.32	7,180	130	30	35	1.3	414	8.1
Dec. 13-26	4,844	15		60	6.0	63		158	55	85		6.4		a387	.53	5,060	174	44	44	2.1	633	8.2
Dec. 27-31	15,090	10		34	2.4	29		90	31	35		2.5		188	.26	7,660	95	21	40	1.3	325	8.2
Jan. 1-12, 16-19, 1958	7,985	14		46	4.3	46		126	45	56		3.9		a298	.41	6,420	132	29	43	1.7	472	8.2
Jan. 13-15, 20-23	21,940	11		23	2.0	19		63	24	21		2.0		133	.18	7,880	66	14	39	1.0	228	7.8
Jan. 24-31	14,650	12		36	3.0	31		97	35	36		3.8		205	.28	8,110	102	23	40	1.3	356	7.9
Feb. 1-10	6,116	12		54	5.2	49		137	53	65		4.7		a336	.46	5,550	156	44	41	1.7	536	8.1
Feb. 11-23	5,435	14		50	5.5	56		128	51	76		4.5		a344	.47	5,050	148	42	45	2.0	553	8.2
Feb. 24-28	15,010	12		22	2.5	23		55	26	30		2.0		144	.20	5,840	66	20	44	1.2	241	7.6
Mar. 1-10	5,045	15		43	5.5	52		104	50	73		3.2		293	.40	3,990	130	45	46	2.0	511	7.7
Mar. 11-20	9,408	15		49	5.6	51		121	59	66		4.0		a324	.44	8,230	146	46	43	1.8	528	7.8
Mar. 21-31	6,393	12		56	5.4	45		150	47	58		5.3		a311	.42	5,370	162	38	38	1.5	519	7.9
Apr. 1-18	5,877	15		56	3.7	40		147	51	45		5.0		288	.39	4,570	155	34	36	1.4	532	7.8
Apr. 19-27	7,498	14		50	3.9	53		131	46	69		4.8		a332	.45	6,720	141	34	45	2.0	516	7.7
Apr. 28-30, May 1-3	14,320	10		43	2.1	29		116	36	31		3.2		211	.29	8,160	116	21	35	1.2	374	7.5
May 4-16	39,360	13		36	2.0	17		108	23	14		3.0		161	.22	17,110	98	10	27	.7	268	7.6
May 17-31	39,890	13		50	2.6	22		148	27	23		1.8		212	.29	22,830	136	14	26	.8	365	7.8
June 1-10	12,050	15		56	5.0	35		157	35	48		3.8		a284	.39	9,240	160	32	32	1.2	474	7.7
June 11-20	5,508	11		58	4.9	33		150	36	51		4.2		a284	.39	4,220	164	42	30	1.1	479	7.7
June 21-30	7,055	15		47	4.4	41		127	37	56		4.2		a276	.38	5,260	136	32	40	1.5	458	7.8
July 1-10	6,023	14		48	4.2	33		139	33	41		4.0		245	.33	3,980	138	24	34	1.2	433	7.7
July 11-20	5,744	13		47	3.9	42		129	38	55		4.0		a283	.38	4,390	134	28	41	1.6	460	7.7
July 21-31	1,873	11		53	4.3	43		151	35	58		2.2		a301	.41	1,520	150	26	39	1.5	491	7.7
Aug. 1-15	1,337	9.0		58	5.0	77		180	51	92		1.8		a390	.53	1,410	165	18	50	2.6	674	8.2
Aug. 16-31	1,784	10		56	4.6	69		175	50	78		3.0		a370	.50	1,780	158	15	49	2.4	630	8.0
Sept. 1-10	1,092	15		48	4.5	73		143	43	94		3.5		a374	.51	1,100	138	22	53	2.7	633	8.1
Sept. 11-21	1,742	11		51	5.1	75		145	50	99		1.8		a374	.51	1,760	148	29	53	2.7	653	8.0
Sept. 22-30	21,700	8.8		28	2.3	21		84	20	24		1.5		147	.20	8,610	80	10	36	1.0	262	7.6
Weighted average	11,690	12		40	3.2	31		113	31	37		2.6		215	0.29	6,790	113	20	37	1.3	366	--

a Residue on evaporation at 180°C.

TRINITY RIVER NEAR MOSS BLUFF, TEX.

LOCATION.--At Devers Pumping Plant Number One, one mile west of Moss Bluff, Liberty County.
RECORDS AVAILABLE.--Chemical analyses: Short periods during summers of 1946 to 1949, daily records October 1949 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 544 ppm Oct. 6-14; minimum, 138 ppm Feb. 17-28.
Hardness: Maximum, 181 ppm Aug. 11-20; minimum, 57 ppm Feb. 17-28.
Specific conductance: Maximum observed, 1,140 micromhos Oct. 8; minimum observed, 191 micromhos Oct. 21.
EXTREMES, 1949-58.--Dissolved solids: Maximum, 3,930 ppm Aug. 26-31, 1956; minimum, 110 ppm Oct. 4-10, 1949.
Hardness: Maximum, 790 ppm Aug. 26-31, 1956; minimum, 40 ppm Apr. 9-13, 1955.
Specific conductance: Maximum observed, 7,630 micromhos Aug. 27, 1952; minimum observed, 127 micromhos Oct. 7, 1949.
REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex.
No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-3, 5, 1957		10		47	4.6	82		144	43	105		5.3		381	0.52		136	18	57	3.1	669	7.9
Oct. 4, 15-20		7.4		22	1.5	32		66	16	41		2.5		a154	.21		61	7	53	1.8	282	7.0
Oct. 6-14		8.2		53	5.2	144		178	29	205		.5		544	.74		154	8	67	5.0	985	7.1
Oct. 21-31		8.2		22	1.9	25		74	20	25		.5		a139	.19		63	2	46	1.4	256	6.9
Nov. 1-10		7.8		35	3.0	29		104	25	35		1.8		a188	.26		100	14	39	1.3	326	7.4
Nov. 11-20		9.8		30	2.7	22		92	20	25		1.8		a156	.21		86	11	35	1.0	271	7.2
Nov. 21-30		8.0		32	2.8	23		92	22	30		1.8		a165	.22		91	16	36	1.1	296	7.7
Dec. 1-13		13		46	4.6	34		130	33	45		4.0		a244	.33		134	27	36	1.3	418	7.9
Dec. 14-27		13		58	5.8	52		157	48	69		6.5		351	.48		168	40	40	1.7	568	8.1
Dec. 28-31		7.8		25	2.0	22		68	22	27		2.0		a141	.19		71	15	40	1.1	244	7.3
Jan. 1-4, 6-10, 1958		15		48	4.7	41		128	42	55		3.0		283	.38		139	34	39	1.5	464	7.7
Jan. 11-18, 27-31		11		36	3.5	39		96	32	54		2.2		a225	.31		104	26	45	1.7	401	7.9
Jan. 19-26		9.6		25	2.5	30		65	25	40		1.8		a166	.23		73	19	47	1.5	293	7.3
Feb. 1-16		13		54	4.7	53		136	45	76		4.0		344	.47		154	42	43	1.8	554	7.8
Feb. 17-26, 28		7.8		19	2.4	25		48	25	32		2.5		a138	.19		57	18	49	1.5	239	7.1
Mar. 1-10		14		52	6.2	58		133	53	80		4.2		346	.47		155	46	45	2.0	566	7.9
Mar. 11-20		10		58	5.5	45		158	47	57		5.9		312	.42		167	38	37	1.5	521	7.9
Mar. 21-31		11		59	5.6	49		159	49	65		5.3		333	.45		170	40	39	1.6	551	7.7
Apr. 1-7, 9, 11-15		9.0		52	5.5	56		150	53	65		5.0		322	.44		152	29	44	2.0	538	7.7
Apr. 16-30		9.4		52	5.1	54		143	53	65		4.2		322	.44		150	34	44	1.9	532	7.7
May 2-6, 9, 11-13		11		42	2.6	23		132	28	19		2.0		201	.27		116	7	30	.9	323	7.4
May 15-31		10		48	2.5	28		147	29	27		2.0		231	.31		130	10	32	1.1	379	7.6
June 1-2, 4-20		11		53	4.4	39		153	35	50		3.5		284	.39		150	25	36	1.4	477	7.5
June 21-22, 24-25, 29-30		11		42	4.4	31		113	34	42		3.8		a224	.30		123	30	35	1.2	399	7.5
July 1-15		12		48	4.7	32		141	33	40		4.0		a243	.33		139	24	34	1.2	422	7.8
July 16-31		12		50	4.6	39		154	35	45		3.5		276	.38		144	17	37	1.4	462	7.5
Aug. 1, 3, 6-7, 9-10		10		57	5.3	71		184	45	85		.5		385	.52		164	13	48	2.4	639	7.7
Aug. 11-20		9.8		64	5.2	80		205	52	94		1.0		433	.59		181	13	49	2.6	715	7.7
Aug. 21-31		9.8		61	4.9	86		192	52	104		1.5		440	.60		172	14	52	2.9	729	8.2
Sept. 1, 3-17, 21, 23-24		13		54	4.0	73		158	41	96		2.8		377	.51		151	22	51	2.6	643	7.9
Sept. 2, 18-20, 25-30		9.0		32	1.9	36		94	23	44		3.0		a195	.27		88	11	47	1.7	359	7.2

a Calculated from determined constituents.

OLD RIVER NEAR COVE, TEX.

LOCATION.--At Barber Hill Pumping Plant, 5 miles northwest of Cove, Chambers County.
RECORDS AVAILABLE.--Chemical analyses: Short periods during summers of 1946 to 1949, daily records October 1949 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 460 ppm Sept. 1-6; minimum, 113 ppm Jan. 22-31.
Hardness: Maximum, 164 ppm Aug. 1-15, Sept. 1-6; minimum, 55 ppm Jan. 22-31.
Specific conductance: Maximum observed, 1,080 micromhos Sept. 5, 6; minimum observed, 158 micromhos Sept. 25.
EXTREMES, 1949-58.--Dissolved solids: Maximum, 11,300 ppm Oct. 14-29, 1956; minimum, 77 ppm Apr. 29, May 1-2, 1957.
Hardness: Maximum, 2,460 ppm Oct. 14-29, 1956; minimum, 34 ppm Apr. 29, May 1-2, 1957.
Specific conductance: Maximum observed, 18,000 micromhos Oct. 15, 17, 1956; minimum observed, 101 micromhos Apr. 29, 1957.
REMARKS.--Values reported for dissolved solids are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-8,10-15, 1957---		14		33	4.6	40		118	17	52		0.5		a234	0.32		101	5	46	1.7	390	8.2
Oct. 9----------		--		--	--	--		115	--	220		--		--	--		112	18	--	--	923	8.1
Oct. 16-31----------		11		19	3.1	21		71	12	24		1.5		127	.17		60	2	43	1.2	220	7.6
Nov. 1-11----------		12		23	3.5	24		82	13	30		1.0		146	.20		72	5	42	1.2	253	7.6
Nov. 12-17, 19-20------		12		18	2.6	19		64	11	23		1.0		118	.16		56	3	43	1.1	194	7.5
Nov. 21-30, Dec. 1-6---		11		20	2.9	22		72	9.2	28		1.0		129	.18		62	3	43	1.2	220	7.7
Dec. 7-18----------		11		30	4.3	35		97	14	52		.5		195	.27		93	13	45	1.6	347	7.7
Dec. 19-27----------		11		40	6.2	50		122	18	82		.5		268	.36		125	25	47	2.0	485	7.9
Dec. 28-31----------		6.4		18	2.7	24		60	12	33		1.0		127	.17		56	7	49	1.4	226	7.5
Jan. 1-10, 1958--------		8.0		27	3.4	31		87	13	45		.5		171	.23		81	10	45	1.5	309	7.6
Jan. 11-14, 16-21------		9.8		27	3.3	34		88	13	48		1.5		a222	.24		81	9	48	1.6	332	8.0
Jan. 22-31----------		7.0		18	2.4	20		68	7.8	24		1.0		113	.15		55	0	44	1.2	205	7.5
Feb. 1-10----------		6.4		27	3.2	32		91	12	44		1.0		171	.23		80	6	46	1.5	315	7.6
Feb. 11-20, 25-26------		6.0		24	2.7	30		81	13	39		1.0		156	.21		71	5	48	1.5	281	7.4
Feb. 21-24, 27-28------		4.6		28	3.5	38		95	12	53		1.0		187	.25		84	6	49	1.8	344	7.5
Mar. 1-10----------		7.2		29	3.8	32		100	11	45		.8		178	.24		88	6	44	1.5	326	6.6
Mar. 11, 13-19---------		8.8		35	5.1	42		108	18	65		1.0		228	.31		108	20	46	1.8	426	7.1
Mar. 21-31----------		11		48	6.4	62		134	37	92		2.8		a360	.49		146	36	48	2.2	594	7.6
Apr. 1-8----------		7.8		52	6.5	73		147	48	101		2.0		a400	.54		156	36	50	2.5	664	7.7
Apr. 9-20----------		10		26	2.5	40		85	17	51		3.0		a227	.31		75	6	54	2.0	340	7.4
Apr. 21-30----------		12		34	3.6	43		98	25	60		2.2		a271	.37		100	19	48	1.9	418	7.6
May 1-10----------		9.2		42	4.2	53		123	34	71		1.8		a313	.43		122	21	49	2.1	505	7.6
May 11-20----------		12		36	2.9	31		112	23	37		2.2		a245	.33		102	10	40	1.3	362	7.5
May 21-31----------		17		40	4.6	36		133	26	42		1.5		a246	.33		119	10	40	1.4	398	7.9
June 1-14----------		15		50	4.9	29		162	26	34		1.0		a256	.35		145	12	31	1.1	410	8.0
June 15-30----------		14		52	5.2	42		160	32	55		1.8		a295	.40		151	20	38	1.5	488	7.8
July 1-10----------		11		42	4.8	39		133	29	49		1.5		a255	.35		125	16	41	1.5	429	7.5
July 11-20----------		11		42	4.9	38		135	28	48		1.0		a264	.36		125	14	40	1.5	421	7.4
July 21-31----------		20		45	5.3	42		155	30	47		2.2		268	.36		134	7	41	1.6	452	8.2
Aug. 1-15----------		18		55	6.6	58		185	30	75		1.8		a374	.51		164	12	43	2.0	583	8.2
Aug. 16-31----------		18		54	6.4	68		184	36	84		1.0		a390	.53		161	10	48	2.3	618	8.1
Sept. 1-6----------		14		56	5.8	107		186	46	138		2.0		460	.63		164	11	59	3.6	816	8.2
Sept. 7-20----------		19		34	4.1	44		122	17	56		1.2		235	.32		102	2	49	1.9	410	7.8
Sept. 21-30----------		20		24	3.0	18		91	11	18		.5		140	.19		72	0	35	.9	224	7.5

a Residue on evaporation at 180°C.

TRINITY RIVER AT ANAHUAC, TEX.

LOCATION.--At Lone Star Pumping Plant in Anahuac, Chambers County.
RECORDS AVAILABLE.--Chemical analyses: Short periods during summers of 1946 to 1949, December 1949 to September 1958.
EXTREMES, 1957-58.--Hardness: Maximum, 242 ppm Oct. 16; minimum, 61 ppm Jan. 16, 24.
Specific conductance: Maximum,3,500 micromhos Sept. 15; minimum, 195 micromhos Jan. 16.
EXTREMES, 1949-58.--Dissolved solids (1949-56): Maximum, 18,400 ppm Aug. 1-31, 1956; minimum, 140 ppm Apr. 12-19, 1955.
Hardness: Maximum, 4,140 ppm Oct. 1, 8, 15, 1956; minimum, 45 ppm Apr. 12-19, 1955.
Specific conductance: Maximum,36,300 micromhos Oct. 1, 1956; minimum, 195 micromhos Jan. 16, 1958.
REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
Oct. 2, 1957		--		--	--	--		92	27	92		--		--	--		86	10	--	--	500	8.2
Oct. 16		--		--	--	--		180	40	660		--		--	--		242	94	--	--	2,440	8.2
Oct. 23, 30		--		--	--	--		68	17	32		--		--	--		63	7	--	--	248	7.9
Nov. 6, 13, 20, 27		12		28	2.7	40		90	24	48		1.0		206	0.28		81	7	52	1.9	356	7.5
Dec. 4		--		--	--	--		105	--	42		--		--	--		105	19	--	--	356	7.8
Dec. 11		--		--	--	--		119	--	59		--		--	--		126	28	--	--	441	7.8
Dec. 30		--		--	--	--		97	--	48		--		--	--		104	24	--	--	384	7.7
Jan. 3, 9, 1958		--		--	--	--		102	--	61		--		--	--		112	28	--	--	435	8.0
Jan. 16, 24		--		--	--	--		59	--	28		--		--	--		61	12	--	--	227	7.6
Jan. 28		--		--	--	--		82	--	44		--		--	--		87	20	--	--	332	7.8
Feb. 4		--		--	--	--		113	--	49		--		--	--		120	28	--	--	390	8.1
Feb. 13		--		--	--	--		88	--	65		--		--	--		103	31	--	--	509	8.2
Feb. 19		--		--	--	--		141	--	74		--		--	--		149	34	--	--	529	8.2
Feb. 26		--		--	--	--		67	--	62		--		--	--		73	18	--	--	353	8.0
Mar. 3		--		--	--	--		46	--	78		--		--	--		63	26	--	--	371	7.9
Mar. 5		--		--	--	--		87	--	58		--		--	--		98	27	--	--	392	8.2
Mar. 7		--		--	--	--		103	--	64		--		--	--		121	36	--	--	482	8.2
Mar. 19		--		--	--	--		126	--	45		--		--	--		141	38	--	--	455	8.2
Mar. 26		--		--	--	--		146	--	59		--		--	--		158	38	--	--	527	8.2
Apr. 2, 4, 7, 9, 11, 14		12		57	5.5	56		149	57	72		4.8		356	.48		164	42	43	1.9	570	7.9
Apr. 16, 18, 21, 23, 25, 28, 30		12		52	4.8	50		139	49	64		3.8		318	.43		149	35	42	1.8	523	7.5
May 2, 5, 7, 9, 12, 14-		12		33	2.0	29		108	26	26		1.8		196	.27		91	2	41	1.3	304	7.1
May 16, 19, 21, 23, 26, 28, 30		12		45	3.4	21		137	29	20		1.2		216	.29		126	14	35	1.1	347	7.2
June 2, 4, 6, 9, 11, 13, 15		15		53	3.1	40		160	33	45		2.5		287	.39		145	14	37	1.4	466	8.1
June 18, 20, 23, 25, 27, 30		15		50	3.6	49		137	42	62		3.8		310	.42		140	27	43	1.8	514	7.9
July 2, 4, 7, 9, 11, 14, 16, 18, 20, 23, 25		17		48	4.5	37		138	35	48		3.0		270	.37		138	25	37	1.4	449	7.9
July 28, 30		20		64	6.1	73		174	43	108		3.0		a403	.55		184	42	46	2.3	728	8.2
Aug. 1, 4, 6, 8, 11, 13		12		58	6.3	76		170	47	104		.5		a388	.53		170	31	49	2.5	679	7.8
Aug. 15, 18, 20, 22, 25, 27, 29		9.4		63	5.8	94		190	58	119		1.0		488	.66		181	26	53	3.0	782	7.8
Sept. 1, 3, 10-11		14		49	5.1	90		140	49	121		2.8		423	.58		144	29	58	3.3	712	8.1
Sept. 5, 8, 17, 19		17		61	25	283		145	99	458		4.0		1,020	1.39		255	136	71	7.7	1,860	8.2
Sept. 15, 22, 24, 26, 29		9.6		37	15	153		93	52	252		1.5		a566	.77		154	78	68	5.4	1,080	7.9

a Calculated from determined constituents.

TRINITY BAY AT MOUTH OF TRINITY RIVER NEAR ANAHUAC, TEX.

LOCATION.--At four sampling stations in Trinity Bay opposite mouth of Trinity River, near Anahuac, Chambers County. Station 2- In Anahuac Channel immediately below delta. Station 3- In Anahuac Channel about 1½ miles southwest of Station 2. Station 6- In Anahuac Channel at south end. Station 7- In Trinity Bay about 1½ miles west of Station 6.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1958.

Specific conductance, micromhos at 25°C, and chloride, in parts per million, water year October 1957 to September 1958

Date of Collection	Station 2		Station 3		Station 6		Station 7	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
Oct. 2, 1957	513	100	507	95	516	100	692	150
Oct. 9	1,130	250	1,140	250	1,200	270	1,870	485
Oct. 16	2,120	560	2,130	565	2,040	620	2,290	620
Oct. 23	253	39	250	40	239	37	236	36
Oct. 30	262	31	282	34	323	42	284	35
Nov. 6	471	70	462	69	475	71	470	71
Nov. 13	322	46	310	42	305	42	303	42
Nov. 20	378	55	518	96	390	56	382	54
Nov. 27	278	32	275	30	285	33	271	28
Dec. 4	420	56	354	42	361	42	351	42
Dec. 11	474	67	443	58	443	58	462	62
Dec. 30	389	49	382	49	382	48	391	49
Jan. 3, 1958	400	55	397	55	391	55	392	55
Jan. 9	458	62	460	61	465	62	490	70
Jan. 16	210	27	188	22	189	22	204	26
Jan. 24	254	32	256	32	299	44	256	32
Jan. 28	348	48	333	46	335	44	335	44
Feb. 4	415	46	396	45	394	46	392	46
Feb. 13	504	64	510	65	526	69	515	62
Feb. 19	531	72	544	74	533	73	541	75
Feb. 26	371	66	409	77	352	63	365	65
Mar. 3	382	81	405	86	370	79	380	81
Mar. 5	404	61	463	79	395	59	395	60
Mar. 7	498	72	485	75	487	71	486	73
Mar. 10	594	100	597	91	603	93	601	92
Mar. 19	458	50	454	46	455	42	456	42
Mar. 26	529	62	530	60	533	63	530	62
Apr. 2	591	75	592	75	586	75	586	75
Apr. 4	583	84	576	81	576	83	581	84
Apr. 7	568	63	564	63	559	62	565	63
Apr. 9	544	57	549	57	544	57	546	56
Apr. 11	500	62	463	54	476	58	473	58
Apr. 14	569	82	545	74	541	73	546	75
Apr. 16	550	74	547	74	548	74	550	75
Apr. 18	562	71	572	74	560	73	556	72
Apr. 21	542	72	542	72	544	73	535	72
Apr. 23	462	54	458	53	512	71	504	66
Apr. 25	523	70	520	69	517	67	517	68
Apr. 30	473	55	472	54	477	54	475	55
May 2	311	26	302	24	400	47	303	24
May 5	416	57	356	36	384	44	424	53
May 7,	234	21	227	20	227	20	270	32
May 9	326	38	275	25	285	27	281	26
May 12	303	24	308	25	326	29	316	28
May 14	306	20	309	19	335	28	309	21
May 16	325	22	323	21	330	22	320	21
May 19	317	19	329	21	320	20	317	18
May 21	330	19	--	--	469	55	338	20
May 23	334	20	338	21	361	26	333	19
May 26	366	23	376	27	359	22	360	23
May 28	368	22	367	24	371	28	370	27
May 30	381	28	376	27	381	24	386	24
June 2	420	34	399	30	410	30	402	30
June 4	409	32	417	34	413	32	410	32
June 6	431	36	427	34	418	34	426	35
June 9	436	39	453	42	439	41	440	40
June 11	495	57	523	64	497	56	498	58
June 13	575	74	577	74	579	74	577	74
June 16	504	60	513	62	503	57	503	58
June 18	511	60	601	88	507	61	495	57
June 20	654	103	530	64	514	63	528	70
June 23	542	72	542	72	542	72	624	95
June 25	566	68	569	71	592	74	592	70
June 27	480	64	475	64	475	63	477	65
June 30	466	56	461	58	448	54	448	54

TRINITY BAY AT MOUTH OF TRINITY RIVER NEAR ANAHUAC, TEX.--Continued

Specific conductance, micromhos at 25°C, and chloride, in parts per million, water year October 1957 to September 1958--Continued

Date of Collection	Station 2		Station 3		Station 6		Station 7	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
July 2, 1958	454	48	473	51	465	49	454	48
July 4	511	65	496	61	491	61	493	61
July 7	498	58	465	49	464	50	469	49
July 9	445	46	456	47	444	45	450	46
July 11	428	42	429	41	429	42	428	41
July 14	440	47	436	45	427	46	427	44
July 16	435	46	450	48	443	45	484	59
July 18	492	56	471	50	409	40	415	38
July 20	436	45	440	46	438	44	444	46
July 23	436	51	435	52	467	59	533	80
July 25	507	66	531	71	475	56	551	77
July 28	632	89	738	119	675	98	639	89
July 30	665	98	670	98	673	99	652	89
Aug. 1	675	97	671	96	639	86	635	85
Aug. 4	641	94	621	87	607	85	748	127
Aug. 6	814	149	818	147	709	116	760	129
Aug. 8	683	106	679	106	683	107	760	131
Aug. 11	721	112	725	115	751	120	775	127
Aug. 13	740	118	864	154	997	193	1,190	250
Aug. 15	775	135	772	134	782	135	788	137
Aug. 18	818	125	860	139	809	123	795	121
Aug. 20	748	103	748	103	756	104	768	110
Aug. 22	934	160	909	147	955	162	1,070	200
Aug. 25	871	140	801	120	812	123	803	122
Aug. 27	740	101	739	103	740	105	740	105
Aug. 29	669	85	658	85	671	88	671	85
Sept. 1	762	126	760	126	768	126	775	128
Sept. 3	628	100	696	107	644	105	911	181
Sept. 5	3,340	970	3,440	970	4,370	1,270	3,120	860
Sept. 8	1,030	222	939	200	1,060	228	1,140	252
Sept. 10	841	150	807	145	3,670	1,060	6,410	1,970
Sept. 11	785	144	758	135	822	151	873	160
Sept. 15	4,670	1,420	4,800	1,400	10,500	3,470	11,700	3,820
Sept. 17	2,040	510	1,930	485	7,440	2,350	9,940	3,190
Sept. 19	4,060	1,140	3,950	1,120	8,960	2,880	12,400	4,040
Sept. 22	553	104	529	99	527	95	530	96
Sept. 24	343	56	359	60	312	48	301	33
Sept. 26	232	30	227	30	223	29	228	30
Sept. 29	294	33	302	34	302	33	302	34

MISCELLANEOUS ANALYSES OF STREAMS IN TRINITY RIVER BASIN IN TEXAS

(Chemical analyses, in parts per million, water year October 1957 to September 1958)

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
ELM FORK TRINITY RIVER RESERVOIR NO. 6-0 NEAR MUENSTER																						
Oct. 3, 1957		6.2		58	3.8	42		145	16	82	0.4	0.0		279	0.38		160	41	37	1.5	532	8.1
Dec. 27		1.3		76	4.0	43		160	36	86	.4	11		337	.46		206	75	31	1.3	609	7.6
Mar. 12, 1958		3.2		88	4.1	59		191	43	111	.3	8.2		411	.56		236	80	35	1.7	749	7.7
ELM FORK TRINITY RIVER NEAR MUENSTER																						
Oct. 3, 1957	0.2	12		696	56	738		180	39	2,400	0.0	--		4,030	5.48		1,970	1,820	45	7.2	7,240	7.4
Dec. 27	12	6.8		130	6.0	63		252	38	170	.0	2.0		540	.73		349	142	28	1.5	986	7.8
Mar. 12, 1958	63	11		98	5.1	38		243	34	78	.3	2.5		a416	.57		266	66	24	1.0	679	7.9
Mar. 14,20,25,29	--	8.7		62	4.5	61		94	46	125	.3	5.7		359	.49		173	96	44	2.0	667	7.6
PINOAK CREEK NEAR HUBBARD																						
Nov. 7, 1957	1.7	--		--	--	--		246	--	45	--	--		--	--		156	0	--	--	782	8.2
Dec. 26	0	12		116	13	53		246	155	66	0.4	0.5		a556	0.76		343	142	25	1.2	856	7.8
Mar. 11, 1958	0	2.6		70	10	104		303	103	58	.8	2.5		a511	.69		216	0	51	3.1	827	8.2
Aug. 24	1,140	7.8		22	1.4	4.8	3.0	73	8.6	1.5	.4	3.5		89	.12		61	8	14	.3	144	7.8
Aug. 26-30	.1	17		58	6.8	77		220	96	40	.6	1.5		a430	.58		172	0	49	2.5	641	8.2
Sept. 11-12-17	.7	15		34	2.9	36		112	61	10	.7	3.5		218	.30		97	5	44	1.6	346	8.1
NORTH CHANNEL TEHUACANA CREEK NEAR FAIRFIELD																						
Oct. 3, 1957		3.9		62	20	511		79	46	875	0.4	0.2		1,560	2.12		236	172	82	15	2,990	7.8
Dec. 26		13		63	19	147		128	86	255	.3	.8		647	.88		235	130	58	4.2	1,190	7.7
Mar. 11, 1958		9.8		65	25	252		139	91	428	--	.8		940	1.28		265	151	67	6.7	1,750	7.2
Sept. 26		11		32	7.5	177		95	18	283	--	1.5		a626	.85		111	33	78	7.3	1,090	7.3
SOUTH CHANNEL TEHUACANA CREEK NEAR FAIRFIELD																						
Oct. 3, 1957		7.8		9.6	3.0	35		34	14	50	0.0	0.5		137	0.19		36	8	68	2.5	254	7.1
Dec. 26		16		64	19	245		110	84	420	.4	.8		a990	1.35		238	148	69	6.9	1,700	7.1
Mar. 11, 1958		14		73	22	279		98	102	490	.5	1.0		1,030	1.40		272	192	69	7.4	1,880	7.8
Sept. 26		12		14	4.8	58		44	15	91	--	1.0		218	.30		55	19	70	3.4	411	6.8

a Residue on evaporation at 180°C.

BRAZOS RIVER BASIN

DOUBLE MOUNTAIN FORK BRAZOS RIVER NEAR ASPERMONT, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 83, 8 miles downstream from Mountain Creek, and 10 miles south of Aspermont, Stonewall County.
DRAINAGE AREA.--7,980 square miles, approximately, of which 6,470 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1948 to November 1951, October 1956 to September 1958.
Water temperatures: November 1949 to November 1951, October 1956 to September 1958.
Sediment records: November 1949 to September 1951.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 6,350 ppm Feb. 23-28; minimum, 636 ppm Oct. 22-28.
Hardness: Maximum, 2,120 ppm July 21-30; minimum, 193 ppm Oct. 22-28.
Specific conductance: Maximum observed, 10,400 micromhos Feb. 25; minimum observed, 735 micromhos Oct. 24.
Water temperatures: Maximum, 94°F Sept. 25; minimum, 33°F Feb. 11.
EXTREMES, 1948-51, 1956-58.--Dissolved solids: Maximum, 6,350 ppm Feb. 23-28, 1958; minimum, 636 ppm Oct. 22-28, 1957.
Hardness: Maximum, 2,510 ppm Aug. 5, 8, 1951; minimum, 193 ppm Oct. 22-28, 1957.
Specific conductance: Maximum observed, 10,400 micromhos Feb. 25, 1958; minimum observed, 735 micromhos Oct. 24, 1957.
Water temperatures (Nov. 1949-51, 1956-58): Minimum, freezing point Jan. 4, 1950, Jan. 29, 1951, Jan. 16, 1957.
Sediment concentrations (Nov. 1949-51): Maximum daily, 77,700 ppm May 19, 1951; minimum daily, no flow on many days.
Sediment loads (Nov. 1949-51): Maximum daily, 565,000 tons May 11, 1950; minimum daily, 0 tons on many days.
REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in Water-Supply Paper 1562.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-6, 1957	a0.03	17		628	87	508		145	1,820	720		0.2		3,850	5.24	0.31	1,920	1,810	36	5.0	4,840	7.7
Oct. 7-9	1,293	11		242	12	57		72	616	52		3.0		1,030	1.40	3,600	654	594	16	1.0	1,330	7.9
Oct. 10-21	80.7	14		218	21	198		122	596	240		3.0		1,350	1.84	294	630	530	41	3.4	1,970	7.9
Oct. 22-28	492	11		61	10	138		137	208	115		2.5		636	.86	845	193	80	61	4.3	989	8.0
Oct. 29-31, Nov. 1-2	22.4	12		186	24	299		141	540	378		1.5		1,510	2.05	91.3	562	447	54	5.5	2,280	8.0
Nov. 3-10	699	9.6		132	14	98		112	361	92		2.0		816	1.11	1,540	387	295	35	2.2	1,120	7.9
Nov. 11-13	106	13		163	22	219		128	440	290		1.5		1,210	1.65	346	497	392	49	4.3	1,900	7.9
Nov. 14-20	36.3	14		282	40	460		145	772	670		1.0		2,310	3.14	226	868	749	54	6.8	3,560	7.9
Nov. 21-30	21.8	14		404	59	754		148	1,100	1,150		1.0		3,560	4.84	210	1,250	1,130	57	9.3	5,220	7.7
Dec. 1-10	9.08	15		508	78	932		149	1,390	1,450		1.0		4,450	6.05	109	1,590	1,470	56	10	6,390	7.8
Dec. 11-31	3.86	13		584	80	894		150	1,610	1,370		.0		4,620	6.28	48.1	1,790	1,660	52	9.2	6,410	7.8
Jan. 1-10, 1958	4.44	10		592	82	1,000		157	1,570	1,580		.5		4,910	6.68	58.9	1,810	1,690	55	10	6,840	7.8
Jan. 11-20	3.72	14		592	82	942		124	1,580	1,500		1.0		4,770	6.49	47.9	1,810	1,710	53	9.6	6,770	7.7
Jan. 21-31	4.46	12		608	88	1,070		137	1,610	1,720		1.0		5,180	7.04	62.4	1,880	1,770	55	11	7,440	7.8
Feb. 1-10	1.44	11		652	91	630		111	1,780	1,010		1.0		4,230	5.75	16.4	2,000	1,910	41	6.1	5,580	7.9
Feb. 11-22	2.39	11		620	86	636		125	1,660	1,030		1.0		4,100	5.58	26.5	1,900	1,800	42	6.3	5,550	8.1
Feb. 23-28	9.02	10		640	102	1,470		130	1,660	2,400		--		6,350	8.64	155	2,020	1,910	61	14	9,430	8.0
Mar. 1-7, 9	13.8	9.8		608	86	974		149	1,640	1,530		1.0		4,920	6.69	183	1,870	1,750	53	9.8	6,980	8.0
Mar. 8, 10-15, 29	31.7	8.8		418	50	533		97	1,110	830		1.2		3,000	4.08	257	1,250	1,170	48	6.5	4,300	8.0
Mar. 16-28, 30-31	6.63	7.8		632	93	1,190		132	1,730	1,870		1.0		5,590	7.60	100	1,960	1,850	57	12	7,830	7.9
Apr. 1-17	4.12	10		624	90	782		130	1,730	1,220		.5		4,520	6.15	50.3	1,930	1,820	47	7.8	6,100	7.6
Apr. 18-25	369	17		270	29	271		111	762	350		6.5		1,760	2.39	1,750	792	702	43	4.2	2,510	7.6
Apr. 26-30	31.4	15		370	46	596		106	996	910		1.5		2,990	4.07	253	1,110	1,020	54	7.8	4,410	7.4
May 1-6, 12-13, 19	1,014	15		348	31	261		98	906	382		1.2		1,990	2.71	5,450	996	916	36	3.6	2,760	7.4
May 7-11	13.6	14		542	61	693		94	1,450	1,080		1.0		3,890	5.29	143	1,600	1,530	48	7.5	5,410	7.5
May 14-18, 20	1,217	15		115	15	161		135	334	168		2.8		890	1.21	2,920	348	238	50	3.7	1,350	7.9
May 21-23	365	15		102	15	174		131	300	194		1.8		898	1.22	885	316	208	55	4.3	1,390	7.9
May 24-31, June 1-4	65.3	16		345	56	727		106	1,020	1,080		.8		3,300	4.49	582	1,090	1,000	59	9.6	4,940	7.6

a Includes days of less than 0.05 second foot flow.

DOUBLE MOUNTAIN FORK BRAZOS RIVER NEAR ASPERMONT, TEX.--Continued

Chemical analyses, in parts per million, water year October 1957 to September 1958--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
June 5-8, 1958	102	16		134	21	337		130	448	410		2.2		1,430	1.94	394	421	314	63	7.1	2,270	7.5
June 9-20	10.1	20		468	58	819		98	1,370	1,190		1.5		3,970	5.40	108	1,410	1,330	56	9.5	5,600	7.4
June 21-23, July 1-5	21.8	18		330	40	557		111	965	780		3.5		2,750	3.74	162	988	897	55	7.1	4,030	7.6
June 24-28	538	18		93	14	163		142	281	165		2.2		832	1.13	1,210	290	173	55	4.2	1,280	7.8
June 29-30	49.0	23		135	19	282		129	448	322		3.8		1,300	1.77	172	415	310	60	6.0	2,010	8.2
July 6-20	a36.2	20		560	73	614		94	1,590	920		3.0		3,830	5.21	374	1,700	1,620	44	6.5	5,190	7.5
July 21-30	a.05	24		685	101	620		74	2,030	920		2.2		4,420	6.01	.60	2,120	2,060	39	5.8	5,460	7.9
July 31, Aug. 1	20.0	27		125	31	224		b185	440	225		1.0		1,160	1.58	62.6	440	288	53	4.7	1,780	8.5
Aug. 2-20	.95	22		645	98	515		81	1,940	740		1.8		4,000	5.44	10.3	2,010	1,950	36	5.0	4,950	7.9
Aug. 21-28	143	16		300	26	137		84	817	165		2.5		1,500	2.04	579	856	786	26	2.0	1,980	7.6
Aug. 29-30	1.30	17		445	47	311		95	1,260	418		1.0		2,550	3.47	8.95	1,300	1,230	34	3.7	3,310	8.1
Aug. 31, Sept. 1-7, 10-14	3.01	17		615	71	478		84	1,710	720		1.0		3,650	4.96	29.7	1,830	1,760	36	4.9	4,640	7.8
Sept. 8-9, 15-20	472	12		203	19	118		79	550	144		2.5		1,090	1.48	1,390	584	520	31	2.1	1,550	7.7
Sept. 21-22, 29-30	92.6	12		255	23	200		88	700	258		2.0		1,490	2.03	373	730	658	37	3.2	2,110	7.9
Sept. 23-25, 28	25.9	12		340	34	405		96	964	558		1.5		2,360	3.21	165	988	910	47	5.6	3,330	8.0
Sept. 26-27	326	12		209	11	23		84	504	12		5.5		c818	1.11	720	566	497	8	.4	1,060	7.8
Weighted average	130	14		217	22	207		110	592	265		2.5		1,390	1.89	488	632	542	42	3.6	1,970	--

a Includes days of less than 0.05 second foot flow.
b Includes equivalent of 10 parts per million carbonate (CO_3).
c Calculated from determined constituents.

SALT FLAT CREEK AT WEIR B NEAR ASPERMONT, TEX.

LOCATION.--At mouth, about 20 miles northwest of Aspermont, Stonewall County.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1958.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Specific conductance (micromhos at 25° C)	pH	Density at 20°C
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 10, 1957	0.30					79,300			3,430	126,000						8,450		95			1.160
Nov. 14	.50					83,500			3,410	133,000						9,580		95			1.159
Nov. 27	.43					86,000			3,260	137,000						9,550		95			1.173
Jan. 3, 1958	.42					88,300			3,200	140,000						9,310		95			1.181
Jan. 29	.52					86,700			3,020	137,000						8,880		96			1.171
Feb. 25	.45					84,400			3,140	133,000						8,650		95			1.167
Apr. 2	.59					89,800			3,220	142,000						10,100		95			1.180
Apr. 29	.32					67,000			3,190	105,000						7,710		95			1.129
May 27	.272					93,400			3,090	149,000						10,300		95			1.190
June 25	.26					95,200			2,800	150,000						10,200		95			1.191
July 24	.26					91,800			2,800	147,000						10,000		95			1.200
Aug. 20	.543					89,200			3,090	140,000						9,250		95			1.178
Sept. 18	.40					91,400			3,270	144,000						10,100		95			1.183

Note: Values given in this table are expressed in parts per million and should be multiplied by the density in any computation of loads.

SALT CROTON CREEK AT WEIR C NEAR ASPERMONT, TEX.

LOCATION.--Half a mile downstream from Salt Flat Creek, about 20 miles northwest of Aspermont, Stonewall County.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1958.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Specific conductance (micromhos at 25° C)	pH	Density at 20°C
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 10, 1957	0.77					60,000			3,090	95,000						6,620		95			1.118
Nov. 14	.81					74,600			3,440	119,000						7,730		95			1.152
Nov. 27	.99					85,700			3,520	133,000						8,200		96			1.171
Jan. 3, 1958	.52					84,900			3,460	134,000						8,530		96			1.173
Jan. 29	.77					84,500			3,110	134,000						8,130		96			1.169
Feb. 28	.90					79,700			3,390	125,000						7,710		96			1.154
Apr. 2	.83					85,300			3,350	134,000						9,390		95			1.172
Apr. 29	1.14					64,000			3,240	101,000						6,760		95			1.125
June 25	.44					93,500			3,190	149,000						8,890		96			1.192
July 24	.57					95,600			2,760	152,000						9,250		96			1.200
Aug. 20	1.17					70,000			4,030	109,000						8,330		95			1.116
Sept. 18	.52					88,100			3,430	138,000						9,270		95			1.176

Note: Values given in this table are expressed in parts per million and should be multiplied by the density in any computation of loads.

SALT CROTON CREEK AT WEIR D NEAR ASPERMONT, TEX.

LOCATION.--About 500 feet upstream from Haystack Creek and 1,000 feet upstream from gaging station, about 20 miles northwest of Aspermont, Stonewall County.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1958.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Specific conductance (micromhos at 25° C)	pH	Density at 20°C
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 10, 1957	0.97					34,000			2,880	54,400						4,870		94			1.067
Oct. 24	.78					57,300			3,870	88,900						7,020		95			1.111
Nov. 14	1.17					69,900			4,760	111,000						7,720		95			1.140
Nov. 26	1.05					77,800			2,320	124,000						8,390		95			1.156
Dec. 19	1.05					86,700			3,310	137,000						9,110		95			1.175
Jan. 2, 1958	.77					90,500			3,680	143,000						9,050		96			1.182
Jan. 16	.80					82,500			3,500	128,000						8,250		96			1.163
Jan. 29	.74					86,200			3,240	136,000						7,950		96			1.170
Feb. 11	.96					82,000			3,100	128,000						7,570		96			1.162
Feb. 26	.78					83,300			3,470	131,000						8,230		96			1.167
Mar. 19	.80					79,400			3,240	123,000						7,430		96			1.157
Apr. 2	1.20					79,800			3,530	125,000						9,080		95			1.157
Apr. 29	1.50					82,000			3,440	128,000						8,690		95			1.162
May 15	1.37					41,400			3,460	64,800						6,380		93			1.081
May 27	.71					100,000			2,720	158,000						9,630		96			1.204
June 11	1.02					100,000			2,780	158,000						10,000		96			1.205
June 25	1.38					89,900			3,350	141,000						9,300		95			1.181
July 10	.65					97,000			2,910	153,000						9,480		96			1.192
July 24	.57					100,000			2,680	160,000						10,200		96			1.200
Aug. 5	.42					100,000			2,690	162,000						10,300		95			1.200
Aug. 20	1.36					97,800			3,470	151,000						7,040		97			1.194
Sept. 18	.58					52,600			3,200	82,900						7,720		94			1.101

Note: Values given in this table are expressed in parts per million and should be multiplied by the density in any computation of loads.

HAYSTACK CREEK AT WEIR E NEAR ASPERMONT, TEX.

LOCATION.--About 400 feet upstream from mouth, about 20 miles northwest of Aspermont, Stonewall County.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1958.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Specific conductance (micromhos at 25° C)	pH	Density at 20°C
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 10, 1957	0.39					22,100			3,880	35,400						4,780		91			1.045
Oct. 24	.29					21,400			3,910	33,100						4,950		90			1.043
Nov. 14	.44					18,000			3,540	28,000						4,300		90			1.036
Nov. 26	.41					19,400			3,560	29,800						4,430		90			1.039
Dec. 19	.42					22,000			3,680	34,200						4,870		91			1.044
Jan. 2, 1958	.28					27,000			4,070	42,200						5,350		92			1.054
Jan. 16	.41					22,600			3,720	34,800						4,820		91			1.045
Jan. 29	.36					22,600			3,880	35,400						4,900		91			1.045
Feb. 11	.81					22,300			3,540	35,000						4,640		91			1.044
Feb. 26	.48					23,500			4,010	37,700						5,080		91			1.047
Mar. 19	.29					20,500			3,750	32,200						4,690		90			1.041
Apr. 2	.12					27,000			4,230	41,900						5,780		91			1.051
Apr. 29	.24					22,200			4,040	35,000						5,290		90			1.044
May 15	.38					19,300			3,980	30,300						5,190		89			1.040
May 27	.073					42,000			5,100	65,000						7,380		93			1.084
June 11	.13					39,900			4,820	62,600						6,950		93			1.079
June 25	.18					34,300			4,700	53,800						6,700		92			1.069
July 10	.13					40,200			4,800	63,200						6,980		93			1.083
July 24	.08					47,100			5,050	73,500						7,560		93			1.095
Aug. 5	.070					50,200			5,270	80,200						7,970		93			1.104
Aug. 20	.102					43,500			4,800	67,600						6,990		93			1.088
Sept. 3	.03					50,000			5,240	77,800						7,210		94			1.099
Sept. 18	.12					38,400			4,370	59,500						6,690		93			1.076

Note: Values given in this table are expressed in parts per million and should be multiplied by the density in any computation of loads.

SALT CROTON CREEK NEAR ASPERMONT, TEX.

LOCATION.--At gaging station just below the mouth of Haystack Creek and about 20 miles northwest of Aspermont, Stonewall County.
DRAINAGE AREA.--69 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1958.
REMARKS.--Records of discharge for water year October 1957 to September 1958 given in Water Supply Paper 1562 as "Dove Creek near Aspermont."

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Specific conductance (micromhos at 25° C)	pH	Density at 20°C
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 7, 1957	930					7,010		--	1,230	10,900						1,720		90	--		1.013
Oct. 7	2,640					22,900		--	1,820	35,500						3,160		94	--		1.043
Oct. 10	1.36					25,900		--	3,030	40,900						4,470		93	--		1.051
Oct. 24	1.02					47,700		--	3,520	75,400						6,310		94	--		1.094
Nov. 5	360					778		140	1,060	1,130						1,110		60	5,010		--
Nov. 14	1.49					54,500		--	3,330	85,700						6,500		95	--		1.108
Nov. 26	1.42					58,500		--	4,480	91,900						7,000		95	--		1.115
Dec. 19	1.70					78,300		--	3,490	124,000						8,300		95	--		1.157
Jan. 2, 1958	1.37					78,900		--	3,710	124,000						8,270		95	--		1.161
Jan. 16	1.63					69,300		--	3,640	112,000						8,060		95	--		1.142
Jan. 29	1.29					70,000		--	3,200	112,000						7,730		95	--		1.139
Feb. 11	1.96					64,000		--	3,660	101,000						6,930		95	--		1.126
Feb. 26	1.63					74,800		--	3,470	117,000						7,770		95	--		1.146
Mar. 8	13.6					55,000		--	3,550	86,800						6,580		95	--		1.109
Mar. 19	1.16					61,800		--	3,560	97,100						7,410		95	--		1.120
Apr. 2	.99					63,900		--	3,790	100,000						8,190		94	--		1.124
Apr. 29	1.50					79,400		--	3,390	124,000						8,720		95	--		1.158
May 12	450					1,840		100	979	2,900						1,220	1,140	77	10,000		--
May 15	1.52					21,500		--	3,100	49,400						5,650		92	--		1.062
May 27	.75					95,200		--	3,190	151,000						9,720		96	--		1.194
June 11	.79					82,300		--	3,670	131,000						9,590		95	--		1.168
June 25	.97					55,900		--	4,440	86,900						7,930		94	--		1.110
July 6	21.4					66,700		--	2,940	106,000						7,220		95	--		1.135
July 10	.57					76,400		--	4,090	123,000						9,250		95	--		1.157
July 24	.56					99,000		--	2,500	158,000						10,300		95	--		1.200
Aug. 5	.42					99,000		--	2,630	157,000						10,000		96	--		1.200
Aug. 20	1.22					98,100		--	3,260	152,000						7,690		97	--		1.196
Sept. 3	.56					98,800		--	2,860	155,000						10,200		95	--		1.200
Sept. 3	.43					101,000		--	2,590	159,000						10,400		95	--		1.203
Sept. 15	5.80					68,600		--	2,790	107,000						7,410		95	--		1.134
Sept. 15	--					3,490		--	1,370	5,460						1,670		82	--		1.007
Sept. 18	.68					42,700		--	3,260	66,900						6,600		93	--		1.083

Note: Values given in this table are expressed in parts per million and should be multiplied by the density in any computation of loads.

SALT CROTON CREEK AT MOUTH NEAR ASPERMONT, TEX.

LOCATION.--At junction with Salt Fork Brazos River, 15 miles northwest of Aspermont, Stonewall County.
RECORDS AVAILABLE.--Chemical analyses: December 1957 to August 1958.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Specific conductance (micromhos at 25° C)	pH	Density at 20°C
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Dec. 18, 1957 -----	1.36					66,100			3,870	104,000						8,140		95			1.130
Jan. 15, 1958 -----	1.04					60,300			3,750	94,900						7,770		94			1.119
Feb. 12 -----------	1.94					67,300			3,380	106,000						8,200		95			1.134
Mar. 19 -----------	1.58					48,800			3,570	78,600						7,010		94			1.098
Apr. 17 -----------	3.39					22,900			2,220	36,400						4,250		92			1.044
May 16 ------------	3.57					9,300			2,060	14,900						3,020		87			1.019
June 11 -----------	.14					35,100			4,460	55,100						7,380		91			1.070
July 10 -----------	.18					28,000			3,110	44,000						5,010		92			1.057
Aug. 6 ------------	.20					33,700			3,810	54,300						6,370		92			1.068

Note: Values given in this table are expressed in parts per million and should be multiplied by the density in any computation of loads.

SALT FORK BRAZOS RIVER NEAR ASPERMONT, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 83, 5½ miles downstream from Salt Croton Creek and 13.2 miles northwest of Aspermont, Stonewall County.
DRAINAGE AREA.--4,830 square miles, approximately, of which 2,770 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1951, October 1956 to September 1958.
Water temperatures: October 1948 to September 1951, October 1956 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 59,200 ppm Sept. 1-14; minimum, 2,670 ppm Oct. 14-19, 23-26.
Hardness: Maximum, 5,300 ppm July 15-28; minimum, 408 ppm Oct. 14-19, 23-26.
Specific conductance: Maximum observed, 92,300 micromhos Sept. 12; minimum observed, 2,420 micromhos Nov. 7.
Water temperatures: Maximum, 84°F Aug. 13; minimum, freezing point on several days during winter months.
EXTREMES, 1948-51, 1956-58.--Dissolved solids: Maximum, 78,500 ppm Mar. 21,24-28, 1949; minimum, 1,280 ppm June 2-4, 1957.
Hardness: Maximum, 5,590 ppm Feb. 1-6, 1957; minimum, 372 ppm May 19-23, 24 (12-10 p.m.), 1951.
Specific conductance: Maximum observed, 111,300 micromhos Mar. 24, 25, 1949; minimum observed, 1,820 micromhos June 3, 1957.
Water temperatures: Maximum, 91°F Sept. 6, 1957; minimum, freezing point on many days during winter months.
REMARKS.--Values reported for dissolved solids are calculated from determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in Water-Supply Paper 1562.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH	Density at 20°C
												Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
Oct. 1-7, 12	2.02	12	1,510	350	17,000		162	3,650	27,100		--	49,700	67.6	271	5,210	5,070	88	102	62,800	7.7	1.034
Oct. 8-11,13	308	7.4	376	38	1,480		89	937	2,320		--	5,200	7.07	4,320	1,090	1,020	75	19	8,300	7.7	--
Oct. 14-19, 23-26	399	14	119	27	848		129	311	1,290		2.9	2,670	3.63	2,880	408	302	82	18	4,650	7.9	--
Oct. 20-22, 27-31	85.1	15	297	72	2,750		157	743	4,340		--	8,290	11.3	1,900	1,040	908	85	37	13,400	8.0	1.002
Nov. 1-3	38.0	15	508	121	4,510		165	1,310	7,150		--	13,700	18.8	4,220	1,760	1,630	85	47	21,000	7.9	1.007
Nov. 4-10	790	11	174	28	877		114	440	1,350		2.0	2,940	4.00	6,270	549	456	78	16	4,950	7.9	--
Nov. 11-12	66.0	17	248	47	1,600		141	602	2,520			5,100	6.94	909	812	697	81	24	8,440	8.0	--
Nov. 13-18	46.3	14	461	112	4,110		172	1,110	6,560		--	12,500	17.1	1,560	1,610	1,470	85	45	19,100	7.9	1.006
Nov. 19-30	32.2	14	655	176	7,400		182	1,600	11,800		--	21,700	29.9	1,890	2,360	2,210	87	66	31,700	7.7	1.013
Dec. 1-10	12.2	13	772	194	8,360		191	1,910	13,300		--	24,600	34.0	810	2,720	2,570	87	70	35,400	7.9	1.015
Dec. 11-31	6.30	12	969	260	12,500		181	2,270	20,000		--	36.100	50.3	614	3,490	3,340	89	92	49,100	7.8	1.024
Jan. 1-10, 1958	7.22	9.7	1,000	286	15,400		168	2,280	24,500		--	43,600	61.0	850	3,670	3,530	90	110	57,300	7.9	1.029
Jan. 11-21	11.2	12	967	282	13,700		157	2,290	21,900		--	39,200	54.7	1,190	3,570	3,440	89	100	53,500	7.9	1.026
Jan. 22-31	9.77	12	962	279	12,500		166	2,310	20,000		--	36,100	50.2	952	3,550	3,410	88	91	49.100	7.9	1.023
Feb. 1-10	5.76	13	1,090	322	15,100		160	2,590	24,100		--	43,300	60.5	673	4,040	3,910	89	103	57,400	7.9	1.028
Feb. 11-23	7.85	12	1,050	329	17,000		155	2,470	27,100		--	48,000	67.4	1,020	3,970	3,850	90	117	64,100	7.9	1.033
Feb. 24-28	12.1	11	953	279	12,500		155	2,340	20,000		--	36,200	50.4	1,180	3,520	3,400	89	92	50,200	7.9	1.024
Mar. 1-8	12.1	10	1,060	311	16,100		154	2,530	25,700		--	45,800	64.2	1,500	3,920	3,800	90	112	61,800	7.3	1.031
Mar. 9-20	14.8	10	879	226	10,500		156	2,210	16,700		--	30,600	42.4	1,220	3,120	2,990	88	82	42,800	7.7	1.019
Mar. 21-28	11.5	13	1,000	290	15,000		143	2,440	23,800		--	42,600	59.6	1,320	3,690	3,570	90	107	54,900	7.6	1.029
Mar. 29-31	90.0	13	630	83	2,380		98	1,590	3,790		--	8,530	11.6	2,070	1,910	1,830	73	24	12,800	7.5	1.003
Apr. 1-5	17.1	12	659	142	4,500		142	1,760	7,140		--	14,300	19.6	660	2,230	2,110	81	41	20,900	7.9	1.008
Apr. 6-18	24.4	12	958	189	9,200		130	2,280	14,700		--	27,400	37.9	1,810	3,170	3,060	86	71	37,700	7.5	1.018
Apr. 19-30	54.8	11	487	107	4,030		141	1,290	6,360		--	12,400	17.0	1,830	1,660	1,540	84	43	18,400	7.7	1.006
May 1-9	39.8	12	673	169	6,270		98	1,760	9,990		--	18,900	26.0	2,030	2,370	2,290	85	56	27,800	7.2	1.011
May 10-12	129	13	963	279	15,200		106	2,240	24,300		--	43,000	60.1	14,980	3,550	3,460	90	111	57,600	7.3	1.028
May 13-17,20	641	17	169	32	812		135	466	1,220		4.5	2,790	3.79	4,830	553	442	76	15	4,660	7.9	--
May 18-19, 21-23	161	16	305	56	1,920		130	765	3,020		--	6,150	8.36	2,670	992	885	81	27	10,000	7.8	--
May 24-31	18.8	16	597	152	4,760		122	1,560	7,610		--	14,800	20.3	751	2,110	2,010	83	45	22,400	7.9	1.008

SALT FORK BRAZOS RIVER NEAR ASPERMONT, TEX.--Continued

Chemical analyses, in parts per million, water year October 1957 to September 1958--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH	Density at 20°C
												Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate					
June 1-10, 20-22	10.5	13	936	220	7,970		106	2,480	12,700		--	24,400	33.7	692	3,240	3,150	84	61	32,900	7.7	1.015
June 11-16	.40	21	1,490	334	15,000		132	3,650	23,900		--	44,500	62.3	48.1	5,090	4,980	86	91	54,100	7.4	1.030
June 17-19,23	28.2	12	665	94	4,080		88	1,740	6,410		--	13,000	17.8	990	2,050	1,970	81	39	19,400	8.0	1.007
June 24-29	118	19	154	35	955		193	398	1,440		2.0	3,100	4.22	988	528	370	80	18	5,230	7.7	--
June 30, July 1-2, 6-12	33.2	17	655	132	4,760		114	1,730	7,540		--	14,900	20.4	1,340	2,180	2,080	83	44	22,200	7.7	1.008
July 3-5, 13-14	2.08	20	1,030	229	11,300		107	2,490	18,000		--	33,100	46.0	186	3,510	3,420	87	83	45,100	7.5	1.022
July 15-28	2.89	17	1,540	355	16,700		129	3,750	26,700		--	49,100	69.0	383	5,300	5,200	87	100	62,200	7.8	1.033
July 29-31	265	22	160	35	951		140	485	1,410		4.5	3,140	4.27	2,250	543	428	79	18	5,210	8.2	--
Aug. 1-4	15.0	19	418	81	3,020		132	1,020	4,810		--	9,430	12.9	382	1,380	1,270	83	35	14,600	7.9	1.004
Aug. 5-6, 23-25	30.4	13	754	153	7,970		101	1,780	12,700		--	23,400	32.3	1,920	2,510	2,430	87	69	30,400	7.5	1.015
Aug. 7-17	.35	13	1,410	314	15,700		119	3,270	25,200		--	46,000	64.5	43.5	4,810	4,710	88	99	54,600	7.4	1.031
Aug. 18-22, 26-31	.23	13	1,420	316	15,600		136	3,330	25,000		--	45,700	64.1	28.4	4,840	4,730	88	98	54,300	7.6	1.031
Sept. 1-14	.72	13	1,540	348	20,700		135	3,630	32,900		--	59,200	83.7	115	5,270	5,160	90	124	74,100	7.5	1.040
Sept. 15, 23, 26	377	9.4	683	138	9,170		81	1,490	14,600		--	26,100	36.1	26,570	2,270	2,200	90	84	38,000	7.5	1.017
Sept. 16-20, 28-30	214	11	335	47	1,390		85	872	2,180		--	4,880	6.64	2,820	1,030	960	75	19	7,840	7.7	--
Sept. 21-22, 25	24.0	12	570	90	2,980		107	1,420	4,750		--	9,880	13.5	640	1,790	1,700	78	31	15,100	7.7	1.005
Sept. 24, 27	47.5	11	621	94	4,390		80	1,490	6,990		--	13,600	18.6	1,740	1,940	1,870	83	43	20,700	7.6	1.007
Weighted average	71.4	13	330	68	2,800		124	826	4,410		--	8,500	11.6	1,640	1,100	1,000	85	37	12,700	--	--

HUBBARD CREEK NEAR BRECKENRIDGE, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 183, 2.3 miles downstream from Big Sandy Creek, 6.8 miles northwest of Breckenridge, Stephens County, 7 miles upstream from Gonzales Creek, and 8 miles upstream from Clear Fork Brazos River.
DRAINAGE AREA.--1,087 square miles.
RECORDS AVAILABLE.--Chemical analyses: April 1955 to September 1958.
Water temperatures: April 1955 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 3,100 ppm June 13; minimum, 143 ppm Oct. 14-15.
Hardness: Maximum, 1,120 ppm June 13; minimum, 86 ppm Oct. 14-15.
Specific conductance: Maximum observed, 5,600 micromhos June 13; minimum observed, 215 micromhos Oct. 14.
EXTREMES, 1955-58.--Dissolved solids: Maximum, 3,100 ppm June 13, 1958; minimum, 118 ppm Feb. 6-8, 1957.
Hardness: Maximum, 1,120 ppm June 13, 1958; minimum, 72 ppm Feb. 6-8, 1957.
Specific conductance: Maximum observed, 5,600 micromhos June 13, 1958; minimum observed, 121 micromhos Apr. 27, 1957.
REMARKS.--Values reported for dissolved solids are calculated from determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in Water-Supply Paper 1562.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-7, 1957	0.13	9.0		89	15	86		173	83	168	0.5	3.8		539	0.73	0.19	284	142	40	2.2	950	7.8
Oct. 8-13	620	6.0		43	5.5	36		100	25	69	.5	1.5		236	.32	395	130	48	37	1.4	434	7.7
Oct. 14-15	10,020	6.4		29	3.2	19		87	10	31	.5	1.0		143	.19	3,870	86	14	33	.9	258	7.6
Oct. 16-20	145	10		42	5.7	38		112	17	70	.5	2.0		240	.33	94.0	128	36	39	1.5	445	7.9
Oct. 21-29	35.5	12		62	8.4	68		136	30	135	.4	3.0		386	.52	37.0	189	78	44	2.1	702	8.1
Oct. 30-31, Nov. 1-5	78.5	11		117	20	166		172	50	382	.4	4.0		835	1.14	177	374	233	49	3.7	1,560	8.0
Nov. 6-9	538	6.4		55	9.1	75		110	25	155	.5	2.5		382	.52	555	174	84	48	2.5	721	7.8
Nov. 10-23	38.0	8.8		72	13	104		130	35	222	.5	2.5		522	.71	53.6	233	126	49	3.0	975	7.8
Nov. 24	17.0	--		--	--	--		157	--	480	--	--		--	--	--	410	282	--	--	1,850	7.9
Nov. 25-30	290	7.2		75	15	113		124	36	250	.4	2.0		560	.76	438	248	147	50	3.1	1,040	7.8
Dec. 1-15	12.2	6.2		123	24	203		160	54	465	.3	3.5		958	1.30	31.6	406	274	52	4.4	1,780	7.8
Dec. 16-25, 28-31	7.06	4.6		164	32	263		194	85	610	.3	4.4		1,260	1.71	24.0	540	382	51	4.9	2,310	7.9
Dec. 26-27	40.5	7.2		98	17	129		171	54	282	.3	1.5		673	.92	73.6	314	174	47	3.2	1,260	7.9
Jan. 1-9, 1958	7.21	4.2		150	28	249		174	70	575	.3	4.3		1,170	1.59	22.8	489	346	53	4.9	2,160	7.8
Jan. 10-31	6.95	3.6		170	33	280		170	90	660	.2	6.2		1,330	1.81	25.0	560	420	52	5.2	2,470	8.2
Feb. 1-20	3.06	4.9		230	48	419		184	136	980	.2	10		1,920	2.61	15.9	772	620	54	6.6	3,440	8.0
Feb. 21-28, Mar. 1-11	61.7	4.4		212	55	476		142	112	1,100	.3	6.2		2,040	2.77	340	755	638	58	7.5	3,750	8.2
Mar. 12-28	21.3	4.6		134	35	261		132	84	600	.2	3.5		1,190	1.62	68.4	478	370	54	5.2	2,230	7.7
Mar. 29-31, Apr. 1	127	3.8		82	17	131		88	43	312	.3	2.3		634	.86	217	274	202	51	3.4	1,230	7.5
Apr. 2-16	12.1	5.4		140	28	229		128	82	545	.4	3.0		1,100	1.50	35.9	464	360	52	4.6	2,070	7.5
Apr. 17-26, 28	21.8	3.5		224	57	483		116	133	1,140	.2	2.0		2,100	2.86	124	794	698	57	7.4	3,850	7.3
Apr. 27, 29-30	563	4.8		94	19	180		88	34	420	.5	2.8		798	1.09	1,210	312	240	56	4.4	1,610	7.2
May 1-2, 8-12	618	6.8		74	16	115		131	36	250	.3	2.2		564	.77	941	250	143	50	3.2	1,060	7.6
May 3-7	1,284	7.8		48	8.0	48		117	21	98	.4	1.2		290	.39	1,010	153	57	41	1.7	551	7.5
May 13-28	143	11		79	20	103		108	46	258	.5	2.0		572	.78	221	279	190	45	2.7	1,120	7.9
May 29-31, June 1-12, 14-21	8.68	7.4		139	33	250		180	81	562	.4	1.8		1,160	1.58	27.2	482	335	53	5.0	2,140	7.6
June 13	20.0	6.7		325	76	741		132	81	1,800	.4	3.0		3,100	4.22	167	1,120	1,020	59	9.6	5,600	7.7
June 22-30, July 1-5	105	10		75	15	110		126	54	230	.5	3.0		560	.76	159	248	145	49	3.0	1,050	7.9
July 6-10	4,411	8.8		34	4.4	29		96	14	50	.5	2.0		190	.26	2,260	103	24	38	1.3	353	7.5
July 11-15	28.8	12		71	11	79		152	32	165	.6	3.0		449	.61	34.9	222	98	44	2.3	850	7.8
July 16-24	17.7	12		114	21	154		193	65	338	.5	2.5		802	1.09	38.3	371	213	47	3.5	1,480	7.8
July 25-31	2.14	8.9		232	48	517		150	78	1,200	.4	3.0		2,160	2.94	12.5	776	654	59	8.1	4,040	7.3
Aug. 1-20	.76	13		169	35	318		140	198	660	.2	5.6		1,470	2.00	3.02	566	451	55	5.8	2,570	7.9
Aug. 21-31	99.9	10		60	11	89		106	31	190	.2	1.5		445	.61	120	194	108	50	2.8	848	7.6
Sept. 1-7, 15-16	12.6	11		99	17	93		170	104	190	.4	4.0		602	.82	20.5	317	178	39	2.3	1,080	7.6
Sept. 8-14	7.27	9.2		57	9.8	56		112	47	113	.4	2.5		350	.48	6.87	182	90	40	1.8	649	7.8
Sept. 17-18, 21-30	75.6	9.6		58	12	79		111	33	169	.1	2.5		418	.57	85.3	194	103	47	2.5	800	7.9
Sept. 19-20	351	10		31	3.9	26		86	12	46	.0	2.8		174	.24	165	93	23	38	1.2	312	7.8
Weighted average	204	7.6		50	8.6	61		103	23	129	0.5	1.8		332	0.45	183	160	76	45	2.1	622	--

SALT CREEK AT OLNEY, TEXAS

LOCATION:--At gaging station at bridge on State Highway 199, 0.5 mile east of Olney, Young County.
DRAINAGE AREA.--9.6 square miles.
RECORDS AVAILABLE.--Chemical analyses: April to September 1958.
EXTREMES, 1958.--Dissolved solids: Maximum, 19,300 ppm July 4-5; minimum 120 ppm Sept. 26.
Hardness: Maximum, 4,040 ppm July 4-5; minimum, 78 ppm Sept. 26.
Specific conductance: Maximum observed, 30,400 micromhos July 5; minimum observed, 214 micromhos Sept. 26.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Texas. Records of discharge for period April 1958 to September 1958 given in Water-Supply Paper 1562.

Chemical analyses, in parts per million, April to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Apr. 23	--	3.2		206	50	643		125	38	1,400	0.4	1.0		2,400	3.26	--	720	617	66	10	4,500	7.5
Apr. 26-28	3.97	--		--	--	--		--	--	1,240	--	--		--	--	--	--	--	--	--	3,990	--
Apr. 29-30, May 1-3	41.0	--		--	--	48		a92	.0	94	--	--		--	--	--	103	28	50	2.1	458	8.5
May 4-6, 14	.15	13		142	26	335		139	41	730	.5	2.0		1,360	1.85	0.55	462	348	61	6.8	2,560	7.1
May 15-21	.10	9.0		320	75	943		170	120	2,050	.4	--		3,600	4.90	.97	1,110	968	65	12	6,530	7.5
May 28	0	7.3		643	182	1,970	12	--	132	4,410	--	--		--	--	--	2,350	--	64	18	12,700	--
June 8-9	.30	7.6		678	187	2,150		67	152	4,910	.0	--		8,120	11.1	6.58	2,460	2,410	66	19	13,900	6.9
June 11-15	0	4.4		894	214	4,020		74	224	8,190	.0	--		13,600	18.6	--	3,110	3,050	74	31	21,700	7.0
June 16-22	b.41	4.9		270	67	1,360		63	38	2,700	.5	--		4,470	6.08	4.95	949	898	76	19	8,060	7.4
July 4-5	0	4.8		1,190	260	5,910		59	52	11,900	.0	--		19,300	26.5	--	4,040	3,990	76	40	29,800	6.7
July 6-8	45.2	12		40	10	138		84	12	252	.4	3.0		508	.69	62.0	141	72	68	5.0	971	7.4
July 7	5.6	16		28	5.5	56		85	4.8	97	--	2.8		252	.34	3.81	92	23	57	2.5	463	8.1
July 13	.1	12		85	18	321		117	14	618	.4	1.5		1,130	1.54	.31	286	190	71	8.3	2,150	7.4
July 23	3.3	11		182	42	984		112	32	1,870	.4	3.0		3,180	4.32	28.3	626	534	77	17	5,840	7.3
July 24	.1	8.6		138	33	687		76	30	1,330	.5	3.0		2,270	3.09	.61	480	418	76	14	4,240	7.5
Aug. 1-4	0	6.8		200	58	1,070		100	42	2,090	.5	--		3,520	4.79	--	738	656	76	17	6,450	7.2
Aug. 5-17	0	5.8		320	89	1,530		92	58	3,090	.7	--		5,140	6.99	--	1,160	1,090	74	20	9,130	7.4
Aug. 19	0	--		--	--	--		6	--	4,790	--	--		--	--	--	1,890	1,880	--	--	13,200	5.4
Aug. 20-23	.52	8.2		215	53	1,240		54	40	2,380	.6	--		3,960	5.39	5.56	754	710	78	20	7,220	6.9
Aug. 24	2.8	8.3		125	21	666		59	43	1,240	.7	4.0		2,140	2.91	16.2	398	350	78	14	3,980	7.3
Aug. 29-31, Sept. 1-12	0	7.0		215	51	1,140		93	44	2,200	1.0	--		3,700	5.03	--	746	670	77	18	6,730	7.6
Sept. 16-19	b26.3	12		28	4.7	64		84	7.2	105	.3	2.8		265	.36	18.8	89	20	61	2.9	503	7.8
Sept. 20-25	0	8.4		97	19	234		105	10	518	.3	1.2		1,170	1.28	--	320	234	61	5.7	1,850	7.7
Sept. 26	1.2	--		--	--	--		90	--	15	--	--		120	--	--	78	4	--	--	214	8.1
Sept. 27	0	--		--	--	--		56	--	1,440	--	--		--	--	--	560	514	--	--	4,570	7.8
Sept. 28-30	0	6.6		46	7.9	146		96	11	265	.4	1.5		531	.72	--	148	69	68	5.2	1,050	7.6
Weighted average	c2.74	14		41	9.0	118		88	6.6	222	0.4	--		458	0.62	3.39	140	68	65	4.3	853	--

a Includes equivalent of 5 parts per million carbonate (CO_3).
b Includes days of no flow.
c Represents 100 per cent of flow for period Apr. 24 to Sept. 30, 1958.

SALT CREEK NEAR NEWCASTLE, TEX.

LOCATION.--At gaging station at county bridge, 1.0 mile upstream from Oak Creek, 2.0 miles upstream from State Highway 24 bridge, 5.0 miles east of Newcastle, Young County, and about 8.5 miles upstream from Salt Creek Reservoir Dam.
DRAINAGE AREA.--57.9 square miles.
RECORDS AVAILABLE.--Chemical analyses: April 1958 to September 1958.
EXTREMES, 1958.--Dissolved solids: Maximum, 4,350 ppm June 21-30, July 1-5; minimum, 142 ppm May 1-4.
Hardness: Maximum, 1,230 ppm June 21-30, July 1-5; minimum, 64 ppm May 1-4.
Specific conductance: Maximum observed, 11,000 micromhos June 24; minimum observed, 272 micromhos May 2,4.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for period April 1958 to September 1958 given in Water-Supply Paper 1562.

Chemical analyses, in parts per million, April to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Apr. 23	--	1.8		224	60	711		198	56	1,510	0.6	0.0		2,660	3.62	--	806	643	66	11	4,960	7.5
Apr. 24-26	8.53	5.5		218	51	660		206	54	1,390	1.0	2.0		2,480	3.37	57.1	754	584	66	10	4,540	7.7
Apr. 27, 29-30, May 5-6	91.0	10		34	5.7	56		91	13	98	.5	3.6		266	.36	65.4	108	34	53	2.3	490	7.5
Apr. 28, May 7-9	5.18	14		57	11	125		109	17	248	.5	2.0		528	.72	7.38	187	98	59	4.0	1,020	7.7
May 1-4	289	9.9		21	2.8	26		65	7.2	40	.2	3.0		142	.19	111	64	11	47	1.4	265	7.3
May 10-20	2.03	13		118	24	281		179	36	580	.5	.8		1,140	1.55	6.25	393	246	61	6.1	2,130	7.9
May 21-27	.61	13		105	27	272		193	42	540	--	2.0		1,100	1.50	1.81	373	215	61	6.1	2,020	7.9
May 28-31, June 1-7	0	9.6		168	51	462		169	54	1,020	--	1.0		1,850	2.52	--	628	490	62	8.0	3,460	7.7
June 8-20	0	7.6		190	53	656		132	60	1,380	.4	1.5		2,410	3.28	--	692	584	67	11	4,480	7.3
June 21-30, July 1-5	a.15	4.2		350	87	1,190		86	59	2,620	.2	--		4,350	5.92	1.76	1,230	1,160	68	15	7,870	7.2
July 6-7, 9-10	110	12		40	7.4	75		97	10	141	.4	3.0		337	.46	100	130	51	55	2.8	649	7.7
July 8	60.0	12		25	4.5	38		81	6.6	61	--	3.8		191	.26	30.9	80	14	51	1.8	358	7.8
July 11-22	a.12	11		72	13	170		121	17	343	.4	1.5		688	.94	.22	233	134	61	4.8	1,320	7.4
July 23-28	a.13	8.8		82	18	228		116	21	465	.3	1.5		882	1.20	.31	278	184	64	5.9	1,720	7.7
July 29-31	0	9.0		85	21	238		123	31	482	.4	1.5		928	1.26	--	298	198	63	6.0	1,760	7.8
Aug. 1-10	0	5.4		84	25	267		98	32	552	.4	.8		1,010	1.37	--	312	232	65	6.6	1,960	7.7
Aug. 11-19	0	4.0		93	27	337		78	34	690	.4	2.0		1,230	1.67	--	343	279	68	7.9	2,360	7.5
Aug. 20-21	0	--		--	--	--		37	--	140	--	--		--	--	--	93	62	--	--	570	7.3
Aug. 22-23	0	7.4		55	12	136		81	20	278	.6	2.5		552	.75	--	186	120	61	4.3	1,070	7.3
Aug. 24-28	a.10	4.0		143	35	487		70	46	1,030	.4	2.0		1,780	2.42	.48	501	444	68	9.5	3,380	7.2
Aug. 29-31, Sept. 1-16		4.2		168	44	559		70	45	1,210	.3	5.0		2,070	2.82	--	600	542	67	9.9	3,920	7.6
Sept. 17-19	53.7	12		28	5.2	48		90	8.6	78	.8	2.0		227	.31	32.9	91	18	54	2.2	424	7.7
Sept. 20-30	a.28	9.8		53	10	123		104	12	240	.5	2.5		502	.68	.38	173	88	61	4.1	959	7.7
Weighted average	14.7	11		32	5.4	55		81	9.9	99	0.4	3.0		255	0.35	10.1	102	36	54	2.4	477	--

a Includes days of no flow.

BRAZOS RIVER AT POSSUM KINGDOM DAM NEAR GRAFORD, TEX.

LOCATION.--Immediately below dam on Brazos River, 2.6 miles upstream from Loving Creek, 11.3 miles southwest of Graford, Palo Pinto County, and 20 miles upstream from gaging station near Palo Pinto.
DRAINAGE AREA.--22,550 square miles, approximately, of which 9,240 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: January 1942 to September 1958.
Water temperatures: October 1949 to September 1955.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 1,470 ppm Apr. 1-30; minimum, 951 ppm Dec. 1-31.
Hardness: Maximum, 416 ppm Sept. 1-30; minimum, 342 ppm Dec. 1-31.
Specific conductance: Maximum observed, 2,830 micromhos Apr. 17; minimum observed, 1,500 micromhos Oct. 1-2.
EXTREMES, 1942-58.--Dissolved solids: Maximum, 2,640 ppm Jan. 1-31, 1956; minimum, 331 ppm Apr. 26-30, May 1-10, 1957.
Hardness: Maximum, 828 ppm Jan. 1-31, 1956; minimum, 135 ppm Apr. 26-30, May 1-10, 1957.
Specific conductance: Maximum observed, 5,720 micromhos Jan. 7, 1956; minimum observed, 494 micromhos May 4, 1957.
Water temperatures (1949-55): Maximum, 76°F Sept. 27-30, 1950; minimum, 45°F on several days in February 1951.
REMARKS.--Values reported for dissolved solids concentrations are calculated from determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for gaging station near Palo Pinto for water year October 1957 to September 1958 given in Water-Supply Paper 1562. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1957--------	1,794	10		123	18	206		126	262	320		1.0		1,000	1.36	4,840	381	278	54	4.6	1,660	7.6
Nov. 1-30--------------	1,701	10		112	17	220		117	228	350		2.0		997	1.36	4,580	350	254	58	5.1	1,710	7.7
Dec. 1-31--------------	845	7.6		109	17	208		117	216	335		.5		951	1.29	2,170	342	246	57	4.9	1,640	7.6
Jan. 1-31, 1958--------	571	9.0		114	19	236		121	223	385		.8		1,050	1.43	1,620	362	264	59	5.4	1,790	7.7
Feb. 1-28--------------	455	8.8		116	19	244		122	226	398		1.0		1,070	1.46	1,310	368	268	59	5.5	1,840	8.2
Mar. 1-31--------------	192	8.8		126	22	295		131	249	482		1.0		1,250	1.70	648	405	298	61	6.4	2,140	7.6
Apr. 1-30--------------	459	8.0		126	18	389		125	253	615		1.5		1,470	2.00	1,820	388	286	69	8.6	2,570	7.4
May 1-31---------------	3,225	7.6		123	22	299		125	241	492		.5		1,250	1.70	10,880	398	295	62	6.5	2,170	7.9
June 1-30--------------	786	7.0		124	22	319		118	255	518		1.5		1,300	1.77	2,760	400	304	63	6.9	2,250	7.1
July 1-31--------------	3,470	12		121	21	318		118	267	500		1.2		1,300	1.77	12,180	388	292	64	7.0	2,180	7.2
Aug. 1-31--------------	759	12		122	20	275		114	246	450		1.5		1,180	1.60	2,420	386	298	61	6.1	2,030	7.2
Sept. 1-30-------------	328	9.0		132	21	300		119	270	488		2.0		1,280	1.74	1,130	416	318	61	6.4	2,190	7.7
Weighted average-----	1,226	9.6		120	20	276		121	248	443		1.1		1,180	1.60	3,910	382	282	61	6.2	2,010	--

BRAZOS RIVER AT WHITNEY DAM NEAR WHITNEY, TEX.

LOCATION.--On State Highway 22, 2.4 miles upstream from Coon Creek, 4.0 miles upstream from Iron Creek, 3.4 miles upstream from gaging station and 7.4 miles southwest of Whitney, Hill County, and at mile 442.
DRAINAGE AREA.--26,170 square miles, approximately, of which 9, 240 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to May 1948, October 1948 to September 1958.
Water temperatures: October 1947 to May 1948 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 876 ppm Sept. 1-30; minimum, 362 ppm May 12-31.
Hardness: Maximum, 277 ppm Oct. 1-31, Mar. 1-31, Sept. 1-30; minimum, 175 ppm May 12-31.
Specific conductance: Maximum observed, 1,490 micromhos Sept. 27-28; minimum observed, 566 micromhos May 19.
Water temperatures: Maximum, 89°F July 29, 30, 31; minimum, 44°F Jan. 8, 21, 24, Feb. 13, 15, 16, 17.
EXTREMES, 1947 -58.--Dissolved solids: Maximum, 1,560 ppm Oct. 1-10, 1948; minimum, 183 ppm June 11-20, 1952.
Hardness: Maximum, 542 ppm Oct. 1-10, 1948; minimum, 96 ppm June 11-20, 1952.
Specific conductance: Maximum observed, 2,660 micromhos Oct. 1, 1948; minimum observed, 203 micromhos May 23, 1952.
Water temperatures: Maximum, 92°F July 21, 28-29, 1957; minimum, freezing point Jan. 28-29, 1948.
REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in Water-Supply Paper 1562. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1957	2,824	10		88	14	113		142	162	168		1.0		683	0.93	5,210	277	160	47	3.0	1,070	7.9
Nov. 1-30	3,383	9.6		88	11	115		134	151	175		1.5		622	.85	5,680	264	154	49	3.1	1,030	7.8
Dec. 1-31	1,563	8.4		82	13	109		137	136	170		1.5		a587	.80	2,480	258	146	48	2.9	1,010	7.9
Jan. 1-31, 1958	1,473	12		88	12	118		146	142	182		1.8		633	.86	2,520	269	150	49	3.1	1,040	7.9
Feb. 1-28	1,114	11		90	12	114		152	136	180	0.4	2.0		684	.93	2,060	274	150	48	3.0	1,070	7.9
Mar. 1-31	1,472	9.0		88	14	116		158	131	185		2.0		632	.86	2,510	277	148	48	3.0	1,070	8.0
Apr. 1-30	1,556	9.2		85	14	119		162	133	180		2.8		656	.89	2,760	270	136	49	3.1	1,070	7.8
May 1-11	14,660	11		76	11	97		156	106	145		2.8		a526	.72	20,820	234	106	47	2.8	914	8.0
May 12-31	4,512	13		58	7.4	61		141	61	89		3.2		a362	.49	4,410	175	60	43	2.0	621	8.0
June 1-11, 14-16, 19-26, 28-30	1,152	13		61	7.7	69		145	64	105		.0		411	.56	1,280	184	64	45	2.2	685	7.7
June 12-13, 17-18, 27	1,138	12		73	10	90		151	87	145		.8		522	.71	1,600	223	100	47	2.6	877	7.7
July 1-6	381	15		68	10	80		156	75	126		1.8		480	.65	494	210	82	45	2.4	790	7.9
July 7-31	4,326	14		82	14	143		143	125	230		1.2		744	1.01	8,690	262	145	54	3.9	1,200	8.0
Aug. 1-31	884	15		84	13	161		142	131	255		1.5		801	1.09	1,910	263	146	57	4.3	1,260	8.2
Sept. 1-30	564	11		88	14	181		136	147	288		1.5		876	1.19	1,330	277	166	59	4.8	1,390	8.2
Weighted average	2,322	11		80	12	110		146	122	170		1.9		604	0.82	3,790	249	130	49	3.0	997	--

a Calculated from determined constituents.

BRAZOS RIVER AT RICHMOND, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59 in Richmond, Fort Bend County, 925 feet downstream from Texas & New Orleans Railroad bridge, and at mile 93.
DRAINAGE AREA.--44,020 square miles, approximately, of which 9,240 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1958.
Water temperatures: November 1950 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 645 ppm Aug. 21-31; minimum, 142 ppm Oct. 16-22.
Hardness: Maximum, 264 ppm Dec. 21-31; minimum, 92 ppm Sept. 25-30.
Specific conductance: Maximum observed, 1,160 micromhos July 28; minimum observed, 234 micromhos Sept. 30.
Water temperatures: Maximum, 87°F June 28, Aug. 4-5, 20; minimum, 44°F Feb. 13.
EXTREMES, 1945-58.--Dissolved solids: Maximum, 1,400 ppm Sept. 1-10, 1951; minimum, 133 ppm Aug. 27-31, 1947.
Hardness: Maximum, 446 ppm Sept. 1-10, 1948; minimum, 74 ppm Jan. 13-14, 18-20, 1950.
Specific conductance: Maximum observed, 2,540 micromhos Sept. 4, 1951; minimum observed, 187 micromhos Aug. 31, 1947.
Water temperatures (1950-58): Maximum, 91°F Aug. 5, 1951; minimum, 40°F Dec. 24, 1953.
REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex.
Records of discharge for water year October 1957 to September 1958 given in Water-Supply Paper 1562.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C): Parts per million	Dissolved solids (residue at 180°C): Tons per acre-foot	Dissolved solids (residue at 180°C): Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
Oct. 1, 11-14, 1957	2,124	14		74	13	82		184	107	109	--	0.5		504	0.69	2,890	238	87	43	2.3	839	8.0
Oct. 2-10, 15	3,822	11		47	7.4	40	4.4	135	49	55	--	1.8		298	.41	3,080	148	38	36	1.4	502	7.9
Oct. 16-22	74,000	7.8		31	4.0	11	3.2	99	21	13	--	2.0		a142	.19	28,370	94	13	20	.5	246	8.0
Oct. 23-31	36,090	7.8		40	5.0	26	4.3	109	35	40	--	2.0		a214	.29	20,850	120	31	31	1.0	383	7.9
Nov. 1-10	12,770	9.6		51	6.3	34	4.6	138	41	55	--	2.8		276	.38	9,520	153	40	32	1.2	472	7.5
Nov. 11-22	16,100	11		62	7.2	45	4.4	139	68	72	--	3.8		346	.47	15,040	184	70	34	1.4	585	7.9
Nov. 23-30	25,860	10		42	4.2	25	3.8	114	34	37	--	3.2		228	.31	15,920	122	29	30	1.0	370	7.8
Dec. 1-10	12,410	11		67	8.7	51		167	69	71	--	6.0		374	.51	12,530	203	66	35	1.6	607	8.1
Dec. 11-20	6,055	13		83	11	63		197	94	88	--	7.6		466	.63	7,620	252	90	35	1.7	755	8.1
Dec. 21-31	6,323	13		86	12	66		210	97	92	--	7.5		485	.66	8,280	264	92	35	1.8	778	8.1
Jan. 1-10, 1958	6,986	14		58	7.8	35	4.0	149	53	51	--	6.0		317	.43	5,980	176	54	30	1.1	515	7.5
Jan. 11-20	7,793	15		62	8.9	38	3.8	167	55	57	--	6.5		342	.47	7,200	191	54	30	1.2	561	7.7
Jan. 21-31	13,420	9.6		47	6.3	33	4.0	120	47	50	--	4.2		274	.37	9,930	144	45	33	1.2	454	7.4
Feb. 1-10	6,075	7.6		66	9.1	44	3.8	167	64	71	--	3.8		377	.51	6,180	202	65	32	1.4	626	8.1
Feb. 11-20	4,973	12		80	12	56	4.0	205	78	87	--	5.7		456	.62	6,120	250	82	32	1.5	758	8.2
Feb. 21-28	37,480	7.2		59	8.3	36	3.3	156	56	56	--	4.0		316	.43	31,980	181	53	30	1.2	558	8.2
Mar. 1-10	20,760	14		52	7.4	25	3.4	150	35	36	0.4	7.8		268	.36	15,020	160	37	25	.9	432	8.1
Mar. 11-20	12,420	14		70	9.8	47	3.4	177	60	72	.4	8.5		398	.54	13,350	215	70	32	1.4	628	8.2
Mar. 21-31	8,973	13		68	11	40	3.4	184	58	62	.4	9.1		382	.52	9,250	214	64	28	1.2	605	8.1
Apr. 1-10	5,146	12		82	14	53	3.6	213	78	82	--	15		466	.63	6,470	262	88	30	1.4	746	7.4
Apr. 11-20	4,345	14		78	14	59	3.4	199	82	94	--	7.9		462	.63	5,420	252	89	33	1.6	759	7.5
Apr. 21-30	8,467	13		74	12	51	3.4	190	76	78	--	7.5		414	.56	9,460	234	78	32	1.5	684	7.3
May 1-10	42,980	13		42	5.3	19	3.4	116	33	28	--	3.8		210	.29	24,370	127	32	24	.7	345	7.4
May 11-20	25,330	11		64	10	58	3.8	154	68	95	--	2.8		394	.54	26,950	200	74	38	1.8	680	7.2
May 21-31	9,605	11		66	10	41	3.4	184	51	67	--	5.9		355	.48	9,210	206	54	30	1.2	603	7.4
June 1-10	4,707	15		66	11	44	3.3	187	57	68	--	3.0		368	.50	4,680	210	56	31	1.3	615	7.8
June 11-20	2,846	14		66	12	63	4.0	187	65	96	--	2.2		421	.57	3,240	214	61	38	1.9	712	7.6
June 21-30	7,367	14		52	8.3	35	3.6	149	50	50	--	3.8		298	.41	5,930	164	42	31	1.2	495	7.6
July 1-3, 11-14	12,480	13		42	7.1	29	3.6	124	36	40	--	2.5		a234	.32	7,880	134	32	31	1.1	412	7.4
July 4-10	4,287	16		70	12	60	4.4	194	65	89	--	3.0		451	.61	5,220	224	65	36	1.7	723	7.2
July 15-31	4,626	14		80	13	111	4.9	156	107	183	--	1.5		632	.86	7,890	253	125	48	3.0	1,040	7.2
Aug. 1-10	1,050	13		77	15	107	4.7	188	102	164	--	.5		605	.82	1,720	254	100	47	2.9	1,010	8.0
Aug. 11-20	1,498	13		74	17	106	4.7	189	107	164	--	1.0		609	.83	2,460	254	100	47	2.9	1,020	7.8
Aug. 21-31	2,930	13		76	17	122	4.6	183	113	183	--	.5		645	.88	5,100	260	110	50	3.3	1,070	7.8
Sept. 1-9	2,410	14		48	7.7	39	4.5	140	50	54	--	2.0		a288	.39	1,870	152	37	35	1.4	498	8.1
Sept. 10-24	3,806	13		64	13	93	5.0	159	77	154	--	1.0		a498	.68	5,120	213	82	48	2.8	875	8.2
Sept. 25-30	11,840	12		30	4.3	15	3.9	95	28	17	--	2.0		a159	.22	5,080	92	14	25	.7	270	7.7
Weighted average	11,870	11		54	7.7	37	3.8	142	50	57	--	4.2		303	0.41	9,710	166	50	32	1.2	508	--

a Calculated from determined constituents.

MISCELLANEOUS ANALYSES OF STREAMS IN BRAZOS RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
WHITE RIVER BELOW FALLS NEAR CROSBYTON																						
July 23, 1958----------	0.30	41		21	36	76		a322	58	29		0.2		419	0.57		200	0	45	2.3	714	8.5
SHORT CROTON CREEK NEAR JAYTON																						
Sept. 19, 1958---------	0.02					4,680			2,560	7,520							3,310		75		23,000	
CROTON CREEK BELOW SHORT CROTON CREEK NEAR JAYTON																						
Nov. 21, 1957----------						6,060			2,910	9,730							3,400				28,100	
CROTON CREEK NEAR JAYTON																						
Sept. 19, 1958---------	3					1,310		82	2,010	2,020							2,160	2,090	57		8,680	7.9
SALT FORK BRAZOS RIVER ABOVE MOUTH OF SALT CROTON CREEK NEAR ASPERMONT																						
Dec. 18, 1957----------						4,450			1,890	7,040							2,320		81		21,000	
SALT CROTON CREEK AT FALLS NEAR SWENSON																						
Jan. 16, 1958----------						65,600			3,650	103,000							7,700		95		156,000	
SALT FORK BRAZOS RIVER BELOW MOUTH OF SALT CROTON CREEK NEAR ASPERMONT																						
Dec. 18, 1957----------						13,500			2,180	21,400							3,250		90		52,200	
BOB'S CREEK AT MOUTH NEAR ASPERMONT																						
Dec. 18, 1957----------						978	29	102	1,770	2,110							2,670	2,590	44		8,350	7.9
MILLER'S CREEK NEAR SEYMOUR																						
Nov. 19, 1957----------	0.49	12		36	6.8	19		127	34	14		1.0		185	0.25		118	14	26	0.8	316	8.1
Jan. 30, 1958----------		11		53	11	53		b178	40	74		.5		330	.45		177	31	39	1.7	524	8.5
Feb. 26----------		7.0		54	11	18		c186	40	17		1.2		239	.33		180	27	18	.6	413	8.5
SALT CREEK AT FM ROAD 1768 AT OLNEY																						
Aug. 29, 1958----------		4.7		114	29	834	4.8	54	40	1,520		5.0		2,580	3.51		404	359	82	18	4,770	7.1

a Includes equivalent of 12 parts per million of carbonate (CO_3).
b Includes equivalent of 6 parts per million of carbonate (CO_3).
c Includes equivalent of 7 parts per million of carbonate (CO_3).

MISCELLANEOUS ANALYSES OF STREAMS IN BRAZOS RIVER BASIN IN TEXAS--Continued

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
SALT CREEK AT COUNTY ROAD 3 MILES SOUTHEAST OF OLNEY																						
Nov. 21, 1957		16		85	20	164		169	30	320		37		755	1.03		294	156	55	4.2	1,460	8.0
Aug. 29, 1958		8.8		75	18	341	7.8	158	22	605		6.0		1,160	1.58		261	132	73	9.2	2,220	6.8
SALT CREEK AT COUNTY ROAD 7 MILES SOUTHEAST OF OLNEY																						
Nov. 15, 1957		5.8		107	22	338		94	16	705		4.8		1,240	1.69		358	280	67	7.7	2,400	7.9
Nov. 21		11		86	17	186		131	17	398		3.5		782	1.06		284	177	59	4.8	1,530	8.1
Aug. 29, 1958		3.0		113	25	479	9.8	104	27	940		8.9		1,660	2.26		385	300	72	11	3,120	7.0
SALT CREEK AT STATE HIGHWAY 24 EAST OF NEWCASTLE																						
Nov. 15, 1957						119		107	16	241		3.5					189	102	58	3.8	975	7.8
Apr. 23, 1958		2.1		284	78	822		177	112	1,810	0.4	1.0		3,200	4.35		1,030	884	63	11	5,860	7.5
OAK CREEK NEAR GRAHAM																						
Nov. 15, 1957	--	--		--	--	43		94	29	70	--	1.2		--	--		112	35	46	1.8	430	7.8
Apr. 23, 1958	--	3.3		63	11	80		94	41	180	0.6	1.2		426	0.58		202	125	46	2.5	829	7.4
Apr. 27	8.5	--		--	--	--		70	--	4.0	--	--		--	--		62	4	--	--	150	7.6
May 3	54	--		--	--	--		72	--	16	--	--		--	--		66	7	--	--	173	7.1
July 31	--	8.8		35	4.5	20		109	5.6	33	.8	6.4		168	.23		106	16	29	.8	317	7.6
LAKE GRAHAM NEAR GRAHAM																						
Apr. 23, 1958		2.4		278	74	655		157	130	1,530	0.2	0.0		2,750	3.74		998	870	59	9.0	5,020	7.9
July 11		5.5		50	9.7	77		106	12	165	.2	.8		372	.51		165	78	50	2.6	744	7.3
July 31		--		--	--	--		125	--	155	--	--		--	--		166	64	--	--	742	7.3
Aug. 11		4.5		52	9.8	81		117	11	168	.3	.2		385	.52		170	74	51	2.7	764	7.3
Sept. 12		4.9	0.04	56	11	90		138	12	180	.1	.2		422	.57		184	72	51	2.9	819	7.8
BELTON RESERVOIR NEAR BELTON																						
Mar. 24, 1958		9.0	0.00	67	9.1	22		201	30	35	0.2	7.7		d 300	0.41		204	40	19	0.7	484	8.1
SULPHUR CREEK BELOW HANCOCK SPRINGS AT LAMPASAS																						
Jan. 16, 1958	14.8	12		99	38	252		344	28	452		3.0		1,050	1.43		404	122	58	5.4	1,960	7.7
SULPHUR CREEK BELOW GOLD SPRING AT LAMPASAS																						
Jan. 16, 1958	4.64	8.4		86	32	130		319	26	238		6.8		684	0.93		346	84	45	3.1	1,260	7.9

d Residue on evaporation at 180°C.

COLORADO RIVER AT COLORADO CITY, TEX.

LOCATION.--At gaging station at Colorado City, Mitchell County, 3,517 feet upstream from bridge on U. S. Highway 80, 4,100 feet upstream from Texas & Pacific Railway bridge, 1.6 miles upstream from Lone Wolf Creek, and at mile 796.
DRAINAGE AREA.--4,082 square miles, approximately, of which 2,590 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: May 1946 to September 1954, November 1956 to September 1958.
Water temperatures: November 1952 to September 1954, November 1956 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 12,500 ppm Feb. 1-10, Mar. 21-31, Apr. 1-11, 14-16; minimum, 542 ppm May 28-29, June 3-4.
Hardness: Maximum, 1,730 ppm Feb. 1-10; minimum, 132 ppm Sept. 27-29.
Specific conductance: Maximum observed, 21,700 micromhos Apr. 10; minimum observed, 677 micromhos May 28.
Water temperatures: Maximum observed, 93°F Aug. 19; minimum observed, freezing point on Jan. 4.
EXTREMES, 1946-54, 1956-58.--Dissolved solids: Maximum, 32,800 ppm Apr. 1-10, 1952; minimum, 176 ppm Oct. 26, 1947.
Hardness: Maximum, 4,500 ppm Aug. 9-12, 1946; minimum, 65 ppm Sept. 15-20, 1949.
Specific conductance: Maximum observed, 45,800 micromhos Apr. 1-10, 1952; minimum observed, 245 micromhos May 14, 1957.
Water temperatures (1956-58): Maximum observed, 93°F July 30, 1957, Aug. 19, 1958; minimum observed, freezing point on several days during December 1956, January 1957, and January 1958.
REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in Water-Supply Paper 1562.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
Oct. 1-9, 1957---------	a0	4.4		72	23	491		62	156	800		0.3		1,580	2.15	--	274	223	80	13	2,890	7.5
Oct. 10----------	.70	4.8		183	70	1,810		134	496	2,880		--		5,510	7.49	10.4	744	634	84	29	9,250	7.7
Oct. 11-21----------	5.38	5.0		204	65	2,140		79	518	3,420		--		6,390	8.69	92.8	776	712	86	33	10,700	7.3
Oct. 22-31, Nov. 1-3---	8.33	3.5		174	51	1,690		82	428	2,700		--		5,090	6.92	114	644	576	85	29	8,600	7.4
Nov. 4-5, 8-9----------	63.0	9.6		82	21	654		101	168	1,030		3.0		2,020	2.75	344	291	208	83	17	3,630	7.9
Nov. 6-7, 10----------	41.7	9.4		58	12	382		89	112	590		3.0		1,210	1.65	136	194	121	81	12	2,260	7.8
Nov. 11-18----------	13.6	4.6		120	36	1,120		91	284	1,780		1.0		3,390	4.61	124	448	373	84	23	5,930	7.5
Nov. 19-30----------	2.22	3.2		179	54	1,840		108	446	2,920		--		5,500	7.48	33.0	668	580	86	31	9,210	7.8
Dec. 1-10----------	1.35	3.0		237	76	2,400		122	593	3,840		--		7,210	9.81	26.3	904	804	85	35	11,900	7.7
Dec. 11-31----------	1.59	2.3		339	115	3,300		133	831	5,330		--		9,980	13.6	42.8	1,320	1,210	84	39	16,100	7.7
Jan. 1-10, 1958--------	3.99	1.9		386	139	3,620		132	905	5,930		--		11,000	15.0	119	1,530	1,430	84	40	17,600	7.8
Jan. 11-31----------	2.54	6.2		378	140	3,490		143	914	5,700		--		10,700	14.6	73.4	1,520	1,400	83	39	17,300	7.7
Feb. 1-10----------	2.04	3.8		414	169	4,080		136	1,100	6,620		--		12,500	17.0	68.8	1,730	1,620	84	43	19,600	7.6
Feb. 11-28----------	4.98	4.0		422	156	4,030		140	1,080	6,540		--		12,300	16.7	165	1,690	1,580	82	38	19,200	7.5
Mar. 1-10----------	4.93	3.1		366	146	3,570		139	975	5,770		--		10,900	14.8	145	1,510	1,400	84	40	17,300	7.5
Mar. 11-20----------	4.35	2.1		378	157	3,930		121	1,110	6,290		--		11,900	16.2	140	1,590	1,490	84	43	18,900	7.3
Mar. 21-31----------	4.40	4.9		394	167	4,100		110	1,160	6,590		--		12,500	17.0	148	1,670	1,580	84	44	19,300	7.6
Apr. 1-11, 14-16-------	3.83	3.9		382	170	4,100		83	1,190	6,570		--		12,500	17.0	129	1,650	1,580	84	44	19,100	7.4
Apr. 12-13, 17---------	5.87	3.5		259	105	2,490		86	782	3,970		--		7,650	10.4	121	1,080	1,010	83	33	12,300	7.3
Apr. 18-22----------	664	11		57	13	245		121	91	378		2.0		908	1.23	1,630	196	96	73	7.6	1,560	8.0
Apr. 23-25----------	24.7	10		105	30	673		130	210	1,080		1.5		2,170	2.95	145	386	279	79	15	3,840	7.8
Apr. 26-30, May 1-12---	11.9	8.7		176	59	1,350		142	442	2,150		--		4,260	5.79	137	682	565	81	22	7,260	7.8
May 13, 16-17----------	239	8.6		74	17	411		132	146	630		.8		1,350	1.84	871	254	146	78	11	2,480	7.5
May 14-15----------	147	8.8		45	8.7	173		124	67	250		2.5		b616	.84	244	148	47	72	6.2	1,140	8.0
May 18-20----------	14.3	11		106	30	823		122	234	1,300		1.5		2,550	3.47	98.5	388	288	82	18	4,510	8.0
May 21-27----------	3.64	6.1		144	50	1,250		115	355	2,000		--		3,860	5.25	37.9	565	471	83	23	6,750	7.7
May 28-29, June 3-4----	78.8	12		46	7.7	140		119	50	212		2.0		542	.74	115	146	49	67	5.0	972	8.0
May 30-31, June 1-2, 5-11-------	16.8	8.2		82	23	552		107	162	880		2.5		1,760	2.39	79.8	299	212	80	14	3,180	7.5
June 12-22----------	a0	5.2		113	32	1,010		88	274	1,600		5.0		3,080	4.19	--	414	342	84	22	5,430	7.4
June 24-26----------	375	13		53	9.4	218		140	70	322		2.8		782	1.06	792	170	56	74	7.3	1,400	7.9
June 23, 27-30, July 1-2, 6-7--------	6.24	6.4		95	22	779		94	214	1,220		1.5		2,380	3.24	40.1	328	250	84	19	4,260	7.2
July 3-5----------	.57	7.1		68	18	528		70	169	820		2.0		1,650	2.24	2.54	244	186	82	15	2,960	7.2
July 8-20----------	a.04	6.1		152	49	1,570		71	452	2,450		--		4,710	6.41	.51	580	522	85	28	7,960	7.2
July 21-31----------	a0	11		210	71	2,100		67	587	3,350		--		6,360	8.65	--	816	761	85	32	10,500	7.8

a No flow Oct. 1-9, June 12-22, July 11, 13-31, Aug. 1-18, Sept. 3-14.
b Calculated from determined constituents.

COLORADO RIVER AT COLORADO CITY, TEX.--Continued

Chemical analyses, in parts per million, water year October 1957 to September 1958--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Aug. 1-10, 1958	a0	13		282	97	2,690		71	752	4,340		--		8,210	11.2	--	1,100	1,040	84	35	13,200	7.5
Aug. 11-18	a0	12		317	106	2,880		69	720	4,740		--		8,810	12.0	--	1,230	1,170	84	36	14,200	6.7
Aug. 19-22	27.0	12		225	70	2,070		80	515	3,370		--		6,300	8.57	459	850	784	84	31	10,500	7.9
Aug. 23-24, 27-31	28.4	8.2		110	29	922		82	246	1,470		2.0		2,830	3.85	217	394	326	84	20	5,020	7.7
Aug. 25-26	41.0	12		63	12	348		89	98	558		2.0		1,140	1.55	126	206	134	79	11	2,080	8.0
Sept. 1-14	a.03	5.2		163	51	1,550		60	394	2,500		--		4,700	6.39	.38	616	567	85	27	8,090	7.0
Sept. 15-17	121	11		46	8.0	212		88	53	340		4.0		754	1.03	246	154	148	76	7.6	1,350	7.9
Sept. 18-19, 30	13.1	7.4		70	16	495		96	118	790		2.5		1,550	2.11	54.8	240	162	82	14	2,860	7.9
Sept. 20-26	1.70	5.2		140	41	1,370		80	311	2,200		--		4,110	5.59	18.9	518	452	85	26	7,250	7.8
Sept. 27-29	107	10		40	7.6	231		103	65	340		3.0		800	1.09	231	132	47	79	8.8	1,430	7.9
Weighted average	23.6	10		86	24	583		119	173	922		--		1,880	2.56	120	313	216	80	14	3,190	--

a No flow Oct. 1-9, June 12-22, July 11, 13-31, Aug. 1-18, Sept. 3-14.

COLORADO RIVER NEAR SILVER, TEX.

LOCATION.--At gaging station at bridge on county road, 5.4 miles southwest of Silver, Coke County, 11 miles upstream from Pecan Creek, 16.4 miles northwest of Robert Lee, and at mile 743.
DRAINAGE AREA.--15,479 square miles, approximately, of which 11,600 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1958.
Water temperatures: October 1956 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 6,700 ppm Apr. 1-10; minimum, 195 ppm Oct. 8-9, 13-14.
Hardness: Maximum, 1,440 ppm Apr. 1-10; minimum, 127 ppm Oct. 8-9, 13-14.
Specific conductance: Maximum observed, 11,900 micromhos Apr. 12; minimum observed, 242 micromhos Oct. 9.
Water temperatures: Maximum observed, 88°F May 24, June 8; minimum observed, 33°F Feb. 12-13, 15.
EXTREMES, 1956-58.--Dissolved solids: Maximum, 6,700 ppm Apr. 1-10, 1958; minimum, 180 ppm June 1-4, 1957.
Hardness: Maximum, 1,440 ppm Apr. 1-10, 1958; minimum, 93 ppm Apr. 29-30, 1957.
Specific conductance: Maximum observed, 12,000 micromhos Jan. 18, 1957; minimum observed, 202 micromhos June 2, 1957.
Water temperatures: Maximum observed, 88°F May 24, June 8, 1958; minimum observed, 33°F Feb. 12-13, 15, 1958.
REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in Water-Supply Paper 1562.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
Oct. 1-7, 1957	3.50	13		145	29	561		145	338	870	0.8	1.5		2,030	2.76	19.2	481	362	72	11	3,480	7.7
Oct. 8-9, 13-14	1,525	11		42	5.3	19		128	29	20	.4	5.6		a195	.27	803	127	22	25	.8	330	7.9
Oct. 10	147	17		89	17	217		103	184	345	--	1.5		a922	1.25	366	292	208	62	5.5	1,600	8.1
Oct. 11-12	41.0	14		48	9.2	95		107	81	135	.4	1.5		a437	.59	48.4	158	70	57	3.3	764	8.1
Oct. 15-17, 21-25	142	9.0		48	8.0	77		120	67	105	.5	2.5		377	.51	145	153	54	52	2.7	658	7.9
Oct. 18-20, 26-27	20.2	11		94	18	275		135	200	415	.5	2.5		1,080	1.47	58.9	308	198	66	6.8	1,880	7.9
Oct. 28-31, Nov. 1-5, 7-11	75.0	9.4		136	34	669		136	324	1,050	.7	2.0		2,290	3.11	464	480	368	75	13	3,950	7.9
Nov. 6, 15-19	132	7.8		94	22	368		131	208	565	.5	2.5		1,330	1.81	474	325	218	71	8.9	2,340	7.9
Nov. 12-14	113	7.0		41	10	129		103	72	185	.4	2.0		498	.68	152	144	59	66	4.7	916	7.8
Nov. 20-30	8.36	8.0		168	35	609		153	396	955	.5	2.0		2,250	3.06	50.8	563	438	70	11	3,770	7.9
Dec. 1-10	5.45	6.8		234	48	828		168	570	1,310	.5	1.0		3,080	4.19	45.3	782	644	70	13	5,070	8.0
Dec. 11-31	4.92	5.2		290	60	877		169	706	1,420	.3	1.0		3,440	4.68	45.7	970	832	66	12	5,530	8.0
Jan. 1-10, 1958	6.78	5.0		300	58	807		162	730	1,310	.3	1.0		3,290	4.47	60.2	987	854	64	11	5,210	7.9
Jan. 11-20	6.72	9.0		296	64	946		157	754	1,520	.4	2.0		3,670	4.99	66.6	1,000	873	67	13	5,840	8.1
Jan. 21-31	7.35	8.2		294	69	1,090		160	764	1,740	.4	2.0		4,050	5.51	80.4	1,020	886	70	15	6,530	7.8
Feb. 1-10	3.96	7.4		340	86	1,450		175	861	2,350	.3	--		5,180	7.04	55.4	1,200	1,060	72	18	8,310	7.9
Feb. 11-28	9.78	7.8		318	84	1,420		132	832	2,300	.4	--		5,030	6.84	133	1,140	1,030	70	16	8,140	8.0
Mar. 1-15	9.43	5.6		264	107	1,440		143	824	2,300	.5	--		5,010	6.81	128	1,100	982	74	19	8,090	8.0
Mar. 16-31	4.94	6.8		320	106	1,790		119	926	2,880	.3	--		6,090	8.28	81.2	1,230	1,140	76	22	9,630	7.6
Apr. 1-10	2.73	6.4		379	121	1,930		128	1,080	3,120	--	--		6,700	9.11	49.4	1,440	1,340	74	22	10,600	7.8
Apr. 11-18	6.44	7.2		379	118	1,820		129	1,060	2,970	--	--		6,420	8.73	112	1,430	1,320	73	21	10,300	7.8
Apr. 19	1,500	12		92	20	481		167	176	730	.7	6.2		1,600	2.18	6,480	312	174	77	12	2,880	7.8
Apr. 20-26	214	9.8		70	20	296		116	162	450	.6	1.5		1,070	1.46	618	256	162	72	8.1	1,910	7.9
Apr. 27-30, May 1-5	25.0	7.2		110	29	411		112	276	640	.7	4.7		1,530	2.08	103	394	302	69	9.0	2,690	7.8
May 6-10	18.4	4.8		182	47	876		128	480	1,380	.3	1.5		3,030	4.12	151	648	542	75	15	5,120	7.6
May 11-12	6.55	--		--	--	--		140	--	1,830	--	--		--	--	--	810	696	--	--	6,560	7.9
May 13-14	415	18		127	36	638		138	274	1,030	.6	.0		2,190	2.98	2,450	465	352	75	13	3,850	7.9
May 15-18, 22-23	189	17		73	16	260		135	158	380	.6	.0		a971	1.32	496	248	138	69	7.1	1,740	8.0
May 19-21	140	20		46	12	113		119	80	158	.8	5.9		521	.71	197	164	67	60	3.8	863	7.9
May 24-30	26.3	15		123	33	472		127	318	730	.6	2.0		1,760	2.39	125	442	338	70	9.8	2,980	7.9
May 31, June 1-3	23.5	11		162	49	1,090		126	394	1,740	.6	2.0		3,510	4.77	223	606	502	80	19	6,030	7.7
June 4-11	33.4	11		105	27	528		122	264	810	.6	2.0		1,810	2.46	163	373	273	75	12	3,180	7.9
June 12-23	3.54	14		195	46	956		116	586	1,450	.6	3.0		3,310	4.50	31.6	676	580	75	16	5,440	7.8
June 24-26	551	16		79	15	311		152	136	470	.8	6.0		1,110	1.51	1,650	258	134	72	8.4	1,990	8.0
June 27-30	38.8	15		56	10	199		132	99	282	.8	3.5		794	1.08	83.2	180	72	71	6.4	1,300	7.9
July 1-3	6.63	14		69	17	389		106	172	580	.8	3.0		1,300	1.77	23.3	242	155	78	11	1,960	7.4
July 4-12	4.48	13		114	26	434		106	315	650	.6	2.0		1,610	2.19	19.5	392	304	71	9.6	3,050	7.4
July 13-16	b.68	--		--	--	--		85	--	1,390	--	--		--	--	--	660	590	--	--	5,130	7.6
July 20-27	b12.0	13		185	44	673		85	543	1,040	.6	4.0		2,540	3.45	82.3	642	573	69	12	4,160	7.3

a Calculated from determined constituents.
b No flow July 17-19, 28-31, Aug. 1-20.

COLORADO RIVER NEAR SILVER, TEX.--Continued

Chemical analyses, in parts per million, water year October 1957 to September 1958--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Aug. 1-5, 1958----------	b0	16		262	63	1,070		78	736	1,700	0.5	3.0		3,890	5.29	--	912	848	72	15	6,310	7.8
Aug. 11-20----------	b0	--		--	--	--		100	--	2,900	--	--		--	--	--	--	--	--	--	9,940	7.8
Aug. 21-22----------	420	19		87	15	172		137	187	242	.6	4.8		a794	1.08	900	278	166	57	4.5	1,350	8.2
Aug. 23-25----------	199	13		40	9.6	74		110	67	96	.7	4.0		a358	.49	192	140	50	54	2.7	601	8.0
Aug. 26-31, Sept. 1-8---	18.8	9.6		110	28	683		109	410	960	.5	4.0		2,260	3.07	115	390	300	79	15	3,540	8.0
Sept. 9, 11-15, 17-26---	43.7	9.0		81	16	272		93	182	420	.2	2.0		1,030	1.40	122	268	192	69	7.2	1,830	7.8
Sept. 10, 16, 27-29-----	150	11		48	7.9	74		85	82	111	.2	2.0		390	.53	158	152	83	51	2.6	679	7.9
Sept. 30----------	88.0	13		140	35	1,200		106	302	1,920	.3	3.0		3,670	4.99	872	494	406	84	24	6,180	7.8
Weighted average------	61.0	12		82	18	291		129	166	446	0.5	3.7		1,080	1.47	178	278	173	69	7.6	1,860	--

a Calculated from determined constituents.
b No flow July 17-19, 28-31, Aug. 1-20.

COLORADO RIVER NEAR SAN SABA, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 190, 5.2 miles downstream from San Saba River, 9.2 miles east of San Saba, San Saba County, and at mile 474.
DRAINAGE AREA.--30,600 square miles, approximately, of which 11,900 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: September 1947 to September 1958.
Water temperatures: September 1947 to September 1958.
Sediment records: December 1950 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 1,050 ppm May 2; minimum, 148 ppm Oct. 14-18, 24-26.
Hardness: Maximum, 376 ppm Sept. 22-24, 30; minimum, 91 ppm Oct. 14-18, 24-26.
Specific conductance: Maximum observed, 2,280 micromhos Sept. 23; minimum observed, 186 micromhos Oct. 15.
Water temperatures: Maximum, 90°F July 20, Aug. 7, 20; minimum, 40°F Feb. 13.
EXTREMES, 1947-58--Dissolved solids: Maximum, 1,530 ppm Oct. 15-19, 1947; minimum, 102 ppm Sept. 23-25, 1955.
Hardness: Maximum, 522 ppm Oct. 15-19, 1947; minimum, 71 ppm June 25-30, 1949.
Specific conductance: Maximum observed, 3,420 micromhos Sept. 20, 1947; minimum observed, 161 micromhos Sept. 11, 1952.
Water temperatures: Maximum, 98°F Aug. 3, 1956; minimum, freezing point Jan. 29, 1948, Jan. 30, 1951.
REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district offica at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in Water Supply Paper 1562.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
Oct. 1-10, 1957 -----	150	9.2		56	14	63		179	57	88		4.0		396	0.54	160	197	50	41	1.9	674	7.9
Oct. 11-13 ----------	2,348	8.8		62	15	61		176	72	90		4.0		414	.56	2,620	216	72	38	1.8	699	7.7
Oct. 14-18, 24-26 ---	25,570	8.0		29	4.6	14		110	11	12		3.0		148	.20	10,220	91	1	25	.6	234	7.7
Oct. 19-23, 27-31 ---	2,984	9.4		44	8.3	21		156	23	24		4.8		228	.31	1,840	144	16	24	.8	370	7.8
Nov. 1-10 ----------	2,035	11		50	9.6	29		163	33	38		6.1		257	.35	1,410	164	31	27	1.0	440	7.8
Nov. 11-20 ----------	982	8.8		72	17	50		221	61	76		7.7		414	.56	1,100	250	68	30	1.4	694	7.9
Nov. 21-30 ----------	1,244	10		65	15	56		198	57	83		6.9		401	.55	1,350	224	61	35	1.6	677	7.8
Dec. 1-10 ----------	825	11		71	16	44		225	46	71		7.6		a378	.51	842	243	58	28	1.2	667	8.2
Dec. 11-20 ----------	540	9.0		76	20	55		249	53	89		8.3		a432	.59	630	272	68	31	1.5	763	8.1
Dec. 21-31 ----------	338	8.8		89	29	87		288	85	140		10		638	.87	582	341	105	36	2.0	1,000	8.0
Jan. 1-10, 1958 -----	348	8.8		89	28	80		292	85	125		9.6		604	.82	568	337	98	34	1.9	961	8.1
Jan. 11-20 ----------	477	12		74	24	72		b241	81	107		7.2		a496	.67	639	283	85	36	1.9	862	8.6
Jan. 21-31 ----------	711	10		70	21	57		c214	77	88		6.5		a434	.59	833	261	86	32	1.5	766	8.5
Feb. 1-10 ----------	330	11		81	24	52	3.8	256	73	90		8.6		490	.67	437	302	98	27	1.3	836	8.2
Feb. 11-22, 28 ------	480	11		--	28	62	4.0	--	89	106		9.0		--	--	--	--	--	--	--	932	8.3
Feb. 23-27 ----------	6,182	10		53	10	27	4.1	149	42	50		5.1		295	.40	4,920	173	51	25	.9	496	7.8
Mar. 1-6 ----------	1,313	10		76	20	55		227	72	89		7.1		463	.63	1,640	272	86	31	1.5	758	8.2
Mar. 7-11 ----------	3,454	10		54	12	32		160	34	58		6.6		302	.41	2,820	184	53	28	1.0	507	8.2
Mar. 12-26 ----------	977	8.4		70	19	43		230	47	72		7.4		401	.55	1,060	252	64	27	1.2	667	8.2
Mar. 27-31, Apr. 1-4	503	8.2		78	26	49		210	76	107		8.1		504	.69	684	302	130	26	1.2	856	8.2
Apr. 5-18 ----------	374	7.8		80	32	76		256	93	130		7.0		600	.82	606	331	121	33	1.8	961	7.7
Apr. 19-30 ----------	885	8.8		91	31	128		212	151	210		6.9		775	1.05	1,850	354	181	44	2.9	1,250	7.9

a Calculated from determined constituents.
b Includes equivalent of 8 parts per million carbonate (CO_3).
c Includes equivalent of 7 parts per million carbonate (CO_3).

COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Chemical analyses, in parts per million, water year October 1957 to September 1958--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
May 1, 3, 7-13, 1958	1,600	13		64	15	83		202	55	124		3.8		496	0.67	2,140	221	56	45	2.4	810	7.9
May 2	1,800	7.8		100	27	245		156	190	400		3.8		1,050	1.43	5,100	360	232	60	5.6	1,820	8.1
May 4-6, 14-15	1,666	12		52	13	50		176	37	75		3.2		358	.49	1,610	183	39	37	1.6	581	7.9
May 16-31	1,671	11		61	13	96		172	68	143		2.0		a479	.65	2,160	206	64	50	2.9	856	7.7
June 1-10	348	11		58	17	69		213	45	101		1.5		450	.61	423	214	40	41	2.1	726	7.8
June 11-17	250	11		58	22	81		223	63	115		2.2		470	.64	317	235	52	43	2.3	816	7.7
June 18-30	3,387	15		47	11	30		163	28	45		3.0		272	.37	2,490	162	29	29	1.0	456	7.7
July 1-10	458	14		57	17	35		222	34	49		2.5		330	.45	408	212	30	27	1.1	560	7.8
July 11-20	352	14		57	17	47		234	35	59		2.5		351	.48	334	212	20	32	1.4	598	7.7
July 21-31	259	17		51	23	44		244	33	58		2.0		a348	.47	243	222	22	30	1.3	608	8.0
Aug. 1-10	122	16		56	16	52		232	30	68		1.8		a354	.48	117	206	16	35	1.6	594	8.0
Aug. 11-20	104	13		50	27	44		257	34	60		2.0		382	.52	107	236	26	29	1.3	639	7.8
Aug. 21-28	334	16		52	22	49		220	41	71		4.0		389	.53	351	220	40	33	1.4	645	8.2
Aug. 29-31, Sept. 1-6	229	13		80	24	157		185	128	250		4.0		815	1.11	504	298	146	53	3.9	1,340	8.2
Sept. 7-21	277	15		66	20	84		226	69	120		2.2		513	.70	384	246	61	42	2.3	851	8.2
Sept. 25-29	354	13		55	17	52		186	55	76		2.2		393	.53	376	207	54	35	1.6	648	8.1
Sept. 22-24, 30	1,176	10		103	29	193		152	210	320		2.2		a942	1.28	2,990	376	252	53	4.3	1,640	7.9
Weighted average	1,503	9.9		49	12	40		160	38	57		4.3		304	0.41	1,230	172	41	34	1.3	506	--

a Calculated from determined constituents.

COLORADO RIVER AT AUSTIN, TEX.

LOCATION.--At raw-water intake at Austin City Water Plant, just downstream from bridge on U. S. Highway 290 in Austin, Travis County, half a mile downstream from Barton Creek and 4.5 miles upstream from gaging station at Montopolis bridge on U. S. Highway 283.
DRAINAGE AREA.--38,400 square miles, approximately, above gaging station, of which 11,900 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1958.
Water temperatures: October 1947 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 238 ppm Feb. 1-28; minimum, 192 ppm Nov. 1-30.
Hardness: Maximum, 168 ppm July 1-31; minimum, 128 ppm Oct. 1-31.
Specific conductance: Maximum observed, 507 micromhos July 4; minimum observed, 283 micromhos Oct. 15.
Water temperatures: Maximum, 79°F on several days during August and September; minimum, 51°F Feb. 13, 16.
EXTREMES, 1947-58.--Dissolved solids: Maximum, 340 ppm Nov. 1-30, 1951; minimum, 184 ppm July 1-31, 1957.
Hardness: Maximum, 214 ppm Jan. 1-31, 1954; minimum, 122 ppm June 1, 4-30, 1957.
Specific conductance: Maximum observed, 591 micromhos July 1, 1948; minimum observed, 243 micromhos Dec. 2, 1953.
Water temperatures: Maximum, 87°F on several days during summer months; minimum, 43°F Jan. 28, 1948, Feb. 4, 1949.
REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in Water-Supply Paper 1562. No appreciable inflow between sampling point and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1957	5,729	9.6		39	7.4	18		149	14	20	0.4	2.5		193	0.26	2,990	128	6	24	0.7	325	8.1
Nov. 1-30	6,268	9.2		40	7.6	18		146	17	22	.2	4.0		192	.26	3,250	132	12	23	.7	330	7.8
Dec. 1-31	4,799	7.8		43	8.2	18		152	17	24	.3	3.5		204	.28	2,640	141	16	22	.7	345	7.9
Jan. 1-31, 1958	3,728	9.2		44	8.8	17		155	18	24	.2	3.5		a201	.27	2,020	146	19	20	.6	355	8.0
Feb. 1-28	4,359	9.4		46	9.9	20		b164	19	28	.3	4.4		238	.32	2,800	156	21	22	.7	389	8.5
Mar. 1-31	5,747	10		49	9.8	15		168	20	24	.4	3.8		223	.30	3,460	163	26	17	.5	394	7.9
Apr. 1-30	4,064	9.6		48	9.8	20		168	23	27	.4	4.0		233	.32	2,560	160	23	21	.7	392	7.5
May 1-31	4,284	10		48	10	22		178	21	26	.3	4.0		232	.32	2,680	161	15	23	.7	394	8.0
June 1-30	4,778	9.0		46	12	17		172	20	24	.4	4.8		235	.32	3,030	164	24	18	.6	388	7.6
July 1-31	4,203	8.4		46	13	17		175	20	26	.2	4.8		229	.31	2,600	168	25	18	.6	388	7.8
Aug. 1-31	2,677	9.4		45	13	16		174	19	24	.3	3.5		226	.31	1,630	166	24	17	.5	383	7.9
Sept. 1-30	1,578	9.2		41	12	18		167	18	24	.3	2.0		a206	.28	878	152	15	21	.6	374	8.0
Weighted average	4,353	9.2		45	9.8	18		163	19	24	0.3	3.8		216	0.29	2,540	153	20	20	0.6	369	--

a Calculated from determined constituents.
b Includes the equivalent of 5 parts per million carbonate (CO_3).

COLORADO RIVER AT WHARTON, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59 in Wharton, Wharton County, 1,000 feet downstream from Texas & New Orleans Railroad bridge, 12 miles upstream from Jones Creek and at mile 67.
DRAINAGE AREA.--41,380 square miles, approximately, of which 11,900 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: April 1944 to September 1958.
Water temperatures: October 1945 to September 1948, March 1950 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 259 ppm Feb. 1-22; minimum, 118 ppm Oct. 15-19.
Hardness: Maximum, 182 ppm Feb. 1-22; minimum, 85 ppm Oct. 15-19.
Specific conductance: Maximum observed, 637 micromhos Aug. 26; minimum observed, 170 micromhos Oct. 17.
Water temperatures: Maximum, 87°F Aug. 8; minimum, 44°F Feb. 13.
EXTREMES, 1944-58.--Dissolved solids: Maximum, 386 ppm Apr. 1-10, 1948; minimum, 108 ppm Sept. 27-29, 1957.
Hardness: Maximum, 231 ppm Feb. 1-10, 1947; minimum, 66 ppm Sept. 27-29, 1957.
Specific conductance: Maximum observed, 765 micromhos Feb. 5, 1957; minimum observed, 146 micromhos Sept. 27, 1957.
Water temperatures (1945-48, 1950-58): Maximum, 95°F July 26, 1954; minimum, 38°F Jan. 17, 1957.
REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex.
Records of discharge for water year October 1957 to September 1958 given in Water-Supply Paper 1562.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-14, 20-31, 1957--	7,492	12		48	6.8	14	4.0	161	21	20	--	3.8		a209	0.28	4,230	148	16	17	0.5	360	8.1
Oct. 15-19----------	37,620	8.4		29	3.0	5.8	3.6	94	13	6.8	--	2.5		a118	.16	11,990	85	8	12	.3	199	7.9
Nov. 1-22, 28-30--------	6,677	9.4		46	7.1	14	4.0	151	21	22	--	5.4		208	.28	3,750	144	20	17	.5	350	8.0
Nov. 23-27----------	15,920	8.0		32	3.7	13	3.6	101	15	18	--	2.5		a146	.20	6,280	95	12	22	.6	249	7.6
Dec. 1-31----------	5,703	11		52	8.4	16	4.0	170	22	27	--	5.5		232	.32	3,570	164	24	17	.5	388	8.0
Jan. 1-31, 1958---------	5,728	13		45	8.0	15	3.9	146	26	23	--	4.8		219	.30	3,390	146	26	18	.5	356	7.8
Feb. 1-22----------	3,921	12		55	11	17	3.9	186	27	27	--	5.0		259	.35	2,740	182	30	17	.5	429	8.1
Feb. 23, 27-28----------	16,030	4.2		--	6.0	10	3.3	--	20	12	--	.5		--	--	--	--	--	--	--	332	8.8
Feb. 24-26----------	46,600	9.6		32	3.2	6.6	3.1	98	19	6.5	--	3.0		a131	.18	16,480	93	12	13	.3	217	7.8
Mar. 1-31----------	7,091	11		53	11	17	3.7	182	26	26	0.3	7.5		258	.35	4,940	177	28	17	.6	429	7.8
Apr. 1-30----------	5,279	13		52	11	17	4.0	181	26	28	.3	4.9		254	.35	3,620	174	26	17	.6	413	7.9
May 1-31----------	5,847	13		51	11	15	3.5	175	25	25	--	6.1		245	.33	3,870	172	29	16	.5	406	7.8
June 1-30----------	3,979	14		45	12	16	3.5	166	23	28	--	3.2		238	.32	2,560	162	26	17	.5	388	7.8
July 1-31----------	3,845	13		45	12	16	3.4	168	22	28	--	4.0		226	.31	2,350	162	24	17	.5	393	7.7
Aug. 1-31----------	2,316	11		40	14	18	3.5	159	23	33	--	3.0		a224	.30	1,400	158	27	19	.6	389	7.7
Sept. 1-8, 12-21, 27-30-	2,262	15		44	12	18	3.6	165	27	26	--	2.5		229	.31	1,400	160	24	19	.6	389	8.0
Sept. 9-11, 22-26-------	7,410	15		35	5.4	11	3.4	114	23	13	--	2.5		165	.22	3,300	110	16	17	.5	274	7.6
Weighted average------	6,128	11		45	8.4	14	3.7	153	22	22	--	4.4		211	0.29	3,490	147	22	17	0.5	354	--

a Calculated from determined constituents.

MISCELLANEOUS ANALYSES OF STREAMS IN COLORADO RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
LAKE J. B. THOMAS NEAR VINCENT																						
Jan. 29, 1958----------		1.4	0.18	33	6.3	60		172	55	27	0.7	0.0		269	0.37		108	0	55	2.5	460	7.9
BEALS CREEK AT FM ROAD 821 EAST OF BIG SPRING																						
Aug. 13, 1958----------		6.4		59	74	504		a329	356	640	1.6	0.5		1,800	2.45		452	182	71	10	3,010	8.5
HARDIN CREEK AT EDEN																						
June 27, 1958----------		0.9		31	7.7	26		153	10	20	0.8	0.2		b181	0.25		109	0	34	1.1	314	7.5

a Includes equivalent of 19 parts per million of carbonate (CO_3).
b Residue on evaporation at 180°C.

GUADALUPE RIVER AT VICTORIA, TEX.

LOCATION.-- At gaging station at bridge on U. S. Highway 59 in Victoria, Victoria County, 1300 feet upstream from Texas and New Orleans Railroad bridge, 10 miles upstream from Coleto Creek, and at mile 51.
DRAINAGE AREA.--5,161 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1948 to September 1958.
Water temperatures: November 1950 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 398 ppm Oct. 4-15; minimum, 134 ppm Oct 17-21.
Hardness: Maximum, 266 ppm May 22-31; minimum, 92 ppm Oct. 17-21.
Specific conductance: Maximum observed, 760 micromhos Aug. 3; minimum observed, 185 micromhos Oct. 18.
Water temperatures: Maximum observed, 86°F June 9, July 11, 30, Aug. 17,22; minimum observed, 48°F Dec. 1.
EXTREMES, 1945-46, 1948-58.--Dissolved solids: Maximum, 1,040 ppm Jan. 11-17, 1946; minimum, 134 ppm Oct. 17-21, 1957.
Hardness: Maximum, 428 ppm Jan. 11-17, 1946; minimum, 86 ppm Oct. 23-31, 1956.
Specific conductance: Maximum observed, 1950 micromhos Jan. 11-17, 1946; minimum observed, 184 micromhos Oct. 24, 1956.
Water temperatures (1950-58): Maximum observed, 90°F Aug. 4, 27, 1952; minimum observed, 40°F Feb. 1-2, 1951.
REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in Water-Supply Paper 1562.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-3, 1957	10,630	17		38	5.0	11	5.2	132	18	14		2.5		a176	0.24	5,050	116	8	16	0.4	287	8.0
Oct. 4-15	1,513	19		74	14	36	3.9	248	39	60		4.5		398	.54	1,630	242	39	24	1.0	642	8.0
Oct. 16, 22-27	8,329	12		47	7.3	15	4.1	159	21	22		4.0		223	.30	5,010	148	17	18	.5	361	7.9
Oct. 17-21	24,460	9.6	0.40	31	3.7	7.4	4.4	110	11	10		2.0		a134	.18	8,850	92	2	14	.3	227	7.9
Oct. 28-31	3,910	14		65	12	30	3.9	216	29	50		7.4		a317	.43	3,350	212	34	23	.9	545	8.0
Nov. 1-11	2,278	20		79	14	29	2.9	266	35	45		9.5		373	.51	2,290	254	36	20	.8	616	7.9
Nov. 12-22	3,775	16		65	11	22	3.5	214	32	34		8.1		304	.41	3,100	207	32	18	.7	496	7.7
Nov. 23-30	7,461	15		44	7.3	15	3.9	146	22	23		4.8		218	.30	4,390	140	20	18	.5	351	7.9
Dec. 1-10	2,432	21		69	16	26	2.7	239	33	42		10		346	.47	2,270	238	42	19	.7	565	7.9
Dec. 11-20	1,812	19		66	19	33	2.4	232	39	52		11		364	.50	1,780	242	52	23	.9	605	8.0
Dec. 21-31	1,749	18		68	19	32	2.5	239	41	53		10		373	.51	1,760	248	52	22	.9	614	7.8
Jan. 1-13, 1958	2,303	16		74	15	32	3.2	239	44	51		8.2		370	.50	2,300	246	50	22	.9	611	7.9
Jan. 14-20	6,406	12		47	7.8	16	4.2	b149	25	26		5.7		225	.31	3,890	150	34	18	.6	368	8.4
Jan. 21-31	4,673	14		56	11	22	3.3	185	31	32		7.2		272	.37	3,430	184	33	20	.7	452	7.7
Feb. 1-10	2,304	15		--	16	27	2.3	--	37	45		9.2		--	--	--	--	--	--	--	612	8.2
Feb. 11-22	2,751	13		76	17	27	2.3	257	38	47		8.6		370	.50	2,750	260	49	18	.7	612	8.1
Feb. 23-28	31,000	9.6		33	4.2	9.2	3.6	110	15	13		3.2		a145	.20	12,140	100	10	16	.4	248	8.0
Mar. 1-10	5,777	15		67	17	25	2.3	228	37	46		11		a332	.45	5,180	237	50	19	.7	569	7.7
Mar. 11-20	3,334	17		67	18	25	2.2	232	38	46		12		368	.50	3,310	241	51	18	.7	604	7.8
Mar. 21-31	2,771	16		52	19	29	2.0	188	41	51		12		342	.47	2,560	208	54	23	.9	617	7.9
Apr. 1-5	2,360	18		40	13	23	3.0	142	31	38		8.4		251	.34	1,600	154	37	24	.8	409	7.5
Apr. 6-17	2,063	14		--	18	32	2.3	--	41	54		11		--	--	--	--	--	--	--	649	--
Apr. 18-30	1,837	17		76	18	30	2.4	260	42	50		10		382	.52	1,890	264	50	20	.8	636	7.1
May 1-6	3,737	15		51	16	28	2.7	184	33	44		7.0		292	.40	2,950	193	42	24	.9	513	7.9
May 7-10	13,480	12		44	7.1	10	3.9	150	17	16		4.2		a188	.26	6,840	139	16	13	.4	327	8.0
May 11-21	3,225	18		77	15	26	2.9	264	31	38		9.8		378	.51	3,290	254	37	18	.7	597	7.6
May 22-31	2,128	16		77	18	29	2.5	272	35	44		11		393	.53	2,260	266	43	19	.8	635	7.5
June 1-10	1,521	18		52	19	38	2.4	200	36	62		4.2		347	.47	1,430	208	44	28	1.1	588	7.7
June 11-20	1,308	18		63	19	33	2.2	236	35	55		4.2		352	.48	1,240	235	42	23	.9	604	7.6
June 21-30	2,463	15		63	16	20	2.5	230	27	33		6.0		308	.42	2,050	223	34	16	.6	514	7.6
July 1-10	1,488	12		60	14	23	2.8	226	22	36		1.2		a282	.38	1,130	206	22	19	.7	520	7.8
July 11-20	1,329	19		62	16	27	3.1	227	29	43		5.2		336	.46	1,210	220	34	21	.8	543	7.5
July 21-31	955	18		57	18	30	2.6	227	30	48		4.4		332	.45	856	216	30	23	.9	558	7.7
Aug. 1-10	783	15		56	18	33	2.6	226	32	51		4.5		336	.46	710	214	28	25	1.0	573	7.6
Aug. 11-20	728	19		56	17	33	2.5	224	32	46		4.4		334	.45	657	210	26	25	1.0	563	7.9
Aug. 21-31	720	18		55	17	32	2.5	227	33	43		3.7		326	.44	634	207	21	25	1.0	634	7.8
Sept. 1-10	777	16		55	19	31	2.4	227	33	46		4.0		a318	.43	667	215	29	24	.9	552	7.8
Sept. 11-21	1,062	17		56	15	26	2.9	219	28	37		3.5		a293	.40	840	201	22	22	.8	517	8.1
Sept. 22-30	4,550	14		44	9.3	13	3.3	164	20	18		3.5		a206	.28	2,530	148	14	16	.5	357	8.0
Weighted average	3,541	14		53	11	20	3.3	183	27	31		6.1		264	0.36	2,520	177	27	19	0.7	441	--

a Calculated from determined constituents.
b Includes equivalent of 4 parts per million carbonate (CO_3).

MISCELLANEOUS ANALYSES OF STREAMS IN GUADALUPE RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
ESCONDIDO RESERVOIR NO. 1 NEAR KENEDY																						
Nov. 18, 1957								118		2.5							88	0			205	7.2
Jan. 6, 1958								104		2.2							77	0			170	7.6
Jan. 27								106		3.0							75	0			155	8.2
May 28								104		3.0							77	0			180	7.9

NUECES RIVER NEAR MATHIS, TEX.

LOCATION.--At intake tower at Lake Corpus Christi, 0.8 mile upstream from gaging station at bridge on State Highway 359, 200 feet downstream from Texas & New Orleans Railroad bridge and 4 miles southwest of Mathis, San Patricio County.
DRAINAGE AREA.--16,660 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1958.
Water temperatures: October 1947 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 415 ppm May 1-31; minimum, 186 ppm Jan. 11-31.
Hardness: Maximum, 198 ppm Aug. 1-31; minimum, 90 ppm Jan. 11-31.
Specific conductance: Maximum observed, 743 micromhos May 10; minimum observed, 247 micromhos Feb. 28.
Water temperatures: Maximum, 92°F June 26-28; minimum, 48°F Jan. 8-10.
EXTREMES, 1947-58.--Dissolved solids: Maximum, 548 ppm June 1-30, 1948; minimum, 175 ppm Apr. 27-30, 1949.
Hardness: Maximum, 201 ppm May 1-24, 1951; minimum, 85 ppm Apr. 27-30, 1949.
Specific conductance: Maximum observed, 1,040 micromhos July 1, 1948; minimum observed, 233 micromhos July 30, 1949.
Water temperatures: Maximum, 94°F July 27, 1948; minimum, 38°F Jan. 31, 1948.
REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in Water-Supply Paper 1562.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1957	2,033	14		38	3.1	24	7.0	134	26	21	0.5	3.0		a203	0.28	1,110	108	0	31	1.0	338	8.0
Nov. 1-30	780	14		46	4.6	36	7.0	165	34	38	--	2.2		271	.37	571	134	0	35	1.4	440	7.7
Dec. 1-31	91.3	21		43	4.5	45	6.2	154	38	41	.4	3.8		296	.40	73.0	126	0	42	1.7	459	7.6
Jan. 1-10, 1958	3,893	19		44	4.7	47	6.0	154	42	44	.4	4.0		300	.41	3,150	130	4	43	1.8	471	7.9
Jan. 11-31	5,519	12		32	2.5	27	5.2	107	26	24	.5	4.0		a186	.25	2,770	90	3	38	1.2	306	7.5
Feb. 1-28	5,165	14		37	3.3	31	4.9	126	28	32	--	4.5		221	.30	3,080	106	2	38	1.3	363	7.8
Mar. 1-16	7,968	16		43	3.7	26	5.8	147	28	25	.5	2.8		231	.31	4,970	122	2	30	1.0	371	7.6
Mar. 17-31	546	15		61	6.6	42	6.2	199	40	47	.4	5.3		338	.46	498	179	16	33	1.4	551	7.7
Apr. 1-30	87.2	17		63	8.6	52	6.1	199	54	64	--	5.6		370	.50	87.1	192	30	36	1.6	608	7.4
May 1-31	83.5	15		57	9.7	69	7.1	184	68	85	--	4.0		415	.56	93.6	182	31	44	2.2	691	7.4
June 1-30	104	17		58	8.7	66	7.7	193	60	82	--	1.0		396	.54	111	180	22	43	2.1	670	7.8
July 1-31	166	21		61	8.6	60	9.1	211	50	72	--	1.5		406	.55	182	188	14	40	1.9	649	7.5
Aug. 1-31	118	23		66	8.0	44	9.8	232	37	55	.4	.5		368	.50	117	198	8	31	1.4	586	8.1
Sept. 1-30	659	23		65	7.3	42	9.4	239	32	50	--	.8		a348	.47	619	192	0	31	1.3	570	8.1
Weighted average	1,538	15		40	3.7	31	5.9	139	30	31	--	3.5		233	0.32	968	115	1	36	1.3	380	--

a Calculated from determined constituents.

RIO GRANDE NEAR EL PASO, TEX.

LOCATION.--At gaging station 5 miles northwest of El Paso, El Paso County, 6 miles northwest of Juarez, Chihuahua, and 1.9 miles above the American Dam.
DRAINAGE AREA.--29,267 square miles.
RECORDS AVAILABLE.--Chemical analyses: 1933 to 1958.
REMARKS.--Chemical analyses by U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif. Records of specific conductance of daily samples and records of discharge for water year October 1957 to September 1958 given in International Boundary and Water Commission Water Bulletin Numbers 27 and 28.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Month	Number of Samples	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3) (a)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
October 1957-	29	38.6	--		103	24	396	--	226	507	372	--	(b)	0.44	1,560	2.12		355	170	71	9.1	2,420	8.1
November-----	30	9.3	--		170	53	1,080	--	354	1,150	1,090	--	0.6	.90	3,830	5.21		642	351	79	19	5,690	8.3
December-----	30	7.2	--		153	48	934	--	343	1,010	916	--	(b)	.81	3,350	4.55		578	298	78	17	5,040	8.2
January 1958-	31	6.6	48		142	42	875	17	333	960	830	1.3	(b)	.77	3,120	4.24		525	252	78	17	4,660	8.3
February-----	28	6.4	--		154	47	887	--	336	981	872	--	(b)	.81	3,250	4.42		576	302	77	16	4,780	8.2
March--------	31	482	--		85	16	103	--	169	246	83	--	(b)	.12	667	.91		278	139	45	2.7	996	8.1
April--------	30	588	--		84	16	108	--	177	256	78	--	(b)	.17	672	.91		278	132	46	2.8	991	8.0
May----------	31	698	--		85	16	97	--	171	250	69	--	(b)	.20	666	.91		276	136	43	2.5	971	7.8
June---------	30	925	--		85	17	101	--	186	251	69	--	(b)	.11	668	.91		279	126	44	2.6	986	7.8
July---------	31	1,110	16		84	17	103	9.0	183	246	74	.6	.6	.15	700	.95		278	128	44	2.7	997	8.0
August-------	31	1,070	--		84	16	102	--	186	237	76	--	.6	.13	657	.89		274	121	45	2.7	979	8.0
September----	30	1,080	--		85	15	109	--	183	231	87	--	.6	.22	684	.93		275	125	46	2.9	1,020	7.7

a Includes equivalent of any carbonate (CO_3) present.
b Less than 0.4 parts per million.

RIO GRANDE BELOW OLD FORT QUITMAN, TEX.

LOCATION.--At gaging station at the rectified channel of the Rio Grande, 1.5 miles below Old Fort Quitman, Hudspeth County, and 81.1 river miles below the American Dam at El Paso.
DRAINAGE AREA.--32,035 square miles (United States and Mexico; from International Boundary and Water Commission Bulletin Number 27).
RECORDS AVAILABLE.--Chemical analyses: 1933 to 1958.
REMARKS.--Chemical analyses by U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif. Records of specific conductance of daily samples and records of discharge for water year October 1957 to September 1958 given in International Boundary and Water Commission Water Bulletin Numbers 27 and 28.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Month	Number of Samples	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
October 1957-	2	18.6			32	4.0	59		163	59	20		2.5	0.19	256	0.35		96	0	57	2.6	425	8.0
November-----	--	0			--	--	--		--	--	--		--	--	--	--		--	--	--	--	--	--
December-----	--	0			--	--	--		--	--	--		--	--	--	--		--	--	--	--	--	--
January 1958-	--	0			--	--	--		--	--	--		--	--	--	--		--	--	--	--	--	--
February-----	--	0			--	--	--		--	--	--		--	--	--	--		--	--	--	--	--	--
March--------	--	0			--	--	--		--	--	--		--	--	--	--		--	--	--	--	--	--
April--------	0	6.4			--	--	--		--	--	--		--	--	--	--		--	--	--	--	--	--
May----------	0	21.2			--	--	--		--	--	--		--	--	--	--		--	--	--	--	--	--
June---------	0	1.2			--	--	--		--	--	--		--	--	--	--		--	--	--	--	--	--
July---------	0	15.1			--	--	--		--	--	--		--	--	--	--		--	--	--	--	--	--
August-------	0	11.1			--	--	--		--	--	--		--	--	--	--		--	--	--	--	--	--
September----	4	324			78	9.7	58		131	195	35		3.1	.06	491	.67		234	126	35	1.6	720	7.8

RIO GRANDE AT UPPER PRESIDIO, TEX.

LOCATION.--At gaging station 7.8 river miles above the junction of the Rio Conchos, and about 10 miles northwest of Presidio, Presidio County, and 285.7 river miles below the American Dam at El Paso.
DRAINAGE AREA.--34,988 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 27).
RECORDS AVAILABLE.--Chemical analyses: 1935 to 1958.
REMARKS.--Chemical analyses by U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif. Records of specific conductance of daily samples and records of discharge for water year October 1957 to September 1958 given in International Boundary and Water Commission Water Bulletin Numbers 27 and 28.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Month	Number of Samples	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
October 1957-	5	40.3													296	0.40		156	53	34	1.3	471	
November-----	--	0													--	--		--	--	--	--	--	
December-----	--	0													--	--		--	--	--	--	--	
January 1958-	--	0													--	--		--	--	--	--	--	
February-----	0	4.2													--	--		--	--	--	--	--	
March--------	--	0													--	--		--	--	--	--	--	
April--------	--	0													--	--		--	--	--	--	--	
May----------	1	.1													817	1.11		446	381	16	.8	1,010	
June---------	2	1.8													769	1.05		424	354	17	.9	972	
July---------	6	5.0	14		65	6.2	54	5.5	159	124	34	0.6	3.7	0.11	427	.58		186	56	38	1.7	605	8.0
August-------	8	50.6													399	.54		192	52	36	1.6	601	
September----	12	325													428	.58		196	94	37	1.7	635	

RIO GRANDE NEAR JOHNSON RANCH, TEX.

LOCATION.--At gaging station about 2 miles upstream from Johnson Ranch, Brewster County, 14 miles downstream from Castolon, and 392.9 river miles below the American Dam at El Paso.
DRAINAGE AREA.--70,715 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 27).
RECORDS AVAILABLE.--Chemical analyses: 1948 to 1958.
REMARKS.--Chemical analyses by U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif. Records of specific conductance of daily samples and records of discharge for water year October 1957 to September 1958 given in International Boundary and Water Commission Water Bulletin Numbers 27 and 28.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Month	Number of Samples	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
October 1957-	10	1,280	--		--	--	73	--	140	--	39	--	--	--	680	0.92		328	214	33	1.8	945	--
November-----	5	401	--		--	--	198	--	193	--	128	--	--	--	1,190	1.62		423	264	50	4.2	1,660	--
December-----	7	374	--		--	--	184	--	187	--	113	--	--	--	1,140	1.55		402	248	50	4.0	1,580	--
January 1958-	9	296	34		123	22	213	7.4	171	516	135	1.9	2.5	0.44	1,190	1.62		398	258	53	4.6	1,670	7.8
February-----	5	268	--		--	--	220	--	165	--	138	--	--	--	1,190	1.62		398	262	55	4.8	1,660	--
March--------	4	144	--		--	--	195	--	153	--	124	--	--	--	1,150	1.57		409	284	51	4.2	1,610	--
April--------	5	27.6	--		--	--	233	--	154	--	168	--	--	--	1,360	1.84		458	331	53	4.7	1,880	--
May----------	3	63.4	--		--	--	60	--	178	--	12	--	--	--	374	.51		147	2	47	2.2	539	--
June---------	8	217	--		--	--	114	--	183	--	64	--	--	--	724	.98		272	122	48	3.0	1,040	--
July---------	13	347	20		64	5.8	66	4.7	177	159	8.9	.8	1.9	.09	451	.61		184	38	43	2.1	648	8.1
August-------	8	362	--		--	--	80	--	184	--	34	--	--	--	632	.86		282	131	38	2.1	892	--
September----	16	10,100	--		--	--	47	--	174	--	14	--	--	--	387	.53		192	49	35	1.5	574	--

RIO GRANDE AT LANGTRY, TEX.

LOCATION.--At gaging station at Langtry, Val Verde County, 24.1 miles above the confluence with the Pecos River, and 614.1 river miles below the American Dam at El Paso.
DRAINAGE AREA.--84,795 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 27).
RECORDS AVAILABLE.--Chemical analyses: 1944 to 1958.
REMARKS.--Chemical analyses by U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif. Records of specific conductance of daily samples and records of discharge for water year October 1957 to September 1958 given in International Boundary and Water Commission Water Bulletin Numbers 27 and 28.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Month	Number of Samples	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
October 1957-	8	1,750	--		95	11	58	--	174	224	28	--	1.9	0.10	552	0.75		282	140	31	1.5	790	8.0
November-----	5	729	--		107	18	109	--	180	318	72	--	2.5	.18	783	1.06		340	192	41	2.6	1,120	8.2
December-----	5	653	--		94	22	126	--	177	334	81	--	2.5	.26	822	1.12		326	181	46	3.0	1,170	7.9
January 1958-	6	584	29		88	21	126	5.5	174	314	82	1.5	2.5	.27	779	1.06		308	166	46	3.1	1,130	8.1
February-----	6	523	--		88	23	128	--	178	313	86	--	2.5	.24	784	1.07		312	166	47	3.2	1,140	8.0
March--------	7	468	--		88	22	120	--	176	304	82	--	1.9	.24	764	1.04		310	167	46	3.0	1,110	8.2
April--------	7	288	--		63	21	80	--	165	197	60	--	1.2	.26	553	.75		244	109	41	2.2	833	8.0
May----------	9	446	--		66	16	50	--	168	148	39	--	2.5	.18	457	.62		233	96	32	1.4	679	8.0
June---------	6	520	--		80	14	71	--	186	198	44	--	2.5	.16	548	.75		256	104	38	1.9	811	8.0
July---------	5	560	20		76	14	60	5.5	202	155	36	1.0	3.1	.16	500	.68		247	82	34	1.6	736	7.9
August-------	4	723	--		77	9.7	54	--	a200	140	31	--	2.5	.11	452	.61		232	74	34	1.5	688	8.1
September----	8	8,620	--		78	8.9	46	--	168	154	23	--	4.3	.14	438	.60		230	93	30	1.3	636	7.8

a Includes equivalent of 4 ppm CO_3.

PECOS RIVER BELOW RED BLUFF DAM NEAR ORLA, TEX.

LOCATION.--Just below dam, 3 miles upstream from Salt (Screwbean) Draw, 5 miles northwest of Orla, Reeves County, and 14 miles upstream from gaging station near Orla.
DRAINAGE AREA.--20,720 square miles, approximately (contributing area).
RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1958.
Water temperatures: March 1953 to September 1958.
EXTREMES, 1957-58.--Dissolved solids: Maximum, 8,800 ppm May 1-31; minimum, 4,660 ppm July 1-31.
Hardness: Maximum, 2,320 ppm May 1-31; minimum, 1,610 ppm July 1-31.
Specific conductance: Maximum observed, 15,900 micromhos May 16; minimum observed, 6,130 micromhos July 7.
Water temperatures: Maximum, 81°F Aug. 1-4; minimum, 43°F Jan. 23-25.
EXTREMES, 1937-58.--Dissolved solids: Maximum, 15,600 ppm Sept. 17-30, 1953; minimum, 1,090 ppm June 1-2, 1948.
Hardness: Maximum, 3,430 ppm July 1-31, Oct. 1-16, 1953; minimum, 602 ppm June 1-2, 1948.
Specific conductance: Maximum observed, 24,200 micromhos Sept. 28, 30, 1953; minimum observed, 1,610 micromhos June 2, 1948.
Water temperatures (1953-58): Maximum, 81°F Aug. 1-4, 1958; minimum, 40°F on several days during winter months.
REMARKS.--Values reported for dissolved solids are calculated from determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex.
Records of discharge for gaging station near Orla for water year October 1957 to September 1958 given in Water-Supply Paper 1562. Mean discharge values reported below have been adjusted to exclude inflow from Salt (Screwbean) Draw which enters Pecos River between sampling point and gaging station.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-31, 1957	35.8	8.6		470	143	1,880		114	1,540	2,950		--		7,050	9.59	681	1,760	1,670	70	20	10,300	7.5
Nov. 1-30	10.4	8.2		479	173	2,050		134	1,620	3,240		--		7,640	10.4	215	1,910	1,800	70	20	11,800	7.4
Dec. 1-31	10.8	7.8		488	168	1,660		137	1,620	2,640		--		6,650	9.04	194	1,910	1,800	65	17	9,910	7.9
Jan. 1-31, 1958	10.8	6.6		496	150	1,490		130	1,540	2,400		--		6,150	8.36	179	1,850	1,750	64	15	9,250	7.7
Feb. 1-28	9.95	7.2		488	166	1,500		133	1,600	2,400		--		6,230	8.47	167	1,900	1,790	63	15	9,470	8.1
Mar. 1-31	11.3	4.6		488	166	1,560		139	1,620	2,480		--		6,390	8.69	195	1,900	1,790	64	16	9,560	7.3
Apr. 1-30	147	3.8		504	187	1,670		134	1,790	2,620		--		6,840	9.30	2,710	2,030	1,920	64	16	9,970	7.5
May 1-31	41.6	10		574	215	2,300		129	2,000	3,640		--		8,800	12.0	988	2,320	2,210	68	21	12,900	7.2
June 1-30	189	10		515	152	1,550		115	1,740	2,400		--		6,420	8.73	3,280	1,910	1,820	64	15	9,350	7.6
July 1-31	216	15		455	116	1,000		119	1,500	1,510		3.0		4,660	6.34	2,720	1,610	1,510	57	11	6,740	7.4
Aug. 1-23	151	17		500	132	1,060		112	1,580	1,670		5.0		5,020	6.83	2,050	1,790	1,700	56	11	7,250	7.8
Aug. 24-31	26.3	18		558	171	1,830		140	1,810	2,890		--		7,350	10.0	522	2,100	1,980	66	17	10,800	7.6
Sept. 1-13	160	16		455	119	1,050		107	1,480	1,620		2.5		4,800	6.53	2,070	1,620	1,540	58	11	7,020	7.9
Sept. 14-30	239	16		415	156	2,110		177	1,360	3,340		--		7,480	10.2	143	1,680	1,530	73	22	11,700	7.3
Weighted average	73.0	11		491	147	1,390		120	1,640	2,160		--		5,900	8.02	1,160	1,830	1,730	62	14	8,620	--

PECOS RIVER NEAR GIRVIN, TEX.

LOCATION.--At supplementary gage at bridge on U. S. Highway 67, about half a mile downstream from Panhandle & Santa Fe Railway bridge, 2.1 miles east of Girvin, Pecos County, 6½ miles downstream from Comanche Creek and 7.8 miles downstream from regular gaging station.
DRAINAGE AREA.--29,560 square miles, approximately (contributing area at supplementary gage).
RECORDS AVAILABLE.--Chemical analyses: October 1939 to June 1941, October 1946 to September 1947, October 1953 to September 1958.
Water temperatures: October 1953 to September 1958.
EXTREMES, 1957-58.--Hardness: Maximum, 4,940 ppm Aug. 1-31; minimum, 379 ppm Sept. 27-28.
Specific conductance: Maximum observed, 29,100 micromhos Aug. 13; minimum observed, 890 micromhos Sept. 27.
Water temperatures: Maximum, 92°F Aug. 14; minimum, 43°F Feb. 11.
EXTREMES, 1939-41, 1946-47, 1953-58.--Hardness: Maximum, 5,040 ppm June 1-30, 1956; minimum, 330 ppm May 18, 1957.
Specific conductance: Maximum observed, 29,100 micromhos Aug. 13, 1958; minimum observed, 790 micromhos Apr. 26, 1957.
Water temperatures: (1953-58): Maximum, 93°F June 1, 1954; minimum, 38°F Feb. 3-4, 1956.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in Water-Supply Paper 1562.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-19, 1957--------	46.1					3,700		108	3,670	5,820							3,990	3,900	67	25	19,700	7.6
Oct. 20-31 ------------	70.5					1,430		118	1,570	2,250							1,750	1,650	64	15	8,820	7.8
Nov. 1-30 -------------	52.9					3,080		128	3,120	4,870							3,480	3,380	66	23	17,000	7.6
Dec. 1-31 -------------	32.6					3,540		175	3,370	5,610							3,770	3,630	67	25	18,900	7.7
Jan. 1-31, 1958--------	35.9					3,710		182	3,310	5,700							3,750	3,600	68	26	19,500	7.9
Feb. 1-28 -------------	32.7					3,750		180	3,440	5,880							3,870	3,720	68	26	19,800	7.8
Mar. 1-31 -------------	47.3					3,810		143	3,710	5,850							4,100	3,980	67	26	20,200	7.7
Apr. 1-30 -------------	20.3					4,440		102	4,170	6,530							4,260	4,180	69	30	22,100	7.3
May 1-31 --------------	15.7					4,490		73	4,190	6,830							4,550	4,490	68	29	22,800	7.4
June 1-30 -------------	10.6					4,720		71	4,490	7,250							4,830	4,770	68	30	23,800	7.8
July 1-31 -------------	19.4					4,690		76	4,460	7,460							4,900	4,840	68	29	24,000	7.5
Aug. 1-31 -------------	10.0					4,930		85	4,420	7,710							4,940	4,870	68	31	24,700	7.2
Sept. 1-26 ------------	10.7					3,770		73	4,000	5,820							4,180	4,120	66	25	20,300	7.6
Sept. 27-28 -----------	1,650	13		132	12	57	9.6	70	330	75		2.0		665	0.90	2,960	379	322	24	1.3	988	8.0
Sept. 29-30 -----------	136					1,610		119	1,670	2,580							1,930	1,830	64	16	9,820	7.6
Weighted average	38.3					2,750		116	2,710	4,270							2,990	2,900	67	22	14,700	--

PECOS RIVER NEAR SHUMLA, TEX.

LOCATION.--At gaging station about 6 miles north of Shumla, Val Verde County, 13.0 miles upstream from the Pecos High Bridge and 18.5 river miles upstream from the confluence with the Rio Grande.
DRAINAGE AREA.--35,162 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 27).
RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1958.
REMARKS.--Chemical analyses by U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif. Records of specific conductance of daily samples and records of discharge for water year October 1957 to September 1958 given in International Boundary and Water Commission Water Bulletin Numbers 27 and 28.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Month	Number of Samples	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
October 1957-	5	432	--		106	43	251	--	159	265	420	--	3.1	0.18	1,270	1.72		441	311	55	5.2	2,040	8.0
November-----	4	362	--		142	59	374	--	169	383	621	--	3.1	.22	1,780	2.42		596	458	58	6.7	2,810	8.2
December-----	5	222	--		167	74	443	--	183	470	752	--	2.5	.20	2,180	2.97		724	574	57	7.2	3,380	7.9
January 1958-	3	218	14		165	78	490	7.4	162	494	819	0.8	3.1	.22	2,290	3.11		732	598	59	7.9	3,560	8.0
February-----	0	219	--		--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--
March--------	1	211	--		182	88	558	--	181	548	938	--	2.5	.21	2,600	3.53		818	670	60	8.5	4,030	8.2
April--------	2	179	--		161	83	508	--	146	506	867	--	1.2	.34	2,410	3.28		744	624	60	8.1	3,740	7.9
May----------	4	607	--		130	51	326	--	162	332	546	--	2.5	.20	1,630	2.22		535	402	57	6.1	2,580	8.0
June---------	5	231	--		125	55	341	--	143	347	582	--	1.9	.21	1,660	2.25		540	422	58	6.4	2,650	8.0
July---------	5	254	14		100	36	207	5.1	159	220	353	.6	3.1	.15	1,100	1.50		400	270	53	4.5	1,760	7.8
August-------	4	168	--		116	52	303	--	146	310	523	--	1.9	.24	1,510	2.05		504	384	57	5.9	2,420	7.8
September----	5	1,330	--		58	10	49	--	149	55	82	--	2.5	.05	366	.50		188	66	36	1.5	616	7.8

RIO GRANDE AT LAREDO, TEX.

LOCATION.--At gaging station at railroad bridge between Laredo, Webb County, and Nuevo Laredo, Tamaulipas, 884.3 miles below the American Dam at El Paso.
DRAINAGE AREA.--135,976 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 27).
RECORDS AVAILABLE.--Chemical analyses: July 1955 to September 1958.
REMARKS.--Chemical analyses by U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif. Records of specific conductance of daily samples and records of discharge for water year October 1957 to September 1958 given in International Boundary and Water Commission Water Bulletin Numbers 27 and 28.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Month	Number of Samples	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
October 1957-	14	4,090	--		--	--	64	--	156	--	69	--	--	--	478	0.65		227	100	38	1.9	740	--
November-----	8	2,290	--		--	--	94	--	174	--	118	--	--	--	646	.88		296	153	41	2.4	1,000	--
December-----	8	1,870	--		--	--	120	--	164	--	145	--	--	--	734	1.00		296	162	47	3.1	1,130	--
January 1958-	15	2,340	14		73	22	108	5.1	151	183	138	0.8	3.7	0.15	645	.88		271	148	46	2.9	1,030	7.9
February-----	10	2,290	--		--	--	122	--	165	--	154	--	--	--	702	.95		294	160	47	3.1	1,120	--
March--------	12	1,730	--		--	--	114	--	153	--	149	--	--	--	664	.90		275	150	47	3.0	1,060	--
April--------	10	1,100	--		--	--	135	--	156	--	192	--	--	--	774	1.05		312	184	49	3.3	1,220	--
May----------	14	2,960	--		--	--	55	--	143	--	80	--	--	--	428	.58		200	82	37	1.7	666	--
June---------	12	5,100	--		--	--	32	--	154	--	44	--	--	--	303	.41		168	42	29	1.1	487	--
July---------	14	1,870	15		67	15	67	5.1	159	119	85	.6	3.7	.12	493	.67		227	97	38	1.9	762	8.0
August-------	11	1,570	--		--	--	72	--	156	--	82	--	--	--	495	.67		229	102	41	2.1	777	--
September----	30	14,380	--		--	--	27	--	149	--	25	--	--	--	296	.40		172	50	25	.9	462	--

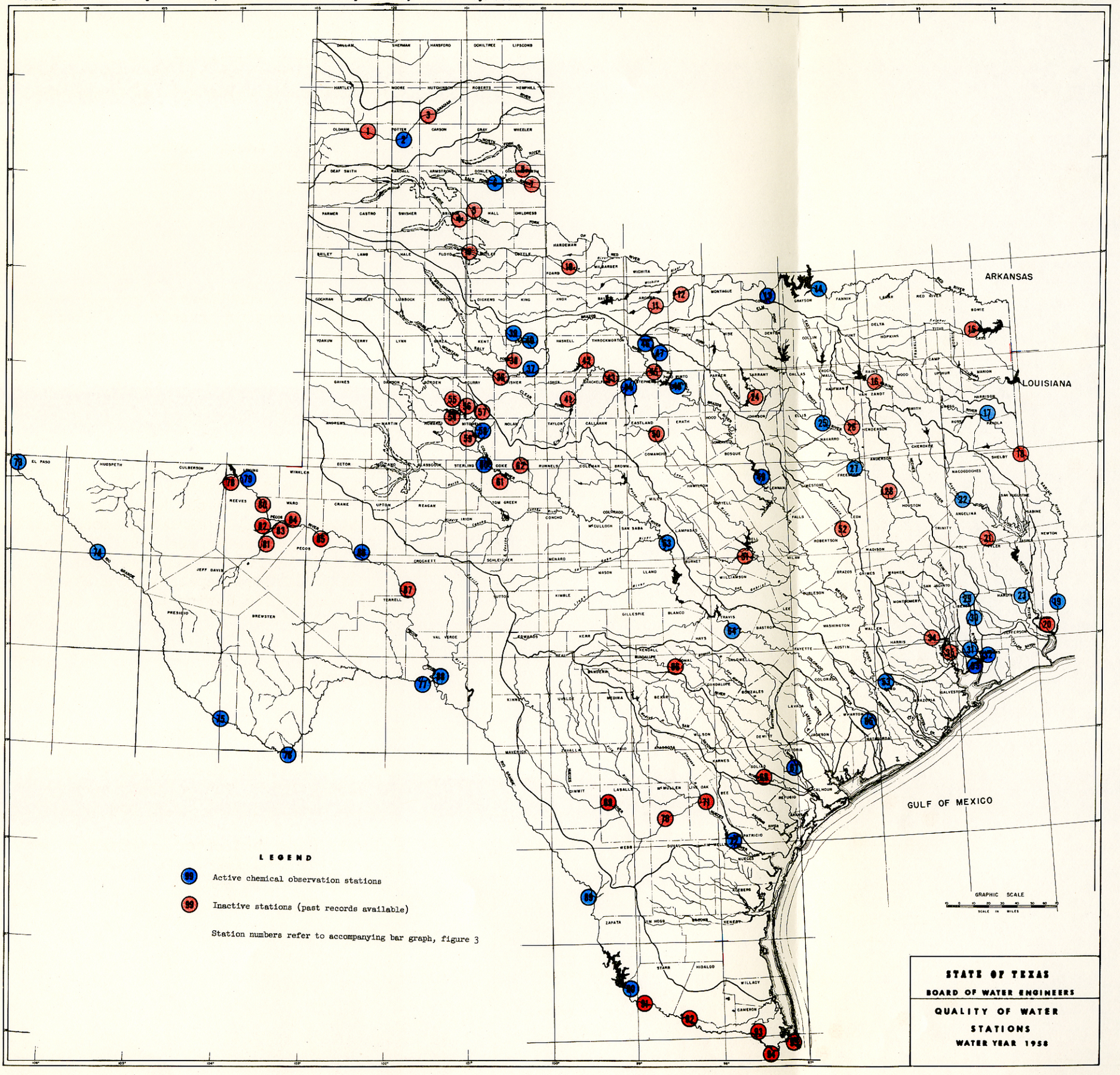
RIO GRANDE BELOW FALCON DAM, TEX.

LOCATION.--Immediately below Falcon Dam, Starr County, 2.5 miles upstream from gaging station near Chapeno, 970.9 river miles below the American Dam at El Paso.
DRAINAGE AREA.--164,482 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 27).
RECORDS AVAILABLE.--Chemical analyses: July 1955 to September 1958.
REMARKS.--Chemical analyses by U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif. Records of specific conductance of daily samples and records of discharge for water year October 1957 to September 1958 given in International Boundary and Water Commission Water Bulletin Numbers 27 and 28.

Chemical analyses, in parts per million, water year October 1957 to September 1958

Month	Number of Samples	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
October 1957	12	3,220	--		55	10	52	--	140	87	64	--	(a)	0.13	370	0.50		179	64	39	1.7	602	8.0
November	6	1,300	--		57	12	54	--	151	94	68	--	0.6	.14	383	.52		190	66	38	1.7	630	8.0
December	10	2,110	--		59	13	54	--	146	99	68	--	(a)	.11	410	.56		201	81	37	1.7	648	7.8
January 1958	5	750	10		60	12	63	5.1	143	110	80	0.6	(a)	.14	426	.58		200	82	40	1.9	689	7.8
February	4	298	--		63	13	62	--	146	114	74	--	.6	.10	427	.58		210	90	39	1.8	682	8.2
March	6	368	--		63	13	63	--	153	113	78	--	(a)	.13	439	.60		212	86	39	1.9	699	8.2
April	12	3,800	--		61	15	65	--	151	118	80	--	.6	.16	454	.62		214	90	40	1.9	724	7.8
May	10	4,230	--		63	13	68	--	143	123	85	--	(a)	.15	473	.64		213	96	41	2.0	740	7.9
June	13	6,850	--		60	13	73	--	137	126	90	--	(a)	.23	470	.64		204	92	44	2.2	756	7.8
July	7	1,290	9		58	14	70	4.7	134	122	87	.6	(a)	.12	461	.63		202	92	42	2.2	737	8.0
August	7	2,160	--		57	14	71	--	133	122	89	--	.6	.13	454	.62		200	91	44	2.2	735	8.0
September	5	3,950	--		55	14	68	--	129	116	83	--	(a)	.08	439	.60		193	88	43	2.1	713	7.8

(a) Less than 0.4 parts per million.


ARKANSAS
LOUISIANA
GULF OF MEXICO
LEGEND
Active chemical observation stations
Inactive stations (past records available)
Station numbers refer to accompanying bar graph, figure 3
GRAPHIC SCALE
STATE OF TEXAS
BOARD OF WATER ENGINEERS
QUALITY OF WATER
STATIONS
WATER YEAR 1958